From: Ulrich Hilger <Ulrich.Hilger@t-online.de>
To: bbemer@wf.net <bbemer@wf.net>
Date: Tuesday, January 25, 2000 1:05 PM

Subject: Re: AllDay

Dear Bob.

below please find the requested information.

Is it a computer program? For what platforms or operating systems?

AllDay is a computer program I originally developed for the Apple Macintosh some year ago. At a certain point in time I decided to discontinue maintenance for the Mac and ported it to Windows. It now is available for Windows 9x/NT while the last version for the Mac still is available.

I created it because I oftenly use these well known little cards that show a whole year on one small page along with lots of basic calendrical information. At the time I created it there was no application which was able to display these overviews of one year with all relevant information about events occuring such as holidays on a computer in a similar layout and graphical complexity. Even today I do not know of any application combining AllDay's current features although there are lots of applications doing partly comparable things in a partly comparable manner.

I wanted to have a tool where I can define my own personal set of events once and for which my mac would display their occurrences correctly for any past present or future year once entered.

I was wondering how these information can be computed in general without relying on support by operating system routines, tables or any other information whatsoever. I started to do my own sort of little research looking for the pure algorithms and basic circumstances making up time and calendar measurement.

Apart from coding basic algorithms it was necessary to invent certain routines for a fast display of such a lot of information at once and in a good graphical layout.

Commercial?

While the last version for the Mac still is freeware, because of the added value of the Windows version, this one is shareware.

Then sold or available where?

The original source of AllDay is my homepage at http://www.calcom.de. From there it can be registered online as well. However, there are a lot of other sources mainly on the web from which the application can be obtained. Some of them I do not even know. Currently I work on setting up a full version of AllDay to be sold through Electronic Software Distribution (ESD) channels.

What are the inputs and outputs?

AllDay shows an overview of any year in either the gregorian or julian calendar system without any input necessary other than the year in question. It computes all relevant information like weekdays and week numbers. For any day of the overview it computes number of day in year, remaining days in year, week number, remaining weeks in year, julian date, jewish date, times of sunrise, sunset, moon rise, moon set, time of next full moon respectively new moon.

It allows input of events which can be repeated in various ways including related to the date of easter or a date in the jewish calendar. Events can be related to a group. Groups can be entered separately with certain attributes such as color and visibility. For proper time computation (sun and moon) the user's location can be entered like the groups in a personal preferences area. Events can be stored in files at the user's choice. File contents can be imported and exported. Aside of events being shown in the year overview an event list shows events sorted either alphabetically by name or chronologically by occurrence. A filter allows to show or hide events related to certain groups. A day calculator can compute the number of days between two dates while allowing to omit certain weekdays and/or days related to certain groups.

Cost to users?

Usage of a single copy of AllDay costs US \$ 20.00.

Principles of operation?

The year overview is built each time the year is changed by computing the weekday of the first day in the year according to the system currently activated (gregorian or julian) and then building a temporary table for the proper date to weekday relation . From the temporary table a graphic is drawn day by day making up the year view taking into account the weekday and possible events for that day. The graphic is built offscreen and then copied to the visible region of the year window to allow for fast partial screen updates.

To show events in the year view, another temporary table is rebuilt each time the year is changed. The temporary event table holds the date in the year displayed for any event in the currently open event file. The table is recalculated by taking the repeat method and base date as an argument and passing it to a set of computation functions (one for each repeat type).

Event files hold the name of each event entered by the user along with the base date, repeat method and group. Groups are stored centrally in a separate file. Language can be changed between english and german and is taken from a text file to allow for easy translation to other languages.

Times of sun and moon are computed using the appropriate astronomical algorithms.

Why is it useful more than any others?

It gives instant access to a calendar with everything in it that is related calendarwise. It leaves out appiontment planning/scheduling by intention and is a pure and complete calendar. Events have to be entered only once to be shown for any past present and future year. Once configured for personal needs it starts almost immediately and shows all relevant calendar information right when it is needed. Having AllDay and a PC, a user hardly has the need to buy paper calendars anymore.

Where would I find the documentation and description? Anywhere on the Web?

It is installed as online help file along with the application, which is available at http://www.calcom.de

If commercial, what company supplies it? Address?

Please refer to http://www.calcom.de

Let me know if there is anything else you like to know.

Best regards Ulrich

CalCom E-Mail info@calcom.de Internet http://www.calcom.de

----Ursprüngliche Nachricht-----Von: bbemer@wf.net An: Ulrich Hilger

Gesendet: Dienstag, 25. Januar 2000 00:18

Betreff: Re: AllDay

Is it a computer program? Commercial? Then sold or available where? For what platforms or operating systems? What are the inputs and outputs? Cost to users? Principles of operation? Why is it useful more than any others? Where would I find the documentation and description? Anywhere on the Web? If

'Father Time' Software Draws Corrections From Readers

To The Editor:

Amterre Management Inc. Philadelphia, Penn. I found the article by Celko and McDonald in the Feb. 9 Software Design section to be both interesting and valid. Unfortunately, it is marred by several errors in the actual procedures.

The COMMENT following the Leap Year label on page 32 is correct, but the condition in the IF should be ((Year MOD 4 =0) AND (Year MOD 100 >> 0)) OR (Year MOD 400 = 0). The FOR clause following

the label Work on the same Month - 12 or actually, IF (Month >1) THEN FOR i=1 page should be for i:=1 PO Month . 1. There are two errors in the block labeled Work on page 33: The second condition should be (Month>2) and the final assignment should be Julianize Two := (Year * 1000)+ Accum-month-table [Month] Day + Julianize Two; Mark Sapiro

City College of San Francisco San Francisco, Calif. Systems & Operations Mgr. Computer Services

To The Editor:

Your readers should be aware of some errors in the "Father Time" article by Celko and McDonald (ISN. Feb. 9).

IF ((Year MOD 4=0) OR (Year MOD 100=0)) AND (Year MOD 400 0) should read IF ((Year MOD 4=0) OR (Year MOD 400=0)) AND (Year MOD The statement that begins:

Also, the statement that

FOR :=1 TO month-table Month-1] should read FOR:=1 Director of Data Processing ro Month-1. .H. Wigdor

The Leapyear section should Joe Celko responds;

Lenpyear: IF((Year MOD 4=0) THEN month-table [2] = 29 AND (Year MOD 100 <> 0) OR (Year MOD 400))

The work section should be: Work: BEGIN JuhanizeOne= 0,

JulianizaOne: = (Year * 1000) DO JulianizeOne: " JulianizeOne + month - table [1]; FOR i= 1 TO (Month -1) + (JulianizeOne + Day);

ounting out the error of my promise to proof articles better My thanks to Les Wigdor for ouys. I sent Les a copy of the original ACM Julianizer. in the future-honest.

-Joe Celko

SOFTWARE DESIGN

Information Systems News - Monday, April 20, 1981

Ways To Handle Periods Of Less

By Joe Celko

in a prior article, the subject of years as data items within a computer data base was discussed in some detail. This article deals with the units of time that

It is worth mentioning as a trivia tem that there is only one unit of time, and that is the second. All of this other stuff you use every day, like year and day, are not regular units in the System Internationale (SI) or "metric system" as we call it in the United States. Computers are not bothered by the diviare one year or less.

sions of a second and think in terms of without any trouble at all. Nobody on "miliseconds" and "nanoseconds" earth thinks in terms of "kiloseconds." in place of "days" as a unit.

kind agreed on days of 12 hours of light ution tried to put in decimal clocks and failed, The Canadian Metric Board experimented with a tenth of a day unit called a "chrona" and dropped it. Why change something that we all agree upon? Because these other units of time For some reason, almost all of manand 12 hours of dark. The French Revo-

are so popular, the SI has them as auxiltary units, and gives them each an official abbreviation. A good reference book on SI should have their abbrevia-

"Ten fifty-seven"? It was always about eleven o'clock" and everyone could, which can be read easier than a Did you ever notice that before digital watches there was no such time as accepted the error. Now it is possible to get a digital watch that will keep better time than any mechanical watch ever mechanical watch and which will cost



Date: From: Department:

January 6, 1959 F. R. Helt, Jr. Applied Programming DPDHO

To:

Department: Location: Miss C. M. Maar Commercial Systems Development WHQ

Subject and/or Reference:

Conversion of Calendar dates to days of the Year

I saw a request in Sales Currents for information on the subject application, and I've worked out a formula which may be of some help. The formula is:

CC:

where:

N is the result of the computation. The integer portion of N, without rounding, is the day of the year.

M is the number of the month, from 1 to 12.

D is the day of the month

K is a constant whose value depends upon the month.

When M = 1 or 2; K = 30.

When M = 3 through 12; K = 32.3.

The above values of K are for a non-leap year. For a leap year, the value remains the same for M=1 or 2, and is changed to 31.3 for M=3 through 12.

frh/ep

F. R. Helt, Jr.

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City College of San Francisco Systems & Operations Mgr. San Francisco, Calif. Computer Services

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pointing out the error of my ways. I sent Les a copy of the original ACM Julianizer. 1 My thanks to Les Wigder for promise to proof articles better in the future-honest.

-Jue Celko

SOFTWARE DESIGN

Information Systems News -- Monday, April 20, 1981

Ways To Handle Deriods Of Less Th

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tid watches there was no such time as "Ten fifty seven"? It was always about eleven o'clock" and everyone accepted the error. Now it is possible to get a digital watch that will keep better time than any mechanical watch ever could, which can be read easier than a Did you ever notice that before digimechanical watch and which will cost

less. This makes people of more and more as

As computers become active, the rate of increase and more and will need to have time entries.

In Europe, the periodate hours, minutes andisplay format, who States would use a cwhat do you expect use a comma for a de-

But the real difference of 24-hour or "nopposed to the a.m.-p.s. the United States. Contact Clocks are making more and more committee."

ANSI standard X. both the 12- and 24 tions. Both representativerees, "A" and "P" a meridiem (not meridian, the right of the 12 hour 24-hour scheme, 00:000 the day and 24:00:00 is

This is amplified in X3.51-1975, where Gr. Time (Universal Time) the right-hand side presentation. The lases the string "spa a meridiem designatural Time.

It is useful to have a local time in relation. Time. The displacemens shown as a four-digit senting hours and minor minus sign in front differential factor (TD) it he right of the local ti-1200 to +1300.

In ANSI standard time zones in the Unthree letter codes, who associated with them with "ST," which markers." There is also set of three-letter codewhich means "David

example, "EST" is "Easte Standard Time" and it has TDF equal to -0500; "EDT" "Eastern Daylight Time" a it has a TDF of -0400. This how daylight savings time handled

The standard calendar is universal standard. We a have universal agreement that there are seven days in veek, too. The day of the we n be calculated by taking Julian date, and dividing by seven. The remaind would then map into a day the week.

direct calculation is given in the following pseudo code.

STRING FUNCTION Dayof-week (INTEGER Year, INTEGER Month, INTEGER Day);

COMMENT Year is given as four digits. The DIV operator is integer division. MOD is the remainder function. The Boolean function LeapYear explains itself. The function is valid from the 1700s through 2100s;

BEGIN EXTERNAL BOOLEAN FUNCTION LeapYear; STRING ARRAY DayName [0:6]

INIT ("SUN", "MON", "TUE", "WED", "THU", "FRI", "SAT");

INTEGER ARRAY Date-Table [1:12]

INIT (0, 3, 3, 6, 1, 4, 6, 2, 5, 0, 3, 5);

INTEGER ARRAY Century-Table

[17:21]

INIT (1, 2, 0, 6, 4); INTEGER Century, Year-in-Century, Result;

IF (LeapYear(Year))
THEN BEGIN Date-Table
[1]:= 6;

Date-Table [2] = 2; END;

Century: Fear DIV 100; Year-in-Century: Fear -(Century * 100); Result: Century-Table [Century]

- + Year-in-Century
- + (Year-in-Century DIV 4)
- + Date-Table [Month]
- + Day:

Day-of-Week := DayName [Result MOD 7]; END.

This algorithm was supplied by Gail Higgins, an Atlantabased consultant, who found it years ago in a puzzle book. She first used it to save a client who had two possible methods of finding the day of the week: (1) Carry it in every record and rewrite the entire system to reflect the record format change (2) Julianize every day of the year and start counting from the front of the year with a table look-up scheme The standard calendar has twelve months, but mankind never did agree on how to write a date. A computer needs to be able to convert the three-letter shorthand for a month name into the numeric value of the month. This is very handy for an interactive program taking in data from untrained users.

Richerd Cichelli developed a perfect hashing technique and gave this algorithm as an example of it in the January 1980 issue of Communications of the ACM. A perfect hashing

has two properties: (1) It always hits the desired value in the hash table. (2) There are no emply records in the hash table.

INTEGER FUNCTION.
Three-Letter (STRING Month-

COMMENT Month-name is the three letter month abbreviation:

BEGIN INTEGER ARRAY Numeric-Value [1:26]

INIT (4, 5, 2, 0, 0, 0, 3, 0, 0, 0, 0, 6, 0, 6, 0, 5, 1, 0, 6, 0, 6, 0, 6, 0, 6, 0, 6, 0, 6, 0, 5, 0);

INTEGER ARRAY Numeric-Value [0:11]

INIT (6, 9, 12, 8, 1, 2, 7, 4, 10, 5, 3, 11);

INTEGER Second-Place, Third-Place:

COMMENT The ORD function returns the numeric position of a letter in the alphabet so that A=1, B=2...Z=26. SUBSTRING (i, text) return the i-th character in the string named text.

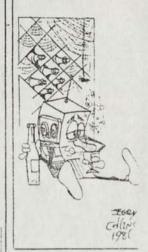
Second-Place := Alpha-Value [ORD (SUBSTRING (2. Month-name));

Third-Place = Alpha-Value [ORI) (SUBSTRING (3, Month-name))

Three-Letter - Numeric Value | Second Place -Third Place |

This is a cute algorithm, lawith such a short list of posble values, but unless it is writen in assembly language, with a good optimizer, it proably is not worth the trouble

The first man to think of puting the day of the year on the bottom of the pages of calendar did a great favor The following algorithm will take a month and a day a input and then return the du of the year. It operates by making a quick first hack at thanswer and then tuning it fo the actual months.



INTEGER FUNCTION Day-of-Year (INTEGER Year, INTEGER Month, INTEGER days;

BEGIN EXTERNAL BOOLEAN Valid-date LeapYear:

IF (Valid-date (Year, Month day)
THEN

BEGIN Day-of-Year: TRUNCATE + 40 4-75 (month + 1 0 - day)

IF (Month > 2 THEN Day of Year: Day of Year + 2 If (Month > 5 THEN Day of Year + Day of Year +) IF (Month > 6 THEN Day of Year: Day of Year

IE Mentis THEN Do a Year Day of Year William Year Year AN

THEN David Year Day-of-Year

end et sk tragative

ELSE Day-of-Year = 0 END.

Potential contributors to: Software Design section show contact James Ludvit. Intention Systems News East State Road, Marthus

PROPOSED AMERICAN NATIONAL STANDARD

Representation for Calendar Date for Machine-to-Machine Data Interchange*

CACM EDITOR'S NOTE

A previous version of this proposed American National Standard was published for public comment in COMM, 11, 4 (Apr. 1968). It was subsequently sent out by American National Standards (formerly USASI) Committee X3, Computers and Information Processing, for letter ballot. A number of comments were received with the responses, and these were submitted for evaluation to the author of the proposed standard, Subcommittee X3.8, Data Elements, Codes, and Formats. As a result of their deliberations, X3.8 withdrew its support of the original version and drafted the current one. This version, published here, is substantively different from the original in that alternative representations for calendar date are provided to include century and ordinal type dates. The section of the original version entitled "Expository Remarks" (which is not part of the proposed standard) was not changed substantively, and is therefore not reprinted here.

This proposed American Standard has been accepted for publication by American National Standards Committee X3. In order that the final version of the proposed standard reflect the largest public consensus, X3 authorized publication of this document to elicit comment and general public reaction, with the understanding that such a working document is an intermediate result in the standardization process and is subject to change, modification, or withdrawal in part or in whole. Comments should be addressed to the X3 Secretary, Business Equipment Manufacturers Association, 235 East 42 Street, New York, NY 10017 .- C.K.

Key Words and Phrases: calendar date, machine-to-machine interchange, month, year, day, representation coded CR Categories: 3.70, 3.73, 3.74, 3.9

Foreword

(This foreword is not a part of the American National Standard Representation for Calendar Date for Machine-to-Machine Data Interchange.)

This proposed American National Standard presents a standard representation for a calendar date for use in the interchange of data from machine-to-machine among data systems.

1. Purpose and Scope

1.1 The purpose of this standard is to provide a standard means of representing a calendar data to facilitate interchange of data between the machines of data systems.

1.2 The scope of this standard is limited to such interchange of data between the machines of data systems.

2. Specifications

2.1 Calendar date is a representation composed of the time elements year, month of year, and day of month.

2.2 Year shall be represented by the two low order digits of the conventional numeric representation of the Gregorian calendar year.

2.3 Month of year shall be represented by the ordinal numbers 01, 02, 12, representing the first through the twelfth months.

2.4 Day of month shall be represented by the ordinal numbers 01, 02, 31, representing the first through the thirty-first days.

2.5 The sequence of the time elements shall be from high order to low order (left to right), year, month of year, and day of month.

2.6 No separators shall be used between the time elements.

* ANSI (USASI) Document X.38/139, 1969 January 22; X3.8.2/122, 1969 January 21.

3. Example

3.1 1967 July 1, 1 July 1967, and July 1, 1967 would be expressed as

4. Qualifications

4.1 In certain applications it may be necessary to represent the year by its full four digits. In these instances the calendar date may be represented as an eight character string of digits wherein the high order four digit (left most) represent the year, e.g. 1967 July 1 would be represented as

4.2 The ordinal representation of the day of the year in lieu of a monthday of month representation is commonly used in applications where frequent computation is employed to determine the number of elapsed days between two dates. In these instances the day of the year should be represented by a numeric string of three digits wherein January 1, the first day of the year would be represented as 001, through December 31, the last day of the year, which would be represented as 365 (366 in a leap year). This three digit representation of the day of the year may be used with a one, two, or four digit representation of the year to yield the identification of the date (Ordinal Date). e.g. 1967 January 1 would be represented as 7001, 67001, or 1967001 depending upon the requirements of the specific application.

4.3 The time elements, year, month of year, day of month, and day of year may be represented and used independently or collectively as required. When used collectively the high to low sequence must be maintained. i.e. year-month of year, month of year-day of month, yearmonth of year-day of month, or year-day of year.

4.4 In the interchange of data between data systems it is essential that the sender provide the recipient of the data a description of the format and contents of the data involved. When calendar dates are involved in interchange, the specific representations employed must be fully described.

4.5 This standard does not specify standard means of representing calendar dates for man-to-machine (or machine-to-man) or man-to-man interchange. The representations of calendar date in these environments will be the subject of future standards now under consideration.

APPENDIX

(This Appendix is not part of the foregoing standard, but is included to facilitate its use.)

Al. Intended Use of the Standard Representations

A1.1 The Standard Representation for Calendar Date is intended for use in interchange of data between the machines of data systems. This interchange is the counterpart of the present interchange of conventional business transaction documents: bid requests, purchase orders, invoices, shipping notices, payments, etc.

A2. Projected Standard Representations for Time Elements

A2.1 The Standard Representation for Calendar Date is intended to be a member of a family of representations for time elements to be developed for the full range of needs for representing time elements in the interchange of data.

A22 Additional members of the projected family of data codes for times include the following:

1. Year and week of year.

2. Julian Day number.

3. Year and quarter of year.

4. Time of day carried to hours, minutes, seconds, and time zone.

5. General time intervals. These are arbitrary intervals and intervals corresponding to established units of calendar and civil time

6. Period-to-date intervals. These are-special cases of (5) above. The period for which the to-date interval is to be identified may be, for

example, a year, half-year, quarter-year, month, or week.
7. Times of the type "This time period last year" where the time period may be, for example, a day, week, or month.

américan national standards committees

X3—computers and information processing

X4—office machines and supplies
operating under the procedures of the
American National Standards Institute

doc. no. : X3L8/225

ete: : 1980 May 2

project :

reply to :

MEMORANDUM FOR Membership of X3L8, Representations of Data Elements

Dear Members:

The attached document ISO/TC97/SC14/N215 - Revision of ISO 2711, Representation of Ordinal Dates, is being provided to the membership of X3L8 for review and comment. Comments should be submitted by May 30 to:

Administrative Secretary, X3L8 C.B.E.M.A. 1828 L Street, N.W., Suite 1200 Washington, D.C. 20036

202/466-2298/99

Sincerely,

Catherine A. Kachurik

Attachment

1980 April 16

P, O and L Members

REPRESENTATION OF DATA ELEMENTS 1SO/TC 97/SC 14

Secretariat: USA (ANSI)

Dear Members:

Subject: ISO 2711 - Information Processing Interchange --Representation of Ordinal Dates

ballot on the same question. Switzerland submitted a proposal for revision (97/4 M 215) that was supported by France. When Scii was advised of Switzerland's proposal, Germany and Gunada supported it. In October 1979, TC 97 reviewed the altuation with 150 Central Secretariat: 3 "PM" sembers of SC 14 supporting the revisions submitted by Switzerland. Central Secretariat advises SC is to revise 150 2711. In March 1978, SC 14 was issued a letter ballot on the question of the S year review of 180 2711. The results of the balloting wave circulated in 97/14 N 206. Next, TC 97 was advised of the results and asked to

approve the revision of 150 2711 based on the Swiss proposal 97/14 N 215. If fossible, please expedite the voting so that the voting may be discussed at the June smetring in Stockholm. Enclosed is a 60 day letter ballot asking the members of TC 97/SC 14 if you

Clerchronger Sincerely,

Secretariat ISO/TC 97/SC 14 Alice Droogan

> AD/MC Encl.: 97/14 N 206, 215 Letter ballot

american national tandards institute, inc. 1430 broadway, new york, n.y. 10018 (212) 354-3300

LETTER BALLOT

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on the Revision to 130 2711 - Information Processing Interchange - Representation of Ordinal Dates - based on the Swiss proposal 97/14 N 215.

This letter ballot is to be returned, by each "P" Member, to the 1SO/TC97/SC14 Secretariat, by 1980-06-1.

............

We approve the Revision to ISO 2711 based on 97/14 N 215,

We approve the Revision to ISO 2711 based on 97/14 N 215, though making certain comments of an editorial nature.

or

We disapprove the Revision to ISO 2711 based on 97/14 N 215 for the technical reasons attached to this letter ballot.

We abstain from voting. (The P Member Bodies have an obligation to vote.)

Place and date

Signature

Delete whichever does not apply.

215 ISO/TC 97/SC 14 N 2157 Hay 9, 1979

To: P, O, and L Members

ISO/TC 97/SC 14 REPRESENTATION OF DATA ELEMENTS

Secretariat: ANSI (USA)

Dear Members:

In March 1978 the Secretariat circulated a letter ballot on ISO 2711 to determine if it should be confirmed, revised or withdrawn. As a result of this ballot, it was the recommendation of SC 14 that ISO 2711 should be confirmed (doc. 97/14 N 206).

These results were subsequently forwarded to TC 97 together with a letter ballot. The results of the TC 97 tetere ballot were. Il in favor of confirmation and 3 in favor of revision. Catchealowkis had voted for revision but did not submit any proposed revision. Switzerland voted for revision and submitted the attached proposal for that revision. France voted for revision and indicated their support for the Swiss document.

Based on the above results, the ISO Directives would indicate moving the document forward for confirmation. However, before that step is taken, the Secretariat requests member bodies of SC 14 to comment on the Swiss proposal.

Please submit comments to the Secretariat no later than July 15, 1979.

Sincerely,

Trance & Schutte.

Secri

FES/hs

cc: H. White, Chan 97/14

PROPOSAL FOR THE REVISION OF ISO 2711 by SNV (Switzerland) - January 1979

F. .

Tierr

It is proposed to change the title to read:
Representation of ordinal dates for data interchange between data processing systems.

2. Scope

It is proposed to change the Scope to read:
"This international Standard establishes a system of representing ordinal dates to facilitate the interchange of data among data processing systems.

It does not apply to information interchange between humans or between machines and humans.

· Field of Application

It is proposed to change the Field of Application to read;
"This International Standard shall be applied only where
representations of ordinal dates are used in the interchange of data among data processing systems.

The ordinal date is commonly used in cases where machines are frequently utilized to carry out a systematic sorting in the order of succession of dates or to determine the number of days clapsed between two dates.

This International Standard does not apply to any other

· Reference

It is proposed to cancel the reference.

· Justification

If considered as a specialized standard, i.e. as a standard data becosed when data containing dates are exchanged between sorting operations according to date, them maybe IS 2711 is a useful standard. However, this should be made between and the reference.

5.2 The reference to 150 2014 is undesirable because this standard addresses interchange of data containing dates between newhors and between machines and humans. 1S 2711 should in between machines.

We believe that the revision of 18 2711 should not be undertaken in isolaten but should be performed together with that of 18 2014. To better understand this request, it is necessary to refer here to 180 2014 in more detail.

although we realize that 18 2014 is not the prime object

· Reasons for revising 1S 2014 when revising 1S 2711

bill Whilst we have voted in favour of 15 2014 in 1975, we now find after about 3 years of existence that it has a number of very undesirable side offerts due to a main weakness. In the Introduction of 15 2014 it is stated.

"... it is considered that similar confusion does not arise when the month is spelled out, either in full or in abbreviated form."

This paragraph is followed by two paragraphs listing the alledged advantages of the so-called descending order. It is nowhere specified that as soon as the month is spelled out by means of letters no order is recommended by the standard.

6.2 We believe that the lack of such a clause has augmented the number of different ways of writing date, and led to such monstruosities as:

1978 December 25

Which correspond to no common usage and is just an arbitrary creation unfortunately derived from 1S 2014. We propose therefore to include in 1S 2014, when revised, a statement like the following:

"As similar confusion cannot arise when the month is spoliced out, either in full or in abbreviated form, this international Standard does not apply in this case. It is then recommended to use the method of writing date which is customary for the writer. Some advantages of the descending order may apply in the case of all-numeric form."

6.3 We have other editorial queries, which we will present later.
6.4 Finally, we wish to state that IS 2014 is presently not and reason is that it is going against the habits of people in furope as well as in America or elsewhere. It has been drafted essentially for the benefit of machines, not of people, as the specific advantages listed presently in IS 2014 make it quite clear. This justification for a standard is more and more rejected by the public and standardization bodies should take this into account.

6.5 This is clearly perceived by the PTT administrations. The enclosed Sheets show that numerous postal administrations have eretained their usual way of indeading datases (either all-numeric arabic digits or mixed arabic-roman digits, or alpha-numeric form). We have found none having changed to

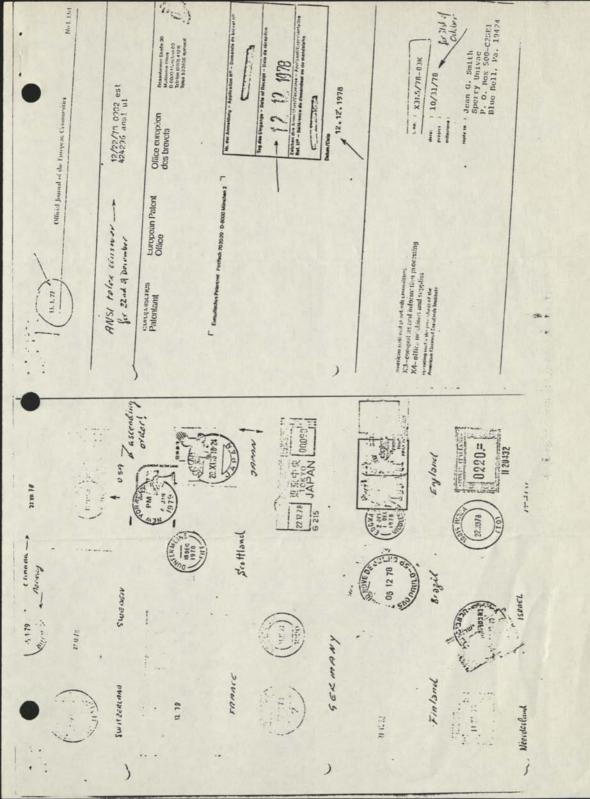
Also the European Communities in their letters or in the Official Journal or the European Patent Office use the European customary form. The acknowledge answer of the telex machine of ANSI uses the US customary all-numeric way, as well as some of the ANSI/X3 technical sub-committees and HEEL, or they use letters for the month (but the whole date in ascending order).

Conclusion

We helieve that all this justifies amply our proposal to revise IS 2211 and at the same time to consider at least the revision of IS 2014, if not its withdrawal.

Encl.: ment.

4 . 4



for 31st of December. COMMISSION OF THE EUROPEAN COMMUNITIES Des 20 December 1978 Directorate Ceneral Protect DISY TG2

READER COMMENTARY/ Robert L. LaFara

Should Not Be Based on Tricks Programming

Cornish's appland R.A. Cornish's in developing the TCIF algorithms [CW, June 4] and enjoyed determining how they ner that I enjoy working other work in much the same manpuzzles. skill

However, a puzzle should not be suggested to be used as part of a program. This type of algorithm is a prime exam-

ple of the type of program-ming that we should try to avoid because it depends on tricks.

Cornish has discovered some interesting "facts." For example, if we represent each month number by a 4-bit bi-nary number, then those nary number, then those months where the first and last bits are different are the

months that have 31 days, It is incredible (maybe even diabol-ical) that anyone would use Without extensive documensuch a fact in a program.

gorithms are especially effi-cient in the use of computer It was implied that these alstand.

that implication. I suggest the following methods which do not require much space and will result in a less obscure memory. I seriously question 15 tation, such a program is nearly impossible to under-

In place of Algorithms 1, 2 and 3, use a table lookup. Only 12 memory locations are required to store the day num-ber of the first day of each use a table lookup. program.

month for nonleap years. A test to see if the year is a leap determine if a day needs to be added. The same table can be year and a test to see if the month is March or later will used to convert from mo/day convert from day-of-year to and to day-of-year

mo/day. To find the day of the week If the program only needs to may be a little more complex. years, then a table giving day-of-week for Jan. I of each year can be used in conjuction with do this over a short span of day-of-year to find the day-of-week.

known method and can be documented with the simple statement: "THE FOLLOW. 1965, p. 255.) Although Zeller's congruence depends on certain "tricky" relations between the variables, it is a ING CODE IMPLEMENTS
ZELLER'S CONGRUENCE
FOR DETERMINING DAY. If a long span of years is in-volved, it may be more effi-Gruenberger and George Jaf-fray, John Wiley & Sns, Inc. (See Problems Zeller's Solution, nse omputer to gruence. cient

mod 7, where m is month (March is 1, April is 2, and so on, and January and February are 11 and 12 of the previous For the interest of persons not familiar with Zeller's conyear), k is the day of the month, D is the year of the century, and C is the century. gruence, it is: f=[(2.6m-0.2)+k+D+(D/4)+(C/4)-2C] indicate greatest integer in" and mod 7 means find the remainder afbrackets ter dividing by 7. OF-WEEK." Square

For example, on what day of the week will Jan. 1, 1980 occur?

f=[28+1+79+19+4-38] f=[(28.4)+1+79+(19.75)+ (4.75)-38] mod 7 m=11, k=1, C=19, D=79

f=[93] mod 7

days are numbered

Sunday=0, and so on. Therefore, 2 is Tuesday. If the computer being used allows only integer arithmetic, the expresimple-Naval sion (2.6m-0.2) can be in mented as [(26m-2)/10]. LaFara is with the

Avionics Center in Indianapo-lis, Ind.

000 FOR JAN |
$$i=i-1$$
 | 1979

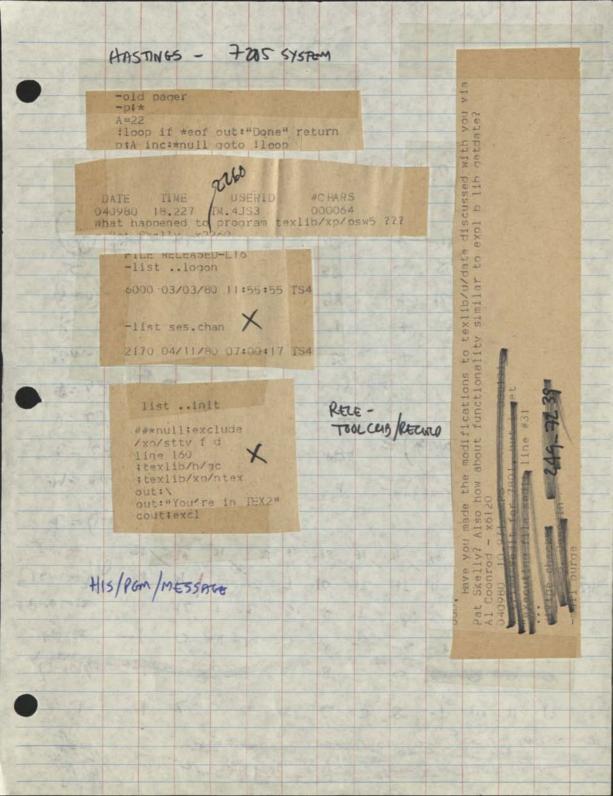
 $k=1$
 $\Delta = 78$
 $Oow = (i]i+i/400 - (2*i/100) + (5*0)/4) + 1]/7$

1980 $D=79$
 $4-38+98+1/7$
 $103-8=65/7=12$

THE SPECIFICATIONS FISCOL DAY IF WE DION'T HAVE THE PARTIMOUND OF THE FISCAL YEAR TO WORK ABOUT, THE DAY OF THE WEEK CAME BE OBTAINED BY ZEUDE'S CONGOVENCE [?]. & REPORTED IN CONGUTERLY works can be improved, However, with THE (J-14)/12 TECHNIQUE OF t= (J-14)/12 (-1 FRE JON & FRES, O OTHERWASE) GR +RMPR * RMORE (i= YR) = MO K= 00 7 = (* RMOR * 13 + 155)/5 (ZELLEN HOD JAF IN MEN. YR) C= i'32 (= i/10) EN) + (4/64) + (4) + 3 + 70 NO + 6 + N d 40 [3] CONFUIRCHIAND GRANGEROM, ETC.

IF LATE FRONT HONE THE MISCAN TO WHOLE ABOUT COVER BY MODIFIED ZELLES CONGOVENCE 1234567891 0 6 6 U-14/12 -1 10000 Kange -1 0 -11-10-9-8-7-6-5-4-3-2 +PMON12 11 12 1 2 3 4 5 6 7 8 9 [26m-2] 10 28 31 2 5 7 10 12 15 18 20 20 31/28 31 30 31 30 31 31 10/11/30 31 t= (-14)/12 (INTEGER) -= (13m-1)/5 M= * xmor+12 = (*RMORX 13 + 155)/5 i=i+t 9= 13'2 79 4= i'J2 19 26m-2=280 /10= 28 (5 x0)/4 (+1 800 YE, +2 ON LEDGS) 98 127 2c = 2*(i/100) 38 89 (45 W × 400) = 4400 93/7 xeroe= 2 4

BUT GAME A SLAPPED OF O, NOT 7





Olle Sturen, Secretary-General of ISO

our date 1979-02-08 your date 1979-01-25 our reference ISO/2015 your reference pak

Mr. R.W. Bemer
Honeywell Information Systems
P.O. Box 6 000
Phoenix, Arizona
U.S.A.

Dear Bob,

Thank you very much for your letter with attached copies of your perpetual calendar. I am very pleased to see this application of one of our standards and have kept for my personal use one copy of the calendar. It is not, however, in line with the ISO policy to add the application of a standard to the standard itself; we rather like to see the ISO standards keep dealing with the principles to be followed.

In spite of my negative response to your precise proposal, I am happy that there is no copyright and therefore that we may be free to use the material if we find other means.

With best regards,

Yours sincerely,

Olle Sturen

```
jd1=1461*(i+4799)/4-31738-3*((i+4899)/100)/4 (8)
jd=jd1+ord-1 (9a)
ord=jd-jd1+1 (9b)
jdord=1461*(i+4799)/4+ord-31739-3*((i+4899)/100)/4 (10)
```

As a curiosity, Julian Day 0 is found for Nov 24 of the year -4713 (yes, minus!), but that's not what the calendar said then. And if you go into more detail with Julian days, remember that they start at noon Greenwich Time.

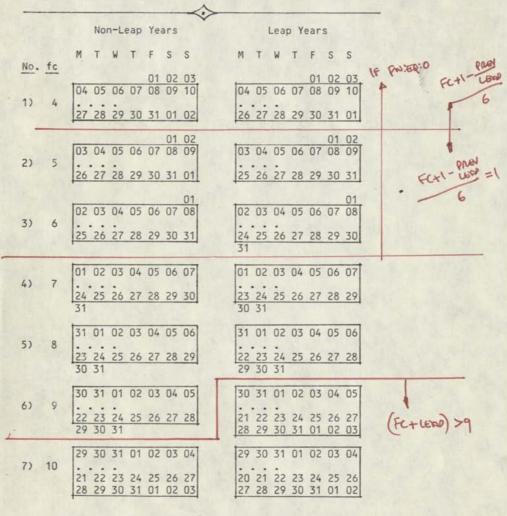


Figure 1. Possible F-Year Patterns

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Year of Decade

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Honeywell

LARGE INFORMATION SYSTEMS DIVISION

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Close the gap to remove February 29.

Two digits signify a leap year. Use the FY calendar of the first digit through February 28; then the FY calendar of the second digit for the balance of the year. Use the lefthand fiscal Week number for FY calendar 1 only for case 7,1.

Chercher le numéro du calendrier dans la table Mode de gauche. Un chiffre simple indique une année d'emploi non bissextile. Utiliser le calendrier Affannée fiscale) correspondant à ce chiffre. Refermer l'espace pour supprimer la 29 février.

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## Honeywell

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d'emploi

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2 chiffres indiquent une année bissextile. Utiliser le calendrier AF correspondant au premier chiffre jusqui 28 Février; puis le calendrier du deuxiène chiffre pour la reste de l'année. Utiliser le chiffre de gauche de 7,1 seulement. la semaine fiscale du calendrier de l'AF 1 pour le cas

## Honeywell

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Chercher le numéro du calendrier dans la table de gauche. Un chiffre simple indique une année d'emploi non bissextile. Utiliser le calendrier AF (année fiscale) correspondant à ce chiffre. Refermer l'espace pour supprimer la 29 février. 2 chiffres indiquent une année bissextile. Utiliser le calendrier AF correspondant au premier chiffre jusqu'au 28 février; puis le calendrier du deuxième chiffre pour la reste de l'année. Utiliser le chiffre de l'année. Utiliser le chiffre de l'année. Utiliser le chiffre de gauche de la semaine fiscale du calendrier de l'AF 1 pour le cas 7,1 seulement.

## Honeywell

LARGE INFORMATION SYSTEMS DIVISION

PERPETUAL FISCAL CALENDAR (design by ByBemer)

## ACCESSORIE

## Perpetual calendar time scheduler

Time Master is a perpetual calendar to determine the day of the week for a future date. With the turn of a dial, you can find instant answers to essential planning and scheduling



questions such as: the number of business days available between any two calendar days—for a 5-day or a 6-day workweek; the number of calendar days between any two dates; and the number of 7-day weeks between two dates. In addition, Time Master also gives a table of changeable holidays and Leapyear adjustments. Price is \$3.95.

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## INTERFACING FUNDAMENTALS: AN INTRODUCTION TO REALTIME CLOCKS

Christopher A. Titus and Jonathan A. Titus Tychon, Inc

David G. Larsen and Peter R. Rony Virginia Polytechnic Institute and State University

n many microcomputer applications the computer must perform actions at accurately timed intervals. This allows the computer to make accurate measurements of an analog signal at specific intervals, for example, at 100 ms. This 100-ms period may be "timed" through the use of a time-delay loop in which software commands are used, or through the use of an external clock of some sort.

At this point, it may be realized that while a time-delay software routine may generate a delay of the required accuracy, the computer can do nothing else while it is performing the timing software steps. This is a serious limitation. Although probably less obvious, the time-delay software steps may be interrupted by some external device that requires immediate servicing by the computer. The overall effect is to "lengthen" the time required for the time-delay software steps. The actual time delay would be the sum of the time spent in the software steps and the time spent servicing the external interrupt.

In most instances in which accurate periods are required, an external circuit is used to time the necessary periods with as little interaction between the computer and external clock as possible. Such clocks are immune to external interrupts and to changes in the normal flow of a program. Once started, they continue to time a period until it is completed and the time is up. In this way, the clock runs in parallel with the computer; the computer then can perform other tasks and service interrupts while the clock is running. This type of external clock is often called a realtime clock, since its time is real, in that it cannot be altered or delayed by events that would normally affect a program.

There are several types of realtime clocks, indicated by the following listing.

Programmable Realtime Clock—The actual required period is preprogrammed within the clock through either hardware or software. Once the clock has been started, it continues timing until the period has ended. At the end of the period, the clock signals the computer that the timing task has been completed.

Free-Running Realtime Clock—Running continuously, the clock signals the computer at the end of each period. The periods generally are of equal length, for instance 10 ms.

Time-of-Day Clock—This type of clock will provide the computer with the actual time, eg, 16:20 hours; however, it is not frequently used in small computer systems.

The concept of realtime has been introduced subtly in previous columns. Operation of an 8085 based computer system, use of the 14-bit timer contained within the 8155 read/write memory, and a description of an interface chip in terms of its realtime operation have all been covered. An excellent example of a programmable realtime clock is the 14-bit counter used in the 8085 based computer. It obtained its time base from the crystal clock that controlled the microprocessor chip; an interrupt was used to signal the end of the timing period. Assuming that a frequency of 1 MHz was used to control the clock, a 14-bit counter could provide a total count of 16,384 µs, or just over 16 ms. This might be somewhat limiting if periods of several seconds are required, but the scheme is fairly flexible. If longer periods are required, the 14-bit counter could be programmed to time some integer fraction of the period and the computer could be used to total the number of shorter periods that are required for the entire period to have elapsed. The computer would only have to increment and test a count each time the clock interrupted it. One drawback to this is that additional software is required, something that the use of realtime clocks was intended to avoid in the first place; however, the additional program steps are quite minimal.

In many cases, it would be valuable if the realtime clock could be preset for the clock's basic frequency, eg, 1 MHz, 10 kHz, etc, as well as for the actual count. If these various intervals were available, the timing of longer periods would be relatively easy and no additional software steps would be required. A simple series of divideby-10 counters such as the sn7490 or sn74390 could be used to divide a high frequency clock signal into lower frequencies for use by the realtime clock's counters. Various frequencies could be selected readily through the use of jumper wires on the computer board. A more sophisticated realtime clock scheme could use an electronic switching circuit that would allow the computer itself to select the frequency required. Thus, a programmer could select the basic period and the actual count through software commands to the realtime clock.

Freerunning realtime clocks are preset to time a period of predetermined length, perhaps 10 ms. This period is timed over and over again, interrupting the computer each time that a period has been completed. In many computer systems, the line power frequency, 60 or 50 Hz, is used to provide a very stable, fixed-length period that may be used equally as well. The freerunning type of realtime clock is not as independent of the computer (eg, software control) as is the programmable realtime clock. Software steps to accumulate the number of periods are still required, and the total timing period may have an error of up to two of the basic frequency periods.

Since freerunning realtime clocks have a regular period, they are often used to signal the processor that it is time to start a software routine that will check various input/output devices to determine whether or not they require some computer service. Through the use of a software table, the computer can check to see what devices are enabled or disabled, and it can also determine the frequency at which they must be checked. It is useless to check a 10-char/s teletypewriter every 10 ms; instead, it would be checked every 80 or 90 ms, while a faster device is checked at the end of each 10-ms period. Such a scheme allows computer and programmer flexibility in the way that realtime operations are handled, particularly for situations in which the computer must perform many realtime operations simultaneously.

In almost all cases, the computer and realtime clock are connected by an interrupt signal. In this way, the clock can immediately signal the computer that the current period has been completed or "timed out." Since interrupts can be quite complex, as has been described previously in these columns, only one realtime clock should be used with a microcomputer. It will be up to the user to determine the priority, and thus the importance, of the realtime clock. Often it is assigned the highest priority.

Unfortunately, there are few, if any, realtime clock interfaces available for the Intel/National Semiconductor 8080 based microcomputer boards, or for the S-100 microcomputer systems. A future column will deal with the hardware interface for a programmable realtime clock, in addition to the software.

This article is based, with permission, on a column appearing in American Laboratory magazine.



## See the exciting 16-bit world of Alpha Micro at your local Alpha Micro dealer.

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## Honeywell

LARGE INFORMATION SYSTEMS DIVISION

## HONEYWELL INTEROFFICE CORRESPONDENCE

ENTER MAIL STATION NUMBER AFTER EACH NAME

DATE January 24, 1972

cc: R. W. Bemer - PHA

то

Ray Spratt - Minneapolis

L. Foster - MPL

FROM

Eric H. Clamons - Waltham

DIVISION

SUBJECT

As per our telephone conversation, enclosed is ISO Recommendation R2015, Numbering of Weeks, and a marked up ISO Fiscal Calendar as it would appear if Honeywell had adopted it.

You will notice the only difference between our calendar and this one is that the weeks are numbered by a different week number in 1972. Beginning with 1973, we would be in phase with the ISO calendar and continue from then on with that method of numbering the weeks. Therefore, our accounting procedures would not be affected by adopting the standard. Note, only the numbering of weeks in a year are standard.

We are trying to issue a standard to our operations because the ISO numbering is different from that of Honeywell. Since many of our Engineering Directors and managers come in contact with both the Honeywell fiscal calendar and the ISO fiscal calendar, we foresee a possible area of confusion. We would like to avoid that.

Mr. Robert W. Bemer of Phoenix is trying to write a feature article on the subject and will be communicating with you separately about establishing a calendar five years in advance.

May we have your earliest consideration on this matter.

Eric H Clamons

Eric n.

EHC/ms Enclosure

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Eric - for your checking. 1 copy is to return with any errors indicated. Jim Wilde says that a Finance Dept might be sold easier if the line was moved up between Aug-Sep and Nov-Dec. giving 4-4-5 all the way thru, but I applied the turn of the year rule on the premise that they weren;t about to buy it anyway. What do you think? I sent a copy to Sturen for verification. jup, agreed lest see foot note.

RECEIVED

1972 JAN 11
ERIC H. CLAMONS

INTER-OFFICE AND INTER-	DEPARTMENT MEMORANDUM	
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## 1972 ISO FISCAL CALENDAR 1972

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## Honeywell

September 2, 1971

Mr. Olle Sturen Secretary General International Standards Organization 1, rue de Varembe 1211 Geneva 20 Switzerland

Dear Mr. Sturen:

Mr. Bemer recently wrote you concerning fiscal calendars. Attached please find a marked-up copy of how one might lay out the calendars. Also, for your purposes, it may be better to number the weeks properly but to show the months separately rather than run together since the standard does not refer to standard fiscal months, only to years. I have also marked up the Appendix to R2015 to show that there is a mistake in print which you can verify from the first attachment.

Yours truly,

Eric H. Clamons

EHC/ms Attachment

cc: R. W. Bemer

A piecemeal approach to calendar reform may be more promising than a general wide-ranging effort—especially for accounting purposes.

# ONE EIGHT-DAY WEEK WOULD IMPROVE THE CALENDAR

BY HOWARD C. GREER

REMEMBER Pa and Ma Kettle? They were those bucolic bumblers first introduced in Betty MacDonald's sometime best-seller, *The Egg and I*, and later immortalized in a television series bearing their name.

Pa Kettle, you may recall, had a disastrous experience with his back-yard water tank, which was perched on a wooden framework, out near the barn. Needing a foot-long piece of 2x4 lumber for some odd job, he cut a hunk out of one of the tank's supporting columns, whereupon the entire structure quite naturally collapsed.

"I can't understand why it all fell down," Pa Kettle complained, mournfully contemplating the wreckage. "That was only a little bit of a piece I took out of it."

What Pa Kettle overlooked was a governing principle which seems absurdly simple to most of us, running something like this:

An integrated structure, requiring balance and stability, must be composed of exactly the right number of pieces, each exactly the right length, placed in exactly the right spot.

The pieces must be all of the *right* length, but not necessarily all of the *same* length. If, for example, the structure stands on uneven ground, one or more of its supports *must* be somewhat longer than the others, or a rickety edifice will result.

"Elementary, my dear Watson," Sherlock Holmes might have observed. And so it is. In designing something as mundane as a water tank, few of us would be so stupid as to miss the point. Yet in designing something as transcendently important as the calendar, the entire Western World seems to have missed the point completely.

#### CALENDAR DEFECTS AND ACCOUNTING

Our basic time unit (the year) has been broken down into a considerable number of pieces (months, weeks and days). The solar year is celestially ordained and immutable, and the same applies to the solar day; the month and the week, however, are strictly human inventions. In the infinite wisdom derived from more than twenty centuries of allegedly civilized existence we have developed a calendar in which the days fit into the weeks, and the months fit into the year, but neither set fits into the other. This does us little credit, and our hit-and-miss month-length progression even less.

"Sure, sure," you may be saying to yourself impatiently. "We all know all about that, but what has it got to do with accounting?"

This much. Calendar defects are about the biggest nuisances and work-wasters with which the accountant must contend, and even a minor calendar improvement (such as this article proposes) would be about the greatest convenience and timesaver the profession could ever secure for itself.

This argues to me that, being unavoidably concerned with the problem, we would do well to concern ourselves with its solution. If we don't—if we fail to press successfully for the first elemental, indispensable modification of our present clumsy time-measurement devices—we may wake up some morning confronting a solution imposed by higher authority that suits us even less than what we're stuck with now.

The one indispensible modification is the lengthening of a single week (two in leap year) from seven days to eight. With this change, our present year of 52 weeks and one day would become a year of exactly 52 weeks. The ensuing emergence of neatly balanced 13-week quarters (in the accounting records if nowhere else) can be confidently expected (how easy it would be is made explicit in a later section). Just give us that one eight-day week, and the rest we can manage for ourselves.

A year of exactly 52 weeks could always begin on Sunday, and every subsequent date would invariably fall on an identical day of the week. The aid which this would lend to planning our activities and measuring our accomplishments is almost beyond reckoning, and quite readily attainable.

Impossible to achieve even that much calendar reform? Well, it shouldn't be. If we, the great American public, will muster all our resources and bring them to bear on the issue, we should be able to resolve it in less than another generation. If we can put men on the moon, immunize against polio and defoliate forests in Vietnam, we should be able to make that trivial calendar correction.

There is a lot of cheerful talk these days about adopting a decimal system of weights and measures, which it is said would take maybe ten years and cost maybe \$10 billion. Why not first adopt an orderly week-into-year calendar arrangement? Something that could be accomplished in not over ten days and would cost practically nothing?

The answer probably runs something like this. Most of those willing to devote time and effort to the project will see little excuse for not expanding the campaign to embrace a more comprehensive and elaborate program, which would get all the needed changes made at one time (reordering the interim monthly subdivisions of the year to produce balanced halves, quarters, and so on). And a task of that magnitude is a lot more formidable. It probably isn't going to get done—at least not soon enough to matter to most of us now living.

Why not? Because there are a dozen or more dif-

HOWARD C. GREER, CPA, is a retired business executive and teacher, and a continuing writer. He is a member of the

American Institute of Certified Public Accountants, the National Association of Accountants, and a former president of the American Accounting Association. Before his retirement, Mr. Greer was a vice president of the Chemstrand Corporation and of the Monon Railroad. He received his bachelor's degree from Northwestern University.

ferent ways in which that second part of the task can be accomplished, and each will have enough embattled, raucous, and determined champions to create delay and controversy without end. One can easily visualize the hours of Congressional committee hearings, the volumes of testimony, and the reams of news-media comment, which the conflicting notions will evoke, to say naught of ultimate interminable lawsuits and dissident clamorings which could well result. That's the way we go at things nowadays, and major calendar reform might prove no exception.

There is something in this sort of issue which inevitably brings out a maximum of opposition to any proposed improvement in our established and habitual life patterns. It comes from advantage-seekers, traditionalists, religious fanatics, hobbyriders, and just plain kooks, and it's tough for an elected political body to deal with. Witness the persistence of our present calendar pattern, the result of an egregious blunder by a conceited Roman emperor, who died nearly 2,000 years ago, leaving a legacy of inconvenience and expense of which no succeeding generation has been able to rid itself.

#### THE ROLES OF JULIUS CAESAR . . .

The record may be worth re-examining, as an indicator of the disabilities of mankind in general and democracies in particular, when confronting a problem of this type. If an excursion into calendar history seems a needless digression, I excuse it on the grounds which seemed persuasive to the judge in a fabled legal proceeding. To a protesting counsel, he is said to have observed sagely: "Yes, yes; this testimony, to which you object, may well be, as you claim, incompetent, irrelevant and immaterial, but it's awfully interesting; let the witness proceed."

Our mixed-up calendar pattern goes back to the late days of the Roman Republic. Prior to the advent of Julius Caesar, those in authority, presumably yielding to pressures, influences, and mere whimsies, had managed to let the Roman calendar drift off base by some 45 days. Wise old Julius, exercising the useful (and sometimes beneficent) powers of a dictator, took matters in hand. After due deliberation, he ordered insertion in the calendar of an extra 45-day month, and then established the sound, orderly progression shown in Exhibit 1 on page 47.

If he had stopped at that, we might still be in

¹Doris Cook covered much the same ground in her excellent article, "Why an Ancient Calendar in the Jet Age?" published in Management Services, September-October 1966.

EXHIBIT 1

## Month Arrangement in Roman Calendars (using current Anglo-Saxon month names)

Month	Julian		Augu	ıstan
1st	March	31 days	March	31 days
2nd	April	30 days	April	30 days
3rd	May	31 days	May	31 days
4th	June	30 days	June	30 days
5th	July	31 days	July	31 days
6th	August	30 days	August	31 days
7th	September	31 days	September	30 days
8th	October	30 days	October	31 days
9th	November	31 days	November	30 days
10th	December	30 days	December	31 days
11th	January	31 days	January	31 days
12th	February	30 days*	February	29 days*

^{*}Leap year only; other years one day less.

#### Note

The progression of month-lengths in the Julian calendar was orderly enough to be easily remembered, but the messed-up revision imposed by his successor made so little sense that an Englishman, back in the middle 1500's, devised a rhyme to help schoolchildren memorize the aberration. We quote the doggerel today as beginning "Thirty Days Hath September," but this itself is an erratic variant of the original version, which ran, in more appropriate sequence: "Thirty Days Hath November, April, June, and September" and so on.

fairly good shape in this regard. Unhappily, he yielded to the conceit which seems an inescapable attribute of dictatorial power, and ordered the renaming of the (then) fifth month of the Roman year to perpetuate his memory. Seemed an innocent enough piece of ostentation, no doubt, but it had one disastrous consequence, which has afflicted all of us ever since.

#### . . . AUGUSTUS CAESAR . . .

Caesar's grandnephew, Octavian, succeeding to his great uncle's dictatorial power, and no less conceited than his predecessor, concluded that if Julius could have a month of his own (now July), he, the Imperator Augustus, should properly have one also; hence the (then) sixth month was appropriately renamed (now August).

So, all right, that didn't matter. Except for one fatal flaw in the setup. July had 31 days; August would have only 30, making it look less important. "Not while I'm boss around here!" the new emperor told his calendar-makers, "Give August 31 days also."

This made things awkward. To keep on with a 31-30 progression, the day-count for the four following months had to be altered (as the table in-

dicates). Why they left January with 31 days and lopped another day off poor old February, my encyclopedia does not disclose, and it really doesn't matter. What does matter is that the world got a messed-up month-length pattern out of it, and has remained stuck with it ever since (dictatorial power is not always beneficent).

Amazing! The calendar affects every human being every day of his life. It is the single most significant and all-pervasive measuring device with which everyone in the civilized world must continually contend. Yet a crude and clumsy one, born of an emperor's whim, has gone virtually unchanged through twenty centuries. We may be civilized and intellectual, but smart in solving simple problems we plainly aren't.

## . . . VENERABLE BEDE AND POPE GREGORY

True, western civilization did get one important calendar correction accomplished, though not without an incredible amount of controversy and delay.

Seems the astronomer advising Julius Caesar

²February was considered unlucky, one authority says; hence, the shorter the better,

goofed slightly in telling him that the solar year was 365% days long; it is actually a bit less than that, with the result that a leap-year increment of one day every four years eventually throws things out of kilter to a significant extent.

An Anglo-Saxon monk, known as the Venerable Bede, pointed out the error, around 730 a.b., but, in characteristic human fashion, the peoples of Europe neglected the issue for some eight centuries thereafter. By the middle 1500's, the cumulative error had reached a total of ten days and called loudly for correction.

If the necessary adjustment had awaited the outcome of democratic process, the nations would doubtless still be arguing about it. Happily, there was a dictator in authority in religious matters (of which the calendar has often been deemed one). This was Pope Gregory XIII, who found the problem worthy of papal attention. After appropriate study, he ordained, in forthright fashion, that ten days should be dropped out of the year 1582, and that thereafter years ending in hundreds should be leap years only when their numerical designation is divisible by 400. This established the so-called Gregorian Calendar, which persists to this day.³

The papal decree solved the problem for the Roman-Catholic-dominated countries, in a quick, simple, and wholly practical manner. Did the non-Catholic nations thereafter promptly accept the new order of things? Indeed they did not. With true independence of spirit, they ignored the Papal Decree. It was, incredibly, one hundred and seventy years more before England got around to adopting the Gregorian Calendar, making it also official for her colonies, including those in America.

This delay explains the sometimes confusing fact that Washington's birthday is variously recorded as February 11 (O.S.) and February 22 (N.S.), according to which calendar you consult. Poor George has had a still different anniversary foisted on him now (the third Monday in February, at least for the time being), but that's a minor indignity compared to others he has suffered.

#### THE DAYLIGHT-SAVING TIME DEBATE

If anyone thinks we Americans do any better nowadays with time-division problems, he will find it instructive to trace the history of our struggles with the fairly simple problem of a summer "daylight-saving" time adjustment.

Back during World War I it was recognized that

advancing clocks one hour in the summer months would allow more work to be done in daylight hours, and the whole nation adopted this wholesome, salutary, and largely popular program.

The farmers, however, disliked daylight saving, some saying it was tampering with "God's time," some that the cows couldn't be milked an hour early, and some just that if city folks were for it, country folks had to be against it. At the war's end, the "agricultural bloc" in Congress got the law repealed. President Wilson vetooed the repealer, and it was then repassed over his veto—a legislative aberration as regrettable as some others we can all call readily and unhappily to mind.

That didn't end the debate, of course—far from it. Cities liked daylight-saving time, and many adopted it on their own account, eventually creating a truly chaotic situation for the transportation agencies and the traveling public. The nuisance grew so intolerable that Congress finally felt compelled to get back into the act.

After a brief and clumsy reimposition of a general "daylight-saving" regimen during World War II, we finally achieved a new dispensation, under which a six-month period of summer daylight-saving time became the basic program, but with individual states retaining autonomy as to its adoption within their boundaries.

Satisfy everyone? Not at all. There has been clamor for further modifications, which Congress has again been reluctantly considering. Fifty years of battle to no final decision! Page Julius Caesar—we could surely use him now and then.

#### THE EIGHT-DAY WEEK

Okay. That's the end of the historical detour, which had the purpose of explaining the writer's gloomy conviction that a piecemeal approach to the problem may well be more promising than any efforts at general wide-ranging reform. For accountants this is particularly true, since attainment of the initial objective is the only thing that seriously matters (balancing out the months, quarters, and half years can be achieved within the internal accounting practice framework, as noted later.

How go about it to stretch one week from seven days into eight? It doesn't much matter how, or when, the extra day is inserted. Most proposals assume that the long week will be the last one in the year, and such an arrangement certainly seems logical. For balance, the additional long week in leap years presumably should be the last week in June (don't let anyone suggest an alternative, or the argument can easily rage for years).

What to call the extra day? Well, if it is to be a "not-part-of-a-week" day, it can be called almost

³The eminent prelate, having his name attached to the revised calendar, is now sometimes rather unfairly blamed for all its defects, though most he merely inherited and allowed to go unremedied (cf. "Thirty Days Hath September," by L. P. Jennings, NACA Bulletin, March 1951).

anything. Some proposals designate it as "Year Day" (and its June counterpart as "Leap Day"), but that's not very imaginative. A change might be most easily assimilated by the public at large if the extra day were made a part of an established week, and given a name hallowed by familiarity.

The odd day could, for example, be tacked onto the final week in December as a "Second Saturday" (Sec-Sat for short). Those feeling bound by the Fourth Commandment could consider the added day a sort of Extra Sabbath (Pre-Sab, maybe?). This shouldn't offend the religiously inclined; it may be guessed that Moses wouldn't have objected to a doubleheader Sunday once or twice a year (he might even have talked the Almighty into a stone-tablet footnote to that effect if either of them had realized how helpful it would be).

#### HOW TO DO IT

The greater stumbling block, unhappily, is not in obtaining acceptance of the principle involved but in selecting the time and manner of its adoption. There are several considerations.

First, the initial week of each new year plainly should start with a Sunday, so that each year will be composed of whole weeks, with no overlapping fractions. Second, the stage should be properly set for a subsequent adjustment of month-lengths, to bring about whatever sort of period-to-period balance is then deemed most desirable, with a minimum of dislocation in year-to-year date comparisons.

To reach these objectives, the ideal time for a full change-over would be in a *Leap Year beginning with a Sunday* (exposition provided a bit later). Such a year unhappily now occurs only once every 28 years (the last one was in 1956, there won't be another until 1984, and the next one after that will be 2012). Even those years now scheduled to begin on Sunday aren't too numerous; the next one now on the books is 1978, and the next ones after that are 1989, 1995 and 2006.

With a little minor surgery, year-after-next, 1973, could be transformed into a year beginning on Sunday. If December 31, 1972, were considered as a Second-Saturday, or a Pre-Sabbath say, January 1, 1973, would become a Sunday, and we'd be off and running on the right track at last. Perhaps such alacrity in embracing the new order is too much to expect, and we should shoot for a change-over in 1978, or even wait patiently for 1984. After all,

we've delayed nearly 2,000 years in taking this simple step—why be hasty now?

Once this change-over has occurred, the remaining adustments necessary to produce orderly and comparable interim-period accounting become almost laughably simple. An accountant who wanted each quarter year to have characteristics like those of each other quarter year could accomplish this by a couple of minor internal adjustments, of which no one outside his department would be more than vaguely aware.

During 1972, for example, two interperiod transfers of one day each would serve practical purposes. Treating Saturday, April 1, as part of the March accounting period and Saturday, July 1, as part of the June accounting period would create four accounting quarter years of 13 full weeks each with one extra day (a Sunday) at the beginning of the first quarter, and another (hopefully a Second-Saturday or Pre-Sabbath) at the end of the fourth quarter. Similar adjustments would correct any disturbing imbalances in subsequent years, provided only that each year was made to begin on a Sunday, as earlier noted.

One might reasonably hope that before too many years this sort of quarter-balancing adjustment would work its way into general acceptance. It could well be accompanied by some minor month-balancing adjustments (no need to continue forever in bondage to Augustus Caesar, and his arbitrary truncation of February to make his own month a longer one). As a practical approach, the change-over, whenever occurring, would need to include no more than the following steps (taken preferably in a leap year, to minimize dislocation of year-to-year date comparisons, as noted later):

- February to be lengthened one day (to a revised total of 30), and March shortened one day (to 30).
- April to be lengthened one day (to 31), and May shortened one day (to 30).
- June to be lengthened one day (to 31), providing the extra leap day needed to balance out a 366-day year; August to be shortened one day (reducing its length to 30 days, and to hell with Octavian).

With the final day of December squeezed into the last week of the year (a Second-Saturday), the following year would start clean with Sunday, January 1, and nothing more would really need to be done. The world might some day get around to considering whether a six-day or a five-day week wouldn't serve its needs better than the one Moses handed us, but that's another story altogether.

An annotated comparison of old-style and re-

⁴An entertaining, if perhaps frivolous suggestion, is that one might be named Nixon-Day and the other Nader-Day, conditional on a promise from the individuals thus immortalized that they will thereupon promptly and permanently withdraw from public life. Other selections may occur to the reader.

EXHIBIT 2 omparative Calendar

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in modernized version, dates unmarked (242) fall on same solar day as before; dates underscored (121) fall one solar day later than before; dates starred (3) are new (replacing March 31, May 31, and August 31).

vised calendars for whatever may be the selected year appears as Exhibit 2 on page 50. Emphasis is placed on the very limited amount of date-dislocation involved, since this would be a significant factor with many calendar users in the transition year.

#### THE "WORLD CALENDAR"

Note that under the revised calendar,⁵ no new date would be more than one day away from its former position, and that even that much of a shift would occur at only brief and infrequent intervals (March, May, July and August). Easy, huh? A change-over in something other than a leap year would involve some date-dislocations of as much as two days, and for longer periods, making that choice a less attractive one.

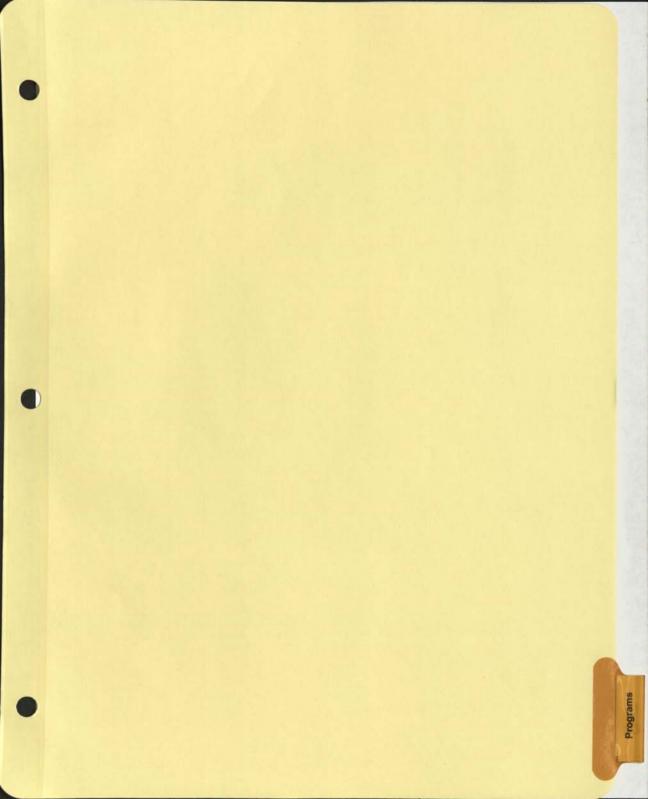
Those enterprises having a need for, and now regularly using, monthly periods consisting of a collection of full weeks (meat packers, department stores and others) would find the revised calendar readily adaptable to their needs. In the first quarter, for example, the January period could be four weeks ending Saturday, January 28, the February period four weeks ending Saturday, February 25, the March period five weeks ending Saturday March 31, and so on. All years, incidentally, would be composed of an even 52 weeks, thus avoiding This is the so-called "World Calendar," actively promoted in the 1950's, and from time to time since then.

the awkward 53-week year which such enterprises now have to employ every five years or so.

That's about all there is to it, folks, and why in the name of John Carey don't the public accounting practitioners get to work and do something about it! Surely such an effort would be more salutary than interminable debate over what size relationship between two merging companies makes it appropriate to state their past results on a "pooling-of-interests" vs. a "separate entity" basis. We can do better than that with our time and talent, and we certainly should.

Unless, that is, we can accept the fatalistic view that such problems, along with our many others, are beyond the possibility of solution through democratic processes. In long gray wakeful dawns, I sometimes yield to the presentiment that it will take some modern Julius Caesar to bring order out of our existing social, economic, and fiscal chaos.

Trouble is, he may not like my simple little calendar-modification program. He may not even be
an American, when it comes to that. Some of our
Oriental brethren, for example, may ultimately tire
of our intolerable meddling in Asian affairs, and
decide to update Pearl Harbor, on a grand scale,
with a flock of the ICBMs they are known to be
readying. In that event it may be Chairman Mao
who will prescribe a new and improved calendar
for any of us who chances to be still around. Starting out with the "Year of the Pfft," maybe?



```
fiscalwk Adapted from TODAY 78-01-27 by RWBener
 Modified by GE Blondeau and RL Brandt 1978-10-04 (602)-866-3619
 Calculates the nth day of the fiscal week, and the fiscal year.
yr=*date']2 x=*date]'3 mo=x']2 da=x]'3 qoto !cont
!date _ Entry-point when 'date' is previously defined as YR-MO-DA.
yr=date*]2 leap=(yr/4)*4 x=date]*3 no=x*]2 da=x]*3 qoto !cont
lyrmoda _ Entry-point when YR, MO, and DA are previously defined.
!cont yr=((yr'>" ")<'**n) mo=((mo'>" ")<'**n) da=((da'>" ")<'**n) subs |
fw=*null fy=fw fd=fw fweek=fw fail="f" failmrk="fail='t' | *svmd| return"
if yr:eq:0 | failmrk |
if mo:le:0 |failmrk|
if mo:qt:12 |failmrk|
if da:le:0 | failmrk |
if da:qt:31 |failmrk|
f30="if da:qt:30 fail='t' return"
if no:eq:2 if da:qt:28 if ((yr/4)*4):eq:yr if da:qt:29 fail='t' 1*svmil return
if mo:eq:4 1f301
if mo:ea:6 | f30|
if mo:eq:9 | f30|
if mo:eq:11 | f30|
del = "000031059090120151181212243273304334"
suf="stndrdthththth"
ord=(del'](mo*3))['3+da
                            ordinal day-of-the-year
ord=ord+(((yr/4)*4)/yr)*(1/(1+(2/mo)))
remainder="a=year+11 b=a/4 c=(b+a)/7" sups 1
 ear=yr | remainder| r=*rmdr
 41 = (ord + 6 - (7 - r) * (r/4) + r * (1/(1 + (r/4)))))/7 fd = *rmdr + 1
year=yr-1 |remainder| r1=*rmdr _ offset for previous year
year=yr+1 | remainder| r2=*rmdr __ offset for next year
ra=(r+r1)/3 _ when this integer is 2, ord values 1,2,or 3 lie in FWi3.
fw=fw1+(52+(1/(1+(ra/3)))*(ra/2))*(1/(fw1+1))-(fw1/53)*(52)*(1/(1+(r2/4)))
fy=yr-(1/(1+fw1))+((fw1/53)*(1/(1+(fw/2)))*(fw)) fw2=("00",fw)E'2
fd=fd,(suf'](fd+2))['2
d=("0",ord)['2 I=d['1 X=d']1 suffix="th"
_ mesg=" Fiscal Year 19", fy if fy:eq:yr mesg=*null
out:" - the IfdI day of Fiscal week IfwI,", mesq
fweek="FW ", (fy['1, fw2,",", (fd'>*+n)) | 1*svndl return
!explain out:*lf,"Calculates today's location in the fiscal calendar."
out: "Variable 'fd' contains the nth day of 'fw', the fiscal week."
out: "Variable 'fy' contains the fiscal year; 'ord', the ordinal day of the year.
out: "Variable 'fweek' contains the format 'FW 822.3', fyfw.fd ."
out: *lf, "If variable 'DATE' is already defined as YR-MO-DA, call fiscalwk"
out:" at entry-point !DATE. (call fiscalwk!date)."
out:*lf,"If variables 'YR', 'MO', and 'DA' are predefined, call fiscalwk at"
out: " entry-point !YRMODA. (call fiscalwk!yrmoda)."
!end_explain return
```

/xp/today 10/26/78 08.844 MEDIA CODE 6 1978-01-27 author: RWBemer, 602-942-1360 _ Modified by GE Blondeau and RL Brandt 1978-10-04 (602)-866-3619 clear * yr=*date']2 leap=(yr/4)*4 x=*cate]'3 mo=x']2 da=x]'3 del="000031059090120151181212243273304334" dy=" Mon Tues Wednes Thurs Fri Satur suf="stndrdthththth" m 1 =" January February March April May June" m2=" July August September October November December" if mo: lt:7 M=(m1'](mo*10))<""" if mo:gt:6 M=(m2']((mo-6)*10))<""" ord=(del'](mo*3))['3+da _ ordinal day-of-the-year ord=ord+(((yr/4)*4)/yr)*(1/(1+(2/mo))) remainder="a=year+11 b=a/4 c=(b+a)/7" subs 1 year=yr | remainder| r=*rmdr fw1=(ord+6-(7-r)*(r/4)+r*(1/(1+(r/4))))/7 fd=*rmdr+1year=yr-1 |remainder| r1=*rmdr _ offset for previous year year=yr+1 |remainder| r2=*rmdr _ offset for next year ra=(r+r1)/3 _ when this integer is 2, ord values 1,2,or 3 lie in FW53. fw=fw1+(52+(1/(1+(ra/3)))*(ra/2))*(1/(fw1+1))-(fw1/53)*(52)*(1/(1+(r2/4))) $\forall y = yr - (1/(1+fw1)) + ((fw1/53) * (1/(1+(fw/2))) * (fw))$ day=(dy'](fd*7))<"","day" fd=fd,(suf')(fd+2))['2 d=("0",ord)['2 I=d['1 X=d']1 suffix="th" if I:eq:1 if X:ne:1 suffix="st" if I:eq:2 if X:ne:1 suffix="nd" if I:ea:3 if X:ne:1 suffix="rd" ord=ord, suffix subs 1 out: "a Today is Idayl, 19lyrl IMI Idal" mesg=" Fiscal Year 19", fy if fy:eq:yr mesg=*null out:" - the IfdI day of Fiscal Week IfwI,", mesq out:" - the lord! day of the year, and" time=0 sec=*time['2 hm=*time']5 if sec: Lt: 25 time=hm goto !end min=hm['2 hr=hm']2 min=("0",min+1)['2 if min:eq:60 min="00" hr=hr+1 if hr:eq:24 hr="00" time=hr,":",min !end out:"it is now Itimela" nosubs return !explain out:" " out:"TODAY will give you the characteristics of the moment," out: "including date, day of the week, ordinal day, fiscal" out:"year, week and day, and time." !end_explain return

!now _ 1979-06-20 author:RWBemer, 602-942-1360"
filename="telbook\$trebor,q" call texlib/f/old
d:"222";*
!again b out:" " call !familiar
out:"What language do you speak? " call texlib/l/today return

!explain_again out:" " out:"Once NOW has been called (getting the telephone book),"
out:"one calls NOW!AGAIN, and it runs faster because it"
out:"already has the telephone book." return

!familiar b t=*time']2 period="morning,"
if t:ge:12 period="afternoon," if t:ge:18 period="evening,"
in:"Your last name is? " surname=*in case
b f:surname if *eof call !notel return

!one call !getfirst last=*cl'>","
if last:nes:surname out:"Good ",period,name clear * nocase return
pre="Are you ",name

!more call !getfirst pre=pre," or ",name
last=*cl'>"," if last:nes:surname call !which nocase return
goto !more

!getfirst name=(*cl'>"#")>'", " n=name," \(\frac{1}{2}\)" countf=n>"." middle=n>"" "
f;1 if middle:eqs:"\(\frac{1}{2}\)" case="1 - first name only" return
countm=middle>"." total=countf+countm
if total:eq:2 case="2 - two initials" return
if countf:eq:1 case="3 - initial & middle" name=middle'>" " return
if countm:eq:1 case="4 - first & initial" name=name'>" " return
case="5 - two names" return

!which pre=pre,"? " in:pre reply=*in
no=reply']1 if no:eqs:"N" no="n"
if no:nes:"n" out:"Good ",period,reply nocase return
if no:eqs:"n" call !notel return

!notel in:"Are you a visitor to Phoenix Ops? " ans=*in']1
if ans:nes:"y" out:"Then why aren't you in the phone book? "
if ans:eqs:"y" out:"Good ",period,"friend ",surname
clear * nocase return

!explain_familiar out:" " out:"When given a last name,"
out:"FAMILIAR searches the telephone book, extracting"
out:"the familiar form of the first name." return

!explain out: ± ±
out:"NOW will ask for your surname, and then give you"
out:"all the characteristics of the moment in time."
out:"NOW is also callable at labels AGAIN and FAMILIAR"
out:"For any explanation, °call now!explain_(label)'"
!end explain out:" " return

A general DATE program written by R. W. Bemer in 1980. It converts between the three major date forms and Julian Day in both directions.

Note that most of the program is for I/O and exhaustive explanations (with references).

Also note what a very small space is required for the actual calculations.

R. WMS.
A FORGOTTEN HEM.
REGIMA

HISTORICAL

!date _ 1980-07-30 author: RWBemer, 602-942-1360 scan: *date: "-" !="19", *1 scan: *r: "-" J=*1 k=*r count=0 case subs \ out: "For today's date, do you went Ordinel, Fiscal, or Julian form!" !egain count=count+1 in: %Respond "ORD", "FIS", or "JUL" if count: It:3 ergo !again call !cal_to_\xin\ *symd\ return out: "No action taken, " nocase return !cal_to_cal ! ord to ord !fis_to_fis | jul_to_jul out: "----No action---" n=1 call !explain2 return |cal_to_ord call !co call !mesg im=mc om=mo goto !reply !cal_to_fis call !cf call !mesg im=mc om=mf goto !reply !cal_to_jul call !cj call !mesg im=mc om=mj goto !reply !ord_to_cal call !oc call !mesg im=mo om=mc goto !reply !ord_to_fis call !of call !mesg im=mo om=mf goto !reply !ord_to_jul call !oj call !mesg im=mo om=mj goto !reply !fis_to_cal call !fc call !mesg im=mf om=mc goto !reply !fis_to_ord call !fo call !mesg im=mf om=mo goto !reply !fis_to_jul call !fj call !mesq im=mf om=mj goto !reply !jul_to_cal call !jc call !mesg im=mj om=mc goto !reply !jul_to_ord call !jo call !mesg im=mj om=mo goto !reply !jul_to_fis call !jf call !mesg im=mj om=mf goto !reply !reply out: " " out: \im\, " is ", \om\ *svmd\ out:" " return lmesg subs \ mc=%1,"-",("0",j)['2,"-",("0",k)['2% mo=%"Dey ".iday," of ",i% mf=%"Day ".fd," of FW ".fw," of FY ".fy% mj=%"Julian Day ".jd% return !julian1 call !jd1 out: "The first day of ",i," is Julian Day ",jd1 return !fiscall call !fdl out: "The first day of ",i," falls on Fiscal Day ",fdl if fd1:gt:4 out: "But it's in Fiscal Year ",(1-1) Ifd1 call !jd1 fd1=jd1/7 fd1=xnmdr+1 return !calc_fc call |jdl t=jdl-jd1/7*7 fc=t+7-(t+3)/7*7 return _ fc<7 means FW 0 !jd1 Jd1=1461x(i+4799)/4-31738-3x((i+4899)/100)/4 return !leap _ An easier way in TEX ( · as substitute char) is: l="if *rmdr:eq:0 leap" call !lp _ leap=0 q=i/4 ·l·=1 q=q/25 ·l·=0 q=q/4 ·l·=1 q=q/10 ·l·=0 l="_isn't" l=1'[(3xleap) out:i,1,% a leap year. "leap"=%,leap return | lp | leap=1-(1-1/4×4+3)/4+(1-1/100×100+99)/100-(1-1/400×400+399)/400 t=1/4000 if xrmdr:eq:0 leap=0 return !caldiff form="MM-DD" r="c" li=8 call !ask return !orddiff form= [1] r="o" li=7 call !ask return !fisdiff form="WW-D" r="f" li=7 call !ask return !ask out: "Separators may be omitted. !dl in: "First date (YYYY-", form ) " date1=x | T | IT lin: | lt: | i goto !dl !d2 in: "Second date? " subs Vif *lin: lt: li goto !d2 date2=*in call !\r\d out: "Difference is ", diff, " days ( *symd) return !cd do=%split:arg:4 i=xl splitr:xr:2 k=xr j=(xl>'xn)'<xn call !cj% call !diff return !od do=%i=arg']4 |day=arg['3 call !oj% call !diff return !fd do=%split:arg:4 fy=xl splitr:xr:1 fd=xr fw=(xl>'xn)'(xn call !f]; call !diff return

```
!diff arg=date v subs
                                       MARGE 010 1682 K
  \do\ firstj=jd a/g=date2 \do\ diff=firstj-jd
   \xsvmd\ return
  !co call !lp iday=3055*(J+2)/100-(J+10)/13*2-91+leap*(J+10)/13+k return
  icf sall !co call !of return
  1cJ 1d=k-32075+1461*(1+4800+(j-14)/12)/4
  Jd=Jd+367*(J-2-(J-14)/12*12)//2-3*((1+4900+(J-14)/12)/100)/4 return
  oc. cell !lp id=iday+((305+idey-leap)/365)*(2-leap)
  J=((Jd+91)×100)/3055-2 k=ig+30-(j×3056)/100 return
  |of/call |calc_fc |fw=(iday+fc-1)/7 |fd=*rmdr+1 |fy=i|
   if fw:eq:53 if (fc+lesp/: lt:10 fy=i+1 fw=1
   if fw:eq:0 i=i-1 fy=i call !lp [i=i+1 fw=53-(fc+1-leap)/6
   return
  !ojvcall !jd1 jd=jd1+iday-1 return
  Ifo call !fo call !oc return
  |fov |=fy call |calc_fc |iday=7xfw+fd-fc call |lp
  if iday:gt:(365+leap) i=i+1 iday=iday-365-leap
  if iday: It: 1 i=i-1 call !lp iday=365+leap+iday
   return
  If call !fo call !oj return
  1jd+=jd+68569 n=4x1/146097 l=1-(146097xn+3)/4 i=4000x(1+1)/1461001
  [1=1-1461*1/4+31 j=80*1/2447 k=1-2447*j/80 l=j/11 j=j+2-12*1
  i=100=(n-49)+i+1 return
//jo call !jc call !co return
/jf call !jc call !cf return
  !explain_cel_to_ord out: "CAL_to_ORD" call !setup
   \calin\ \oo\, viday \ov\, vleap
   out: "Ref: CACM 1972-10, p. 918, JDRobertson" \ symd out: " " return
  !explain_cal_to_fis out: "CAL_to_FIS" call !setup
   \calin\ \fisout\
   \ov\,viday \ov\,vfc \ov\,vleap
   Vesymd\ out: " " return
  !explain_cal_to_jul out: "CAL_to_JUL" call !setup
   \calin\ \oo\, vjd
   out: "Ref:
                 CACM 1968-10, p.657, HFFliegel, TCVanFlandern"
  xsvmd out: " " return
  !explain_ord_to_cal out: "ORD_to_CAL" call !setup
   \ordin\
   \oo\,vj \ov\,vk \ov\,vleap \svmd\
   out: "Ref: CACM 1970-10, p. 621, Stone (modified)" out: " " return
  !explain_ord_to_fis out: "ORD_to_FIS" call !setup
   \ordin\ \fisout\
   \ov\, vfc \xsvmer out: " " return
  !explain_ord_to_jul out:"ORD_to_JUL" call !setup
   \ordin\ \oo\,vjd \svmd out:" " return
  !explain_fis_to_cal out: "FIS_to_CAL" call !setup
   \fisin\ \calout\
   \ov\,vieap \ov\,vfc \ov\,viday xsvm out:" " return
  !explain_fis_to_ord out: "FIS_xo_ORD" call !setup
   \fisin\ \ordout\
   \ov\,vleap \ov\,vfc (svmd) out:" " return
  lexplain_fis_to_jul out; "FIS_to_JUL" call !setup
   \fisin\ \ordout\
   \ov\,vid \ov\,vleap \*svad out:" " return
  !explain_jul_to_cal out: "JUL_to_CAL" call !setup
   \oi\, vid \calout\
   out: "Ref:
               CACM 1968-10, p.657, HFFliegel, TCVanFlandern"
```

```
\*svmd\ out:" " return
!explain_jul_to_ord out:"JUL_to_ORD" call !setup
 \o!\,vjd \ordout\ \*svmd\ out:" " return
!explain_jul_to_fis out: "JUL_to_FIS" call !setup
(oi), vjd \fisout\ \*svmd\ out:" " return_
!explain_daldiff out: "CALDIFF" call !setup
 \oi\,vc1 \ov\,vc2 \oo\,vdiff \*svmd\ out:" " return
!explain_orddiff out: "GRDDIFF" call !setup
\oi\,vo1 \ov\,vo2 \oo\,vdiff \*svmd\ out:" " return
!explain_fisdiff out: "FISDIFF" call !setup
\oi\,vf1 \ov\,vf2 \oo\,vdiff \*svmd\ out:" " return
!explain_julian1 out: "JULIAN1" call !setup
\oi\,vi \oo\,"jd1 ",vj1," of Jan O1)" \*svmd\ out:" " return
!explain_fiscall out: "FISCAL1" call !setup
\oi\,vi \oo\,"fd1 (D -- Fiscal Day for Jan 01)" \*svmd\ out:" " return
!explain_leap out: "LEAP" call !setup
\oi\,vi \oo\,vleap \*svmd\ out:" " return
!setup subs \ ergo !go_on if vieap:eqs:vleap return
igo_on out: " " oi="out:%Inputs: %" oo="out:%Outputs: %"
vfc="fc (fiscal constant -- year offset)" ov="out:%
vfd="fd (D -- Fiscal Day)" vfw="fw (WW -- Fiscal Week)"
vi="i (YYYY q- year)" vj="j (M or MM -- calendar month)"
vk="k (D or DD -- calendar day)" vfy="fy (FFFF -- Fiscal Year)"
viday="iday (XX) -- ordinal day of the year)"
vji="(XXXXXXX viulien Day" vjd="jd ",vji,")"
vleep="leep (1 leep year, 0 if not)." vdiff="diff (in days)"
vc1=" (YYYY-MM Do or YYYYMMDD)" vc2="date2",vc1 vc1="date1",vc1
vol=" (YYYY-10) or YYYY111)" vo2="date2",vo1 vo1="date1",vo1 vf1=" (FFFF-WW-D or FFFFWWD)" vf2="date2",vf1 vf1="date1",vf1
calin='Ni \ov\,vj \ov\,vk" calout=oo,calin calin=oi,calin
ordin=1, 1 \ov\, viday" ordout=00, ordin ordin=01, ordin
fisin= , vfy \ov\, vfw \ov\, vfd" fisout=00, fisin fisin=0i, fisin return
             " " out: "DATE is a collection of calendar algorithms"
out: "that use TEX or FORTRAN integer erithmetic" n=0
out: "but little logic to calculate." out: " " g="
!explain2 out: "TEXLIB/U/DATE converts in every way between"
out: "four forms of the date -- Calendar (CAL or C), "
out: "Ordinal (ORD or O), Fiscal (FIS or F), or"
out: "Julian (JUL or J), but not to the same." out: " " if n:ne:0 return
out: "These are the entry points; the 2-letter form"
out: "Is for noninteractive subroutines: " out: " "
out: " CAL_to_FIS
                      CF",g," FIS_to_ORD
out: " CAL_to_JUL CJ",g, "FIS_to_JUL
out: " ORD_to_CAL OC",g, " JUL_to_CAL JC"
out:" ORD_to_FIS OF",g," JUL_to_ORD JO"
out: " ORD_to_JUL OJ",g, " JUL_to_FIS
                                             JF" out:" "
out: " CALDIFF",g, "CD",g, " JULIAN1",g, "JD1"
out:" ORDDIFF",g, "OD",g, " FISCAL1",g, "FD1"
out: " FISDIFF",g, "FD",g, " LEAP ",g, "LP" out:g,g, "VC VO VF"
out: " " out: "Explanations and input-output specifications are"
out: "found by calling entry !EXPLAIN_(long form). E.g., "
out: " out: " CALL TEXLIB/U/DATE! EXPLAIN_CAL_to_JUL (or)"
out: " CALL TEXLIB/U/DATE! EXPLAIN_ALL" out: " "
out: "...DIFF (or .D) give the number of days between two"
out: "dates given in calendar, ordinal, or fiscal form."
out: * If, "Input to this program may be validated prior to"
```

out: "actual call by calling at VC, VO, or VF -- for" out: "Calendar, Ordinal, or Fiscal form respectively." out: "A variable VALID is returned as either T or F," out: " "lend_explain out: " return

!explain_all subs \ call !explain e="call !explain_"
 \e\cal_to_ord \e\cal_to_fis \e\cal_to_jul \e\ord_to_pal \e\ord_to_fis
 \e\ord_to_jul \e\fis_to_cal \e\fis_to_ord \e\fis_to_jul \e\jul_to_cal
 \e\jul_to_ord \e\jul_to_fis \e\caldiff \e\orddiff \e\fisdiff
 \e\julian1 \e\fiscal1 \e\lap **symd\ return

!vc valid="f" ergo !bad_input z=i+j+k ti=i tj=j tk=k
call !co call !oc if j:le:12 if j:eq:tj if k:eq:tk valid="t"
return
!vo valid="f" ergo !bad_input z=i+iday tiday=iday ti=i
call !lp if iday:le:(365+leep) if iday:ge:1 valid="t"
return
!vf valid="f" ergo !bad_input z=fy+fw+fd tfy=fy tfw=fw tfd=fd
call !fj call !jf if fy:eq:tfy if fw:eq:tfw if fd:eq:tfd valid="t"
!bad_input return

!test in:"Date? (YYYYMMDD) " t=*in split:*in:4 i=*l
split:*r:2 j=*l k=*r jd="?" iday=jd fy=jd fw=jd fd=jd

!testloop i=i+1 date=i,("0",j)['2,("0",k)['2
fd=fy,("0",fw)['2,fd out:t," ",iday," ",jd," ",fd
call !co call !oj call !jf call !fc
t=i,("0",j)['2,("0",k)['2 if t:nes:date out:"..",t
call !cj call !jf call !fo call !oc
t=i,("0",j)['2,("0",k)['2 if t:nes:date out:"..",t
call !cf call !fo call !oj call !jc
t=i,("0",j)['2,("0",k)['2 if t:nes:date out:"..",t
call !co call !of call !fj call !jo call !oc
t=i,("0",j)['2,("0",k)['2 if t:nes:date out:"..",t
goto !testloop

-call texlib/u/date!explain_all

DATE is a collection of calendar algorithms that use TEX or FORTRAN integer arithmetic but little logic to calculate.

TEXLB/U/DATE converts in every way between offer forms of the date — Calendar (CAL or C), Ordinal (ORD or O), Fiscal (FIS or F), or Julian (JUL or J), but not to the same.

These are the entry points; the 2-letter form is for noninteractive subroutines:

222552	201	
FIS to CAL FIS to ORD FIS to JUL JUL to CAL JUL to ORD JUL to FIS		
853853	282	101
CAL to ORB CAL to JUL ORB to CAL ORB to FIS	CALDIFF ORDDIFF FISDIFF	JULIAN1

Explanations and input-output specifications are found by calling entry !EXPLAIN_(long form). E.g.,

CALL TEXLIB/U/DATE:EXPLAIN CAL to_JUL (or)
CALL TEXLIB/U/DATE:EXPLAIN_ALL

...DIFF (or .D) give the number of days between two dates given in calendar, ordinal, or fiscal form. Number of working days is in process.

Input to this program may be validated prior to actual call by calling at VC, VO, or VF —— for catendar, Ordinal, or Fiscal form respectively. A variable VALLD is returned as either T or F.

nouts: 4	
	Inputs: i (YYYY year) (MO OF MM calendar month)  k Coor DD calendar door)
utputs: id	ay (XXX ordinal day of the year)
ef: CA	CM 1972-10, p. 918, JDRobertson Angel
CAL to FIS Inputs: i	(YYYY year) (M OF NM calendar month)
Outputs: fy fat for fide for fee fee fee fee fee fee fee fee fee fe	ty (FFF - Fiscal Veer)  ty (WH - Fiscal Veer)  td (W - Fiscal Veer)  td (C - Fiscal Veer)  td (C - Fiscal Cony)  tday (XXX - ordinal day of the year)  tc (fiscal constant - year offset)  teap (fift leap year, 0 if not).

	nth)	7)		el, TCVanfla	
CAL to JUL Inputs: i (YYYY year)	calendar mo	calendar da	Julian Day)	p.657, HFFLieg	
CYTYY	(M or MM	(0 or 00	CXXXXXX	1968-10,	
CAL to JUL Inputs: 1	•		utputs: jd	lef: CACM	A STATE OF THE PARTY OF THE PAR

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	ord	1	1	3D y	ď	
1	1	MM	00	Le	10,	
>	×	0	0	11	-02	
5	: 5	5	8	2	19	
4 -	iday (XXX ordinal day of the year)	-		Leap	CACM	7.4
٥.		::				-
ORD to CAL		tput			:	
2 2		8			Re	-

	yea				4000
	the				*
ORD to FIS Inputs: i (YYYY year)	ordinal day of	Fiscal Year)	scal Week)	scal Day)	
1	1	1	F	H	-
CYYYY	CXXX	(FFFF	- MAD	9	( tiens
115	iday	ty	4	p.	+
ORD to FIS Inputs: 1		Outputs:			

year)	set)
t e	the the
UL (YYYY year) iday (XXX ordinal day of the year) jd (XXXXXX Julian Day)	L (FFF - Fiscal Vear)  to (WW - Fiscal Day)  td (O - Fiscal Day)  (YYYY - Year)  (H Or NM - calendar month)  k (D or DO - calendar day)  k (O or NM - calendar day)  te (Fiscal constant - year of feet)  te (fiscal constant - year offset)  tday (XXX ordinal day of the year)
30	8 8
1 1 1	A TATE TO SEE TO
Inputs: 1 ida	FIS to CAL Inputs: 16 Outputs: 1 k

Inputs: fy fd Outputs: ida	ORD	fy (FFFF Fiscal Year)	fw (WW Fiscal Week)	fd (D Fiscal Day)	: 4 (YYYY year)	iday (XXX ordinal day of the year	leap (1 if leap year, 0 if not).	fc (fiscal constant year offset
5 445 455	RD	fy	++	td.	+	fday	Leap	te

					year		
					the		. (10
	(FFFF Fiscal Year)	(WW Fiscal Week)	(D Fiscal Day)	(YYYY year)	txxx ordinal day of	(XXXXXXX Julian Day)	leap (1 if leap year, 0 if not).
_	fy	2	p	-	iday	pf	Leap
FIS to JU	Inputs:			Outputs:			

				TCVanFlanc	
- Julian Day)	ear)	- calendar month)	- calendar day)	CACM 1968-10, p.657, HFFLiegel, TCVanFlanc	
CXXXXXXX	CYYYY y	(M or MM -	(0 or 00 -	1968-10, p	
Inputs: jd	tputs: i	,	×	f: CACM	
5 5	0			8	

dern

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		the
Day)		to
		day
CXXXXXX Julian	year)	ordinal
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CXXXXX	CYYYY	CXXX
PE		Jiday
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ordinal day o	ulian Day	at Year)	Week)	(D Fiscal Day)	
ordir	1	Fisca	scal	scal	
1	XXXX	1	14 -	1	
CXXX	CXXX	(FFF	MAD	9	
iday 15	þſ	ty.	4	p _t	
Heavy CXXX	Inputs:	Outputs:			
4					

CALDIFF Inputs:	date1	CYYYY-MM-DD	0	YYYYMMD
	date2	CYYYY-MM-DD OF YYYYMMD	0	YYYYMMD
Outputs:	diff	(in days)		

22

FISDIFF	date1	(FFFF-WW-D	-	FFFFWWD
	date2	(FFFF-WW-D or FFFFWWD)	-	FFFFWWD)
Output s:	diff	(in days)		

- Can	
*	
Day	
year)	
CXXXXXX	
101	
JULIAN1 Inputs: Outputs:	

9

	66
	Jan
	for Jan
	ay a
	Fiscal D
	6 -
	- <del>1</del>
FD1	Inputs: Outputs:

Inputs: i (YYYY -- year)
Outputs: leap (1 if leap year, 0 if not).

LEAP

```
pgm/datevar 06/20/83 20.055 MEDIA CODE 6
    his/pgm/datevar 1983-06-16 P G Skelly HVN:357-6568
date=*date
!start case subs | date="19",date
!loop if (date'> **n):nes:date date=(date'> **n),(date>' **n)]'1 goto !loop
date=date['8
CY=date'34
FY=CY
CM=(date]'4)']2
CD=(date]'4)['2 clear date
call !leap
OD=3055*(CM+2)/100-(CM+10)/13*2-91+leap_adj*(CM+10)/13+CD
JD=1461*(CY+4799)/4-31738-3*((CY+4899)/100)/4
fw00_adj=JD-((JD/7)*7)
fw00_adj=fw00_adj+7-(((fw00_adj+3)/7)*7)
JD=JD+00-1
FW=(")",(OD+fw00_adj-1)/7)['2
FD=+rmdr+1
if FW:eqn:53 if (fw00_adj+leap_adj):ltn:10 FW="01" FY=FY+1
if FW:eqn:0 FY=CY-1 call !leap FY=CY+1
if FW:eqn:0 FW=53-(fw00_adj+1-leap_adj)/6
clear fw00_adj clear leap_adj
FQ = ((FW + 12)/13) - (FW/53)
FM=("0",((((3*FW)+10)/13)-(FW/53)))['2
   FY [ 'Z
FYD=FYC['1
limit=31
if CM:eqn:01 EM="January"
                             RM=" I"
if CM:egn:02 EM="February"
                             RM="11"
                                      limit=28 if leap limit=29
            EM="March"
if CM:eqn:03
                             RM="III"
                             RM="IV" limit = 30
if CM:ean:04 EM="April"
if CM:eqn:05 EM="May"
                             RM=" V"
if CM:eqn:06 EM="June"
                             RM="VI" limit=30
if CM:eqn:07 EM="July"
                             RM="VII"
if CM:eqn:08 EM="August"
                             RM="VIII"
if CM:ean:09 EM="September"
                             RM="IX" limit=30
if CM:egn:10 EM="October"
                             RM="X"
if CM:ean:11
             EM="November"
                             RM="XI" limit=30
if CM:eqn:12 EM="December"
                             RM="XII"
if FD:eqn:1 ED="Monday"
if FD:eqn:2
            ED="Tuesday"
if FD:ean:3
             ED="Wednesday"
if FD:eqn:4 ED="Thursday"
if FD:eqn:5 ED="Friday"
if FD:eqn:6
             ED="Saturday"
             ED="Sunday"
if FD:ean:7
nd=(")", CD+1)['2 if nd:gtn:limit nd="01"
   M if nd:eqn:1 nm=("0",CM+1)['2 if nm:eqn:13 nm="01"
   CYE'2 if nm:eqn:1 if nd:eqn:1 ny=(CY+1)E'2
next=ny,"-",nm,"-",nd clear ny clear nm clear nd clear limit
I*symdl return
!leap leap_adj=0
                  leap="f" q=CY/4 if *rmdr:eqn:0 leap_adj=1 leap="T"
```

if *rmdr:eqn:0 leap_adj=0 leap="F"
if *rmdr:eqn:0 leap_adj=1 leap="T"

q=q/25

q=q/4

```
q=q/10 if *rmdr:eqn:0 leap_adj=0 leap="F"
    r a return
!date ercall !enter date=date
goto ! start
!enter in: "Date : " date=*in return
!explain
!expl out:" "
out: "This program returns the following variables for the current date :-"
out:"- CY : calendar year, four digits"
out:"- FY : fiscal year, four digits"
out: "- FYC : fiscal year of century, two digits"
out: "- FYD : fiscal year of decade, one digit"
out:"- FQ : fiscal quarter of year, one digit"
out: "- CM : calendar month of year, two digits"
out:"- EM : calendar month of year, English language word"
out:"- FM : fiscal month of year, two digits"
out:"- RM : calendar month of year, Roman numerals"
out:"- FW : fiscal week of year, two digits"
out:"- CD
            : calendar day of month, two digits"
out:"- ED : calendar day of week, English language word"
out:"- FD : fiscal day of week, one digit"
out: "- JD : Julian Day, seven digits"
out:"- OD : ordinal day of year, three digits"
"- leap : True (T) if a leap year, false (F) otherwise"
    "- next : Tomorrow, in TEX *date format ( yy-mm-dd)"
Obre " "
out:"It also works for any A.D. date through year 9999 by a call to !date ."
out: "If a variable 'date' (of the form 'yyyy-mm-dd') is not found, then it"
out: "is requested as an input from the terminal."
out:" " return
```

rele sihn@@nale FILE RELEASED SINGLE -list his/pgm/dateanal.r his/pgm/dateanal 1980-03-06 P G Skelly 866-2260 case subs ! scan:("19".*date):"-" i=*1 year=*1 month=*r'12 day=*r1'2 fyc=il'2 fyd=fycl'| call !is_leap_year ord_day=("00",(3055*(month+2)/100-(month+10)/13*2=91+1p*(month+10)/13+day))['3 id=1461*(year+4799)/4=31738-3*((year+4899)/100)/4 t=jd-jd/7*/ fc=t+/-(t+3)/7*/ jul_day=jd+ord_day-1 fw=("0",(ord_day+fc=1)/7)['2 fd=*rmdr+1 i=i-1 call !is_leap_year if fw:eq:53 if (fc+lp):lt:10 fw="01" fyc=(i+2)['2 fyd=fyc['] if fw:eq:0 fw=("0",(53=(fc+1-1p)/6))['2 fyc=il'2 fyd=fycl'] :*symd: clear fc clear i clear jd clear lp clear q clear t return !is_leap_year lp=0 q=i/4 if *rmdr:eq:0 lp=1 q=q/25 if *rmdr:eq:0 10=0 q=q/4 if *rmdr:eq:0 lp=1 q=q/10 if *rmdr:eq:0 1p=0 return !explain !expl out:" " out:"This program returns the following variables for the current date :-" out: "- year : year, four digits" out:"- fyc : (fiscal) year of century, two digits" : (fiscal) year of decade, one digit" out: "- fyd out:"- month : month of year, two digits" out: "- fw : (fiscal) week of year, two digits" out: "- jul-day : Julian Day, seven digits" out: "- ord_day : (ordinal) day of year, three digits" out:"- day : day of month, two digits" out:"- fd : (fiscal) day of week, one digit" out:"- fd out:" " return -_ said to beinteractive, fill a specific need, and a short form of "date" -_ that does need tobe told current date.

```
comment R1 is trapezoidal rule, R2 is Simpson's rule;
 go to compute:
R3: cf[1] := cf[4] := 1.0/8.0;
      cf[2] := cf[3] := 3.0/8.0; go to compute:
R4: |cf(1)| := |cf(5)| := 7.0200.0;

|cf(2)| := |cf(4)| = 32.0/90.0;
      ef[3] := 12 0/900; go to compute;
R5: ef(1) := ef(6) := 19.0/288.0:
      ef[2] := ef[5] := 75.0/288.0
      cf[3] := cf[1] := 50.0/288.0; go to compute;
R6: cf[1] := cf[7] := 41.0/840.0;
      cf[2] := cf[6] := 216.0/840.0:
      cf[3] := cf[5] := 27.0/840.0;
     cf[4] := 272.0/840.0; go to compute;
R7: cf[1] := cf[8] := 75.1/1728.0:
      cf[2] := cf[7] := 357.7/1728.0;

cf[3] = cf[6] := 134.3/1728.0;
      cf[4] := cf[5] := 298.9/1728.0:
compute: da := b - a:
for k := 0 step 1 until rule do
begin
  x := a + k \times da/rule;
  fu[k+1] := F \times cf[k+1]:
ab := 1.0
    Integral := NC(F,x,a,da,fn|k|,k,cf,rule,eps,1.0,ab,0);
  end of Integral;
  comment Now evaluate the integral of 1.0/sqrt(abs(x+y))
    on the unit disk in the x,y-plane;
  real x, y, answer;
 answer := Integral(Integral(1.0/sqrt(abs(x+y)), x,
   -sqrt(1.0-y\uparrow 2), sqrt(1.0-y\uparrow 2), 7, 0.001), y, -1.0, 1.0, 3, 0.001);
end of program;
```

# ALGORITHM 199 CONVERSIONS BETWEEN CALENDAR DATE AND JULIAN DAY NUMBER ROBERT G. TANTZEN

Air Force Missile Development Center, Holloman AFB, New Mex.

```
procedure JDAY (d,m,y,j);
integer d,m,y,j;
```

comment JDAY converts a calendar date, Gregorian calendar, to the corresponding Julian day number j. From the given day d. month m, and year y, the Julian day number j is computed without using tables. The procedure is valid for any valid Gregorian calendar date. When transcribing JDAY for other compilers, be sure that integers of size 3 × 10° can be handled;

```
begin integer e, ya;

if m > 2 then m := m - 3

else begin m := m + 9; y := y - 1 end;

e := y + 100; ya := y - 100 \times e;

j := (146097 \times e) + 4 + (1461 \times ya) + 4 + (153 \times m + 2) + 5 + d + 1721119

end JDAY
```

procedure JDATE (j.d.m.y);
integer j.d.m.y;

comment JDATE converts a Julian day number j to the corresponding calendar date, Gregorian calendar. Since j is an integer for this procedure, it is correct astronomically for noon of the day JDATE computes the day d, month m, and year g, without using tables. The procedure is valid for any valid Gregorian calendar date. When transcribing JDATE for other compilers, be sure that integers of size 3 × 10° can be handled;

```
begin j := j - 1721119:
  y := (1 \times j - 1) + 146097; \quad j := 4 \times j - 1 - 146097 \times n
    d := i + 1:
  i := (1 \times d + 3) + 1161; d := 4 \times d + 3 - 1461 \times i;
    d := (d + 4) + 4:
  m := (5 \times d - 3) \div 153; d := 5 \times d - 3 - 153 \times m
    d := (d+5) \div 5:
  y := 100 \times y + j; if m < 10 then m := m + 3
    else begin m := m - 9; y := y + 1 end;
end 11) 1 TE
procedure KDAY (d,m,ya,k);
integer d.m.vak:
comment KDAY converts a calendar date, Gregorian calendar,
  to the corresponding serial day number k. From the given day
  d, month m, and the last two decimals of the year, va. the serial
  day number k is computed without using tables. The procedure
  is valid from 1 March 1900 (k=1) to 31 December 1999.
  (k = 36465). To obtain the Julian day number j (valid at noon)
  use i = k + 2115079:
begin if m > 2 then m := m' - 3
    else begin m := m + 9; ya := ya - 1 end;
  k := (1461 \times ya) \div 4 + (153 \times m + 2) \div 5 + d
procedure KDATE (k.d.m.ya):
integer k.d.m.ya:
comment KDATE converts a serial day number k to the corre-
  sponding calendar date, Gregorian calendar. It computes day d,
  month m, and the last two decimals of the year, ya, without
 using tables. The procedure is valid from k = 1 (1 March 00) to
 k = 36465 (3) December 99) for any one century. For the 20th
 Century the relation between k and theulian day number i
  (at noon) is j = k + 2415079:
begin ya := (4 \times k - 1) + 1461; d := 4 \times k - 1 - 1461 \times ya;
 d := (d+4) \div 4; m := (5 \times d - 3) \div 153;
   d := 5 \times d - 3 - 153 \times m:
 d := (d+5) \div 5:
```

ALGORITHM 200 NORMAL RANDOM

if m < 10 then m := m + 3

RICHARD GEORGE*

end KDATE

Argonne National Laboratory, Argonne, Ill.

else begin m := m - 9; ya := ya + 1 end:

real procedure NORMAL RANDOM (Mean, Sigma n);

procedure Random; real Mean, Sigma;

integer n;

comment Random is assumed to be a real procedure which generates a random number uniform on the interval (-1, +1). The value of n should be greater than 10, in order to approximate the normal distribution with accuracy. Towever, very large values of n will increase the running time. The use of Mean and Signag should be obvious. Reference: R. W. Hamming, Numerical Methods for Scientists and Engineers;

integer is real sun;

for i := step | until u do sum := sum + Wandom;

 $NORMAL\ RANDOM := Menn + Sigma \times sum \times sqrt\ (3.0/4)$  and  $NORMAL\ RANDOM$ 

## Letters to the Editor

## A Machine Algorithm for Processing Calendar Dates

Key Words and Phrases: calendars, calendar date, Julian date, Gregorian date, Gregorian calendar, Julian calendar, time interval, continuous day count, Fortran statement function, arithmetic statement function, function

CR Categories: 3.1, 3.10, 3.11, 3.15, 3.2, 4.9

#### Entron:

The need to determine the elapsed number of days between any two given calendar dates seems to be a common problem in writing computer programs. Generally speaking, rather elaborate logic is needed to take into account the varying number of days in esch mouth, plus the occurrence of leap years, and perhaps also the omission of a February 29 in years divisible evenly by 100 but not by 400. The following algorithm takes advantage of the truncation feature of integer arithmetic in the Forthan programming language to solve this problem in a very compact way. It converts any given calendar date (I = year; J = month, a number from 1 to 12; K = day of month) to a Julian Date (JD)continuous count of days from an epoch in the very distant past. For example, noon at Greenwich, England, on January 1, 1970, is the beginning of Julian Date 2,440,588. So if I = 1970, J = 1, and K = 1, then the algorithm gives JD = 2440588. Clearly, the interval between any two calendar dates (on the Gregorian Calendar) can be found by obtaining the Julian Date for each, and finding

The algorithm is given below (presented as a FORTRAN arithmetic statement function). It is valid for any Gregorian Date producing a Julian Date greater than zero.

ID (I, J, K) = K - 
$$32075 + 1461*(I + 4800 + (J - 14)/12)/4$$
  
+  $367*(J - 2 - (J - 14)/12*12)/12 - 3$   
 $*((I + 4900 + (J - 14)/12)/100)/4$ 

The authors have yet to discover the algorithm of comparable empatuses for converting a Julian Date back to a calendar date. But in preference to leaving the problem undiscussed, the follow-s is offered (presented as a FORTRAN subroutine):

SUBROUTINE DATE (JD, I, J, K)

L = J1) + 68569N = 4*L/146097

L = L - (146097*N + 3)/4l = 4000*(L + 1)/1461001

 $L = \frac{1000 \cdot (L + 1)}{14610}$  $L = L - \frac{1461 \cdot I}{4} + 31$ 

J = 80*L/2447K = L - 2447*J/80

L = L - 2447*3/80L = J/11

J = J + 2 - 12*L1 = 100*(N - 49) + 1 + L

RETURN END

HENRY F. FLIEGEL
Georgetown University Observatory
Washington, D.C.
AND
THOMAS C. VAN FLANDERN
U.S. Naval Observatory
Washington, DC 20390

## On "Prime Phrase" in Feldman and Gries Paper

Key Words and Phrases: compilers, operator precedence, translator writing systems

CR Categories: 4.12

EDITOR

The article by Feldman and Gries on Translator Writing Systems [Comm. ACM 11, 2 (Feb. 1968), 77-113/1s an excellent one, but one error in it ought to be corrected. In their description of operator precedence parsing on page \$2, they give a definition of a prime phrase as "a phrase which contains no phrase other than itself but at least one terminal character." In Floyd's original article on the subject [J.ACM 10 (Jul. 1963), 316-333], a prime phrase was defined to be a phrase which contains no prime phrase other than itself but at least one terminal character. It may not be obvious that the two definitions are not equivalent. The difference shows up when the grammar in question has a production whose right side consists of one nonterminal symbol.

Consider the grammar:

 $S \rightarrow aU_1b$   $U_1 \rightarrow U_2$  $U_2 \rightarrow b$ 

Then in the sentence " $aU_2b$ ", " $U_2$ " is a phrase but not a prime phrase by either definition. Hence " $aU_2b$ " is a prime phrase by Floyd but not by Feldman and Gries.

If Feldman and Gries's definition is used, a parse may reach a state where there are no prime phrases and hence the parse cannot be continued.

PAUL ABRAHAMS
New York University
Courant Institute of Mathematical Sciences
251 Mercer Street
New York, NY 10012

#### Do You Use Microfiche?

Key Words and Phrases: microfiche, user study, document surrogates

CR Categories: 3.7, 3.72, 3.79

EDITOR

There has been a growing tendency for Federal agencies to encourage, usually through differential pricing, the distribution of microfiche instead of full size copies of reports. The economic advantages of microfiche are obytous to the issuing agencies (and to the General Accounting Office); agency distribution lists show that some libraries actually prefer to receive microfiche. We have little information, however, on the acceptance and use of microfiche by individual scientists and engineers.

I have been asked by COSATI (the Committee on Scientific and Technical Information of the Federal Council for Science and Technicogy) to look into this matter. Those of your readers who have actually been offered the opportunity of using microfiche and have strong opinions on such subjects as legibility, convenience, availability, and quality of readers and reader-printers and kindred topics are encouraged to write to me. I am especially interested in hearing from those who have found it possible, or even preferable, to use microfiche in quantaining their personal

## Letters to the Editor

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+  $367 \cdot (J - 2 - (J - 14)/12 \cdot 12)/12 - 3$   
*( $(I + 4900 + (J - 14)/12)/100)/4$ 

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** BROUTINE DATE (JD, I, J, K)
- JI) + 68569
- 4*L/146097
- L - (146097*N + 3)/4
- 400*(L + 1)/1461001
- L - 1461*I/4 + 31
- 80*L/2447
- L - 2447*J/80
- J / 11
- J + 2 - 12*L
- 100*(N - 49) + I + L

HENRY F. FLIEGEL
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New York University
Courant Institute of Mathematical Sciences
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Y2=Y3
         Y3=Y4
X4=X5
         14=15
A1=A2
         B1=B2
          BARACE
                               50 TE 42
         1F(1.6E.LM1)
         K5#K5+M0
          Y5=V(K5)
          H4=Y5-Y4
                               M4=84/A4
          IF(MDM1.EG.0)
                               5.4157+53-A2
          IFCHOMI .NE.02
          B4=83.83-82
18(1.E0.1)
                                63 10 31
          GR TR (50,55), MUO
G NUMERICAL DIFFERENTIATION
          W2=ABS(M4-M3)
          W3=ABS(M2-M1)
5W=W2+W3
                                Gp Tp 52
           1F(SW.NE.0.0)
           H2=0.5
           13×( EM*EN-3+M3)/SK
           1F(1-1) 80.80.60
          C052=C053
           SIN2=SIN3
W2=ABS(A3*B4-A4*B3)
     56
           #3#AB5(A1*B2-A2*B1)
IF(#2*#3.NE.D.O) GB
#2=SQRT(A3*A3*B3*B3)
           W3=SURT(A2+A2+B2+B2)
           Ces3: W2*A2+W3*A3
SIN3: W2*B2+W3*B3
R=Ces3*Ces3+SIN3*SIN3
                                 GO TO 58
           1F(R.EQ.0.0)
           R=SQRT(R)
CDS3=CDS3/R
            SIN3=SIN3/R
           1F(1-1) 80,80,65
     58
          RMINATION OF THE COEFFICIENTS
            22=(2.0*(M2-T2)+M2-T3)/A2
            Q3=(-M2-M2+T2+T3)/(A2+A2)
            G0 T0 70
            R=SQRT(A2+A2+B2+B2)
            P1=R*C052
P2=3.0*A2-R*(C052+C052+C053)
            P3*A2-P1-P2
            02=3.0+B2-R*(SIN2+SIN2+SIN3)
            66 TR 75
  C COMPUTATION OF THE POLYNOMIALS
            DZ=A2+RM
            Z=0.0
D0 71 J=1,MM1
               Z#Z+DZ
```

```
UCK)=PO+Z
V(K)=Q0+Z*(Q1+Z*(Q2+Z*Q3))
```

DØ 76 K=K+1 J=1.MM1 Z=Z+RM U(K)=P0+Z*(P1+Z*(P2+Z*P3)) V(K)=90+Z+(Q1+Z*(Q2+Z+Q3)) 76 CONTINUE

## 80 C. ERROR EXIT

90 WHITE (1U.2090) 91 WHITE (10,2091) 92 WRITE (10,2092) GO TO 99 93 WRITE (1U,2093) GO TE 99 WRITE (10,2095)

```
9e wallt (10,2076)
48 -HITE (10.2093) 1.X(1).Y(1)
99 WHITE (10,2099) MDO,LO,MO,NO
```

C FRAMAI STATEMENTS

```
MD BUT OF PROPER HANGE. /)
2090 FORMATCIAZOIN ***
2090 FRAMATCIA/SIH

2091 FRAMATCIA/22H

2092 FRAMATCIA/22H

2095 FRAMATCIA/23H

2096 FRAMATCIA/23H
                                                 L = 1 CA LESS./)
M = 1 CA LESS./)
IMPACPER N VALUE./)
2005 FRANCILIA/294 ... ISPANCER N VALUES//)
2006 FRANCILIA/294 ... QUELES CUT OF SEQUENCE.//)
2008 FRANCILIA/294 ... IDENTICAL X AND T VALUES.//
2008 FRANCILIA/394 ... ISPANCER N VALUES.//
                                                  10x.6HY(1) =, E12.3)
2099 F2HMAI(7H MD =,14.8A.3HL =,15.8X.
                        35H ERROR DETECTED IN HOUTINE
```

## Remark on Algorithm 398 |Z|

Tableless Date Conversion | Richard A. Stone, Comm. ACM 13 (Oct. 1970), 621]

J. Douglas Robertson [Recd. 16 Dec. 1970 and 30 Mar. 19711 200 Oakcrest Drive F-161, Lafayette, LA 70501

Key Words and Phrases: date, calendar, Fortran statement function, arithmetic statement function

CR Categories: 3.15, 4.9, 5.9

As a companion to Algorithm 398, 1 offer a relatively compact algorithm for calculating the day of the year on which a particular date falls given the year, month, and day of the month. The algorithm is written below as a Fortran arithmetic statement function, where I is the year; J is the month, (1 = Jan, ..., 12 = Dec); and K is the day of the month.

$$IDAY(I,J,K) = 3055*(J+2)/100 - (J+10)/13*2 - 91 \\ + (1 - (I-J/4*4+3)/4 + (I-J/100*100+99)/100 \\ - (I-J/400*400+399)/400)*(J+10)/13 + K$$

The above, along with Stone's Algorithm 398, Robert G. Tantzen's Algorithm 199 [2], and the two algorithms by H.F. Fliegel and T.C. Van Flandern [1] constitute a comprehensive set of algorithms for processing calendar dates. A useful addition to this set would be an algorithm for Zeller's Congruence (calculates the day of the week on which a particular date falls) as described in [3]. It appears below as a Fortran arithmetic statement function, where I is the year; J is the month, (1 = Jan, ..., 12 = Dec); and K is the day of the month.

IZLR(I,J,K) = MOD((13*(J+10-(J+10)/13*12)-1)/5+K+77)+5*(I+(J-14)/12-(I+(J-14)/12)/100*100)/4+ (I+(J-14)/12)/400-(I+(J-14)/12)/100*2,7)

Fliegel, H.F., and Van Flandern, T.C. A machine algorithm for processing calendar dates. Comm. ACM 11 (Oct. 1968), 657. Tantzen, Robert G. Conversions between calendar date and Julian day number, Algorithm 199, Comm. ACM 6 (Aug. 1963), 444.

3. Uspensky, J.V., and Heaslet, M.A. Elementary Number Theory. McGraw-Hill, New York, 1939, p. 206.

Communications of the ACM

October 1972 Volume 15 Number 10

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York, 1961.
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soc: 54 (1959)
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Vir Force I Science

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m (101)

is any nonnegative integer c (representing cost), an m-disaction of c relative to w is an m-tuple  $(a_1, a_2, \cdots, a_m)$  such the  $a_i$  are nonnegative integers, and such that  $\sum_{i=1}^{n} a_i w_i$ The m-distribution (a1 , a2 , ... , am) is minimal if, for any distribution  $(b_1, b_2, \cdots, b_n)$  of c relative to w, we have  $\sum_{i=1}^n a_i \le \sum_{i=1}^n b_i$ . The m-distribution  $(a_1, a_2, \dots, a_m)$  is gadard if it is obtainable as follows:

 $c_i = c_{i+1} - a_{i+1} \times w_{i+1}$  $(i=m-1, m-2, \cdots, 1)$  $a_i = c_i/w_i$  $(i=m, m-1, \cdots, 1)$ abere all divisions are integer divisions)

# MINDIST (C, M, SENSE, W, RESULT) is called with a anegative integer C, a positive integer M, and an array  $i = (W[1], W[2], \dots, W[M])$ , then the resulting array  $\textit{RESULT} = (RESULT[1], RESULT[2], \cdots, RESULT[M])$ saminimal M-distribution of C relative to W. If, before calling WINDIST, SENSE is set to true, then MINDIST retains EYSE as true if and only if RESULT is also a standard Membution of C relative to W.

CHING, S. K., AND GILL, A. Algorithmic solution of the

integer array A[1:M], B[1:M]; en to EXIT rud  $I(Q \times W[M]) > C$  then Q := Q - 1;  $\mathbb{E} = \mathcal{C} - W[M] \times Q;$ 

dM = 2 then legin RESULT[1] := R; RESULT[2] := Q;go to EXIT

end: WINDIST  $(R+J\times W[M], M-1, SENSE, W, B);$ dJ ≠ 0 then go to NOT ZERO;

 $\operatorname{for} I := 1 \operatorname{step} 1 \operatorname{until} M - 1 \operatorname{do} A[I] := B[I];$ AM := 0; MMA: if J = Q then

for I := 1 step 1 until M do RESULT[I] := A[I]; so to EXIT

tod;  $\delta UM := 0;$ for I := 1 step 1 until M do SUM := SUM + A[I];  ${\rm ff}\left(\mathbb{W}[M] \times SUM - R - J \times \mathbb{W}[M]\right)/(\mathbb{W}[M] - \mathbb{W}[M-1]) \leq 0$  then

 $\mathsf{for}\,I:=1\,\mathsf{step}\,1\,\mathsf{until}\,M-1\,\mathsf{do}\,RESULT[I]:=A\{I\};$ REBULT[M] := A[M] + Q - J;

go to EXIT end; J := J + 1;to LOOP;

NOT ZERO: SUM := 0; SUN := 0; for I := 1 step 1 until M do SUM := SUM + A[I];for I := 1 step 1 until M - 1 do SUN := SUN + B[I]; if SUM < SUN then begin A[M] := A[M] + 1; go to GAMMA end; SENSE := false: go to BETA;

end PROCEDURE MINDIST

TABLELESS DATE CONVERSION* [Z] RICHARD A. STONE (Reed. 2 Jan. 1970 and 6 April 1970) Western Electric Company, P.O. Box 900,

Princeton, NJ 08540 Patent applied for.

KEY WORDS AND PHRASES: date, calendar

procedure calendar(y, n, m, d); value y, n; integer y, n, m, d, t;

comment calendar is called with the year in y and the day of the year in n. The month number is returned in m, and the day of the month is returned in d. The first section of the procedure changes days preceeding each month.

Error detection: m will be in the range 1-12 if and only if n is in the correct range;

begin

 $t := if (y \div 4) *4 = y then 1 else 0;$ comment The following statement is unnecessary

 $t := if (y+400)*400 = y \lor (y+100)*100 \neq y then t else 0;$ d := n + (if n > (50+t) then 2 - t else 0);m := ((d+91)*100) + 3055;

 $d := (d+91) - (m*3055) \div 100;$ m := m - 2end calendar

ALGORITHM 399

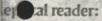
SPANNING TREE [H] Jouro J. Seppänen (Reed. 6 Jan. 1970 and 8 May 1970)

KEY WORDS AND PHRASES: graph, tree, spanning tree

procedure spanning tree(v, e, I, J, p, T); value v, e; integer v, e, p; integer array I, J, T;

Ct: The Lockheed I compiler that makes th IBM and other brands limited-performance s with an expandable

tem III brings you fielddes multi-tasking in ation. It's easy to use run it in a short time



reat idea, why aren't firms offering low-cost xpandability? Answer: om the company that plane, the world's o world's biggest plane; wilt more spacecraft than my that built the recorders rom Jupiter and Mars that's why no one else lockheed System III

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# TGIF Algorithms

By R. A. Cornish

he pace of most large opertain days such as Saturday or Sunday, and some process control programs need calendar control functions on those days.

The following algorithms, for exam-ple were originally developed for a power management system used to limit peak demand. A requirement of this system was to shur down airconditioning and heating units over the weekend. Because of economic factors, a limitation in core size precluded the use of a high-level language requiring a compiler or interpreter. large software routines such as float-

Because of these limitations, the only requirements for these algorithms are a standard instruction set, arithmetic/ logic capability and multiply/divide routines, either hardware or software. All the algorithms in this article will be outlined step by step, followed by a table to illustrate the algorithm. The following labels will be used to denote either registers or memory locations. All ranges in parentheses are in base

MO- Month (01-12): input to com

poter, stored in binary.

DY - Day (01-31), input to computer, stored in binary.

YR - Year (00-99), input to computer, stored in binary.

YR - Year (00-00); input to com-DM - Maximum days in a month

(01-31), calculated.

DAYS — Elapsed days in a year (000-366), calculated.

DW — Day of the week (0-6); calculated.

FD - First day of the year (0:0): catcolined

The intent of these algorithms may be simply stated as follows: When an operator enters the MQ/DY/YR as operator enters the MO/DY/R as 10/02/26 the computers stores the enter as 76: 275 (YR. DAYS) and responds with Monday, October 2, 1878. In this example, the labels defined previously would be: MO—10 to 1874. DM - 31 DAYS - 275

The first algorithm is used to ensure that an operator entry does not exceed the maximum days in a month such as

Since all of the algorithms calculate leap years; it should be pointed out that in the Gregorian calendar, the beginning of acentury is not necessarily a leap year even though the year is evenly divisible by four. If the first two digits are divisible by four with no remainder, it is a leap year. Thus 1900

and 2100 are not leap years, whereas

This may be important if you are us ing an extended cash flow analysis on your project. In these algorithms, however, the current century (1900) is always added to the YR entry to deter-(Continued on In Depth/29)

IN DEPTH I NEDICH 21

When the primary purpose of the computer is process control, the software is invariably written in assembly language. In some processes, it may be necessary for the computer to ascertain when the weekend occurs (and tell the operator). The four algorithms in this article have been developed by the author toward this

	MO -	1A	18	ıc .	10	16
JAN	0001	1	31		- Marie	4
PEDI	0010	0				29,29
IAR	0011	1	31 .			5.457
PR .	0100	0		1000	30	BG-
TAY	0101	1	31			
JUN	0110	0		4.55	50	
TUL.	0111	1	31		200	1
wg	1000	120	31			
EP	1001	0		30	1	
ct	1010	151	n			能學
ov	1011	0	4 3	30	7	明言
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(Continued from In Depth/27)

Algorithm I: Given the MO and YR. find the maximum days in the month (DM).

This algorithm is based on the relationship between the most significant bit (MSB) and the least significant bit (LSB) of the number of the month expressed in binary.

1A. Exclusive OR the MSB with the LSB of MO.

1B. If the result is I, the number of days (DM) is 31. Exit.

If the result is 0, and the MSB is 1. the number of days (DM) is

ID If the result is 0, the MSB is 0, and the second MSB is 1, the number of days (DM) is 30.

1E. If the result is 0, and the MSB is 0, and the second MSB is 0, the number of days (DM) is 29, if

(1900 + YR) is divisible by 4 with no remainder, 28 if not. Table 1 (on In Depth/27) illustrates

the steps.

Algorithm 2: Given the MO, DY and (R, find the elapsed days (DAYS). This algorithm depends on finding

the number of days up to the month given to which DY can be added. 2A Subtract 1 from MO, multiply the result by 30 and store the

product P Subtract I from MO, divide the result by 2 and store the quotient

Q and the remainder R. Add Q + R + P and store the re-

2D. If Q is greater than 3, and R is equal to 0, add 1 to B and store the result in B.

2E. If Q is equal to 0, the elapsed days (DAYS) is equal to B + DY.

2F. If Q is not equal to 0, and (1900 + YR) is divisible by 4 with no remainder, the elapsed days (DAYS) is equal to B - 1 + DY.

2C. If Q is not equal to 0, and (1900

+ YR) is not evenly divisible by
4, the elapsed days (DAYS) is
equal to B - 2 + DY. Exit.
These steps are shown in Table 2.
Algorithm 3: Given the YR and
DAYS, find the MO and DY.

This algorithm takes advantage of the symmetry in the number of days in the month of the periods March through July and August through De-

3A. Divide (1900 + YR) by 4. If the remainder is 0, subtract of from DAYS. If the remainder is not 0,

subtract 60 from DAYS.
3B. If the result of the subtraction is negative, set MO equal to 0, subtract I from DAY5 and store the result in DAYS.

If the result of the subtraction in 3A is not negative, store the re-sult in DAY5 and subtract 153 rum DAYS

JD. If the result of the subtraction is

Flapsed Days (DAYS) From MO, DY and YR

	2A	1	2B	20	2D	.2E	29	. 2G
- 72.2	P	0	R	В	B	DAYS	DAYS	CAYS
JAN	0	0	a	0	200	Q+DY		3 5
FEB	30	0	1	31	100	31+DY		3.7
MAR	60	1	0	61			60+DY	59+D1
APR'	90	1	1	92		344	91+DY	90+py
MAY	120	2	0	122		Property of	121+DY	120+DY
JUN	150	2	1	153		100	152+DY	151+DX
JUL	180	3	0	183			182+04	181+DY
AUG	210	3	1	214		0	21.3+0Y	212+DX
SEP	240	4	0	244	245	THE RE	244+DY	243+DY
OCT	270	4	1	275		1	274+DY	273+01
NOV	300	5	0	305	306		305+DY	304+DY
DEC	330	5	1	336	art Jan	100	335+07	334+pY

egative, set MO equal to 2. 3E. If the result of the subtraction in 3C is not negative, store the re-sult in DAYS and set MO equal 3F. Divide DAYS by 61 and store the

quotient Q1 and remainder R3 aG. Divide the remainder R1 by 31

and store the quotient Q2 and

remainder R₂:

3H. DY is equal to R₂ + 1.

(Continued on In Depth/30)

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## IN DEPTH

(Continued from In Depth/29)
31. MO is equal to MO ± 2Q1 + Q2

This algorithm for a nonleap year is illustrated in tables 3A and 3B.
Algorithm 4: Given the YR and DAYS, find the day of the week (DW).
This algorithm is based on the fact that the same day of the week occurs on the same date every 28 years. In order to determine the day of the week (DW), the first day of the year must be determined. Although the Gregorian calendar was not instituted until 1582. this algorithm would compute January 1, 0001 as Sunday. Create a file of literal strings with ad-

dress DYFL as follo

DYFL + 0 - Sunday

1 - Monday

- + 2 Tuesday + 3 Wednesday
- + 5 Friday + 6 Saturday
- This algorithm computes the relative file address (DW = 0-6). A similar file for souths can created with (MO-1)

or enths can created with (MO-1),
e relative file address,
event file address,
event file address,
event file file file
squal to 0, set R₁ equal to 2a.

Subtract 1 from R₁ and divide
the result by 2. Store the quotient O₂ and the remainder R₂
Multiply the quotient O₂ by 5
and divide the product by 7.

Store the remainder R₃
4D. Add R₂ + R₃ and subtract 7. If
the result is not regardize, store

the result is not negative, store the result in ED (First Day). If the result is negative, store R 2 (Continued on In Depth/32)

Account

for project time

and cost.

Suc.	DAYS	3A -60	3B DAYS	3C DAYS	3D -153	3E DAYS	мо
JAN	1- 31	-	0-30				0
FEB	32- 59	1	31-58		132		0
MAR	60- 90		acity.	0- 30	-		2
APR	91-120	*	Park.	31- 60		34.15	2
MAY	121-151	+		61- 91	-		2
JUN	152-181			92-121	-		2
JUL	182-212			122-152	-	of the first	2
ADG	213-243	+	-August	153-183	+	0- 30	7
SEP	244-273	+30	Distant.	184-213		31- 60	7
OCT	274-304		1	214-244	+	61- 91	7
NOV	305-334	+		245-274	+	92-121	7
DEC	335-365	-	13	275-305	+	122-152	7
1	7	Carried States	A SHE	100	1	1000	18

Table 3A

5	3A-3E			3F		3G		33
14 3	DAYS	MO	Q ₁	R	02	R ₂	DA	MO
JAN	0- 30	0	0	0-30	0	0-30	1-31	1
PEB	31- 58	0	0	31-58	1	0-27	1-28	2
MR	0- 30	2	0	0-30	0	0-30	1-31	3
APR	31- 60	2	0	31-60	1	0-29	1-30	4
MAY	61- 91	2	1	0-30	0	0-30	1-31	5
JUN	92-121	2	1	31-60	1	0-29	1-30	1 6
JUL	122-152	2	2	0+30	0.	0-30	1-31	7
AUG	0- 30	7	0	0-30	0	0-30	1-31	8
SEP	31- 60	7	0	31-60	1	0-29	1-30	9
OCT	61- 91	7	1	0+30	0	0-30	1-31	10
NOV	92-121	7	1	31-60	1	0-29	1-30	11
DEC	122-152	7	2	0-30	0	0+30	1-31	12



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## GIF ALGORITHMS

## IN DEPTH

(Continued from In Depth/30)

Ry in FD.

4E. Divide the elapsed days (DAY5) by 7 and store the remainder R4. If R4 is equal to 0, set R4 equal

4F. Subtract 1 from R4 and store the result in R4. 4G. Add FD + R4 and subtract 7. If

the result is not negative, store the result in DW. If the result is negative, store FD + R4 in DW

Table 4 illustrates this algorithm for the years 1961 through 1988. Table 4A ws the conversion from FD to DW



R.A. Cornish is a senior engin Western Electric's Mountain-Northwestern Regional Headquartees. He is presently engaged in the design of hardware and sufficient for process control and test set computer systems

He has a B.S.E.F. from Manhattan College, N.Y. (1959) and an M.S.E.E. from the Polytechnic Institute of N.Y.

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EAR	4A R ₁	Ω2	4B R ₂	4C .	40 20	535°
1	(C.S. 44)	-2	2	3	-	
61	1	0 -	0	0	0	SUN
62	2 3	0	1	0	1	HON
63	3.5	0	2	0	2	TUE
64	4	0	3	0	3	WED
65	5	1	0	5	5	FRI
66	6	1	1	5	6	SAT
67	7	1 1	2	5	0(7)	SUN
6.0	- 8	1	3	. 5	1(8)	MON
69	9	2	.0	3	3	WED
970	10	2	1	3	4	THU
71	11	2	2	3	5.	FRI
72	.12	2.0	3	3	6	SAT
73	13	3	0	12	1	MON
74	14	2	- 1	1	2	TUE
75	15	1	2	1	3 20	WED
76	16	3	3	1	4	THU
77.	17	4	0	- 6	6	SAT
78	18	4	1.	6	0(7)	Stilt
79	19	1-34	2	6	1(8)	NON
180	20	4	13	6	2(9)	SUE
01	21	5	0	4	4	THU
B2	22	. 5	-1	4	5	ERI
83	23	5	2	4	6	SAT
14	24	5	3	4	0(7)	SUN
85	25	6	0	2	2	TUE
06	26	4	1	2	3	WED
87	27	-6	2	2	4	THU
88	28(0)	6	0.00	2	5	PRI

4E	R ₄	1	- 2	3	4	5	6	7 (0)
4G	R4	0	1	2	3 1	4	5	6
PD 0	SUN	D	1	2	3	4	5	6
1	MON	1	2	3	4	5	6	0
2	TUE	2	3	4	5	6	0	1
3	WED	3	4	5	6	0	1	2
4	THU	4	5	6	. 0	1	2	3
5	PRI	5	6	0	1	2	3	4
6	SAT	6	0	1	2	3	4	5

Table 4A

## On Photographic Patent Gra

By Howard A. Karten

CW Staff
PALO ALTO, Calif. - A patent for reading and writing data on silver halide photographic plates using lasers was recently granted to Drevler Technology Corp. whole new era of data storage in which one billion bytes could be stored on a disk 22 in, in diame-

ter by 1/10th in thick.

Although no working devices based on the patent have yet been constructed, a prototype could be built within six months, and practical, working versions could be available within two years, according to Jerome Drex-

## Amdahl Oper For East Coas

By a CW Staff Writer COLUMBIA, Md. — Amdahl Corp has taken steps to expand services for its East Coast cus- rationiers with the opening of a systems support center here.

The eastern systems support larg user education, a parts depot and the company's around-the-clock remote trouble-shooting system. the Amdalıl Diegnostic Assis-

Lance Center (Amdac).

A spokesman for the Sunny-vale, Calli, firm, which cur-sently divides the eastern and southeastern regions of the U.S. into six support regions, said the center will augment the services of the hardware and software specialists available within each

In addition, the eastern support center will benefit both cus-tomers and the company, he claimed. We have grown to the point where it's not practical to try to run the whole world out of Sunnyvale, so we are decentralizing some functions out to the field. We are putting those func-

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## ETTERS

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for a five-day session on the subject of our choice in our own city; attend the Caravan for hardware; or read Computerworld to gather an awareness of what is happening.

E.R. Tauber

Franklin Park, Ill.

## Chill in the Air

Here are two items which may also have contributed to the poor attendance of the National Computer Conference technical sessions:

 Coldness in the ballrooms. I spent three days in the technical sessions. Most of these were held in the ballrooms. For example, I spent an entire day in the Regent Ballroom at the New York Hilton. By the time I got out, I was shivering while wearing a longsleeve dress and a lined raincoat.

I have mentioned this situation to the hotel people. They think only conference officials should make requests for higher temperature. Evidently, no one observed this or requested adjustment.

 Paper listings in the proceedings and technical session program. The papers in the proceedings were listed according to subject. There were no cross-listings of authors and sessions. But in many instances, a single session covered three papers, all listed under different subjects.

Only a handful of attendees obtained the detailed lists of papers and authors in the session program booklet. I was preregistered, but I was not given this booklet. It becomes hard to preview the contents of the paper and determine which session is of most interest.

Dr. Elizabeth H. Yen

## On TGIF Algorithms

Useful additions to the TGIF Algorithms in R.A. Cornish's article [CW, June 4] are the four parts of the Association for Computing Machinery Algorithm #199. These four computation-only algorithms convert dates to and from Julian day integers. The long version handles the 10 century span from 1582 to 2582. The short version handles the 20th century.

Carrying the Julian day integer instead of the date internally makes such

FORTRAN 0001	V G LEVEL 21 YMD1 DATE = 79165  CINPUTS IVR - YEAR (1 10 92)  HO - MONTH (1 TO 12)  CUUTPUTS IDVTR - DAY OF MONTH (1 TO 31)  CUUTPUTS IDVTR - DAY OF CENTURY (FROM JAN 1, 1901)  LOVYR - DAY OF YEAR (1 TO 300)  LOVYR - DAY OF YEAR (1 TO 300)  LOVYR - DAY OF YEAR (1 TO 300)  LOVYR - DAY OF WERE 11 TO 300)  LOVYR - DAY OF WERE 11 TO 300]
0002 0003 0004 0005 0006 0007 0008 0009	C IDYN - DAY OF YEAR (1 TO 300)  LEAPYR 27 DAY OF MERK (1 TO 7, MON IS 1)  F (1YRK-0-1-E) IYR LEAPYR-1  DYN = 1MD-275/9-1DYNG-30  IF (1MD-67-2) IDYN-1DAPYR  DYCT - (1YR-1)-14-01/4-1DYNR  REIDYCT - 1DYCT-7*7*1  END
0001	CSUBROUTINE YMD2(1YR,1MJ,1DYCT,1DYYR,1DYMG,1DYWK) CDIPUTS 1178 - URA OF YOR (1 TO 366) C
0002 2003 2004 0005 0006 0007 0009 0010	LFAPR = 2 IF ((IVR/)_EU_IK) LEAPYR=1 IFENP = 10YR IOYNG = 11EHP+2091/275 10YNG = 11EHP+2091/275 10YNG = 11EHP+1461/10YR 10YNG = 11EHP-1461/10YR 10YNG = 11EHP-1461/10YR RETURN = 10YC1-10YC7/7-7+1
0001	CINPUTS IDYCT - DAY OF CENTURY IDYRA IDYMO 1 DYMA 1 TOYAR I DYMA 1 TOYAR IDYMO 1 DYMA DAY OF TEAR (1 TO 366) IDYMM - DAY OF TEAR (1 TO 366) IDYMM - DAY OF TEAR (1 TO 366) IDYMM - DAY OF TEAR (1 TO 366)
0002 0003 0004 0005 0006 0007 0007 0007 00012	C IDYYN - DAY OF WORTH 15 TO 366) C IDYMO - DAY OF WORTH 15 TO 31 IYN - 10 YOF YOF YOR

Figure 1. Three Subroutines for Data Conversion

Old Steps	New Step	Procedure
4A,4B	4A'	Divide (YR+1899) by 4 and store the quotient in $\mathbf{Q}_1$ and the remainder in $\mathbf{R}_1$ .
4C	4B*	Multiply $Q_1$ by 5 and store the product in $R_2$ .
4D,4E,4F	4C'	Add R ₁ , R ₂ and DAYS, subtract 1 and store the result in R ₃ .
4G	4D1	Divide R3 by 7 and the remainder is DW.

Figure 2. Compact Version of TGIF Algorithm

## Simplifying Algorithm

The article "TGIF Algorithms" in the June 4 issue caught my eye, since I had hunted (successfully) for a day-of-the-week algorithm some time ago. Algorithm 4 in the article has an error in step 4B (the division should be by four, not two), but otherwise seems to work, at least for the dozen or so dates

will recognize that the algorithm can be simplified considerably by the recognition that "modulo n" arithmetic gets heavy usage in this algorithm and that for the modulo 7 arithmetic, considerable compaction of the algorithm can occur.

Without resorting to a complete dissection of the algorithm, here is an equivalent [See Figure 2 above].

TIME

The following algorithms are reprinted from *The Computer Bulletin* (see *The Computer Journal*, Vol. 21 no. 3, p. 276).

Algorithm 2. FIBONACCI SEARCH M. C. Pike, J. Pixner Medical Research Council Statistical Research Unit.

real procedure Fibonacci search (a, b, eps, fval, f);

begin

```
value a, b, eps; real a, b, eps, fval; real procedure f;
comment this procedure finds within plus or minus eps the
position of the minimum of the function f(x) in the range
a < x < b by the optimum minimax method (J. Kiefer, Proc.
Am. Math. Soc. 4 (1953), p. 502). f(x) must be monotonic
decreasing from x = a to the minimum position and then
monotonic increasing to x = b.
On exit fval contains the minimum value of the function;
begin real e, ff1, ff2, p1, p2;
  integer n, nn, f1, f2, c;
  Boolean equal:
  cqual := false:
  f1:=n:=1; f2:=2; e:=(b-a)/eps;
  AGAIN: if f2 < e then
  begin n:=n+1; c:=f1; f1:=f2; f2:=c+f2;
  go to
  AGAIN end:
  p2 := (f1|f2) \times (b-a) + a; p1 := a+b-p2;
  ff1 := f(p1); ff2 := f(p2); nn := 2;
  begin integer array fibno[1: n];
    fibno[1]:= 1; fibno[2]:=2;
    for c := 3 step 1 until n do fibno[c] := fibno[c - 1]
                                             + fibno[c - 2]:
    REPEAT: if ff2> ff1 then
    begin b := p2; p2 := p1:
    p1 := b - (fibno[n - nn + 1]/fibno[n - nn + 2]) \times (b - a);
      comment this instruction may be replaced by
      pl := b - p2 + a but rounding error trouble may
      become so
      evident if pl is calculated in this way that
      it leads to a collapse of the procedure;
      f(2) = f(1) : f(1) = f(1)
    end
    else
    begin a := p1; p1 := p2; p2 :=
      a + (fibno[n - nn + 1]/fibno[n - nn + 2]) \times (b - a);
      ff1:=ff2; ff2:=f(p2)
    if equal \wedge ff1 = ff2 then go to EXIT;
    equal:= if ff1 = ff2 then true else false;
    nn := 1 + nn; if nn < n then go to REPEAT:
    EXIT: end;
If f/2 < f/1 then
begin fval:= ff2; Fibonacci search:= p2 end
begin fval:= ff1; Fibonacci search:= p1 end
  end
  end;
```

has 30 bits. On other computers with more bits in the mantissa these results will undoubtedly be different. In general the better the real number representation the better the chances are that Algorithm 2 will meet its stated sion.

he principles of the Fibonacci Search may be found in Bellman "Dynamic Programming" Chapter I or Bellman "Applied Dynamic Programming" Chapter IV, two references which are more recent and readily available than the one cited by the authors of the Algorithm. The process of locating the minimum of a unimodal function may be accomplished by trisection, as shown in the procedure MINX, above. In view of the relative simplicity of MINX, it would be informative to learn from the authors of Algorithm 2 the circumstances under which its apparent complexity is justified.

Certification of Algorithm 2. FIBONACCI SEARCH

J. Boothroyd

University of Tasmania Computing Centre

Algorithm 2 was transcribed into Elliott 503 algol (after making minor changes to accommodate certain 503 algol restrictions) and tested using the functions abs(x) and  $7x^2 + 2x + 4$ , for several values of a, b and eps. As indicated in the commentary of the procedure, the FIBONACCI SEARCH algorithm should locate the position of the minimum of a function within an interval of length eps. The results for abs(x), with a well-defined minimum, were all within specification. For the quadratic, however, the procedure failed to meet the specified precision in the following four cases out of fourteen tried.

```
Fibonacci(xmin) fval(f(x)min)
                 eps
                 10-5:
                         -0.14288052
                                         3-85714286
                 10-6.
-1
                         -0.14288010
                                         3-85714286
                 10-6.
-- 15
                         -0.14288868
                                         3.85714286
-2
        -0-1
                10-6:
                         -0.14287128
                                         3.85714286
```

The mantissa of the 503 floating-point number representation

```
See also The Computer Journal, Vol. 9 no. 4, pp. 414, 416, 417.

Algorithm 3. EASTER

I. D. Hill

Medical Research Council
```

procedure easter (d, m, y);

value y; integer d, m, y; comment y is the year. At exit, d and m are the day and month, respectively, of Easter Sunday in that year. The result is valid only for the Gregorian calendar, introduced in 1582 (1752 in Britain).

The method is that given by O'Beirne (New Scientist, 1961, 9, 828);

Statistical Research Unit.

```
begin procedure divide (x, z, q, r); value x, z; integer x, z, q, r; begin q:=x\div z; r:=x-z\times q end divide; integer a, b, c, h; divide (y, 19, m, a); divide (y, 190, b, c); divide (y, 100, b, c); divide (b, 4, d, y); divide (b, 4, d, y); divide (c, 4, b, d); divide (2\times (y+b)-h-d+32, 7, m, c); h:=h+c-7\times ((a+11\times h+19\times c)\div 433); m:=(h+90)\div 25;
```

divide  $(33 \times m + h + 19, 32, b, d)$ 

end easter;

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University of Tasmania Computing Centre

Algorith 3 has been tested using Elliott 503 ALGOL and yielded results in agreement with those obtained from D. E. Knuth's procedure Easter [Comm. ACM 5 (April 1962), 209 and (Nov. 1962), 556], for the years 1752 through 2000.

Certification of Algorithm 3 EASTER

J. Randle

Bradford Institute of Technology

This algorithm provides a welcome off-beat example in integer arithmetic without the use of arrays with which to test our compiler on the Stantec Computing Systems which is still in the debugging stage.

With the single change of reversing the integer and procedure declarations within the procedure body of EASTER, required by a restriction of our compiler, the procedure produced correct results for those years tested.

Algorithm 4. TWOBYTWO

I. D. Hill and M. C. Pike, Medical Research Council Statistical Research Unit.

real procedure two by two (a, b, c, d, method); value a, b, c, d, method; integer a, b, c, d, method;

comment evaluates the tail area probabilities in a 2 by 2 table by the exact method for fixed marginal totals (R. A. Fisher (1935), J. R. statist. Soc. 98, 39-54: F. Yates (1934), J. R. statist. Soc. Suppl. 1, 217-235; J. O. Irwin (1935), Metron. 12, Pt. 2, 84-94). The table considered is

If method = 0 the single-tail probability is found by summing the individual probabilities of a, a - 1, a - 2, ... 1, 0 in the top left-hand cell.

If method = 1 or 2 a two-tail probability is found. The expected value, on the null hypothesis, of the observation in the top left-hand cell is E = (a + b)(a + c)/N. If E > a then the two-tail probability is the sum of the above singletail probability and a probability calculated in similar fashion from the other tail.

If method = 1, then the terms included in the second tail are all those which give an inverse odds ratio at least as great as the observed odds ratio.

If method = 2, then the terms included are as many as possible subject to the second-tail probability being not greater than the probability calculated for the first tail.

If E < a, then a similar procedure is adopted using the top right-hand corner.

If E = a, then the two-tail probability = 1.0;

begin integer r1, r2, c1, c2, N, count; Boolean change; real E, z, t, sum, old sum, d1, d2, AA, BB; procedure swop (a, b); integer a, b; begin integer s; s:= a; a:= b; b:= s end swop; real procedure logfac (a); integer a; comment evaluates ln (factorial a); begin real aa, k, b; aa:= a; if aa > 7.5 then begin

k := 1 [aa; logfac:  $-(aa + 0.5) \times ln(aa) + 0.5$ ]

else begin aa := aa + 0.5: b := 1: for k := 2.0 step 1.0 until aa do  $b := b \times k$ ; logfac:= In (b) end end logfac; real procedure sumterms (a, b, c, d, term, first, count); value a, b, c, d, first; integer count; real a, b, c, d; real array term; Boolean first; begin integer i, j; real sum, nusum, t; j := a + 1;t := sum := term [1];if j = 1 then count := 1; for i := 2 step 1 until j do begin  $b := b + 1 \cdot 0$ ;  $c := c + 1 \cdot 0$ ;  $t := t \times a \times d/(b \times c);$ nusum := sum + t;

 $0.9189385333 = ln(sqrt (2 \times pi))$ 

time to the automate,

nusum:= sum + t;

if ¬ first then begin

term [i]:= t;

count:= i

end;

if nusum = sum then go to OUT;

sum:= nusum;  $a:= a - 1 \cdot 0; d:= d - 1 \cdot 0$ end:

OUT:

sumterms:= sum end sumterms; r1:=a+b; r2:=c+d;c1:=a+c; c2:=b+d;

c1 := a + c; c2 := b + a;if  $r1 = 0 \lor r2 = 0 \lor c1 = 0 \lor c2 = 0$ then begin

twobytwo:= 1·0; go to EXIT 4 end

if any row or column total is zero, result is  $1 \cdot 0$ ; N := r1 + r2; change:= false;

 $E:=r1\times c1/N;$ t:=a-E;

if  $abs(t) < 0.5 \land method \neq 0$  then begin

twobytwo:= 1.0; go to EXIT 4 end;

if t > 0 then begin

change:= true; swop(a, b); swop(c, d); swop(c1, c2)end:

if a > d then begin

swop (a, d); swop (r1, c2); swop (r2, c1) end;

z := logfac (c1) + logfac (c2) + logfac (r1) + logfac (r2) - logfac (N);

sum := t := exp(z - logfac(a) - logfac(b) - logfac(c) - logfac(d));

if a = 0 then goto if  $method \neq 0$  then SECOND else EXIT 2;

begin real array term [1:1];

term [1]: = sum; sum:= sumterms (a, b, c, d; term, true, count); if method = 0 then go to EXIT 2

end;

SECOND:

if a < 0.5 then begin

less. This makes peopl of more and more at

as computers becomractive, the rate of increase and more and will need to have time entries.

In Europe, the perioate hours, minutes an display format, wh States would use a c what do you expect ! use a comma for a de-

But the real differe use of 24-hour or "n opposed to the a.m.-p.: the United States. Cotal clocks are making more and more comm

ANSI standard X-both the 12- and 24-tions. Both representatizeroes. "A" and "P" a meridiem (not meridianthe right of the 12 hour 24-hour scheme, 00:00-0 the day and 24:00:00 is

This is amplified in X3.51-1975, where Grime (Universal Time) the right-hand side representation. The 1 uses the string "spa meridiem designational Time.

It is useful to have at local time in relation. Time. The displacemens shown as a four-digit senting hours and minor minus sign in front differential factor (TD) the right of the local ti-1200 to +1300.

In ANSI standard time zones in the Untime letter codes, who associated with them with "ST," which make "Time." There is also set of three-letter codes which means "Dayling".

example, "EST" is "Easte Standard Time" and it has TDF equal to -0500; "EDT" "Eastern Daylight Time 'a it has a TDF of -0400. This how daylight savings time handled.

The standard calendar is universal standard. We have universal agreeme that there are seven days in week, too. The day of the we n be calculated by takin e Julian date, and dividing by seven. The remaind would then map into a day

the week.

direct calculation is given in the following pseudo code.

STRING FUNCTION Dayof-week (INTEGER Year, INTEGER Month, INTEGER Day);

COMMENT Year is given as four digits. The DIV operator is integer division. MOD is the remainder function. The Boolean function LeapYear explains itself. The function is valid from the 1700s through 2100s;

BEGIN EXTERNAL BOOLEAN FUNCTION LeapYear; STRING ARRAY DayName [0:6]

INIT ("SUN", "MON", "TUE", "WED", "THU", "FRI", "SAT");

INTEGER ARRAY Date-Table [1:12]

INIT (0, 3, 3, 6, 1, 4, 6, 2, 5, 0, 3, 5);

INTEGER ARRAY Century-Table

[17:21]

INIT (1, 2, 0, 6, 4); INTEGER Century, Year-in-Century, Result;

IF (LeapYear(Year))
THEN BEGIN Date-Table
[1] := 6;

Date-Table [2] := 2; END; Century := Year DIV 100;

Year-in-Century := Year -(Century * 100); Result:= Century-Table

- + Year-in-Century
- + (Year-in-Century DIV 4)
- + Date-Table [Month]
- + Day

Day-of-Week := DayName [Result MOD 7]; END.

This algorithm was supplied by Gail Higgins, an Atlantabased consultant, who found it years ago in a puzzle book. She first used it to save a client who had two possible methods of finding the day of the week: (1) Carry it in every record and rewrite the entire system to reflect the record format change (2) Julianize every day of the year and start counting from the front of the year with a table look-up scheme. The standard cslendar has twelve months, but mankind never did agree on how to write a date. A computer needs to be able to convert the three-letter shorthand for a month name into the numeric value of the month. This is very handy for an interactive program taking in data from untrained users.

Richerd Cichelli developed a perfect hashing technique and gave this algorithm as an example of it in the January 1980 issue of Communications of the ACM. A perfect hashing

has two properties: (1) It always hits the desired value in the hash table. (2) There are no emply records in the hash table.

INTEGER FUNCTION Three-Letter (STRING Month-

- name)

COMMENT Month-name is the three letter month abbreviation;

BEGIN INTEGER ARRAY Numeric-Value [1:26]

INIT (4, 5, 2, 0, 0, 0, 3, 0, 0, 0, 0, 6, 0, 6, 0, 5, 1, 0, 6, 0, 6, 0, 6, 0, 6, 0, 6, 0, 5, 0);

INTEGER ARRAY Numeric-Value [0:11]

INIT (6, 9, 12, 8, 1, 2, 7, 4, 10, 5, 3, 11);

INTEGER Second-Place, Third-Place:

COMMENT The ORD function returns the numeric position of a letter in the alphabet so that A-1, B-2, Z-26, SUBSTRING (i, text) return the i-th character in the string named text.

Second-Place := Alpha-Value [ORD (SUBSTRING (2. Month-name))];

Third-Place = Alpha-Value |ORD (SUBSTRING (3, |Month-name))|

Three-Letter > Numeric Value [Second-Place -Third-Place]

END

This is a cute algorithm, he with such a short list of possible values, but unless it is written in assembly language, a with a good optimizer, it probably is not worth the trouble

The first man to think of putting the day of the year on the bottom of the pages of calendar did a great favor the data processing community.

The following algorithm will take a month and a day a input and then return the day of the year. It operates by making a quick first hack at the answer and then tuning it for the actual months.



INTEGER FUNCTION Day-of-Year (INTEGER Year, INTEGER Month, INTEGER day):

EXTERNAL BOOLEAN Valid date, LeapYear,

IF (Valid date (Year, Month, day)

THEN

Day-of-Year, TRUNCATE ((30-4)75) (month = 1.0 + day).

IF (Month > 2 THEN Day of Year: - Day of Year +2 If (Month > 5 THEN Day of Year: - Day of Year +1 IF (Month > 6 THEN Day of Year: - Day of Year +1 IF (Month > 7 THEN Day of Year: - Day of Year IF (LeapYear (Year) AN) Month - (Month > 7 THEN Day of Year: - Day of Year)

THEN Day-of-Year :- Day-of-Year :- 1:

END ELSE Day-of-Year := 0 END.

Pountial contributors to the Software Design section show contact James Ludwik, Information Systems News, East Jose Road, Manhass N.Y. 1030, Phone. 516-8;



## Year 2000

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## year 2000 technical support center

## **Date Calculation Algorithms**

These algorithms should be implemented using 32 bit or 9 digit precision arithmetic in the computer language of your choice. All division is integer division, i.e. you drop the remainder. For example, 35 / 4 is 8; to make this clear the algorithms use the INT function, INT(35/4). These algorithms make use of the MOD function, the remainder after integer division.

The following algorithms are included:

- · Convert from YYYY,MM,DD to YYYY,NNN and determine day-of-week
- · Convert from YYYY,NNN to YYYY,MM,DD and determine day-of-week
- · Convert from YYYY, NNN to Lilian (day 1=Fri Oct 15, 1582)
- · Convert from Lilian to YYYY,NNN
- · Convert from Lilian to day-of-week
- · Convert from YYYY, MM, DD to YYYY, NNN
- Convert from YYYY,MM,DD to day-of-week

NOTE: Day 1 of the Lilian date in these algorithms is Friday, 15 October 1582.

#### Convert from YYYY,MM,DD to YYYY,NNN and determine day-of-week

```
Input: YYYY, MM, DD
Output: NNN (1-366) and DOW (0-6, 0=Sunday, etc)

IF MOD(YYYY,4) = 0 THEN LY = 1 ELSE LY = 0
IF MOD(YYYY,100) = 0 THEN LY = 0
IF MOD(YYYY,400) = 0 THEN LY = 1
* LY is 1 if it is a leap year
NNN = INT(((MM + 2) * 3055) / 100) + DD - 91
IF NNN > (59 + LY) THEN NNN = NNN - 2 + LY
T = INT(YYYY / 100) - 6 - INT(YYYY / 400)
DOW = MOD((NNN + INT((YYYY * 5) / 4) - LY - T),7)
```

Example: 1996, Nov 1 results in NNN = 306, DOW = 5

#### Convert from YYYY,NNN to YYYY,MM,DD and determine day-of-week

```
Input: YYYY, NNN (1-366)
Output: MM, DD and DOW (0-6, 0=Sunday,etc)

IF MOD(YYYY,4) = 0 THEN LY = 1 ELSE LY = 0
IF MOD(YYYY,100) = 0 THEN LY = 0 IF MOD(YYYY,400) = 0
    THEN LY = 1
* LY is 1 if it is a leap year
WORK = NNN
IF WORK > (LY + 59) THEN WORK = WORK + 2 - LY
MM = INT(((WORK + 91) * 100) / 3055)
DD = (WORK + 91) - INT((MM * 3055) / 100)
MM = MM - 2;
T = INT(YYYY / 100) - 6 - INT(YYYY / 400)
DOW = MOD((NNN + INT((YYYY * 5) / 4) - LY - T),7)
```



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```
Example: 1996, 306 results in Nov 1, DOW = 5
```

#### Convert from YYYY, NNN to Lilian

Day 1 of the Lilian date in these algorithms is Friday, 15 October 1582.

#### Convert from Lilian to YYYY,NNN

Day 1 of the Lilian date in these algorithms is Friday, 15 October 1582.

```
Input: LIL     Output: YYYY, NNN (1-366)

CLD = INT(((LIL + 139444) * 100) / 3652425)
NNN = CLD + LIL + 139444 - INT(CLD / 4)
WORK = INT((NNN * 100) / 36525)
IF MOD((NNN * 100), 36525) = 0 THEN WORK = WORK - 1
* (in some computer languages the 2 lines above can be
* implemented as divide 36525 into (NNN * 100) giving
* WORK remainder REM if REM = 0 then WORK = WORK - 1)
NNN = NNN - INT((WORK * 36525) / 100)
YYYY = WORK + 1201;
Example: 151229 results in YYYY = 1996, NNN = 306
```

#### Convert from Lilian to day-of-week

```
Input: LIL         Output: DOW (0-6, 0=Sunday, 1=Monday, etc.)
DOW = MOD((LIL + 4),7)
Example: 151229 (Nov 1, 1996, 306) results in DOW = 5
```

## Convert from YYYY,MM,DD to YYYY,NNN

Example: Nov 1, 1996 results in NNN = 306

### Convert from YYYY,MM,DD to day-of-week

Example: Nov 1, 1996 results in DOW = 5

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Senator Bennett, I have three supercritical points for your attention:

- 1) When is a czar not a czar?
- 2) The popular windowing solution is uncontrolled and dangerous.
- 3) Existing standards for representing dates are insufficient.
- 1) The press to the contrary, a chairman of a Presidential Council is not a "czar". He has no powers derived from and assigned by the Congress. The press releases do not say that he has been given executive powers. Can he, for example, order the US Post Office to change the cancelling machinery to mark a 4-digit year followed by month, day and 24-hour time? Canada has already done most of this. Why not US? Can he impose rules for date data interchange that supersede the pitiful specifications of the GSA? Can he order businesses to change their practices?

My keynote speech for a Washington Y2K conference last December, which I faxed to you, said basically that we are in a situation comparable to the two great World Wars. And no person in charge is acting as if this were true. Where is the greatness of a Churchill?

- 2) I have asked repeatedly for the US Government standard for a very simple item. "For what value are 2-digit year numbers less than that value assumed to be in the next century?" No one can tell me. Millions of people are using such a method of repair, and they are using different such values! At a minimum can't we agree on a single value - say 50? Not doing so is a recipe for more disaster. Governments can set speed limits. Can't they set year limits?
- 3) Your example of a railway merger demonstrated brilliantly the disasters that can occur without standards. It was probably as simple as the first company having the ship date starting in column 16, whereas the ship date for the other company started in column 38, and nobody told the computer about it!

The GSA Federal Acquisition Regulation (applicable only to US Government purchases) is excerpted at the end of this paper. I can't say that it is laughable in this situation, although it otherwise qualifies as such.

So let's see how we did it for 2 digits, for the year (19)98:

```
0011 1001 0011 1000 PC octet form (ASCII)
1111 1001 1111 1000 IBM octet form (EBCDIC)
0000 1001 1000 1111 IBM packed decimal form #1
0000 1001 1000 1110 IBM packed decimal form #2, etc.
0110 0010 Anybody's binary form
1001 1101 Anybody's 2's complement binary
```

Now do the same to represent all four digits of the year 1998:

```
0011 0001 0011 1001 0011 1001 0011 1000
                                        PC octet form (ASCII)
1111 0001 1111 1001 1111 1001 1111 1000 IBM octet form (EBCDIC)
                                                                         +4
         0000 0001 1001 1001 1000 1111 IBM packed decimal form #1
                                                                         +2
         0000 0001 1001 1001 1000 1110 IBM packed decimal form #2, etc.
                   0000 0111 1100 1110 Anybody's binary form
                  1111 1000 0011 0001 Anybody's 2's complement binary
                                                                         +2
                                        V2K octet form (ASCII)
                  1000 1001 0011 1000
                                                                          0
                  1000 1001 1111 1000
                                          V2K octet form (EBCDIC)
                                                                          0
                  0000 1001 1000 1000
                                         V2K packed decimal form
```

Looks confusing, doesn't it? But the point is that ALL of these forms are valid and legal ways to represent a year value. When one agency sends year data to another, the question is "Which form?" And, with computers, such issues cannot be evaded.

The baseball dilemma -- "You can't tell the players without a scorecard" (with their numbers).

I invented the escape sequence in 1960, and it means more than just the key on the upper left of your keyboard. It is tailormade to tell and indicate WHICH one of these forms is the one the original user used. If escape sequences can control screen color, laser printing, and change your screen to show Russian or Arabic, they can certainly discriminate unambiguously between ways we represent the date.

A white paper has existed on our WebVenue "bmrsoftware.com" since last October. It was dedicated to the GSA, and marked as in the public domain. It describes quite fully the way to solve this problem. But Ms Cynthia Warner of the GSA said she had only three people, and as of last December they had not enough time to even read it! Our Government is spending \$BILLIONS, and the GSA has only four people assigned?

The voluntary standards effort has not even addressed the problem of interchanging date data. Yet this is now agreed by all to be the most dangerous aspect of this entire problem! But their procedures are too cumbersome to do it now. There's little time left!

The US Government has an institution called NIST, for "National Institute for Standards and Technology". Note the word "Standards" in the name. Why doesn't the Congress order them to create the necessary standards, not just for the US Government, but for the US people, and for the people of the world who have the same problem? I'll be glad to show them just how to do it!

tel 972-671-5000

fax 972-783-9737

R. W. Bemer BMR Software, Inc. 1100 Centennial Blvd., Suite 140 Richardson, TX 75081

From FAR Final Rule, effective October 21, 1997. (sic)

39.002 Definitions.

. . . . .

"Year 2000 compliant, as used in this part, means, with repect to information technology, that the information technology accurately processes date/time data (including, but not limited to, calculating, comparing, and sequencing) from, into, and between the twentieth and twenty-first centuries, and the years 1999 and 2000 and leap year calculations, to the extent that other information technology, used in combination with the information technology being acquired, properly exchanges date/time data with it."

This is followed by the weasel words ...

"Solicitations and contracts should require ... that non-compliant information technology be upgraded to be compliant in a timely manner."

Senator, that's no way to run a railroad! Even a Government-only railroad.

#### UNIVERSAL DATE VALUE INTERCHANGE

R. W. Bemer, BMR Software (bmrsoftware.com)

Computers do only three things with date values. They

- 1) Take them in,
- 2) Do calculations and other manipulations based upon them.
- 3) Put them out, to display or another computer.
- (2) is the tough part, where most of the Y2K problems lie, due to
  - o Programs that operate upon them in myriad ways, often so poorly documented as to be ununderstandable, and
  - o Again, their insufficient form (missing century).
- (1) and 3) present more problems. The insufficiency, yes, but also the format/layout. Is a date for import (1) or export (3)
  - o In YYMMDD or MMDDYY or DDMMYY form?
  - o In YYYYMMDD or MMDDYYYY or DDMMYYYY form?
  - o Encoded in decimal or binary numbers?
  - o Encoded in some symbolic form other than direct numbers?
  - o If decimal, 8 bits or 4 bits per digit of date?
  - o If discrete binary, 16 bits or 8 bits per date unit?
  - o If full binary, 32 bits or 16 bits per complete date?
  - o Relative to some other date by a number of days?
  - o Interspersed with delimiters and/or spaces?

But the big question is -- with all these possible and existing uses, how do we know which? More properly, how does a stranger know? We know, of course, because it's all implicit in the programs we are using.

WE CAN MOSTLY FIX (1) AND (3) FOR INTERCHANGE RIGHT NOW!

#### HERE IS HOW

Only one unfailing human method of demarking time exists. The earth rotates once each day. Has and will. Two more rotations make it two days later. Thus there is only one basic way to know the date. How many days is it from some starting date? Unsurprisingly such a method exists. It is called the Julian Day system. The Julian day for the first day of Year 1 A.D. had the value:

0001 = 1 721 475

For day 1 of the following centuries the Julian Day was/will be:

400	=	1	867	157	1700	=	2	341	973	2100	=	2	488	070
800	=	2	013	254	1800	=	2	378	497	2200	=	2	524	594
1200	=	2	159	351	1900	=	2	415	021	2300	=	2	561	118
1600	=	2	305	448	2000	=	2	451	545	2400	=	2	597	642

The leading digit doesn't change for 27 centuries. 12 centuries with a leading "2" have passed, and we have 15 more to go before the "2" rolls over to "3". So we don't need the leading "2". Imply it, and you ALMOST get what is called the Smithsonian Day (which is that value + 1). Call this value the Xchange Day (X Day). It has some lovely properties:

- o Scrap all of your leap year code. The 100- and 400-year leap year exceptions are built into the conversion formulas.
- o To get the day of the week, add 2 to the X Day value, divide by 7, and add 1 to the remainder (Monday=1).
- o One can't mistake the first two digits as month or day values, etc.
- o It needs the same space -- 6 zoned-, or 4 signed packed decimal-, or 3 unsigned packed decimal-bytes -- to accommodate 27 centuries as separate 2-digits for year and month and day do for just one century. Don't change your record formats; fill them differently.
- o This would accommodate the current minimum representation, due to Equifax, of 3 bytes, one each for discrete binary day, month, year. Full binary, which gets 16777216 in 3 bytes, can get only 65536 in 2 bytes, for a span of at most 179 years, which is not good enough.
- o Vertex 2000 TM has the same minimums, and we need that internally for now, but V2K dates are just as easily converted to X Days.

Let's make the X Day the gold standard, the lingua franca, the common denominator, the canonical form -- our salvation in the world of data interchange. Use it like Euro currency, one unit of which should be equivalent to so many lira, or dollars, or pounds, or francs, or rubles. But the Euro is artificially derived; days come from the real world.

So no matter what you use at home, in the world market you can use the X Day exclusively to represent the date.

What does that mean to us in the present crisis? We know it won't fix all programs an entity uses to run its enterprise, but it will surely work as the default medium of exchange. And exchange has two properties:

- Businesses can most likely put an exact finger on the character of dates they input and output externally.
- Everyone now realizes the greatest danger of the 2-digit year to be nonstandardized and unrecognizable interchange, which this cures.

Can the United States and the rest of the world profit NOW by using only the X Day for interchange?

- o Will this solve the Year 2000 problem? Definitely not.
- o Will it take the sting out of our coming collapse? Definitely yes.
- o Can it be done in time? With the right authority, a good chance.

What must be done? First we must get agreement to standardize this. If we wait for the GSA or business groups to agree, forget it! But suppose the Congress passes a law like this?

In date data interchange under private agreement between exporter and importer, both may represent the date in any way they agree to.

Absent such agreement, electronic interchange of year values must be done only in X Day form.

Converting X Day to all other forms, simple and compound, is easy. The formulas are known and simple (but I have copied them in an Appendix). I had planned for my company to make available to all, as a free public service, source and object computer programs, in the common computer languages, for translation to and from X Day from other forms such as calendar, ordinal, and fiscal dates.

But others have a huge debt to us users for being at fault for Y2K. Let's ask Microsoft to provide these as their gift to ameliorating this crisis, in compensation for having done it wrong in the first place. Imagine sitting at your PC:

C:\>time
Current time is 2:17:31.29p
Enter new time:

C:\>date Current date is Wed 03-18-1998 Enter new date:

C:\>xday Current X Day is 450891

C:\>dayo
Bad command or file name

(or maybe we choose this name)

Let's ask Sun to contribute free Java applets for these rules. Let's ask IBM and UNISYS and others to provide all such routines free for their computers. They should respond gladly and soon. Or is patriotism dead? Or is self-interest going to be totally destructive?

Such a package would be applied by the sender just before sending, and by the receiver to convert to the form they need. Instead of talking face-to-face, interpose two translating telephones. Then when and if the standards people ever get around to deriving what I suggested in my White Paper to the GSA, they can use any other date form for which an escape sequence is registered.

Would I wish that every computer in the world processed dates in X Day form? I certainly would. It's absolutely the simplest and best way. And one would hope that for the future, once the present 2000 crisis is passed, that they all would be so programmed. I think it as critical a standard to set as ASCII (the ISO Code).

(SEE THE FORMULAS ON THE OTHER SIDE)

| For questions, | | call Bob Bemer | | 972-671-5000 |

| file is \Y2K\XDAY | | prepared 1998-03-15 | XD=X Day value Y=4-digit year yyyy FY=fiscal year JD=Julian Day value M=2-digit month mm FW=fiscal week JD1=JD for January 01 D=2-digit day dd FD=fiscal day S,T=working OD=ordinal day FC=fiscal const FC=fiscal constant

My 1980 TEX program "DATE" adopted the following plan for conversions (that they may be further compacted to remove the "IF"s is obvious):

- A) CAL to JD do (1) B) CAL to JD1 C) CAL to FIS D) CAL to ORD do (2) (for 1st day of CAL year) do (D) and (F) do (4) and (5) (CAL year known) E) ORD_to_CAL
  F) ORD_to_FIS
  G) ORD_to_JD do (4) and (6) (CAL year known) do (7) and (9) do (2) and (JD=JD1+OD-1) H) FIS_to_ORD Y=FY do (7) and (8) JD=XD+2000000 do (H) and (E) I) FIS to CAL XD=JD-2000000 do (H) and (G) J) FIS to JD JD to CAL K) do (3) | For questions, | L) JD to FIS do (K) and (C) | call Bob Bemer | JD_to ORD do (K) and (D) M) | 972-671-5000 |
- 1)  $S=(M-14)/12 \dots T=D-32075+1461*(Y+4800+S)/4$ JD=T+367* (M-2-S*12) /12-3* ((Y+4900+S) /100) /4
- 2) JD1=1461* (Y+4799) /4-31378-3* ((Y+4899) /100) /4
- T=JD+68569 3) --> M=80*T/2447 T=T-(146097 P e Y=4000*(T+1)/1461001 h n D=T-2447*M/80 T=M/11 M=M+2-12*T Y=100* (S-49) +Y+T
- 4) LEAP=1-(Y-Y/4*4+3)/4+(Y-Y/100*100+99)/100-(Y-Y/400*400+399)/400 T=Y/4000 if remainder:eq:0 LEAP=0 (optional)
- 5) OD=3055* (M+2) /100- (M+10) /13*2-91+LEAP* (M+10) /13+D
- 6) T=OD+((305+OD-LEAP)/365)*(2-LEAP) M=((T+91) *100) /3055-2 D=T+30- (M*3056) /100
- do (2) ... T=JD1-JD1/7*7 FC=T+7-(T+3)/7*7
- OD=7*FW+FD-FC ... do (4) if OD:gt: (365+LEAP) Y=Y+1 OD=OD-365-LEAP | prepared 1998-03-15 if OD:1t:1 Y=Y-1 do (4) OD=365+LEAP+OD
- FY=Y ... FW=(OD+FC-1)/7 FD=remainder+1 if FW:eq:53 if (FC+LEAP):1t:10 FY=Y+1 FW=1 if FW:eq:0 Y=Y-1 FY=Y do (4) Y=Y+1 FW=53-(FC+1-LEAP)/6

| Wow! It would be so | | easy to build a chip | | for these conversions |

| file is \Y2K\XDAY.APP |

#### BLACK1

VB40016 DLL 935,632 08-15-95 12:00a VB40016.DLL
OC25 DLL 536,048 08-15-95 12:00a OC25.DLL
README TXT 710 07-24-98 4:22p readme.txt
XDAYCVT EXE 19,056 08-03-98 1:09p XDAYCVT.EXE

#### BLUEI

VB40016 DLL 935,632 08-15-95 12:00a VB40016.DLL OC25 DLL 536,048 08-15-95 12:00a OC25.DLL README 710 07-24-98 4:22p readme RUN EXE 19,056 08-03-98 1:09p run.exe

- 1) copy all files on both disks to a directory
- 2) run xdaycvt.exe (RUN.EXE on blue diskettes)
- 3) enjoy

## the algorithms are:

```
Public Sub date2xday()
Dim t1, t2 As Long
t1 = (theMonth - 14) \ 12
t2 = theDay - 2032075 + (1461 * (theYear + 4800 + t1)) \ 4
theXday = t2 + 367 * (theMonth - 2 - t1 * 12) \ 12 - 3 * ...
... ((theYear + 4900 + t1) \ 100) \ 4
End Sub
```

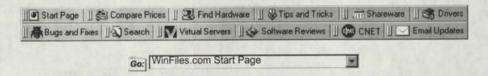
Public Sub xday2date()
Dim t1, t2, t3, t4 As Long
t1 = theXday + 2068569
t2 =  $(4 * t1) \setminus 146097$ t1 =  $t1 \cdot (146097 * t2 + 3) \setminus 4$ t3 =  $(4000 * (t1 + 1)) \setminus 1461001$ t1 =  $t1 \cdot (1461 * t3) \setminus 4 + 31$ t4 =  $(80 * t1) \setminus 2447$ theDay =  $t1 \cdot (2447 * t4) \setminus 80$ t1 =  $t4 \setminus 11$ theMonth =  $t4 + 2 \cdot 12 * t1$ theYear =  $100 * (t2 \cdot 49) + t3 + t1$ End Sub

Start Page: Windows Software: Windows NT: Productivity Tools: Time and Clock Tools



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# Windows NT Time and Clock Tools



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ECREW Timer	Versio	n 1.5	WI THE	WILL STAN	Online Registration Not Yet Available			
	20-Jan- 00	303K	Win 95/98/NT	Shareware \$20.00	Expiration Unknown	Install		
	clock. It in screen po	ner is a icludes isitions,	an alarm, a cuck fonts, colors, an	ohic add-on for too sound, desk	<1 min at ISDN 128K the Windows Taskbar's standard (top corner anchors, and changeable) e formats. This version has a limited			
	number of alarms.  Published by Anatoly ECREW Timer Home Pag							

TimeNode	Version	on 1.0	100		Online Registration Not Yet Available				
	20-Jan- 00 4,392K Win 98/NT Shareware Expiration Unknown Uninstall & Uninstall								
	27 min :	at 28.8K	10 mi	in at 56K	5 min at ISDN 128K				
	Internet. T downstrea System Tr	imeNode am compu ray.	can also bed iters to main	our computer time to be synchronized from atomic clocks over the can also become a server and redistribute this time to a network lers to maintain a time synchronization network. Runs as Icon or					
		olished by eoSoft De Group	evelopment		TimeNode Home Page				

	Version 2.0 20-Jan-00 17K	Win 95/98/NT	Freeware	No Registration Required Never Expires Install & Uninstall
	<1 min at 28.8K			<1 min at ISDN 128K
Whatime	allows you to see space. It simply pu and applies the de will work fine on air runtimes, you can computers have the new version henjoy! Requires the	what time it is in a uts an entry on you seried hour and mi ny comuter with V download the full nese runtimes alre has the ability to st ne VB 5.0 Runtim	ny time zone, ur task bar tha nute shift to th B 5.0 runtimes program with ady installed, tart automatica	uisness, or family. This program without hogging precious desktop at contains the user specified label, he current time. This small download is present. If you do not have these runtimes at the homepage. Most so the small download should be fine. ally with any preset configuration.
	Published by A	Indrew Baker		Whatime Home Page

		on 4.4			Register Now		
	19-Jan- 00	3./8UK	Win 95/98/NT	Shareware \$17.00	Expires after 14 Days	Install & Uninstall	
JogglerPlu	24 min	at 28.8K	8 min a	at 56K	4 min at ISDN 128K		
	that can b	be taken u a given tir	ipon interval exp ne is limited only	by the availab	N1. It is similar in use to a kitchen it er providing three independent acti number of timers that you can have ability of system resources. You ha pups of timers through settings.		

	Version	n 2.20	- N. 17 17 11	10 B	Online Registration Not Yet Available		
	19-Jan- 00	1,307K	Win 95/98/NT	Shareware \$19.95	Expires after 45 Days	Install & Uninstall	
SetTime32	8 min at 28.8K		3 min at 56K		1 min at ISDN 128K		
	calculates	Several a	nputer clock's dr automatic and m	rift rate and sch anual modes. I	et time service. Automatically hedules time checks to keep you clock Runs quietly in the background. Just		
	Published by Tony Isaac SetTime32 Home Page						

	Version v	12.7			No Registration Required		
	19-Jan-00	74K	Win 95/98/NT	Freeware	Never Expires	Install	
WebTime	<1 min at 2	28.8K	<1 min a		<1 min at ISDN 128K		
for Windows 95/NT	A small utility several atomi and Technolo	ic clocks	n that will synchro s maintained by the	e United States	nternal clock with one National Institute of S	Standards	
	Publishe	ed by Gr	regory Braun	WebTime for	r Windows 95/NT Ho	ome Page	

	Version	5.3.0.606			No Registration Required		
	15-Jan- 00	Install & Uninstall					
WorldTime	24 min at 28 8K		9 min a	t 56K	4 min at ISDN 128K		
	zone, Day (NTP) to s Calculates with unlimit of time sin	light saving yncronize and displated LAP tince or until	gs time rule and or your computers s ays the Julian Da mes that only disp any specified dat	lescription, Us system time (Use, unlimited so play if used, a e down to the	rable clocks, each with it's own times the Network Time Protocol JTC) to any internet time source, stopwatches accurate to 1/100 secund a module that tracks the amount second.		
	Publishe	d by Paw	Print Graphics	1	NorldTime Hom	e Page	

	Version 1.35			No Registration Required			
	12-Jan-00 2,301K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall		
Alarm	14 min at 28 8K	5 min at	56K	3 min at ISDN 128K			
Clock	This is a simple, yet cool looking, alarm clock / variable timer for Windows 95/98/NT Includes help file.						
	Published by TI	had Hogan	No Home Page Available				

	Version 2	.0.101		Online Registration Not Yo						
	12-Jan-00 797K 5 min at 28.8K		Win 95/98/NT Demo \$65.00		Expires after 21 Days	Install & Uninstall				
			2 min at 56K		1 min at ISDN 128K					
VAKCER Project Tracker PE	them auton popular app communication	natically plication ation, file in sena	There's no need as such as illustrate management an arate files allowing	I to start a tion, image ad much m to configu	e editing, web design lore. The list of suppl ure the list easily. Su	etects more than 200 n, word processing, orted applications				

and autosave project features. VPT also caluclates project cost based on hourly rates for each application. Project reports can be viewed and printed with a click of a mouse.

Published by VAKCER

Corporation

VAKCER Project Tracker PE Home Page

MARIA	Version	3.11	Ge	t It!	Online Registration Not Yet Available		
	11-Jan- 00	340K	Win 95/98/NT	Shareware \$15.00	Expires after 30 Days	Install & Uninstall	
⊕⊕ Horas	clocks co	ps you rrespon adjusti	1 min at 56K  <1 min at ISDN 128K  keep track of the time around the world by letting you create several  ding to different time zones. Horas has many features including the  nent of your computer clock, a time converter, a time lookup tool, an  space on your desktop.				
	Published	Horas Home Page					

Version 1.0		The same of		Online Registration Not Yet Available		
04-Jan- 00	568K	Win 95/98/NT	Shareware \$10.00	Expires after 30 Days	Install & Uninstall	
4 min at	28.8K	1 min at 56K		1 min at ISDN 128K		
However, was deve and then the time re and add r	as the loped in you can emaining new even	year drew on, an nto a true countdon cycle through the ng in an LED Pan ents to it.	own program, when and see when sort of style,	to count down to the became less and less which takes events, ar nen they will come to which will allow you to	nd names them, pass. It displays o edit, change	
Publishe	ed by Jo	shua Butcher		CountDown Home Page		

	Versi	on 5.0			Regist	er Now
	04-Jan- 00	1.41	Win 95/98/NT	Shareware \$9.00	Expires after 21 Uses	Install & Uninstall
CountDown	12 min at 28.8K 4 min at 56K 2 min at ISDN 128K CountDown is a timer utility that counts the time down to your specified entry and the second					
0	be run sir	multaneou	usly, are included	ows you a visu i. A stopwatch n online or wor	al message. Two tim like feature also allow king on a specific tas	ers, which can vs you to track k.
	Pub	lished by	Ron Grau	C	CountDown Home Pa	age

	Version 2.01				Register Now				
	30-Dec- 99	1,442K	Win 95/98/NT	Shareware \$15.00	Expiration Unknown	Install & Uninstall			
Speaking Clock Deluxe	9 min at 28.8K 3 min at 56K 2 min at ISDN 128K A very competent clock which tells the time in many different languages (English is								
	multiple a announcii alarms ca	larm syst ng the tim in be set	em, so you can le playing any w	have up to 50 di ave file or even be repeated da	nloaded). The clock fferent alarms, with starting another pr ily, weekly, monthly	the possibility of ogram. The			

	Version 1.0			No Registration			
	28-Dec-99   174K	Win 95/98/NT	Freeware	Never Expires No Ins			
MFAC	1 min at 28.8K	1 min at 28.8K <1 min at 56K <1 min at ISDN 128K					
	You need a clock that function also? You no configurable.	eed a tool for an co	ount down or co	ount up, both 100%	free		
	Published by	TwinSoft	No	Home Page Available			

	Version 1.0 28-Dec-99 115K 1 min at 28.8K	Win 95/98/NT <1 min	Freeware at 56K	No Registration Never Expires <1 min at IS	No Install DN 128K
Multi Timer	Ten independent Tim hours, with 1 second can resume on a late time ran. Sound signa other windows) with u	accuracy. Timers r computer session al (optional) and bl	can be viewed on, all settings ar inking message age on alarm.	e remembered from window (cannot be	n the previous hidden with
	Published by Joha		Mul	lti Timer Home Pa	ge

					Avail	able			
World-time Countdown Clock	28-Dec- 99	1,423K	Win 95/98/NT	Shareware \$20.00	Expiration Unknown	own Uninstall			
	9 min a	t 28.8K	3 min a		2 min at IS				
	the world. three cloc regions of can set a second te	Click on the sho the work date to w	any of over 50 mow its time continued. Watch the survivide a banner of the survivide which scrolls	najor cities to se ously. The map nrise creeping ar ounts down with across the wind	also shows the day round the Earth. Or a message of your	y and night n registration your r own and enter			

	Version	1.00b		ALSO III	Online Registra Availa	ble
Server	24-Dec- 99	413K	Win 95/98/NT	Shareware \$79.00	Expires after 15 Days	Install & Uninstall
	3 min at	28.8K	1 min a	at 56K	<1 min at IS	DN 128K
	correct at specificall obtain the on all of y	all time y design correct our net	s. @NetClock is ned for PC netwo Date/Time from worked PC's set	an Internet star orks/intranets. It any Internet At	a/Time on all of your n ndards SNTP Time So t provides everything tomic clock, and then bate and Time at all tir	you need to keep the clocks
		d by Ne Solutio	tcPlus Internet	@NetC	lock Time Server Ho	ome Page

<b>KaTimeClock</b>	Version 1	.9.1.65			Online Registration		
	24-Dec- 99	610K	Win 95/98/NT	Shareware \$100.00	Expires after 30 Days	No Install	
	the following Password: Windows 9	ock is a ng featu s ** Eas 95, 98, N	8K 1 min at 56K 1 min at ISDN 128K is a timeclock designed specifically for small businesses. It supports to the support of th				
	Published by KAST KaTimeClock Home Page						

CC Clock 23-	Version	3.1.22	DECEMBER 12	Online Registration					
	23-Dec- 99	1,500K	Win 95/98/NT	Shareware \$20.00	Expiration Unknown	Install & Uninstall			
	The Cour	ir way. W	3 min ock! An intelliger fill chime, post re seconds, analog	nt, customizable eminders, start p g or digital.	2 min at ISDN 128K desktop clock/calendar app that get programs, shut down windows and				
			cadman		CC Clock Home Pa	age			

	Versio	n 2.11	1 -0	Registe		gister Now
	18-Dec- 99	1,187K	Win 95/98/NT	Shareware \$24.95		Install & Uninstall
Chameleon Clock	7 min a	t 28.8K	3 min	at 56K	1 min at	ISDN 128K ock and thus does
	digits - the synchroniz call, go to makes me application handy to h There is a cannot be	re are mozing your of a meeting essages us as/documentave a calculso one fedescribed	ore than 3000 of to clock with Interned of the properties of the original of the properties of the properties of the clock with a properties of the original of the properties of the properties of the original of the properties of the properties of the properties of the original of the properties of the pr	hem available.  It Time Servers  Iss a TV progra  MIDI, and CD-I  own your PC a  ng and in the T  obably will not	It always keeps of the seed to be remain? Try the alarm Audio sounds, op the specified ting of the specified time and time a	in feature that hens hens he. It's also very cones support. He, and that's why it

	Version	n 3.14	2010		Regis	ter Now	
	01-Dec- 99	1,150K	Win 95/98/NT	Shareware \$19.95	Expiration Unknown	Install & Uninstall	
CIOCK	7 min a	t 28.8K	3 min	min at 56K 1 min at ISDN 128K			
	different s Advanced	system in d Calenda	formation (memo	ory usage, drive egular and coun ment. Includes	at the same time. I space etc.). EldoS tdown timers, alarn Time Zone Editor, t	Clock includes ns and reminder	

				Available	
30-Nov-	600K	Win 95/98/NT	Shareware \$10.00	Never Expires	Install
C clock so utomatica iclude ana	ynchror illy with alog, dig	nizer, desktop clo popular Internet gital, millennium,	ck and screen s Atomic time services world analog and	aver. Synchronize your vers. Desktop display o d world digital.	PC clock
-	99 4 min at C clock s utomatica clude ana	4 min at 28.8K C clock synchror atomatically with clude analog, dig	4 min at 28.8K 1 min at 20.0ck synchronizer, desktop clo	4 min at 28.8K 1 min at 56K C clock synchronizer, desktop clock and screen sutomatically with popular Internet Atomic time serviculde analog, digital, millennium, world analog and	4 min at 28.8K 1 min at 56K 1 min at 56K 1 min at 56K 1 min at ISDN C clock synchronizer, desktop clock and screen saver. Synchronize your utomatically with popular Internet Atomic time servers. Desktop display oclude analog, digital, millennium, world analog and world digital.

epitellist.	Version	n 3.1			No Registr	ation Required
	27-Nov- 99	388K	Win 95/98/NT	Freeware		Install & Uninstall
	2 min at 28.8K 1 min at 56K <1 connects to one of the NIST time servers to get the current			t ISDN 128K		
1000000	Version 3. the Option the VB 6.0	1 adds s is dialog Runtin	startup at system and adds a few nes.	startup, fixes minor stability	s a bug in the App y improvements a	as well. Requires
	Pub	lished b	y VicTech	W	ebTimeSync Ho	me Page

	Version 1.01				No Regist	ration Required			
	24-Nov-99 40		NT Freewa	are N		ires   No Install			
Hamsin	3 min at 28 8	K 1 n	nin at 56K		<1 min	at ISDN 128K			
Clock	Hamsin Clock is	a completely custo	omizable digital	desktop	clockwith	a powerful alarm			
Olock	system. The prog	gram allows select	ing color, font a	ind opaq	ue/transpa	arent mode.			
		Sergey V. Popo		Hamsin	Clock Ho	me Page			
	Version 2.1	_		No	Registra	tion Required			
	24-Nov-99 4811	Win 95/98/NT	Freeware			nstall & Uninstal			
	0 00 01/	4 min	at EEV		1 min at I	SDN 128K			
World Time	The program sho	ws the time of five	different timez	ones, wi	th analog	and digital clocks.			
Clock	Choose from a list	st of 150 countries	and 400 cities	and delli	ne 5 count	ries/cities of your			
	own. Correctly in	plemented daylig	ht savings time	rules.					
	Published by Jo	hannes Wallroth	Wor	d Time	Clock Ho	me Page			
		The second				3.00			
	Version 2.0			N	o Registra	tion Required			
	22-Nov-99 1,56	9K Win 95/98/N	T Freeware	Never		nstall & Uninsta			
Kilroy's	10 min at 28.8	K 3 mir	at 56K		2 min at	ISDN 128K			
Clock	A clock that allow	vs the user to char	nge the color of	most sru	iff in the a	pp. It also has the			
		ctures. Has all req	uired files in set	tup!	M1-11	D			
	Publish	ned by Jeff	K	diroy's (	lock Hon	ne Page			
May 1	Version 7.2.0	178 635			Avai	ration Not Yet lable			
	19-Nov-99 45K	Win 95/98/NT	Shareware \$15.00		ayə	Install Unknow			
UK	<1 min at 28.8K	<1 min a	at 56K	•	1 min at	ISDN 128K			
Speaking	Speaking Clock is a desktop clock that uses one or two Microsoft Agent characters of								
	your choice to appounce the time and date, and to act out various expressions relating								
1 1	7	to the clock. It can automatically announce the time at intervals you specify or on demand. You can set five independent alarms, each of which can launch a program							
Clock	to the clock It ca	in automatically ar	nnounce the tim	e at inte	vais you s	specify or on			
Clock	to the clock. It ca	n automatically ar	nnounce the tim dent alarms, ea	e at inte	ich can lau	inch a program			
Clock	to the clock. It ca demand. You ca and announce a	n automatically an n set five indepen- message. Skins le	nnounce the tim dent alarms, ea et you customize	e at inter ch of wh e the clo	ich can lau ck and da	inch a program te's appearance.			
Clock	to the clock. It ca demand. You ca and announce a	n automatically ar	nnounce the tim dent alarms, ea et you customize	e at inter ch of wh e the clo	ich can lau	inch a program te's appearance.			
Clock	to the clock. It ca demand. You ca and announce a	n automatically an n set five indepen- message. Skins le	nnounce the tim dent alarms, ea et you customize	e at inter ch of wh e the clo	ich can lau ck and da	inch a program te's appearance.			
Clock	to the clock. It ca demand. You ca and announce a Published by	n automatically and set five independences sage. Skins leuK Software	nnounce the tim dent alarms, ea et you customiz UK Sp	e at inter ch of wh e the clo peaking	ck and dated to the control of the c	inch a program te's appearance. me Page tration Required			
Clock	to the clock. It ca demand. You ca and announce a Published by  Version 161 17-Nov-99 5	in automatically and set five independences age. Skins leuk Software  WK Software  WWin 95/98/	nnounce the tim dent alarms, ea et you customiz UK Sp	e at inter ch of wh e the clo peaking	ch can lau ck and da Clock Ho No Regis lever Exp	inch a program te's appearance. me Page tration Required ires   No Instal			
	to the clock. It ca demand. You ca and announce a Published by  Version 161 17-Nov-99 5	in automatically air set five independences Skins leuk Software  WK Software  Win 95/98/	nnounce the tim dent alarms, ea et you customiz  UK Sp  NT Freewa min at 56K	e at interch of whee the clopeaking	ch can lau ck and da Clock Ho No Regis lever Exp <1 min	Inch a program te's appearance. me Page tration Required ires   No Instal at ISDN 128K			
Clock	to the clock. It ca demand. You ca and announce a Published by  Version 161 17-Nov-99   5 <1 min at 28.8 Simple, but nice	in automatically and set five independences age. Skins leuk Software  WK Software  WK Win 95/98/	nnounce the tim dent alarms, ea et you customiz  UK Sp  NT   Freewa min at 56K	e at interch of whee the clopeaking	No Regis lever Exp	tration Required tres   No Instal at ISDN 128K			
	to the clock. It ca demand. You ca and announce a Published by  Version 161 17-Nov-99   5 <1 min at 28.8 Simple, but nice servers. There a	in automatically air set five independences Skins leuk Software  WK Software  Win 95/98/	nnounce the tim dent alarms, ea et you customiz  UK Sp  NT   Freewa min at 56K	e at interch of whee the clopeaking	No Regis lever Exp	tration Required tres   No Instal at ISDN 128K			
	to the clock. It ca demand. You ca and announce a Published by  Version 161  17-Nov-99 5 <1 min at 28.8 Simple, but nice servers. There a into .cfg files.	n automatically an set five indepenmessage. Skins luk Software  WK Software  Win 95/98/ SK <1 alarm clock. Can re no any docume	nnounce the tim dent alarms, ea et you customiz  UK Sp  NT   Freewa min at 56K change skins. Centation or contr	e at interch of whee the clopeaking  are  Can syncols, in or	No Regis lever Exp <1 min honise tim der to cha	tration Required fires No Instal at ISDN 128K e with Internet inge anything look			
	to the clock. It ca demand. You ca and announce a Published by  Version 161  17-Nov-99 5 <1 min at 28.8 Simple, but nice servers. There a into .cfg files.	in automatically and set five independences age. Skins leuk Software  WK Software  WK Win 95/98/	nnounce the tim dent alarms, ea et you customiz  UK Sp  NT   Freewa min at 56K change skins. Centation or contr	e at interch of whee the clopeaking  are  Can syncols, in or	No Regis lever Exp	tration Required fires No Instal at ISDN 128K e with Internet inge anything look			
	to the clock. It ca demand. You ca and announce a Published by  Version 161  17-Nov-99   5 <1 min at 28.8 Simple, but nice servers. There a into .cfg files.  Published by	n automatically an set five indepenment of the indepenment of the indepenment of the independent of the inde	nnounce the tim dent alarms, ea et you customiz  UK Sp  NT   Freewa min at 56K change skins. Centation or contr	e at interch of whee the clopeaking  are  Can syncols, in or	No Regis lever Exp <1 min honise tim der to cha	tration Required ires   No Instal at ISDN 128K e with Internet nge anything look			
	to the clock. It ca demand. You ca and announce a Published by  Version 161  17-Nov-99   5  <1 min at 28.8 Simple, but nice servers. There a into .cfg files.  Published by  Version 200	n automatically an set five indepenment of the indepenment of the indepenment of the independent of the inde	nnounce the tim dent alarms, ea et you customiz  UK Sp  NT   Freewa min at 56K change skins. C entation or contr	e at interch of whe cho of whe cho chooseaking  are  Can sync cols, in or	No Regis lever Exp <1 min honise tim der to cha	tration Required fires No Instal at ISDN 128K e with Internet inge anything look			
	to the clock. It ca demand. You ca and announce a Published by  Version 161  17-Nov-99 5 <1 min at 28.8 Simple, but nice servers. There a into .cfg files.  Published by  Version 200  16-Nov- 2.91	n automatically an n set five indepenmessage. Skins le UK Software  Win 95/98/ 9K Win 95/98/ 9K <1 alarm clock. Can re no any docume y Alex Artamono	NT Freewarmin at 56K change skins. Centation or control	e at interch of whee the cloopeaking  are   N  Can syncrols, in or	No Regis lever Exp <1 min honise tim der to cha	tration Required ires   No Instal at ISDN 128K e with Internet inge anything look			
	version 161 17-Nov-99 1 Timin at 28.6 Simple, but nice servers. There a into .cfg files. Published by  Version 200 16-Nov- 99 2,91	n automatically an set five indepenence of the inde	NT Freewamin at 56K change skins. Centation or contr	e at interch of whee the cloopeaking  are   N  Can syncrols, in or	No Regis lever Exp <1 min honise tim der to cha ck Home  Repires	tration Required fres No Install & Uninstall			
Clock	version 161  Version 161  17-Nov-99 5  <1 min at 28.8 Simple, but nice servers. There a into .cfg files.  Published by  Version 200  16-Nov- 99 2,91  18 min at 28.8 Movemble date at 8.8	n automatically an set five indepenmessage. Skins le UK Software  Win 95/98/ Win 95/98/ K <11 alarm clock. Can re no any docume  Alex Artamono  Alex Artamono  Win 95/98/N  K 6 mi	nounce the tim dent alarms, ea et you customiz  UK Sp  NT Freewa min at 56K change skins. Centation or control  T Shareware \$14.00 n at 56K	e at interch of whe cho of whe cho observed with the choose a choice of the choose a choice of the c	No Registever Exp <1 min honise tim der to cha ck Home  Registever Exp <1 min registever Exp <3 min registerer ck Home	tration Required ires No Install at ISDN 128K  e with Internet nge anything look  Page  Install & Uninstall  ISDN 128K  Install & Uninstall			
Clock	version 161  Version 161  17-Nov-99 5  <1 min at 28.8 Simple, but nice servers. There a into .cfg files.  Published by  Version 200  16-Nov- 99 2,91  18 min at 28.8 Movemble date at 8.8	n automatically an set five indepenmessage. Skins le UK Software  Win 95/98/ Win 95/98/ K <11 alarm clock. Can re no any docume  Alex Artamono  Alex Artamono  Win 95/98/N  K 6 mi	nounce the tim dent alarms, ea et you customiz  UK Sp  NT Freewa min at 56K change skins. Centation or control  T Shareware \$14.00 n at 56K	e at interch of whe cho of whe cho observed with the choose a choice of the choose a choice of the c	No Registever Exp <1 min honise tim der to cha ck Home  Registever Exp <1 min registever Exp <3 min registerer ck Home	tration Required ires No Install at ISDN 128K e with Internet nge anything look			
Clock	version 161  17-Nov-99 5  <1 min at 28.8 Simple, but nice servers. There a into .cfg files.  Published by  Version 200  16-Nov-99  18 min at 28.8 Movable date ar icon with 2-line of the servers. There a into .cfg files.	n automatically an set five indepenment of the indepenment of the indepenment of the indepenment of the independent of the inde	NT Freeward Shareward Share of Manage Skins. Contation or control on at 56K Shareward	e at interch of whe cho of whe cho observed with the choose a choice of the choose a choice of the c	No Registever Exp <1 min honise tim der to cha ck Home  Registever Exp <1 min registever Exp <3 min registerer ck Home	tration Required ires No Install at ISDN 128K e with Internet nge anything look			

	Version 1.0			No Registration	Required	
	13-Nov-99 348K	Win 95/98/NT	Freeware	Never Expires	No Install	
Reminder	2 min at 28 8K	1 min a	t 56K	<1 min at ISI		
Keillilder	To keep you from forg	getting those tasks eed to do them so	that you don't f	orget.		
THE DIE	Published by 2	Zero Alpha	Re	Reminder Home Page		

	Version	1.5		C. Kienikini	Reg	ister Now			
	03-Nov- 99		Win 95/98/NT	Shareware \$10.00	Expires after 15 Days	Uninstall			
Sync-It with	1 min at 28.8K <1 min at 56K <1 min at ISDN 128K								
Atom	A network time protocol client that calibrates the system time of your computer with a timeserver on the Internet. Features include automatic selection of the closest server, scheduled time synchronization, taskbar tray support and easy-to-use and attractive user interface.  Published by Sami Tolvanen  Sync-It with Atom Home Page								
CONTRACTOR STATE			TA INTERNATION	TO STATE OF THE STATE OF					
Man .	Versio 02-Nov-99	9 960K		T Freeware	Never Expires	ration Required Install & Uninstate t ISDN 128K			
Time Left	TimeLeft is counts how given dead	s a cou w much dline. Y	ntdown/stopwato time (year, mor ou can customiz	th clock using V oths, days, hour e alarm time, al	Vinamp skins to sl s, minutes and se ert message text,	now digits. TimeLeft conds) is left of any icon, etc.			
	Publishe	d by <b>Ky</b>	rylo Nesterenk	0	Time Left Home	e Page			
		-							
		on 1.5	W DE/00	NIT   Francis		istration Required			
	02-Nov-			MT Freew min at 56K		n at ISDN 128K			
	ZULT quickly calculates what time it is in other time zones. Ideal for communication by								
	phone, IR you are co access to	C, ICQ, ommuni Greenv	AIM, etc., to hel cating with. Also vich Mean Time	p you determine very handy for	e the current local purposes where y es VB5 runtimes.	you need ready			
	Pul	blished	by LoafieWare		ZULU Home	Page			
Williams M.	71111	NX							
	Versio	n 1.0				stration Not Yet			
			Win 95/98/NT	Shareware	Never Evnison				
	01-Nov-	719K	WIN 95/98/N I	\$10.00	Never Expires	Install & Uninsta			
	99 4 min at	28.8K	2 min	\$10.00 at 56K	1 min a	ISDN 128K			
Hold Back Time	99 4 min at Prevent ye dates which December (Leap Year	28.8K our com ch may r 31, 19 ar).	2 min puter from proc potentially cause 99 to January 1s	at 56K essing time bey	1 min a	t ISDN 128K			
	99 4 min at Prevent ye dates which December (Leap Year	28.8K our com ch may r 31, 19 ar).	2 min puter from proce potentially cause 99 to January 1: 7 Labyrinth	at 56K essing time bey e problems with st, 2000, and Fe	1 min a	t ISDN 128K e. There are two e applications: obruary 29th, 2000			
	99 4 min at Prevent ye dates whi Decembe (Leap Yea Publi	28.8K our com ch may r 31, 19 ar). ished by Softv	2 min puter from procepotentially cause 99 to January 1st Labyrinth ware	at 56K essing time bey e problems with st, 2000, and Fe	1 min a ond a certain date different software ebruary 28th to Fe	t ISDN 128K e. There are two e applications: bruary 29th, 2000			
	99 4 min at Prevent ye dates while Decembe (Leap Yea Publi	28.8K our com ch may r 31, 19 ar). ished by Softv	2 min puter from proce potentially cause 99 to January 1st / Labyrinth ware	at 56K essing time bey e problems with st, 2000, and Fe	1 min a ond a certain date different software abruary 28th to Fe	e. There are two applications: abruary 29th, 2000 me Page			
Time	99 4 min at Prevent y dates which December (Leap Year Publi	28.8K our com ch may r 31, 19 ar). ished by Softv	2 min puter from proc potentially caus- 99 to January 1: / Labyrinth ware	at 56K essing time bey e problems with st, 2000, and Fe	1 min a ond a certain date different software ebruary 28th to Fe lid Back Time Ho  No Regi are Never Ex	t ISDN 128K e. There are two e applications: bruary 29th, 2000			
	99 4 min at Prevent yı dates which Decembe (Leap Yea Publi	28.8K our com ch may r 31, 19 ar). ished by Softv	2 min puter from proc potentially cause 99 to January 1: / Labyrinth ware  Win 95/96	at 56K essing time bey es problems with st, 2000, and Fe  Ho  B/NT Freew nin at 56K	1 min a ond a certain date different software ebruary 28th to Fe old Back Time Ho  No Regi are Never Ex <1 mir	t ISDN 128K e. There are two e applications: ebruary 29th, 2000 me Page  stration Required pires   No Instal			
Time	99 4 min at Prevent y dates whi Decembe (Leap Yea Publi  Versi 30-Oct- 2 min Stop Wate	28.8K 28.8K 28.0 com ch may r 31, 19 ar). ished by Softw ion 1.2 99 34 at 28.8F	2 min puter from proc potentially caus- 99 to January 1: / Labyrinth ware	at 56K essing time bey es problems with st, 2000, and Fe  Ho  B/NT Freew nin at 56K	1 min a ond a certain date different software ebruary 28th to Fe old Back Time Ho  No Regi are Never Ex <1 mir	t ISDN 128K b. There are two c applications: cbruary 29th, 2000 me Page stration Required pires   No Instal n at ISDN 128K			
Time	99 4 min at Prevent y dates whi Decembe (Leap Yea Publi  Versi 30-Oct- 2 min Stop Wate	28.8K 28.8K 28.0 com ch may r 31, 19 ar). ished by Softw ion 1.2 99 34 at 28.8F	2 min puter from procepotentially cause 99 to January 1:  / Labyrinth ware  AK Win 95/98  ( 1 in all the features of	at 56K essing time bey es problems with st, 2000, and Fe  Ho  B/NT Freew nin at 56K	1 min a ond a certain date different software ebruary 28th to Fe  Id Back Time Ho  No Regi are Never Ex <1 mir tch.  Stop Watch H	t ISDN 128K e. There are two e applications: ebruary 29th, 2000 me Page stration Required pires No Instal n at ISDN 128K			
Time	99 4 min at Prevent y dates whi Decembe (Leap Yea Publi  Vers 30-Oct- 2 min Stop Wato	28.8K our com ch may r 31, 19 ar). ished by Softv ion 1.2 99   34 at 28.8f ch has a iblished	2 min puter from procepotentially cause 99 to January 1: y Labyrinth ware  4K Win 95/98 C 1 r all the features of by Zero Alpha	at 56K essing time bey e problems with st, 2000, and Fe  Ho  B/NT Freew nin at 56K f a real stop wa	1 min a cond a certain date different software ebruary 28th to Fe lid Back Time Ho  No Regi are Never Ex <1 min tch.  Stop Watch H	t ISDN 128K e. There are two e applications: ebruary 29th, 2000 eme Page  stration Required pires No Instal n at ISDN 128K eme Page  stration Required			
Time	99 4 min at Prevent y dates which Decembe (Leap Yea Publi  Versi 30-Oct- 2 min Stop Wate Pu  Versi 28-Oct-	28.8K our com ch may r 31, 19 ar). ished by Softv ion 1.2 99   34 at 28.8f ch has a iblished	2 min puter from procepotentially cause 99 to January 1: 7 Labyrinth ware  4K Win 95/96 1 In all the features of by Zero Alpha	at 56K essing time bey e problems with st, 2000, and Fe  Ho  B/NT Freew nin at 56K f a real stop wa	1 min a ond a certain date different software ebruary 28th to Fe lid Back Time Ho No Regi are Never Ex <1 min tch. Stop Watch H	t ISDN 128K e. There are two e applications: ebruary 29th, 2000 eme Page  stration Required pires No Instal n at ISDN 128K eme Page  stration Required			

StopWatch has all the features of a real stopwatch.

Published by Zero Alpha

StopWatch Home Page

	Version	2000.7.0	□ Ge	t It!	Online Registration Not Yet Available		
	27-Oct- 99	2,565K	Win 95/98/NT	Shareware \$10.00		Install & Uninstall	
	16 min	at 28.8K	6 min	at 56K		ISDN 128K	
CLOX Worldwide Clocks	show the clickable location is registered all CLOX on earth. via the integral of the clickable of the clicka	ational clocks applet which displays a row of analogue and digital cloc times in user-selected locations around the world. Clocks can be set map but manual override is possible. In addition to the times, the day also given to avoid confusion. Setting daylight saving times is simplifuser receive updated information, internet support and other benefits a very neat, simple to use way of knowing exactly what time it is an includes a calendar and alarm and can automatically adjust your syst				can be set using a es, the day in each es is simplified and other benefits. All in time it is anywhere st your system time	

Y2KCountdown	Version 2.0			No Registration	
	26-Oct-99 220K	Win 95/98/NT	Freeware	Never Expires	
		<1 min at		<1 min at ISE	N 128K
	Customizable utility	that counts down	to Y2K.		
	Published by SurfWare Y2K			Countdown Home	Page

	Versi	on 2.0			No Registrati		
	23-Oct- 99	3,460K	Win 95/98/NT	Expires on 12/26/99	Install & Uninstall		
	22 min	at 28.8K	8 min a	t 56K	4 min at IS		
Christmas 1999	Christmas and who t enables y cards. In	s. The prog to buy the ou to go s addition, t	gram lets you cre m for. These lists shopping on-line, he program inclu	ate and manage can be passw download Chr	utes, and seconds ge Christmas lists of word protected. Chr istmas stuff, or sen r.	istmas 1999 also	
	Published by Focusmedia Christmas 1999 Home Page						

	Version 1.0			No Registration Req	uired
Dabble VOV	22-Oct-99 500K	Win 95/98/NT	Freeware	Expires on 1/2/00	Install
Bobb's Y2K	3 min at 28.8K	1 min	at 56K	1 min at ISDN 12	8K
Countdown	Countdown timer	til midnight janu	ary first 2000 wit	1 min at ISDN 12 th a few added features.	
Special Edition	Published by		Bobb's Y2K	Countdown Special Edition Page	on Home

Now Year	Version 1.0 19-Oct-99 1,900K 12 min at 28.8K	4 min a	56K	Never Expires 2 min at	ation Required Install & Uninstall ISDN 128K
Countdown	This program is a litt show you how many Published by <b>Jo</b>	le countdown tim days-hours-mini	er until the neutes-seconds	ew year of every there are left in t No Home Page A	ne year.

	Versi	on 3.0		tion Not Yet ble			
	12-Oct- 99 1,817K Win 95/	Win 95/98/NT	Shareware \$7.95	Expires after 20 Days	Install & Uninstall		
The PC Timer	11 min	at 28.8K	4 min	at 56K	2 min at ISDN 128K		
	start butte	by to use countdown timer. Just enter the length of time you desire, and clutton. Minimizes to, and runs quietly in, the system tray. Reappears, and some when the timer ends. Manage the time you spend working or playing of ter more efficiently. Whether you need to be reminded to turn off the stown a time limit on how long your children spend on the computer. The PC Timer Home Page  The PC Timer Home Page					

	Versi	on 5.1	district the second		er Now	
	05-Oct- 99	3,746K	Win 95/98/NT	Shareware \$12.00	Expires after 14 Days	Install & Uninstall
<b></b> Joggler	A timer u more. Us exercises spend on time.	ing it, you s; to remir a task; o	am for Windows can be reminde d yourself to cal r do all three by	95. It is some ed every 20 mir I Melissa in 30	4 min at ISI what like a kitchen tim nutes to perform your minutes; to keep trace e instances of Joggle	ner, but much stretching k of the time you r at the same
	Publ	ished by I	Leepoware	The same of	Joggler Home Pag	е

	Versio	n 1.3.0	E More	THE WAY	Online Registration Not Yet Available		
	02-Oct- 99	1,718K	NAME OF TAXABLE PARTY.	Shareware \$40.00	Expiration Unknown		
	11 min at 28.8K 4 min at 56K				2 min at ISDN 1		
TimeSlice	projects a An expen when you minutes o any set oi and keep database invoices a by providi TimeSlice	and/or cate se amount have bee or tenth, qu f time reco notes on , spreadsl and report ing the ab e is minimi	egories with applit can be added to an be added to an working away uarter, half, or whorded. You can be exactly what you heet, word process. TimeSlice stay lility to command	cable rates, the o each time eni- from your composed bour and the ill time against 're doing. Time ssing programs as out of your when the timer and end the timer and the	of for hourly work. You can east timing when you try. You can easily add tiputer. TimeSlice allows ynen generate invoices or clients, projects, or speci. Slice data can be export as so that you can create cay while you work on you dit active time entries where the state of the	begin work. me entries ou to bill by reports for fic tasks ed to custom ur computer	

The state of	Versio	n 1.32			Online Registra Availa	
Timeless Time & Expense	27-Sep- 99	1,420K	Win 95/98/NT	Shareware \$42.99	Expires after 30 Days	Install & Uninstall
	9 min a	t 28.8K	3 min	at 56K	2 min at ISI	
	With Time needed to billing info Time, Dat	allows you eless Time accurate ermation. e and Cu	u to easily track to a Expense's flee & Expense's flee estimate time Also includes Inversency formats.	time at a fine le exible reporting and costs on fi roice reports, T	ng all a lot of time. Tin evel of detail by project capability, you get the uture tasks in addition o Do list and Internat	ct and/or activity. ne information n to accurate tional support for
TO SHALL SHALL	Publis	hed by M	AG Softwrx	Timeless	s Time & Expense H	lome Page

		Version	1.3			No Registration	Required
		22-Sep-99	867K	Win 95/98/NT	Freeware	Never Expires	No Install
A	A Multilingua	5 min at 2	28.8K	2 min a	t 56K	1 min at ISDN 128K	
Clock	Speaking	The Multilingual Spea multimedia computer that mimics a LC-disp reminding you at a pre		into a \$9.95 spea olay, it can speak i	king alarm clock	d It has a nice grap	nical trontend
		Publish	hed by L	eif Porsklev	Multilingual	Speaking Clock F	lome Page

	Version 1.0 29-Aug-99 819K 5 min at 28.8K	2 min at	56K	No Registration Required Never Expires Install & Uninstall 1 min at ISDN 128K
RovoClock	accessorie set to be our opinion) looking a smooth illustrative	e freeware. Rovo g one. The clock fee, non- standard, u seconds) and 3 si	Clock is not ar eatures plasticuser interface tarter buttons	et. It is the only component of the nordinary clock, it's an attractive (in clooking panels and clock arms and . It also features as functionality a to start up apps and web links. It can

MARIA	Published by Rovo	Scape Software		RovoClock Home Page		
	Version 1.0 27-Aug-99 650K 4 min at 28.8K	Win 95/98/NT 1 min a	Freeware	No Registration Required  Never Expires Install & Uninstall  1 min at ISDN 128K		
Candy	A colourful and high clock can be loaded including animated compliment the bac can be reloaded at clocks, and new one	lly configurable d i in from a graphi GIFs. The hands kground and ther a later stage. Car es can easily be	esktop clock p cs file, most c , border and r n all the setting ndy Clock con created using	program. The background for the common formats are supported numbers can then be modified to gs saved into a small ascii file which nes with a variety of ready made clip art, graphics from the web etc.		
	Published by Galli	crow Software	C	Candy Clock Home Page		

	Version 1.5.3b	The second second		No Registration	
	26-Aug-99 25K	Win 95/98/NT	Freeware	Never Expires	
	<1 min at 28.8K	<1 min	at 56K	56K <1 min at ISDN 128K	
Chasiki	This nice clock lies of button (it jars on some button 'Sec00' or 'Semenu appears. Now indication of the clock	nebody). Setting of t'). If you click the you can change th	the right time w right button of you he font, colors as responds to the	ill take you a mome our mouse on the cl nd format of date ty Windows setting.	ent (click the lock then the pe.The
	Publisher I	Jnknown	C	hasiki Home Page	

	Version 1.0.5			No Registration			
			Freeware	Never Expires			
O Alema	<1 min at 28.8K	<1 min a	at 56K	<1 min at ISDN 128K			
Alarm	A simple alarm clock time you desire, and you shut it off again.	then at that time the	ne computer will e readme file!	l loop your default s	ound until		
AT SELECTION OF THE	Published by Dyna	Published by Dynasty Productions   Alarm Clock Home Page					

	Version 1.1		ner <b>99!</b>	Online Registration Not Yet Available		
Tardis	25-Aug- 99	980K	Win 95/98/NT	Shareware \$20.00	Expiration Unknown	Install & Uninstall
	6 min at	28.8K	2 min	at 56K	1 min at IS	
	have ever problems day in son	tried to caused ne case	develop applica by machines ha es!	ations across mo	hat all PCs agree or ore than one PC you idea of what time it i	will know the
	Published by H.C. Mingham- Smith					

AA Project	2-Aug-99 1,013K 6 min at 28.8K xcellant Project, Task, ach task can have its o	Win 95/98/NT 2 min a or DayCare Time own Charge amou	Clock. Keeps tr	Never Expires 1 min at ISDN ack of time spent or	128K tasks.
E	6 min at 28.8K xcellant Project, Task, ach task can have its	or DayCare Time	Clock. Keeps tr	ack of time spent or	tasks.
Project E	ach task can have its o	or DayCare Time	Clock. Keeps tr	Configurable Can	tasks.
it	ave and print reports. Fovernment projects, the remembers the setting lesers. Email me if you Published by Ch	Reports can be mo me can be tracked gs and modes that like it!	onthly, weekly of d in tenths of an t it was last use	or daily. For those tra hour if you wish. Ve	acking ery friendly EE for ALL

	Version	on 1.5			No Registr	ation Required
	20-Aug- 99	1,919K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	12 min at 28.8K		4 min at 56K s characters to speak the time		2 min at ISDN 128K	
Agent Clock	install Micr componen website.	osoft Ager ts, text to s	nts under Window speak engine, and	d Agent chara	y downloading that the control of th	e Agent 2.0 core e Microsoft Agents

	Version 1.0			No Registration F	Required
Time	20-Aug-99 1,424K	Win 95/98/NT	Freeware	Never Expires	Install
	9 min at 28.8K	3 min at 56K		2 min at ISDN 128K	
	A simple updating Time options. A small, useful	displaying progra program.		Color, Pause, and o	ther
	Published by We	Published by Wes DeMoney			

Marin Mills	Version	on 1.0			Online Registra Availa	
	18-Aug- 99	2,513K	Win 95/98/NT	\$19.95 Days		Install & Uninstall
	16 min	16 min at 28.8K		6 min at 56K		DN 128K
140tude Time	the standa around the illuminatio	ard Windo e world, re n on earth s with the	www.stray.clock, er enders a breathta h that can be use program and give	system clock through an Internet was tray clock, enhancing it by senders a breathtaking photo-real that can be used as the deskt program and gives you informate world.		ime at locations irrent the screensaver lidays in
	Publishe	ed by 40to	ude Software	41	Otude Time Home Pa	age

HEREN FROM	Versio	n 3.04	THE WILLIAM STATE		Online Registration Not Yet Available			
	18-Aug- 99	1,298K	Win 95/98/NT	Shareware \$45.00	Expires after 30 Days	Install & Uninstall		
	8 min a	8 min at 28.8K 3 min at 56K			1 min at ISDN 128K			
Proj Clock	to each project for the day. A history database is kept to record all time transactions. Reports summarize all billed project time in the given time period. Data may be viewed by saveable SQL calls. Proj Clock Pro is multi-user network ready and has user-customizable reports.							
		Published by CyberMatrix Corporation Inc.  Proj Clock Home Page						

STEEL ST	Version 1.0 15-Aug-99 1,490K 9 min at 28.8K	Win 95/98/NT 3 min a	Freeware t 56K	No Registration Required Never Expires Install & Uninstall 2 min at ISDN 128K
Binary	Displays the time in E	Binary format, usi	ng images of ifferent patter ou learn how t	LED's (Light Emitting Diodes) to ns to represent the time. Interesting o read it!!;) A tutorial is built into the
	Published by Da	ark Eclipse	В	inary Clock Home Page

Chrono	Version Release 2 Beta				No Registration Required	
	11-Aug-99	989K	Win 95/98/NT Freeware		Install & Uninstall	
	be used either for those situal current time. V	r as a repations who	placement for the en you're in the e sustomizable inter	ty that display clock in the eleventh hour face and flex	1 min at IS ys the current time system tray, or as a and need constan ible mix of settings play in 12/24 hour	or date. It can a companion it watch over the i, it can be
			mbols, and date	display.	Chrono Home Pa	ige

	Version	on 1.1			No Registration Required	
Voice Clock	09-Aug- 99	8,020K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	50 min a		18 min :			ISDN 128K
	that can au automatica alarms with You can ma can SPEAH flash the cle	itomatically ally set you ability for ake an ala K ANY PHI ock. You o	y speak the time or PC's time using pre-reminders so orm a reoccurring	every 1, 15, 3 the internet to many days reminder (ne essage, launc clock and sho	0, or 60 minutes, ime server of you in advance and server forget a birthoch files, shutdown	ur choice. Has nooze buttons . day!). On alarms it n, reboot, log off, or tead.

	Version 1.00		the state of	No Registration	Required
Time Meter	08-Aug-99 171K	Win 95/98/NT	Freeware	Never Expires	No Install
	1 min at 28.8K	<1 min a	t 56K	<1 min at ISI	N 128K
	Time Meter was devel Save.	oped to provide a			
	Published by Tong	Naraktisood	Ti	Time Meter Home Page	

	Version 1.0			No Registration	Required				
	07-Aug-99 2,560K	Never Expires	Install						
	16 min at 28.8K 6 min at 56K 3 min at ISDN 128K								
HyperTime	Lets you assign sound or just a friendly remind you'll have a lovely son play at the top of each I special sound play at the appointment, or your fa	ler. Download our nding bird clock! V hour, every half ho he time you specify	collection of bir Vith HyperTime, our, or every 15 y - a great way t eely.	d sounds and in sec , you can specify so minutes. You can e to remind you of a m	onds, and unds that ven have a leeting,				
	Published by Hyp	erpresence	Нур	erTime Home Page					

	Version 2.2		Get It!		Register Now	
	06-Aug-99	1,900K	Win 95/98/NT	Shareware \$10.00	Never Expires	Install
B Dia Pon	12 min a		4 min		2 min at ISDN	
Big Ben	the Millenniu	ost famous um. This sl r Chimes o	s bells. An ideal ut hareware utility is	ility for New Year quite unobtrusive	ne hours with the sour's Eve parties as we e, and will play a sec k each hour with a nu	approach tion of the
CALL BY THE STATE OF	Publi	shed by K	(PJ Jones	Big	Ben Home Page	

CC TimeKeepe	Version 1.4 04-Aug-99 285K	Win 95/98/NT	Freeware	Never Expires	ation Required Install & Uninstall
	A 1 1 00 017	d makes a	LECV	<1 min a computer. Start, er use. With its sn	Pause, Stop and
THE CONTRACTOR AND ADDRESS.	intuitive interface, the Published by Cryst	nis ireeware prov	es mai great	things come in sm TimeKeeper Ho	iali packages.

A Lifeclock	Version 2.0 04-Aug-99 828K Win 95/98/NT Free 5 min at 28.8K 2 min at 56K			1 min at ISDN 128K	
Lifeclock	A 32-bit Windows a have to live using a Published by A	ccurate life expe	edicts/estima ctancy tables	tes your death da Requires the VB Lifeclock Home	te and how long you 6.0 Runtimes. Page

A PARTY OF	Versio	Version 2000			Online Registration Not Yet Available	
	03-Aug- 99	1,890K	Win 95/98/NT	Shareware \$5.00	Expiration Unknown	Install & Uninstall
Today	12 min :	at 28.8K	4 min a	at 56K	2 min at ISDN 128K	
	right next	to the time	e, without having late and a small	to move your n	ogram that shows nouse at all. It has	no fancy alarms

STATE STATE	Version 31-Jul-99		Win 95/98/NT	Freeware	No Registration	
	<1 min at	28.8K	<1 min	at 56K	<1 min at IS	DN 128K
CurrentTime	Internet and connection t connect. Wit	fetching o reach th a full-	the correct time the Internet, Curr	with second pre- rentTime will syn- nection, you may source code is	onnecting to time so cision. If you use a chronize the time e choose the interva- included.	dial-up very time you I at which
THE RESERVE OF THE PARTY OF THE	Publish	ed by M	agnus Baeck	Cur	rentTime Home Pa	ige

	Version 1.1			No Registration	
ionus	20-Jul-99 12K	Win 95/98/NT	Freeware	Never Expires	
	<1 min at 28.8K	<1 min at		<1 min at ISI	N 128K
iAlarm	A next-generation clock	with reminder fund	tionality. See-	it-and-love-it.	
	Published by Christi			us iAlarm Home Page	

CAR HE IS TO THE	Versi	on 2.00	9.77 9-20	THE WAY	Regist	er Now
	18-Jul- 99	1,020K	Win 95/98/NT	Shareware \$9.00	Expires after 14 Days	Install & Uninstall
WorldTime2000	6 min	at 28.8K	2 min	at 56K	1 min at ISI	ON 128K
CD.	the work alarms, wallpape	d. Comes modify, d ers, you d	with time information and took an achieve a version achieve achi	nation for ove ations. With ve	r 400 cities and time our choice of fonts, cook. Modern, 'cool' lo	zones. Set
		ed by PC Systems	CM Computer Pty Ltd	Wo	rldTime2000 Home	Page

	Version 1.00			No Registration	Required
	17-Jul-99 67K	Win 95/98/NT	Freeware	Never Expires	
	<1 min at 28.8K	<1 min a	t 56K	<1 min at ISI	
	Displays the time of a neat, clear interface.	ny country in the v			
	Published by Ja	amie Brown	Apex	World Time Home	Page

RoundClock99	Versi	on 1.0	The series		Online Registration Not Yet Available		
	12-Jul- 99	1,431K	Win 95/98/NT	Shareware \$10.00	Expiration Unknown	Install & Uninstall	
	Introduc 99 is a d desktop date and	color, drag clock wh d updates	dimension in d ggable, hideable lich has the add s every second.	esktop noveltie e and customiza ed novelty bein	2 min at IS s - the ROUND clo able (in the register g circular. It also s	ck. RoundClock red version) hows the current	
	Publish	ned by G	raham Taylor	Rou	indClock99 Home	Page	

	Version 1.01			No Registration Required		
	10-Jul-99 244K	Win 95/98/NT	Freeware	Never Expires	Install	
@ Beatle Atomic	2 min at 28.8K	1 min at 56K		<1 min at ISDN 128K		
Time	This software connection generate the 'Swatch	cts to an atomic tin Internet Time'				
	Published by Ph	nilipp Robbel	Beatle /	Beatle Atomic Time Home Page		

	Version	2.0.2			Regist	er Now			
	07-Jul- 99	654K	Win 95/98/NT	Shareware \$35.00	Expires after 30 Days	Install & Uninstall			
	4 min a	28.8K	1 min	in at 56K 1 min at ISDN 128K in various cities around the world. There are two dis					
World Clock	that can Both win limited to a world r allows th City time the statu	be used dows and display map, can be user to s are acts of the	for this purpose re user configura ying information for n contain as man to input a time in dijusted to their lo	the World Timble for content or four cities what or cities as there one city to see cal times based data. All International city to see call times based data.	ne window and the Time and format. The World hereas the Time Zone e are available. A "Whe what time it would be don which time zone tational settings are su World Clock Home Page 2015.	le Zones window. I Time window is window, which is at if" feature in another city. hey are in and pported.			

WinGlobe	Versi	on 1.2	- Libert	9,14,1	Online Registration Not Yet Available	
	06-Jul- 99	1,741K	Win 95/98/NT	Shareware \$15.00	Expiration Unknown	Install & Uninstall
	11 min at 28.8K 4 min at 56K				2 min at ISDN 128K	
	the local	time and	its on your Wind population of all he moment.	addition to just sitti ound the world. It als	so shows where it	
and the second	Pub	lished by	Dirk Djuga	1	WinGlobe Home Pa	age

	Versio	n 1.00			Online Registr Avail	
	04-Jul- 99	760K	Win 95/98/NT	Shareware \$20.00	Expiration Unknown	Install & Uninstall
Time Manager	Stopwate Stopwate	ch comb	like it might be a bo. You can laun handy tool and d. display a mes	PIM, Time Mana ch both its modul the Timer has so sage box, launch	1 min at IS ager is actually a colles from the system ome nice features. No a program or docu- ng or repeating mod	untdown timer and tray. The When it goes off it ment, and/or

window sizes, and elect to keep the	numbers for both modules, choose from two smaller versions of each on top of your desktop.
Published by Vira Tech Development	Time Manager Home Page

24-Jun-99 1,000K 6 min at 28.8K	Install & Uninstall ISDN 128K			
switches between all functions flawlessly of	U.S. timezones.	The application of the second	on has been teste nachine.	ed rigorously and
	6 min at 28.8K Gives fast and accur switches between all functions flawlessly of	6 min at 28.8K  2 min a Gives fast and accurate accessibility switches between all U.S. timezones.	6 min at 28.8K  2 min at 56K  Gives fast and accurate accessibility to nine major switches between all U.S. timezones. The applicati functions flawlessly on any Windows95, 98 or NT n	6 min at 28.8K  2 min at 56K  1 min at 56K  Switches between all U.S. timezones. The application has been teste functions flawlessly on any Windows95, 98 or NT machine.

	Version 1	.0	The second		No Registration	Required
COOL STEELS OF THE PARTY	15-Jun-99	7K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28				<1 min at ISI	
Traveler's Clock	clock is small, clock, and cho	easy to	to use, and best of	all free! I just m erences. This c ss your flight!	an alarm clock? We hade this today, and lock will ensure you	it features a that you
	Publishe	ed by	Jason Rand	Trave	ler's Clock Home I	Page

L ISTANIANT R	Version 2.0b8				ration Required				
BeatNik Internet Clock	02-Jun-99 568K Win 95/98/NT Freeware Never Expires Install & Uninst 4 min at 28.8K 1 min at 56K 1 min at ISDN 128K								
	A nonrectangular s internet connection formats. Includes a	or SOCKS 4 pro	xy. Displays t	time in 12/24-hour					
	Published by Something Decent BeatNik Internet Clock Home F								

	02-Jun-					
	99	2,095K	Win 95/98/NT	Shareware \$11.00	Expiration Unknown	Install & Uninstall
		at 28.8K			2 min at IS artoonish picture of	
StarClock	angry, or Other fea compone backgrou often, Sta	sleeping, tures incl nts, two s nd music	complete with a ude a right-click creen savers, sy Despite a few right take a nice of	ppropriate sound menu that lets y stem tray suppo ough edges and	on changes. He can d effects played at you launch common ort, shutdown control a nag screen that yion.	regular intervals. Windows ols, and optional

	Version	3.20.04			Online Registration	Not Yet Available
	01-Jun- 99	1,544K	Win 95/98/NT	Demo \$89.00	Expiration Unknown	Install & Uninstall
Paspansiya	10 min :	at 28.8K	3 min at	56K	2 min at IS	DN 128K
Logger	data at the	end of th	e day. Produce of rocessor, or use	the templa	2 min at is nts, lawyers, enginee time tracking, or ente d time reports. Design ates provided with the ceivable section.	your invoices with application. Track
	Publ	ished by	Alan Macy	Res	ponsive Time Logge	er Home Page

	Version	2.04			Onl	ine Registration Not Ye	et Available		
	31-May-99		Win 95	Shareware	) E	xpiration Unknown	Install		
	5555			\$5.00 min at 56K		<1 min at ISDN 12	8K		
	2 min at	tivo Do	ekton Als	rm Clock prog	ram unio	uely designed for life aff	er the year		
	2000 and s	necifica	lly design	ned for Window	vs 95/98	and MS IE 4/5+ browse	rusers.		
	Providing V	ou with a	choice	of having 2 diff	erent ev	ent settings for every da	y or the		
	week Now	vou'll ne	ever miss	another sched	duled eve	ent again with an easy to	use utility		
	having mult	inle alar	m and/or	event settings	. Use vo	our custom messages for	alert		
Active	reminders	I ISA VOLL	r favorite	sound music	picture.	video files and even live	e web audio		
Desktop	or video fee	eds for th	ne alert s	ignals or event	s. Can b	e used as an Active Des ected to do so, when the	sktop		
Marm Clock	(recommen	ded) or	as an ex	on alert mode	enunding	the alarm signal for two	(2) minute		
2000	hofore char	naina int	n a Snoo	ze mode Thei	n. after s	ix (6) minutes of snoozing	g, it will		
	raturn to so	und the	alarm ac	ain The alarm	will auto	omatically repeat the ala	m cycle		
	Four (1) time	ac swith	throp (3)	SHOOTE CVCIES	then er	nd. unless vou select Sto	ob (at any		
	time) If the	alarm is	left una	ttended while a	activated	. it will function for a tota	1 OT 20		
	minutes the	en reset	itself to	a standby mod	e until th	e next day. About the sa	me way as		
		ther digi	tal alarm	clock functions	s, except	t this clock is Internet us	er		
	interactive.	od by Me	urico		_		200		
	Published by Maurice Travis			Active D	esktop	Alarm Clock 2000 Hom	e Page		
		ITAVIS							
		0.10	_			No Registration R	equired		
	Version 26-May-	200.000.000	100-	95/98/NT Fr	eeware	Never Expires Install			
	99	1,062	vvin :				The State of the S		
SetTime	7 min a	28.8K		2 min at 56	K	1 min at ISDN	128K		
Client	Synchroniz	es your	PC clock	to the world s	tandard.	An SNTP client that is a	uling		
Client	more. Set I	ime Clie	ent also il	ncludes a stop-	watch til	mer and complete sched heck the time, run a prog	ram or		
	open a doc	ument a	t anvtim	e - anv dav. Ge	et on time	e. Stay on time. Be on tir	ne.		
	Dublie	hed by	Breese l'	T&C	Se	etTime Client Home Pa	ge		
	1 dbilo	ned by t	7100001		-				
	I Varalan	1 20				No Registration Re	equired		
	Version 23-May-99		Win 9	/98/NT Fre	eware	Never Expires Install			
	3 min at	28 8K		1 min at 56K		<1 min at ISDN	128K		
TinyTimer	This emall	evetom	ray acce	essory provides	the use	r with a small, easy to us	se Pop-Up!		
	timer. Use it to monitor your online time, or any general purpose timing activity. Installs								
	itself in the	system	tray.						
31- 1 125	Published	by Por	corn Sc	oftware		TinyTimer Home Page			
HELE THE SIL		15 -1	411513						
	Version 2	2.0 beta	2	OF IOD NIT   F.		No Registration F Never Expires Instal			
O-OTime	18-May-99	2,000	K Win	95/98/NT   Fr	eeware	2 min at ISDN			
@Time	12 min	at 28.88	Foource	vou arel Why	not run o	n Internet Time? Get the	@Time		
Internet	On the Internet? Of course you are! Why not run on Internet Time? Get the @Time Desktop Clock; Internet Time right there, on your screen! Features include Alarms, A								
Time Clock	Buddy List, and a customizable interface.								
			CreativE		@Time I	Internet Time Clock Ho	me Page		
The state of the s						District Street			
1075	Version	20				Online Registration	Not Yet		
				Char	eware	Available	1		
	17-May- 99	250K	Win 95/		0.00	Expiration Unknown	No Instal		
	2 min at	28.8K		1 min at 56K		<1 min at ISDN	128K		
ClockG2	A combina	tion PC	clock sy	ochronizer and	desktop	clock. Synchronize you	r PC clock		
GIJUNUZ	lautamatica	My savith	nonular	nternet Atomic	time ser	vers. Specify now often	VOU WISH		
	ClockG2 to	synchr	onize yo	ur PC clock. Di	splay ch	oices include analog, dig	gital, and		
	world clock	k. World	Clock dis	splays the time	mes No	different major cities of your installation is necessary	v. Simply		
	download	and run	our wind	OWS COID! SCITE	11103. 140	motanation to riccossar	, Omipij		
	download .	and run.				ClockG2 Home Page			

ClockG2 Home Page

Published by GetWare

Y2KountDown	Version	1.0			No Registr	ation Required	
	14-May- 99	683K	Win 95/98/NT	Freeware		Install & Uninstall	
	4 min at	28.8K	2 min a	t 56K	1 min at ISDN 128K		
	remaining, remaining	as well is displa	as the current da ayed when the m	ate and time a	are displayed. As	well, the time icon for a second.	
	Publis	hed by Softw	CyberTech	Y2	Y2KountDown Home Page		

	Version 1.0			No Registration	
	12-May-99 134	K Win 95/98/NT	Freeware	Never Expires	
O 4-1	1 min at 28.8K	<1 min :	at 56K	<1 min at ISDN 128K	
StopWatch	"hacking code", pl tool for all of you of	tracking utility. It let's us you can save a log consultants out there.	file for future r	eference. Excellent	productivity
	Published by Ark	cosoft Technologies	Arkoso	ft StopWatch Home Page	

	Versio	n 1.5			Register Now		
AKClock	11-May-	407K	Win 95/98/NT	Shareware \$10.00	Expires after 7 Days	Install & Uninstall	
	3 min at	28.8K	1 min	at 56K	<1 min at IS desktop. Clock may		
	analog me	de may	eate your own so be rectangular of and digital modes	or rounded. Also	ts really simple! Cloc o available many feat	tures. As for	

○ WorldClock	Version	n 2.0			Online Registra Availa		
	10-May- 99	4,983K	Win 95/98/NT	Shareware \$39.95	Expires after 30 Days	Install & Uninstall	
	31 min at 28.8K 11 min at 56K 5 min at ISDN 128K						
	This program allows you to display times for more than one place in the World are so many configuration options there will certainly be something to suit you						
	Publis	shed by S	Stuart Folo	,	NorldClock Home Pa	age	

	Versio	n 1.2	8.11.5		Online Registr Avail	
	09-May- 99	190K	Win	Shareware \$10.00	Expiration Unknown	Install & Uninstall
	1 min at	28.8K	<1	min at 56K	<1 min at ISDN 128K  The purpose of this software is to	
Synchronization	tens of na server. It i	nosecor s design	with aim ids. The ied as a	most common i	ne) with another com recision, because the use is to synchronize is controlled by control	with network
	10.41000000	ned by D Hrbac	avid	Time	Synchronization Ho	me Page

	Version	on 3.0			Inline Registration	Not Yet Available
	02-May- 99	2,644K	Win 95/98/NT	Demo \$59.00	Expiration Unknown	Install & Uninstall
	17 min a	at 28.8K	6 min at	56K	3 min at IS	DN 128K
Time & Billing	you to trac operation a project trac capabilities network/mi	k your clie and billing cking, cust s. The progulti-user ve	nts' billing history procedures. Add comizable invoice	y and to and itional proge forms, and gned and example.	or anyone who must ilso acts as a managalyze the effectivene ram features include I extensive reporting asy to understand ar	e recurring billing, and printing and navigate. A

CoolClock	Version 02-May-99		Win 95/98/NT	Freeware	No Registration Never Expires	
	2 min at 2	28.8K	1 min a	t 56K	<1 min at ISI	
	Not in a wind	ow so yo	ou can click throug up functions. Anin	the numbers! nates bitmaps a	tually written on you Very configurable of cross the surface of	with built in f the clock to
	Published by Coolest.com CoolClock Home Page					

	Version	n 3.01		BUNG	Online Registration Not Yet Available	
	25-Apr- 99	1,186K	Win 95/98/NT	Shareware \$15.00	Expires after 30 Days	Install & Uninstall
	7 min =4 00 0V		3 min	at 56K	1 min at ISDN 128K	
	zones. As the backg can be di map.	ground col splayed a	lour and the text nd optionally the	colour to suit to world time zon	heir individual tastes. nes can be superimpo	A world map osed on this
	Published	by Cast	le Software Ltd	V	VorldTimer Home Pa	age

	Version	2.1b				stration Not Yet vailable
	17-Apr- 99	488K	Win 95/98/NT	Shareware \$20.00	Never Expires	Install & Uninstall
	3 min at					ISDN 128K
AtomTime	time serve compares option of of of options proxy serv	er in Bo this va updating to auto vers.	ulder, Colorado ( lue to your PC tir g your PC clock to mate the update	USA) and fetch ne and displays o match the ato process. Atom	the current atoms the difference. Yomic clock value. Time98 also featu	There are a number ires support for most
	Publishe	d by Br	uce Adelsman		AtomTime Home	Page

	Versio	n 3.0			- Register Now	
	17-Apr- 99	846K	Win 95/98/NT	Shareware \$25.00	Expires after 30 Days	Install & Uninstall
	5 min at	28.8K	2 min	at 56K	1 min at ISI	
Outatime	You will fi day. If yo calculate	basis, " or activity and that u have your fig	Outatime" will ap ies) that you hav this is a great wa	pear on your so e been working by to realise ex- eneet at the end ly.	ring on each of your do creen, and ask you to gon since the last time actly what you are doi of the week, "Outatime Outatime Home Pag	click on the e it appeared. ng during the e" will be able to

Timelt!	9 min at 28.8K	3 min at 56		No Registration Required Never Expires Install & Uninstal 2 min at ISDN 128K
	Timer application to ke a project. "Pause" fea with this version!	eep track of time sp ture included. Also	pent on-line displays c	e or length of time spent working on current date and time. Alarm added
	Published by Duques	sne SoftWorks		Timelt! Home Page

	Version 2.3	n 2.31		Mark 1	Online Registra Availa			
When	30-Mar- 99	1,616K	Win 95/98/NT Shareware \$10.00		Expires after 15 Days	Install & Uninstall		
	10 min	10 min at 28.8K		4 min at 56K		2 min at ISDN 128K m with AutoSnooze, a countdown		
	timer, and	d a calend arm soundisplay the	lar. Fully custom ds and a custom	izable, you ma alarm/timer m	y choose options like nessage. ?When has o fit your needs. 15 da	military time, an easy to read ay fully functiona		
	Publishe	Published by SW Systems, Inc. When Home Page						

	Version 2.1			No Registration	
WTClock	30-Mar-99 35K	Win 95/98/NT	Freeware	Never Expires	
	<1 min at 28.8K	<1 min at ISDN 128K			
	Simple analogue cloc combine using of MS	k for your desktop VB and MM Flash	technics. Requ	uires the VB 5.0 Ru	ntimes.
	Published by Irek	Souleimanov	W	TClock Home Pag	е

	Version 2.0		Shill be	Online Registrat Availab	
	26-Mar-99 60K	Win 95/98/NT	Shareware	Never Expires	No Install
	<1 min at 28.8K	<1 min	at 56K	<1 min at ISI er protocol. It can both	
TSTC (Tim tc Server - Time Client)	e station only can be time from the inter	e connected to In rnet, and serve the	ternet (due to fin is time to all other to TSTC server	network chain, in the ewall limitations). The er stations on the net r. This program is free	at station reads work. You can

	Version 1.0			No Registration				
	25-Mar-99   12K	Freeware	Never Expires	No Install				
	<1 min at 28.8K	<1 min at 28.8K <1 min at 56K <1 min at ISDN 128K						
dCAL	A nifty little command for any given month names that are not in systems.	and year. Uses the n english. Similar to	e 32-bit Window the CAL.EXE	s API to support mo utility on many Unix	onth and day			
1500 A T - S IN	Published by Dave Navarro dCAL Home Page							

		Version 1	.0			No Registrati	on Required
		-Mar- 2.0	36K Win 95	/98/NT	Freeware	Never Expires	Install & Uninstall
		99 2,0	S SK	4 min at	56K	2 min at IS	
GPCountDo	wn A fre will o	ee Countdow	own utility that n to. It is very u don't need th	allows ye	ou to specify configure. Th	up to 10 events to e download include beb page and select	hat the program es the VB6
			y Grant Porte	ous	GPO	CountDown Hom	e Page
				1117			
						Online Registrati	on Not Yet
	Vers	sion 2.0	-			Availab	le
	24-Mai	r- 5 300K	Win 95/98/N			Expiration	Install &
World	99			\$39 n at 56K	.95	Unknown 6 min at ISDI	Uninstall
Clock	The def	n at 28.8K	i zoned, graph	ical worl	d clock. Data	a base support, or	screen life like
	watch w	vith dozens	of clock faces	S.			
	Publish	ed by SIM	COM Softwar	е	Worl	d Clock Home Pa	ge
	II de la la						
		Version	10			No Registrati	on Required
	2	O BACO	THE RESERVE TO SERVE THE PARTY OF THE PARTY	E/OO/NIT	Ernouvere	Never Expires	Install &
		99	Section Sections	5/98/NT			Uninstall
PrimeTimeS	Sync	9 min at 2	8.8K	3 min a			SDN 128K
	A	simple utili	ty that sets yo	ur systen	n time from t	he Internet. Just of NTP server at MI	T and sets you
		ock.	and it automat	ically col	moots to the	TITL SCITCI SEIM	. und dotte you
	- Contract		by Prime Sof	tware	Prir	neTimeSync Hon	ne Page
	- 17-	-1 4 0				No Pogietro	tion Required
		rsion 1.0 er-99   49	K Win 95/9	R/NT	Freeware		s No Instal
	<1 mi	in at 28 8k	<	1 min at	56K	<1 min at	ISDN 128K
Cmdtime	An extre	emely eas	v to use freewa	are comm	mand-line uti	ity for synchronizi	ng computer's
	time over	er the Inte	rnet. It uses fa	st and re	liable Simple	Network Time Pr r with external she	otocol. It's
			Jury Gerasin		battiriles, t	Cmdtime Home P	age
	Pul	blished by	Jury Gerasiii	OV		omatime mome r	ugo
	Var	sion 1.0					tion Required
LES PAUL DE SENSE					Freeware		s No Instal
	22-Ma	r-99 92k		min at		<1 min at	ISDN 128K
	22-Ma 1 mir	n at 28.8K	<	1 min at SNTP) c	56K		ISDN 128K rt: RFC868
MR Tech	22-Ma 1 mir Simple (Time P	n at 28.8K Network T	ime Protocol (	SNTP) c	56K lient originall ocol) Feature	y written to suppo	rt: RFC868 minimized to
MR Tech ClockAlign	22-Ma 1 mir Simple (Time P	Network Totocol) &	ime Protocol ( RFC2030 (SN	SNTP) control of the state of t	56K lient originall ocol) Feature ows you to c	y written to supported include: Startup	rt: RFC868 minimized to p folder and re-
COCCUSE Sense Continues of the State of	22-Ma 1 mir Simple (Time P systray align on	Network Torotocol) & Align on startup. [	ime Protocol ( RFC2030 (SN startup optiona Date stamp as	SNTP) control of the state of t	56K lient originall ocol) Feature ows you to c	y written to suppo	rt: RFC868 minimized to p folder and re-
COCCOSCO Constitution of the Constitution of t	22-Ma 1 mir Simple (Time P systray align on a calend	Network Torotocol) & Align on startup. Idar to see	ime Protocol ( RFC2030 (SN startup optiona Date stamp as what today's o	SNTP) country our tray date is.	lient originall ocol) Feature ows you to o vicon so that	y written to suppo es include: Startup topy to your startu you don't have to	rt: RFC868 minimized to p folder and re- keep looking a
COCCOSCO Constitution of the Constitution of t	22-Ma 1 mir Simple (Time P systray align on a calend	Network Torotocol) & Align on startup. Idar to see	ime Protocol ( RFC2030 (SN startup optiona Date stamp as	SNTP) country our tray date is.	lient originall ocol) Feature ows you to o vicon so that	y written to supported include: Startup	rt: RFC868 minimized to p folder and re- keep looking a
COCCOSCO Constitution of the Constitution of t	22-Ma 1 mir Simple (Time P systray align on a calend	Network Torotocol) & Align on startup. Idar to see	ime Protocol ( RFC2030 (SN startup optiona Date stamp as what today's o	SNTP) country our tray date is.	lient originall ocol) Feature ows you to o vicon so that	y written to suppo es include: Startup opy to your startu you don't have to ch ClockAlign Ho	rt: RFC868 minimized to p folder and re- keep looking a ome Page
COCCOSCO Constitution of the Constitution of t	22-Ma 1 mir Simple (Time P systray align on a calend	n at 28.8K Network T Protocol) & Align on s a startup. I dar to see Published	ime Protocol (SN startup optional ate stamp as what today's oby Mel Reyes	SNTP) control of the state of t	56K lient originall ocol) Feature ows you to d vicon so that	y written to supposes include: Startup sopy to your startup you don't have to ch ClockAlign Ho No Registratio	rt: RFC868 minimized to p folder and re- keep looking a ome Page
COCCUSE Sense Continues of the State of	22-Ma 1 mir Simple (Time P systray align on a calend	n at 28.8K Network T Protocol) & . Align on a n startup. I dar to see Published	ime Protocol ( RFC2030 (Sharper) RFC2030 (Sharper) Reference of the Protocol ( RFC2030 (Sharper) Reference of the Protocol ( RFC2030 (Sharper) Reference of the Protocol ( RFC2030 (Sharper) RFC	SNTP) cluster Protection (NTP) cluster Protection (NTP) cluster SNTP) cluster SNTP	56K lient originallocol) Feature ows you to control of the control	y written to supposes include: Startup opy to your startup you don't have to ch ClockAlign Ho No Registration lever Expires   Insert	rt: RFC868 minimized to p folder and re- keep looking a pme Page on Required stall & Uninsta
COCCUSE Sense Continues of the State of	22-Ma 1 mir Simple (Time P systray, align on a calend Vers 14-Mar 1 min	n at 28.8K Network T Protocol) & . Align on a n startup. It dar to see Published 	ime Protocol (SRFC2030 (SN startup optional) attentional attention	SNTP) court Protect All, this all your tray date is.	56K lient original cot) Feature ows you to c vicon so that  MR Te  Reseware N Reseware Res	y written to supposes include: Startup copy to your startup you don't have to ch ClockAlign Ho  No Registratio lever Expires   Insection   7 min at 18	rt: RFC868 minimized to p folder and re- keep looking a ome Page on Required stall & Uninsta stell the clock to
ClockAlign	22-Ma 1 mir Simple (Time P systray, align on a calend  Vers 14-Mar 1 min A count	n at 28.8K Network T Protocol) & Align on a n startup. I dar to see Published iion 1.1.8 r-99 120K n at 28.8K Idown time	ime Protocol (S RFC2030 (S) RFC2030 (S) Startup optional Date stamp as what today's (by Mel Reyes Win 95/98/	SNTP) court Protect In the second sec	56K lient original locol) Feature ows you to cook icon so that  MR Te  reeware K ses, January	y written to supposes include: Startup opy to your startul you don't have to ch ClockAlign Ho  No Registratic lever Expires Ins <1 min at IS 1,2000. You can so loace the clock on	rt: RFC868 minimized to p folder and re- keep looking a ome Page on Required stall & Uninsta DN 128K et the clock to
COCCUSE Sense Colonia Company	22-Ma 1 mir Simple (Time P systray, align on a calend  Vers 14-Mar 1 min A count countdown	n at 28.8K Network T Protocol) & Protocol) & Protocol) & Protocol Published Network T Network T	ime Protocol (SRFC2030 (SN startup options as what today's oby Mel Reyes  Win 95/98// <1 retro to that date of different options are st	SNTP) clared strength of the s	56K lient original ocol) Feature ows you to o vicon so that MR Te  reeware KK es, January and you can oversistent da	y written to suppose include: Startupopy to your starture you don't have to ch ClockAlign How No Registration of the characteristic	rt: RFC868 minimized to p folder and re- keep looking a pme Page on Required stall & Uninsta EDN 128K set the clock to top of all other you set it to
ClockAlign	22-Ma 1 mir 1 mir 1 mir 1 mir 2 systray, align or a calend 1 vers 14-Mar 1 min A count countd window display	n at 28.8K Network T Protocol) & Protocol) & Protocol) & Protocol) & Protocol All Section 1.1.8 Protocol All Section 1.1.8 Protoc	ime Protocol ( RFC2030 (SN startup optiona Date stamp as what today's o by Mel Reyes  Win 95/98// <1 r er to that date o ober of differen options are su on any time yo	SNTP) clare Protein American SNTP Protein Am	56K lient original cocol) Feature ows you to cool con so that MR Te  reeware SK as, January and you can be application.	y written to suppose include: Startup opy to your startup tyou don't have to ch ClockAlign Ho  No Registratic lever Expires Ins <1 min at IS 1, 2000. You can splace the clock on ta. That means, if it will display hou	rt: RFC868 minimized to p folder and re- keep looking a me Page on Required stall & Uninsta EDN 128K set the clock to top of all other you set it to rs to go, until y
ClockAlign	22-Ma 1 mir Simple (Time P systray, align or a calen I Vers 14-Mar 1 min A countd window display	n at 28.8K Network T Protocol) & Protocol) & Protocol) & Protocol) & Protocol) & Protocol & Protoco	ime Protocol ( RFC2030 (SN startup optional pate stamp as what today's of the stamp as what today are stamp as any time you also where	SNTP) cl NTP Protein, this allily your tray date is.  NT Fr min at 56 of all date it ways, a ored as p u run the	56K lient original cocol) Feature ows you to co vicon so that  MR Te  Reeware Note: Ses, January and you can persistent da application, set the Y2KC	y written to suppose include: Startupopy to your starture you don't have to ch ClockAlign How No Registration of the characteristic	rt: RFC868 minimized to p folder and re- keep looking a me Page on Required stall & Uninsta DN 128K et the clock to top of all other you set it to rs to go, until y www.desktop w

	Version 2.0 10-Mar-99 268K 2 min at 28.8K	Win 95/98/NT 1 min a		No Registration Required Never Expires Install & Uninstall <1 min at ISDN 128K
Planet.Clock	Windows time zon	e information to p colors are adjust	roduce as ma	ows O/S 95, 98 and NT and uses the any clocks as you want on your top or not, daylight savings time and
	Published by Vic	A CONTRACTOR OF THE PARTY OF TH	P	Planet.Clock Home Page

	Versi	on 3.4	NOT THE		Online Registration Not Yet Available			
	07-Mar- 99	2,303K	Win 95/98/NT	Shareware \$19.50	Expiration Unknown	Install & Uninstall		
	14 min	at 28.8K	5 min		3 min at IS			
TraxTime	everyone clock me Custom r length) ca available	else who taphore a reports ca an be writ	wants to know llows users to pun to be sent to prin ten to accompar	how they're spe unch in and out iters, disk files, o	sultants, profession nding their time. Its of an unlimited num or viewed on screer es. A manager's ve	simple punch ber of projects. h. Memos (of any		
	Pub	lished by Softwar	Spud City e Co.	1	TraxTime Home Pa	ige		

	Version	4.0			No Registration				
	04-Mar-99	173K	Win 95/98/NT	Freeware	Never Expires				
	1 min at 2			<1 min at 56K <1 min at ISDN 128K					
	customizable Several anim	e in look ne relate	and shape. Uses la d themes available	ayered alpha bl	Windows NT 4.0. It ended images to bu	ild the clock.			
	Published by El Barto Umi Clock Home Page								

Standard	Versio	n 4.3	Elba (Elba)		Online Registration Not Ye Available			
	03-Mar- 99	247K	Win 95/98/NT	Shareware \$10.00	Expires after 30 Days	Install & Uninstall		
	2 min at	28.8K	1 min a	at 56K	<1 min at IS cond of the official mass	DN 128K		
Time Keeper	based on necessary saves you accurately	the disc y to mal u money y correct	crepancy tendence ke contact the off on your telepho its time discrepar	by at the time of ficial cesium ato ne bill. STK conncies.	and margin if error with f synchronization. So omic master clock evenunteracts boot time de ard Time Keeper Hou	it is not ery day. This eviation and		
	Pu	blished	by Tamie	Standa	ard Time Keeper Hol	me Page		

HotClock	Versio	n 1.0		THE REPAY	Online Registr Availa			
	01-Mar- 99	501K	Win 95/98/NT	Shareware \$29.95	Expiration Install & Unknown Uninstall			
	3 min at	28.8K	1 min	at 56K	1 min at IS			
	chart that as a seco Perfect to logo, cho and drop'	looks lond to a pol for mosing co	ike the face of a s long as 24 hou neeting and confe olors, and specified allows you to p	clock. Displays t rs. Graphically p erence planning. ving the fill patte	quence of events by time intervals that sporesent any agenda Customize your clo rn for each pie segn where on the page w	oan from as short or schedule. ock by inserting a nent. The "drag		
	Publishe	d by Co	ode Workshop C		HotClock Home Pa	ge		

MARKET IN	Versio	n 2.7.3	□ Ge	t It!	Online Registr Avail			
	25-Feb- 99	4,100K	Win 95/98/NT	Shareware \$50.00	Expiration Unknown	Install & Uninstall		
TimeCard	26 min	at 28.8K	9 min	at 56K	5 min at IS	DN 128K		
	hours and access to customiza	d wages. employe ation and	Features include e data, earned v	e individual pass wage calculation	employees (and ada word protection, di , task tracking, a po imeCard Home Pa	rect administrati rinted report,		
		1 - 100		36 300	No Pegist	ration Required		
		sion 4.00 5-99   13		3/NT Freew				
	1 mi	n at 28 8	K <1	min at 56K		at ISDN 128K		
			One Guy Codi		than its predecess Automachron Ho	me Page		
		ion 1.0				ation Required		
	20-Feb-99							
TimeMeter	Tiny tray TimeMeter was developed to provide a quick way to count the time. Load in							
	trav. No a	alarm, jus	t simply count th	e time.	alon may to soull t			
	Publis	hed by T	ong Naraktisoo	od	TimeMeter Hom	e Page		
			A THE WAY IN		- Company			
William !	Versi	on 2.0		15000	Online Registi Avail	able		
~ T.Min	20-Feb- 99		Win 95/98/NT	Shareware \$5.00	Expiration Unknown	Install & Uninstall		
T-Minus	9 min a	at 28.8K	3 min	at 56K	2 min at IS 000? What about y			
	law's birth	nday? Or	your next vacat left before the ev	ion? With this ha	andy little tool, you'l	I know exactly		
			LoafieWare	verito you demie	T-Minus Home Pa	ge		
	I don	Siled by	Louneviale			0.5		
		-			No Books	rollon Doguirod		
	AN F.L	sion 1.0		8/NT Freew		ration Required		
Millennium	12 mi	n at 28.8	K 4	min at 56K	2 min a	t ISDN 128K		
Countdown	Digital clo	ock that s	shows the month	s, days, hours, i	minutes, seconds,	total days, and		
Clock	total hour	rs until th	e Millennium.  y JPM Compute		ium Countdown C			

	Versio	n 3.2	⊞ Ge	t It!		Online Registration Not Yet Available Expiration Install & Unknown Uninstall			
	14-Feb- 99	401K	Win 95/98/NT	Shareware \$10.00					
	3 min at	28.8K	1 min	at 56K		at ISDN 128K			
E C	Server Se servers a time. Rar server.	earch a ind quic ely if ev	utomatically sca ckly finds the one ver is SocketWa	ns through a list	handles everything t of more than 100 pour the quickest and the performance of	oublic access time most accurate			
	Publ	Code	y Locutus ware	So	cketWatch Home	Page			

DATE OF STREET BY	Version	on 2.2	THE PERSON NAMED IN		No Registr	ation Required
	11-Feb- 99	2,030K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	13 min	at 28.8K	4 min a			ISDN 128K
The Work Timer	time spent paper, and customiza and calcul	on a project it is much ble interfaction of the	more accurate! lee, a popup menu e total time spent	the need for on New features on from the tray on a project.	in version 2.0 inc y, the ability to wo	e using a piece of clude a ork with projects,
	Publishe	ed by Dave	Beauchemin	Ine	e Work Timer Ho	ome Page

	Version 3.0			No Registration		
	09-Feb-99 873K	Win 95/98/NT	Freeware	Never Expires		
- T DC	5 min at 28.8K	2 min a		1 min at ISD		
TimeRC	servers from aroun	lient which synchron of the world using the in your house to the	EXACT time!	With this accurate	reading you	
	Published by Karl Sudar TimeRC Home Page					

SD-2000	Versio	n 3.0			Online Registration Not Yet Available		
	03-Feb- 99	2,197K	Win 95/98/NT	Shareware \$20.00	Expiration Unknown	Install & Uninstall	
	14 min a	t 28.8K	5 min a	t 56K	2 min at IS		
	A stardate Generatio			sed on the star	date used in Star Ti		
	Published	by Mish	h Handwerker		SD-2000 Home Pa	age	

Star Wars Count- down	Version 2.0c 03-Feb-99 2,140K			No Registration Required Never Expires Install & Uninstall 2 min at ISDN 128K
	the time until the day Written by Duke Witc	Episode 1 come hel cause I thou	ars. Based on as out. It has o ght it would be	your system time, it counts down sool sounds and graphics as well! e cool to have.
	Published by Du	ike Witchel	Star W	ars Count-down Home Page

	Version 1.0	OF THE RESERVE		No Registration	Required		
	28-Jan-99 7K	Win 95/98/NT	Freeware	Never Expires	No Install		
ShellTime	<1 min at 28.8K	<1 min a		<1 min at ISI			
	Puts an icon in the sylong since you last re	ystem tray. Hovering booted. You can a	also see the las	t reboot time.			
	Published by I	Published by Matt Cawley ShellTime Home Pa					

	Version	1.00	Market Market	Kily as		stration Not Yet
TBTimer	27-Jan- 99	335K	Win 95/98/NT	Shareware \$5.00	Never Expires	Install & Uninstall
TD TIME	2 min at	28.8K	1 min a	at 56K		it ISDN 128K
	for the reg	istered	down timer/cloc version) designe Tbproducts	ed to run in the	r the unregistered title bar of the cu No Home Page A	version, 100 hours rrent application. vailable

	Version 1.00				tion Required				
	25-Jan-99 7K		Freeware	Never Expire	s No Install				
Java Time	<1 min at 28.8K	<1 min	at 56K	<1 min at	ISDN 128K				
Protocol	This small Java star	idalone application	n reads the curr	ent date and time	from a given				
lient (REC 868)	time protocol server (RFC 868) and optionally sets the date and time on the local system.								
ment (IXI & 000)	Published by A		Java Time P	Protocol Client (F	RFC 868) Home				
	Version 1.1			No Registra	tion Required				
	23-Jan-99 168K	Win 95/98/NT	Freeware		s   No Instal				
	1 min at 28 8K	<1 min	at 56K	<1 min at	ISDN 128K				
Millennium	A tray and program	for WIN95-98-NT	that allows fast	and easy one-clic	k check for				
Tray	current time/date ar file) every hour.	d countdown to ye	ear 2000. Also p	olays your favouri	e sound (.wav				
		Utilmind SH	Mille	ennium Tray Hon	ne Page				
ALL RESIDENCE	And the latest of the latest o								
	Version 1.0				tion Required				
Show	19-Jan-99 18K				s No Instal				
Internet	<1 min at 28.8K	<1 min	at 56K	<1 min at	ISDN 128K				
	A freeware utility that	at displays the curr	rent Swatch Inte	ernet Time in your	icon tray, and				
Time	has a built in time of		01	Indonesia Timos III	Dama				
A Lorus	Published by Le	ft Side Software	Snow	Internet Time H	ome Page				
1000	Version 3.1			Online Registr	able				
	19-Jan- 1 345K	Win 95/98/NT		xpires after 30	Install &				
	99	The state of the s	\$79.00	Days 1 min at IS	Uninstall				
Total IT	8 min at 28.8K A professional wind	3 min at	oon	dividuals to keep	track of the tim				
▲ Track-IT	spent on projects a	ows-based sortwa	working It elim	inates the need for	or paper time				
Light	sheets Just choos	e the appropriate of	project and activ	rity, click the start	button and see				
	how a true picture of	of your day helps in	mprove producti	ivity. Track time a	s work is being				
	done or enter the in	formation at the er	nd of the day or	week in a spread	sheet format.				
	Can be used with T	rack-IT pro for pro	ject workgroups	3.					
	Published by	Dovico	Track	-IT Light Home	Page				
The state of the s									
	Version 2.41			No Registratio	n Required				
IN THE REAL PROPERTY.	17-Jan-99 156K		Freeware Ne	ever Expires In	stall & Uninsta				
WinDate	17-Jan-99 156K	<1 min at	56K	ever Expires Ins	stall & Uninsta DN 128K				
WinDate	17-Jan-99 156K 1 min at 28.8K WinDate will put Tir	<1 min at	56K Message in curre	ever Expires   Insert window's title	stall & Uninsta DN 128K bar. Alarm				
WinDate	17-Jan-99 156K 1 min at 28.8K WinDate will put Tir option. New to this	<1 min at me/+Date/+Day/+M version: Day name	Message in curre is now localise	ever Expires   Insert window's title ed to your language	stall & Uninsta DN 128K bar. Alarm pe. Single exe.				
WinDate	17-Jan-99 156K 1 min at 28.8K WinDate will put Tir	<1 min at me/+Date/+Day/+M version: Day name	Message in curre is now localise	ever Expires   Insert window's title	stall & Uninsta DN 128K bar. Alarm pe. Single exe.				
WinDate	17-Jan-99 156K 1 min at 28.8K WinDate will put Tir option. New to this Published by Ma	<1 min at me/+Date/+Day/+M version: Day name	Message in curre is now localise	ever Expires   Insert window's title and to your language inDate Home Pa	stall & Uninsta DN 128K bar. Alarm ge. Single exe. ge				
WinDate	17-Jan-99 156K 1 min at 28.8K WinDate will put Tir option. New to this Published by Ma	<1 min at me/+Date/+Day/+N version: Day name irk Dickinson	Message in curre is now localise W	ever Expires   Insert window's title and to your language inDate Home Pa No Registra	stall & Uninsta DN 128K bar. Alarm ge. Single exe. ge				
	17-Jan-99 156K 1 min at 28.8K WinDate will put Tir option. New to this Published by Ma Version 1.01 14-Jan-99 30K	<pre>&lt;1 min at me/+Date/+Day/+N version: Day name irk Dickinson</pre> Win 95/98/NT	56K Message in curre is now localise W	ever Expires   In: <1 min at IS ent window's title d to your languag inDate Home Pa  No Registra Never Expire	stall & Uninsta DN 128K bar. Alarm ge. Single exe. ge				
WinDate Stop Watch	17-Jan-99 156K 1 min at 28.8K WinDate will put Tir option. New to this Published by Ma Version 1.01 14-Jan-99 30K <1 min at 28.8K	<1 min at me/+Date/+Day/+N version: Day name rk Dickinson Win 95/98/NT <1 min	56K Message in curre is now localise W Freeware at 56K	ever Expires   In: <1 min at IS ent window's title d to your languag inDate Home Pa  No Registra  Never Expire <1 min at	stall & Uninsta DN 128K bar. Alarm Je. Single exe. Jessian Required Jessian No Instal JSDN 128K				
	17-Jan-99 156K 1 min at 28.8K WinDate will put Tir option. New to this Published by Ma  Version 1.01 14-Jan-99 30K <1 min at 28.8K	<pre>&lt;1 min at me/+Date/+Day/+N version: Day name rk Dickinson  Win 95/98/NT &lt;1 min t's a stop watch, m</pre>	756K Message in curre e is now localise W Freeware a at 56K Measuring up to	ever Expires Insert	stall & Uninstal DN 128K bar. Alarm je. Single exe. ge ition Required ps   No Instal TISDN 128K				
	17-Jan-99 156K 1 min at 28.8K WinDate will put Tir option. New to this Published by Ma Version 1.01 14-Jan-99 30K <1 min at 28.8K What can we say, minutes and second	<1 min at me/+Date/+Day/+N version: Day name rk Dickinson Win 95/98/NT <1 min t's a stop watch, mds. The display wr.	Message in curre e is now localise W  Freeware a at 56K leasuring up to aps after 100 ho	A No Registra No Registra Never Expire  No Registra Never Expire  100 hours, showin	stall & Uninstal DN 128K bar. Alarm je. Single exe. ge ution Required ps   No Instal IISDN 128K ng hours, pis also include				
	17-Jan-99 156K 1 min at 28.8K WinDate will put Tir option. New to this Published by Ma Version 1.01 14-Jan-99 30K <1 min at 28.8K What can we say, minutes and second	<pre>&lt;1 min at me/+Date/+Day/+N version: Day name rk Dickinson  Win 95/98/NT &lt;1 min t's a stop watch, m</pre>	Message in curre e is now localise W  Freeware a at 56K leasuring up to aps after 100 ho	ever Expires Insert	stall & Uninstal DN 128K bar. Alarm je. Single exe. ge ution Required ps   No Instal IISDN 128K ng hours, pis also include				
	17-Jan-99 156K 1 min at 28.8K WinDate will put Tir option. New to this Published by Ma Version 1.01 14-Jan-99 30K <1 min at 28.8K What can we say, minutes and second	<1 min at me/+Date/+Day/+N version: Day name rk Dickinson Win 95/98/NT <1 min t's a stop watch, mds. The display wr.	Message in curre e is now localise W  Freeware a at 56K leasuring up to aps after 100 ho	No Registra Never Expires Insert window's title do to your languaginDate Home Pa No Registra Never Expire <1 min at 100 hours, showing ours. A lap feature top Watch Home	stall & Uninsta DN 128K bar. Alarm je. Single exe. ge attion Required iss   No Instal ISDN 128K ing hours, is also include Page				
	17-Jan-99 156K 1 min at 28.8K WinDate will put Tir option. New to this Published by Ma Version 1.01 14-Jan-99 30K <1 min at 28.8K What can we say, minutes and second	<1 min at me/+Date/+Day/+N version: Day name ink Dickinson Win 95/98/NT <1 min to a stop watch, m ds. The display wr. BTT Software	Freeware a t 56K leasuring up to aps after 100 hc	No Registra 100 hours, showlours. A lap feature top Watch Home No Registra Never Expire <1 min at 100 hours, showlours. A lap feature top Watch Home No Registra	stall & Uninstal DN 128K boar. Alarm Je. Single exe. Je. Single exe. Je. No Instal JSDN 128K John JSDN 128K JSDN 128				
	17-Jan-99 156K 1 min at 28.8K WinDate will put Tir option. New to this Published by Ma  Version 1.01 14-Jan-99 30K <1 min at 28.8K What can we say, if minutes and secon Published by  Version 1.11 12-Jan-99 212K	<1 min at me/+Date/+Day/+M version: Day name rk Dickinson Win 95/98/NT <1 min ds. The display wr. BTT Software Win 95/98/NT	Freeware a ts 56K leasuring up to aps after 100 hc Si	No Registra  No Now, showing the properties of t	stall & Uninsta DN 128K bar. Alarm le. Single exe. ge lition Required les   No Instal ISDN 128K lis plours, le is also include Page lation Required les   No Instal Regions, le is also include Regions   No Instal Regions   No Instal				
Stop Watch	17-Jan-99   156K   1 min at 28.8K   WinDate will put Tir option. New to this Published by Ma  Version 1.01   14-Jan-99   30K	<1 min at me/+Date/+Day/+M version: Day name rk Dickinson Win 95/98/NT <1 min ds. The display wr. BTT Software Win 95/98/NT <1 min ds. The display wr. BTT Software	Freeware at 56K  Freeware at 56K  Freeware at 56K	No Registra	stall & Uninsta DN 128K bar. Alarm je. Single exe. ge attion Required is No Instal ISDN 128K ng hours, is also include Page				
Stop Watch	17-Jan-99 156K 1 min at 28.8K WinDate will put Tir option. New to this Published by Ma  Version 1.01 14-Jan-99 30K <1 min at 28.8K What can we say, if minutes and secon Published by  Version 1.11 12-Jan-99 212K 1 min at 28.8K A alarm program in popup alarm messay	<1 min at me/+Date/+Day/+M version: Day name ink Dickinson Win 95/98/NT <1 min is a stop watch, mds. The display wr. BTT Software Win 95/98/NT <1 min in the display wr. BTT Software Win 95/98/NT <1 min in the display wr. BTT Software	Freeware a at 56K leasuring up to aps after 100 hc Freeware a at 56K leasuring up to aps after 100 hc streep at 56K leasuring up to aps after 100 hc leasuring up to	No Registra No Watch Home No Registra Never Expire A lap feature Top Watch Home No Registra Never Expire A lap feature Top Watch Home No Registra Never Expire Top Watch Home No Registra Never Expire Top Watch Home No Registra Never Expire Top Watch Home	stall & Uninsta DN 128K bar. Alarm le. Single exe. ge lition Required les   No Instal ISDN 128K les also include Page lation Required les   No Instal ISDN 128K les also include les   No Instal ISDN 128K les   No Instal ISDN 128K les   No Instal ISDN 128K les   Instal ISDN 12				
Stop Watch	17-Jan-99 156K 1 min at 28.8K WinDate will put Tir option. New to this Published by Ma  Version 1.01 14-Jan-99 30K <1 min at 28.8K What can we say, if minutes and secon Published by  Version 1.11 12-Jan-99 212K 1 min at 28.8K A alarm program in popup alarm mess minizes itself in tray	<1 min at me/+Date/+Day/+M version: Day name ink Dickinson Win 95/98/NT <1 min is a stop watch, mds. The display wr. BTT Software Win 95/98/NT <1 min in the display wr. BTT Software Win 95/98/NT <1 min in the display wr. BTT Software	Freeware a ts 56K leasuring up to aps after 100 hc Freeware at 56K leasuring up to Si Freeware at 56K leasuring up to aps after 100 hc Si ws ystem resources	No Registra No Watch Home No Registra Never Expire A lap feature Top Watch Home No Registra Never Expire A lap feature Top Watch Home No Registra Never Expire Top Watch Home No Registra Never Expire Top Watch Home No Registra Never Expire Top Watch Home	stall & Uninstal DN 128K bar. Alarm le. Single exe. ge lition Required les   No Instal ISDN 128K les also include Page lition Required les   No Instal ISDN 128K les also include les   No Instal ISDN 128K led interval and lerence. Usually				

	Versio	n 1.0			No Registration Required	
	11-Jan- 99	960K	Win 95/98/NT	Freeware	Expiration Unknown	Install Unknown
	6 min at	28.8K	2 min a	t 56K		ISDN 128K
TimeLeft	counts ho elapsed fr can custo	ow much rom) Ne omize al	n time (year, mor ew Year's Day (o arm time, alert m	nths, days, hou r your chief birt	ers, minutes and se thday or your proje con, etc.	
	Publis	shed by	NesterSoft		TimeLeft Home	Page

	Version 1.0			HE IN	Online Registration Not Yet Available		
SysClock	07-Jan- 99	678K	Win 95/98/NT	Shareware \$10.00	Expiration Unknown	Install	
Systiation	4 min at 28.8K 1 min at 56K Shows the system time in form of some LEDs. Y reached, it plays a WAV-File of your choice.				1 min at ISDN 128K You can define an alarm time. When it is		
		Published by Andreas Heidt			SysClock Home Page		

TZN	12 min at 28 8K	1,873K Win 95/98/NT Freeware		2 min at ISDN 128K	
99	A new version of a p new legal and techni Published by Mac	cal tips. Improve	d interface, to	ng towards 2000 po! Countdown 99	

	Version 1.0		THE RESERVE OF THE PARTY OF THE		No Registration Required	
Timer	06-Jan-99 228K	Win 95/98/NT	Vin 95/98/NT Freeware		No Install	
	1 min at 28.8K	1 min a		<1 min at ISI		
	A simple clock and til or AM/PM format. Sto	mer application. Di ores multiple alarm	s which will run	once or multiple tir	nes.	
	Published by J	ames Ryan		Timer Home Page		

	Version	1.52	THE SHOT	10000	Register Nov	
	05-Jan-99	190K	Win 95/98/NT	Shareware \$19.95	Expires after 30 Days	Install
TweakEzy	1 min at	28.8K	<1 min		<1 min at ISDN 12	
	access. Ide	eal for co	dy utility for corre orrecting time drift by accurate to with	ts less than 1 m	ne. Does not require Intern- inute per week. Clocks, da	et ite/time
			Ezy PC Utilities		weakEzy Home Page	

	Version 1.0			No Registration	Required
	02-Jan-99 45K	Win 95/98/NT	Freeware	Never Expires	No Install
Millenium	<1 min at 28.8K	<1 min a	t 56K	<1 min at ISI	
Clock	Another tiny and nice and seconds till the y				
	Published by	y yanone	nium Clock Home	Page	

Khronos	Version	on 1.0			ation Not Yet			
	01-Jan- 99	1,568K	Win 95/98/NT	Shareware \$11.48	Expiration Unknown	Install & Uninstall		
	10 min a	at 28.8K	3 min a	at 56K	2 min at ISDN 128K			
	customiza	able. Also	s the date and time in a small window on your desktop. Fully lso chimes on the quarter hours. Complete install/uninstall capability Steve Berst Khronos Home Page					

	Version	n 3.07		Online Registra Availa				
	01-Jan- 99	281K	Win 95/98/NT	Shareware \$1.00	Expires after 30 Days	Install & Uninstall		
	2 min at	2 min at 28.8K 1 min at 56K <1 min at ISDN 128K						
	system ich change th looks just window. V Requires	on tray. ne displa like sor Vith the the VB	Two display type ay from regular, v me of the clocks.	es can be chose which is the orig You can also n e, it makes your	2000. It resides on your regular and digital inal display, to Digital make the Millennium are desktop neat and profile.	al. You can Display, which always-on-top ofessional.		

	Version	2.1a		A LANGE	. Re	gister Now	
- No Atom Time	Atom Time 21-Dec-98 509K Win	Win 95/98/NT	Shareware \$15.00	Never Expires	Install & Uninstall		
Atom Time 98	3 min at 28.8K 1 min at 56K 1 min at ISDN 128K						
The state of the s	IVVIII SVIICIII	onize y	your PC clock with the Atomic Clock time server in Boulder, Colorado. ne sequel to the highly rated AtomTime95.				
	Published	by Br	uce Adelsman	At	Atom Time 98 Home Page		

	Version 1.8			No Registration Required		
	21-Dec-98 64K	Win 95/98/NT	Freeware	No Install		
	<1 min at 28.8K	<1 min		<1 min at ISI		
TeaTimer	A small timer application messagebox when the for serveral minutes three ways to display the icon in the systra support installed on	he timer stops. You or start a countup. y the timer progres by area and third or	u can set the tim With TeaTimer s, first a standar ne of four 3D dis TeaTimer.	ner to a specified tin you can choose fro rd Windows progres splay types. You ne	ne, let it run om one of ssbar, second ed OpenGL	
	Published by A	rndt Teinert	Te	aTimer Home Pag	е	

THE RESIDENCE OF	Version 1.0			No Registration Required			
	20-Dec-98 10K	Win 95/98/NT	Freeware	Never Expires			
Clock9X	<1 min at 28.8K <1 min at 56K <1 min at ISDN 128K						
	A really cool program MM/DD/YY format. G Visual Basic.	that will display the Great to put in your	starup menu, le	ots of options, code	d in Microsof		
	Published by James Bertelson No Home Page Available						

	Versio	n 1.01			No Registr	ation Required			
	05-Dec- 98	1,100K	Win 95/98/NT	Never Expires	Install & Uninstall				
TalkClock	7 min a		2 min a			1 min at ISDN 128K			
C TalkClock	at the push	of a butto can be mir	on. TalkClock is v	ery easy to usual run in the bac	se with its simple kground without t	taking up your			
	Publish	ned by Ge	orge Callow		TalkClock Home	e Page			

NukeTime	Version	on 2.1		TANK!		Registration Not Yet Available		
	30-Nov- 98	1,500K	Win 95/98/NT	Shareware \$20.00	Expiration Inst Unknown Unit			
	9 min a	t 28.8K		at 56K	2 min at IS			
	includes r synchroni for Win98 synch. at	numerous ize your F Taskland any inter	functions allowing or (NT) Server er plus build-in tan net or e-mail ses	ing a precise and er with internet of askplaner for una	ficial local time to you d reliable easy to use t telephone time se attended operation	se way to ervices. Support		
	Publi	shed by I Softw	MicroLogic are	NukeTime Home Page				

	Version	2.5	LATER S		Online Registration Available	Not Yet	
Big-Time Clock	26-Nov-98	33K	Win 95/98/NT	98/NT Shareware \$6.75 Expiration Uni		No Install	
	<1 min at 28.8K <1 min at 56K				<1 min at ISDN 128K		
	time in bold	, cleve	nerates a running erly handcrafted d or flashing cold	numerals on th on.	hich displays your compu e center of your screen ar	nd a	
	Publis	hed by	g-Time Clock Home Pag	е			

	Version	n 1.6			Online Registr Avail		
	23-Nov- 98	323N	Win 95/98/NT	Shareware \$10.00	Expiration Unknown	Install & Uninstall	
TimeKeeper	2 min at	28.8K	1 min		<1 min at ISDN 128K		
0	Will track the real bi	the am	ount of time spen	ou can even use provider. Require	You can also add an e it to figure out the es the VB 5.0 Runt	accumulated time imes.	
	Publishe	d by Pr	ogram-Action	Ti	imeKeeper Home F	Page	

The Good	Version 5.0 22-Nov-98 1,249K 8 min at 28.8K	Win 95/98/NT 3 min at	U SALESSEE SALES SALES	1 min at ISDN 128K		
Morning Program	Says "Good Morning" Evening" in the evening Published by Jona	in the morning, ng, "Good Night"	"Good Aftern " at night.	noon" in the aftern		

A COLUMN TO SERVE	Version 4.00			1200	Online Registra Availa				
	21-Nov- 98	2,860K	Win 95/98/NT	Ψ10.00	Expires after 14 Days	Install & Uninstall			
	18 min at 28.8K 6 min at 56K 3 min at ISDN 128K A great program for anybody to have! Whether you need to count up or down to an								
T EZ-Timer	from eithe the time re box, laund set to auto and text s ability to u telephone put in any	er timer or eaches 00 ch a progromatically ize/font/co ise comm (TOLL-FF message	stopwatch mode 0:00:00: EZ-Time am, shut down y repeat. Plus, the plor) can be easil and-line argume	es. Any combiner can play a so our PC, or rest e properties of the properties of the properties and you can an another can all you can an another can be propertied. Very said the properties and you can another displays.		an happen when mizable dialog er can also be kground color features like the he Internet or con you want to			
	Pub	Develop			EZ-Timer Home Pag	je			

	Version	0.99			No Registration		
	21-Nov-98	1,400K	Win 95/98/NT	Freeware	Never Expires		
SER IN PUICEO	9 min at	28.8K	3 min a				
JX PHOTO	Want to put y you define ev will display a	verytihing b	ov vourself! Clock	Size, Font, Colo and. Play your N	2 min at ISDN 128K GIFJX PHOTO CLOCK let r. SCREEN SAVER function P3 files at chime time!		
	Publis	shed by Je	ffrey Xuan	JX PHO	TO CLOCK Home F	Page	

	Version 1.0				Online Registration Not Yet Available		
	18-Nov- 98	3,589K	Win 95/98/NT	Shareware \$20.00	Expiration Unknown		
	22 min at 28.8K		8 min at 56K		4 min at ISDN 128K		
Time Tracker	An Electronic Time Card program that will allow a person to track the number of hours that they spend working on different account/projects per day. The program supports up to twenty different accounts. Each account is selectable by a radio button. The hours are calculated for a total per day and each account is calculated separately for a total of hours for the account per day. The total hours are then taken and multiplied against a cost per hour. This gives you a total cost for the week. Charges are incremented in .1 of hours or every 6 minutes. The data is stored in a Microsoft Access 7.0 database format for later retrieval. Free lifetime upgrades with registeration.  Published by Jason Alexander  Time Tracker Home Page						

	Version 2.1			No Registration		
BarClock	16-Nov-98 361K	Win 95/98/NT	Freeware	Never Expires	No Install	
	2 min at 28 8K 1 min at 56K		<1 min at ISDN 128K			
	With this tiny program, just keep an eye on the time. But to do this, you don't need to have a special window always on top or maintain the explorer's task bar visible. In fact, the current time is displayed in the active title bar of the active window. This software is very easy to use. To always have the time under your eyes, just put the executable file (or a link to it) in the statup menu.					
	Published by Guill	aume Brocker	Ba	rClock Home Pag	е	

STALE WATER	Version 1.1			No Registration Required	
	16-Nov-98 174K	Win 95/98/NT	Freeware		Install & Uninstall
	1 min at 28 8K <1 min at 56K		<1 min at ISDN 128K		
UTC Clock	This program gives you three clocks that show UTC, Local and a desired time zone. The display is compact allowing it to hide in the corner of the monitor. The program is free but if you download it send me and e-mail telling me what you think.				
		ed by Jason Alexander UTC Clock Home Page		e Page	

TimeZone	Version 1.1.3			No Registration Required		
	14-Nov-98 1,747K		Freeware at 56K		Install & Uninstall t ISDN 128K	
	This program shows the time in the 4 main US to have 'round the world support and perhaps even			me zones. The next version should an atomic clock sync feature.		
	Published by V Technologi	ictor	31,115	TimeZone Home Page		

	Version 1.20	The state of the s		No Registration	
	04-Nov-98 1,360K	Win 95/98/NT	Freeware	Never Expires	
	8 min at 28.8K 3 min at 56K		t 56K	1 min at ISDN 128K	
Meganet Clock	A small clock, when exi the cuurent date and tir the current date! When long format. Can be eas	ne. Very useful wh	nen doing repor lays the time in h the add/remo	ts etc. and you need 24hr format, and the ve options in control	d to know e date in I panel.
27	Published by Joe		Megai	net Clock Home Pa	ige

	Version 1.7 03-Nov-98 870K Win 5 min at 28.8K A simple timing program.		Freeware	Never Expires	ation Required Install & Uninstall ISDN 128K
Timer	electronic alarm clo minutes/seconds of	ock. Timer has a pount down. When h screen is display	progress bar a the time is up ayed. Pretty si	and digital display o, a wav file called mple app to write,	that shows as the I FINISH.WAV is but did learn a few
	Published by Sc	ott C. Russell		Timer Home P	age

	Version	1 2.0		Online Registration Not Yet Available		
TopClock	29-Oct-98	0.00t-08 537K Win 95/98/N1		Expires after 15 Days	Install & Uninstall	
	3 min at	28.8K	1 min at 5	6K		SDN 128K
	It has digita	al clock	interface and alla	rm clock		ditional options are: ry corner of the World
	Published by Tomas Rutkauskas TopClock Home Page					e Page

	Version 4.3			No Registration Required		
	20-Oct-98 293K	Win 95/98/NT	Freeware		Install & Uninstall	
Dimension	2 min at 28.8K 1 min at 56K		<1 min at ISDN 128K			
	Incredibly easy to u USNO or any other		er.			
	Published by Ro	b Chambers		Dimension 4 Home Page		

	Version 1.0			No Registration	
Timer	12-Oct-98 8K	8K Win 95/98/NT Freewa		Never Expires	No Install
	<1 min at 28.8K	<1 min a		<1 min at ISI	
	This very simple pro- chronometer. You ca how long you're play	an use it to time an	ything you wan	t, from the time you'	re online to
	Published by V	Vim Heirman		Timer Home Page	

	Version	n 3.08	W1 4 19		Online Registration Not Yet Available		
	10-Oct- 98	950K	Win 95/98/NT	Shareware \$89.00	Expiration Unknown	Install & Uninstall	
	Quickboo Windows	e Time- oks. Aut PC. Cu	clock, Email, Mu o-Sync of data a istomizable secu	alti-site communications different learning different learning the state of the sta	1 min at ISDN 128K ications. Employee timeclock. Export to locations. Small and fast. Runs on any res. Wide array of reports.		
	Publish	ned by I	Rob Fletcher	PC	ower Clock Home I	Page	

	Version	on 1.25	A STATE OF	THE PERSON	Online Registra Availa				
	09-Oct- 98	5,400K	Win 95/98/NT	Shareware \$49.99					
	34 min	at 28.8K	12 min	6 min at ISI aployee to punch-in/o					
TimeClock Lyte	number of comment PCs on the location. I product the payroll pa	or name or s. Allows ne networ Easy to un nat can re ackages.	r initials. Easy "w tracking time by k can be assignenderstand timecand an Access 7.0	ho is here" fea department, lo d to a particula and report. Data data file. Data	ture with optional pur cation, or type of hou ar employee or depar a may also be access a export feature for in	nch-out rs. Particular tment or ed with any nporting into			
	Published by Quality Software Solutions, Inc.  TimeClock Lyte Home Page								

H. U.S. MICE	Versio	n 3.7			Online Registration Not Yet Available		
Standard Time Keeper	01-Oct- 98	247K	Win 95/98/NT	Shareware \$10.00	Expires after 30 Days	Install & Uninstall	
	2 min at	28.8K	1 min		<1 min at ISDN 128K		
	on the dis make cor on your to time discr	screpand tact the elephon repancie	cy tendency at the official cesium a e bill. STK counters.	e time of synch tomic master c eracts boot time	nargin if error with cale pronization. So it is no clock every day. This se deviation and accura ard Time Keeper Ho	t necessary to saves you money ately corrects	
THE REST OF	Pu	blished	by Tamie	Standa	ard Time Reeper no	ne rage	

	Version 2.0				No Registration Required	
	28-Sep- 98	1,933K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	12 min at 28.8K		4 min a			ISDN 128K
Countdown	Weeks to g	go to the to	urn of the millenni d displayed as to icon tray and can	um. Many op tals or as rem	tions - Weeks, Se naining time. Res	ides on your

	Version 1.0			No Registration	Required	
Berlin uhr	27-Sep-98   131K	Win 95/98/NT	Freeware	Never Expires		
	1 min at 28.8K	<1 min a		<1 min at ISI	N 128K	
	This Software emulates	the famous Berlin				
	Published by Christophe Gevrey			Berlin uhr Home Page		

Design to the second	Version 1.1			No Registration	Required
	18-Aug-98 300K	Win 95/98/NT	Freeware	Never Expires	Install
	2 min at 28.8K	1 min a		<1 min at ISDI	
DateTime	A useful freeware Wir connection to accurat just a few clicks of you Date/Time host. You easily update your PO	ely set their syster ur mouse you can can compare new	n date and time fetch the curren values with you h new, correct v	. It's easy to use and it date and time from r system data and tin values.	fast. With an Internet ne. You can
	Published by Pr	rimaSoft PC	Da	teTime Home Page	

TO THE REST	Versio	n 1.11	332 1	14 74	Online Registra Availa	
	10-Aug- 98	1,477K	Win 95/98/NT	Shareware \$9.95	Expires after 30 Days	Install & Uninstall
The second second	9 min a	t 28.8K	3 min		2 min at ISI	
InterTime 98	clock to w SmartSea ModemSp between v designed product yo you could	ithin 200 prochable allow by for App whether you for Windo bu can bun't ask for	milliseconds of a you to locate a ti lications allows you are online or ows 95 and 98, In y. It's easy to use more!	ccuracy. Advar me server with ou to schedule offline. No more terTime is diffe e, automatic ar	InterTime can update can update can be controlled in your own country colors updates, disting a random connection connection and good looking. For	rverCheck and and even city! ngushing s.Completely clock sync under 10 bucks,
THE RESERVE OF THE	Pu	blished by	Pipsoft	In	terTime 98 Home P	age

	Version 1.2.5 07-Aug-98 1,900K 12 min at 28.8K	Win 95/98/NT 4 min at	Freeware 56K	No Registration Never Expires 2 min at ISDI	Install
Time (DeskTop Clock)	change the location, for	nt, Display style, an n timer, countdown ne hour and 1/2 ho	nd colors, in 12 alarm, and ala ur with chimes	2 min at ISDN 128K e on your desktop. You may 2 or 24 hour format. Also arm clock. "Time" will s at the 1/4 & 3/4 hour, (if you skTop Clock) Home Page	

THE RESERVE OF THE PARTY OF THE	Version 1	.00a			No Registration			
Up To 2000	22 1.1 00		Win 95/98/NT Freeware		Never Expires	No Install		
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K			
	A very small	applicati	on that tells you th	e number of d	number of days remaining to the year 2000.			
	Published	Published by Albani iperCreation			Up To 2000 Home Page			

Charles III	Version 2.0			AL SELECTION	Online Registr Avail	
WinActivity	07-Jul- 98	2,200K	Win 95/98/NT	Shareware \$19.00	Expiration Unknown	Install & Uninstall
for	14 min	at 28.8K	5 min		2 min at IS	
Windows	just play	ick on the ing game internet si	s. Generate & pr	rint reports and	ous projects, surfin graphs or publish y	our reports on you
Mary Mary Control	Publishe	ed by Pitr	inec Software	WinActi	vity for Windows I	Home Page

	Version 1.0			No Registration	Required
Days	21-Jun-98   122K	Win 95/98/NT	Freeware	Never Expires	
	1 min at 28.8K	<1 min a	t 56K	<1 min at ISI	
	Calculates the number calendar for date sele		any two user	Days Home Page	
	Published by Ma	tt Billenstein			

	Versio	n 6.7		W. W. Co.		tration Not Yet
	20-Jun- 98	841K	Win 95/98/NT Shareware \$25.00		Expiration Unknown	Install Unknown
	5 min at	28.8K	2 min	at 56K		ISDN 128K
⊕ YATS32	YATS32 a available A large lis servers a supported	allows y on any st of inte nd time d for so	you to synchroniz TCP/IP network ernational Internet protocols are sume time protocol	ze your system c such as the Inte et time servers is upported. Conne	rnet or your corpo	er of time servers brate UNIX network.
	Publ	Softv	y Dillobits ware		YATS32 Home P	age

	Version 0.9b 16-Jun-98 1,660K	Win 95/98/NT	Freeware	No Registration Required Never Expires Install & Uninstall
and the constitute	10 min at 28.8K	4 min a	t 56K	2 min at ISDN 128K
10000		extension to call,	and once this fied using you	s: You set the time you want it to call s time arrives it triggers a dial-up ur modem.
	Published by Rapid			PBXAlarm Home Page

	Version 1.0.98				ration Required	
0	09-Jun-98 1,495K					
Count98!	9 min at 28.8K	3 min at			ISDN 128K	
	This is a countdown	to Windows98. I	Developed b	y Ricky Girglani.		
	Published by Ric	ky Girglani	Count98! Home Page			

NEW SAME	Versi	on 1.0	THE REAL PROPERTY.	I STATE OF		legistration Not Yet Available	
The state	02-Jun- 98	2,913K	Win 95/98/NT	Shareware \$10.00	Expiration Unknown	Install & Uninstall	
	18 min	at 28.8K	6 min	at 56K	3 min at IS	DN 128K	
CLOX 2000	timezone the intern animated making it	et, newsf world da relly easy	nternet features lashes and more ylight map, an al y to use.	CLOX 2000 is	y to automatically s super-accurate an calendar. Full online	d includes an	
	Publis	hed by M Visual N	irage Audio Media	C	LOX 2000 Home P	age	

	Version	1.01			No Registration	Required
	26-May-98	293K	Win 95/98/NT	Freeware	Never Expires	
TimeManager	2 min at 2	28.8K	1 min a	<1 min at ISDN 128K		
The state of the s	Controls and	displays	Time and TimeZ s of the windows t	time managme	! The first Program nt!	
			rtin Bachem	Home Page Availa	ble	

	Version	Version 1.0			Online Registration Not Yell Available	
			Win 95/98/NT Shareware \$10.00		Never Expires	No Install
InnaMinute	<1 min at 2	28.8K	<1 min	at 56K	<1 min at ISI	
9	Need to sto	p surfi withou	ng an hour from	now? Click, click als, options, para	turn off the oven in flik. InnaMinute waits in ameters or fuss. Put i	the tray to
	Publis	hed by	Ed Halley	In	naMinute Home Pag	ge

Dollar	Version	1.0			Online Registration Not	Yet Available
	30-Apr-98	688K	Win 95/98/NT	Shareware \$1.00		No Install
	4 min at 2	8.8K	2 min a	t 56K	1 min at ISDN 1	
	Displays th	e the	time and the da	y of the week	k in a user specified format.	
	Publish	ned by	D. Ferrell	Th	e One Dollar Clock Home	Page

Especial Line	Version	1.02	The state of the s		Register Nov	V 1000
TimeEzv	22-Apr-98	222K	Win 95/98/NT	Shareware \$19.95	Expires after 30 Days	Install
TimeEzy :Global Clock	which offers Savings Tin	lobal C point'r ne into	<1 min lock for Win 95 a lock access to to account wherever Ezy PC Utilities	nd NT 4.0. An e mezones aroun and whenever	<1 min at ISDN 12 exceptionally easy to use u d the world. Takes Dayligh appropriate. y:Global Clock Home Pa	tility

ALC: UN	Version 1.3.5 21-Apr-98 527K 3 min at 28.8K	Win 95/NT	Freeware at 56K	Never Expires	ration Required Install & Uninstall ISDN 128K
Clockit	A timer that totals the transfer of the minimized file in the program a update fixes minor Published by Rich	to the system and increment bugs in the pro	end working of tray or set "Aldecrement the ogram. Require	lways on Top". You e time displayed or	the timer. This

GetTime	Version 2.13p3		Ge	t It!	Online Registration Not Yet Available				
	13-Apr- 98	206K	Win 95/98/NT Shareware \$15.00 Never Expires Install & Un						
	1 min at	28.8K	<1 min	at 56K	<1 min a	it ISDN 128K			
	time source 95/NT ma case, and However, your netw	ce? Nov achines, other cor if you d york syn	y you can with Ge quitely updating mputer on the net to have access to	etTime! GetTim the system cloo twork). You don to the Internet, the	e runs unobtrusive ck with a central ti n't need access to	me source (in this the Internet. all the computers on ternet.			

	Version	2.8.32			Register Now				
	15-Nov- 97	3,905K	905K Win 95/98/NT Shareware Expiration Insta						
	24 min	at 28.8K	9 min	4 min at IS pols into one easy-t					
Global Dialing Assistant	where it is of key loc access to current da maximize setting up between y	s daytime ations you information ate/time, a the value o conferent your local dished by	and nighttime a u choose. Next,ton on over 1,600 and high/medium e of your calls. A noe calls with the	round the world he International 0 cities worldwid n/low-cost calling dditionally, you conference Canat of any other	ock allows you to s as well as the curry Dialing Guide give lee (including dialing g periods) that will in can reduce costly in alculator that autom location you choos dialing Assistant H	ent date and time s you quick access codes, nelp you nistakes when atically converts e.			

	Version 1.0			The Letters of	Register Now		
MouseClock	15-Aug- 97	500K	Win 95/98/NT	Shareware \$10.00	Expiration Unknown	Install & Uninstall	
	3 min at	28.8K	1 min	1 min at 56K only cursor enhancement you		DN 128K	
	the currer and suppo when you straight w behind oth configural	orts 24- need it ith the l her Win ble, And	hour format. Ima In a profession MouseClock rate dows when you other very handy	agine having all t al that gets paid clock? MouseC no longer requir utility from AMF	this information right hourly? Why not ke clock can stay on to be its use. Easy to u	t in front of you eep your rates p, or be put se and fully	
	Pu	iblished	by AMF	IAIC	Juseciock Hollie I		

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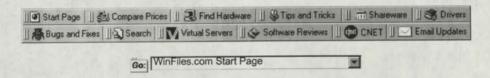
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## Windows 95/98 Time and Clock Tools



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	Version	on 1.0			Online Registration Not Yet Available		
TimeNode	20-Jan- 00	4,392K	Win 98/NT	Shareware	Expiration Unknown	Install & Uninstall	
	27 min :	at 28.8K	10 mi	5 min at ISDN 128K inchronized from atomic clocks over the			
	downstrea System Tr	am compu ray.	iters to main	tain a time synd	and redistribute this ti chronization network.	Runs as Icon on	
	Published by Mike Waldo/GeoSoft Development Group TimeNode Home Page						

	Version	1.31			Online Registration Not Yet Available						
	19-Jan- 00	602K	Win 95/98	\$13.00							
A PRINCE	4 min at	28.8K		n at 56K	1 min at IS						
GlobeTime 1.31	time-zone need to kr system tra	limited number of ving overseas and Installs itself in the									
		ned by F Softwa	Popcorn		GlobeTime 1.31 Home Page						

Version 4.4				Register Now	
19-Jan- 00	3,/8UK WIN 95/98		Shareware \$17.00	Expires after 14 Days	Install & Uninstall
that can bactive at	be taken u a given tir	ipon interval exp ne is limited only	iration. The nu by the availab	4 min at ISDN 128K  T. It is similar in use to a kitchen timer, r providing three independent actions umber of timers that you can have bility of system resources. You have ups of timers through settings.	
		Leepoware	J	ogglerPlus Home Pa	age

SetTime32	Versio	n 2.20	The same		Online Registration Not Yet Available		
	19-Jan- 00	1,307K	Win 95/98/NT	Shareware \$19.95	Expires after 45 Days	Install & Uninstall	
	8 min at 28.8K		3 min at 56K		1 min at ISDN 128K		
	Updates y calculates accurate. install and	natically o keep you clock ckground. Just					
	Publ	ished by	Tony Isaac		SetTime32 Home Page		

	Version v	12.7			No Registration F	
	19-Jan-00	74K	Win 95/98/NT	Freeware	Never Expires	Install
WebTime	<1 min at 2	8.8K	<1 min a	n at 56K <1 min at ISDN 128K		
for Windows 95/NT	CONTROL OF STREET AND STREET AND STREET	c clocks	n that will synchrols maintained by the	United States	nternal clock with one National Institute of S	Standards
	Publishe	d by Gr	egory Braun	WebTime for	r Windows 95/NT Ho	me Page

THE RESERVE OF THE PARTY OF THE	Version	5.3.0.606	Mary Control		No Registration Required			
WorldTime	15-Jan- 00	3,877K	Win 95/98/NT Freeware Never Expires Install & Unin					
	24 min	24 min at 28.8K		t 56K	4 min at ISDN 128K			
	zone, Dayl (NTP) to s Calculates with unlimi of time sin	light saving yncronize and displated LAP till ce or until	gs time rule and d your computers s ays the Julian Dat	lescription, Use system time (I te, unlimited so play if used, a e down to the	ses the Network JTC) to any inter- stopwatches accu- and a module that	net time source, trate to 1/100 sec tracks the amount		

	Version 1.35			No Registration Required		
Alarm	12-Jan-00 2,301K	Win 95/98/NT	Freeware			
	14 min at 28.8K	5 min at		3 min at ISDN 128K		
	This is a simple, yet includes help file.	cool looking, ala	rm clock / va			
	Published by TI	nad Hogan		No Home Page Available		

	Version 2	2.0.101		Online Registration Not Yet Available						
The second	12-Jan-00	n-00 797K Win 95/98/NT Demo Expires after 21 Install & Uninstall Days								
VAKCER Project Tracker PE	5 min at	28.8K	2 min at	56K	1 min at ISDN 128K					
	popular ap communication now stored 200 application and autosation for each application	plication ation, file in sepa ations ar ave projection	s such as illustra e management ar trate files allowing nd has enhanced ect features. VPT	tion, image nd much m g to configu program to also caluc can be vie	e editing, web design nore. The list of suppo ure the list easily. Sup racking algorithm as clates project cost ba	proted applications pports more than well as auto backup sed on hourly rates n a click of a mouse.				

⊖⊕ Horas	Version 3.11		⊞ Ge	Get It!		ation Not Yet	
	11-Jan- 00	340K	Win 95/98/NT	Shareware \$15.00	Expires after 30 Days	Install & Uninstall	
	2 min at 28.8K 1 min at 56K				<1 min at ISDN 128K		
	clocks cor automatic	respon	ding to different t	ime zones. Ho puter clock, a t	ie world by letting you ras has many features time converter, a time	s including the	
	Published	by Ba	sta Computing		Horas Home Page		

	Version 1.0			No Registration Required				
	09-Jan-00 2,770K	Win 95/98	Freeware	Never Expires	Install & Uninstall			
Darkcore Online Timer	17 min at 28.8K 6 min at 56K 3 min at ISDN 128K							
	Keeps track of time sp when so much time o			sion and total time.	. Also has a reminder			
	Published by I Schoentha	CONTRACTOR OF THE PARTY OF THE	Dark	Darkcore Online Timer Home Page				

Parada Nation	Versio	n 1.0	THE SAL		Online Registra Availa	
	04-Jan- 00	\$10.00		Expires after 30 Days	Install & Uninstall	
	4 min at	28.8K	1 min	1 min at ISDN 128K		
Countrown	However, was deve	as the loped in you can emainin	year drew on, an ito a true countdo cycle through th ig in an LED Pan	own program, when and see wheel sort of style,	to count down to the became less and less which takes events, ar nen they will come to which will allow you to	important, it nd names them, pass. It displays be edit, change
	Publishe	ed by Jo	shua Butcher	C	CountDown Home Pa	age

	Versi	on 5.0			Regist	er Now
	04-Jan- 00	1,953K	Win 95/98/NT	Shareware \$9.00	Expires after 21 Uses	Install & Uninstall
	12 min	at 28.8K	4 min		2 min at IS	
	sounds a	n alarm (\	WAV file) and shusly, are included	ows you a visu d. A stopwatch n online or wor	lown to your specified ual message. Two tim like feature also allow king on a specific tas	ers, which can vs you to track k.
	Pub	lished by	Ron Grau	C	CountDown Home Pa	age

3 1 3 1 3 1 3 1	Version	n 2.01		MATERIAL MAT	Regis	ter Now		
	30-Dec- 99	1,442K	Win 95/98/NT	Shareware \$15.00	Expiration Unknown	Install & Uninstall		
	9 min at 28.8K 3 min at 56K 2 min at ISDN 128K A very competent clock which tells the time in many different languages (English is							
Speaking Clock Deluxe	multiple a announci alarms ca addition it	larm syst ing the time an be set also feat analog dis d in the sy	tem, so you can ne, playing any v to go off once or tures a time synd solay and a very	have up to 50 di vave file or even be repeated da chronization fund attractive interfa- e it also shows f	nloaded). The clock fferent alarms, with starting another pr ily, weekly, monthly ction, choice of two ace design. The clo the time) and bet so	n the possibility of rogram. The y or yearly. In digital displays ick can be et to start when		
ALTERNATION OF THE PARTY OF THE	Publis	hed by L	eif Porsklev	Speakin	g Clock Deluxe H	ome Page		

	Version 1.0			No Registration	Required
MFAC	28-Dec-99 174K	Never Expires			
	1 min at 28.8K	<1 min a		<1 min at ISI	
	You need a clock that function also ? You no configurable.	eed a tool for an o	ount down or co	ount up, both 100%	free
	Published by	No	Home Page Available		

	Version 1.0			No Registration					
	28-Dec-99 115K	Win 95/98/NT	Freeware	Never Expires					
A STATE OF THE STATE OF	1 min at 28.8K <1 min at 56K <1 min at ISDN 128K								
Multi Timer	Ten independent Tim hours, with 1 second can resume on a late time ran. Sound signa other windows) with u	accuracy. Timers r computer session al (optional) and bl	can be viewed on, all settings ar inking message age on alarm.	one by one or all at e remembered from window (cannot be	once. Timers the previous hidden with				
	Published by Joha	nnes Wallroth	Mul	ti Timer Home Pag	ge				

CIOCK	Versi	on 1.1			Online Registr Avail			
	28-Dec- 99	1,423K	Win 95/98/NT	Shareware \$20.00	Expiration Install Unknown Unins			
	9 min a	at 28.8K	3 min	at 56K	2 min at IS	DN 128K		
	the world three cloo regions of can set a	Click on the sto sho the work date to w	any of over 50 m w its time continued. Watch the sur	najor cities to se ously. The map orise creeping ar ounts down with	ee its timezone and also shows the day round the Earth. Or a message of your	set one of the y and night n registration you		

@NetClock Time Server	Version	1.00b	\$4. 6 K 10 M		Online Registra Availa		
	24-Dec- 99	413K	Win 95/98/NT	Shareware \$79.00	Expires after 15 Install of Uninstall		
	3 min at	28.8K	1 min		<1 min at IS		
	correct at specificall obtain the on all of y	all time y design correct our net	s. @NetClock is ned for PC netwo Date/Time from worked PC's set to	an Internet star orks/intranets. It any Internet At	a/Time on all of your n ndards SNTP Time So t provides everything tomic clock, and then Date and Time at all tir	erver system you need to keep the clocks	
		by Ne Solutio	tcPlus Internet				

Barrier Land	Version 1	.9.1.65	130000000	a half	Online Registration Available	
	24-Dec- 99	DIUK	Win 95/98/NT	Shareware \$100.00	Expires after 30 Days	No Install
	4 min at	28.8K	1 min	1 min at ISDN 128K for small businesses. It supports		
	the following Passwords	ng featu	res: ** Continuou	us Filing Techno out ** Simple Ad	ology ** Independent E Iministration ** Runs u	mployee
	Pul	blished b	by KAST	KaT	imeClock Home Pag	le

CC Clock	Version	3.1.22			Online Registr Avail		
	23-Dec- 99	1,500K	Win 95/98/NT	Shareware \$20.00	Expiration Unknown	Install & Uninstall	
	9 min at 28.8K 3 min at 56K				2 min at ISDN 128K		
	out of you	r way. W	lock! An intelligent, customizable desktop clock/calendar app that gets vill chime, post reminders, start programs, shut down windows and seconds, analog or digital.				
	Pub				CC Clock Home Page		

	Versio	n 2.11			Rej	gister Now		
	18-Dec- 99	1,187K	Win 95/98/NT	Shareware \$24.95	Never Expires	Install & Uninstall		
TO A SECTION ASSESSMENT	7 min at 28.8K 3 min at 56K 1 min at ISDN 128K							
Chameleon Clock	digits - the synchroniz call, go to makes me application	re are mo ing your of a meeting ssages us ss/docume	re than 3000 of the clock with Interne , or just not to mi sing MP3, WAV, I ents, and shuts do	nem available. t Time Servers ss a TV progra MIDI, and CD-/	\$24.90			

F JOHN L HOUSE	Version 1.2.1 b	- Day 15		No Registr	ration Required	
and the same	16-Dec-99 1,790K	Win 95/98	Freeware	Never Expires	Install & Uninstall	
Customizable	11 min at 28.8K	ISDN 128K				
Digital Clock	A completely customi atomic clock server)	zable digital	clock progra	am (with auto-upda	ate from nasa's	
	Published by Jaco	b Myers	Custon	mizable Digital Clock Home Page		

	Version	on 3.14			Register Now	
THE REST	01-Dec- 99	1,150K	Win 95/98/NT	Shareware \$19.95	Expiration Unknown	Install & Uninstall
		t 28.8K			1 min at IS	
EldoS Clock	different s Advanced system ar add, remo Clock incl	system in d Calenda nd Taskb ove and n ludes plug	formation (memo ar, LaunchPad, re ar Clock replace nodify Windows gins support, so	ory usage, drive egular and coun ment. Includes time zone record adding additiona	at the same time. I space etc.). EldoS itdown timers, alarn Time Zone Editor, the sand fix errors in al features is quick	Clock includes ns and reminders hat allows you to them. EldoS and easy.
	Pu	iblished b	y EldoS	Eld	doS Clock Home F	Page

30-Nov-	-			Available	
99	600K	Win 95/98/NT	Shareware \$10.00	Never Expires	Install
C clock s automatica aclude ana	ynchror illy with alog, dig	nizer, desktop clo popular Internet gital, millennium,	ock and screen s Atomic time serv world analog and	aver. Synchronize your vers. Desktop display o d world digital.	PC clock
	4 min at C clock s utomatica clude and	4 min at 28.8K C clock synchror utomatically with aclude analog, dig	4 min at 28.8K 1 min C clock synchronizer, desktop clo utomatically with popular Internet	4 min at 28.8K C clock synchronizer, desktop clock and screen s utomatically with popular Internet Atomic time serviculde analog, digital, millennium, world analog and	4 min at 28.8K  1 min at 56K  1 min at ISDN  C clock synchronizer, desktop clock and screen saver. Synchronize your utomatically with popular Internet Atomic time servers. Desktop display onclude analog, digital, millennium, world analog and world digital.

	Version 3	.1		No Registration Red	quired
	27-Nov- 99	88K Win 95/98	/NT Freeware	Never Expires Install 8	Uninstal
	2 min at 25	3.8K 1 n	nin at 56K	<1 min at ISDN 1	28K
WebTimeS	VNC connects to	one of the NIST ti	me servers to de	t the current time for your s	ystem.
	Version 3.1 a	edds startup at sy dialog and adds a	stem startup, fixe	es a bug in the Apply button ty improvements as well. R	code or
	Publisl	ned by VicTech	V	VebTimeSync Home Page	
THE PARTY OF	Version 1.0			No Registration R	equired
	24-Nov-99 4		8/NT Freewa		
Hamsin	3 min at 28.8		min at 56K	<1 min at ISDN	
	Hamein Clock is	a completely cus	stomizable digital	desktop clockwith a power	
Clock	system The pro	gram allows sele	cting color, font a	and opaque/transparent mo	de.
		v Sergey V. Pop		Hamsin Clock Home Page	е
	Published b	y Sergey v. Pop	OV	riamoni olook riomo r ag	
	Version 2.1			No Registration Req	uired
	24-Nov-99 481	K Win 95/98/N		Never Expires Install &	
World Time	3 min at 28 8	K 1 mi	n at 56K	1 min at ISDN 12	8K
		ows the time of fi	ve different timez	ones, with analog and digit	al clocks.
Clock	Choose from a l	ist of 150 countrie	es and 400 cities	and define 5 countries/citie	es of your
	own. Correctly in	mplemented dayl	ight savings time	rules.	
	Published by J	ohannes Wallro	th Wo	rld Time Clock Home Pag	е
William Co.	Version 2.0			No Registration Reg	
8 1 4 2	Version 2.0 22-Nov-99 1,5	69K Win 95/98	NT   Freeware	Never Expires Install &	Uninstal
Kilroy's	22-Nov-99 1,5	69K Win 95/98	in at 56K	Never Expires Install & 2 min at ISDN 12	Uninstal 8K
Kilroy's	22-Nov-99 1,5 10 min at 28. A clock that allo	69K Win 95/98 8K 3 m ws the user to ch	in at 56K ange the color of	Never Expires Install & 2 min at ISDN 12 most sruff in the app. It als	Uninstal 8K
Kilroy's Clock	22-Nov-99 1,5 10 min at 28. A clock that allo ability to open p	69K Win 95/98 8K 3 m ws the user to ch ictures. Has all re	in at 56K ange the color of equired files in se	Never Expires Install & 2 min at ISDN 12 most sruff in the app. It als tup!	Uninstal 8K so has the
	22-Nov-99 1,5 10 min at 28. A clock that allo ability to open p	69K Win 95/98 8K 3 m ws the user to ch	in at 56K ange the color of equired files in se	Never Expires Install & 2 min at ISDN 12 most sruff in the app. It als	Uninstal 8K so has the
	22-Nov-99 1,5 10 min at 28. A clock that allo ability to open p Publis	69K Win 95/98 8K 3 m ws the user to ch ictures. Has all re	in at 56K ange the color of equired files in se	Never Expires Install & 2 min at ISDN 12 most sruff in the app. It als tup!	Uninstal 8K so has the
	22-Nov-99 1,5 10 min at 28. A clock that allo ability to open p	69K Win 95/98 8K 3 m ws the user to ch ictures. Has all re	in at 56K ange the color of equired files in se	Never Expires Install & 2 min at ISDN 12 most sruff in the app. It als tup!  (ilroy's Clock Home Page  Online Registration Navailable	Uninstal 8K so has the
Clock	22-Nov-99 1,5 10 min at 28. A clock that allo ability to open p Publis  Version 7.2.0 19-Nov-99 45K	69K Win 95/98, 8K 3 m ws the user to chictures. Has all reinhed by Jeff	shareware \$15.00	Never Expires Install & 2 min at ISDN 12 most sruff in the app. It als tup! (iliroy's Clock Home Page  Online Registration Navailable Expires after 15 Days	Uninstal 8K so has the lot Yet
Clock	22-Nov-99 1,5 10 min at 28. A clock that allo ability to open p Publis  Version 7.2.0 19-Nov-99 45K	69K Win 95/98, 8K 3 m ws the user to chictures. Has all reshed by Jeff	shareware \$15.00	Never Expires Install & 2 min at ISDN 12 most sruff in the app. It als tup!  (ilroy's Clock Home Page  Online Registration Navailable  Expires after 15 Days  1 min at ISDN 12	Uninstal 8K so has the lot Yet Unknown
Clock	22-Nov-99 1,5 10 min at 28. A clock that allo ability to open p Publis  Version 7.2.0 19-Nov-99 45K <1 min at 28.8I Speaking Clock	69K Win 95/98, 8K 3 m ws the user to ch ictures. Has all re iched by Jeff  Win 95/98/NT  < <1 min is a desktop cloc	Shareware \$15.00 at 56K	Never Expires Install & 2 min at ISDN 12 most sruff in the app. It als tup!  Gilroy's Clock Home Page  Online Registration Navailable  Expires after 15 Days  <1 min at ISDN 12 or two Microsoft Agent char	Uninstal 8K so has the lot Yet Unknown 8K acters of
UK Speaking	22-Nov-99 1,5 10 min at 28. A clock that allo ability to open p Publis  Version 7.2.0 19-Nov-99 45K <1 min at 28.84 Speaking Clock your choice to a	69K Win 95/98, 8K 3 m ws the user to ch ictures. Has all re iched by Jeff  Win 95/98/NT  ( <1 min is a desktop cloon nounce the time	Shareware \$15.00 at 56K that uses one of and date, and the	Never Expires Install & 2 min at ISDN 12 most sruff in the app. It als tup!  Cilroy's Clock Home Page  Online Registration Navailable  Expires after 15 Install or two Microsoft Agent char or act out various expression	I Uninstal 8K so has the lot Yet Unknown 8K acters of ns relating
UK Speaking	22-Nov-99 1,5 10 min at 28. A clock that allo ability to open p Publis  Version 7.2.0 19-Nov-99 45K <1 min at 28.8/ Speaking Clock your choice to a to the clock. It c	69K Win 95/98, 8K 3 m ws the user to chictures. Has all reshed by Jeff  Win 95/98/NT < 1 min is a desktop clocan automatically	Shareware \$15.00 at 56K k that uses one of announce the time.	Online Registration Navailable  Expires after 15 Days  1 min at ISDN 12  Continue Registration Navailable  Expires after 15 Days  1 min at ISDN 12  To two Microsoft Agent chard act out various expression at intervals you specify of the service of	Uninstal 8K so has the lot Yet Unknown 8K acters of ns relating
UK Speaking	22-Nov-99 1,5 10 min at 28. A clock that allo ability to open p Publis  Version 7.2.0 19-Nov-99 45K <1 min at 28.8I Speaking Clock your choice to a to the clock. It codemand. You can be seen the clock is considered to t	69K Win 95/98, 8K 3 m ws the user to chictures. Has all reshed by Jeff  Win 95/98/NT  ( <1 min is a desktop clock on outcome the time and on automatically an set five indepe	Shareware \$15.00 at 56K k that uses one ce and date, and training the single should be	Online Registration N Available Expires after 15 Days of two Microsoft Agent character at out various expression that intervals you specify out of which can launch a p	Uninstal 8K so has the Unknown 8K racters of ns relating or on
UK Speaking	Version 7.2.0  19-Nov-99 45K 41 min at 28.8 Speaking Clock your choice to a to the clock. It c demand. You ca and announce a	69K Win 95/98, 8K 3 m ws the user to chictures. Has all reshed by Jeff  Win 95/98/NT  C <1 min is a desktop clocannounce the time automatically an set five independent message. Skins	Shareware \$15.00 at 56K k that uses one of announce the timendent alarms, ealet you customize	Online Registration N Available Expires after 15 Days <a href="Image: Available">Install &amp; Available</a> Expires after 15 Days <a href="Image: Available">Install &amp; Available</a> Expires after 15 Days <a href="Image: Available">Install &amp; Install &amp;</a>	Uninstal 8K so has the Unknown 8K acters of ns relating or on rogram earance.
UK Speaking	Version 7.2.0  19-Nov-99 45K 41 min at 28.8 Speaking Clock your choice to a to the clock. It c demand. You ca and announce a	69K Win 95/98, 8K 3 m ws the user to chictures. Has all reshed by Jeff  Win 95/98/NT  ( <1 min is a desktop clock on outcome the time and on automatically an set five indepe	Shareware \$15.00 at 56K k that uses one of announce the timendent alarms, ealet you customize	Online Registration N Available Expires after 15 Days of two Microsoft Agent character at out various expression that intervals you specify out of which can launch a p	Uninstal 8K so has the Unknown 8K racters of ns relating or on rogram earance.
UK Speaking	22-Nov-99 1,5 10 min at 28. A clock that allo ability to open p Publis  Version 7.2.0 19-Nov-99 45K <1 min at 28.88 Speaking Clock your choice to a to the clock. It c demand. You ca and announce a Published by	69K Win 95/98, 8K 3 m ws the user to chictures. Has all reshed by Jeff  Win 95/98/NT  < <1 min is a desktop clock on ounce the time an automatically an set five independent of the control of the contro	Shareware \$15.00 at 56K k that uses one of announce the timendent alarms, ealet you customize	Online Registration Navailable Expires after 15 Days  1 min at ISDN 12  Contine Registration Navailable Expires after 15 Days  1 min at ISDN 12  Install 8  Install 9	Uninstal 8K so has the Unknown 8K acters of ns relating or on rogram earance.
UK Speaking	22-Nov-99 1,5 10 min at 28. A clock that allo ability to open p Publis  Version 7.2.0 19-Nov-99 45K <1 min at 28.8I Speaking Clock your choice to a to the clock. It codemand. You cand announce a Published by  Version 161	69K Win 95/98, 8K 3 m ws the user to chictures. Has all reshed by Jeff  Win 95/98/NT  ( <1 min is a desktop cloc nnounce the time an automatically an set five independence of the control	Shareware \$15.00 a at 56K ck that uses one of announce the time ndent alarms, ealet you customiz	Online Registration N Available Expires after 15 Days To two Microsoft Agent character at intervals you specify on the clock and date's apposed in Registration R Registration R Online Registration N Available Install On two Microsoft Agent character at intervals you specify on the at intervals you specify on the clock and date's apposed in Clock Home Page No Registration R	Uninstal 8K so has the Unknown 8K racters of ns relating or on rogram earance.
UK Speaking	Version 7.2.0  19-Nov-99 15-Nov-99 1	69K Win 95/98, 8K 3 m ws the user to chictures. Has all re inhed by Jeff  Win 95/98/NT  C <1 min is a desktop cloc innounce the time an automatically an set five indepe in message. Skins UK Software	Shareware \$15.00 at 56K kk that uses one of and date, and to announce the timedent alarms, ealet you customize UK Sp.	Online Registration Navailable Expires after 15 Days  of two Microsoft Agent charact out various expression e at intervals you specify och of which can launch a pe the clock and date's appleaking Clock Home Page	Uninstal 8K so has the Unknown 8K acters of as relating or on rogram earance.
UK Speaking Clock	22-Nov-99 1,5 10 min at 28. A clock that allo ability to open publis  Version 7.2.0 19-Nov-99 45K <1 min at 28.88 Speaking Clock your choice to a to the clock. It c demand. You cand announce a Published by  Version 161 17-Nov-99 1 <1 min at 28.	69K Win 95/98, 8K 3 m ws the user to chictures. Has all reshed by Jeff  Win 95/98/NT  C <1 min is a desktop cloomnounce the time an automatically an set five independent of the composition of the composi	Shareware \$15.00 at 56K k that uses one of announce the tim ndent alarms, ea let you customiz UK Si	Online Registration Navailable Expires after 15 Days  1 min at ISDN 12  Continue Registration Navailable Expires after 15 Days  1 min at ISDN 12  The Microsoft Agent chard a pet the clock and date's appointed the clock and date's appointed to the clock and date's appointed the c	Uninstal 8K so has the Unknown 8K acters of acters of rogram earance.
UK Speaking	Version 7.2.0  19-Nov-99 45K <1 min at 28.8 Speaking Clock your choice to a to the clock. It c demand. You cand announce a Published by  Version 161 17-Nov-99 <1 min at 28.8 Simple hit nice	69K Win 95/98, 8K 3 m ws the user to chictures. Has all reshed by Jeff  Win 95/98/NT  K <1 min is a desktop cloc nounce the time automatically an set five independence of the set of the control of the set of	Shareware \$15.00 at 56K k that uses one of announce the time and date, and to announce the time and the time that alarms, each of the time that 56K or change skins. (1)	Online Registration N Available Expires after 15 Days or two Microsoft Agent character at intervals you specify on the at intervals you specify on the clock and date's apposed in the clock a	Uninstal 8K so has the lot Yet Unknowl 8K racters of ns relating or on rogram earance.
UK Speaking lock	22-Nov-99 1,5 10 min at 28. A clock that allo ability to open p Publis  Version 7.2.0 19-Nov-99 45K <1 min at 28.8! Speaking Clock your choice to a to the clock. It c demand. You cand announce a Published by  Version 161 17-Nov-99 1 <1 min at 28. Simple, but nice servers. There as	69K Win 95/98, 8K 3 m ws the user to chictures. Has all reshed by Jeff  Win 95/98/NT  K <1 min is a desktop cloc nounce the time automatically an set five independence of the set of the control of the set of	Shareware \$15.00 at 56K k that uses one of announce the time and date, and to announce the time and the time that alarms, each of the time that 56K or change skins. (1)	Online Registration Navailable Expires after 15 Days  1 min at ISDN 12  Continue Registration Navailable Expires after 15 Days  1 min at ISDN 12  The Microsoft Agent chard a pet the clock and date's appointed the clock and date's appointed to the clock and date's appointed the c	Uninstal Market Parameter
UK Speaking Clock	Version 7.2.0  19-Nov-99  45K  1 min at 28.8  A clock that allo ability to open p Publis  Version 7.2.0  19-Nov-99  45K  1 min at 28.8  Speaking Clock your choice to a to the clock. It commands to the clock. It commands an announce a published by  Version 161  17-Nov-99  1 min at 28.  Simple, but nice servers. There a into .cfg files.	69K Win 95/98, 8K 3 m ws the user to chictures. Has all reshed by Jeff  Win 95/98/NT  K <1 min is a desktop cloc nounce the time automatically an set five independence of the set of the control of the set of	Shareware \$15.00 at 56K k that uses one of and date, and to announce the time and time	Online Registration N Available Expires after 15 Days or two Microsoft Agent character at intervals you specify on the at intervals you specify on the clock and date's apposed in the clock a	Uninstall 8K so has the Unknown 8K sacters of a relating or on rogram earance.

	Versio	Version 2000			Re.	gister Now	
	16-Nov- 99 2,913K Win 95/98/NT Shareware \$14.00 Never Expires Ir			Install & Uninstall			
PACT	18 min a	at 28.8K	6 min			ISDN 128K	
ShowTime	Movable date and time display, with pha- icon with 2-line display, e.g. with date at world times, integrated notes editor.			e and day of we	eek. Alarm, count	tdown, hour signal,	
	Publish	Published by PACT Software			PACT ShowTime Home Page		

	Version 1.0			No Registration	n Required
	13-Nov-99 348K	Win 95/98/NT	Freeware	Never Expires	No Install
Reminder	2 min at 28.8K	1 min a	t 56K	<1 min at ISI	
	To keep you from forg	getting those tasks eed to do them so	that you don't for	orget.	
	Published by 2		Re	eminder Home Pag	ge

	Version	2.07			Regist	er Now
	12-Nov-99	982K	Win 95	Shareware \$15.00	Expiration Unknown	
	6 min at	28.8K	2 n	nin at 56K ntdown timer, o	1 min at ISDN 128K	
Virtual Stopwatch	time logging	g system	m. Log da that beep	ta can be edite	ode. Clock mode suppor d and reports can be ger le, run a program, or disp nterval, run on set days o	nerated from it. You play a message.
	on a specifi DLL's.	ic day.	The graph	ic digit display	is configurable through t	he use of add-or

No. 1907 Com	Versio	n 1.12	TO THE		Online Registr Avail	
	08-Nov- 99	1,011K	Win 95/98	Shareware \$15.00	Expiration Unknown	Install & Uninstall
	6 min a	t 28.8K	2 m	nin at 56K	1 min at IS	DN 128K
	holidays in dates (e.g of USER ( and nation	n national l Last Sun CALENDA nal languag	anguages day in Jul R in differ ges (havin	s;- calendars inclu y or 40 days after ent national langu	ry Windows start. It support of calendar de fixed dates as we western/Orthodox uages;- you can inst from developer's We	Easter);- support
		ished by D Zhuravljo		Co	ngratulator Home	Page

	Versio	n 1.5		TO BE SEL	Regist	er Now
	03-Nov- 99		Win 95/98/NT	Shareware \$10.00	Expires after 15 Days	Install & Uninstall
Sync-It with	1 min at	28.8K	<1 min	at 56K	<1 min at IS	
Sync-It with Atom		time s		es include auto askbar tray sup	system time of your of omatic selection of the oport and easy-to-use	and attractive
	Publishe	ed by S	ami Tolvanen	Syn	c-It with Atom Home	e Page

	Version 1.0 No Registration Req 02-Nov-99 960K Win 95/98/NT Freeware Never Expires Install &				
	6 min at 28.8K	2 min a	t 56K	1 min at ISDN 128K	
Time Left	TimeLeft is a count counts how much to given deadline. You	ime (year, month u can customize	s, days, hours alarm time, ale	s, minutes and sec ert message text,	conds) is left of any icon, etc.
	Published by Kyn	de Nactoronko		Time Left Home	Page

	Version 1.5			No Registration	n Required
	02-Nov-99 10K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28.8K	<1 min a		<1 min at ISI	
ZULU	ZULU quickly calcula phone, IRC, ICQ, All you are communicati access to Greenwich	M, etc., to help you ng with. Also very	determine the chandy for purpo ). Requires VB:	current local time for oses where you need 5 runtimes.	r the person
	Published by I	LoafieWare		ZULU Home Page	

	Version 1.0			Michiga III	Online Registration Not Yet Available		
	Shareware \$10.00	The state of the s	Install & Uninstall				
- Uald Dook	4 min at	28.8K	2 min			ISDN 128K	
Hold Back Time	dates which December (Leap Year	ch may 31, 19 ar).	potentially cause 99 to January 1s	problems with	ond a certain date different software ebruary 28th to Fe	e applications: bruary 29th, 2000	
	Published by Labyrinth Software			Но	ld Back Time Ho	me Page	

The second	Version 1.2			No Registration	Required
	30-Oct-99 344K	Win 95/98/NT	Freeware	Never Expires	No Install
Stop Watch	2 min at 28.8K	1 min at	56K	<1 min at ISE	N 128K
	Stop Watch has all the	e features of a rea			
	Published by Z	Zero Alpha	St	op Watch Home Pa	age

	Version 1.2			No Registration	Required
StopWatch	28-Oct-99 344K	Win 95/98/NT	Freeware	Never Expires	No Install
	2 min at 28.8K	1 min at	56K	<1 min at ISDN 128K	
	StopWatch has all the	features of a real			
	Published by 2	Zero Alpha	St	opWatch Home Pa	ige

	Version	2000.7.0	₩ Ge	t It!		stration Not Yet ailable
	27-Oct- 99	2,565K	Win 95/98/NT	Shareware \$10.00		Install & Uninstall
The second like	16 min	at 28.8K		at 56K		ISDN 128K
Worldwide Clocks	show the clickable location is registered all CLOX on earth. via the integral of the clickable with the clickable clickable and the clickable clic	times in u map but n s also give d users re- is a very i Includes a ternet.	iser-selected loca nanual override is en to avoid confu ceive updated in neat, simple to us a calendar and a	ations around to s possible. In a sion. Setting do formation, inter se way of know larm and can a	he world. Clocks addition to the time aylight saving time met support and civing exactly what automatically adjusting adjusting exactly what automatically adjusting adjusting exactly exactly exactly adjusting exactly exact	digital clocks which can be set using a se, the day in each se is simplified and other benefits. All in time it is anywhere st your system time
OF BUILDING	Publ	lished by I	an Tragen	CLOX W	Vorldwide Clocks	s Home Page

	Version 2.0			No Registration	Required
Y2KCountdown	26-Oct-99   220K	Win 95/98/NT	Freeware	Never Expires	No Install
	1 min at 28.8K	<1 min a	56K	<1 min at ISI	N 128K
	Customizable utility	that counts down			
	Published by	SurfWare	Y2K0	Countdown Home	Page

	Versi	on 2.0			No Registrati	on Required
Christmas 1999	23-Oct- 99	3,460K	Win 95/98/NT	Freeware	Expires on 12/26/99	Install & Uninstall
		at 28.8K	8 min a		4 min at 15 utes, and seconds	
	Christmas and who t enables y cards. In	s. The prog to buy the ou to go s addition, t	gram lets you cre m for. These lists shopping on-line, he program inclu	ate and manage can be passw download Chr	ge Christmas lists of word protected. Chr istmas stuff, or sen	of items to buy, istmas 1999 also
	Publi	shed by F Interac	ocusmedia tive	Chi	ristmas 1999 Hom	e Page

	Version 1.0			No Registration Req	uired
Bobb's Y2K Countdown	22-Oct-99 500K	Win 95/98/NT	Freeware	Expires on 1/2/00	Install
	3 min at 28.8K	1 min a	at 56K	1 min at ISDN 12	8K
	Countdown timer	til midnight janu	ary first 2000 wil	th a few added features.	
Special Edition	Published by		Bobb's Y2K	Countdown Special Editi Page	on Home

	Version 1.0 19-Oct-99 1,900K	WILL OF IOO ALT	Erecurere		ation Required Install & Uninstall
Now Year	12 min at 28 8K	4 min a	t 56K	2 min at	ISDN 128K
Countdown	This program is a little show you how many	e countdown tim days-hours-minu	utes-seconds	there are left in t	ne year.
	Published by Jos	seph Martin		No Home Page A	vailable

Part of the	Versi	on 3.0	Branch Lin	relana	Online Registra Availa	
	12-Oct- 99	1,817K	Win 95/98/NT	Shareware \$7.95	Expires after 20 Days	Install & Uninstall
The PC Timer	11 min	at 28.8K	4 min	2 min at ISI	N 128K e, and click the	
	start butto an alarm, computer setting a the answ	on. Minim when the more effi time limit er!	izes to, and runs e timer ends. Mar ciently. Whether on how long you	quietly in, the nage the time y you need to be r children spen	system tray. Reapper you spend working or e reminded to turn off d on the computer. T	ars, and sounds playing on the the stove, or for the PC Timer is
	Publishe	ed by But	falo Software	Th	ne PC Timer Home P	age

	Versi	on 5.1			Registe	er Now
	05-Oct- 99	3,746K	Win 95/98/NT	Shareware \$12.00	Expires after 14 Days	Install & Uninstall
Joggler	A timer ut more. Usi exercises	ing it, you	am for Windows can be reminde	95. It is some d every 20 mir l Melissa in 30	4 min at ISI what like a kitchen tim nutes to perform your minutes; to keep trac e instances of Joggle	er, but much stretching k of the time you

	Version	on 1.3.0			Online Registration Available	Not Yet
	02-Oct- 99	1,718K	Win 95/98/NT	Shareware \$40.00	Expiration Unknown	No Install
	11 min at 28.8K 4 min at 56K 2 min at ISI Automates the task of tracking your time and billing for hourly work. You					
TimeSlice	when you minutes of any set of and keep database invoices a by provid	have been tenth, que firme reconnotes on a spreadsland report	en working away uarter, half, or whorded. You can b exactly what you, heet, word proce s. TimeSlice stay ility to command	from your compole hour and the fill time against live doing. Time ssing programs as out of your withe timer and example.	try. You can easily add ti puter. TimeSlice allows y nen generate invoices or clients, projects, or speci Slice data can be export s so that you can create of ray while you work on you did active time entries when	ou to bill by reports for ific tasks ed to custom ur compute
	Publis	hed by Ma	aui Software		imeSlice Home Page	

	Version	n 1.32		Date of Man	Online Registra Availa	
	27-Sep- 99	1,420K	Win 95/98/NT	Shareware \$42.99	Expires after 30 Days	Install & Uninstall
Timeless Time & Expense	9 min a	t 28.8K	3 min	at 56K	2 min at IS	DN 128K
	Expense a With Time needed to billing info Time, Dat	allows you eless Time accurate ormation. te and Cu	u to easily track to a & Expense's flee & Expense's flee bly estimate time Also includes Inversency formats.	ime at a fine le exible reporting and costs on foice reports, T	ng all a lot of time. Tirevel of detail by project capability, you get the uture tasks in addition to Do list and Internal	ct and/or activity. ne information n to accurate tional support for
The table of a U	Publis	hed by M	AG Softwrx	Timeless	s Time & Expense H	lome Page

	Version 1.3			No Registration	Required
Multilingual	22-Sep-99 867K	Win 95/98/NT	Freeware	Never Expires	No Install
	5 min at 28.8K	2 min a	t 56K	1 min at ISD	N 128K
Clock	5 min at 28.8K The Multillingual Spei multimedia computer that mimics a LC-dis reminding you at a p	play, it can speak in reset time.	n different langu	uages and it has an	alarm for
The second secon	Published by L	eif Porsklev	Multilingual	Speaking Clock F	lome Page

THE THE PERSON NAMED IN	Version	1.0		THE PARTY IN	Online Registration	Not Yet Available
Alarm	08-Sep-99	226K	Win 95/98	Shareware \$5.00	Expiration Unknown	Install & Uninstall
	1 min at			n at 56K	<1 min at IS	
					ir different times to be re k in the system tray.	eminded of
	Published	Published by John McBride			Alarm Clock Home P	age

	Version 1.0 29-Aug-99 819K			No Registration Required Never Expires Install & Uninstall
	5 min at 28.8K	2 min a	t 56K	1 min at ISDN 128K
RovoClock	accessorie set to be our opinion) looking a smooth illustrative Y2K countdown (in be also set to stay of	e freeware. Rovo g one. The clock f e, non- standard, seconds) and 3 s on top of other wi	Clock is not an eatures plastic user interface starter buttons ndows.	et. It is the only component of the nordinary clock, it's an attractive (in clooking panels and clock arms and it talso features as functionality a to start up apps and web links. It can
	Published by Rovo	Scape Software		RovoClock Home Page

	Version 1.0 27-Aug-99 650K	Win 95/98/NT	Freeware	No Registration Required Never Expires Install & Uninstall
	4 min at 28.8K	1 min a	t 56K	1 min at ISDN 128K
Candy	clock can be loaded including animated G compliment the back can be reloaded at a clocks, and new ones	in from a graphi GIFs. The hands ground and the later stage. Ca s can easily be	cs file, most c , border and r n all the settin ndy Clock con created using	program. The background for the common formats are supported numbers can then be modified to gs saved into a small ascii file which nes with a variety of ready made clip art, graphics from the web etc.
	Published by Gallic	row Software		andy Clock Home Page

	Version 1.5.3b	The state of the s		No Registration	
	26-Aug-99   25K	Win 95/98/NT	Freeware	Never Expires	
N ME TO THE	<1 min at 28.8K	<1 min :	at 56K	<1 min at ISI	
Chasiki	This nice clock lies of button (it jars on some button 'Sec00' or 'Semenu appears. Now indication of the clock	ebody). Setting of t'). If you click the you can change th	the right time w right button of you e font, colors are responds to the	ill take you a mome our mouse on the cl nd format of date ty Windows setting.	lock then the pe.The
	Publisher U	Jnknown	C	hasiki Home Page	

	Version 1.0.5	The Committee of the Co		No Registration	
	25-Aug-99 9K	Win 95/98/NT	Freeware	Never Expires	
Alarm	<1 min at 28.8K	<1 min a	t 56K	<1 min at ISI	
Clock	A simple alarm clock time you desire, and you shut it off again.	then at that time the	ne computer wil e readme file!	l loop your default s	sound until
	Published by Dyna	sty Productions	Ala	rm Clock Home Pa	ige

	Versio	n 1.1	₩INI	ier <b>99!</b>	Online Registr Availa	
	25-Aug- 99	980K	Win 95/98/NT	Shareware \$20.00	Expiration Unknown	Install & Uninstall
Tardis	have ever	tried to caused	ntranet it can ope develop applica by machines ha	erate to ensure to	1 min at IS hat all PCs agree of the than one PC you idea of what time it	the time. If you will know the
	Publishe	ed by H Sm	.C. Mingham- ith		Tardis Home Pag	е

	Versio	n 3.5.3	RITE.	The territory		stration Not Yet ailable
	22-Aug- 99	2,557K	Win 95/98	Shareware \$28.00	Expires on 12/31/99	Install & Uninstall
PC Life @	16 min	at 28.8K	6 mi	n at 56K		ISDN 128K
2000	status of the	ne PCs R1 ot Y2K cor endant on	C and/or BIO	OS. No need to this an active solutes in the RTC! It	ution! It is not an F works with every	y good PCs because RTC or BIOS patch! It known combination
I WILLIAM DE LA CONTRACTION DE	Publi	shed by P	C Life	PC	Life @ 2000 Hor	ne Page

	Version 1.5.3 22-Aug-99 1,013K	Win 95/98/NT	Freeware	No Registration Never Expires	
	6 min at 28 8K	2 min a	t 56K	1 min at ISDN	128K
Project TimeClock	Excellant Project, Task Each task can have its save and print reports. Government projects, ti it remembers the settin. Users. Email me if you	own Charge amou Reports can be maked ime can be tracked gs and modes that	onthly, weekly of in tenths of an tit was last use	or Configurable. Can be daily. For those to hour if you wish. Vo d in. Completely FR	generate, acking ery friendly EE for ALL
	Published by Ch	nad Capps	Project	TimeClock Home I	Page

	Version	on 1.5			No Registr	ation Required
	20-Aug- 99	1,919K	Win 95/98/NT	Freeware		Install & Uninstall
	12 min a	at 28.8K	4 min a	t 56K		that you can assign
Talking Agent Clock	to alarms. I install Micro component website. Published	Microsoft A osoft Ager ts, text to s	Agents are part of the under Window speak engine, and Campbell/Terry	f the Windows vs 95/98/NT b d Agent chara	s 2000 operating by downloading th	system. You can be Agent 2.0 core be Microsoft Agents

	Version 1.0		Charles Charles	No Registration F	Required
	20-Aug-99 1,424K	Win 95/98/NT	Freeware	Never Expires	Install
Time	9 min at 28.8K	3 min a		2 min at ISDN	
	A simple updating Time options. A small, useful	displaying progra program.	am. With Copy		tner
	Published by We	s DeMoney	-0.0	Time Home Page	The sta

	Version	on 1.0	D. raful	10.49	Online Registra Availa	
	18-Aug- 99	2,513K	Win 95/98/NT	Shareware \$19.95	Expires after 30 Days	Install & Uninstall
	16 min	at 28.8K	6 min		3 min at IS	
40tude Time	the standa around the illuminatio that come countries	ard Windo e world, re on on earth s with the around th	ws tray clock, erenders a breathta that can be use program and give e world.	nhancing it by s aking photo-rea ed as the deskt wes you inform	et Timeserver, is a re showing the current ti alistic image of the cu top wallpaper and in ation about public ho	ime at locations urrent the screensaver lidays in
	Publishe	ed by 40ti	ude Software	40	Otude Time Home P	age

G.W. DED	Versio	n 3.04			Online Registra Availa	
	18-Aug- 99	1,298K	Win 95/98/NT	Shareware \$45.00	Expires after 30 Days	Install & Uninstall
	8 min a	t 28.8K	3 min	at 56K	1 min at ISI	
Proj Clock	useful utilii can be pur to each pro Reports su by saveab customiza	ty for any nched in a oject for t ummarize le SQL ca ble report	one who must ke and out for each he day. A history all billed project alls. Proj Clock P as.	eep track of tim project. A runn database is ke time in the give	dows system tray. Pre billed to different paining total displays the ept to record all time en time period. Data r network ready and	total time billed transactions. may be viewed
ALTER OF		shed by Corporation	yberMatrix on Inc.	F	Proj Clock Home Pa	ge

	Version	1.0						Required
	15-Aug-99	1,490K	Win 95/98/N	NT Fr	reeware			tall & Uninsta N 128K
Pinant	9 min at 2	time in B	inary format,	in at 56	nanes of I	FD's (Light F	mitting	Diodes) to
Binary	represent rea	al ones (I	Duh. ) create	s differe	ent pattern	s to represen	t the tir	me. Interestin
Clock	and cool to lo	ook at, es	specially once	you lea	arn how to	read it!! ;) A	tutorial	is built into th
		ed by Da	rk Eclipse		Bir	ary Clock H	lome P	age
		Park III	Min I Land				100	
	Version Re Bet					No Reg	istratio	n Required
	11-Aug-99	989K	A A STATE OF THE PARTY OF THE P		reeware	Never Expi	The same	Install & Uninstall
	6 min at	28.8K	2 n	nin at 5	6K			DN 128K
Chrono	be used either for those situ current time. configured to	er as a re lations w With its suit alm	eplacement for	the eleventer interfactors. Suppo	ock in the seventh hour be and flex ort time disp	system tray, or and need co ible mix of se	or as a instant ettings,	or date. It can companion watch over the it can be ormat
			nh-Duy Tran		picy.	Chrono Hor	me Pag	je
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	automatically	set your	r PC's time us pre-reminder	sing the	y 1, 15, 30 internet tir any days ir	), or 60 minut me server of advance an	your cr	an also noice. Has ze buttons .
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appointment, or your favorite net show!freely	
Published by Hyperpresence	HyperTime Home Page

	Version 2.2		Ge	t It!	Register Now	
Big Ben	06-Aug-99 1,9	900K	Win 95/98/NT	Shareware \$10.00	Never Expires	Install
	12 min at 28	3.8K	4 min	at 56K	2 min at ISDN	
	the Millennium. Westminster Ch tolls of Big Ben	famous b This sha nimes on itself.	pells. An ideal uti reware utility is each quarter-ho	ility for New Yea quite unobtrusive our, and will mark	ne hours with the sou r's Eve parties as we e, and will play a sect k each hour with a nu	approac
	Publishe	d by KP	J.Jones	Bio	Ben Home Page	

	Versio	n 1.0.5			- Regi	ster Now
	06-Aug- 99	2,518K	Win 95/98	Shareware \$15.00	Expires after 20 Days	Install & Uninstall
Clik Clocks	16 min a	at 28.8K	6 mi	n at 56K	3 min at l	SDN 128K
	Include a c stopwatch on Clik Clo lovers, small	with sincr ocks web s art users	une the pc clonized funct site and the rand people w			ISDN 128K lace alien minds. luble display lounds. FREE skins st have for clock c. Complete

	Version 1. 04-Aug-99 2		in 95/98/NT	Freeware	Never Expires	ation Required Install & Uninstall
CC TimeKeepe	2 min at 28. Helps you trace	k the time r work an ace, this fi	1 min a e you spend id then save reeware prov	working at the to a file for late es that great	/1 min n	iali packages.

	Version 2.0 04-Aug-99 828K	Win 95/98/NT	Freeware	Never Expires	ation Required Install & Uninstall
Lifeclock	5 min at 28.8K	2 min a	1 min at ISDN 128K		
Lifeclock	A 32-bit Windows a have to live using a	ipplication that priccurate life expe	edicts/estima ctancy tables	tes your death da Requires the VB	te and how long you 6.0 Runtimes.
	Published by A			Lifeclock Home	Page

	Versio	n 2000	LIMIL	MILIBIA	Online Registr Avail			
Today	03-Aug- 99	1,890K	Win 95/98/NT	Shareware \$5.00	Expiration Unknown	Install & Uninstall		
	12 min a	at 28.8K	4 min	at 56K	2 min at IS			
	today's da	te is? "To to the tim just the c ast and sid to your co						
	van	Publishe houwelir	ed by ngen.com		Today Home Pag	le		

	Version 1.0.1				istration Required	
	31-Jul-99 38K	Win 95/98/NT			xpires   No Install	
	<1 min at 28.8K	<1 mir	at 56K		in at ISDN 128K	
CurrentTim	Will always make su Internet and fetching connection to reach connect. With a full- synchronization will	the correct time the Internet, Cur time Internet con	with second rentTime will nection, you C source cod	precision. If you synchronize the may choose the e is included.	u use a dial-up e time every time yo interval at which	
	Published by M			CurrentTime H	ome Page	
- 10				THE RESERVE		
	Version 2.2.6			No Regis	tration Required	
	28-Jul-99 168K	Win 95/98	Freeware	Never Exp	ires No Install	
Tclock	1 min at 28.8K	<1 min	at 56K		at ISDN 128K	
TOIOUK	This program lets you	u change the form	mat of your c	lock (bottom righ	it of screen) it also	
	allwos you to syncan		online clocks	s and display sw	atch internet time.	
	Published by Ka	zuto Sato	1	No Home Page A	vailable	
41 10 5 11 11						
	Version 1.0.0			No Registra	ation Required	
	24-Jul-99 2,159K	Win 95/98   Fr	reeware N	ever Expires	Install & Uninstal	
	13 min at 28.8K	5 min at 5	56K	2 min at	ISDN 128K	
TimeZone	Shows the time in a	specified place o	n the world n	nap. You specify	the place by movin	
99	the mouse cursor ov	er it.				
	Published by Sh		Tir	neZone 99 Home Page		
	Software	Software				
100	Version 1.1			No Reg	gistration Required	
	20-Jul-99 12			ware Never E	xpires   No Insta	
ionus	<1 min at 28.8K	<1 m	nin at 56K		in at ISDN 128K	
0000000	A I was analian al	ook with romindo	r functionality	. See-it-and-love	e-it.	
iAlarm	A next-generation clo Published by Chr			ionus iAlarm	7. 101	

	Version	on 2.00			Registe	er Now
	18-Jul- 99	1,020K	Win 95/98/NT	Shareware \$9.00	Expires after 14 Days	Install & Uninstall
WorldTime200	An appli the work alarms.	min at 28.8K 2 min application for simultaneously world. Comes with time inforrms, modify, delete or add loc		viewing many mation for over ations. With ye	400 cities and time	s from around zones. Set colors and
	Publish		CM Computer	The second	rldTime2000 Home	10.01

	Version 1	.00			No Registration Required	
	17-Jul-99	67K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 2		<1 min a		<1 min at ISI	
	Displays the ti neat, clear into		ny country in the v		your current location	
	Publish	ed by Ja	amie Brown	Apex	<b>World Time Home</b>	Page

	Versi	on 1.0	-12/1/4	190001	Online Registr Avail	
PoundClock99			Win 95/98/NT	Shareware \$10.00	Expiration Unknown	Install & Uninstall
	9 min	at 28.8K	3 min	at 56K	2 min at IS	
	Introduc	es a new	dimension in de	and customiza	s - the ROUND clo able (in the register g circular. It also s	red version)

date and updates every second.	
Published by Graham Taylor	RoundClock99 Home Page

	Version 1.01			No Registration Required	
@ Beatle Atomic Time	10-Jul-99 244K	Win 95/98/NT	Freeware	Never Expires	Install
	2 min at 28.8K	1 min at 56K		<1 min at ISDN 128K	
	This software conne generate the 'Swatch		ne server and u	ses the received time	to
	Published by P	hilipp Robbel	Beatle /	Atomic Time Home I	Page

THE REAL PROPERTY.	Version	2.0.2			Regist	er Now
	07-Jul- 99	654K	Win 95/98/NT	Shareware \$35.00	Expires after 30 Days	Install & Uninstall
Company of the Compan	4 min a	28.8K	1 min	at 56K	1 min at ISI	
World Clock	that can Both win limited to a world r allows th City time the statu	be used dows an display nap, can e user to s are acts s of the	for this purpose re user configural ring information for n contain as man o input a time in djusted to their lo	, the World Tim ble for content or four cities why cities as there one city to see cal times based data. All Interna	und the world. There a le window and the Tim and format. The World lereas the Time Zone e are available. A "Wh what time it would be d on which time zone to ational settings are sup Vorld Clock Home Pa	ne Zones window. I Time window is window, which is at if' feature in another city. hey are in and pported.

	Versi	Version 1.2 Online Registration I						
	06-Jul- 99	1,741K	Win 95/98/NT	Shareware \$15.00	Expiration Unknown	Install & Uninstall		
WinGlobe	11 min at 28.8K 4 min at 56K				2 min at ISDN 128K			
	the local	time and	ts on your Wind population of all he moment.	ows desktop. In I major cities arc	addition to just sitti ound the world. It als	ng there it knows so shows where it		
THE POWER PROPERTY.	Published by Dirk Djuga WinGlobe Home Page							

	Versio	n 1.00	Months	PA EL PROVI	ation Not Yet		
Time Manager	04-Jul- 99	760K	Win 95/98/NT	Shareware \$20.00	Expiration Install & Unknown Uninstal		
	5 min a	28.8K	2 min	at 56K	1 min at ISDN 128K		
	Stopwate can play shutdow pick the window	ch is a h a soun n/restar font and sizes, a	nandy tool — and d, display a mes t Windows. Sele d colors used for nd elect to keep	the Timer has s sage box, launch ct from terminati the numbers for	les from the system ome nice features. Van a program or docuing or repeating mod both modules, choos of each on top of	When it goes off it ment, and/or les. You can also ose from two	
	Publ		y Vira Tech pment	Tin	me Manager Home	Page	

	Version 2.21a				Register Now				
	28-Jun- 99	413K	Win 95/98	Shareware \$24.95	Expires after 30 Days	Install & Uninstall			
	3 min at			n at 56K		ISDN 128K			
ClockWise	also allows atomic clo extremely allows any system clo	s the us ck at NI powerfu progra ock, and	er to automa ST via mode ul. It's bigges m to be run o	tically set the sy m. It uses minir t feature is it's v	er, stopwatch and pro ystem clock via Internal mal system resource: versatile scheduling in tended. It can also au ot.	net NTP or to the s, and yet is nterface, which			

	Joseph (	RJ Soft	ware)	310	ockWise Home Pa				
	122201112	1							
	Versio		110 05100			ration Required			
	25-Jun-99	23K				es No Install			
- WatchCloc	<1 min at	1 28.8K	<1 m	in at 56K	<1 min a	IT ISUN 128K			
Wateriolog	I his is a little	e neat too	of that deals w	ith clocks. You	can see the curre	nt time, see now			
- C W 10 17 17 17 17 17 17 17 17 17 17 17 17 17	many secon	as or tim	e until mlanign	it, what today s	date is, if it a leap	year or not, and			
	finally, if it is	a weeko	ay or not.		No Home Page Av	oilabla			
	Publish	ed by <b>Ry</b>	an Couch		NO HOME Page AV	allable			
	Version					ation Required			
	24-Jun-99	1,000K		T Freeware		Install & Uninsta			
Magohn's	6 min at 2			at 56K		ISDN 128K			
Worldtime	Gives fast ar	nd accura	ate accessibilit	y to nine major	world titles. The	application easily			
	switches bet	ween all	U.S. timezone	s. The applica	tion has been test	ed rigorously and			
				s95, 98 or NT	hn's Worldtime 2	Home Page			
	Published	by Mago	ohn Software	Mayo	iiii s vvoiluuiiile 2	Home Fage			
			E 22 13 13			FILE STATE			
	Version					tration Required			
	15-Jun-99		Win 95/98/N			ires   No Install at ISDN 128K			
Townstant.	<1 min at	28.8K	<1 m	in at 56K					
Traveler's	Are you a traveler that doesn't feel like paying \$15 for an alarm clock? Well, this alarm clock is small, easy to use, and best of all free! I just made this today, and it features a								
Clock	clock is sma	II, easy to	o use, and bes	or all free! I ju	his clock will ensu	o you that you			
	clock, and cr	noice of c	ollierent beep	miss your fligh	HIS CIOCK WIII ELISU	e you mat you			
				miss your fligh	raveler's Clock H	ome Dees			
	Publis	hed by J	ason Rand		raveler's Clock n	ome Page			
	Version 2	068			No Registra	tion Required			
	02-Jun-99		Win 95/98/NT	Freeware		Install & Uninstal			
BeatNik	4 min at 2		1 min a			ISDN 128K			
Internet	A nonrectan	oular ekir	nnable clock	Synchronize vo		ic Clock via direct			
	internet con	pection o	r SOCKS 4 pro	oxy Displays t	me in 12/24-hour	and Internet Time			
lock	formats. Incl			ony. Displays t	1110 111 122 1 11001	and monitor mine			
			thing Decent	ReatN	ik Internet Clock	Home Page			
	Published L	by Some	thing Decent	Death	IN IIIICITICI OIOON	riome ruge			
					-				
	Version 2	2.51				ister Now			
	02-Jun- 2	DOSK V	Vin 95/98/NT	Shareware	Expiration	Install &			
	99 2,	USSK V	THE RESIDENCE OF THE PARTY OF T	\$11.00	Unknown	Uninstall			
	13 min at 2		5 min a			ISDN 128K			
	An analog or	r digital c	lock on your d	esktop with a	cartoonish picture	of a boy in the			
StarClock	clock's face.	Every fe	ew seconds the	boy's express	sion changes. He	can be happy,			
Star Clock	langry or sle	ening co	omplete with a	ppropriate sou	nd effects played a	at regular intervals			
	Other feature	es includ	le a right-click	menu that lets	you launch comm	on Windows			
	components	. two scr	een savers, sy	stem tray supp	oort, shutdown cor	itrols, and optional			
	background	music. D	espite a few ro	ough edges an	d a nag screen tha	at pops up every s			
	often, StarC	lock migh	ht take a nice o	desktop compa	nion.	and the state of the state of			
		shed by			AND DESCRIPTION OF THE PERSON	Dama			
		mmunica			StarClock Home	rage			
	Col				377   504	MARKET STATE			
	Col	12							
	22.00	9 Reta			No Registrat	on Required			
	Version 0		Win 95/98	Freeware	No Registrat	on Required			
TCE	Version 0 02-Jun-9	9 59K			lever Expires	nstall & Uninstall			
TCE	Version 0 02-Jun-9	9 59K	<1 min	at 56K	lever Expires   I	nstall & Uninstall SDN 128K			
TCE	Version 0 02-Jun-9 <1 min a A nice clock	9 59K t 28.8K with extr	<1 min	at 56K ul alarms syste	lever Expires	nstall & Uninstall SDN 128K introl Winamp.			

	Version	3.20.04	100		Online Registration	Not Yet Available		
	01-Jun- 99	1,544K	Win 95/98/NT	Demo \$89.00	Expiration Install & Unknown Uninstall			
Decreasive	10 min	at 28.8K	3 min at	56K	2 min at IS	DN 128K		
Time Logger	data at the your favor	e end of the ite word p	e the built-in stop e day. Produce of rocessor, or use	customized the templaticounts re	nts, lawyers, enginee time tracking, or ente d time reports. Design ates provided with the ceivable section.	your invoices with application. Track		
	Pub	lished by	Alan Macy	Res	ponsive Time Logge	er Home Page		

	Version	Version 2.04			Online Registration Not Yet Availa		
	31-May-99	394K	Win 95	Shareware \$5.00	Expiration Unknown	Install	
	2 min at 2	28.8K	1 n	nin at 56K	<1 min at ISDN 12	8K	
Active Desktop Alarm Clock 2000	Providing you week. Now having multi reminders. It or video fee (recommend activated, it before chan return to so	ou with a you'll ne iple alar Use you ds for the ded) or will cha ging into	a choice of ever miss a m and/or e ir favorite s ne alert sig as an exte nge into a o a Snooz alarm aga three (3) s	f having 2 differed another schedule event settings. Use sound, music, pinals or events. I mal application and alert mode so to emode. Then, a fin. The alarm we have so the sound and the sound are the sound and the sound are mode.	95/98 and MS IE 4/5+ browse ent event settings for every da ed event again with an easy to lose your custom messages for cture, video files and even live Can be used as an Active Des If selected to do so, when the unding the alarm signal for two after six (6) minutes of snoozir ill automatically repeat the ala nen end, unless you select Sto.	y of the o use utility ralert e web audio sktop ne alarm is o (2) minute ng, it will	

	Version	n 2.1.2			No Registr	ation Required
	26-May- 99	1,062K	Win 95/98/NT	Never Expires	Install & Uninstall	
SetTime	7 min a		2 min a		1 min at ISDN 128K	
Client	more. SetT features. S	ime Client etTime Cli	also includes a sent can display a anytime - any day	stop-watch tin message, ch . Get on time	ner and complete neck the time, run e. Stay on time. B	a program, or e on time.
	Publis	hed by Br	eese IT & C	Se	tTime Client Ho	me Page

Cale Wall	Version 1.30	Win 95/98/NT	Freeware		ation Required		
TinyTimer	3 min at 28.8K This small system t timer. Use it to mon	1 min at 56K <1 min at ISDN 128K m tray accessory provides the user with a small, easy to use Pop-Upl monitor your online time, or any general purpose timing activity. Installs					
	itself in the system tray. Published by Popcorn Software TinyTimer Home Page						

@Time Internet Time Clock	Version 2.0 beta 2 18-May-99 2,000K 12 min at 28.8K On the Internet? Of co	4 min a	t 56K hv not run or	No Registration Required Never Expires Install & Uninstall 2 min at ISDN 128K Internet Time? Get the @Time creen! Features include Alarms, A
	Buddy List, and a cus Published by Cre	tomizable interfa	ce.	nternet Time Clock Home Page

ClockG2	Versio	n 2.0	LES BELT		Online Registration Not Yet Available						
	17-May- 99	250K	Win 95/98/NT	Shareware \$10.00	Expiration Unknown	No Install					
	2 min at	28.8K	1 min a	<1 min at ISDN 128K							
	automatica ClockG2 to world cloc ClockG2 for download	ally with o synch k. World ollows y and run	popular Internet ronize your PC of d clock displays to your Windows col	Atomic time se lock. Display che times of six of or schemes. No	o clock. Synchronize your rvers. Specify how often y noices include analog, dig different major cities of you o installation is necessary	you wish gital, and our choice.					
	Publ	ished by	y GetWare	Published by GetWare ClockG2 Home Page							

	Version	n 1.0			No Registr	No Registration Required	
	14-May- 99	683K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall	
	4 min at	28.8K	2 min a	t 56K	6K 1 min at ISDN 128K		
Y2KountDown	remaining, remaining	as well is displa	as the current da eyed when the mo	ate and time a	are displayed. As	well, the time icon for a second.	
	Publis	TO PROPERTY OF THE PARTY OF	by CyberTech Y2KountDown Home Page oftware				

	Version	1.0			No Registration Requir		
Arkosoft	12-May-99	134K	Win 95/98/NT	Freeware	Never Expires	No Install	
	1 min at 2	28.8K	<1 min a		<1 min at ISI		
StopWatch	"hacking cod tool for all of	e", plus y you cons	you can save a log sultants out there.	file for future r	of time while you're eference. Excellent	productivity	
	Published b	y Arkoso	oft Technologies	ft StopWatch Hom	e Page		

	Version	n 1.5	Visit Indiana		Register Now		
	11-May-	407K	Win 95/98/NT	Shareware \$10.00	Expires after 7 Days	Install & Uninstall	
	3 min at	28.8K	1 min	at 56K	<1 min at 18 r desktop. Clock may		
AKClock	by using s analog mo instance: a controls st files for sig	kins. Code may analog a tated at gnal and	reate your own sign be rectangular of and digital modes oove on your design alert. Watch the	kins for Clock, i or rounded. Als s, alert, signal, l ktop than Clock	its really simple! Cloo o available many fea hiding from mouse (it k) and more! You ma	ck window in tures. As for allow you to use	
	Publish	ned by I	Dimension X		AKClock Home Pag	ge	

	Version	n 2.0	(10/18-	10 75	Online Registra Availa		
WorldClock	10-May- 99	4,983K	Win 95/98/NT	Shareware \$39.95	Expires after 30 Days	Install & Uninstall	
	31 min a	t 28.8K	11 min		5 min at ISE		
- F / T / T / T / T	This program allows you to display ting are so many configuration options the			here will certa	nore than one place in the World. There ertainly be something to suit your needs		
	Published by Stuart Folo			1	NorldClock Home Pa	age	

	Version	on 3.0		0	Inline Registration	Not Yet Available		
	02-May- 99	2,644K	Win 95/98/NT Demo Expiration Install & Uninstall					
	17 min a	at 28.8K	6 min at	56K	3 min at IS	DN 128K		
Billing	you to trac operation a project trac capabilities	k your clie and billing cking, cust s. The pro- ulti-user v	ents' billing histor procedures. Add tomizable invoice gram is well desi ersion is also ava	y and to and litional programmed forms, and gned and ea ailable.	r anyone who must iso acts as a managalyze the effectivene ram features include extensive reporting asy to understand all the control Time & Billing and the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy to understand all the control Time & Billing asy	ss of your recurring billing, and printing		

	Version 02-May-99		Win 95/98/NT	Freeware	No Registration Never Expires	
	2 min at 2	28.8K	1 min a		<1 min at ISI	
CoolClock	Not in a window so yo		ou can click throug up functions. Anim ouds/etc look.	mapped clock and date that is act ou can click through the numbers! up functions. Animates bitmaps ac		with built in f the clock to
	Published by Coolest.com CoolClock Home Page					

	Version 3.01		W. Tue		Online Registra Availa	
AND Model Times	25-Apr- 99	1,186K	Win 95/98/NT	Shareware \$15.00	Expires after 30 Days	Install & Uninstall
	7 min a	t 28.8K	3 min	at 56K	1 min at ISI	DN 128K
	the backs	round col	our and the text	colour to suit the world time zon	number of clocks in the e of each clock, the under individual tastes. The can be superimposed to the control of	A world map osed on this
	Published	by Cast	e Software Ltd	٧	VorldTimer Home Pa	age

	Version 1.0 22-Apr-99 1,930K	Win 95/98 Freeware	No Registration Required  Expiration Unknown Install & Uninstall
WAVAlarm	12 min at 28.8K A cool App that play to use!		2 min at ISDN 128K set time. VERY simple and Straight forward
	Published by GMR	Software	WAVAlarm Home Page

	Version 2.1b		Maria Maria	Maria Day		stration Not Yet
	17-Apr- 99	488K	Win 95/98/NT	Shareware \$20.00	Never Expires	Install & Uninstall
	3 min at	28.8K	1 min	at 56K		ISDN 128K
AtomTime	compares	er in Boo this va updating to auto	ulder, Colorado ( lue to your PC tir g your PC clock to	USA) and fetch ne and displays o match the ato process. Atom	the current atoms the difference. Yomic clock value. Time98 also featu	There are a number ires support for most
	Publishe	d by Br	uce Adelsman		AtomTime Home	Page

	Version 3.0				Register Now	
	17-Apr- 99	846K	Win 95/98/NT	Shareware \$25.00	Expires after 30 Days	Install & Uninstall
	5 min at	28.8K	2 min a	at 56K	1 min at ISI	
Outatime	AAIII LIGID A	you to it	ecold novi long y	ou opena mem	ing on each of your da creen, and ask you to	aliak an tha

- TW	9 min at 28.8K	Win 95/98/NT 3 min at	Freeware 56K	Never Expires 2 min at	ation Required Install & Uninstall ISDN 128K
Timelt!	Timer application to ke a project. "Pause" feat with this version!	eep track of time ture included. Al	spent on-lin so displays o	current date and t	ime. Alarm added
	Published by Duques	ne SoftWorks		Timelt! Home	Page

	Versio	Version 2.31		111	Online Registration Not Yet Available	
	30-Mar- 99	1,616K	Win 95/98/NT	Shareware \$10.00	Expires after 15 Days	Install & Uninstall
When	Much mod timer, and various all oversize of	d a calend larm soundisplay the	desktop clock , clar. Fully custom	offering an alar izable, you man alarm/timer m	2 min at ISI m with AutoSnooze, a y choose options like lessage. ?When has of it your needs. 15 da	a countdown military time, an easy to read
	trial version.  Published by SW Systems, Inc.  When Home Page					

4 3 3 4 7	Version 2.1			No Registration	
	30-Mar-99 35K	Win 95/98/NT	Freeware	Never Expires	
WTClock	<1 min at 28.8K	<1 min a		<1 min at ISI	
	Simple analogue cloc combine using of MS	k for your desktop VB and MM Flash	technics. Requ	uires the VB 5.0 Ru	ntimes.
	Published by Irek		W	TClock Home Pag	е

	Version 9			No Registration Required		
	27-Mar-99 1,589K	Win 95/98	Freeware		Install & Uninstall	
Jeff's Clock	10 min at 28.8K	4 min	at 56K	2 min a	ISDN 128K	
O Jeff's Clock	A 32-bit Windows clock in the setup package,	k which has so no other f	ed.			
	Published by Jef			No Home Page Available		

THE WAR THE REAL PROPERTY.	Version 2.0	Palle Mil		Online Registration Not Yet Available	
11 12 13 MILES	26-Mar-99 60K	Win 95/98/NT	Shareware	Never Expires	No Install
	<1 min at 28.8K	<1 min	at 56K	<1 min at ISD	
TSTC (Time TC Server - Time Client)	client and a time s station only can be time from the inter use any other time you can send me	server. It is useful e connected to In rnet, and serve th e client to connec an email to tell m base of IP addres ogging support - p	I to build a time reternet (due to finis time to all other to TSTC servere you like it, do its - Scheduled comments.	er protocol. It can both network chain, in the e- rewall limitations). That er stations on the net- er. This program is free it men!! Features: - Cl lient (one time a day) ose between client/se	case one at station reads work. You can eware, but if lient accessini file

	Pi	ublish	ed by L Crois		Marie	TS	TC (Tim	ne Ser	ver - Time Clier	nt) Home Page
dCAL	25-N <1 i A nifty for an name syste	min a y little ny give es that ms.	t 28.8K comma en mon are no	and lin th and t in er	e utility to year. Use glish. Sim	min a displa es the ilar to	t 56K ay a cale 32-bit V	Vindo	Never Expir	t ISDN 128K onth and year, o t month and day Unix/Linux
District Section		Publis	sned by	Dave	Navarro			-	dCAL Home Pa	ige
	_	Ver	sion 1	0		2151			No Registra	tion Required
		24-Ma 99	r- 2,0	36K	Win 95/9	min a	Freev	E3.638	Never Expires	Uninstall Uninstall
GPCountDo	ru	ill cou intime	nt down	n to. It u don'	is very ea	asy to	configu	the w	up to 10 events e download inclu eb page and sel	ect the quick
					nt Porteo	us		GPO	CountDown Hor	ne Page
	Ve	ersion	2.0						Online Registra Availa	
World	99	-Mar- 99 5,300K Win 95/9 min at 28.8K 12		95/98/NT 12 min	\$3	areware Expiratio		Expiration Unknown 6 min at ISI	Install & Uninstall	
Clock	The d	definiti n with	ve mult dozens	of clo	ed, graphic ock faces. Software	al wo	rld clock		a base support, o	on screen life like
		V	ersion	1.0					No Registra	ation Required
PrimeTimeS	vnc	23-N 99	ar- 1	473K	CONTRACTOR OF THE PARTY OF THE		Free	ware	Never Expires	Install & Uninstall ISDN 128K
		A sim Time clock.	button a	ty that and it	sets your automatic	syste	em time onnects	from to the	he Internet. Just NTP server at N	click on the Set MIT and sets you
				by Pr	ime Softv	vare		Prin	neTimeSync Ho	me Page
Cmdtime	22-I <1 An ex	Mar-9 min a	n 1.0 9   49h It 28.8K ely easy he Inter	to us	e freewar	min a	t 56K mand-li	ware ne util Simple	Never Expir	ration Required res   No Install it ISDN 128K zing computer's Protocol. It's
343	desig	ned to	use e	ther s	tandalone Gerasimo	, or in	batch-f	iles, o	r with external sl Cmdtime Home	nedulers.
			-				MIGH		No regar	attan Dagwisad
MR Tech	22-N 1 n Simple (Time	nin at le Net	9 92K 28.8K work Ti	me Pi	rotocol (SI	min a NTP) P Pro	tocol) F	iginall eature	Never Expir <1 min a y written to supp es include: Startu	p minimized to
ClockAlign	systra align	ay. Ali on sta endar	gn on s artup. D to see	tartup ate st what t	optional.	this a	llows you	u to c	opy to your start you don't have t	up folder and re- to keep looking a

	Version 10		TO VENTAGE	No Registration Required					
	18-Mar-99 537		Freeware	Never Expires No Install					
SpaceClock	3 min at 28.8K	1 min	at 56K 1 min at ISDN 128K						
CONTROL OF THE PARTY OF THE PAR	IA Windows 9x clock	k program. It prov	ides a graphic	of the light and dark halves of the					
	earth as seen from	above the North	Pole, with loca	il times for selected cities.					
	Published by	Jim Davis	1	No Home Page Available					
		The second second	THE RESERVE						
	Version 1.1.8			No Registration Required					
	14-Mar-99 120K	Win 95/98/NT	Freeware	Never Expires Install & Uninsta					
	1 min at 28.8K	<1 min a	t 56K	<1 min at ISDN 128K					
	countdown timer to that date of all dates, January 1, 2000. You can set the clock to								
- VOVClock	countdown a number	er of different way	s, and you ca	n place the clock on top of all other					
Section of the last of the las	windows All user o	ntions are stored	as persistent	data. That means, if you set it to					
	display hours to go,	any time you run	the application	n, it will display hours to go, until ye					
	change that option.	Also, where you	place the Y2K	Clock on your Windows desktop w					
			AND THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO I						
	be the same anytim	e you run it. Hurr	y, there's less	than 40 million seconds lett!					
	be the same anytim Published by Carl	e you run it. Hurr	y, there's less	than 40 million seconds left! Y2KClock Home Page					
	be the same anytim	e you run it. Hurr	y, there's less	than 40 million seconds lett!					
	be the same anytim Published by Carl	e you run it. Hurr	y, there's less	Y2KClock Home Page					
	be the same anytim Published by Carl  Version 2.0	CJ Lambrecht	y, there's less	Y2KClock Home Page  No Registration Required					
	Published by Carl  Version 2.0  10-Mar-99 268K	CJ Lambrecht Win 95/98/NT	Freeware	Y2KClock Home Page  No Registration Required  Never Expires Install & Uninsta					
	Published by Carl  Version 2.0  10-Mar-99 268K  2 min at 28 8K	CJ Lambrecht Win 95/98/NT	Freeware	Y2KClock Home Page  No Registration Required  Never Expires Install & Uninsta					
	Version 2.0 10-Mar-99 268K 2 min at 28.8K	Win 95/98/NT 1 min a	Freeware t 56K	No Registration Required Never Expires Install & Uninstall August 128K					
	Version 2.0 10-Mar-99 268K 2 min at 28.8K A multifaceted cloc	Win 95/98/NT 1 min a ck that integrates	Freeware t 56K into the Windo	No Registration Required Never Expires Install & Uninstall 1 min at ISDN 128K Never ONE 95, 98 and NT and uses the proclocks as you want on your					
	Version 2.0 10-Mar-99 268K 2 min at 28.8K A multifaceted cloc Windows time zon screen. Fonts and	Win 95/98/NT 1 min a ck that integrates e information to p colors are adjust	Freeware t 56K into the Windo	No Registration Required Never Expires Install & Uninstall August 128K					
	Version 2.0 10-Mar-99 268K 2 min at 28.8K A multifaceted clowwindows time zon screen. Fonts and much more. And, i	Win 95/98/NT T min a ck that integrates e information to p colors are adjust t is free.	Freeware t 56K into the Windoroduce as ma able, stay on t	No Registration Required Never Expires Install & Uninsta <1 min at ISDN 128K ows O/S 95, 98 and NT and uses the open or not, daylight savings time and the open of					
	Version 2.0 10-Mar-99 268K 2 min at 28.8K A multifaceted clock Windows time zon screen. Fonts and much more. And, i Published by Vice	Win 95/98/NT T min a ck that integrates e information to p colors are adjust t is free. ctoryServices,	Freeware t 56K into the Windoroduce as ma able, stay on t	No Registration Required Never Expires Install & Uninstall 1 min at ISDN 128K Never ONE 95, 98 and NT and uses the proclocks as you want on your					
	Version 2.0 10-Mar-99 268K 2 min at 28.8K A multifaceted clowwindows time zon screen. Fonts and much more. And, i	Win 95/98/NT T min a ck that integrates e information to p colors are adjust t is free. ctoryServices,	Freeware t 56K into the Windoroduce as ma able, stay on t	No Registration Required Never Expires Install & Uninsta <1 min at ISDN 128K ows O/S 95, 98 and NT and uses the open or not, daylight savings time and the open of					
	Version 2.0 10-Mar-99 268K 2 min at 28.8K A multifaceted clock Windows time zon screen. Fonts and much more. And, i Published by Vice	Win 95/98/NT T min a ck that integrates e information to p colors are adjust t is free. ctoryServices,	Freeware t 56K into the Windoroduce as ma able, stay on t	No Registration Required No Registration Required Never Expires Install & Uninsta <1 min at ISDN 128K Dows O/S 95, 98 and NT and uses the ny clocks as you want on your op or not, daylight savings time and lanet.Clock Home Page					
	Version 2.0 10-Mar-99 268K 2 min at 28.8K A multifaceted clock Windows time zon screen. Fonts and much more. And, i Published by Vice	Win 95/98/NT 1 min a ck that integrates e information to p colors are adjust it is free. ctoryServices, c.	Freeware t 56K into the Windoroduce as ma able, stay on t	No Registration Required Never Expires Install & Uninstall & Unins					
Planet.Clock	Version 2.0 10-Mar-99 268K 2 min at 28.8K A multifaceted clock Windows time zon screen. Fonts and much more. And, in Published by Victory Inc.  Version 1.10 07-Mar-99	Win 95/98/NT 1 min a ck that integrates e information to p colors are adjust t is free. ctoryServices, c.  Win 95/98  Win 95/98	Freeware t 56K into the Windo roduce as ma able, stay on t	No Registration Required Never Expires Install & Uninstall 41 min at ISDN 128K DWS O/S 95, 98 and NT and uses the control of t					
	Version 2.0 10-Mar-99 268K 2 min at 28.8K A multifaceted clock Windows time zon screen. Fonts and much more. And, in published by Vice in the control of the	Win 95/98/NT 1 min a ck that integrates e information to p colors are adjust t is free. ctoryServices, c.  24K Win 95/98 K <1 m	Freeware t 56K into the Windo roduce as ma able, stay on t	No Registration Required Never Expires Install & Uninstall All Mere Services Install All Mere Servic					
Planet.Clock	Version 2.0 10-Mar-99 268K 2 min at 28.8K A multifaceted clock Windows time zon screen. Fonts and much more. And, in published by Vice in the control of the	Win 95/98/NT 1 min a ck that integrates e information to p colors are adjust t is free. ctoryServices, c.  24K Win 95/98 K <1 m	Freeware t 56K into the Windoroduce as ma able, stay on t  P  B   Freeware in at 56K have your com	No Registration Required Never Expires Install & Uninstall 41 min at ISDN 128K DWS O/S 95, 98 and NT and uses the control of t					

1-14	Version 3.4		11/2/2014	100	Online Registration Not Yet Available	
	07-Mar- 99	2,303K	Win 95/98/NT	Shareware \$19.50	Expiration Unknown	Install & Uninstall
	14 min	at 28.8K	5 min a	at 56K	3 min at IS sultants, profession	
TraxTime	clock me	taphore a	llows users to pu	inch in and out o ters, disk files, o	nding their time. Its of an unlimited num or viewed on screen	ber of projects.  Memos (of any
	available		Spud City	ly the time entrie	es. A manager's ve	rsion is also

ALCOHOLD !	Version	1.0			No Registration Required		
	04-Mar-99	143K	Win 95/98	Freeware	Never Expires No Inst		
	1 min at 2	1 min at 28.8K		at 56K	<1 min at ISDN 128K		
@ beat	Multimedia Ala digital Internet	arm Cloc t Time. S	ck (can start for example MP3s at bell time) with an Small, good, easy to use and complete free.			alog and	
	Publish		bastian		@ beat Home Page		

A 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100	Version 4.0			No Registration	No Registration Required	
	04-Mar-99 173K	Win 95/98/NT	Freeware	Never Expires	No Install	
	1 min at 28.8K	<1 min a	at 56K	<1 min at ISDN 128K		
Umi Clock	customizable in look Several anime related	and shape. Uses la d themes available	ayered alpha bl	ended images to bu	Vindows NT 4.0. It's fully nded images to build the clock.	
	Published by	El Barto	Un	ni Clock Home Pag	je	

2367	Version	n 4.3			Online Registra Availa		
	03-Mar- 99	247K	Win 95/98/NT	Shareware \$10.00	Expires after 30 Days	Install & Uninstall	
Standard	2 min at	28.8K	1 min a		<1 min at ISDN 128K		
Time Keeper					and margin if error with	h coloulations	

	Version 1.0				Online Registration Not Yet Available	
	01-Mar- 99	501K	Win 95/98/NT	Shareware \$29.95	Expiration Unknown	Install & Uninstall
	3 min at				1 min at IS quence of events by	
HotClock	as a seco Perfect to logo, cho and drop'	ond to a ool for m osing co feature	s long as 24 hou neeting and confe olors, and specif	rs. Graphically perence planning. ying the fill patter lace labels anyw	ime intervals that sporesent any agenda Customize your clorn for each pie segn where on the page w	or schedule. ock by inserting a nent. The "drag ithout retyping.
	- domonto	LL	S. St. St. St. St. St. St. St. St. St. S		HotClock Home Pa	ge

	Version 2.7.3		Get It!		Online Registration Not Yet Available		
	25-Feb- 99	4,100K	Win 95/98/NT	Shareware \$50.00	Expiration Unknown	Install & Uninstall	
TimeCard	26 min at 28.8K				5 min at ISDN 128K		
Timecard	hours and	d wages. employe	Features include e data, earned v	e individual pass	employees (and adi sword protection, di n, task tracking, a pr	rect administrative	
	Publi	shed by E	Bill Staples	I	imeCard Home Pa	age	

CONTRACTOR OF THE PARTY OF THE	Version 4.004				No Registration Required	
	23-Feb-99	130K	Win 95/98/NT	Freeware	Never Expires	Install
	1 min at	28.8K	<1 min a	at 56K	<1 min at ISDN	128K
	computer's t	time with	an NTP server. A	as well as TIM intrusive than	col - for synchronizing orks under Win95/98 E for synchronizing its predecessor Neto	and time over date.
	Publishe	d by On	e Guy Coding	Auto	machron Home Pag	je

	Version	1.0		A STATE OF THE	No Registration Required		
	20-Feb-99	190K	Win 95/98/NT	Freeware	Never Expires	No Install	
TimeMeter	1 min at 28.8K			<1 min at 56K		N 128K	
			vas developed to p mply count the tim		way to count the tir	ne. Load in	
	Published	by Tong	g Naraktisood	Tir	meMeter Home Pag	ge	

T-Minus	Version	on 2.0	TOTAL VE	12 190	Online Registr Avail				
	20-Feb- 99	1,391K	Win 95/98/NT	Shareware \$5.00	Expiration Insta Unknown Unins				
	9 min at 28.8K 3 min at 56K 2 min at ISDN 128K How much time do you have left before the year 2000? What about your mother-in-								
	law's birth	nday? Or	your next vacation? With this handy little tool, you'll know exactly left before the events you define!						
	Published by LoafieWare T-Minus Home Page								

	Version	1.0			No Registration Required			
Millennium Countdown Clock	19-Feb-99	1,900K	Win 95/98/NT	Freeware	Never Expires	Install		
			4 min at 56K		2 min at ISDN 128K			
	Digital clock total hours un	hat shows	the months, days ennium.	s, hours, minute	es, seconds, total day	s, and		
Olook	Publish	ed by JPN	1 Computer	Millennium Countdown Clock Home Pag				

	Versio	n 3.2	₩ Ge	t It!	Online Registr Avail			
	14-Feb- 99	401K	Win 95/98/NT	Shareware \$10.00	Expiration Install & Unknown Uninstall			
	3 min at			at 56K	<1 min at ISDN 128K			
m.	Server Se servers a time. Rar server.	earch a and quic ely if ev	utomatically sca kly finds the one ver is SocketWat	ns through a list that will give yo	handles everything t of more than 100 pour the quickest and he performance of	oublic access time most accurate		
ALCHUM P. S	Publ	ished b	y Locutus ware	So	cketWatch Home	Page		

	Version	on 2.2			No Registr	ation Required			
	11-Feb- 99	2,030K	Win 95/98/NT Freeware Never Expires Install & U						
A SAME OF THE PARTY OF THE PART	13 min :	at 28.8K	4 min a	t 56K	2 min at	ISDN 128K			
The Work Timer	time spent paper, and customiza	on a proje it is much ble interface	ect). It eliminates more accurate!	the need for on New features of from the tray on a project.	in version 2.0 inc y, the ability to wo	e using a piece of clude a ork with projects,			
	Publishe	d by Dave	Beauchemin	The	e Work Timer Ho	me Page			

THE RESERVE OF THE PERSON NAMED IN	Version 3.0		The state of the	No Registration	
<b>D</b> TimeRC	09-Feb-99 873K	Win 95/98/NT	Freeware	Never Expires	No Install
	5 min at 28.8K	2 min a		1 min at ISD	
	Windows 95 time clie servers from around can set every clock ir	the world using the	EXACT time!	With this accurate	reading you
	Published by	Karl Sudar	TimeRC Home Page		

	Versio	n 3.0		Online Registration Not Yet Avai					
SD-2000	03-Feb- 99	2,197K	Win 95/98/NT	Shareware \$20.00	Expiration Unknown	Install & Uninstall			
	14 min a								
			nd converter bas spin-offs.	sed on the star	rdate used in Star Tr				
	Published	d by Misl	h Handwerker	The same	SD-2000 Home Page				

Star Wars	Version 2.0c 03-Feb-99 2,140K 13 min at 28.8K	Win 95/98/NT 5 min a	t 56K	No Registration Required Never Expires Install & Uninstall 2 min at ISDN 128K		
Count- down	the time until the day	Count-down to Star Wars. Based on your system time, it counts down the day Episode 1 comes out. It has cool sounds and graphics as well! ke Witchel cause I thought it would be cool to have.				
	Published by Du	Published by Duke Witchel Star Wars Count-down Home Page				

	Version	1.1			No Registration F	Required		
IntRVal Current Time Contol	02-Feb-99	94K	Win 95/98	Freeware	Never Expires Ins			
	1 min at 2	8.8K	<1 mir	n at 56K	<1 min at ISDN	128K		
	a original alar	m beca	the current sys use you will se most important	t the time to alar	ange it as much as you m and you will set wha	t to do whe		
	Publishe	ed by L	.A.S.E.R	IntRVal Current Time Contol Home Page				

	Version	1.21	APP TO S		Online Registration	Not Yet Available
WB Clock	01-Feb- 99	284K	Win 95/98	Shareware \$15.00	Expiration Unknown	
	2 min at			n at 56K	<1 min at IS	
	anyone wh may reside want to ke	ne in virt no value e. The h ep it on	tually any loc es time and is nard-drive sp	cation on Earth, s respective of ace occupied by	cation dependent alarms, WB Clock is an excelle other people's schedule by WB Clock is very smare not planning on using WB Clock Home Pace	ent choice for es wherever they all, so you might ng it right away.

	Version 1.	.0			No Registration	
ShellTime	28-Jan-99	7K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	Puts an icon in long since you	the sy last re	ystem tray. Hovering booted. You can a	ng over the icor also see the last	gives a tooltip which treboot time.	ch shows hov
			y Matt Cawley ShellTime Home Page			

	Version	1.00		1.11		stration Not Yet	
TBTimer	27-Jan- 99	335K	Win 95/98/NT	Shareware \$5.00	Never Expires Install & Uninst		
	2 min at 28.8K 1 min at 56K <1 min at ISDN 128K						
	for the reg	istered	down timer/cloc version) designe Tbproducts	ed to run in the	r the unregistered title bar of the cu No Home Page A	version, 100 hours rrent application. vailable	

		n 1.00		E		ration Required		
		99 7K	Win 95/98/N					
Java Time	<1 min a	at 28.8K	<1 m	in at 56K		at ISDN 128K		
Protocol	This small	Java star	ndalone applicat	ion reads the c	urrent date and time	ne from a given		
lient (RFC 868)		col server	(RFC 868) and	optionally sets	the date and time	on the local		
ment (iti o ooo)	system.		STOCKE STOCKE	Java Time	e Protocol Client	(RFC 868) Home		
	Publi	shed by A	Andy Brunner	ouvu iiiii	Page	(1.1 0 000) 110		
						Acres la la fin		
	Version	on 1.1			No Regist	ration Required		
	23-Jan-9	9 168K	Win 95/98/N	T Freewa		res   No Install		
	1 min a	t 28.8K	<1 m	in at 56K	<1 min	at ISDN 128K		
Millennium	A tray app	program	for WIN95-98-N	T that allows fa	ast and easy one-c	lick check for		
Tray			nd countdown to	year 2000. Als	o plays your favou	rite sound (.wav		
	file) every					Daniel Daniel		
	Pub	lished by	Utilmind SH	M	illennium Tray Ho	ome Page		
		on 1.0	William OF/OR/A	T Freewa		ration Required res   No Install		
Show	19-Jan-9	99 18K at 28.8K		in at 56K	<1 min	at ISDN 128K		
Internet	A frequence	utility the	at displays the c	urrent Swatch I	Internet Time in yo	ur icon trav. and		
ime	has a built	in time c	onversion tool.	and a water	yo	a. Journal of Carlo		
			ft Side Software	e Sho	ow Internet Time	Home Page		
	1 dollor	ou by Lo	II Oldo Collina.					
TIX TURBER					Online Pegis	tration Not Yet		
	Versio	n 3.1				ilable		
	19-Jan-	4 0 4514	MIL OF IOO INT	Shareware	Expires after 30			
	99	1,345K	Win 95/98/NT	\$79.00	Days	Uninstall		
▲ Track-IT	8 min at	28.8K	3 min	at 56K	1 min at	SDN 128K		
	A professi	onal wind	ows-based softv	ware that allows	s individuals to kee	p track of the tim		
Light	spent on p	rojects a	nd activities while	e working. It e	liminates the need	for paper time		
	sheets. Ju	ist choos	e the appropriati	e project and a	ctivity, click the sta activity. Track time	as work is being		
	done or er	tor the in	formation at the	end of the day	or week in a sprea	adsheet format		
	Can be us	ed with T	rack-IT pro for p	roject workgrou	ups.	addition format.		
		olished by		Tra	ck-IT Light Home	Page		
	1 01	morrou by	201.00					
		0.11			No Pogistro	ion Required		
	Version		Win 95/98/NT	Freeware	Never Expires			
- WE-D-4-	1 min at		<1 min a			ISDN 128K		
WinDate	WinDate v	vill out Tir	me/+Date/+Day/-	+Message in ci	irrent window's titl	e bar. Alarm		
	WinDate will put Time/+Date/+Day/+Message in current window's title bar. Alarm option. New to this version: Day name is now localised to your language. Single exe.							
			rk Dickinson		WinDate Home P	age		
	1 0011011	ou by inc				TEST TO THE		
	Versio	n 1.01			No Regist	ration Required		
		9 30K	Win 95/98/N	T Freewa		res No Instal		
Stop Watch		at 28.8K		in at 56K		at ISDN 128K		
Stop watch	What can	we say i	t's a stop watch.	measuring up	to 100 hours, show	ving hours,		
	minutes a	nd secon	ds. The display v	wraps after 100	hours. A lap featu	re is also include		
			BTT Software		Stop Watch Hon	ne Page		
A SHARE STATE					STREET, CASE			
	Version	n 1.11			No Regis	tration Required		
	12-Jan-9		Win 95/98/N	T Freewa		ires   No Instal		
	1 min	4 20 OV	<1 m	in at 56K	<1 min	at ISDN 128K		
QuickAlarm	A alarm no	ogram in	Chinese Langua	age.It can play	sound by user def	forence Usually		
100000								
	Inonun ala	m mass	age daily, month	low system res	y once at your pre	ici ci ice. Osually		
	popup ala minizes its	rm messa self in tray	y icon and run in  Pumking Meng	low system res	source.  QuickAlarm Hon			

	Version 1.0					No Registrat	ion Requir	ed
	11-Jan- 960	K W	in 95/98/NT	Freewar	е	Expiration	Install U	Inknown
	99 6 min at 28.8		2 min a	+ EGV		Unknown 1 min at I	100000000000000000000000000000000000000	
TimeLeft					ing Win	amp skins to sh		
	counts how mi	ch tir	ne (vear mor	the days	hours r	ninutes and sec	onds) is le	ft to (or
						y or your project		
	can customize				t, icon,	etc.		
	Published I	by Ne	sterSoft		Tir	neLeft Home P	age	
			NAME OF THE OWNER, WHEN					
						Online Regist	ration No	Yet
	Version 1.0						lable	
	07-Jan- 678	KW	in 95/98/NT	Sharewa \$10.00	re	<b>Expiration Unk</b>	nown	Install
SysClock	99 4 min at 28.8		1 min a			1 min at I	SDN 128K	Secretary Sec.
					s You	can define an al		
	reached, it play				J. 104 .	our donne un di	ditti dillo.	***************************************
	Published by				Sy	Clock Home F	age	
A - 50 Maria A - 10								
	Version 0.4	4			Onlin	e Registration	Not Yet A	vailable
	07-Jan-99 1,4	1000	Win 95/98 S	hareware	25.77	iration Unknow	1 90	Install
Total Timer	9 min at 28.8	2000	3 min at	\$10.00		2 min at ISI		
70000					compu	ter has been on		in
	System Tray.	· vviii	silow you not	violig your	compa	ici ilas beeli eli	ioi. Italia	
	Published I	hy Ra	dek R		No H	ome Page Avail	able	
		7						-
				TABLE !				
	Version 2.0			T		No Registra		
Y2K	07-Jan-99 1,8	73K			ware I	Never Expires		
Countdown	12 min at 28	.8K	4 mi	n at 56K	Halina	towards 2000 v	ISDN 128	K of all
9	new legal and t	or a p	cal tine Impr	oved interf	ace too	lowards 2000 v	vitri dozeni	s or all-
			aulay McCol			ountdown 99 l	lome Pan	0
	r ublished by	IVIac	aulay Miccol		TEIT	ountdown 55 i	Torne r ag	
	6.0							
	Version 1.						tration Re	
	06-Jan-99 2		Win 95/98		reeware			Install
Timer	1 min at 28.			min at 56K			at ISDN 1	
	A simple clock	and t	mer applicati	on. Display	s analo	g and digital clo un once or mult	cks in 24 r	iour time
			James Ryan	alaillis Wil	ICIT WIII I	Timer Home		
	Publishe	d by	James Ryan			Tillier nome	rage	
		_						
	Version 1.5	2		10,20	118	Re	gister Nov	
	Version 1.5		Win 95/98/N		ware	Expires after		Install
TweakEzv	05-Jan-99 190	OK		\$19	ware	Expires after	30 Days	
TweakEzy	05-Jan-99 190 1 min at 28.8	OK K	<1 m	\$19 in at 56K	.95	Expires after	30 Days	8K
TweakEzy	05-Jan-99 190 1 min at 28.8 A tiny yet yery	K hand	<1 m	in at 56K	.95 stem tim	Expires after	30 Days	8K et
TweakEzy	05-Jan-99 190 1 min at 28.8 A tiny yet very laccess. Ideal fo	K handy or cor	<1 m y utility for correcting time d	in at 56K recting sys	tem tim	Expires after	30 Days	8K et
TweakEzy	05-Jan-99 190 1 min at 28.8 A tiny yet yery	K handy or cor stay	<1 m y utility for correcting time of accurate to y	in at 56K recting systrifts less the	tem tim an 1 mi	Expires after	30 Days at ISDN 12 uire Intern Clocks, da	8K et
TweakEzy	05-Jan-99 190 1 min at 28.8 A tiny yet very access. Ideal fo stamps etc. will	K handy or cor stay	<1 m y utility for correcting time of accurate to y	in at 56K recting systrifts less the	tem tim an 1 mi	Expires after <1 min a e. Does not req nute per week.	30 Days at ISDN 12 uire Intern Clocks, da	8K et
TweakEzy	1 min at 28.8 A tiny yet very access. Ideal for stamps etc. will Published by R	ok handy or cor stay RealE	<1 m y utility for correcting time of accurate to y	in at 56K recting systrifts less the	tem tim an 1 mi	Expires after <1 min a e. Does not req nute per week. weakEzy Home	30 Days at ISDN 12 uire Intern Clocks, da Page	8K et te/time
TweakEzy	05-Jan-99 190 1 min at 28.8 A tiny yet very access. Ideal for stamps etc. will Published by R	K handy or cor stay RealE	<1 m v utility for cor recting time d accurate to v zy PC Utilitie	in at 56K recting sys rifts less the vithin seconds	stem tim lan 1 mi nds.	e. Does not req nute per week.	30 Days at ISDN 12 uire Intern Clocks, da Page	8K et te/time
	05-Jan-99 199 1 min at 28.8 A tiny yet very access. Ideal for stamps etc. will Published by R  Version 1. 02-Jan-99	handy or cor stay RealE	<1 m / utility for correcting time d accurate to v zy PC Utilitie Win 95/98	in at 56K recting systrifts less the vithin seconds	stem time ian 1 minds.	Expires after  <1 min a e. Does not req nute per week.  weakEzy Home  No Regis Never Exp	30 Days at ISDN 12 uire Intern Clocks, da Page	8K et te/time
Millenium	05-Jan-99 190 1 min at 28.8 A tiny yet very access. Ideal for stamps etc. will Published by R  Version 1. 02-Jan-99 <1 min at 28	handy or cor stay RealE	<1 m / utility for correcting time d accurate to v zy PC Utilitie Win 95/98	\$19 in at 56K recting systrifts less the vithin seconds	stem time ian 1 minds. Tv	Expires after  <1 min a e. Does not req nute per week.  veakEzy Home  No Regis Never Exp <1 min	at ISDN 12 uire Intern Clocks, da Page tration Re- ires No	8K et te/time
	05-Jan-99 190 1 min at 28.8 A tiny yet very access. Ideal for stamps etc. will Published by R  Version 1. 02-Jan-99 <1 min at 28	handy or cor stay RealE	vitility for correcting time di accurate to vizy PC Utilities  Win 95/98	\$19 in at 56K recting systrifts less the vithin seconds	stem time an 1 minds.  To receware (	Expires after  <1 min a e. Does not req nute per week.  weakEzy Home  No Regis Never Exp	at ISDN 12 uire Intern Clocks, da Page	et te/time quired o Install 28K minutes

Khronos	Version	on 1.0	BULLET		Online Registr Avail			
	01-Jan- 99	1,568K	Win 95/98/NT	Shareware \$11.48	Expiration Unknown	Install & Uninstall		
	10 min at 28.8K 3 min at 56K 2 min at ISDN 128K							
	Khronos o customiza	displays table. Also	the date and time in a small window on your desktop. Fully so chimes on the quarter hours. Complete install/uninstall capability.					
	Publis	shed by S	teve Berst		Khronos Home Pa	ge		

	Version	n 3.07			Online Registra Availa	
Millennium	01-Jan- 99	281K	Win 95/98/NT	Shareware \$1.00	Expires after 30 Days	Install & Uninstall
	2 min at	28.8K	1 min	at 56K	<1 min at IS	
	don't like system ic change th looks just window. \ Requires	on tray. ne displa like sor Nith the the VB	Two display type ay from regular, very from regular, very from the clocks. It cool appearence 5.0 Runtimes.	can change it to es can be chose which is the orig You can also n e, it makes your	ennium, or the year of 2000. It resides on yen eregular and digital inal display, to Digital nake the Millennium ar desktop neat and pro	our desktop and il. You can Display, which always-on-top ofessional.
	Publish	ned by 1	Γien-Hao Lan		Millennium Home Pa	ge

∝®  Atom Time	Version	2.1a			Re	gister Now
	21-Dec-98 50	509K	Win 95/98/NT	Shareware \$15.00	Never Expires	Install & Uninstall
Atom Time 98	3 min at 28.8K 1 min at 56K 1 min at ISDN 128K					
		onize y	our PC clock with e sequel to the h	ighly rated Ato	mTime95.	Boulder, Colorado.
			uce Adelsman	At	tom Time 98 Hor	ne Page

	Version 1.8			No Registration	Required				
Mile in a large recent	21-Dec-98 64K	Win 95/98/NT	Freeware	Never Expires					
	<1 min at 28.8K <1 min at 56K <1 min at ISDN 128K								
TeaTimer	A small timer applica messagebox when the for serveral minutes three ways to display the icon in the systra support installed on y	ne timer stops. You or start a countup. If the timer progres by area and third or	with TeaTimer s, first a standa ne of four 3D dis TeaTimer.	ner to a specified time you can choose frought and Windows progress splay types. You need	ne, let it run m one of ssbar, second ed OpenGL				
50 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Published by A	rndt Teinert	Te	aTimer Home Page					

	Version 1.0			No Registration	
Clock9X	20-Dec-98 10K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28.8K	<1 min a		<1 min at ISDN 128K	
	A really cool program MM/DD/YY format. Visual Basic.	m that will display the Great to put in your	starup menu, k	ots of options, code	d in Microsoft
	Published by Ja	Home Page Availab	ole		

<b>□</b> TalkClock	Versio	n 1.01			No Registr	ration Required	
	05-Dec- 98	1,100K	Win 95/98/NT Freeware Never Expi		Never Expires	Install & Uninstall	
	7 min a	t 28.8K	2 min at 56K 1 min at ISDN 128				
	at the pust	of a butto can be mi	6/98/NT program on. TalkClock is v nimized and still r	ery easy to u un in the bac	se with its simple kground without	taking up your	
					TalkClock Hom	e Page	

Published by George Callow

TalkClock Home Page

NukeTime	Version	on 2.1		Carrie Charles	Online Registr Avail			
	30-Nov- 98	1,500K	Win 95/98/NT	Shareware \$20.00	Expiration Ins Unknown Uni			
	9 min at 28.8K 3 min at 56K 2 min at ISDN							
	synchroni for Win98 synch. at	Taskland any inter	ous functions allowing a precise and reliable easy to use way to ur PC or (NT) Server with internet or telephone time services. Supp laner plus build-in taskplaner for unattended operation. Autom. time sternet or e-mail session.					
	Publi	shed by I	MicroLogic	N	NukeTime Home Page			

	Version 1.01			No Registration	Required	
NewYear	29-Nov-98 38K	Win 95/98	Freeware	Never Expires	No Install	
	<1 min at 28.8K		at 56K	<1 min at ISDN 128K		
	A tiny system tray acce year.	ssory, which s	The state of		200	
	Published by Popco	rn Software		NewYear Home Page		

Towards- 2000	Version 1.1	1			No Registration	Required
	29-Nov-98	37K	Win 95/98	Freeware	Never Expires	No Install
				at 56K	<1 min at ISI	
	A tiny system tra 2000. Ideal for sy	y acce	essory, which s administrators	shows a tooltip adhering to Y2	counting down the da K projects.	ays to the yea
	Published by P	орсо	rn Software	Tow	vards-2000 Home Page	

	Version 1.11		Andrew Co.	No Registration	Required
Xmas -	29-Nov-98 38K	Win 95/98	Freeware	Never Expires	No Install
Christmas	<1 min at 28.8K	<1 min	at 56K	<1 min at ISE	
	A tiny desktop tray according away from Christmas.	essory, which			
	Published by Popcor	rn Software	Xmas - Chi	mas - Christmas Day Countdown Timer Home Page	

- II (figure)	Version	2.5	The Street		Online Registration Available	Not Yet
Big-Time Clock	26-Nov-98	33K	Win 95/98/NT	Shareware \$6.75	Expiration Unknown	No Install
	<1 min at			<1 min at ISDN		
	time in bold customizab	l, clevi	erly handcrafted d or flashing colo	numerals on th	hich displays your compu e center of your screen ar	nd a
	Publis	hed by	B. Carley	Big	g-Time Clock Home Pag	е

	Version 1.6				Online Registr Avail		
	23-Nov- 98	323K	Win 95/98/NT	Shareware \$10.00	Expiration Unknown	Install & Uninstall	
TimeKeeper	2 min at	min at 28.8K 1 min at 56K			<1 min at ISDN 128K		
0	Will track the amount of time spe the real billing cost of a project. Y spent hooked onto your Internet Published by Program-Action			ou can even use provider. Require	e it to figure out the	accumulated time mes.	

The Good Morning Program	Version 5.0 22-Nov-98 1,249K 8 min at 28.8K	Win 95/98/NT Freeware 3 min at 56K		No Registration Required Never Expires Install & Uninstal 1 min at ISDN 128K	
	Says "Good Morning" Evening" in the eveni Published by <b>Jona</b>	ng, "Good Night"	"Good Afternoon" in the afternoon, "Good		

	Version	n 4.00	70 80 -	ar (Mag)	Online Registration Not Ye Available	
	21-Nov- 98	2,860K	Win 95/98/NT	Shareware \$15.00	Expires after 14 Days	Install & Uninstall
	18 min at 28.8K		6 min	6 min at 56K		DN 128K
T EZ-Timer	from either the time robox, laund set to auto and text sability to utelephone put in any	from either timer or sto the time reaches 00:0 box, launch a program set to automatically re and text size/font/colo ability to use comman		is. Any combiner can play a so our PC, or rest properties of by adjusted. Vents and you can 3.01, you callimer displays.	need to count up or down to an handy 32-bit utility lets you select ation of five things can happen whe und, pop up a customizable dialog art your PC. The timer can also be the time display (background color rsion 3.01 adds new features like the now register over the Internet or an also select which icon you want	
	Development EZ-Timer Home Page					

OF BUILD	Version 0.99				No Registration Required		
	21-Nov-98	1,400K	Win 95/98/NT	Freeware	Never Expires		
SER IN PLICATO	O t4 20 0V		3 min at 56K		2 min at ISDN 128K		
JX PHOTO	will display a ANIMATION in the background. Play your MP3 files at chime to						
	Publis	shed by Je	ffrey Xuan	JX PHO	TO CLOCK Home I	Page	

	Version 1.0		with the		Online Registration Not Yet Available	
	18-Nov- 98	3,589K	Win 95/98/NT Shareware \$20.00		Expiration Unknown	COLUMN TO SERVICE AND ADDRESS OF THE PARTY O
	22 min at 28.8K		8 min at 56K		4 min at ISDN 128K erson to track the number of hours	
Time Tracker	that they sup to twentare calculations for the cost per head format for	spend wor ity different ated for a the accou our. This r every 6 later retri	rking on different nt accounts. Each total per day and nt per day. The to gives you a total	account/project account is self each account otal hours are to cost for the we are is stored in a erupgrades with	tts per day. The program lectable by a radio button is calculated separately then taken and multiplied bek. Charges are increme Microsoft Access 7.0 da	supports  n. The hours for a total of against a ented in .1 atabase

BarClock	Version 2.1			No Registration Required	
	16-Nov-98 361K	Win 95/98/NT	Freeware	Never Expires	No Install
	2 min at 28 8K	1 min at 56K		<1 min at ISDN 128K	
	have a special window	w always on top or played in the activ always have the tir	maintain the ex e title bar of the me under your e	It to do this, you don't need to xplorer's task bar visible. In fact, active window. This software is eyes, just put the executable file	
	Published by Guil	laume Brocker	Ba	rClock Home Pag	e

TimeZone	he display is comp	<1 min a you three clocks act allowing it to load it send me on Alexander K Win 95/98 4 min as the time in the ld support and provided in the load of the control of the	at 56K s that show U hide in the c and e-mail te  Freeware at 56K 4 main US ti	<1 min a OTTC, Local and a discorner of the monitive elling me what you UTC Clock Hom No Registra Never Expires 2 min at me zones. The nes	or. The program is think. le Page ation Required Install & Uninstall
TimeZone	his program gives he display is compree but if you down Published by Jas  Version 1.1.3  14-Nov-98   1,7471  11 min at 28.8K his program shows lave 'round the wor Published by Technology	you three clocks act allowing it to load it send me on Alexander  K Win 95/98 4 min s the time in the ld support and p	Freeware at 56K	OTC, Local and a dicorner of the monite billing me what you UTC Clock Hom  No Registra  Never Expires  2 min at me zones. The ne	esired time zone. or. The program is think. the Page ation Required Install & Uninstall ISDN 128K
TimeZone	Published by Jas  Version 1.1.3  14-Nov-98   1,7471  11 min at 28.8K  This program shows  ave 'round the wor  Published by  Technolo	wact allowing it to load it send me on Alexander  K Win 95/98 4 min s the time in the ld support and p / Victor	Freeware at 56K	No Registra Never Expires 2 min at me zones. The nes	or. The program is think. le Page ation Required Install & Uninstall
TimeZone	Version 1.1.3 14-Nov-98   1,747 11 min at 28.8K his program show: ave 'round the wor Published by Technolo	Min 95/98 4 min is the time in the ld support and p	Freeware at 56K	No Registra Never Expires 2 2 min at	think. the Page ation Required Install & Uninstall ISDN 128K
TimeZone h	Version 1.1.3 14-Nov-98   1,747 11 min at 28.8K his program show; ave 'round the wor Published by Technolo	Win 95/98 4 min s the time in the ld support and p	Freeware at 56K	No Registra Never Expires 2 min at me zones. The nex	ation Required Install & Uninstall ISDN 128K
TimeZone	Version 1.1.3 14-Nov-98   1,747 11 min at 28.8K his program shows ave 'round the wor Published by Technolo	Win 95/98 4 min s the time in the ld support and p	at 56K 4 main US ti	Never Expires 2 min at me zones. The nex	Install & Uninstall ISDN 128K
TimeZone	14-Nov-98 1,747 11 min at 28.8K his program shows ave 'round the wor Published by Technolo	s the time in the	at 56K 4 main US ti	Never Expires 2 min at me zones. The nex	Install & Uninstal ISDN 128K
TimeZone	14-Nov-98 1,747 11 min at 28.8K his program shows ave 'round the wor Published by Technolo	s the time in the	at 56K 4 main US ti	Never Expires 2 min at me zones. The nex	Install & Uninstal ISDN 128K
TimeZone	11 min at 28.8K his program shows ave 'round the wor Published by Technolo	s the time in the	at 56K 4 main US ti	2 min at me zones. The nex	ISDN 128K
SAVcalendar	his program shows ave 'round the wor Published by Technolo	s the time in the ld support and p Victor	4 main US ti	me zones. The nex	
SAVcalendar	Published by Technolo	Victor	erhans even	THE PARTY OF THE P	kt version should
	Technolo		oupo oron	an atomic clock s	ync feature.
				TimeZone Home	Page
	Version 4.6	gies			
	Voreign 4 A		19:45		
					tion Required
	07-Nov-98 900			Never Expires	Install & Uninstall SDN 128K
		2 min at	t day it is on	a certain date from	1998 to 2010
	Published I		Luay IL IS OII	SAVcalendar Hom	e Page
	Published	by SAV		Avcalendar nom	le l'age
	Version 1.20	W WE OF ION	WHIT I For		gistration Required Expires Install
	04-Nov-98 1,360 8 min at 28.8K		min at 56K		Expires Install in at ISDN 128K
- Moganot A	emall clock when			inimized. When mi	nimized it displays
Meganet A	he current date an	d time Very use	ful when doi	ng reports etc. and	you need to know
	he current date! W	hen maximized i	t displays the	e time in 24hr forma	at, and the date in
lo	ong format. Can be	easily uninstalled	ed with the a	dd/remove options	in control panel.
	Published by	Joel Andrews		Meganet Clock	Home Page
	Version 1.7				tration Required
0	3-Nov-98 870K	Win 95/98/NT	Freeware		Install & Uninsta
	5 min at 28.8K	2 min a	at 56K	1 min a	at ISDN 128K
Timer	simple timing pro	gram. Created to	nelp when t	taking on-line tests	that shows as the
	nioutee/eaconde co	unt down When	n the time is	up, a wav file calle	that shows as the
	played and a splash	screen is displa	aved. Pretty	simple app to write	, but did learn a fev
tt	hings in Delphi. So	urce available u	pon request.		
	Published by Sco			Timer Home I	Page
					FFD_FFEE VA
RESTRUCTION OF	Version 2.0				n Not Yet Available
4	29-Oct-98 537K	Win 95/98/NT	\$8.00	Expires after 15 Days	Install & Uninsta
1	3 min at 28.8K	1 min at 5	6K	1 min at IS	SDN 128K
	With TonClock you	can get the mos	st exactly time	e from Internet sen	vers with two clicks
TopClock	AITH LODGIOCK AOT	nterface and alla	arm clock fun	ction. Allso the add	ditional options are:
TopClock	t has digital clock in	CONTRACTOR OF STREET, SANSAGE	m winner along	time lenght in ever	v corner of the Wor
TopClock	t has digital clock in he full info about M	oon phases, Su	n rises, day	iorigini iii ovor	
TopClock	t has digital clock in he full info about M and etc.	loon phases, Su			
TopClock	t has digital clock in he full info about M	loon phases, Su		TopClock Home	
TopClock	t has digital clock in he full info about M and etc.	loon phases, Su			
TopClock Vilia	t has digital clock in he full info about M and etc. Published by Toma Version 4.3	loon phases, Su as Rutkauskas		TopClock Home	e Page
TopClock V	t has digital clock in he full info about M and etc. Published by Toma Version 4.3 20-Oct-98 293K	oon phases, Su as Rutkauskas Win 95/98/NT	Freeware	No Registr	e Page ration Required Install & Uninsta
TopClock	t has digital clock in he full info about M and etc. Published by Toma Version 4.3 20-Oct-98 293K	as Rutkauskas Win 95/98/NT	Freeware	No Registr Never Expires	e Page ration Required Install & Uninsta
TopClock VI	t has digital clock in he full info about M and etc. Published by Toma Version 4.3 20-Oct-98 293K	win 95/98/NT 1 min at se SNTP/Time o	Freeware t 56K client synchro	No Registr	e Page ration Required Install & Uninsta

	Version 2.10					ion Required			
	15-Oct-98 77K		Freeware	Never		Install & Uninstall			
Year 2000	<1 min at 28.8K	<1 min	at 56K		<1 min at	ISDN 128K			
Check	Simple Y2K Test to	ool. However, o	tificate	itical tests	s with the ad	ded advantage of			
	printing individual of Published by To		uncate.	ear 2000	Check Hor	ne Page			
	Published by 10	ily Hellers		our zooc	Ollock flor	no r ago			
	Version 1.00				No Regist	ration Required			
		3K Win 95/9			<b>Never Expi</b>				
DigiClock	<1 min at 28.8	< <1	min at 56K		<1 min	at ISDN 128K			
	Get ready to try the	e most simple	clock ever m	ade! It ha	s two function	ons: Current time			
	and date. To quit,		No H	ome Page A	vailable				
	Published by B	ertii Svenaser		NOT	onie rage A	valiable			
	Version 1.0			Online R	egistration	Not Yet Available			
	12-Oct-98 1,000	K Win 95/98		Chelled O Pelester Co. To.	-	Install & Uninstall			
	6 min at 28 8K	2 min a	t 56K		1 min at ISI				
Lap Timer	This program man	ually times un	o four race o	ars, keep	oing track of	last lap, fastest lap			
	This program manually times up to four race cars, keeping track of last lap, fastest lap time and lap number and average lap time. It can be customzed for car descriptions, track location, date and session. All sessions can be saved for later printing.								
	track location, date	and session.	All sessions	can be sa	aved for later	r printing.			
	Published by Software			Lap T	imer Home	Page			
	Contware	, 1110.		00.70		III DE N			
	Version 1.0					stration Required			
	12-Oct-98 8H			Freeware Never Expires No Install					
Timer	<1 min at 28.8K	<1	min at 56K		<1 mir	at ISDN 128K			
Timer	This very simple p chronometer. You	rogram snows	me anything	voll want	from the tin	ne vou're online to			
	how long you're pl	aving Quake.	ne arryuning	you want	, moin the th	no you to ormino to			
		Wim Heirman	1		Timer Home Page				
	1 donorios sy			400					
	Version 3.08			C	nline Regis	tration Not Yet			
						ilable			
	10-Oct- 950K V	Win 95/98/NT	Shareware \$89.00		xpiration Inknown	Install & Uninstall			
Power	98 6 min at 28.8K	2 min a		,		ISDN 128K			
Clock	Employee Time-cl	ock Email Mu	Iti-site comm	unication	s. Employee	timeclock. Export t			
	Quickbooks Auto-	Sync of data a	mong differe	nt locatio	ns. Small ar	nd fast. Runs on any			
	Windows PC. Cus	tomizable secu	rity for all fe	atures. W	ide array of	reports.			
	Published by Re		incy in our contract		Clock Home				

	Version	1.3.0	and the same		Online Registration	
	09-Oct- 98	3,267K Win		areware 19.95	Expiration Unknown	Install & Uninstall
	20 min a	t 28.8K	7 min at 5	56K	4 min at IS ur computer system	
- CILIM	atomic cloc	ck over the Inte	ernet Clock	Watch quer	ies one of the NIST made on demand,	timeservers, which

	Version 1.25		TE WIND		Online Registration Not Ye Available	
	09-Oct- 98	5,400K	Win 95/98/NT	Shareware \$49.99	Expires after 30 Days	Install & Uninstall
	34 min	at 28.8K	12 min	at 56K	6 min at ISI	DN 128K
TimeClock Lyte	comment	s. Allows	tracking time by	department, lo	cation, or type of hou ar employee or depart	rs. Particular

- 24 1	Versio	n 3.7		Marie Control	Online Registration Not Yet Available Expires after 30 Install & Days Uninstall		
	01-Oct- 98	247K	Win 95/98/NT	Shareware \$10.00			
Standard	2 min at	28.8K	1 min	at 56K	<1 min at IS		
Time Keeper	corrects to on the dis	he time screpan tact the elephon	discrepancy to a cy tendency at the e official cesium a e bill. STK count	0.01 second note time of synchologic master of eracts boot time	of the official master clock.And STK nargin if error with calculations base ironization. So it is not necessary to lock every day. This saves you more deviation and accurately corrects		
ELLER TO SERVICE	Pu	blished	by Tamie	Stand	ard Time Keeper Home Page		

	Version 2.0				No Registration Required		
	28-Sep- 98	1,933K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall	
Contract to the second	12 min a	at 28.8K	4 min a	t 56K		ISDN 128K	
Countdown	Weeks to g	n or off and d system	iral display which urn of the millenni d displayed as to icon tray and can	um. Many op tals or as rem	tions - Weeks, Se naining time. Res	ides on your	

	Version '	1.0			No Registration Required		
= =	27-Sep-98	131K	Win 95/98/NT	Freeware	Never Expires	No Install	
Berlin uhr	1 min at 2	8.8K	<1 min at 56K		<1 min at ISDN 128K		
	This Software	emulates					
	Published by Christophe Gevrey			Berlin uhr Home Page			

	Version 2.0		100	5.	Register Now		
	14-Sep-98	515K	Win 95	Shareware \$10.00	Expiration Unknown	Install & Uninstall	
SIARCG!'s	3 min at 28.8K		1 min at 56K		1 min at ISDN 128K		
Clock	ther Ahhthe soothing tick tockingthe chimes diligently sounding the song they play every fifteen minutes, why not have a Grandfather desktop?				Clock on your		
	Published	by SIA	ACTION OF THE PERSON OF THE PE	SIARC	G!'s Grandfather Clock	Home Page	

Control of the last of	Version	n 1.2				Onlin	e Reg	istration N	lot Yet	Available
	01-Sep- 98	284K	Win 95/98	Sharew \$15.0		Expira		Inknown		
- WD Clock	2 min at	28.8K		n at 56K				min at ISI		
WB Clock	current tim	e in virti	as Timer, S ually any loo s time and is	ation on I	Earth.	WB Cld	ock is	an exceller	nt choice	e for
	Publishe	ed by A.	Grishin		110	WB C	lock I	lome Page	е	
							100			
	Version	0.98				Online	e Rea	istration N	lot Yet	Available
DotMatrix	The state of the s	-	Win 95/98	Sharev \$10.		-		xpires		Install
Digital	1 min at	28.8K	<1 m	in at 56K			<1	min at ISI	N 128	
Clock	Many featu	ures. Us	k under win er Define Co	olor, Size				-		
	Published	by Jatu	porn Panja		DotN	latrix D	igital	Clock Ho	me Pag	е
7 7 7 7 7		alo III	CARL L	Land of	740		. 60	14000		
	Versi	on 1.1						No Regist	ration R	equired
	18-Aug-9		K Win 9	5/98/NT	Fr	eeware		Never Exp		Install
	2 min a	at 28.8K		1 min a	t 56K			<1 min a	at ISDN	128K
DateTime	connection	eeware	Windows 95	6/98/NT u	tility th	at allow	ne. It's	puter user	s with a	in Interne
DateTime	connection just a few Date/Time easily upd	eeware to accu clicks of host. Y ate your	Windows 95	neir system e you can pare new ettings wi	tility the m date fetch value	at allow e and tir the curr s with y y, correct	ne. It's rent da our sy ct valu	puter user s easy to u ate and time stem data	rs with a se and the e from a and tim	in Interne fast. With an Interne
DateTime	connection just a few Date/Time easily upd	eeware n to accu- clicks of host. Y ate your ished by	Windows 95 urately set the your mouse ou can come PC clock se	neir system e you can pare new ettings wi	tility the m date fetch value	at allow e and tir the curr s with y y, correct	ne. It's rent da our sy ct valu DateT	puter users easy to use and time stem data es. ime Home	rs with a se and the from a and time	in Interne fast. With an Interne e. You ca
DateTime	connection just a few Date/Time easily upd Publ	eeware n to accu- clicks of host. Y ate your ished by	Windows 95 urately set the your mouse ou can com. PC clock so y PrimaSoft  Win 95/9	6/98/NT uneir system by you can pare new lettings with PC	harew \$9.9	at allow e and tir the curr s with y y, correc	ne. It's rent da our sy ct valu DateT Onl	nputer users easy to use and time stem data es. ime Home ine Regisi Avai es after 30 Days	s with a se and the from a and time. Page tration liable Insurance University Control of the con	in Interne fast. With an Interne e. You ca Not Yet stall & hinstall
DateTime	connection just a few of Date/Time easily upd Publ	eeware n to accu- clicks of host. Y ate your ished by n 1.11 1,477k	Windows 95 rately set the your mouse ou can come PC clock set or PrimaSoft  Win 95/9	5/98/NT uneir system by you can pare new ettings with PC	harew \$9.9	at allower and tirthe currist with y, correctivate by the currist ware to the currist ward ware to the currist ware to the cur	ne. It's rent da our sy ct valu DateT  Onl	puter users easy to use and time stem data es. ime Home ine Regist Ava es after 30 Days	s with a se and the from a and time. Page tration liable Un	n Interne fast. With an Interne e. You ca Not Yet stall & install
DateTime InterTime 98	connection just a few Date/Time easily upd. Publ  Versio  10-Aug- 98 9 min a Using NTF- clock to wi SmartSeal ModemSp between w designed fi product yo you couldn'	n 1.11  1,477H  28.8K  Server ithin 200  y for Apy  whether for Windo  ou can be  n't ask for	Windows 95 urately set the your mouse ou can come PC clock so y PrimaSoft  Win 95/9 s located from which you to located from you to located plications all you are online ows 95 and uy. It's easy	s/98/NT uneir systems of you can pare new ettings with PC 8/NT Smin at 5 m around ate a time lows you need to the systems of accurate a time lows you need to the systems of a system of a sy	harew \$9.9 66K I the wracy. serve to school.	ware 5 world, In Advancer within edule comore restitic and	one. It's rent da our sy ct valu DateT  Onl  Expire  tterTimed fear your ellock urend or and or good	ine Registary and incomplete Registary and inc	rs with a se and the form a and time Page tration ilable Instruction SDN 12 ate your Server Cry and e stingushons. Core clock for under	n Interne fast. With an Interne e. You ca  Not Yet  stall & linstall lisk r system heck and ven city! ing npletely sync
InterTime	connection just a few Date/Time easily upd. Publ  Versio  10-Aug- 98 9 min a Using NTF- clock to wi SmartSeal ModemSp between w designed fi product yo you couldn'	n 1.11  1,477H  28.8K  Server ithin 200  y for Apy  whether for Windo  ou can be  n't ask for	Windows 95 rately set the your mouse ou can come PC clock so y PrimaSoft  Win 95/9 s located from milisecond on milisecond on you to locate plications all you are onlinows 95 and you, It's easy or more!	s/98/NT uneir systems of you can pare new ettings with PC 8/NT Smin at 5 m around ate a time lows you need to the systems of accurate a time lows you need to the systems of accurate a time lows you need to the systems of accurate a time lows you need to the systems of the sys	harew \$9.9 66K I the wracy. serve to school.	ware 5 world, In Advancer within edule comore restitic and	one. It's rent da our sy ct valu DateT  Onl  Expire  tterTimed fear your ellock urend or and or good	ine Registary and the can updates, disn country pdates, disn connection any other looking. For	rs with a se and the form a and time Page tration ilable Instruction SDN 12 ate your Server Cry and e stingushons. Core clock for under	n Interne fast. With an Interne e. You ca Not Yet stall & linstall lask r system heck and ven city! ing npletely sync
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	07-Aug-98 1,900K	Win 95/98/NT	Freeware	Never Expires		
Time (DeskTop Clock)	12 min at 28.8K A small border-less wind change the location, for available are countdown announce the time on the have the sound files).	4 min a dow that shows you t, Display style, and timer, countdown	our system time nd colors, in 12 n alarm, and ala our with chimes	or 24 hour format. A arm clock. "Time" wi at the 1/4 & 3/4 hou	ou may Also II ır, (if you	
	Published by Dan	iel Campau	Time (Des	eskTop Clock) Home Page		

	Version 1.00a				No Registration Requi		
- 11 - 0000	23-Jul-98	272K	Win 95/98/NT	Freeware	Never Expires		
Up To 2000	2 min at 28 8K		1 min at	1 min at 56K		N 128K	
	A very small	applicati	on that tells you th	e number of d	ays remaining to the	e year 2000.	
	Published	by Alba	ni iperCreation	U	p To 2000 Home Pa	ige	

THE RESERVE	Version 2.0				Online Registration Not Yet Available			
WinActivity	07-Jul- 98	2,200K	Win 95/98/NT	Shareware \$19.00	Expiration Unknown	Install & Uninstall		
for	14 min at 28.8K				2 min at ISDN 128K			
Windows	just playi	ck on the ing game nternet si	s. Generate & pr	working on vari	ous projects, surfing graphs or publish yo	g on the web or our reports on you		
	Published by Pitrinec Software			WinActiv	WinActivity for Windows Home Page			

	Versi	on 3.5			Online Registration	Not Yet Available		
Clock	02-Jul- 98	1,880K	Win 95/98	Shareware \$3.48	Expiration Unknown Install & Uninst			
		at 28.8K		2 min at IS				
	the font, b	backgroud	d color, and f	foreground col ttributes are s	the user's will. The user lor. Another option is to aved.	set an alarm to go		
	1045	rogramm	TameDagger Clock Home Page					

Days	Version 1.0			No Registration	Required
	21-Jun-98   122K	Win 95/98/NT	Freeware	Never Expires	No Install
	1 min at 28.8K	t 56K	<1 min at ISDN 128K		
	Calculates the number calendar for date sele		any two user	selected dates. Use	s a graphical
	Published by Ma	tt Billenstein		Days Home Page	

	Versio	n 6.7	G.MUKA		Online Registration Not Yet Available			
	20-Jun- 98	841K	Win 95/98/NT	Shareware \$25.00	Expiration Unknown	Install Unknown		
	5 min at					ISDN 128K		
♦ YATS32	YATS32 a available A large lis servers a supported	allows y on any st of inte nd time d for so	you to synchroniz TCP/IP network ernational Internet protocols are sume time protocol	ze your system c such as the Inte et time servers is apported. Connec	provided in the H	er of time servers rate UNIX network.		
	Publ	Published by Dillobits YATS32 Home Page						

	Version 0.9b		No Registration Required Never Expires Install & Uninsta		
	16-Jun-98 1,660F				Install & Uninstall
PBXAlarm	10 min at 28.8K Uses your home P you, you tell it which	BX to alarm you. It	works like thi	s: You set the tim	ne you want it to call
	event, calling the e	extension you speci	fied using you	r modem. PBXAlarm Home	

	Version 1.0.98				ration Required
G 0 1001	09-Jun-98 1,495K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
Count98!	9 min at 28.8K	3 min at			
	This is a countdown	to Windows98.	Developed b	y Ricky Girglani.	
	Published by Ric	ky Girglani	Count98! Home Page		

and the state of t	Version 1.0				Online Registration Not Yet Available		
	02-Jun- 98	2,913K	Win 95/98/NT	Shareware \$10.00	Expiration Unknown	Install & Uninstall	
	18 min	at 28.8K	6 min		3 min at ISDN 128K		
CLOX 2000	timezone the intern animated making it	et, newsf world da relly easy	nternet features of lashes and more ylight map, an all y to use.	e. CLOX 2000 is	y to automatically s super-accurate an alendar. Full online	d includes an	
	Publis	hed by M Visual N	LOX 2000 Home P	age			

	Version 2.0	and the second		No Registration Required				
200 / 2785	31-May-98 17K Win 95/98/NT Freeware Never Expires Install & Uni							
	<1 min at 28.8K			<1 min at ISDN 128K				
Whatime	allows you to see was space. It simply pure and applies the dewill work fine on a runtimes, you can computers have the	what time it is in a its an entry on you sired hour and mi ny comuter with V download the full ese runtimes alre as the ability to st	ny time zone, ur task bar tha nute shift to th B 5.0 runtimes program with eady installed, tart automatica	uisness, or family. This program without hogging precious desktop to contains the user specified label, is current time. This small downloads present. If you do not have these runtimes at the homepage. Most so the small download should be fine. ally with any preset configuration.				
	Published by A	ndrew Baker		Whatime Home Page				

	Version	1.0			Register Now		
Clock-O- Matic	28-May-98	539K	Win 95 Shareware \$10.00		Expiration Unknown	Install	
	3 min at 2			nin at 56K	1 min at ISDN 128K		
	the most advi computer geo Published	anced a eks from d by SIA	larm clock tardiness.	available. It's mis	y your bedside, Clock-O-Mat ssion - to protect absent min	ded	
	Software						

	Version		The second second	No Registration Required			
TimeManager	26-May-98		Win 95/98/NT	Freeware	Never Expires		
	2 min at 2	28.8K	1 min at 56K		<1 min at ISDN 128K		
	Controls and	displays	Time and TimeZ s of the windows t	Zone absolutely! The first Program which bring time managment!			
	Publishe	ed by Ma	rtin Bachem	No	No Home Page Available		

InnaMinute	Version	1.0		100	Online Registra Availal	
	25-May-98	14K	Win 95/98/NT	in 95/98/NT Shareware \$10.00	Never Expires	No Install
	Most timers Need to sto	have p surfi withou	way too many fe	atures. Need to now? Click, click	<1 min at ISDN 128K b turn off the oven in five minutes? ck, InnaMinute waits in the tray to rameters or fuss. Put it in your	
	Published by Ed Halley InnaMinute Home Page					

3D Hand Clock	Versio	n 1.0	LUCK E	THIS LAN	Online Registration Not Yet Available		
	21-May-98	1,489K	Win 95/98	Shareware \$10.68	Expires after 14 Days	Install	
	9 min at		3 min at 56K		2 min at ISDN 128K		
	options for t	his screen selection	n saver inclu , and passw	rotates, moves, bounces, and hops in 3D space. Some rer include: Color cycling, movement types, color schell password protection.			
		ed by Spo Software		3D	Hand Clock Home Page		

The One Dollar Clock	Version	1.0			Online Registration Not	Yet Available
	30-Apr-98	688K	Win 95/98/NT	Shareware \$1.00	Expiration Unknown	No Install
	4 min at 2				1 min at ISDN 1	
Clock	Displays th	e the	time and the da	k in a user specified format.		
	Publish	hed by	D. Ferrell	Th	e One Dollar Clock Home	Page

	Versi	on 1.1	Water Market To		Online Registration Not Yet Available	
	26-Apr- 98	1,985K	Win 95/98	Shareware \$10.00	Expires after 30 Days	Install & Uninstall
	12 min	at 28.8K	4 mi	n at 56K	2 min at ISDN 128K	
UsageLogger	i.e., by ma two defina time is de can be log zone", Gr emergend	aking the cable "time fined as the gged and/caphical view/normal"	user "login", a zones" a "no ne time in who or protected. ews of last fe usage.	and recording to ormal" and an " lich the compute Features inclu	amount of time the "co the login/logout times. lemergency" time. The ter is "not meant" to b ude: Customizable em s", cumulative values	There can be e "emergency" e used, thus so it ergency "time
		shed by A echnolog	A.A. A.	U	sageLogger Home P	age

THE RESERVE	Version 1.02		B TO THE PARTY OF		Register Now	
TimeEzy :Global Clock	22-Apr-98	222K	Win 95/98/NT	Shareware \$19.95	Expires after 30 Days	Install
		Global C	<1 min clock for Win 95 and click access to ti	nd NT 4.0. An e	<1 min at ISDN 12 exceptionally easy to use used the world. Takes Dayligh	tility
	Savings Ti	me into	account wherever	r and whenever	appropriate. y:Global Clock Home Pa	

	Version 1.3.5			No Registration Required	
Clockit	21-Apr-98 527K	Win 95/NT	Freeware	Never Expires	Install & Uninstall
	3 min at 28.8K	1 min at 56K		1 min at ISDN 128K	
	A timer that totals to it can be minimized file in the program a update fixes minor l	to the system	tray or set "Aldecrement the	lways on Top". You e time displayed or es the <b>VB 5.0 Run</b>	the timer. This times.
	Published by Rich	ard Gelinas		Clockit Home I	Page

GetTime	Version 2.13p3		Get It!		Online Registration Not Yet Available			
	13-Apr- 98	206K	Win 95/98/NT	Shareware \$15.00				
	1 min at 28.8K <1 min at 56K				<1 min at ISDN 128K			
	Would you like to have all the computers on your network synchronized to a common time source? Now you can with GetTime! GetTime runs unobtrusively on Windows 95/NT machines, quitely updating the system clock with a central time source (in this case, another computer on the network). You don't need access to the Internet. However, if you do have access to the Internet, then you can have all the computers on your network synchronized to one of several time servers on the Internet.							
	Publis	shed by	Ken Salter		GetTime Home	Page		

	Version 2.8.32				Register Now	
	15-Nov- 97	3,905K	Win 95/98/NT Shareware \$29.00		Expiration Unknown	Install & Uninstall
	24 min at 28.8K		9 min at 56K		4 min at ISDN 128K	
Global Dialing Assistant	where it is of key loc access to current da maximize	ations you informate ate/time, a the value	and nighttime and u choose. Next,t ion on over 1,600 and high/medium	round the world he International cities worldwid /low-cost calling dditionally, you	ock allows you to s as well as the curre Dialing Guide gives e (including dialing g periods) that will h can reduce costly m	ent date and time s you quick access codes, nelp you

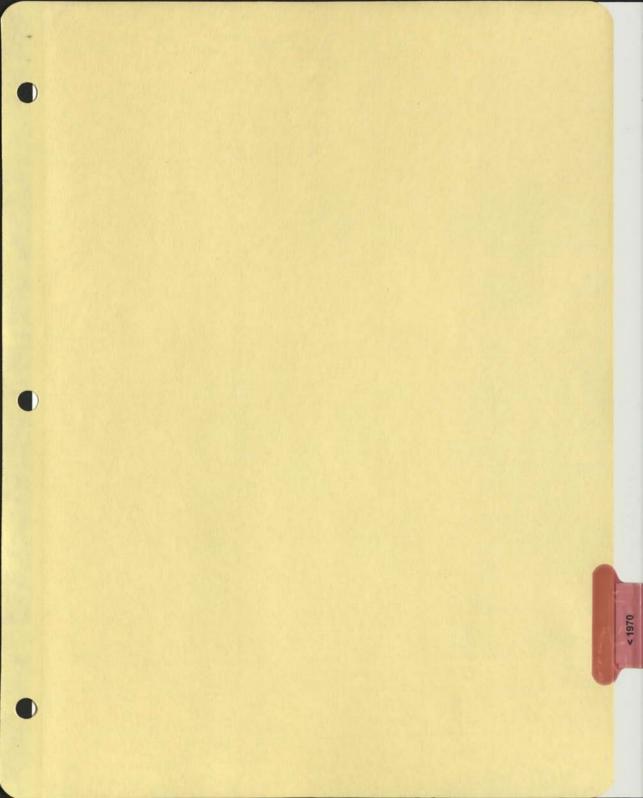
TrayTime	Version 1.5			Register Now			
	17-Oct- 97	774K	Win 95/98 Shareware \$8.00		Expires after 30 Days	Install & Uninstall	
	5 min at	28.8K	2 mi	n at 56K	1 min at ISDN 128K		
	A secondary time zone tray clock. It sits beside the standard tray clock in the Window 95 taskbar/tray area and displays another time zone's time. Very handy for people working together over different time zones, an absolute must for everybody involved with international trade or with friends overseas.						
	Published by Christensen Software TrayTime Home Page						

	Version 1.0				Regist	ter Now	
	15-Aug- 500K Win 95/98/NT Shareware Expiration Install Uninst						
	3 min at 28.8K		1 min at 56K		1 min at ISDN 128K		
	MouseClock is the only cursor enhancement you'll ever need! MouseClock virtually becomes part of your mouse pointer. It stays out of the way, while providing you with the current time and free system resources. MouseClock also features a rate clock and supports 24-hour format. Imagine having all this information right in front of you when you need it. In a professional that gets paid hourly? Why not keep your rates straight with the MouseClock rate clock? MouseClock can stay on top, or be put behind other Windows when you no longer require its use. Easy to use and fully configurable. Another very handy utility from AMF.  MouseClock Home Page						

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Date:
From:
Department:
Location:

January 6, 1959 F. R. Helt, Jr. Applied Programming

CC

To:
Department:
Location:

Miss C. M. Maar Commercial Systems Development WHO

Subject and/or Reference:

Conversion of Calendar dates to days of the Year

I saw a request in Sales Currents for information on the subject application, and I've worked out a formula which may be of some help. The formula is:

where:

N is the result of the computation. The integer parties of N, without rounding, is the day of the year.

M is the number of the month, from 1 to 12.

D Is the day of the month

K is a constant whose value depends upon the month.

When M = 1 or 2; K = 30.

When M = 3 through 12; K = 32.3.

The above values of K are for a non-leap year. For a leap year, the value remains the same for M=1 or 2, and is changed to 31.3 for M=3 through 12.

frh/ep

F. R. Holt, Jr.

## GENERAL @ ELECTRIC

DIAL COMM 8-433 4967 DATE July 16, 1968 MAIL ZONE C-85

Information Systems

Equipment Division

DEPT. • Medium Systems Department

ADDRESS. Phoenix, Arizona

COPIES

SUBJECT .

P.T. MEMO # 25 Method of Representing the Date

R.W. Bemer OFFICE

 I would like to suggest another possibility for representing the date:

FISCAL YEAR FISCAL WEEK FISCAL DAY

Representation:

Fiscal Year - Last two digits

Fiscal Week - Two digits (01-09 for first 9 weeks)

Fiscal Day - One digit (Monday = 1)

I believe that all of these terms are "well-defined." The composite will be called "The Fiscal Date."

- 2. Some of the advantages
  - A. Preserves descending sequence.
  - B. Preserves notion of "day of week."
  - C. Extendable to hours, minutes, seconds.
  - D. Permits manipulation of fractions of a year in a consistent manner.
  - E. Implicity contains the definition of Fiscal Month and Fiscal Quarter.
- 3. I believe some thought should be given to associated human factors problems. Specifically, how do you write the date, i.e. with or without separators and how do you say such numbers?

Suggest using the "blank character" between each entity:

68 28 5

for easy reading.

R.W. Bemer

July 16, 1968

Page 2

We would say it

Sixty-eight Twenty-eight Five.

 For appending hours and minutes, it is suggested that a colon separator be used.

Noon, for example, would be

68 28 5:1200

 There is no particular problem in converting from this date form to day of year.

The formula is

Day of Year = 
$$FW * 7 + FD + K - 7$$

One must carry a different K around in his head for each FY (e.g., K=0 for 1968) but I do not envision this as any great burden.

The reason this formula is suggested rather than

$$DOY = (FW-1) * 7 + FD + K$$

is

- a. The FW is already "written down" and it is easy to multiply by seven rather than either mentally or physically writing down FW-1 and then multiplying by seven.
- b. Rather than the annual factor being "K", it will resolve into "(K-7)." Then one subtracts off this entity from FD to get a number to add to FW * 7.
- 6. The conversion from Fiscal Date to the Gregorian Date, and from the Gregorian Date to Fiscal Date, must take place through a table of 12 values, whose origin is different for each FY.

R.W. Bemer

#### a. Fiscal to Gregorian

1) Given the Fiscal Date, compute Day of Year.

Divide Day of Year by 30. The resulting quotient plus one is the Gregorian month.

 To the above remainder, algebraically add the value of ADJ corresponding to the quotient to get Gregorian Day.

uotient	Adjustment (for 1968)
1	-1
2	+1
3	0
4	0
2 3 4 5 6	-1
6	-1
7	-2
8	-3
8	-3
10	-4
11	-4
12	-5

#### Example:

FD = 68 28 5

DOY = 194

 $\begin{array}{r} 6 = \text{quotient} \\ 30 \overline{\smash{\big)}\ 194} \\ \underline{180} \\ 14 = \text{remainder} \\ \text{Quotient} + 1 = \text{Gregorian Month Number} \end{array}$ 

6 + 1 = 7 = July

Remainder + ADJ = Day of Month

14 - 2 = 12 = 12th day

68 28 5 Fiscal Date = July 12, 1968 Gregorian Date

July 16, 1968

Page 4

R.W. Bemer

#### b. Gregorian to Fiscal

- Subtract one from the Gregorian Month number and multiply by 30.
- 2) Add Gregorian Day number to the above product.
- Algetraically subtract ADJ corresponding to Gregorian Month number to the above sum.

This yields Day of Year.

4) Divide DOY by 7 and add 1 to get FW.

5) To the remainder of the above division, add K (K = 0 for 1968) to get FD.

### Example:

Given July 12th, 1968

DOY 
$$180 + 12 - (-2) = 194$$

$$FW = Q [194 \div 7] + 1 = 27 + 1 = 28$$

$$FD = Remainder + K = 5$$

- 7. There is no question that carrying around a different table for each year is a nuisance. Clearly though, the table "pattern" does not change (except for one value in leap year) and all that must be remembered is the K value (origin shift) required for each Fiscal Year.
- 8. The continued use of Fiscal Dates would probably submerge the idea of "monthness" as we now know it. We can already see signs of this in such procedures as

"We get paid on even FW's."

I suspect that such notions as

 $FW \pmod{4} \equiv 0$ 

would start cropping up all over the place.

Programming Technology Engineer

# GENERAL & ELECTRIC

DIAL COMM . 8 *223 -1873

DATE • February 7, 1969

DEPT. . M&PPO

ADDRESS. Bridgeport, Bldg. 28-EW

COPIES. L. B. Cowles

SUBJECT .

Mr. R. W. Bemer Manager - Systems & Software Engineering Integration Engineering & Manufacturing Integration Opn. - AD&RPD Mail Drop C-80 Phoenix



Information

Dear Bob:

Your USASI Trip Report - X3 meeting covered by your letter of January 27, gives me the opportunity to express my strong conviction on a subject which Logan Cowles and others in EMIO have been trying to push on me on the basis that I was out of step with the rest of the world. Please refer to item 5, page 3 'Writing of Dates''. I now see from your minutes that the unorthodox writing of dates by year/month/day is not a world-wide accepted standard for correspondence forms and abbreviations.

I have no objection to the computer industry finding it convenient to use this method in the machine-readable form, but I honestly believe that if our already criticized industry tries to cram this standard down every citizens personal life, we are going to create more adverse reflections on our industry's image than is justified.

I can visualize as you have stated that there may be some instances of difficulty in transcribing human-to-human correspondence to machine form, but I think this is a small price to pay for letting us poor mortals enjoy our habits of many centuries in our normal business and personal lives.

I urge you, therefore, not to take the stand that you have reported in your minutes.

J. H. Sweeney

9

1969 February 17

3409

Engineering and Manufacturing Integration Operation

L. B. Cowles

Mr. J. H. Sweeney, Manager Marketing and Product Planning Operation

Thank you for the opportunity to clarify the situation on the writing of dates, as follows:

- There are no I30 standards; these are only recommendations. Furthermore, a matter of this importance might take several years for a recommendation to be agreed by the country members. What we have reported (and it's true) is that the day-month-year form (which is used by parts of the USA) has been rejected and a new vote is in process for the year-month-day form.
- 2. I assume that your position makes you acutely awars of the problem of reaching international agreements, yet (if I understand you correctly) you would propose that the habit of part of the USA (dissimilar to the Department of Defense and the Armed Services) should be exported to the rest of the world. I believe you would have as little success as you would in re-exporting our system of measurement to the 90 percent of the world that is metric.
- 3. Or you may feel that in this matter we could go our separate ways for human usage. I think this will be impossible, particularly if the American Bankers Association preprints checks in this form. Even today the form familiar to you is outdated in many aspects. Maintaining dual forms for human and machine work implies constant reconversion for humans affected by machines, as we all are.
- 4. Perhaps you have never been detained in quarantine, as I was because the European health officer insisted that my smallpox vaccination had expired.
- 5. You spoke of enjoying our habits. If you wish I can get you a list of secretaries that have been asked to use this new form and their comments regarding how difficult it was to change those habits. I do agree that a proper public relations campaign is necessary.

1969 February 17 Mr. J. H. Sweeney 6. Finally, I would recommend a book called The Dynamics of Change.
One of the major theses here, with which I cannot disagree, is that the rate of change increased so much in the last 20 years that we are untrained to accommodate it. A couple of pages here will give you the flavor. R. W. Bemer po