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INFORMATION PROCESSING AND RETRIEVAL–PRACTICES

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INFORMATION PROCESSING AND RETRIEVAL–PRACTICES

SYLLABI

1. Classification of Documents according to abridged English Edition of UDC and CC- 6th edition.
2. Cataloguing of books, Serials and Non - Book material according to AACR 2R and Sears List of Subject Headings.

INTRODUCTION

In popular usage, the term information refers to facts and opinions provided and received during the course of daily life: one obtains information directly from other living beings, from mass media, from electronic data banks, and from all sorts of observable phenomena in the surrounding environment. A person using such facts and opinions generate more information, some of which is communicated to others during discourse, by instructions, in letters and documents, and through other media. In treating the basic elements of information processing, it distinguishes between information in analog and digital form, and it describes its acquisition, recording, organization, retrieval, display, and techniques of dissemination.

Information processing is the change (processing) of information in any manner detectable by an observer. As such, it is a process that describes everything that happens (changes) in the universe, from a change in position (for example, the falling of a rock) to the printing of a text file from a digital computer system. In the latter case, an information processor is responsible for changing the form of presentation of that text file. Information processing may more specifically be defined in terms used by Claude E. Shannon (an American mathematician, electronic engineer, and cryptographer known as 'the father of information theory') as the conversion of latent information into manifest information. Latent and manifest information is defined through the terms of equivocation (remaining uncertainty, what value the sender has actually chosen), dissipation (uncertainty of the sender what the receiver has actually received) and transformation (saved effort of questioning - equivocation minus dissipation).

Information retrieval (IR) is the activity of obtaining information resources relevant to an information need from a collection of information resources. Searches can be based on metadata or on full-text (or other content-based) indexing. Automated information retrieval systems are used to reduce 'information overload'. Many universities and public libraries use IR systems to provide access to books, journals and other documents. Web search engines are the most visible IR applications.

CLASSIFICATION OF DOCUMENTS

Information, which is the processed and meaningful form of facts and figures, is integral to all the real-life practices, and a major source of all kind of information is document. Before learning about documents and their classification, let us first learn the basics of information processing and practice.

Information Processing and Practice

Information refers to the facts and opinions received and provided every day. It is the basis of life and an irreplaceable part of our daily-to-day practices. Information needs to collected, sorted, managed, organized, classified, stored and retrieved so that it can be used for the required purposes. Information processing refers to the acquisition, recording, organization, retrieval and dissemination of information. Information to be of use must be disseminated; if information is not disseminated, it is rendered useless.

Information processing involves collection, analysis and dissemination of information. After the information is processed, it must be accurate, reliable, consistent, complete and verifiable and available on time.

Information processing consists of several steps, which must be performed in a sequence so that the information so obtained is meaningful and can be utilized. Information processing is a continuous process wherein data is collected, stored and analyzed to give meaningful result.

At the most basic level, information processing cycle consists of four steps—input, processing, output and storage. Input refers to any data or facts that are collected from external sources. The data is then processed or analyzed to convert it into meaningful information. The meaningful information is the output that the end user uses. The information so obtained can be used in a variety of applications depending on the needs of the information user. Once the data has been converted to information, the information needs to be stored for retrieval and use at a later stage.

Information practice can be simply thought of as the guidelines that one needs to follow while collecting and using information. Information practice simply states that the information must be collected by lawful means and from sources that are verifiable. The information so collected must be accurate, precise and useful. It must not be made available to anyone and everyone but only to people who actually need it. There must be a limitation on how the information is used and by whom. Information must be used in a manner that it helps the end user to meet the needs for which information was required.

Documents

A document is basically a written, drawn, presented or recorded representation of thoughts. It is the basic unit that holds information of any kind. Document is in fact

the primary source of information wherein information can be collected and retrieved from. Traditionally, a document used to be a paper in which information was written by hand with ink or by a printing medium. Today, in the computer and information age, a document is referred to as a textual file. These documents are often called digital documents as these are created, stored, used and retrieved via a computer.

There are several types of documents which may contain different types of information depending on the use of the information. The most commonly used document types are as follows:

- Bonds
- Certificates
- Charter
- Compact
- Constitution
- Contracts
- Covenant
- Diploma
- Guarantee
- License
- Passport
- Pledge
- Surety
- Warrant
- Reports
- Letters
- Thesis
- Proposals

Characteristics of Documents

Documents can be identified from their characteristics. The following are the characteristics of documents:

- **Characters:** These are the fundamental parts of most documents. These are symbols used to create a document. The characters can be used to create numbers, text or images in documents.

- **Paragraphs:** These segregate the text of a document into sections and make the document easy to read and understand. Paragraphs are usually made up of a number of sentences.

- **Section:** A section of a document is the area, text or paragraph, which is formatted or marked in a different manner from the other text in the document. Section in a document helps the user of the document to know that a new area of information has started. Sections are usually marked to make the

reading of a document easier as these usually highlight the important information. So a document user can focus on the important text in the document with the help of sections rather than finding important and relevant information from a long text.

- **Frame:** It is an area of a document that acts as a placeholder for text or images. Frames are usually used when long text is included in a document. A frame can be used to partition different chunks of text and organize them in a proper manner.

- **Headers and Footers:** Header is an area of a document, which is set aside at the top of the page and may contain information, such as titles and logos. Footer of a document is an area marked off as separate at the bottom of a document. Footers generally include information, such as page numbers, file name and dates.

- **Footnotes and Endnotes:** Footnotes are areas marked off in a document and contain additional information related to something marked in the document with a special symbol. These are usually added to provide reference or citation in a document.

- **Page:** A page contains contents of the document, such as text, images, charts, list, and so on. Pages form a document and a document usually consists of several pages, which are put together to give a shape and flow to the document and its contents.

Documents are important information sources and must be kept securely. They may contain information pertaining to a variety of subjects and so meet the information needs of several users and information seekers.

Document Classification

Documents may be of different type and may contain different information. There can be several documents that contain information about the same subject. Information retrieval becomes difficult if documents containing information about the same subject are not categorized or organized together. Classification or categorization of information basically involves putting documents of similar nature together.

Document classification is a problem in information science, computer science and/or library science wherein similar documents need to be categorized together for easy information management, access and retrieval. The basic task of document classification involves assigning each document to a specific class or category. Documents may be classified as text documents, image documents, music documents, and so on. Usually, when it comes to document classification, text classification is implied.

The process of document classification can be manual or algorithmic. Manual or intellectual classification of documents is generally the strategy used with library science, while computer and information science depend on automatic or

algorithmic classification of documents. The intellectual classification of documents requires a lot of manpower to scan each and every document and mark it as belonging to one of the classes or categories. The manual method of document classification is a tiresome and long process. Manually scanning each document takes a lot of time and this process is not error free. The scanning and classification of documents is done by special personnel who have been trained for the task. Manual or intellectual document classification also costs more because of the large number of resources involved.

Document classification can be done on the basis of the subject of the document or the attributes of the document. Content-based document classification is the process wherein the documents are assigned to a particular class or category depending on the content or the subject of the document. Content-based classification of documents follows specific rules for categorizing documents. In library science, when documents are classified on the basis of the content, the document must contain at least 20 per cent content related to the subject to which it is assigned. In case of computer science, content-based document classification is done on the basis of the number of times a specific word of the related subject appears in the document.

Request-oriented classification of documents involves classifying the documents on the basis of the anticipated requests from the users of the documents. The classifier basically classifies the documents on the basis of entities of the document and the possible queries that may arise for these entities. Request-oriented document classification is more of policy-oriented document classification because it is based on the ideals and purpose of the entity according to which the documents are classified. Request-based document classification is not used as it is not considered to be a user-based approach. The request-oriented document classification is not helpful for users who need to retrieve information from the documents.

Document classification must not be confused with indexing of documents. Indexing involves specifying what the document contains. In other words, indexing means a document is scanned and marked according to the content of the document. Indexing involves describing the subject of the document. In fact once documents are indexed, their classification becomes easier.

Automatic or algorithmic document classification is done with the help of machines in an automatic manner. A specific set of rules is followed to classify the documents in this method of classification. Automatic document classification can be divided into three types, namely, supervised document classification, semi-supervised document classification and unsupervised document classification.

Supervised document classification is done with the help of external mechanisms. The external mechanisms provide information on the correct classification of the documents. The unsupervised document classification requires no external mechanism to assist in document classification. In unsupervised

document classification, no external references are made as to the correct classification of the documents and the entire process is handled automatically. The semi-supervised document classification method involves partial assistance of an external mechanism. In semi-supervised document classification, parts of a document are labeled and classified by external sources so that the documents can be correctly classified.

Automatic document classification is done with the help of document classification software. Document classification software is a tool that can be used to identify and organize document based information so that the required information and documents can be retrieved as and when required in a cost effective manner.

The main objective of document classification is to reduce the detail and diversity of data and resulting information overload by grouping similar documents together. Document classification aims to simplify access to knowledge and information and processing of the information contained in the documents. Document classification makes the process of retrieving, organizing and developing knowledge from information easy. It also facilitates effective exchange of knowledge and information.

Before document classification algorithms can be applied on the documents for classification, documents need to be pre-processed. Pre-processing of documents is essential because the documents need to be converted into a form that the algorithms can work upon. Document pre-processing basically converts the documents into numerical form or representation so that algorithms can be applied for document classification.

Document pre-processing is divided into three stages—feature extraction, feature selection and document representation. Each of these stages is discussed as follows:

1. **Feature extraction**: The first step in document pre-processing is feature extraction. It involves generating a list of terms that describe the document. The documents are parsed to get a list of all the words in the document. This list of words so obtained is reduced by reducing techniques to get what is called the document dictionary. Feature reducing techniques, such as word stemming and stop word removal are applied on the parsed list to get the document dictionary. The stop word removal technique basically removes all unwanted words such as articles, numbers and prepositions from the list. The process of stop word removal is carried out by comparing the words in the dictionary with an already existing or compiled list, and words are then purged accordingly. Word stemming groups words with same root together. This means that the words in the dictionary with the same suffix or prefix are grouped together to shorten the word list that describes the document.

2. **Feature selection**: The main aim of feature selection is to eliminate those words or descriptions that provide very less or least important

information. The feature selection stage uses statistical methods or values to determine the most valuable or most important information. The most common statistical indicators used are term frequency, inverse document frequency and their multiplicative combination.

Term frequency is used to determine the most important words and suggests that these words are used very often in documents. Inverse document frequency finds the rarest words in the documents and suggests that these words have the maximum explanation power. The multiplicative combination of term frequency as well as inverse document frequency helps to list the top n words that describe the document sufficiently.

3. **Document representation**: Document representation is the final task of document pre-processing. In this step, the document is represented in terms of the features or words that were selected in the feature selection step. Thus, the document is represented with 'n' elements where 'n' is the list of top words that were selected in the feature selection phase.

Techniques of Document Classification

The various automatic document classification techniques are as follows:

- **Naïve bayes classifiers (NBCs):** These are collection of probabilistic classifiers that are used for text categorization. NBCs are extensively used for document classification, especially where text is involved in the documents. These classifiers categorize documents into one class or another depending upon the words that the documents contain. Bayesian approaches for document classification form a basis for other classification models and approaches as well. The NBC works on the assumption that word order in a document is irrelevant. In other words, the occurrence or presence of one word does not affect the presence or absence of another word. Thus, the NBC works on the assumption of word independence. The Bayesian models of document classification work well for real time and complex problems where other methods of classification do not provide good results. There are several non-NBCs that work by overcoming the assumption of word independence. One major problem with NBCs is the fact that they can process binary feature vectors. This means that the Bayesian classification of documents overlooks important and relevant information contained in the documents. The important documents that contain more useful and relevant information may be found lower in categorized documents. NBC cannot work very well for documents with large number of entities because of the word independence assumption.

- **Decision trees:** Decision trees are by far the easiest methods of document classification. These trees rebuild the manual categorization of the document by constructing a tree structure. This tree structure is created in the form of well-defined yes–no or true–false queries. The node of the tree represents

the questions and the leaves represent the corresponding category or class of documents. A document can be easily classified using this decision tree by putting the document into the tree node. The document is then allowed to run through the query structure formed till the document reaches a particular leaf that matches the document category or for which the document returns yes or true as a result. The biggest advantage of using decision tress for classification of documents is the fact that these are very easy to understand and interpret. The well-defined structure of the decision trees makes it possible for even a new user to understand and conceptualize document classification. Decision trees follow a specific logic for classification of documents and so they take into consideration all relevant and important information contained in the documents. Thus, the most relevant and useful documents can be easily accessed and retrieved. A risk associated with decision trees for document classification is over-fitting. Over-fitting in a decision tree takes place if there is another decision tree that categorizes the documents in a better manner. The decision tree approach of document classification aims at constructing decision trees that always correctly categorize documents leaving no place for errors. However, this may not always be the case because one decision tree may not be suitable for all types of documents. Thus, the decision tree approach builds separate trees for all types of documents that are categorized by it. The decision tree method of document classification may even build huge trees for documents, thus, creating an issue. One way to overcome this problem is by creating parameters for the decision tree, such as the maximum number of nodes, maximum depth of the tree or the maximum number of documents that can be handled by the tree for classification. Decision trees with their limiting parameters can be very effective for classifying documents in an accurate manner. These can work well for documents with a very large number of entities also provided limitations are placed on the decision trees.

- **Decision rules:** Decision rule algorithms are used for document classification in an effective manner. Using decision rules, algorithms as set of rules are defined for each category or class of documents. These decision rules define the category or the class of the documents. The decision rule is typically defined by the category name and the most relevant word or feature from the document dictionary that best describes the category. A set of decision rules is created in this manner with the logical operation 'OR'. This means that when a document has to be classified, it does not need to meet all the rules as specified by the rule set. In fact, if the document matches even a single rule of the rule set, it is considered to belong to the category against which it is checked. The decision rule set for a specific category may be very huge. Therefore, heuristics must be applied to limit the size of the decision set. If the decision rule set is very huge, the time required for classification will be a lot, especially if the document does not match the

first few rules. Decision rule algorithms define a separate rule for each category of documents that it may need to classify. The main advantage of using decision rules is that, for each category, a separate and local dictionary can be developed, which can be then used for classification of documents. The main problem with decision rules is that a document may not always be assigned to one category. In other words, it becomes difficult to decide the right category for a document. This is because one particular document may meet the decision rules of more than one category. In such a case, the document cannot be assigned to only one document category and this creates a confusion regarding the category to be assigned to the document. The same document may, thus, be assigned to various categories when it comes to document classification with decision rules. This also poses an issue when information has to be retrieved from a document. Since the document is assigned to several categories, it is often difficult to assess the category, which will contain the required and relevant information. Thus, information retrieval is a tough task when documents are classified according to decision rule algorithms.

- **Neural networks:** Various neural network approaches have been applied to document classification and categorization. Document classification can be done based on simple neural networks that consist of only an input and an output layer. The simple neural networks are called perceptrons. Document classification can also be done on the basis of complex neural networks, which have a hidden layer between the input and output layers. Usually, document classification is done based on three layers—input layer, output layer and a hidden layer. Documents are then classified using the technique of back-propagation learning in neural networks. The three layer neural networks are called feed-forward networks. However, as compared to feed-forward networks, the perceptrons perform better at document classification. Perceptrons are more effective at document classification and carry out the process more accurately. Neural networks can also be used to handle fuzzy logic using the technique of counter-propagation. However, when handling fuzzy logic, the document classification results are not always effective. One of the main advantages of neural networks is the fact that these can handle contradictory documents well. In other words, neural networks are able to perform classification in a better manner of a document that may seem to belong to more than one category. There are times when one document may belong to several classes and it may be difficult to assign a single class to these documents. Other document classification techniques may assign these documents to one or more categories, which may lead to confusion. In such a case, neural networks work best, as they assign such documents to a single category. Neural networks also are very effective to classify noisy documents or documents that contain too much and irrelevant information. The main disadvantage of document classification via a neural

network is that it involves high computation costs. Another disadvantage of a neural network is the fact that these networks are not easy to understand and create, and an average user cannot use these for document classification in an effective manner. The most common types of neural networks that have been used and widely accepted for document classification include trained neural networks and artificial neural networks.

- **Regression-based methods:** Document classification based on regression-based methods works by representing the documents to be classified as a pair of input/output matrices. The input matrix is called A and the output matrix is called B. The input matrix A consists of documents that need to be classified. The output matrix B consists of flags that indicate the document category of corresponding documents in matrix A. Thus, matrix B contains the same number of rows, which is m, as matrix A. The number of columns in matrix B is c, which represents the number of categories defined. The main aim of the regression techniques is to find a matrix F that transforms matrix A into B', which matches B as closely as possible. The matrix F can be found by applying different regression techniques. A major advantage of regression-based methods is the fact that morphological pre-processing can be avoided. The regression-based methods work very well on documents without affecting the quality of categorization. In other words, regression-based methods perform document classification in an effective and accurate manner. Regression-based methods are language dependent. Another advantage of using regression-based methods is the fact that these can work well on documents that belong to a single category or multiple classes. Regression-based methods work very well for documents that belong to multiple classes. These methods classify such documents in a manner that makes information retrieval and access easy without any confusion. However, regression-based methods for document classification are not very popular methods and are not used much in this field. These methods are also not very easy to understand and so, it is difficult for a classifier to make use of these in an accurate and effective manner. Most regression-based methods are also time-consuming because of the several computations involved. Finding and constructing matrices takes a long time as does classification based on these matrices. Other document classification methods provide better and more effective results when it comes to document classification.

- **K-nearest neighbor:** This method of document classification is not based on learning techniques. In the k-nearest neighbor method of document classification, k-nearest documents are defined. By nearest documents is meant the documents that closely match the category of the documents to be classified. Document classification is performed by comparing the category frequencies of k-nearest documents with the document that has to be classified. How close the documents are to each other can be measured

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using a specific measurement or some statistical technique. The k-nearest neighbor method of document classification takes into account the fact that the length or the size of the documents can differ while the documents are usually classified on the basis of the content that they contain. The advantage of the k-nearest neighbor method of document classification is the fact that it is a simple technique of document classification and can be used by a new user as well. This is the best algorithm when it comes to classifying documents that belong to different categories or classes. The main disadvantage of the k-nearest neighbor document classification is the fact that it takes a lot of computational time. This is because no pre-processing of documents is done when it comes to using this method. When using this method, it is also possible that too many documents from different categories come under the k-nearest neighbor document. In other words, it is possible that a large number of documents not belonging to the same category match the k-nearest neighbor. This results in wrong and inadequate categorization of documents. This is because a document assigned to a specific category may not actually belong to that category; but since it matches the k-nearest document of that category, it is assigned the specific class. Thus, information retrieval may not always be correct when it comes to documents classified by this method.

- **Vector-based methods:** There are two types of vector-based methods that can be used for document classification. One is called the centroid algorithm and the other method is called support vector machines. One of the simplest document classification techniques is centroid algorithm. In this method of document classification, during the pre-processing stage, an average vector for each category is calculated. This vector is called the centroid vector for the category. When a document has to be classified, it is checked against the centroid vector for each category. The document is assigned to the category whose centroid vector it closely matches. The main advantage of this method of document classification is that it is very simple and can be used by a new user as well. However, the main drawback of the centroid algorithm method of document classification is that it does not work well if the number of document categories is too large. This method of document classification also fails when a document belongs to more than one category. In such a case, the document classification is often not done in the right manner. Support vector machines make use of positive documents, which are documents that are typical for a category. It also makes use of negative documents, which are not typical of the category. The support vector machines then create decision surfaces to differentiate the positive documents from the negative ones. The documents closest to the decision surface form a vector. The documents to be classified are matched against this vector and the category of the document is then decided. The main advantage of support vector machines is the fact that the documents are classified in a quick manner and the algorithm offers a superior runtime

as compared to other documents. The disadvantage of this method is the fact that a document can be classified in more than one category. However, support vector machines are considered the best document classification technique and outperform other techniques of document classification.

- **Concept mining:** Concept mining is an activity that extracts concepts from artifacts. Artifacts are loosely structured sequence of words and other symbols and can provide a great insight into the similarity of documents. The conversion of words to concepts is performed using a thesaurus. The mapping of words to concepts is often ambiguous because a word may be related to several concepts. Concept mining can be used to detect and index similar documents based on their concept rather than the words used. The method of concept mining also classifies documents by topic, i.e., documents that contain information about the same subject are classified as similar.

- **Latent semantic indexing:** It is an indexing and retrieval technique. It uses a mathematical technique to identify the relationships that exist between terms and concepts in a document. This technique is based on the principle that words in a document used in the same context are similar in meaning as well. For document classification, latent semantic indexing makes use of example documents to establish a conceptual basis for each category. A document to be classified is matched against the example document for each category and is assigned the category or class it matches the closest. The latent semantic indexing technique for document classification is by far the simplest technique that can be made use of. In addition, this technique can be used by a novice classifier as well. The computation time required in this method of document classification is also less. One problem with this method of document classification is the fact that a document may be classified as belonging to more than one class or category. This may happen when a single document matches the example documents of various categories. This may, thus, lead to incorrect classification of documents and also confusion when it comes to information retrieval.

Applications of Document Classification Techniques

Document classification techniques can be applied to the following:

- **Spam or email filtering:** It is the process wherein emails are categorized according to specific criteria. This process involves separating spam email messages from legitimate email messages. Usually, the process is automated and works on incoming email messages. However, human intervention may also be required sometimes to classify email messages as relevant or spam messages.

- **Email routing:** It is the process wherein the email has to be routed to the correct inbox depending on the topic of the email or the address of the mailbox. In most cases, automated routing is performed.

- **Language identification:** Document processing techniques can be well applied for language identification in a document. The different classification techniques are used to determine the natural language in which the text has been written.

- **Genre classification:** The various document classification techniques can also be used to decide the genre of the text. In most cases, automatic techniques are used for genre identification and classification.

- **Sentiment analysis:** Document classification techniques can also be used for sentiment analysis, which is to determine the attitude of the speaker or a writer with respect to a specific topic or with respect to the overall context of a document.

- **Readability assessment:** Document classification techniques are used to determine the readability of a text. In other words, these techniques are used to determine what text is suitable for reading for what age group.

- **Text simplification:** Document classification techniques are also used to simplify text. In other words, these techniques are used to modify, enhance or classify text in a simple manner so that it becomes more understandable. However, while simplifying text, it needs to be ensured that the basic meaning and information remain the same. Text simplification is usually done in an automated manner and generally does not require any human intervention.

Library Classification

Libraries generally deal with a wide range of documents including books, journals, periodicals, and so on. and provide information related to several knowledge domains to the information users. Libraries need to maintain their sources of information in a proper and organized manner so that these sources can be accessed and retrieved easily. Libraries use classification systems to organize library materials so they can be easily and quickly found. These systems place items about the same subject in the same area of the library. Library classification is an aspect of library and information science. The main goal of library classification is to provide a useful ordering of documents rather than a theoretical organization of knowledge. There are many standard systems of library classification in use, which can be divided into three types depending on how they are used:

- Universal classification schemes, which cover all subjects

- Specific classification schemes, which cover particular subjects or types of materials

- National classification schemes, which are specially created for certain countries

On the basis of their functionality, the library classification systems can be described as:

- **Enumerative:** In this classification system, subject headings are listed alphabetically, with numbers assigned to each heading in alphabetical order.

- **Hierarchical:** In hierarchical classification system, the subjects are divided hierarchically, from most general to most specific.
- **Faceted or analytico-synthetic:** In faceted classification system, the subjects are divided into mutually exclusive orthogonal facets.

Library classification is associated with library cataloging. Library classification includes two steps. In the first step, it is ascertained what the material or the document is all about, while in the second step, a call number based on the classification system in use is assigned to the work using the notation of the system. The call number in most cases is the address of the book or the location of the book in the library.

Library Catalogs

Library catalog is a register of all bibliographic items found in a library. A bibliographic item can be any information entity, such as book, computer files, graphics, realia, cartographic materials, and so on, that is considered library material. The main objective of a library catalog is to:

- Enable a person to find a book of which either the author, the title, the subject or the date of publication is known.
- Enable a person to know what the library has by a given author, on a given subject and in what kind of literature.
- Assist a person, who is information seeker, in the choice of a book, especially according to the edition and character of the book.

Types of Library Catalogs

The following types of catalogs can be used in a library:

- **Author catalog:** It is a formal catalog. It is sorted alphabetically according to the authors' or editors' names of the various library materials that have been entered in the catalog.
- **Title catalog:** It is also a formal catalog, which is sorted alphabetically according to the title of the various materials that have been entered in the catalog.
- **Dictionary catalog:** It is a catalog in which all entries (author, title, subject, series, and so on) are recorded in a single alphabetical order.
- **Keyword catalog:** It is a subject catalog, sorted alphabetically according to some system of keywords.
- **Systematic catalog:** This type of catalog is a subject catalog. The systematic catalog is sorted according to some systematic subdivision of subjects. This catalog is also called classified catalog.
- **Shelf-list catalog:** It is a formal catalog with entries sorted in the same order in which the bibliographic items are shelved in the library.

- **Online catalog:** It is a computer based catalog which is used in most libraries these days. An online catalog is very easy to use and enables a user to search for the required library material using software or a special computer program designed for use with online catalog.

DEWEY DECIMAL CLASSIFICATION

In a library system, documents need to be maintained in a manner that facilitates easy access and retrieval of information contained therein. For this, the documents need to be classified on the basis of some specific system or rules. One of the most popular classification methods for documents in libraries is Dewey decimal classification (DDC). It is a proprietary library classification system that was first published in the United States in 1876. Over the years, several changes have been incorporated in this classification system and is today available for use online as well as for small libraries.

DDC uses the concepts of relative location and relative index, which allow documents or books to be added to the library in an easy manner based on the subject of the book or the document. DDC makes use of three digit Arabic numerals for the main classes of documents. It also uses fractional decimals to allow expansion within the classes of the documents. Each document is assigned a classification number under this system of classification. This number can be used to locate the document in a position relative to other books in the library based on the subject of the book. The classification number makes it possible to find and return any book to its proper location in a library.

This system of document classification follows a hierarchical structure of organizing the various documents. The documents are classified or organized according to the field of study that the document belongs to. The scheme is made up of ten classes divided into ten subclasses, which are further divided into ten sections. The main divisions in this classification system include philosophy, social sciences, science, technology and history. A number is allotted to each subject in this system of document classification. Each number has two parts: a class number and a book number, to avoid any type of confusion when it comes to locating and returning the book to the right place.

Classes and Tables in the DDC

The DDC uses the following classes:

- 000 – General Works, Computer Science and Information
- 100 – Philosophy and Psychology
- 200 – Religion
- 300 – Social Sciences
- 400 – Language

- 500 – Pure Science
- 600 – Technology
- 700 – Arts and Recreation
- 800 – Literature
- 900 – History and Geography

The various tables in DDC are as follows:

- T1 Standard Subdivisions
- T2 Geographic Areas, Historical Periods, Biography
- T3 Subdivisions for the Arts, for Individual Literatures, for Specific Literary Forms
- T3A Subdivisions for Works by or about Individual Authors
- T3B Subdivisions for Works by or about More Than One Author
- T3C Notation to Be Added Where Instructed in Table 3B, 700.4, 791.4, 808–809
- T4 Subdivisions of Individual Languages and Language Families
- T5 Ethnic and National Groups
- T6 Languages

The DDC uses a relative index, which is an alphabetical index to the classification for retrieval of the required documents.

Implementation of DDC: Case Studies

The various case studies related to the implementation of DDC are discussed as follows:

Case Study 1—Use of DDC in Oxford Brookes University

The Oxford Brookes University Library uses DDC for arranging books and other library materials on shelves so that the library materials can be easily retrieved.

DDC is a hierarchical number system that organizes all human knowledge into ten main categories, which are: 000 Computer Science, information and general works; 100 Philosophy and psychology; 200 Religion; 300 Social science; 400 Language; 500 Science; 600 Technology; 700 Arts and recreation; 800 Literature; and 900 History and geography.

Each main category is then divided into ten sub-categories. For example: 500 Science—510 Mathematics; 520 Astronomy; 530 Physics; 540 Chemistry; 550 Earth sciences and geology; 560 Fossils and prehistoric life; 570 Biology; 580 Plants (Botany) and 590 Animals (Zoology).

Each sub-category is then also divided into ten specific topics. For example: 530 Physics—531 Classical mechanics; 532 Fluid mechanics; 533 Gas mechanics;

534 Sound and related vibrations; 535 Light and related radiation; 536 Heat; 537 Electricity and electronics; 538 Magnetism and 539 Modern physics.

Each of these topics may be further divided into more specific subject areas. A decimal point is used after the first three digits to separate the specific subjects— it also makes the numbers easier to read. You will see that as the subject becomes more specific, so does the numbering. For example: Sound and related vibrations— 534.1 Generation of sound; 534.2 Transmission of sound; 534.22 Transmission in solids and 534.23 Transmission in liquids.

DDC at Oxford Brookes: When an item arrives in the library, it is assigned a DDC number, often called the 'classmark' or 'shelfmark'. Each of the numbers in this shelfmark has a meaning and is not assigned randomly. For example, the book 'The Royal Doctors 1485-1714' by Elizabeth Furdell has been assigned the shelfmark 610.6952094205 FUR. These numerals indicate the following:

610 = Medical sciences

610.6 = Professions

610.69 = Medical personnel

610.695 = Specific kinds of medical personnel

610.6952 = Physicians

610.69520942 = Physicians in England and Wales

610.6952094205 = Physicians in England and Wales 1485-1603

Most items will also be assigned some letters at the end of the numerals, 'FUR' in the above example. These are taken from the author's surname or the first word of the title.

Finding items on the shelves: The shelf-mark will always have at least three numbers, followed by some letters. It is usually displayed on the spine of the item, but is sometimes placed on the front cover. Here are some examples: 361.HIG— the DDC system places items about the same subject at the same number. This means that once you have identified the DDC number for the subject you are interested in, you can browse the shelves at that number. On each shelf, the items are arranged in a numerical sequence from left to right by their DDC number. Where several items have an identical DDC number, the letters are used to further arrange them. For example: 361.32.BOR and 361.32.STO.

Journals: Journals are also shelved in a separate section. The same DDC numbers are used, but the catalog shows these items with a shelfmark that is preceded by 'J', and it only has one letter after the numbers. For example, the journal 'Nursing Standard' has the shelfmark J 610.73 N.

UNIVERSAL DECIMAL CLASSIFICATION (UDC)

Universal decimal classification (UDC) is another system of document classification, which is used widely. UDC is basically a bibliographical and library classification

system that was developed by Belgian bibliographers Paul Otlet and Henri La Fontaine. These bibliographers first introduced this classification system at the end of the 19th century. Since then, the UDC has undergone many changes and is used across the globe today. UDC allows systematic arrangement of all branches of human knowledge. It is based on a coherent system of knowledge wherein the knowledge fields are related and inter-linked.

UDC was based on the DDC and was developed originally as an analytical and synthesizing classification system. The vocabulary that the UDC covered was large. Also, the UDC included syntax that allowed detailed content indexing and also information retrieval from large collections of documents.

The first edition of UDC was launched in 1905. In this edition, many features were included that changed the way document classification wad done and viewed. One of these features included common auxiliary tables, which were tables that described generally used concepts. Another feature was special auxiliary tables. These tables described reusable attributes in a particular field of knowledge. UDC also included an expressive notational system with connecting symbols and syntax rules.

UDC was originally designed as an indexing and retrieval system. However, due to its logical structure and scalability, today UDC is one of the most widely used knowledge organization systems in libraries. It is used both for content indexing of documents in libraries and also for shelf arrangement of documents. UDC works for a variety of documents including textual documents, films, video, sound recordings, illustrations, maps, and so on.

Since the first edition in French in 1905, UDC has been translated and published in various editions in 40 languages. UDC Summary is the abridged edition that can be used on the Web and is available in over 50 languages. The system has also been changed and modified to meet the changing needs and demands of increasing human knowledge.

Use of UDC

UDC is used in around 1,50,000 libraries in 130 countries across the globe. It also finds application in many bibliographical services wherein detailed content indexing is required. UDC is used as a system of information exchange in many countries. It finds use in several libraries, schools, special libraries and also academic libraries. UDC can be used to describe any type of document in the libraries in great details and so makes information management an easy task.

UDC is also used for indexing of scientific articles, which are important sources of information for science related topics. UDC has also been used to index national bibliographies of around 30 countries.

UDC has been used to index NEBIS—the Network of Libraries and Information Centers in Switzerland. UDC has indexed approximately 2.6 million records for NEBIS. There are several other articles, journals and documents of

great importance that have been indexed and classified by UDC. Examples of databases indexed by UDC include the Slovenian National Union Catalog with over 3.5 million records, Hungarian National Union Catalog with around 2.9 million records, VINITI RAS database with over 28 million records, PORBASE with 1.5 million records and also Meteorological and Geo-Astrophysical Abstracts with 600 journal files.

UDC is a machine readable system and so can be used in automatic mechanical systems and even in new libraries effectively for the purpose of classification, retrieval and management of information in documents.

The standard version of the UDC is called the UDC Master Reference File. The standard version is maintained in a form of a database and is usually updated and releases annually. This ensures that the UDC contains a reference to the latest information. The UDC is always under review to take into account the latest and new developments and include these in the reference database.

Structure of UDC

The UDC has a well-defined structure. Notation in UDC is used to represent class, which refers to a subject of the document. Notation is basically used to present the class and its position in the hierarchy. The main idea of using notations is to enable mechanical sorting and filing of the document subjects.

UDC makes use of Arabic numerals that are arranged in a decimal format. Every number in the UDC is a decimal fraction with the initial decimal point omitted. The number in decimal fraction decides the filing order of the documents. The advantage of using the decimal notation for classification of documents is that the decimal numbers are infinitely extensible. This simply means that when new subdivisions of classes are introduced, the entire system of numbering does not need to be changed. Instead, the decimal number can be extended using a decimal point for the new subdivision. Every decimal notation in UDC follows a set pattern. For the ease of reading and access, the UDC notation is punctuated after every third digit.

Example of Notations in UDC:

Notation	Class description
539.120 physics	Theoretical problems of elementary particles
539.120.2	Symmetries of quantum physics
539.120.5	Strings
539.120.226	Space–time symmetries
539.120.3	Currents

The notations used in UDC have features that make it easy to work with. The UDC notations are hierarchically expressive, which means that they specifically

name a class. In general, the longer the notation is, the more specific the class will be. When final digit is removed from the notation, the broader class code is obtained. For example, in the above notations, if we remove 3 from the notation 539.120.2, we get the broad class category, which is 'theoretical problems of elementary particles physics'. UDC notations are also syntactically expressive. This means that when digits are combined by punctuations, it points to the fact that the expression or the notation depicts a combination of classes rather than a single class.

UDC helps to define unlimited attributes for a subject and to express a relationship between these subjects. UDC is perspective classification system wherein concepts are subsumed and placed under categories where these can be studied. Thus, the same concept can occur in different knowledge domains. The best thing about UDC is that, even if a concept occurs in different domains of knowledge, there is no confusion regarding its usage in any way.

Classes

Classes are the basic unit of UDC. These classes basically define and represent concepts. There are two kinds of tables or classes, namely auxiliary tables or classes and main tables or classes, in which concepts can be organized in UDC.

The auxiliary tables contain concepts that are generalized and common to several subjects in the main table. The concepts can be related to the language of the text, the place or physical form of the document and any other facet that is common to a large number of subjects in the main classes. These tables are called common auxiliaries and UDC numbers from these tables can be added at the end of a number taken from the main table. The number of common auxiliaries in UDC is around 1,50,000.

The main tables or classes of the UDC contain the various disciplines and branches of knowledge. The main classes are numbered 0–9. At the beginning of each class, there are several special auxiliaries that define the concepts common within the specific class. The main classes of UDC have approximately 6,00,000 sub-divisions.

Main Classes of UDC

UDC includes the following main classes or tables:

0: Science and Knowledge. Organization. Computer Science. Information Science. Documentation. Librarianship. Institutions. Publications.

1: Philosophy. Psychology.

2: Religion. Theology.

3: Social Sciences.

4: Vacant.

5: Mathematics. Natural Sciences.

6: Applied Sciences. Medicine, Technology.

7: The Arts. Entertainment. Sport.

8: Linguistics. Literature.

9: Geography. History.

Class 4 is a vacant class. The change was made in 1960 when the Linguistics were shifted to class 8 to make place for new developments taking place in the field of knowledge. The class was left vacant to accommodate new developments in the fields of natural sciences and technology.

Common auxiliary tables in UDC: The common auxiliaries in UDC are concepts that can be used with other main or auxiliary concepts of the UDC. The common auxiliaries are usually represented with some unique notation. The common auxiliaries begin with a unique symbol, which is called the facet indicator and defines the concept that the auxiliary class is representing. Following are the common auxiliary tables in UDC:

=...: Common auxiliaries of language. Table 1c.

(0...): Common auxiliaries of form. Table 1d.

(1/9): Common auxiliaries of place. Table 1e.

(=...): Common auxiliaries of human ancestry, ethnic grouping and nationality. Table 1f.

'...': Common auxiliaries of time. Table 1g.

-0...: Common auxiliaries of general characteristics: Properties, Materials, Relations/Processes and Persons. Table 1k.

-02: Common auxiliaries of properties. Table 1k.

-03: Common auxiliaries of materials. Table 1k.

-04: Common auxiliaries of relations, processes and operations. Table 1k.

-05: Common auxiliaries of persons and personal characteristics. Table 1k.

There are several connecting symbols used in UDC for easy understanding of the notation and to allow easy parsing. These connecting symbols make it easy for a person to understand the main class and the auxiliary class being referred to and, thus, the concept being referred to.

The commonly used connecting signs in UDC are as follows:

+ — This is the plus sign (+) that performs the action or coordination and addition. For example: 511 + 61 describes Number Theory + Medical Sciences.

: — This is the colon sign (:) that is used to describe a connection or relation between the classes or the concepts. For example, 33:37 shows the relation between economics and education.

/ — This is the stroke sign (/), which is used to describe a consecutive extension of classes. It simply means that one class is extension of another and

contains everything that the first class contains.

[] — These are square brackets ([]), which are used for sub-grouping of classes and concepts within another class or a subject.

* — This is an asterix (*), which is used to introduce a non-UDC notation in the UDC notation.

A/Z — This is alphabetical extension that describes the alphabetical specification of a class.

Thus, using UDC documents are classified as main tables and auxiliary tables wherein the main tables represent a domain of knowledge or concept in the broad sense and the auxiliary tables represent the concepts within the specific domains of knowledge.

The main table 0 is related to the concepts of Science and Knowledge and cover domains, such as organization, computer science, information, documentation, librarianship, publication and institutions. A few examples of documents covered by main class 0 are as follows:

001 — Science and Knowledge in general; organization of intellectual work

002 — Documentation, books, writings, authorship

003 — Writing systems and scripts

004 — Computer science and technology; computing

005 — Management

006 — Standardization of products, eights, measures and time

007 — Activity and organizing; information, communication and control theory (cybernetics)

008 — Civilization, Culture, Progress

01 — Bibliography and bibliographies; Catalog

02 — Librarianship

06 — Organization of general nature

08 — Polygraphies, collective works

09 — Manuscripts, rare and remarkable works

069 — Museums

Class 1 relates to Psychology and Philosophy. Examples of main classes for the subject psychology include:

11 — Metaphysics

13 — Philosophy of mind and spirit; metaphysics of spiritual life

14 — Philosophical system and points of view

17 — Moral philosophy, ethics, practical philosophy

159.9 — Psychology

159.91 — Psychophysiology, mental physiology

Class 2 is related to religion and theology. 2–1/–9 is the special auxiliary subdivision for religion and can be used to talk about a facet of any religion. The main classes 21/29 talk about religious systems, religions and faith. Example: 24 is the class that talks about Buddhism, 28 talks about Islam. –5 is a special auxiliary that talks about worship in a specific religion. So, if we use UDC notation 24–5, it means we are referring to worship in Buddhism.

Class 3 in UDC is related to Social sciences. Examples of classes are as follows:

303 — Methods of social sciences

305 — Gender studies

316 — Sociology

32 — Economics. Economic science

37 — Education

Class 5 of UDC refers to Mathematics and natural sciences. The examples of the classes are as follows:

502 — The environment and its protection

504 — Threats to environment

51 — Mathematics

510 — Fundamental and general considerations of mathematics

511 — Number Theory

512 — Algebra

514 — Geometry

53 — Physics

535 — Optics

54 — Chemistry, crystallography, mineralogy

55 — Earth sciences, geological sciences

56 — Paleontology

57 — Biological sciences in general

58 — Botany

59 — Zoology

Class 6 of UDC talks of applied sciences, medicine and technology and takes up the largest proportion of the UDC. There are over 44,000 subdivisions of this class. A few examples of documents belonging to this class include:

60 — Biotechnology

61 — Medical sciences

611/612 — Human biology

62 — Engineering, technology in general

63 — Agriculture and related sciences and techniques., forestry, farming, wildlife exploitation

64 — Home economics, domestic science, housekeeping

65 — Communication and transport industries, accountancy, business management, public relations

66 — Chemical technology, chemical and related industries

67 — Various industries, trades and crafts

68 — Industries, crafts and trades for finished or assembled articles

69 — Building (construction) trade, building materials, building practice and procedures

Class 7 of UDC contains documents related to arts, recreation, entertainment and sports. The numbers 7.01/09 are special auxiliaries of this class and can talk about various concepts related to these fields. Examples of documents in this class are:

71 — Physical planning; regional, town and country planning; landscapes, parks, gardens

72 — Architecture

73 — Plastic arts

74 — Drawing, design, applied arts and crafts

75 — Painting

76 — Graphic art, printmaking; graphics

77 — Photography and similar processes

78 — Music

79 — Recreation, entertainment, games, sport

Table 8 of the UDC is related to language, linguistics and literature. This table is a fully faceted table with special auxiliaries defining concepts within the specific subject. Class 81 is related to linguistics and languages. Class 82 is related to literature. 81–1/–9 refers to special auxiliary divisions of the literature class. For example: 82–2 refers to dramas and plays and 82–4 deals with essays.

Class 9 refers to geography, biography and history. This class is also completely faceted and the special auxiliaries of this class talk about place, time and ethnic grouping. Examples of documents contained in class 9 are as follows:

902 — Archaeology

903 — Prehistory. Prehistoric remains, artefacts, antiquities

904 — Cultural remains of historical times

908 — Area studies. Study of a locality

91 — Geography, exploration of the Earth and of individual countries, travel, regional geography

92 — Biographical studies, genealogy, heraldry, flags

93/94 — History

Each record in the UDC displays the following information:

- **UDC Number or Notation:** UDC notation is a combination of symbols, numerals, signs and letters that represent a class, the position of the class in the hierarchy and also the relation of the class to other classes. Notation is a language-independent indexing term that enables mechanical sorting and filing of subjects.

- **Class Identifier:** It is a unique identifier assigned to each class. It identifies the meaning of the relationship between the representation of the class and its notational number or UDC number.

- **Broader Class:** It represents a class, which is super-ordinate class, i.e., the class above the given class in the hierarchy.

- **Caption:** It is the verbal description of the content of the class.

- **Including Note:** It is the extension of the caption containing verbal examples of the class content. It usually is a selection of important terms that do not appear in the subdivision.

- **Application Note:** It contains instructions for number building, further extension and also for specification of the class.

- **Scope Note:** It is the note explaining the extent and the meaning of a UDC class. The scope note is used to resolve disambiguation or to distinguish this class from other similar classes.

- **Examples:** Examples of combination are used in the records to illustrate UDC class building and complex subject statements.

- **See Also Reference:** It indicates the conceptual relationship between UDC classes from different classes in the hierarchy.

UDC is the world's foremost multilingual classification scheme. It is used for all fields of knowledge and contains information related to anything that can be conceptualized in the human brain. UDC also acts as a sophisticated indexing and retrieval tool. It is maintained in a database containing more than 70,000 records.

Features of UDC

UDC is owned, managed, maintained, and distributed by an international consortium of publishers with its headquarters in The Hague. The editorial team of the UDC comprises of six Associate Editors led by an Editor-in-Chief and an advisory board of over 20 members.

The main features of the UDC are as follows:

- UDC is a practical bibliographic classification. It is considered as the first faceted classification. UDC is a synthetic classification, which is able to specify minute subjects, aspects, formats and the different related viewpoints.

- Its structure is flexible to accommodate new subjects. UDC allows changing the citation order easily and flexibly for shelf arrangement and searching of documents as and when required.

- UDC is the first official internationally used classification system, which has been published in French, German and English.

- The notation used in UDC is independent of any particular language or script. UDC is totally language independent. It has been translated many times and thesis translations have appeared in about 39 languages.

- UDC lays more emphasis on subject analysis and document specification.

- UDC is a multidimensional scheme. Its auxiliary synthesis of relations and concepts is very powerful and, thus, it can be easily used to define and describe relationships.

- UDC is more suitable for micro-documents, electronic information and information retrieval in online and networked databases and Websites. It makes information management an easy task.

- UDC is a general classification that covers a wide domain of knowledge and, thus, almost any subject that one can talk about.

- UDC is regularly revised so that all new concepts and developments can be included within the classes. The revision of UDC is a planned process and is carried out under the guidance of the UDC Consortium. The revision of the UDC is carried out with the help of specialists and subject experts.

Merits and Demerits of UDC

UDC is being widely used for retrieval of information especially from online documents. The following are the merits of UDC that make it apt for document classification and information retrieval:

- UDC uses an expressive notation, which makes retrieval of information very easy. The structure of UDC is hierarchical, which means that it progresses from general subjects to specific subjects and relationships. The overall structure is not theoretical, which makes it easy to understand this system of classification. UDC is based on the assumption that no single class can cover all aspects of a particular subject or context, and so, a wide range of classes is used in the classification system to make it easy to classify and retrieve information.

- UDC is a flexible method of classification of documents. It is flexible in the sense that it allows changes to be made easily to the order of the numbering of documents. The reason why UDC has been designed flexibly is to keep pace with new developments that take place in the field of knowledge. UDC is also more responsive to the complex changes that take place between interrelated subjects.

- UDC uses precision to classify and retrieve information. This is beneficial especially when information has to be retrieved from online resources.

- UDC allows easy browsing. It is a knowledge organization tool that allows hierarchical browsing. This is helpful for new users who are not familiar with the use and structure of UDC. Hierarchical browsing also implies that the search time for a known item in UDC is optimum and minimum.

- UDC is versatile classification system, which allows the accommodation of new subjects in an easy manner. Notations used in the UDC are versatile and the decimal numbers are infinitely extensive making the addition of a new subject or knowledge document an easy task.

- UDC is based on the Synthetic Principle, which uses tables extensively to classify the documents and allows for the classification to become divisible. This means that the document classification can be extended to include several categories and viewpoints.

- One of the main benefits of UDC is the fact that it is continuously revised and maintained. The revision of UDC ensures that all the new subjects and information are added and made available for use from time to time. Maintenance of the UDC involves deleting obsolete terms, replacing these with new ones and also rectifying problems that arise in the UDC. This ensures that the classification system works effectively for every instance of information retrieval.

Despite being widely accepted and used as a document classification system, UDC does suffer from the following drawbacks:

- UDC is based on DDC. It is known to be an enumerative classification scheme, which is feasible in a closed system of knowledge. UDC works well and the best where the material or the documents to be classified are not too many. UDC does not allow the addition of a newly found class into an existing class; rather it allows a new auxiliary class to be defined for the new class.

- UDC is not fully exploited. Though it is used widely, the DDC is still a more popular classification method in use.

- UDC is based on the assumption of universality. This means that it must cover all subjects with growing degrees of information. However, class 4 of the UDC lies vacant for a new evolving class. UDC also does not include kernels and concepts of the main classes.

- UDC uses a limited number of relational operators. The underlying semantic relationship is not clearly defined in the UDC. The UDC does define the relationship between the classes but fails to define the manner in which the classes influence each other.

- UDC uses a decimal notation to describe a class. The notation in some cases may be too lengthy whereas it should be as brief as possible. Sometimes, use of punctuations and auxiliaries in class notations also causes an error in the interpretation of the accurate class.

- Citation order problems are a major drawback of the UDC because no standards have been prescribed. In addition, the auxiliaries of the UDC are still developing, resulting in changes in notations often, which is a problem.

Principles of UDC

UDC is a classification system developed for arranging books and sub-titles in library shelves so that these can be easily found and retrieved. UDC is a system that allows for classification of the recorded knowledge and retrieval of this knowledge in an effective manner.

Following are the principles on which UDC has been based:

- UDC is classification in the strict sense and is based on analysis of data, content and relationships that exist between the concepts. UDC does not arbitrarily classify documents and knowledge.

- UDC is a universal classification system that involves every field of knowledge and classifies the documents on the basis of integrated patterns and correlated subjects.

- UDC is based on the principle of proceeding from general to particular knowledge domains.

- UDC is a practical system for information retrieval. It focuses more on the detailed specifications rather than on the order of the subjects or the documents it classifies.

- UDC also takes into account the principles of mutually exclusive classes, collection of related subjects and consistency of approach.

- UDC notation consists of Indo-Arabic numerals used decimally, which allows infinite hospitality and social sciences.

- UDC is based on the principle of using notations that allow linking of a main class to the auxiliaries in an easy manner.

- UDC is a general classification scheme and not a bundle of special classification. It is rather an integrated whole.

- UDC makes use of synthetic devices, such as colon (:), permits coordination of a concept in different permutations, thereby, minimizing rigidity in the enumerated classification scheme.

- UDC avoids the lacunae of numerous private classification schemes by providing a standard system covering all the disciplines and may be used in any type of library.

UDC in Use: Case Studies

The following case studies discuss the use of UDC:

Case Study 1—UDC for Use in Scott Polar Research Institute

The Library of the Scott Polar Research Institute (SPRI Library) offers the world's premier polar information center. It is located within a department of the University of Cambridge. The library houses resources of national and international importance consulted by governments, industry, scientists and scholars. The library also houses World Data Centre for Glaciology, Cambridge and has special responsibilities for the provision of information to British and European glaciologists. The SPRI Archives contain the world's finest collection of unpublished material relating to the Polar Regions.

For scientists and scholars, SPRI Library offers a collection developed since the 1920s with over 700 current journals and over 1,40,000 volumes covering all subjects relating to the Arctic, Antarctic, and ice and snow. For industry, it is a prime information source on such subjects as exploration and exploitation of natural resources and on the environmental implications of such activities in the Polar Regions. For government users, the library offers information for international relations and strategic defense.

The SPRI Library houses the following collection of information resources:

- **Arctic collections**: These are unique in covering all countries of the circumpolar north for all subjects and in all languages. There is no other library with similar collection. This collection contains substantial collections relating to the Arctic Ocean, European Arctic, and Russian North. The Arctic collections have information covering seas, such as the Arctic Ocean and adjacent waters: the various seas north of Russia (Chukchi, East Siberian, Laptev, Kara and White seas); Barents Sea; Norwegian Sea; Greenland Sea; Labrador Sea; Davis Strait and Baffin Bay; Hudson Bay; Lincoln Sea; waters of the Canadian Arctic Islands; Beaufort Sea; Bering Sea; the Sea of Okhotsk and the Gulf of Alaska. Land areas covered include Alaska (except for the Panhandle); Canadian Territories (Yukon and Northwest); those parts of Quebec and Labrador occupied by the Inuit; Greenland; Iceland; Svalbard; the European Arctic south to the Arctic Circle; and the Russian Federation in European Russia Asia, including all of Kamchatka and Sakhalin.

- **Antarctic collections**: These are the most famous collections in the library. It is presumed that these collections are not used in any other library of the world. These collections contain information both for the continent itself and for the surrounding ocean and sub-Antarctic islands.

The Antarctic is taken to include the continent together with its surrounding waters and islands north to the Antarctic Convergence, such as Gough Island, the New Zealand Sub-Antarctic Islands, Iles Amsterdam and Saint-Paul, Iles Crozet, Macquarie Island, and the Prince Edward Island. This area corresponds to the zone of interest of the Scientific Committee on Antarctic Research (SCAR). The SPRI has had a long association with British Antarctic activities and so the library also aims to maintain good, but not exhaustive, holdings for the Falkland Islands and Tristan da Cunha focusing particularly on natural history and on historical and political issues with an Antarctic dimension.

- **Glaciological collections**: The SPRI has over 100 current periodicals, 35,000 entries on glaciology and related subjects in the library database. There are as many entries in the card catalog. The glaciological holdings maintained by World Data Centre for Glaciology, Cambridge are very extensive and presumably not found anywhere else.

  The SPRI has adopted a broad definition of the scope of glaciology. It collects publications on all topics relating to snow and ice in all languages and for all parts of the world. The glaciology collection is, thus, not restricted to the Polar Regions. Among subjects included are glacial geology, geocryology, glacio-astronomy and snow and ice engineering.

UDC for use in SPRI

The SPRI Library follows long-established cataloging practice as in the size and coverage of the collection itself. Since its foundation, a policy has been maintained of providing information access points to items at the analytic and not just at the main entry level.

Each entry provides sufficient bibliographic information for identification and location of the source document together with a brief abstract and appropriate index numbers derived from UDC. All cataloging, indexing and abstraction is carried out by specialist bibliographers possessing a range of linguistic, regional and subject expertise as per the classes and rules specified by UDC.

Subjects Covered by Scott Polar Research Institute Library

All subjects relating to the Polar Regions are included, with particularly good coverage for:

- Land and sea ice
- Snow and snow cover
- Geocryology
- Snow and ice engineering
- Geology
- Marine sciences

- Ice navigation
- Atmospheric sciences
- Global change: indicators and implications
- Environmental issues
- Zoology (especially sea mammals and birds)
- Indigenous peoples of northern Russia, North America and the European Arctic
- International law and policy
- History of exploration

Geographical Locations Covered

The library database has particularly good coverage for:

- Alaska
- Antarctica (especially published results of historic expeditions)
- Arctic Ocean and adjacent waters
- Canadian North (Yukon and Northwest Territories)
- Northern Fennoscandia
- Greenland
- Russian Arctic and Siberia
- Svalbard

Since UDC covers all of the above listed subjects and geographic locations in its classes, it can be easily used in the SPRI Library. The records are maintained in the catalog using the main as well as auxiliary classes of the UDC, which correspond to the subject encompassed by the SPRI Library database. Since 1985, all bibliographic records are entered in the SPRI Library as per the rules of the UDC. The adaptation of the classes and notations of the UDC has made the retrieval and organization of collections in the SPRI Library easy and practical.

Case Study 2—Use of UDC in Internet Services

The UDC is an international scheme that endeavors to cover all areas of knowledge. The original purpose of use of the UDC for ordering and indexing entries in a printed bibliography have since been overtaken by its use for indexing and retrieval in computer-based systems. The scheme consists of 60,000 classes (divisions and sub-divisions) as well as a number of auxiliary tables to describe information related to a wide range of subjects.

At least five Internet services are currently using UDC. These include:

1. **BUBL**: The BUBL Subject Tree aims to give comprehensive coverage of UK Internet resources in all subject areas. The original Subject Tree uses UDC, but it should be noted that BUBL is in the process of

transforming into a new service called LINK that will be using the DDC scheme. BUBL does not classify individual items, but uses the UDC to provide section that can be browsed for each subject area. The depth to which the classification scheme is used varies across the different subjects.

2. **GERHARD**: In the Deutsche Forchungsgemeinschaft (DFG) funded project GERHARD (German Harvest Automated Retrieval and Directory), UDC is used in the enlarged and multilingual version of the ETH library Zürich. The aim of the project is to establish a service for searching and browsing German Internet resources. The documents are gathered by a robot, matched to the UDC entries by computer linguistic algorithms to create searchable index and an automatically generated Subject Tree. The project started in October 1996 at the university library of Oldenburg.

3. **NISS**: The NISS Directory of Networked Resources is a selective service that covers all subject areas. NISS uses UDC in some detail and browsing. NISS involves working through UDC hierarchies with the numbers displayed on the screen, above each section. The directory may be browsed in UDC number 'inverted tree structure', UDC number linear structure or alphabetical subject heading order. NISS does not normally classify beyond the decimal point, although there are exceptions in the 'computing' and 'geography' sections. UDC Class-marks are added to the directory on an ad hoc basis.

4. **OMNI**: OMNI (Organizing Medical Networked Information) is a selective subject service that catalogs resources relating to medicine. OMNI currently uses UDC to create sections that can be browsed by the users. OMNI finds it difficult to classify with the UDC scheme.

5. **SOSIG**: The Social Science Information Gateway is a selective subject service that catalogs resources relating to the social sciences. SOSIG does not use the UDC in its complete form, but has drawn upon UDC social science classification numbers to create the browsing sections of the service. 26 UDC numbers are currently used for the browsing sections. In cataloging however, a larger list is used—57 numbers have been selected with a view of increasing the number of browsing sections when a suitable number of resources have been placed in the new sections. No other UDC numbers are currently used.

UDC is used in a number of online catalogs, databases and information retrieval packages mainly because it is not language dependent. In addition, UDC is multi-lingual and is available for use in several languages.

The UDC according to Internet services has an advantage in that it is widely used and accepted. UDC is an agreed international standard, which means it is widely recognized, used and available. The structure of the classification allows

composite codes to be assigned to provide complex and detailed description of the subject content of a document or resource. UDC is a sizeable and comprehensive classification scheme, which gives it a certain amount of flexibility. UDC can be used in several Internet services in several different precision levels. UDC for Internet services is free to use and none of the services have to pay for UDC, which is counted as a main advantage of the UDC.

The UDC does have some weaknesses as seen by the Internet services. The UDC according to several Internet services is not frequently updated. Internet services that use UDC pointed out that some subjects in the UDC are old-fashioned and outdated. Some Internet services also pointed out that some sections of subjects have out-grown the main class of UDC that holds them. Internet services also pointed that the UDC was weak in some subjects and complex to use.

Case Study 3—UDC in Hellenic Centre for Marine Research

The HCMR Library Documentation and Information Centre is the result of a merger in 2003 of the National Centre for Marine Research (established in 1985) and the Institute of Marine Biology of Crete (established in 1987). The HCMR Library collection itself, however, goes back to 1945 when it formed part of the Hellenic Hydro-Biological Institute of the Academy of Athens. The joint HCMR Library is located in two Research Centers, which together constitute the HCMR Centre, in Anavyssos Attiki and in Herakleio, Crete.

The HCMR Library is a primary source for marine-related information in Greece; its collections and services are developed and maintained to support HCMR scientific staff as well as the scientific community all over Greece. Currently, the library collection numbers more than 17,000 volumes of monographs, reprints, reports and over 180 active print journals and also provides access to over 8,000 electronic journals. These represent the culmination of more than 100 years of collection and compilation, with an eclectic approach, which comprises oceanography, marine biology, marine geology, marine technology, geophysics and climatology, seismology, as well as extensive resources in ecology, zoology, fisheries, aquaculture and limnology. The HCMR Library has an outstanding collection of expedition reports, and a comprehensive collection of documents concerning Greek Waters.

In accordance with its collection development policy, the HCMR Library gathers material in all formats in order to support the research missions. The primary emphasis is on acquiring current materials, with a special emphasis on digital resources that can be delivered via the World Wide Web. The library seeks the most effective and economical methods possible for its collection acquisitions, licensing, and contracting procedures. The library makes use of the UDC to arrange and organize all types of collections it has and allows online access of these resources.

The Library's main objective is to collect and disseminate scientific information related to the Aquatic Sciences. It covers relevant subjects such as oceanography,

marine geology, marine biology, environment, pollution, ichthyology, ichthyopathology, fisheries, limnology and aquaculture. Fully automated services and access to its bibliographic databases are provided.

The books in the library are classified by the UDC according to the following main categories used by the library:

0 Generalities, science and knowledge, organization, information, and so on

5 Mathematics and natural sciences

51 Mathematics

53 Physics

54 Chemistry

55 Earth sciences, geology, meteorology, and so on

56 Paleontology

57 Biological sciences in general

58 Botany

59 Zoology

62 Engineering, technology in general

626 Hydraulic engineering in general

627 Shore engineering

628 Public health engineering (water supply, pollution of water sources, sewage, treatment, disposal)

639.2 Fishing, fisheries

639.3 Fish breeding, aquaculture

Case Study 4—UDC used in Library of Bombay College of Pharmacy, India

The library at Bombay College of Pharmacy is an integral part of the college. The library has a crucial role in supporting higher education as well as research activities; it has assumed great importance and new dimension today in context of the phenomenal growth of knowledge. The library has an open access system that follows the abridged English edition of 'UDC B.S.1000A, 1961' with the edition of 'UDC 615 Pharmaceutics, Therapeutics, Toxicology'. The library catalog consists of an Author Card Index, Title Card index, Journal, Series Card Index and follows the AACR code for cataloging. Library collection includes Pharmaceutics, Pharmaceutical Chemistry, Pharmacology, Pharmacognosy, Pharmacy Management and related subjects, Reference books, such as the USP, BP, IP, Martindale, Merck Index, and Manuals, and so on. Library has a good collection of old Reference Books and Bound Volumes of Journals. At present the library has a collection of 9250 books, 36 national and international Journals,

2740 bound-back volumes of 88 journals, 4488 thesis in fields of Pharmaceutics, Pharmacology, Pharmaceutical Chemistry and Pharmacognosy. The library has a collection of 132 non-book materials, i.e., slides, cassettes, floppies, CDs, and so on. The library makes use of the UDC for organizing all types of library materials that it houses including journals, reports, thesis, CDs, cassettes, and so on.

UDC is used by the library at Bombay College of Pharmacy to:

- Collect, store, organize and access information in digital form
- Meet requirements of patrons by providing better services
- Provide personalized and retrospective information in efficient way
- Procure digitalized databases
- Avoid routine jobs in the management of the library
- Provide coherent view of all information within the library in a convenient format
- Serve a widely dispersed communities through the network
- Minimize massive storage and space problem associated with large libraries

COLON CLASSIFICATION (CC)

Colon classification is the best available systematic scheme of library classification. The colon classification system is used in many libraries in India and a few libraries abroad as well. Colon classification was developed and introduced by late Dr S. R. Ranganathan. The available library classification systems according to Dr S. R. Ranganathan were not flexible enough to allow accommodation of new subjects that evolved with the ever-changing dynamic world of knowledge. According to him, the existing library classification systems were not able to cope up with the new subjects very well. He, thus, went on to develop a new library classification system called colon classification.

Colon classification includes and enumerates all possible subjects and their sub-divisions. The colon classification system analyses the subjects according to their various components, and places them under five fundamental categories known as personality, matter, energy, space and time. The different components of the subject are connected and synthesized using special symbols provided in colon classification.

To build a class number, colon classification analyzes and picks up the possible isolates belonging to different fundamental categories. These are then put together with the help of appropriate connecting symbols to get a unique class number that defines a specific subject.

Colon classification is an Analytico-synthetic scheme of classification. It involves analysis and synthesis of the subjects and their inter-connections. Colon

classification is a general scheme for classification of documents. The main aim of colon classification is to classify all kinds of documents—books, periodicals, reports, pamphlets, microforms and electronic media in all kinds of libraries on the basis of the subject of the documents.

Colon classification because of its simplicity and ease of use finds use in several applications and is used in many libraries and institutions to make the task of classification and retrieval of information simple and easy.

Editions of Colon Classification

Colon classification was first published in 1933 and since then several editions have been published. The first edition of colon classification provided and used scheduled diverse facets in each basic class. The colon was introduced as the notational device for synthesis of the classes. Since the use of symbol ':' was an important part of the scheme, the scheme was named colon classification.

The features of the first edition of colon classification (CC1) are as follows:

1. Colon classification provided schedules for different facets in each basic class.

2. Special schedules for common subdivisions, geographical divisions and language divisions were provided in colon classification.

3. The class number could be constructed in colon classification by combining numbers taken from the different facets of the various basic classes.

4. CC1 used mixed notation, consisting of capital letters, small letters, Arabic numerals and the colon.

5. Decimal fraction notation, as well as octave notation was used in CC1 for the purpose of hospitality in array.

6. CC1 made use of eight special devices that included the colon device, geographical device, chronological device, favored category device, classic device, alphabetical device, subject device and bias number device.

7. CC1 provided a new phenomenon for constructing the book number. It also allowed the books having the same class number to be individualized and classified.

8. CC1 used the concept of phases.

The second edition of colon classification (CC2) was published in 1939. This edition was an improvement of CC1. CC2 made use of the concept of fundamental categories. Fundamental categories included personality, matter, energy, space and time. These categories formed the basis of classification of the documents.

The third edition of colon classification was published in 1950. The third edition was improved to provide a facet formula for each basic class. However, the formula was defined taking into consideration the fundamental categories on the basis of which the classification of documents was carried out.

The fourth edition of colon classification was published in 1952. In this edition, different indicators were introduced apart from the colon. These indicators were used to define different facets that corresponded with the different fundamental categories. The different indicators introduced in the fourth edition are as follows:

- Comma for personality
- Semi-colon for matter
- Colon for energy
- Dot for space
- Dot for time

With the introduction of new indicators, the entire scheme used for document classification needed to be changed and reconstructed. In the fourth edition of colon classification, the concept of fundamental categories was used in a concrete manner. The fourth edition also introduced the concepts of rounds and levels.

The fifth edition of colon classification was published in 1957. The fifth edition had all the basic features of its preceding editions. However, the fifth edition of colon classification introduced substantial changes in the rules and in various schedules that were used for the classification of documents.

The sixth edition of colon classification was published in 1960. The sixth edition made various changes in the schedules using which classification was done. The use of Greek symbols was made in the sixth edition. A major change was made to the sixth edition of colon classification. The sixth edition made use of an inverted comma (') instead of dot (.) for the time facet.

The seventh edition of colon classification was published in 1987. This edition of colon classification provides schedule of basic classes. In the seventh edition, common isolates are also listed and so the class numbers are not readily provided, but have to be constructed. The seventh edition of colon classification is an analytic-synthetic scheme for classification of documents.

Main Classes of Colon Classification

In colon classification, no subject or document can exist without a main class. Thus, main class is the central element of colon classification. The main classes of colon classification are as follows:

- **Z:** This class is meant for any publication that deals with several subjects and cannot go into any other single main class.
- **2:** This class deals with documents related to library science. The facet formula for this class is 2[P];[M]:[E][2P] where [P] is the kind of library,

[M] is the kind of document under process and [E] Cum [2P] are library techniques, procedures and processes.

- **B:** This class deals with Mathematics. The main class Mathematics is divided into 9 canonical sub-divisions or classes. These are: B1 for Arithmetic, B2 for Algebra, B3 for Analysis, B4 for Other Methods, B5 for Trigonometry, B6 for Geometry, B7 for Mechanics, B8 for Physico-Mathematics and B9 for Astronomy.

- **C:** The main class C deals with Physics and is divided into 8 canonical divisions that are C1 for Fundamentals, C2 for Properties of Matter, C3 for Sound, C4 for Heat, C5 for Light, Radiation, C6 for Electricity, C7 for Magnetism and C8 for Cosmic Hypotheses.

- **D:** this class deals with Engineering. The facet formula for this class is D[P],[P2]:[E][2P] where [P] is the kind of work, [P2] is the part of work, [P3] is the part of work of D6 and [E] cum [2P] are various engineering operations.

- **E:** The main class E deals with documents related to Chemistry. The facet formula for this class is E[P]:[E][2P] where [P] are elements or compounds, organic and inorganic, collectively termed as substance number, [P2] are organic derivatives and [E] cum [2P] are chemical processes and manipulation.

- **F:** This class deals with Technology. The facet formula for this class is F[P]:[E][2P] where [P] is the substance facet, [E] cum [2P] means the problem facet as well as the process facet.

- **G:** This class is related to Biology. The facet formula for this class is G[P]:[E][2P] where [P] is the kind of life and [E] Cum [2P] is the biological problem of life.

- **H:** The class H refers to documents related to Geology. The class is divided into 8 canonical divisions, which are H1 for Mineralogy, H2 for Petrology, H3 for Structural Geology, H4 for Dynamic Geology, H5 for Stratigraphy, H6 for Paleontology, H7 for Economic Geology and H8 for Cosmic Hypotheses.

- **HZ:** This class deals with Mining. The facet formula for the class is HZ[P],[P2]:[E][2P] where [P] is the ore, [P2} is the part of the work and [E] Cum [2P] are the processes involved in mining.

- **I:** The class I deals with botany. The facet formula is I[P],[2P]:[E][2P] where [P] is the natural group, [P2] is the part or organ of the plant, [E] Cum [2P] denotes the life processes.

- **J:** This class is related to Agriculture and the facet formula is J[P]:[E][2P]:[2E] where [P] is denoted as plants, [E] is the problem isolate, [2P] is denoted by substance, [2E] is denoted by operation isolate.

- **K:** The class K is related to Zoology with the facet formula K[P]:[E][2P] where [P] is the natural group isolate and [E] and [2P] is the problem isolate.

- **KZ:** This class is related to Animal Husbandry. It uses the facet formula KZ [P]:[E][2P]:[2E][3P] where [P] is the kind of animal isolate, [E] is the problem isolate and the techniques of animal husbandry, [2P] is the extension of [E], [2E] and [3P] are the form division.

- **L:** This class deals with Medicine and has the facet formula LP [P]:[E][2P]:[2E][3P] where [P] is the body organ,[E] cum [2P] is the biological problems of human life; working and failure of human machine, [2E] cum [3P] is the prevention or treatment or pathology of diseases.

- **LZ:** This class represents Pharmacognosy and has the facet formula LZ3 [P]:[E][2P]. This main class has been divided into canonical classes: LZ3 for Pharmacology, LZ5 for Pharmacopoeia and LZ8 for Pharmacy.

- **M:** The class M deals with information and documents related with Useful Arts.

- **^ :** This class is related with Spiritualism and the facet formula used for this class is ^[P],[P2]:[E][2P] where [P] is the kind of religion, the domain of spiritual and mystic experiences, [P2] is the entity isolates or is the agency of experiences, [E] cum [2P] is the problem facet that involves methods, techniques and ultimate results of mystic and occult experiences.

- **N:** This class represents Fine Arts. It is further sub-divided into NA for Architecture, ND for Sculpture, NN for Engraving, NQ for Painting and NR for Music.

- **O:** The main class O is related with Literature. It works on the facet formula O[P],[P2][P3],[P4] where [P] stands for language of the literature, [P2] stands for the form of literature that includes drama, poetry or fiction, [P3] stands for the author facet, [P4] stands for the individual named work of a given author.

- **P:** The main class P deals with documents that contain information related to Linguistics. It uses the facet formula P[P],[P2][P3]:[E][2P] where [P] is the language under study, [P2] is the variant stage, [P3] is the linguistic element whereas [E] cum [2P] are the linguistic problems.

- **Q:** The main class denoted by Q deals with religion. It uses the facet formula Q[P]:[E][2P] where [P] is the religion itself, [E] cum [2P] enlists the religious practices and beliefs.

- **R:** The class R represents Philosophy. It is divided into eight canonical divisions that are R1 for Logic, R2 for Epistemology, R3 for Metaphysics, R4 for Ethics, R5 for Aesthetics, R6 for Favored System(1), R7 for Favored System (2) and R8 for Other Systems.

- **S:** The class S deals with Psychology and has the facet formula S[P]:[E][2P] where [P] is the individual human being and [E] and [2P] enlist psychological activities and processes.

- **T:** The main class T deals with education. It makes use of the facet formula T[P]:[E],[2P],[2P2] where [P] is constituted of various types of educands-the level or kind of students, [E] is constituted of educational techniques or problems, [2P] covers the subject taught, [2P2] enlists methods or physical medium of education.

- **U:** This class deals with Geography and has the facet formula U[P].[S]'[T].

- **V:** This class deals with History and has a facet formula V[P],[P2]:[E][2P]'[T] where [P] is the community as distinguished from the geographical area, [P2] is the organ of the government, [E] and [2P] cover the activities, functions and policies of government.

- **W:** The class W deals with Political Science. The facet formula used for classification is W[P][P2]:[E][2P] where [P] is Type of State, [P2] is the organ of the state; [E] cum [2P] cover activities, politics and function of the state.

- **X:** The main class X deals with Economics and its various systems. The facet formula used is [P];[M]:[E][2P] where [P] is business or economic agency, [M] is the medium of currency and [E][2P] is economic problems and activities.

- **Y:** The class Y deals with Sociology by making use of facet formula Y[P]:[E][2P]:[2E][3P] where [P] is the community or social group-isolates enumerated, [E] and [2P] facet covers activities, traditions, social problems, [2E] and [3P] deals with secondary problems, such as conservation, development and prevention of social ills.

- **Z:** The class Z is related to Law. It makes use of the facet formula Z[P],[P2],[P3],[P4} where [P] is the community over which a given law has the jurisdiction. [P] stands for community and not a subject. [P2] and [P3] are Law I and Law II respectively.

Thus, the colon classification system covers a wide range of subjects and knowledge domains on the basis of which it classifies the various documents. Colon classification defines the main subjects as the main classes and within a main class, several classes can be defined that deal with the various aspects of the subject represented in the main class. Thus, colon classification system focuses on the details of the document rather than the order of the subjects on the basis of which it classifies documents.

Notations used in Colon Classification

Colon classification makes use of a notational system to name classes and to assign numbers to the subjects it classifies. The notational system used consists of

23 Roman small letters (a…z excluding i, l, o), 10 Indo–Arabic numerals (0–9), 26 Roman Capital letters (A–Z), bracketed numbers, indicator digit hyphen (-) and asterisk (*).

Z, 0 (zero) or 9 (nine) represent an empty digit. T, V, X and Z are used as emptying digits but if these appear as the initial digit of the document number or name then they have a semantic meaning associated and are not considered emptying digits. U, W and Y are empty-emptying digit.

Colon classification also makes use of isolates, and the notational system used assigns numbers to the isolates. The notational system makes use of the following to name and number isolates: 10 Indo–Arabic numerals (0–9), 26 Roman capital letters (A–Z), 23 Roman small letters (a–z excluding i, l, o), bracketed numbers and indicator digits * ' •!) & ' . ; , - = + '! (.

Isolates in Colon Classification

In colon classification, an isolate is the basic unit of knowledge. An isolate cannot stand by itself and, thus, cannot make a main class in colon classification. A common isolate is an isolate that is enumerated only once and remains fixed or same for every main class. Common isolates are attached to a majority of classes but not essentially all classes. Common isolates represent auxiliaries and not a part or concept of a main subject. Common isolates stand for divisions such as encyclopedia, dictionary, periodical, commission report and conference proceeding.

Common isolates can be further divided into anteriorizing common isolates and posteriorizing common isolates. Anteriorizing common isolates are the ones that when attached to a subject give it an anterior position over other subjects of the same class. They are of three kinds: Applicable before Space Facet, Applicable after Space Facet, and Applicable after Time Facet. Posteriorizing common isolates give posterior position to the document to which they are attached. It means a class number fitted with a PCI will come after the same class number without it. Posteriorizing common isolates are of two types: Energy PCI and Personality PCI. Energy PCI are attached with a colon and Personality PCI are attached to any class with a comma.

Advantages and Disadvantages of Colon Classification

Colon classification is an analytical and synthesizing technique of document classification. The system studies the details of the documents to be classified and then accurately tries to classify the document. Colon classification has the following advantages:

- Colon classification system uses a sound theory for classification of documents and so can be used to classify any document related to any subject.
- The notations used in colon classification are easy to use and understand and so a unique number can be assigned to practically every document or

subject, which is classified using this system of document classification.

- Since colon classification uses analysis and synthesis of the documents to be classified, the system is able to provide a helpful order for the classes it contains. This factor also makes it possible to locate any topic or subject whether it is simple, complex or compound.

- Since colon classification is easy to use and understand, it can easily be used in an online or computer-based document finding system to locate and retrieve information in an accurate manner.

Colon classification is used in several libraries especially in India. Though its implementation is successful, there are a few drawbacks of colon classification system. The disadvantages of colon classification are as follows:

- There is no provision for revision of colon classification classes and subjects. There is no machinery or a centralized institution that manages colon classification and so revision work in this case is not possible.

- A few editions of colon classification lack guidance and clarity in some areas and so make the classification ambiguous.

- Colon classification rules are not easy to understand. One needs a manual to apply the rules for classification of documents and also for retrieval of accurate information.

- Colon classification is not considered simple and cannot be used by novice users as it is not user friendly.

Implementation of Colon Classification—Case Studies

The following case studies discuss the implementation of colon classification:

Case Study 1—Colon classification as used in Central University of Tibetan Studies

The acquisition and technical processing section of the Central University of Tibetan Studies library is responsible for the acquisition and technical processing of the information resource, acquired in accordance with the acquisition policy of the library and requisitions of learned faculty members. The section also receives books on approval from different suppliers and organizes meetings of the books' selection committee to get the purchase recommendations.

The library follows colon classification 6th ed. for subject classification of printed documents and AACR2 for cataloging of the documents.

The library houses:

1. All types of documents in Tibetan language in any subject irrespective of forms

2. Documents in any language dealing with the subjects of Buddhology, Tibetology, Philosophy, Religion, Culture, History, Geography, Arts,

Anthropology and allied subjects having direct bearing on Tibetology and Buddhology

3. Documents of English, Hindi and related languages on the subjects of Himalayan Studies, Indology, Mongolian Studies and Sinology

4. Documents of Sanskrit language and literature

5. Important reference materials and popular books

6. Documents relating to Library and Information Science

7. Academic course materials to support the curriculum of the institute

The Technical Section of the Shantarakshita Library is responsible for the technical processing of printed and non-print documents other than Serial and Tibetan language. The library follows Dr S. R. Ranganathan's colon classification, 6th ed., for subject classification of the printed documents and AACR2, 1978 for cataloging of all type of documents. The multi-lingual library database having bibliographical details in Tibetan, Devanagari and Roman Scripts is accessible from any computer node of the University's network and also from university Website. The library has successfully used colon classification for the use of effective cataloging. The organization of the library materials has become easy for the library and also the access and retrieval time has been improved significantly.

Case Study 2—Colon classification used in Banaras Hindu University

The Banaras Hindu University library system with the Central Library at the apex has three Institute Libraries, namely, Institute of Agricultural Sciences, Institute of Technology and Institute of Medical Sciences, eight Faculty Libraries, 26 Departmental Libraries, and one South Campus Library. The total collection of library materials in the libraries exceeds 15.0 lakhs.

This library uses colon classification. Books are arranged according to the subject content of each book. Each book is given a number known as the Call Number. This number is written on the spine of each book and is also written on the corresponding cards in the Card Catalog, which is the key to the library collections. Before going to the shelves, it is advisable to consult the catalog to know a particular book is available in the library or not, and if it is available then one should note down the Call Number written by pencil on the Catalog Card.

The library has a good collection of periodicals in various subject fields. It presently subscribes above 600 print periodicals. Periodicals in the subject fields of medical sciences, engineering and technology, law, education, botany, physics, chemistry are available in the concerned Institute/Faculty/Departmental Libraries. All periodicals are cataloged according to colon classification.

Copy of the thesis approved for Ph.D. and D.Litt. in the Banaras Hindu University is kept in the Theses Section. Above 14,000 titles of thesis are there in that section.

A separate catalog by author, title and subject has been provided in front of the section. The computerized catalog is also available in theses section. Thesis can be searched through OPAC (Online Public Access Catalog) also. The journey of books started from acquisition section to technical section after accessioning. In technical section, books are processed with the help of colon classification scheme and unique call number is provided to it.

The database of books is created in SOUL software and now catalog card is generated on the pattern of AACR2 using SOUL Library Automation Software of UGC/INFLIBNET (University Grants Commission/ Information and Library Network). The barcoding, labeling and other steps are applied on the document to make it fit for issue.

Case Study 3—Central Reference Library

The Indian National Bibliography has been conceived as an authoritative bibliographical record of current Indian publications in Assamese, Bengali, English, Gujarati, Hindi, Kannada, Malayalam, Marathi, Oriya, Punjabi, Sanskrit, Tamil, Telugu and Urdu languages, received in the Central Reference Library, Kolkata.

The following types of publications are excluded:

- Maps
- Musical scores
- Periodicals and Newspapers (except the first issue of a new periodical and the first issue of a periodical under a new title)
- Keys and Guides to Textbooks
- Ephemeral and other such materials

The main entries are in Roman script and the collations and annotations, if any, are in English. The classified portion follows DDC scheme but numbers from colon classification scheme are assigned to each entry at the bottom right hand to facilitate the use of Bibliography and libraries, arranged according to the CC schemes.

BIBLIOGRAPHIC DESCRIPTION

A bibliography is a list of all the sources that have been used in the research of any literary work, which may be a book, a journal or any other project. As a discipline, bibliography can be defined as the academic study of books. Bibliography considers books as physical and cultural objects and, thereby, suggests that books have attributes or characteristics, which can be defined and developed independent of each other. It is considered as a special aspect of library and documentation sciences that can be used to describe books and text therein.

A bibliography typically includes the name of the author, the titles of the works, the names and locations of companies that published the works that have

been referred to, the dates when the works were published and the page number of the sources. When the bibliography contains a brief description about the content, quality and usefulness of the source, it is known as annotated bibliography.

Bibliographies vary in the detail they carry and also on the purpose, and can usually be classified as enumerative bibliographies and descriptive bibliographies. Enumerative bibliography identifies books in specific collections or libraries in a specific discipline, by an author, a period of production or by the co-author, printer, and so on. These bibliographies result in an overview of the publications in a particular category. An entry in an enumerative bibliography will contain the core elements of the source including the title, the creator or author, the date and place of publication of the resource. An enumerative bibliography does not describe the source in detail. For instance, an entry for a journal in an enumerative bibliography will contain the creator, article title, journal title, volume, pages and the date of publication and will not have any description as to what the journal actually contains.

Descriptive bibliography on the other hand refers to a systematic description of a book as a physical or material object. In descriptive bibliography, each and every element of the book is considered as a separate entity and has its own representation.

A descriptive bibliography provides sufficient information related to the book so that a reader is able to understand the precise contents of the book. Descriptive bibliographies usually contain information on the following aspects of a book:

- Format and collation statement that uses conventional symbolic forms to describe the book in terms of sheets, fold, signatures and pages
- A description of the binding techniques used to bind the book together
- The transcription of the title page including rule lines and ornaments
- The contents of the book
- A description of the physical properties of the paper used including the production process, the measurements and the watermarks present on the paper
- A description of the illustrations found in the book including the printing process used for illustrations and the location of the illustrations in the book
- Details about the presswork or the production of the book
- A list of the copies of the book examined to create the descriptive bibliography

Analytical bibliography deals with the objective, physical analysis and history of a book. Analytical bibliography basically investigates the printing and physical features of the book. In fact, analytical bibliography is the first stage of descriptive bibliography and provides all the vocabulary, mechanisms and techniques that is used for creating a descriptive bibliography of the book.

There are two other sub-categories of bibliographies**:** historical and aesthetical bibliography. Historical bibliography involves the investigation of the printing practices, tools and related documents of the source under observation. Aesthetic bibliography deals with examining the art of designing the books and the text and illustrations contained therein.

Bibliography as a broad concept can be applied to non-book items as well. It can be used for investigating the material form, structure, textual variations, technical and production processes of the non-book items. Bibliography can be applied to recorded music, films as well as Websites and other non-boom materials effectively.

International Standard Bibliographic Description (ISBD)

ISBD is a set of rules formulated by International Federation of Library Associations and Institutions (IFLA) for creating bibliographic descriptions. This set of rules is especially suitable for bibliography or a library catalog and works effectively for text documents. The purpose of these rules is to create a bibliographic description in a human readable and standard form. The ISBD provides bibliographic description and allowed for exchange of records and documents internationally in a standard form.

Structure of an ISBD record

The ISBD defines nine areas of description according to which documents can be classified. Every area consists of multiple elements and follows a classified structure. These elements and areas are separated and identified by standardized punctuations including colons, semi-colons, slashes, dashes, commas and periods. The nine areas of description are as follows**:**

   0: Content form and media type area

   1: Title and statement of responsibility area. This area has the following elements**:**

      1.1 Title proper

      1.2 Parallel title

      1.3 Other title information

      1.4 Statement of responsibility

   2: Edition area

   3: Material or type of resource specific area

   4: Publication area, production area, distribution area, and so on

   5: Material description area, for example, the number of pages of the book

   6: Series area

   7: Notes area

   8: Resource identifier and terms of availability area

Anglo–American Cataloging Rules

The Anglo–American Cataloging Rules are national cataloging codes that were first published in 1967. The second edition of Anglo–American Cataloging Rules is known as AACR2. The second edition of AACRs was published jointly by the American Library Association, the Canadian Library Association and the Chartered Institute of Library and Information Professionals in the UK. The editor of AACR2 is Michael Gorman.

The purpose of designing AACR2 is the construction of catalogs and other lists in general libraries of all sizes. The rules of AACR2 cover the description of library materials, the provision of access points for all library materials, which are generally collected and need classification.

AACR2 claims to be Anglo–American. However, the first edition of AACR was published in 1967 in North American and British texts. In the second edition, which was published in 1978, the two sets of rules were unified and brought in line with the International Standard Bibliographic Description.

AACR2 exists in several print versions, as well as an online version. Print versions are available from the publishers while the online version is available only via Cataloger's Desktop from the Library of Congress. The AACR2 has also been translated and these translated versions are also available from various sources.

The AACR2 follows the principle of cataloging from the item in hand or the library source, which is available and is being investigated. AACR2 does not rely upon inferring information from external sources. AACR2 is based on the assumption that collecting and relying on information from external sources may give rise to conflicts in cataloging.

AACR2 has been updated by masking small changes over the years. A significant change was brought about in 1988 and 2002. The 2002 revision included substantial changes to sections for non-book materials.

Structure of AACR2

AACR2 consists of two parts and four appendices. It also contains an index at the end. The structure of AACR2 is as follows:

Part I: Description

1. General Rules for Description
2. Books, Pamphlets and Printed Sheets
3. Cartographic Materials
4. Manuscripts
5. Music
6. Sound Recordings

7. Motion Pictures and Video Recordings

8. Graphic Materials

9. Machine-Readable Data Files

10. Three-Dimensional Artifacts and Realia

11. Microforms

12. Serials

13. Analysis

Part ll: Headings, Uniform Titles and References

14. Choice of Access Points

15. Headings for Persons

16. Geographic Names

17. Headings for Corporate Bodies

18. References

Appendix A: Contains Instructions for Capitalization

Appendix B: Contains List of Standard Abbreviations

Appendix C: Deals with Numerals

Appendix D: Glossary

AACR2 prescribes three levels of details in the description depending upon the nature and size of the library, which is using the AACR2 for cataloging. The first level provides a brief cataloging description to identify a particular document in the library. The first level of description is recommended for a small library. The second level of description is recommended for a medium-sized library. The third level of description includes all elements that are prescribed by AACR2 and is recommended for a highly specialized library. The third level of description is also recommended for national and research libraries.

Logical Structure of Anglo–American Cataloging Rules 2

The AACR2 considers each bibliographic document as an entity. So, for each document, AACR2 defines the following entities—series, subseries, class of materials, type of publication and chief source of information.

A document in the AACR2 is an object that comprises of intellectual and/or artistic content. A document in AACR2 can be either a published document or an unpublished document. A document may contain one or more document parts. Each document part is a separate component of the document. The document and the document part consist of content. Content is the intellectual or artistic substance contained in the document and may further contain content part. The content part is an individual component of the intellectual or artistic content of a document or document part. The content and content parts together are set as one or more

infixion. An infixion refers to the formatting and structuring of the intellectual or artistic content. An infixion is stored in one or more physical carriers. Physical carrier is the medium in which data, sound, images, and so on, are stored. The physical carrier may be housed in a container, which is again a document or document part separate from the documents being described.

The document is the focus of the bibliographic description. The document may belong to one or more series or sub-series. Series is a group of documents, which are related to one another. In a series, each document has its own title and a common collective title applies to all the documents in the series. A series also acts as a place marker to accommodate documents that belong together.

A series may comprise one or more sub-series. Sub-series is a series within series. A sub-series usually contains documents that are a subset of larger set of documents.

The logical structure of AACR2 is based on the assumption that a document may also belong to a class of materials. Class of materials may be a broad class or a specific class to which the document has been assigned. Class of materials is a bibliographic entity that organizes the rules for the bibliographic description. Documents are assigned to specific classes depending upon the physical carrier of the documents. These specific classes are then grouped to form a broad class of materials based on the common physical characteristics of the specific classes.

Type of publication is the category to which the document belongs. Documents are assigned to a type of publication depending on whether the document is to be completed in a single or finite number of publications or editions or it will be continued indefinitely.

The class of materials and the type of publication together determine the chief source of information of the document. Chief source of information is the source of bibliographic data, which has to be given preference as the source from which a bibliographic description is prepared.

The logical structure of AACR2 described is suitable for published documents. For unpublished documents, in addition to the above description, several external factors also need to be included in the logical structure.

When an unpublished document has to be described, the rules for description also provide for entities external to the document to be described. These entities include person, corporate body, production, creation, ownership and equipment. A person is an individual and a corporate body is an organization or group of people identified by a particular name or an act. A person or corporate body is responsible for the production of the document or the creation of the document content. A person or a corporate body may also be the one to whom the ownership in the document has been transferred.

A person or corporate body may be responsible for production or creation of a document. Production is the act of physical creation of document, while creation

of document is the act of originating intellectual or artistic content. A person or corporate body is also responsible for transfer of ownership of the document. Ownership refers to the legal title to a document.

Infixion and physical carrier may require equipment. Equipment is a device used to play, project, operate or use a document whose content cannot otherwise be accessed by the unaided senses or document users.

The logical structure of AACR2 also takes into account manufacture. Manufacture is the process of making copies of a document by mechanical or electronic means. Release is the process of making copies of a document for the public. Manufacture and release are linked to copy. Copy is a single specimen of the document. A copy is normally the object from which the cataloger derives the evidence necessary to describe the document as a document. A copy belongs to an impression. An impression encompasses all copies of an edition that are manufactured at one time.

Issue belongs to edition that encompasses all copies of the document produced from the same image or master copy and also issued by the same entity. The logical structure is used to create a bibliographic description by studying the relationships between different entities.

Entries in AACR2

According to AACR2, each library prepares various unit records for each document. The unit record is prepared to meet the various needs and approaches of the various document users. Each unit record in AACR2 is called an entry.

AACR-2 recommends the following types of entries:

1. **Main Entry:** The Main entry is an author entry in AACR2. This means that the main entry is based on the author of the document. If the author of the document is not known, then the main entry is prepared under the title. The main entry represents the complete description of a document. It also includes the tracing of headings under which the document is to be presented in the catalog. A heading is a name, word, or phrase placed at the head of a catalog entry or reference to provide an access point for the document. A heading may represent a bibliographic description, a series or a work.

2. **Added Entry:** An added entry is a secondary entry. This entry acts as an additional entry to the main entry, which represents a document in a catalog. There are different types of added entries. These include— Joint author(s), Editor(s), Translator(s), Compiler(s), Subject, Title, Series, and so on. A document may require several added entries. The number of added entries depends upon the nature of the document and also on the nature of the catalog used in a library.

3. **Reference:** Reference provides a direction from one heading or entry

to another. AACR2 uses different types of references that include See Reference, See Also Reference, Name Title Reference, Explanatory Reference, and so on. The most frequently used references in AACR2 include 'See' end 'See Also'. See Reference directs the user of a catalog from one form that contains the name of the person or corporate body or title of the document to another form that has been chosen as a heading or a uniform title. The 'See Also' Reference directs the user from one name heading or uniform title to another that is related to it.

The entries in AACR2 are written on catalog cards. These catalog cards may be ruled, semi-ruled or plain cards. When the entries are to be made by hand, the ruled catalog cards are best option. In case of typed entries, plain cards are more suitable and easy to use. There are different lines on the catalog card, which may be of the following types:

- **First indentation:** First indentation is the first vertical line that lays nine spaces from the left margin. The first indentation line is generally marked in red ink.

- **Second indentation:** Second vertical line lays spaces from the left margin or at a space of four letters from first indentation. This second vertical line is also marked in red ink.

- **Third indentation:** Third indentation line beyond the second line is an imaginary line. lt lays fifteen spaces from the left margin. This line generally marks the beginning of a reference. The referred-from heading continues from the third indention.

- **Horizontal line:** The catalog card also has one horizontal line. This horizontal line lies in the upper section of the catalog card. The horizontal line is a bold line and is also indicated in red ink.

- **Hole:** The catalog card also contains one hole at the bottom portion. This hole is located at an equal distance from both the vertical cores of the cards. Catalog cards are usually placed in trays, and brass or iron rods are used to support these cards in trays through the hole in the catalog card.

Types of Information Needed for Document Cataloging

AACR2 needs different types of information for cataloging of documents. This information includes the following:

- Name of the authors
- Name of the collaborators
- Title, subtitle or alternative title of the document
- Edition name of the series
- Editor of the series

- Name, place and year of publication
- Size and number of pages of the document
- Copyright year
- ISBN/ISSN (International Standard Book Number/International Standard Serial Number)
- The call number (class number and book number) of the document
- Accession number of the document

Organization of Bibliographic Description in AACR2

The various elements and components to be included in the bibliographic description are organized as areas. The following is the organization of a description of a document in AACR2:

Title and Statement of Responsibility Area

1.1B Title proper (including alternative title)

1.1D Parallel titles

1.1E Other title information

1.1F Statements of responsibility

Edition Area

1.2B Edition statement

1.2C Statements of responsibility relating to edition

Publication Area, Distribution Area, and so on

1.4C Place of publication, distribution, and so on

1.4D Publisher, distributor, and so on

1.4F Date of publication, distribution, and so on

Physical Description Area

1.5B Extent of item, including specific material designation

1.5C Other physical details

1.5D Dimensions

1.5E Accompanying material (if any)

Series Area

1.6B Title proper of series

1.6C Parallel title of series

1.6F ISSN of series

1.6G Numbering within series

Note Area

1.7 Notes

Standard Number and Terms of Availability Area

1.8B ISBN

1.8E Qualification

General Rules for Bibliographic Description in AACR2

For description in AACR2, each area except the first area is preceded by a full stop-space-dash-space (. - -). The prescribed punctuation is omitted only when the next area is paragraphed in the description.

Title and Statement of Responsibility Area is the first area of the description in AACR2. Generally, the cataloger transcribes whatever is seen in the same order that it appears on the chief source of information. If the elements of the chief source of information are not in prescribed order, they are transposed to get them into the correct order, which is title/statement of responsibility. According to AACR2, the Title and Statement of Responsibility Area is to be transcribed as it appears with the same wording and spellings but not necessarily capitalization. Punctuation between elements is prescribed according to AACR2. Punctuation other than the prescribed punctuation can be added, omitted or changed as per the requirements of the catalog and the library for which the catalog is being developed. A comma is generally used to separate alternative titles. Exclamation points and question marks occurring in the title are retained in the description.

An alternative title may be introduced with the help of the conjunction 'or'. The title proper must also be transcribed as it appears in the source of information. If the title proper has the author name and date of publishing as integral parts, these must be retained in the description. According to AACR2, the first alphabet of the title proper, alternative title as well as a parallel title must be capitalized. In case of a very long title, the title must be transcribed as it is. There are very rare circumstances in which the long title is abridged or abbreviated. In case the title of the description is missing from the chief source of information, the cataloger must look for the title in other related sources or can even make a title on his/her own.

Sometimes, the chief source of information includes a collective title together with individual titles for the works that have been included in the collection. In this case, the collective title is used as the title proper and the individual titles are omitted from the description.

General Material Designation or GMD identifies the general category of the material being cataloged or described. GMD helps to distinguish one general category from another in a catalog that contains several types of materials. The physical description area also describes the special nature of the material. AACR2 includes two lists for GMDs, one for libraries in the United Kingdom and one for Anglo–American libraries. The AACR2 uses two lists because in the United

Kingdom, strong emphasis is placed on general character of the terms to be used in GMDs while in other libraries, these terms are not of much significance. AACR2 is based on the principle of a fully integrated library collection with all library materials being cataloged under the same rules. Thus, AACR2 gives the cataloger the option of adding general material designation to not only non-book materials but even to books.

Sometimes, the chief source of information contains repeated titles in different languages. Such titles are parallel titles. In this case, the first title is regarded as the title proper of the description and is recorded for use. Other title information also needs to be transcribed as it appears in the chief source of information. This information is separated from the title using space-colon-space (**:**). If other title information is lengthy and does not contain essential information, some of it may be omitted from the description. The omissions are denoted by ellipses. However, the first five words of the other title information must never be omitted. The individual words in the other title information must not be abbreviated.

If the statement of responsibility appears in the title, whether as a part of the title proper or as a part of other title information, this statement of responsibility must be transcribed as it is. The preposition 'of' is used to record this statement of responsibility in the description. The statement of responsibility is always transcribed as it appears in the chief source of information unless the cataloger is using the first level of description as suggested by AACR2. In this case, the statement of responsibility is the same as the main heading. AACR2 does not allow the use of abbreviations in recording the statement of responsibility. The statement of responsibility may include in addition to or instead of the name of the author, names of people or bodies having other responsibility for the work, such as the translators, editors, writers, and so on. The records in the statement of responsibility have only those names that are of bibliographic significance, i.e., the names associated with the intellectual and artistic content of the work. According to AACR2, statement of responsibility is recorded only if it appears prominently in the item being described. A statement of responsibility is said to be prominent only if it appears in the title, statement of responsibility or the edition area of the item being described.

Sometimes, several items or works appear without a collective title and none of the works listed pre-dominates. In such a case, AACR2 gives a provision to the cataloger to record the items in a single record or create separate record for each item that appears in the chief source of information. If the title page lacks a collective title, each title must be recorded separately as per the AACR2. The titles must be recorded in the order in which they appear.

AACR2 defines edition for printed matter as 'all copies produced from essentially the same type image and issued by the same entity'. The edition statement must be recorded in the edition as found in the document. In the edition area, AACR2 allows the use of abbreviations. Also the numbers written in Roman numeral format must be transcribed as Arabic numerals in the description. Sometimes, the

edition statement is followed by the statement of responsibility for the edition of the document being described. Sometimes, the chief source of information includes more than one edition statements. In this case, each statement of edition must be recorded, separated by commas. Also, in this case, the first alphabet of the first word of each edition statement is capitalized.

Material specific details area appears in the bibliographic description of cartographic materials, music, electronic sources, and so on. The publication, distribution area has details of the place and area of publication. It is recorded in the format Place**:** Publisher, Date. The place, date and name of publisher are transcribed as they appear in the chief source of information. If two or more places of publication appear in the chief source of information, the cataloger as per the rules of AACR2 transcribes only the first name. For published materials, the place of publication can never be left blank as per the rules of AACR2. If the place name is missing, the cataloger must find the name from a reference material or source. For all types of information sources, their bibliographic description must never be without a date. If the chief source of information and other sources have no date that can be transcribed, the cataloger must guess the date. The AACR2 provides for either the first or last date of publication to be recorded. If any of these dates is not known, the fact is recorded in a note.

Illustrations of all types must be listed in the description by preceding these with the abbreviation 'ill' unless otherwise stated in AACR2. The size of the item being described is also an important part of the physical description. The size of a book is the height of the cover. Size is usually measured in centimeters for all types of information sources and documents.

The series area contains information about the series of the document being described or recorded. The series must be transcribed in the bibliographic description as it appears in the source of information.

Note area will have all the information regarding the notes contained in the bibliographic description. Generally, the following information about a note is added in the bibliographic description**:** nature and scope, language, source of title proper, variations in title, statement of responsibility, edition, history, publication, distribution, physical description, accompanying material, dissertations, audience, summary and contents. According to AACR2, bibliographic citations are included as notes in the description of the document. On the other hand, informal content notes are taken and used when a document contains features that are of particular importance. For dissertations, AACR2 follows specific rules. According to AACR2, till a dissertation or a thesis is published, it is cataloged as per the rules that apply to the cataloging of a manuscript. When a dissertation is published, it becomes a published material and so separate rules apply for cataloging. Also, according to AACR2, when a document contains a single biography, a pagination is added to the note.

Most of the rules described above are general and apply to almost all types of information sources that are cataloged using AACR2. These rules apply to

book and non-book materials alike. For non-book materials, however, the cataloger needs to be extra cautious because of the nature of the document.

Bibliographic Description of Books According to AACR2

For the bibliographic description of a book, AACRs need to access information sources that can provide description about the book. The title of the book is the main source of information to prepare catalog card for the book. The cover page of the book is not considered as the title page of the book. The page leaving one or two pages from the beginning on which the description of the book is printed is called the title page of the book. In the uppermost part, the title page includes the title and sub-title of the book. The middle of the title page provides the names of the authors and collaborators along with their working institutions. The lower portion of the title page contains the name of the publisher, the place and year of publication, price, and so on.

When the title page of a book is missing, the information for preparing a catalog card for the book can be obtained from the cover caption or the haIf title page of the book. The haIf title page of the book contains the name or title of the book but the name of the author and other information related to publication is not printed.

The back of the title page contains information, such as copyright year, print and reprint edition, name and address of the publishers, price, and so on. Apart from the title page, information about the book can be obtained from any accompanying material, a container, and another published description of the book and even from other available sources.

The information gathered about the book from other sources apart from the title page of the book must be correct and relevant. It must be verifiable as well, which means that the sources of information of the book must exist and should be accessible when required.

Rules for Bibliographic Description of a Book

AACR2 specifies rules for the description of books to ensure that the books are classified correctly and are easy to locate. The rules ensure that books are described in a manner that the needs of the users of the books are met and that these users are able to access the information contained therein in an easy manner.

When creating a bibliographic description of a book as per AACR2, the following elements must be included in the entry in catalog card**:**

- **Call Number:** The call number of a book is the combination of class number and book number. The class here refers to the category to which the book belongs. The call number is the first item that should be recorded in the upper left hand corner of the catalog card.

- **Accession Number:** The accession number of a book should be recorded on the seventh line from the top of the card or fourth line from the bottom.

The accession number usually represents the number of times the book has been accessed. This number may consist of the year in which the book was acquired, the full date and a sequential number followed by a period.

- **Author:** 'Author' in the entry is the name of the author. The author is indicated by writing the surname first, which is followed by a comma. The remaining parts of the name (i.e., forenames) are given after leaving one space. The name is followed by the date of birth and/or death of an author in full and a full stop. The name of the author is written from the first indentation and continued from the third indentation on the next line of the catalog card.

- **Title:** The title proper of the book should be recorded exactly as it is. In the catalog card, the wording, order and spelling of the title must be the same as is found on the title page of the document. When recording the title, capitalization and punctuation should be avoided.

  When recording titles, special care must be taken when it comes to the following types of titles:

  o **Alternate Titles:** When an alternate title has to be recorded, the entry must contain the first part of the title followed by a comma and then the alternate title.

  o **Abridge Title:** An abridge title or short form of a long title must be recorded only when recording of this title does not lead to any loss of information about the title. In an abridge title, the omission must be marked by three dots (…).

  o **Initials and Acronyms:** When a title contains initials and acronyms without full stops, these must be recorded without any spaces. If the initials and acronyms appear with full stops, these must be recorded with full stops.

  o **Parallel Titles:** When parallel titles appear in the title, these must be recorded in the order indicated by their sequences. If the title appears in two or more languages, choose one of these as the title proper and record the other titles as parallel title. Parallel title appearing outside the chief source of information should be noted in the note section of the catalog card.

  o **Titles in Numerals:** When a title appears in numeric form, it must be recorded in letters and must be enclosed in square brackets. For example**:** 20 Point Program is recorded in the catalog card as 20[Twenty] Point Program.

  o **Other Title Information:** Other title information includes subtitle appearing in the chief source of information. The other information must be recorded in the catalog card by using space colon space ':' between the title proper and other title information.

- **Statement of Responsibility:** The statement of responsibility must be recorded in the form in which it appears in the chief source of information. The statement of responsibility should be preceded by a diagonal slash. If there is more than one statement of responsibility, record them in the order indicated by their sequence in the chief source of information. If the statement of responsibility is taken from an external source, it must be enclosed in square brackets.

- **Edition:** The edition of the book when recorded must be preceded by a full stop, space dash space '. – '. The standard abbreviations and numerals in place of words should be used when editions are recorded.

- **Place:** The place refers to the place where the book was published. If a publisher has many offices in more than one place, the name of the first place must be recorded and all other place names must be omitted. However, if the place of publication, distribution, and so on, is uncertain, the probable place name must be given with a question mark in square brackets. If no place or probable place name can be given, put the abbreviation sl (sine loco) in square brackets like '[s.1.]'. The term 'sine loco' means 'no place' in Latin.

- **Publisher:** When recording the publisher name in the catalog card, use the shortest form of the publisher in which it can be understood and identified internationally. If the book has two or more publishers, record the first named publisher. If the name of the publisher of the book is not known, the abbreviation sn (sine nominee) is given in square brackets.

- **Date of Publication:** The date of publication is recorded in Arabic numerals preceded by a comma in the catalog card. When the date is not specified, the copyright date is recorded in the catalog card. In case the date of publication is not known, then n.d. is written is square brackets.

- **Physical Description Area:** The physical description area paragraph starts from the second indentation and continues from the first indentation of the catalog card. This area consists of pagination, illustrative matter and size of the document expressed in cm if the book is without pagination, the total number of pages is recorded in square brackets. The connecting symbol between pagination and illustrative matter is a colon ':'. The illustrative matter can be described as 'Charts', 'Maps', 'Music', 'Plans', 'Portraits', 'Samples', or simple as 'ill'. The connecting symbol between the illustrative matter and the height of the document is semi colon ';'. The height of the document is written in cm.

Bibliographic Description of Periodicals

A periodical is a serial or a document appearing or intended to appear more often or indefinitely at regular periods. Periodicals appear more frequently than annually. Every issue of a periodical may contain separate articles and stories.

The bibliographic description of periodicals is like that of books. However, when the bibliographic description of a periodical is prepared, more information needs to be added since each issue of periodical contains different articles with different titles. In addition, an individual number of periodicals forms annual set, which is represented by a title.

When bibliographic description of a periodical is constructed, the following six files are essentially created:

- Bibliographic description contains the cataloging information about the periodical.

- The technical description contains then information about the digitization process if the periodical is made available in a digital format.

- The content description file represents the periodical as a whole. This file consists of a group of annual sets of periodicals. This file contains references to specific volume files and allows a specific volume of the periodical to be accessed quickly.

- The volume file of a periodical represents one annual set of the periodical. This file contains references to issues of the periodicals and enables access to a concrete issue of a periodical in a quick manner.

- The issue files of a periodical represent one issue of the periodical. It contains information about the issue of the periodical as well as a list of articles contained in the periodical. This file contains references to individual pages in the periodical.

- The page file of a periodical represents one page of the periodical. This file contains a preview image of the periodical and also information of the specific page of the periodical but not of the articles contained therein. The page file contains references to data files of the periodical.

Bibliographic Description File of a Periodical

The bibliographic description file of periodicals contains the following entries:

- **MAINTTL:** This refers to the main title of the periodical. This entry is mandatory for the periodical description.

- **OTHERTTL:** This entry contains other information about the title of the periodical.

- **GMD:** GMD is the general material designation or type of the document, i.e., the periodical. This entry is also mandatory as per AACR2 rules for bibliographic description of the periodical.

- **LANGDOC:** This entry contains information about the language of the periodical i.e., the language in which the periodical has been written.

- **PBLSHR:** This entry contains the information about the publishers of the periodical. The information may be about one publisher or several publishers.

- **PLACEPBL:** This entry contains information about the place of publication of the periodical.

- **PRINTER:** The information about the printer of the periodical is represented by this entry. The printer is the person or corporate body which is responsible for printing of the periodical for the first time.

- **PLACEPRT:** This entry contains information about the place of printing of the periodical.

- **SERIES:** Series of the periodical refers to the series of the series of the periodical i.e., the frequency of the publishing of the periodical.

- **DATOFPUBL:** This is a mandatory entry in the bibliographic description of the periodical. This entry contains information about the date of publication of the periodical.

- **PERIODICITY:** This entry gives information about how frequently the periodical is published, i.e., annually, monthly, weekly or quarterly.

- **PERSUP:** This entry gives information as to whether the periodical is a regular supplement that will be published often or a periodical which will be published indefinitely.

- **PHYSDESCR:** The physical description information is made available in this entry. The physical description of the periodical is mandatory and provides information, such as the size of the periodical, the annotation, shelf number, accessibility or availability of the periodical, the issue number and description, notes and the library in which the periodical is stored.

The technical description contains one entry for the periodical under the heading **CAPTURE**. This description provides information about how the original periodical was digitized, the method used for digitization, the description of technological devices used for digitization and also the format of the digitized periodical. The technical description can also describe annual sets of the periodical.

The Content Description file provides information about the annual sets of the periodical. The description of the contents of the annual sets is represented by **CONTENTSID**. This further contains the information about the volume number of the annual set represented by **VOLUMENUMB** and also the date of publication of the periodical as represented by **DATATION**. The content description file also contains a special statement called **DEFECTS** that describes or provides information about the annual sets that are missing from the periodical.

The volume files have a definite structure like other files. It contains the **VOLUMEID**, which is description of one annual set. This further contains information about the volume number, the date of publication and also the defects related to one annual set. The volume file contains information as to why certain annual sets are missing.

The issue category of the bibliographic description of the periodical contains information about one issue of the periodical. It contains the following entries:

- **MAINTTL:** This represents the main title of the issue of the periodical.
- **ISSUEID:** This represents the identification information about the issue of the periodical.
- **DATATION:** This represents the date of publication of the issue of the periodical.
- **ISSUENO:** This gives the issue number of the periodical.
- **COMEDIT:** This gives a comment regarding the issue and described what type of an issue the periodical is. For example, the issue may be a supplement or an afternoon issue of the periodical.
- **DEFECTS:** This represents why some pages of the issue are missing.
- **SUMMARY:** This provides a brief summary of the articles and illustrations in the issue.

For every article and illustration, the following information is maintained in the bibliographic description of the periodical:

- **ARTICLEDESCR:** This provides the description of the article. The description of an article consists of:
  - o The title of the article
  - o The first statement of responsibility, which provides information about the main author of the article
  - o Referenced page statement that provides information about references to pages where the article can be found
  - o Annotations
  - o Keywords of the article
  - o Universal Decimal Classification of the article
  - o Notes
- **ILLUSTRDESCR:** This provides information about the description of the illustrations used in the issue. The description of one illustration consists of:
  - o The title of the illustration
  - o The first statement of responsibility statement, which names the author or creator of the illustration
  - o The reference page statement, which provides information about the reference pages that contain the illustration
  - o Annotations
  - o Keywords
  - o Notes

The page category contains information about one page of the periodical. It contains information related to the quality of the page, the content contained, the watermark used on the paper, and so on.

Bibliographic Description of Non-Book Materials According to AACR2

Non-Book materials may include cartographic materials, music, sound recording, motion pictures and video recordings, machine readable data files, 3D artifacts and realia and also microfilms. The bibliographic description of these non-book materials as intended by AACR2 follows a specific set of rules and principles. One of the main principles that AACR2 follows when creating a bibliographic description of non-book materials is authorship. The non-book materials, which are described by AACR2 have strong visual and aural components that are frequently non-verbal. The creation of these non-book materials usually involves carrying out multiple functions, and these functions may be carried out by different people and corporate bodies.

For instance, the making of a map may involve the gathering of data by one person and the encapsulation of the data in map form by another; one person or group may be responsible for the geographic aspect of a map, and another for the subject aspect. Similarly, the creation of a slide set may involve taking photographs, compiling of appropriate pictures, writing the accompanying text, performing accompanying music, and so on. These non-book materials may also involve a lot of other aspects. For example, films are products of the art of photography, and can be used to display all the other arts, including dance, music, drama, sculpture or they can display a person presenting his/her intellectual work area. Sound recordings, motion pictures and video-recordings display the performance of the work of a person by another person or a group of people. Thus, when dealing with non-book materials, it is not easy to deal with authorship because of the complex functions involved in the creation of the non-book materials.

Non-book materials are works of mixed responsibility. There are two kinds of authorship recognized by AACR2 when it comes to non-book materials. These include photography and performance. Photography is basically authorship for visual components. Performance is a function of photography and is generally categorized as a mixed authorship area. AACR2 prescribed rules for creating accurate bibliographic description of non-book materials by giving due consideration to their complex structure and functions involved in creating these non-book materials.

In works of mixed authorship, since different functions can be performed by different people, it is sometimes possible for the work of one person to be extracted from the work as a whole and published separately as a new work. Thus, AACR2 needs to create a new bibliographic description for the same work.

Example: Bibliographic Description of Sound Recording

The bibliographic description of a sound recording file or document in AACR2 may be made based on the rules and principles given by AACR2. The bibliographic description for a sound recording file may typically include the title of the sound recording file and other information related to the title. The bibliographic description

may also include information related to the statement of responsibility, which represents information about creator, editor, interpreter and the person or boy who made arrangements for sound recording. Bibliographic description also contains information about the place of recording, the date of recording and the series.

The physical description of the sound recording file also forms a major part of the bibliographic description of the sound recording file. The physical description provides information related to the duration of the sound recording file, the booklet related to the sound recording file and also the annotations. It may also provide information about the related bibliographic references and the shelf number and the library where the sound recording file can be found.

The work files are also important when it comes to the bibliographic description of a sound recording file. The work file represents the sound recording as a whole. For example, the sound recording file may be a symphony or a collection of songs. The description of a single work of the entire collection is provided in the parts file. This file also provides information related to the audio format of the sound recording file.

Technical description within the bibliographic description of the sound recording file may provide information related to the digitization of the sound recording file, the method and equipment used for digitization, and so on. It may also provide information about when the first digitization of the sound recording file was performed.

Implementation of AACR2—Case Studies

Case Study 1- Use of Anglo–American Cataloging Rules 2 by Library and Archives Canada

Library and Archives Canada (LAC) began implementation of Amendments 2001 to the AACR2, 1998 revision on December 1, 2001. The three major rule revisions in Amendments 2001 are:

Rule 21.1B2(d): A conference, expedition or event no longer has to be prominently named in the item being cataloged to justify main entry.

Rules 1.1F7, 22.1C, 22.12, 22.19B: British titles of nobility and terms of honor will be excluded from headings for which surnames are the entry element but included if the name consists solely of a surname, or if a married woman is identified only by her husband's name and a term of address, or if used to resolve conflicts in headings. LAC will revise any previously established heading on an as encountered basis.

Chapter 9: Renamed 'Electronic Resources,' chapter 9 has been reissued in its entirety even though not all rules have been revised. Main points to note: GMD 'computer file' has been replaced by 'electronic resource' and conventional terminology to record the specific format of the physical carrier is now optional in

the extent of item. Please also note that rules in area 3 are under consideration; any changes will be issued in a future amendment. LAC will use conventional terminology to record the specific format of the physical carrier.

Library and Archives Canada's policy is that bibliographic descriptions for Canadiana are for the most part at the second level of detail, with supplementary data added as required. Minor publications, ephemera, less significant materials, and so on, as well as material that is no longer current are given limited description and the description of serials has been modified to a level that falls between the first and second levels.

The tables that follow are designed to document those decisions for material cataloged at the full level (i.e., second level of detail), in sufficient detail to be used as a working tool by catalogers.

The categories of material identified in the columns on the right are largely self-explanatory, and correspond in scope to the similarly titled chapters in Part I of AACR2R. In order of display, these six categories are as follows:

1) Monographs
2) Music Scores
3) Sound Recordings
4) Microforms
5) Serials
6) Kits

The codes used to specify usage for each of the descriptive elements are defined as follows:

R (Required)

The element, (if applicable to the item in hand) is to be included in the description, subject to any restrictions, qualifications, and so on. detailed in the rule itself or in Library and Archives Canada's interpretation of the rule.

D (Discretionary)

The element (if applicable to the item in hand) may or may not be included in the description, depending on the cataloger's assessment of its importance and subject to any restrictions, qualifications, and so on, detailed in the rule itself or in Library and Archives Canada's interpretation of the rule.

X (Not required)

The element is not to be included in the description.

NA (Not applicable)

The element is not applicable to the type of material (i.e., there is no rule for the element included under the relevant chapter).

Levels of Detail in Description. Material for Canadiana

Table of Contents**:**

- .1B Title proper
- .1C General material designation
- .1D Parallel titles
- .1E Other title information
- .1F Statements of responsibility
- .2B Edition statement
- .2C Statements of responsibility relating to the edition
- .2D Statement relating to a named revision of an edition
- .2E Statements of responsibility relating to a named revision of an edition
- .3B Musical presentation statement
- .3B Numeric and/or alphabetic designation
- .3C Chronological designation
- .3D Supplied designation for first issue
- .3E Alternate systems of designation
- .3F Designation of the last issue
- .3G Successive designation
- .4C Place of publication, distribution, and so on
- .4D Name of publisher, distributor, and so on.
- .4E Statement of function of publisher, distributor, and so on
- .4F Date of publication, distribution, and so on
- .4G Place of manufacture, name of manufacturer, date of manufacture
- .5B Extent of item
- .5C Other physical details
- .5D Dimensions
- .5E Accompanying material
- .6B Title proper of series
- .6C Parallel titles of series
- .6D Other title information of series
- .6E Statements of responsibility relating to series

- .6F ISSN of series
- .6G Numbering within series
- .6H Subseries (See .6B-.6G)
- .6J Other series statements (See .6B-.6G)
- .7B1 Nature, scope, or artistic form
- .7B2 Language
- .7B3 Source of title proper
- .7B4 Variations in title
- .7B5 Parallel titles and other title information
- .7B6 Statements of responsibility
- .7B7 Edition and history
- .7B8 Material specific details
- .7B9 Publication, distribution, and so on
- .7B10 Physical description
- .7B11 Accompanying material and supplements
- .7B12 Series
- .7B13 Dissertations
- .7B14 Audience
- .7B15 Reference to published descriptions
- .7B16 Other formats available
- .7B17 Summary
- .7B18 Contents
- .7B19 Numbers borne by the item
- .7B20 Copy being described
- .7B21 'With' notes
- .7B22 Combined notes relating to the original
- .7B23 Item described
- .8B Standard number
- .8C Key title
- .8D Terms of availability
- .8E Qualification

NOTES

Rule	Descriptive Element	Mon	MuSc	SdRe	Mic	Ser	Kits
.1B	Title proper	R	R	R	R	R	R
.1C	General material designation	X1	R	R	R	X1	R
.1D	Parallel titles						
	• First parallel title	R	R	R	R	R	R
	• Parallel title in English	R	R	R	R	R	R
	• Parallel title in French	R	R	R	R	R	R
	• Other parallel titles	R	R	R	R	X	R
.1E	Other title information						
	• Other title information necessary to distinguish one title from another	R	R	R	R	D	R
	• Other title information providing the initialism or acronym for the expanded form used as the title proper	R	R	R	R	R	R
	• Other title information incorporating a first statement of responsibility	R	R	R	R	R	R
	• Brief addition supplied to explain title proper consisting solely of a name of a corporate body, and so on.	R	R	R	R	R	R
	• Additional other title information	R	R	R	R	X	R
.1F	Statements of responsibility						
	• First statement of responsibility	R	R	R	R	R	R
	• Parallel first statement of responsibility in English	R	R	R	R	R	R
	• Parallel first statement of responsibility in French	R	R	R	R	R	R
	• Parallel first statement of responsibility in another language	R	R	R	R	R	R
	• Subsequent statement(s) of responsibility	R	R	R	R	X	R
	• Parallel subsequent statement(s) of responsibility in English	R	R	R	R	X	R
	• Parallel subsequent statement(s) of responsibility in French	R	R	R	R	X	R
	• Parallel subsequent statement(s) of responsibility in another language	R	R	R	R	X	R
.2B	Edition statement						
	• Edition statement in the language of the title proper/edition statement that appears first	R	R	R	R	R	R
	• Parallel edition statement in English	R	R	R	R	R	R
	• Parallel edition statement in French	R	R	R	R	R	R
	• Other parallel edition statements	X	X	X	X	X	X
.2C	Statements of responsibility relating to the edition						
	• First statement of responsibility in the language of the title proper/statement of responsibility that appears first	R	R	R	R	R2	R
	• First statement of responsibility in English	R	R	R	R	R2	R

Rule	Descriptive Element	Mon	MuSc	SdRe	Mic	Ser	Kits
	• First statement of responsibility in French	R	R	R	R	R2	R
	• First statement of responsibility in another language	X	X	X	X	X	X
	• Subsequent statement(s) of responsibility in the language of the title proper/subsequent statement that appears first	R	R	R	R	X	R
	• Subsequent statement(s) of responsibility in English	R	R	R	R	X	R
	• Subsequent statement(s) of responsibility in French	R	R	R	R	X	R
	• Subsequent statement(s) of responsibility in another language	X	X	X	X	X	X
.2D	Statement relating to a named revision of an edition						
	• Statement relating to a named revision of an edition in the language of the title proper/statement relating to a named revision of an edition that appears first	R	R	R	R	R2	R
	• Statement relating to a named revision of an edition in English	R	R	R	R	R2	R
	• Statement relating to a named revision of an edition in French	R	R	R	R	R2	R
	• Statement relating to a named revision of an edition in another language	X	X	X	X	X	X
.2E	Statements of responsibility relating to a named revision of an edition						
	• First statement of responsibility in the language of the title proper/statement of responsibility that appears first	R	R	R	R	R2	R
	• First statement of responsibility in English	R	R	R	R	R2	R
	• First statement of responsibility in French	R	R	R	R	R2	R
	• First statement of responsibility in another language	X	X	X	X	X	X
	• Subsequent statement of responsibility in the language of the title proper/subsequent statement of responsibility that appears first	R	R	R	R	X	R
	• Subsequent statement of responsibility in English	R	R	R	R	X	R
	• Subsequent statement of responsibility in French	R	R	R	R	X	R
	• Subsequent statement of responsibility in another language	X	X	X	X	X	X
.3B	Musical presentation statement						
	• Musical presentation statement in the language of the title proper/musical presentation statement that appears first	NA	R	NA	NA	NA	NA
	• Parallel musical presentation statement in English	NA	R	NA	NA	NA	NA
	• Parallel musical presentation statement in French	NA	R	NA	NA	NA	NA

NOTES

Rule	Descriptive Element	Mon	MuSc	SdRe	Mic	Ser	Kits
	• Other parallel musical presentation statements	NA	X	NA	NA	NA	NA
.3B	Numeric and/or alphabetic designation	NA	NA	NA	NA	R	NA
.3C	Chronological designation	NA	NA	NA	NA	R	NA
.3D	Supplied designation for first issue	NA	NA	NA	NA	R	NA
.3E	Alternate systems of designation	NA	NA	NA	NA	R	NA
.3F	Designation of the last issue	NA	NA	NA	NA	R	NA
.3G	Successive designation	NA	NA	NA	NA	R	NA
.4C	Place of publication, distribution, and so on						
	• First named place	R	R	R	R	R	R
	• Subsequently named place given prominence	R	R	R	R	R	R
	• First named Canadian place	R	R	R	R	R	R
	• Other places	R3	X	X	X	X	X
.4D	Name of publisher, distributor, and so on						
	• First named publisher, distributor, and so on	R	R	R	R	R	R
	• Subsequently named publisher, distributor, and so on, given prominence	R	R	R	R	R	R
	• First named Canadian publisher, distributor, and so on	R	R	R	R	R	R
	• Other publishers, distributors, and so on	X3	X	X	X	X	X
	• Parallel form of first named publisher, distributor, and so on, in English	R	R	R	R	R	R
	• Parallel form of first named publisher, distributor, and so on, in French	R	R	R	R	R	R
	• Parallel form of first named publisher, distributor, and so on, in another language	X	X	X	X	X	X
	• Parallel form of prominently named publisher, distributor, and so on, in English	R	R	R	R	R	R
	• Parallel form of prominently named publisher, distributor, and so on, in French	R	R	R	R	R	R
	• Parallel form of prominently named publisher, distributor, and so on, in another language	X	X	X	X	X	X
	• Parallel form of first named Canadian publisher, distributor, and so on, in English	R	R	R	R	R	R
	• Parallel form of first named Canadian publisher, distributor, and so on, in French	R	R	R	R	R	R
	• Parallel form of first named Canadian publisher, distributor, and so on, in another language	X	X	X	X	X	X
	• Parallel form of name for other publishers, distributors, and so on, in English	X3	X	X	X	X	X
	• Parallel form of name for other publishers, distributors, and so on, in French	X3	X	X	X	X	X
	• Parallel form of name for other publishers, distributors, and so on, in another language	X	X	X	X	X	X
.4E	Statement of function of publisher, distributor, and so on	D	D	D	D	D	D

Rule	Descriptive Element	Mon	MuSc	SdRe	Mic	Ser	Kits
.4F	Date of publication, distribution, and so on	R	R	R	R	R	R
.4G	Place of manufacture, name of manufacturer, date of manufacture	D	D	D	D	D	D
.5B	Extent of item	R	R	R	R	R	R
.5C	Other physical details	R	R	R	R	R	R
.5D	Dimensions	R	R	R	R	R	R
.5E	Accompanying material	R	R	R	R	R	R
.6B	Title proper of series	R	R	R	R	R	R
.6C	Parallel titles of series						
	• First parallel title	R	R	R	R	R	R
	• Parallel title in English	R	R	R	R	R	R
	• Parallel title in French	R	R	R	R	R	R
	• Other parallel titles	X	X	X	X	X	X
.6D	Other title information of series						
	• Other title information necessary to distinguish one series from another	R	R	R	R	R	R
	• Other title information incorporating a first statement of responsibility necessary to distinguish one series from another	R	R	R	R	R	R
	• Additional other title information	X	X	X	X	X	X
.6E	Statements of responsibility relating to series						
	• Statement of responsibility necessary to distinguish one series from another	R	R	R	R	R	R
.6F	ISSN of series	R	R	R	R	R	R
.6G	Numbering within series	R	R	R	R	R	R
.6H	Subseries (See .6B–.6G)						
.6J	Other series statements (See .6B–.6G)						
.7B1	Nature, scope, or artistic form	R	R	R	R	R	R
.7B2	Language	R	R	R	R	R	R
.7B3	Source of title proper	R	R	R	R	R	R
.7B4	Variations in title	R	R	R	R	R	R
.7B5	Parallel titles and other title information	R	R	R	R	R	R
.7B6	Statements of responsibility	R	R	R	R	R	R
.7B7	Edition and history	R	R	R	R	R	R
.7B8	Material specific details	NA	R	NA	NA	R	R
.7B9	Publication, distribution, and so on	R	R	R	R	R	R
.7B10	Physical description	R	R	R	R	R	R
.7B11	Accompanying material and supplements	R	R	R	R	R	R
.7B12	Series	D	D	D	D	D	D
.7B13	Dissertations	R	R	R	R	NA	R
.7B14	Audience	D	D	D	D	D	D
.7B15	Reference to published descriptions	X3	NA	NA	NA	NA	X3
.7B16	Other formats available	D	D	D	D	D	D

NOTES

Rule	Descriptive Element	Mon	MuSc	SdRe	Mic	Ser	Kits
.7B17	Summary	X	X	X	X	X	X
.7B18	Contents	R	R	R	R	R	R
.7B19	Numbers borne by the item	R	R	R	R	R	R
.7B20	Copy being described	R	R	R	R	R	R
.7B21	'With' notes	R	X	X	R	R	R
.7B22	Combined notes relating to the original	NA	NA	NA	R	NA	NA
.7B23	Item described	NA	NA	NA	NA	R	NA
.8B	Standard number						
	• Number applying to the item being described	R	R	R	R	R	R
	• Other standard numbers	D	D	D	D	D	D
.8C	Key title	NA	R	R	R	R	NA
.8D	Terms of availability	R	R	R	R	R	R
.8E	Qualification	D	D	D	D	D	D

Case Study 2- AACR2 as used in University of Brunei Darussalam Library

The Cataloging Division of University of Brunei Darussalam Library describes and classifies library materials, including print, non-print and electronic resources either through purchasing or gift. General cataloging policy is to catalog everything as per AACR2. The University Library adheres to an accepted international standards and rules in its cataloging and classification of materials acquired by the library. This may be in the form of printed and electronic resources including online resources. The University Library adopts AACR2 in the formulation of descriptive cataloging and access points in the cataloging of each item.

The University Library adapts to the AACR2 on the cataloging of material, which is not available in the bibliographic database and also copy cataloging. The bibliographic database contains only one bibliographic description of a given bibliographic item, regardless of the number of library locations holding the item. The mandatory elements will be incorporated in the bibliographic records are as below:

- Title
- Authors, editors, compilers, translators, illustrators, and so on
- Edition
- Place/s of publication
- Name of publisher/s
- Date of publication
- Physical description
- Series
- Notes
- ISBN/ISSN

The University Library shall catalog all materials based on AACR2 descriptive cataloging standard with the following policies for cataloging types of library materials:

- **Monograph:** The library will catalog monograph material on the basis of the rules of AACR2. Monograph is a bibliographic resource that is complete in one part or intended to be completed within a finite number of parts.

- **Chapter of a book/journal articles:** The Library will catalog parts of single chapters of books, articles from journals or articles clipped in newspapers based on the request by academic staff on the basis of AACR2.

- **Electronic resource:** Electronic resource is the material (data and/or program(s)) encoded for manipulation by a computerized device. This material may require the use of a peripheral directly connected to a computerized device (e.g., CD-ROM drive) or a connection to a computer network (e.g., the Internet). Electronic resources are cataloged and classified using AACR2.

- **Government documents:** Government documents are all materials published by government**:** federal, state, local or foreign government documents are cataloged and classified using AACR2.

- **Loose-leaf publications:** A loose-leaf publication is generally cataloged as an open entry monograph because the basic information is intended to be revised and replaced or added to the catalog using AACR2.

- **Maps and cartographic material:** Maps are cataloged and classified according to AACR2.

- **Microforms:** Microforms are cataloged and classified as per AACR2.

- **Non-book materials:** Non-book materials include sound recordings, audio-visual materials, slides, films and video-recording, computer files, and so on. All of these materials are fully cataloged and classified as per the AACR2.

- **Periodicals and newspapers:** A periodical is a continuing publication issued twice a year or more frequently. Newspaper is a type of periodical. Periodical permanently are cataloged and assigned AACR2 classification numbers. Newspapers held in microform formats are cataloged using AACR2.

- **Serials:** A serial is a continuing publication issued once a year or less frequently. Serials, include non-monographic items issued under same title, with consecutive numbering or dates. Serial titles either with accession number or without accession numbers are cataloged and classified. The serials are classified as per AACR2.

In general, materials will receive full cataloging according to AACR2 second level of description as follows:

Title proper [general material designation]

= Parallel title

: other title information

/ first statement of responsibility

; each subsequent statement of responsibility

Edition statement/first statement of responsibility relating to the edition.

Material (or type of publication) specific details. First place of publication, and so on: first publisher, date of publication, and so on

Extent of item: other physical details; dimensions.

(Title proper of series/statement of responsibility relating to series, ISSN of series; numbering within the series. Title of subseries, ISSN of subseries; numbering within subseries).

Standard number

Controlled Vocabulary

Language is the key to all information retrieval. Information that is of use and needs to be retrieved must be analyzed and given a suitable descriptor and placed in a storage medium for retrieval and access. When information is retrieved on the basis of the subject, the descriptors are called subject descriptors or subject headings. The subject descriptors constitute the subject indexing language. The subject indexing language may be artificial or coded language based on ordinal numbers, digits or notations. However, this language is mainly based on the class of documents and not the subject of the documents. Therefore, the coded language is not considered easy and also cannot be used by information or document users in a user friendly manner. The other type of indexing language is the natural language. Natural language descriptors make use of natural language words or the language that is commonly and naturally used. This type of language can be free and uncontrolled language or controlled language. Free language uses free subject descriptors, is taken from un-manipulated language and is used as it appears in the documents. Though free indexing language is very easy to use but since it is not manipulated and controlled, there are various problems that may be faced when preparing a subject headings' list using the free indexing language. When using free indexing language, several synonyms, homonyms, same spelling words, and so on, may appear and so the list can become too long and unmanageable. Since there are no set of rules that are followed when creating a list with free indexing language, there is no uniformity in the sense that a single heading may have several written variants making information retrieval difficult and confusing. Thus, if free indexing language is used for creating subject headings' list, the list will become scattered, lack precision and will also be inefficient.

To make the subject heading more efficient and to practice control over the subject list, controlled vocabulary derived from natural language needs to be used. This is called standardized terminology to maintain subject heading lists.

The control of subject headings is two-fold in case of controlled vocabulary, as described here:

1. It has select vocabulary. This is because out of the several terms used for describing and defining the concept, only one term is used as a subject heading or subject index. According to controlled vocabulary, there must be one-to-one correspondence between the subject heading and the concept, i.e., one concept must be described by one heading. Of the various terms that describe the concept, the one used is called the preferred term or heading.

2. Controlled vocabulary is a system of terms and not simply a container of terms or subject headings. It has its own structure for headings and rules for creating and maintaining subject headings.

To provide controlled vocabulary indexing, a standard set of rules needs to be formulated and used. There are also standard sources, such as subject heading lists and thesaurus that list index terms and provide rules for combining these terms to make new subject headings. These lists offer complete guidance related to cataloging and are very easy to use. While a subject heading list is a pre-coordinated indexing language, thesaurus is a tool for post-coordinated indexing language.

In a standard list of subject headings:

- The subject headings are listed explicitly and alphabetically.

- Some of the preferred headings can be further divided by topics into subdivisions.

- Guidance is provided to coin some headings based on some model or key headings.

- Instructions are provided to coin sub-headings at several places based on the main headings or preferred headings.

- In-built guidance is provided on how to choose preferred headings from non-preferred headings.

A subject heading list provides guidance for creating more subject headings than are listed in the subject heading list developed using a controlled vocabulary. A subject heading list is a complete system that provides guidance for creating subject catalogs and a Web of cross references for easy and optimal retrieval.

Sears List of Subject Headings

For information seekers, subject access to information in libraries and a database are a must as they provide easy retrieval of information. To ensure that information retrieval works in an effective manner, subject descriptors or the names of subjects must be standardized across all libraries and databases. The Sears List of Subject Headings (popularly called the Sears List) is a known tool for assigning standardized subject headings to all types of documents in general small libraries having up to 20,000 titles in all subjects. However, research, special and large libraries may not

find the Sears List of Subject Headings adequate or detailed enough for subject cataloging of their collection of documents.

The Sears List, as it is popularly known, was first designed in 1923 by Minnie Earl Sears (1873–1933) in deference to demands of small libraries for simpler and broader subject headings for use in their dictionary catalogs. Such libraries were finding Library of Congress Subject Headings (LCSH) too detailed, complicated and also costly. As compared to the LCSH the Sears List has simple phrasing. The Sears List of Subject Headings has been used for cataloging purposes for over eight decades now.

The first edition contained only 3200 preferred headings. The list become popular for dictionary catalogs of medium and small size libraries. The 2nd (1926) and 3rd (1933) editions were again edited by Minnie Earl Sears. The Sears List of Subject Headings from fourth to fourteenth (1939/1991) editions was regularly updated to include new subject headings and modernize the terminology. However, the format of the Sears List of Subject Headings was not changed at all and remained based on the DDC. The 13th edition (1986) of the Sears List of Subject Headings was edited jointly by Carmen Rovira and Caroline Reyes and the first edition to be created as an online database for editorial use. This change facilitated searching a subject in its natural form rather than the recast headings that were used before online orientation of the Sears List of Subject Headings.

For example, when the changes were made to the Sears List of Subject Headings for online search, 'Library, Public' was changed to 'Public library', similarly 'Chemistry, Organic' was changed to 'Organic chemistry'. This also eased the congestion of entries under a single entry word. For example, all entries pertaining to libraries were now filed by the initial word instead of all converging under the word 'library', i.e., 'Public libraries' filed under 'p' and 'School libraries' under 's'. With the creation of the electronic database, several and frequent updates were made to the Sears List of Subject Headings. The 13th and subsequent editions of the Sears List of Subject Headings followed ALA Filing Rules.

New editions of the Sears List of Subject Headings are produced regularly to:

- Incorporate new subjects and their terms
- Restructure the form of old headings based on the changing information needs and information seeking behavior of the users
- Give new terms to old subject headings based on current usage
- Delete the obsolete terms
- Discover new relations between subjects and terms

The new edition of the Sears List of Subject Headings is the 19th edition of the list. The new edition has about 440 new subject headings. These headings are in the areas of computers, IT, politics, popular culture and psychology. The total number of preferred headings in the Sears List of Subject Headings is about 8000.

However, the number of headings that can be coined and subdivided is much larger.

Two major areas of new additions include Islam and graphic novel. Graphic novel alone has about thirty headings in the Sears List of Subject Headings. Some other new headings in the list include: reality shows, suicide bombers, stem cell research, body piercing, and so on. Some other changes have been done to cancelled or modified headings. For example, 'biological diversity' becomes 'biodiversity', 'native' people has been replaced by 'indigenous' people. Some headings have been fine-tuned, e.g., 'fictitious' character has been changed to 'fictional 'character.

Principles of Sears List of Subject Headings

A controlled vocabulary provides means of organizing information for easy and quick retrieval. Every controlled vocabulary system is based on some principles related to:

1. Choice of preferred headings, i.e., the subject headings
2. Levels of specificity of terms, which relate to the depth of the subject analysis
3. Form and structure of preferred headings, i.e., the grammatical rules used for creating the subject headings

These principles help in developing grammar of the subject headings. The choice and structure of the subject headings depend on the users and the library structure.

From the time of its inception, the Sears List of Subject Headings has been based on the principles of LCSH. These principles have, however, been modified to suit small and medium sized libraries. The Sears List of Subject Headings is based on clearly stated rules and principles of subject cataloging, which are as follows:

- Direst and specific entry
- Common usage
- Uniformity and consistency

Direct and Specific Entry

This principle states that when a subject is entered in the list, it must be entered directly under the specific name rather than the name of the class to which it belongs. Specific here means the exact term and it should correspond to the subject of the document. The specific entry is an exact measure of the depth and breadth of the subject. Thus, when entering subjects into the Sears List of Subject Headings, the heading must be as specific as possible. This makes information retrieval easier and quicker. For example, the entry for the flower Rose must be made under the specific heading Rose rather than under the class Flowers. Similarly, a book written by Charles Darwin will be under the heading Darwin, Charles and not under the class Scientists or Writers.

The principle of direct and specific entry also says that the specific heading must be a lead heading and not a subdivision of any heading, For example: Flowers–Rose is a direct and specific entry but Rose is a specific entry, since Rose acts as the lead entry and not a subdivision.

Usually, the entries for subjects appear as an alphabetical list in the Sears List of Subject Headings and this type of cataloging is also known as alphabetic–classed catalog. In this type of cataloging, the entries are maintained under their headings along with the subdivisions.

However, when entries are made under the direct and specific entry principle, an ambiguity lies in the level of specification as to how specific the catalog should be. The level of specification basically depends upon the type of library, its conditions, policy and requirements of cataloging.

Common Usage

The Sears List of Subject Headings complies with the principle of common usage. In other words, the Sears List of Subject Headings contains entries that are most commonly used by information seekers. The headings used are common instead of being scientific and jargon. This makes using the Sears List of Subject Headings easy and convenient. For example: the Sears List of Subject Headings uses Dinners instead of Banquets, Elderly instead of Aged.

The Sears List of Subject Headings generally uses American spellings. However, when Sears List of Subject Headings is used in libraries outside America, changes in spellings can be made as per the requirements of the library. Thus, the Sears List of Subject Headings is deemed flexible.

Common usage is, however, not easy to determine and also keeps changing with time. The common usage also varies from one user to another. When formulating the Sears List of Subject Headings, all these issues on terms of common usage have been considered and that is why the Sears List of Subject Headings is constantly reviewed and edited to accommodate the required changes as and when required.

Uniformity

The principle of uniformity says that the Sears List of Subject Headings must be uniform. In other words, a heading once chosen should be consistently and uniformly applied in its scope, meaning and spellings until a decision is taken to the contrary. The use of singular and plural terms must be made consistently and spellings must be chosen once and uniformly.

The principle of uniformity also applies to the grammar and structure of the headings. Uniformity in subject headings is achieved by laying down strict, unambiguous and clear rules for singular and plural forms and also the word order in a multi-phrasal word. The rules for structure of headings having subdivisions must also be laid down. The following rules have been laid down for achieving uniformity in the Sears List of Subject Headings:

- **Single noun headings:** Many headings in the Sears List of Subject Headings are single nouns either in singular or plural form. For example: Actors, Birds, Carbon, Zoology, and so on. Singular noun can be either an abstract noun, such as bravery, truth, and so on, or a broad area of knowledge, such as Poetry, Physics, Education, and so on. Plural nouns are concrete and countable objects, such as books, fables, crystals, and so on. The plural nouns are more common when it comes to creating subject headings in the Sears List of Subject Headings. In some cases, the headings have a singular form as well as a plural form but these have different meanings.

- **Synonym headings:** Synonyms are words that have similar meanings. When synonyms are entered in the Sears List of Subject Headings, parenthesis are used as quantifiers to state the context in which the heading has been used. For example: Lime {Mineral), Lime (Fruit) where lime is a synonym and can mean either a mineral or may refer to a fruit.

- **Phrase headings:** Phrase headings are used to describe some complex headings of subjects. Phrase headings in Sears List of Subject Headings can be of three types. The first type of phrase headings use the conjunction 'and', i.e., they use two nouns joined by the conjunction 'and'. For example: Libraries and students, Banks and banking, Weights and measures. When two nouns are joined by the conjunction 'and', the phrase represents either two similar or two opposite concepts.

  A phrase heading can also be an adjectival heading, i.e., it uses an adjective and a noun. For example: Arab civilization, Love stories, Organic Chemistry, International ballistic missiles.

  The Sears List of Subject Headings may even make use of prepositional phrases. The prepositional phrases join noun phrases with the help of a preposition. For example: Picture books for children, Life of other planets, Space fight to the moon, and so on.

- **Subdivision of headings:** Any heading in the Sears List of Subject Headings can be divided into subdivisional headings. These headings may be divided in three ways: topical subdivisions, geographical subdivisions and commonly used subdivisions. The topical subdivisions are the ones that are specific to a given heading. Some headings in the Sears List of Subject Headings have already been divided into topical subdivisions. For example: Cancer–Chemotherapy, English Language–Grammar. All topical subdivisions may not be listed. In fact, some topical subdivisions need to be created by following the instructions provided in the main headings. These are known as instructional topical subdivisions. Geographic subdivisions can be obtained by instructions or by using pattern of the key geographic headings of the Sears List of Subject Headings. These can also be created based on the instructions provided in the main headings.

Structure of the Sears List of Subject Headings

The Sears List of Subject Headings is an alphabetical list. This list is arranged alphabetically word by word and is listed in English language for use in small and medium sized libraries. The Sears List of Subject Headings covers the entire range of knowledge and has subject headings corresponding to every known phenomenon of a wide range of subjects. The Sears List of Subject Headings is divided into two parts: The Introductory Part whose pages are numbers in Roman Numerals and The Core List of Subject Headings whose pages are numbered in the Indo-Arabic numeral format.

The preliminary pages of the Sears List of Subject Headings consist of the Principles of Sears List, which is a clear, concise and comprehensive introduction of what the Sears List of Subject Headings is all about. These preliminary pages that include the Principles of Sears List provide an instruction manual. This operational manual explains with illustrations the purpose of subject cataloging and the principles underlying the design of the list. The manual also provides instructions on how to use and consult the list. It gives instructions on how to operate the list, how to locate or coin the appropriate headings, how to create and use subdivisions of the headings. It also explains the history of the Sears List of Subject Headings and the reasons for it being reviewed constantly. The structure of the Sears List of Subject Headings also provides for a section called Headings to be added by the cataloger. This section is a list of 14 categories of headings that are not explicitly listed but can be added by the catalogers as and when required.

The Key Headings in the Sears List of Subject Headings is a list of subject headings for type of headings pertaining to people, places, languages, literatures and wars. All headings in the Sears List of Subject Headings can be divided into non-preferred headings and preferred headings. Preferred headings are usually the main headings and listed in bold while the non-preferred headings are synonyms or variants of the preferred headings and are listed in light type face. Since these are synonyms of the main headings, these are not used as subject headings. For example**:** 'Abnormal children' is a non-preferred heading according to the Sears List of Subject Headings and so is not used as a heading in the subject list.

Sears List of Subject Headings offers guidance for creating subject catalogs for maximizing the retrieval of information.

The core of the Sears List of Subject Headings deals with word by word alphabetical list of the subject headings. Non-preferred headings are the ones that are not to be used for the purpose of cataloging and also for retrieving information related to the subject mentioned in the heading. Each non-preferred heading is listed by preceding the heading with the lead 'USE'. This further directs the information seeker to the preferred heading which actually is used for information retrieval. For example**:** Dairy farming is a non-preferred heading in the Sears List of Subject Headings. So the entry for dairy farming is made as follows:

Dairy Farming

USE Dairying

Here, USE directs the information seeker to the preferred heading dairying, which will provide the required information to the user.

Preferred headings are always listed in bold in the Sears List of Subject Headings and is used for the classification of documents. In other words, preferred headings are the ones that can be assigned to documents.

The preferred headings are broadly categorized as ideas, objects, places, processes and relationships. A preferred heading is listed along with its DDC class number, the scope of use, the instructions for subdivisions and the related terms, the broader terms and also the narrower terms. For example**:** Consider the entry Dairying (May subdiv. Geog.) 636.2, 637.

UF Dairies

- Dairy Farming
- Dairy Industry

  BT Agriculture
- Livestock Industry

  NT Milk
- Dairy Cattle

The above entry means that Dairying is a preferred entry, which may be subdivided geographically based on the location. The numerals, 636.2 and 637, point to the DDC class to which dairying has been assigned. The UF are non-preferred terms that act as synonyms for dairying. Of the three non-preferred headings, dairies, dairy farming and dairy industry, dairying is the preferred term and finds place in the Sears List of Subject Headings. The non- preferred terms are similar and equivalent to dairying in their meaning as well as scope.

BT is the hierarchically broader term than dairying. It means that agriculture and livestock industry encompass dairying. NT is the narrower term about which information can be obtained by referring to the preferred subject heading. RT is related term which is in the same level in the hierarchy as the preferred heading. The related terms are so named because these are related to the preferred heading in some manner or the other. For example:

Diagnosis

RT Pathology

Here, it means that diagnosis is the preferred subject heading and pathology is a related term.

Subdivisions: Preferred headings are basically of two types. In the Sears List of Subject Headings, about 500 subject headings are used as direct headings and also subdivisions for some other headings. For example: Directories is a preferred heading and also a subdivision.

Directories- History (Here, directories is the main heading)

Physicians- Directories (Here, directories is the subdivisional heading)

Key Headings: In the Sears List of Subject Headings, all subjects are not listed. For some subjects, models are given so that the subject headings can be termed on the basis of these models. On the basis of these model headings, several new subject headings can be coined. The key or model headings listed in the Sears List of Subject Headings includes:

Category	Model heading
Author	Shakespeare, William, 1564–1616
Country	United States
State	Ohio
City	Chicago (Ill)
Language	English language
Literature	English literature
Ethnic	Native American
Public figures	President United States
Wars	World war, 1939–1945

So, if we have a heading for any country, we will look under United States for a similar subject heading for the given country and then coin the subject heading accordingly. For example: if our subject is History of India, we will look under the United States where the analogous heading is the United States–History and so our new heading will be India–History.

Subdivisions are a way of making a heading more specific and to make class of headings smaller. Some of the subject headings in the Sears List of Subject Headings are already subdivided. All the subject headings in the Sears List of Subject Headings may be further subdivided by any of the about 500 subdivisions that are listed in the Sears List of Subject Headings.

A few subdivisions of subject headings in Sears List of Subject Headings are as given below:

Science – Philosophy

Food – Fiber contents

Girls – Education

Trees – India

Education – Bibliography

Bible – Study and teaching

India – History—1857–1947

Architecture – 20th Century

These subdivisions are either generally applicable to all subject headings or maybe restricted in use suitable for a given category of headings.

There are four types of subdivisions used in Sears List of Subject Headings. These subdivisions are as follows:

1. **Topical:** Topical subdivisions bring out the aspect of a subject or point of view presented in a particular work. Uniformity can be more readily achieved with subdivisions. For example**:** Birds–Eggs.

2. **Bibliographical:** These subdivisions specify the form an item takes. For example: Sindhi language–Dictionaries.

3. **Geographical:** A topical heading with a geographic subdivision means simply topic in a particular place. Geographic subdivisions can be either direct or indirect. The Sears List uses the direct form of subdivision. For example: Trees–India.

4. **Chronological:** Chronological subdivisions correspond to general accepted period of country's history or to the spans of time most frequently treated in literature. This makes a search much simpler bringing all works on a single period history. Historical periods vary from one country to another and usually correspond to major dynastic or governmental changes. For example**:** India–History—1857–1947.

Sears List of Subject Headings is a list/register of headings, and it provides patterns and instructions to coin headings for new and old subjects. Paradoxically, the headings that can be newly formulated from the Sears List of Subject Headings are much more in number than are listed. These unlisted but coinable headings mostly pertain to specific names of individuals, corporate bodies, associations, institutions, commercial organizations, processes, events, natural and geographical entities, flowers, vegetables, fruits, animals and all creatures. All these headings can form subject headings and are supplied by the catalogers as per the instructions provided in the list. However, there are some entries that are omitted from the Sears List of Subject Headings.

Cataloging or Bibliographic Description of Different Types of Documents According to Sears List of Subject Headings

- **Biography:** Biography is a form of writing with subject heading 'Biography' as a literary form. The subject heading can be either main heading or a subdivision. Biography is further divided into two groups: the collective and the individual biographies. Collective biographies are works containing biographies of more than three persons. Collective biographies are not limited to any area or to any class of persons. These are simply assigned the subject

heading Biography. Collective biographies are devoted to people of a single country or geographic area. For example: The Biography Who's Who of the Arab World will have the subject heading Arab Countries–Biography. Sometimes, the biographies are related to people of a specific class. For example**:** Women–Biography. A biography may even be related to people of a specific profession. For example: Doctors–Biography. An individual biography is a work of a single person. The subject heading for an individual biography will have the name of the person as the subject heading. If the biography is an autobiography, the author's name is entered in the bibliographic record twice as the author and as a subject.

- **Nationalities:** National aspects do not form main headings but are listed as subdivisional headings under the geographic main heading. Headings that are stationary in relation to the national aspect of a location are never given national adjectives but are listed as geographic subdivisions. For example: Art and Architecture is a stationary heading and may be listed as Art and Architecture–Japan. Headings that are not stationary are also expressed as topical headings with geographic subdivision, e.g., Automobiles–Germany and Corporations–Japan. When transported or replicated to foreign country, these headings are given national adjectives to express national style, ownership or origin and subdivided by the place where they are found, e.g., German automobiles–United States and Japanese corporations–France. People of a specific nation are subdivided geographically except authors, novelist, dramatist and poets who are given national adjectives. Writers such as biographers, journalists, and so on. are subdivided geographically. For example: American composer in France is listed as Composers–United States and Americans–France.

- **Literature:** Literature consists of two types of materials—works about literature and literary works. Works about literature are main subject headings, such as Drama, Fiction and Poetry. For example: A work about history of poetry is listed as Poetry–History. Literary works are usually of two types: literary works by several authors or anthologies and works by a single author. Heading for general anthologies are given broad headings. For example: Literature–Collections; Poetry–Collections; or Drama–Collection. National literatures are given headings subdivision Collections, e.g., American literature–Collections and Italian poetry–Collections. Subject headings are assigned to literary works without any subdivisions. Works by a single author or individual literary works have no subject headings. Literary works are best known by author and title. In Sears List of Subject Headings, the subject heading for a literary work is the topic of the literary work.

- **Wars and Events:** In the Sears List of Subject Headings, wars fought between two or more nations are given a name followed by a date or dates. For example: Israel–Arab War, 1967. Civil wars, insurrections and invasions are entered under the subject heading history of the country involved

following the dates. For example: United States–History 1861–1865; Civil war. Events that have names are given a heading for the name followed by the place and then by the date. For example: World Trade Center Bombing, New York (N.Y.), 1993. Battles are entered under the name of the battle, but inverted form, with the place of the battle qualified as needed. Recurring events, such as festivals, and so on, are given the recurring name, followed by the date, with the place in parentheses.

- **Non-Book Materials:** The Sears List of Subject Headings also provides for the assignment of subject headings to non-book materials. Subject headings for electronic media and for audiovisual and special instructional materials in Sears list of subject materials should follow the same principles that are applied to books. Non-book materials often concentrate on very small aspects of larger subjects and so the cataloger may not find in the Sears List of Subject Headings the headings that should be used for the non-book materials. In such instances, the cataloger can add new subject headings as and when needed. The subject headings for non-boom materials must not contain any subdivisions.

Maintaining a Catalog According to Sears List of Subject Headings

Maintaining a library catalog is an important and vital function of a library. As per the Sears List of Subject Headings, maintaining a catalog with subject headings is not very easy for the cataloger. Maintaining a catalog requires the cataloger to add new headings, revise the existing headings and also make appropriate references without affecting the integrity of the Sears List of Subject Headings.

- **Adding a new record or heading:** When a new subject heading has to be added to the Sears List of Subject Headings, the first thing that needs to be checked is if a subject heading with the same name exists in the list or not. Sometimes, a heading may already exist but not as a main heading. This heading may exist as a reference and so now can be added as a new subject heading. A new subject heading may even be a combination of already existing headings and their subdivisions. In such a case, it becomes important to ensure that the subject heading is placed at the right position in the Sears List of Subject Headings. The cataloger must keep in mind the fact that the things and examples that are already not present in the Sears List of Subject Headings are added to the list as and when required. This is essential for expanding the list and ensuring that the list is current and updated.

- **Revising subject headings:** The Sears List of Subject Headings must be reviewed and updated at regular intervals. When the Sears List of Subject Headings is revised, the list of canceled and replaced headings must be consulted to ensure that an obsolete heading does not get added to the list again. Whenever a subject heading is revised in the Sears List of Subject Headings, all its related headings and subdivisions must also be revised.

- **Making references:** References direct the user from terms not used as headings to the term used as a subject heading. References also help to go from related terms as well as broader terms to the actual subject headings. There are three types of references used in the Sears List of Subject Headings: See references, See also references and general references.

See references: The see references are considered very useful by the cataloger for describing and creating subject headings. The see references need to be considered from point of view of the readers. The readers profile may depend upon age, background, education, occupation and geographical location. It also takes into account the type of library that uses the Sears List of Subject Headings. These references are added the very first time the subject heading is used in the Sears List of Subject Heading. The following terms are used as see references in the Sears List of Subject Headings:

- o Synonyms
- o Compound Headings
- o Inverted form of Headings
- o Variant Spellings of the Heading
- o Opposites or Antonyms

See also references: In the Sears List of Subject Headings, each subject heading has a broader term label associated with it. The broader term is broader in scope than the subject heading. According to the rules of Sears List of Subject Headings, only one broader term is used for a subject heading. The broader term aids the cataloger to find the best term to assign the subject heading. The broad term also helps to indicate where the see also references appear in the public catalog. In the Sears List of Subject Headings, a reference is never made to a subject heading unless there is some work listed under the heading. These references if made are called bling references and should be avoided or deleted from the Sears List of Subject Headings.

General References: In Sears List of Subject Headings, general references point to a general category or group of things and not a specific subject heading. General references provide instructions to create and maintain subdivisions of subject headings. For every subdivision, a general reference is provided in the Sears List of Subject Headings.

Strengths of Sears List of Subject Headings

- Sears List of Subject Headings uses common language and vocabulary, which makes it easier for information seekers to search and retrieve information efficiently.

- The Sears List of Subject Headings is continually reviewed and revised in response to the new subject categories, also updates made to the DDC.

- The principles used for Sears List of Subject Headings are practical and uniform and enable the creation of sub-headings in an easy manner.

- The Sears List of Subject Headings can be used in foreign libraries as well where the library collections are in English.

- Sears List of Subject Headings provides versatility and flexibility to the catalogers to add their own headings as per the needs and requirements of the library in which the list is used.

Weaknesses of Sears List of Subject Headings

- The Sears List of Subject Headings is not well known by new librarian and catalogers who lack the time to think about new subject headings on a day-to-day basis.

- The Sears List of Subject Headings is costly to implement. It requires a lot of resources to manage, review and maintain the list and accommodate the changes in the list.

- The Sears List of Subject Headings has a major weakness in the subject headings becoming obsolete. The Sears List of Subject Headings does not provide for keyword preferences, searches and indexing of the subject headings.

- The Sears List of Subject Headings is not updated as often as other lists and so is not exactly up to date and may not contain subject headings for the current events.

- Sears List of Subject Headings is designed for American, Christians and Western Culture. It also uses American spellings and so may not be suitable for use in other countries and cultures, thereby, limiting its scope.

CATALOGING

Cataloging is the process of creating metadata that represents information sources, such as books, moving images, sound recordings, and so on. Cataloging creates bibliographic records to provide information, such as the creator's name, title and subject terms that describe the information sources. The bibliographic records are surrogates for information sources. Initially, the bibliographic records were maintained in writing in cards. This required a lot of manual work to be done in terms of adding new records, deleting old ones and also updating the records when required. Since 1970s, the bibliographic records are maintained in machine readable form. These bibliographic records are indexed by information retrieval tools for easy access and retrieval. Also, the bibliographic records are searchable using search engines or bibliographic databases.

Bibliographic control is the basis of cataloging. It provides rules to describe information sources. The aim of bibliographic control is to enable information users

to search and locate the most useful and the much needed information source. Bibliographic control is used to:

- Identify all types of information sources.
- Identify the works in the information source. These works can be a collection contained within a single information source or the multiple works can span several issues of an information source.
- Systematically arrange all the information sources into libraries, archives, museums or Internet communication files. These libraries and archives are known as collections of information sources.
- Create a list of information sources so that these can be accessed and retrieved easily.
- Create metadata for the information sources. This includes providing a name, title, subject and other information for the information source.
- Provide means of accessing these information sources or copies of the information sources. This includes aiding the information seeker to find the exact location of the information source if the source exists and finding references to the source if the source does not exist.

Descriptive Cataloging: Descriptive cataloging is the type of cataloging that describes the physical details of an information source, typically a book. Descriptive cataloging is the cataloging process where catalogers take information from the information source in hand, create it in a way that the item can be completely identified and distinguished from other items, and then determine the names and titles to be used as access points. The information is recorded into a bibliographic record.

Subject Cataloging: Subject cataloging is a process that deals with classification or indexing of information sources. Classification is the process of assigning a document or an information source to a class or category using some classification system. The most commonly used classification systems include Dewey decimal classification and Universal Decimal Classification. Indexing is the process of assigning a characterizing label to the information sources or documents that are entered in the bibliographic records. Classification makes use of controlled vocabulary, while indexing makes use of controlled vocabulary, free indexing or both of these.

Cataloging Rules

Cataloging rules are the rules that are used to design a catalog. Cataloging rules are based on the assumption that the process of cataloging uses human intellect instead of raw computer indexing of unstructured and undifferentiated mass of keywords. Cataloging rules are also based on the bibliographic universe which is huge and complex, and so these rules must ensure that catalogs are designed in a manner that reduces the complexity of the catalog for the users. Cataloging rules

are intended to support the labeling of bibliographic data by humans such that computers can use the labeled data to build complex indexes that will appear simple to the users of the catalog. The cataloging rules define raw data elements, recommend implementation decisions and display decisions, so as to ensure the greatest possible functionality and user service in the resultant catalog.

Objectives of Cataloging Rules

Cataloging rules must be designed to meet the following objectives:

- Ascertaining the work or information sources that can be provided access, based on the title and the creator of the information source
- Ascertaining the information sources of a specific creator that can be provided access
- Ascertaining subjects of information sources that can be provides access
- Ascertaining the information sources in a specific genre that can be provided access
- Ascertaining whether the information source can provide access to a specific expression or a manifestation
- Providing the user with efficient indexes

Principles on which Cataloging Rules are based

The cataloging rules are based on the following principles that ensure that the catalog created is both unique and easy to access:

- **Principle of the name commonly known:** The cataloging rules assume that the most important entities for the creation of a catalog include the creator, subject, genre and the form of the information source. In order to build efficient indexes, all these entities must be given a language based identifier so that the users can quickly identify and locate the required entity. For the catalog to be efficient, the name of the entity identifier must be in a language as simple as possible and must make use of common terms that are used by a large number of information users and seekers.

- **Principle of uniform identifier:** If the name commonly known is similar for more than one entity, then this identifier name must be made unique by addition of the necessary information. If this is not done, the catalog will not be an efficient one and there would be confusion regarding information access and retrieval. If each identifier is not made unique, then there will be several entries under the same name or index and, thus, the catalog will lose its uniformity as well as uniqueness.

- **Transcription principle:** This principle says that when a catalog has to be created, the language of the entity being indexed or entered must be used in the catalog as well. The language must be changed only when it is ambiguous or when it is felt that there are some errors in the language. The identifying information on the item being cataloged provides a communication link

between the catalog user and the cataloger. The transcription principle, thus, says that when a catalog is being prepared, use the identification information given in the item being cataloged even when the script that appears on the item being cataloged is not the script of the catalog.

Cataloging rules have facilitated the development of cataloging standards. Following are the standard cataloging standards used across a large number of libraries:

- Anglo-American Cataloging Standards were developed by English speaking libraries. The first Angle American Rules were published in 1908. Since then, several changes have been made to these rules to accommodate the new changes and additions. The Anglo-American Cataloging Rules 2 (AACR2) is the latest and revised edition of these rules.

- In England, the first cataloging code was developed by Bodleian Library at the Oxford University in 1674. These cataloging standards emphasized authorship and books by the same author were listed together in the catalog.

- Cataloging codes are codes which describe the information that must be included in the bibliographic record and how the information must be presented to the user. Most cataloging codes are similar to, or even based on, the International Standard Bibliographic Description (ISBD). These rules organize the bibliographic description of an item in the following eight areas: title and statement of responsibility (author or editor), edition, material specific details (for example, the scale of a map), publication and distribution, physical description (for example, number of pages), series, notes, and standard number. The most commonly used cataloging codes in the English-speaking world are AACR2. AACR2 provides rules for descriptive cataloging and has been translated in several languages for use across libraries of different countries.

- **Digital format:** Most library catalogs are available online and can be accessed easily using various websites. For this, the catalogs need to be encoded and transported over the digital media in a digital format. The most common digital format standards used for catalogs are MARC (MAchine-Readable Cataloging) standards which are considered to be difficult to work with. Library digital collections often use simpler digital formats to store their metadata such as the XML-based schema.

- **Transliteration:** Library items that are written in a foreign script are, in some cases, transliterated to the script of the catalog so that they can be easily indexed in the catalog. For this, standards need to be set to uniformly transcribe all such library items and to maintain uniformity in the catalog as well.

Levels of Cataloging

The various levels of cataloging are as follows:

1. **High or full level cataloging**: This type of cataloging can be describe in terms of the following:

   - *Published material:* For published materials, full or high level cataloging includes full description and subject access points, comprehensive notes, full fixed field information, and format specific details.

   - *Original material:* For original material pertaining to collections, full level cataloging includes full multilevel descriptive records related to one another in a part-to-whole relationship. It may also include Aggregated Collection, Collection, Series, Item and Part descriptions with subject access points. For single original items, the full level or high level description can include complete details with subject access points.

2. **Medium or standard level cataloging:** Medium or standard level cataloging can be described as follows:

   - *Published material:* For published material, standard level cataloging includes less detailed description, one or two subject headings, limited notes and not all coded data with shortened classification numbers.

   - *Original material:* For original material, standard level cataloging includes a single record with minimal or no arrangement and includes at least two subject access points.

3. **Basic or brief level cataloging:** This level applies to published material. It contains only those elements needed to identify an item, for example, author, title and statement of responsibility, edition, publication, ISBN, and so on. This level of cataloging contains no subject headings or classification.

4. **Collection level cataloging:** This level of cataloging is applied to published materials. Collective level cataloging creates records for a group of materials intentionally brought together, usually with a common subject or acquired as a collection. Collection level cataloging records generally have a title constructed, a broad description of the collection, appropriate access points including subject access, and may contain a note about the group of items or a contents list.

5. **Series level cataloging:** Series level cataloging is used for published materials that span a series. The series level cataloging includes a description of each series of the published material.

6. **Preliminary level cataloging:** Preliminary level cataloging is applied to items that are a part of a collection and have been requested for digitization.

Preliminary level cataloging is usually not a detailed cataloging. It contain subject access points and may even be completed or updated as and when required.

7. **Less than full-level cataloging:** Less than full level cataloging applies to materials that are not examined, especially materials that have been copied from some other sources. In such cases, the cataloging is done by copying brief cataloging information of the original material.

Role of a Cataloger

A cataloger is a person or an organization that performs original cataloging of documents. A cataloger performs collection documentation, reference services and manages the cataloging software. The main function of the cataloger is to develop a catalog that adheres to the principles of cataloging and is also easy to use. The cataloger must ensure that the catalog is developed and maintained in a manner which facilitates easy and quick access and retrieval of information. A cataloger to perform his functions must have complete knowledge about library and information science. The cataloger must also have an in-depth knowledge of the principles of cataloging and the rules used to develop catalogs.

The essential functions of a cataloger are listed below:

- A cataloger performs original cataloging of manuscripts, architectural drawings, books and periodicals, prints, and photographs.

- A cataloger works with members of the cataloging group to develop a uniform catalog.

- A cataloger is responsible for implementing and maintaining online and local automated systems for managing and disseminating catalog information and digitized copies of the catalog.

- A cataloger is also responsible for developing and implementing methods, procedures, standards, policies and objectives governing the documentation, finding aids and cataloging of collection materials.

- A cataloger works to ensure the proper documentation of collections and items for cataloging.

- A cataloger must determine the priorities for cataloging and processing.

- A cataloger must perform his duties with an in-depth knowledge of the principles and uses of automated systems. He should have a working familiarity with a wide range of database management and on-line public access systems for library.

- A cataloger must train other staff members to use the necessary resources for cataloging purposes.

- A cataloger must overlook the development of policies, procedures and strategies governing the access and use of the catalog.

- A cataloger must provide reference services to users of collection materials.

- A cataloger must respond to inquiries regarding the catalog and the various library collections.

- The cataloger must develop informational brochures, lists and other topical guides to research collection materials, to related databases and reference sources that are used in the catalog.

- A cataloger is also responsible for organization, cataloging, and documentation of monographs and serials, ephemera and maps, archives and manuscripts, sound recordings, visual materials, film and video, architectural drawings, related collection items, and so on.

- A cataloger must be able to solve technical and procedural problems in a creative manner.

- A cataloger must be able to effectively update the catalog as and when required to ensure that it contains current information. The cataloger must ensure that the deletion of obsolete entries takes place without affecting other records in the catalog.

- A cataloger also needs to prepare and organize collection material for the purpose of cataloging in an effective manner. Unorganized collection material when cataloged may create several problems related to the uniformity of the catalog.

CATALOGING OF NON-BOOK MATERIALS

Non-book materials are all those library materials that are not printed and maintained in the format of a book. These may be maps, manuscripts, audio media, sound recordings, electronic resources, and so on, which are maintained in a specific format by the library. The cataloging of these library materials is not an easy task. Usually, these library materials are considered difficult to be inspected by a cataloger. To catalog non-book materials, a cataloger needs to have special skills and must be trained enough so that the cataloging can be done in an accurate manner.

Cataloging on non-book materials is also considered difficult because many times, the information source of these library materials is missing or not mentioned. The library materials may even be accompanied by other material considered helpful for the information seekers and users by the publisher. The cataloger needs to catalog this accompanying material as well. The cataloging of non-book materials is a time-consuming process wherein each element needs to be minutely examined.

Some non-book materials may not be original works and so the cataloger finds it difficult to catalog such materials. When non-book materials are not original materials, the cataloger needs to find the original material and source of information to perform the cataloging in the right manner. This is a difficult task.

NOTES

Apart from this, non-book materials may contain a lot of small details which the cataloger needs to record in the description. These details may be important for the use of the non-book materials and so cannot be ignored, and recording so many details can both be cumbersome and a time-consuming process.

For the cataloging of non-book materials, a standard set of rules and principles needs to be followed. The AACR2 provides rules for the cataloging of non-book materials. The AACR2 provides details of cataloging all types of non-book material.

Choosing a Classification System for Cataloging of Non-book Materials

The classification system suitable for cataloging and indexing of the non-book materials is not easy to determine. The following guidelines or criteria need to be considered and kept in mind when choosing classification system for non-book materials.

First, is the material an integral part of the general collection, or is it to be considered as supplementary? If it is to be a basic part of the holdings, then ideally it should be treated in the same manner as books. How will the user locate the material? If the material consists primarily of photo-reproductions of books, the user may not know whether a specific title sought is represented in book or non-book form, and will search for the item in the same manner as for a book. Whether the approach is by author, title, subject or form, it will affect both the classification system and the arrangement of materials. Photos, for example, are usually located by subject; for maps, the approach is by area. Some instructors and researchers may even insist that a collection should be arranged historically, geographically or by course content.

What kinds of approaches are desired: subject, author, title or form? How many approaches will be covered by indexes, card catalogs and other intermediary finding devices?

How complex is the proposed system? Is the notation mixed with long involved numbers and letters; have mnemonic features been incorporated into the system? Exactly how much information is the classification symbol to convey? Once again, the library must establish whether a simple location symbol is sufficient, or if the symbol is to indicate subject matter, author, publisher or other bibliographic information.

Are cards to be filed into the main catalog or into a separate card catalog? Generally speaking, all cards in the main catalog should be standardized to minimize confusion, while more liberties can be taken with both the classification system and card format if a separate catalog is created. The library may even wish to include non-book cards in the main shelf-list to broaden subject searches.

Is the collection to be housed in one location, or is it to be dispersed among departmental libraries, subject divisions or stack levels? If the collection is to be

dispersed, both classification and location symbols must be considered. The location of the collection will, in turn, be determined by the clientele, the necessity and availability of equipment, and the physical layout of the library.

Is the collection to be under the supervision of trained library personnel? A closely supervised non-book collection may not need detailed cataloging or as close a classification system as one that is left on its own.

Is the material to be in closed or open stacks? An open stack collection that encourages browsing is usually classified differently than a closed stack collection. Can, in fact, the material be placed in open stack areas, or is the format such as to make browsing impractical or even impossible?

Has adequate provision been made for the material in the Dewey Decimal or Universal Decimal Classification schemes? If not, can either scheme be adapted to the material in question?

Has the manufacturer or issuing body supplied a numbering system? If so, is it easily recognized by users and can it be used as a library classification system? Are indexes or bibliographies provided by the publisher or available through another source? Indexes furnished with a set of non-book materials can often be successfully used as a means of reaching the materials without completely analyzing each title or without full cataloging and classification.

Are other aids and working records available? If catalog cards are supplied by the publisher or another source, how much adapting is necessary? Is a classification number included on the cards and can it be used as it is? Must entries be established? Are subject headings consistent with those used for books? What is the present and potential size of the collection? Is it possible to thoroughly classify and catalog all items the library will receive in the foreseeable future?

Does the library have the necessary personnel and funds to fully classify and continually update a closed classification system? Complete cataloging and classification of non-book materials can make excessive demands on a catalog department. Microforms, for example, not only represent a great variety of formats but all languages and subjects as well. Moreover, full cataloging and classification of such materials as maps, music scores and phono-records require experienced specialists if a professional job is to be done. How many different types and sizes of items are involved in a particular non-book collection?

Although either the Dewey or universal decimal classification systems can accommodate any book-like material regardless of size or shape, the various sizes and types of materials in a particular non-book collection may have an effect on both storage requirements and the ability to establish a uniform classification scheme.

Does the material lend itself to full classification? Is much of it fragmentary? Does much of the material contain more than one title on each physical item as is often the case with microform and phono-records? Will the proposed scheme conflict with the one used for books? Will call numbers conflict with the numbers

assigned by the UDC or DDC or the library's own catalog department? At the very least, a symbol may have to be added to the notation to designate the material as non-book.

Who will use the material? Is the collection to be used primarily by specialists who may not need complete classification or even complete cataloging of the material? The scholar can and usually does rely on indexes and bibliographies, and needs only to be informed that a title is available and its location in the library. Or will the users represent a broad segment of interests and specializations? What is the frequency of use? Are the materials to be used by a relatively small proportion of the academic community at rather infrequent intervals? Or will the collection receive constant use by many individuals? The potential use received by a collection should influence the type of system selected. Are there likely to be additions to the individual titles in the collection?

A detailed classification system permits the expansion of the collection in contrast to a tightly shelved serial system, that is, unless provision has been made for added volumes. If the items are issued in series and arrive in the library over a long period of time, a compatible classification scheme which will not scatter the series should be selected.

Binding problems must be considered. For example, a government documents collection classed into the general collection will have to be bound. With perhaps tens of thousands of items involved, this would represent a considerable amount of money. On the other hand, if the collection is classed in a special area and properly supervised, little or no binding is usually required.

What storage facilities are available and is there room for expansion? Is the collection to be housed in a fixed location? Limited space often dictates a fixed location which, in turn, dictates the type of system to be used. Can the material be handled and shifted on the shelves or in drawers with minimum damage? If possible, fragile or bulky materials should not be continually shifted. A closed stack, fixed location system encourages much less handling of individual items than does an open stack, subject classification system. Is the collection to be continually weeded? If so, how will this affect the classification system? The continual discarding of items may make an elaborate subject classification system meaningless. Is the collection to be circulated? If so, will items be checked out from the main circulation desk where loan records are kept by call number? Special routines must be established if the material is classified by a scheme other than the one used for books.

Maintenance of a charge file by author or title is a comparatively clumsy filing arrangement; yet too many different charge files for various special materials are not efficient. Finally, how has the material in question and similar materials been treated in the past? As with books, if reclassification is involved, a whole new set of problems must be considered.

It is to be noted here that all criteria mentioned above may not apply to every non-book material in question. However, the non-book materials must be questioned or matched against the guidelines given for correct cataloging.

Cataloging of Cartographic Materials

AACR2 provides for cataloging of all types of cartographic materials. Map is the most common type of cartographic material which is cataloged using AACR2. AACR2 defines a map as 'a representation, normally to scale and on a flat medium, of a selection of material or abstract features on, or in relation to, the surface of the Earth or of another celestial body'. Other cartographic materials about which cataloging rules are provided in AACR2 include relief maps, globes, atlases, celestial charts, photographs and surveys on the basis of which conventional maps are developed. The vocabulary and techniques of cartography are difficult and not understood by all, and so most libraries face difficulty in cataloging these. AACR2 provides specific and simple rules to catalog these materials in an effective manner.

The bibliographic information about the map as a cartographic material can be obtained from any part of the map. For other areas, the information can be taken from the accompanying materials. The rules of punctuation and arrangement of pattern follow the same basic rules as discussed earlier.

Many maps are issued as a set, sometimes over a long period of time in many parts or altogether as a whole. A library may decide to catalog each part of the map separately or it may catalog the set as a unit.

The title proper of the map must be recorded word for word as it appears in the source of information. However, basic rules for punctuation and capitalization must be followed as described earlier. The title of the map may sometimes include information about the scale of the map. The scale of the map is usually recorded as a part of mathematical and other materials details area but it may also be included as a part of the title in the catalog if required and if considered appropriate.

A map may bear more than one title. In such a case, each title is separated by a comma. A general material designation field may also be added to the description of maps. The GMD (General Material Designation) for maps is cartographic materials which is included in the title in brackets. Parallel titles for a map are also recorded in the catalog and each title is separated by a comma. The order of recording titles is the same in which these titles appear on the map. These may be recorded from top to bottom or left to right as is seen on the map.

Other title information about the maps generally includes geographic area that the map covers. This other title information is enclosed in brackets when a map is cataloged or described.

Statement of responsibility includes names of all people or corporate bodies that have some responsibility with respect to the map. Individual maps in a collection lacking collective title are cataloged separately and for each separately cataloged

title, a 'with' note is provided in the catalog. If a set of maps lacking a collective title is to be kept together and cataloged as a unit, and if it consists of a large number of items, the cataloger may supply a collective title descriptive of the entire set. In such a case, the title must have the name of the area covered by the maps.

If a cartographic item includes an edition statement, it is recorded in the edition area of the catalog. If an item contains an edition statement in more than one language, the statement for which the language matches the language of the title proper must be chosen for being recorded in the catalog record. The statement of responsibility must be recorded for the edition being cataloged and not all the editions of the cartographic material.

Mathematical and other material specific details area is used only for cartographic materials. These details include scale, projection and coordinates for a map. The statement of scale is recorded in the mathematical data area and expresses as a representative fraction with a ratio 1:x. According to AACR2, even if the scale has been recorded as a part of the title, it will be repeated again in this area. If a verbal scale is given, it must be translated into a representative fraction. This figure is enclosed in square brackets. Sometimes, maps come with bar graphs and not with scales. In such a case, a scale indicator can be used to arrive at the scale used for the map. The scale indicator is a device for measuring bar graphs and grids to convert these into representative fractions. If a map does not contain a bar graph, scale or even a verbal scale, the cataloger must compare the map with another map of known scale and then approximate the scale. Scale statements that are obtained from bar graphs or from other maps must be enclosed in square brackets and must be preceded by 'ca'.

Sometimes the scale used for items in maps varies. In such a case, the scale statement must be represented with the largest fraction and the smallest fraction separated by a hyphen. If the main map is drawn to more than one scale, then the scale statement will be 'Scale Differs'. If the projection and coordinates also differ, separate scale statements are given for the map. If the projections and coordinates are same for the main entries or main items on the map, then the scale statements are combined and a single scale statement is developed and entered for the map.

If a map includes a statement of precision, it must be recorded after the statement of scale separated by space-semicolon-space. If the projection is known but not given on the item, it must be enclosed in square brackets.

Statement of coordinates and equinox is recorded in parentheses. Publication and distribution area contain information about the publication and distribution of the cartographic materials and must be included in the catalog. The publication place and date may not be left empty as per the rules. If these are not mentioned in the cartographic materials, then these must be either estimated or gathered from reference cartographic materials or accompanying materials.

An atlas shares the characteristics of a book as well as a map. The source of information for cataloging of an atlas is the title. For an atlas, a scale statement needs to be recorded. Other physical details regarding an atlas, such as layout, production method and medium, are recorded in the physical details area. The dimension for an atlas is generally the height of the cover and is measured in centimeters. It also needs to be recorded in the catalog.

Maps are usually issued as a part of a bibliographic series. Thus, the series area for a map contains information regarding the title, statement of responsibility, parallel titles and the number of the series.

Notes area for cartographic materials contains information about various aspects. Sometimes the accompanying material of a map is too large and complex to be added to the physical description area. However, if the accompanying material is used for reference purposes, the information regarding it needs to be added in the catalog. In such a case, the information regarding the accompanying material is provided in the notes area. A map may contain some description of an area of the map which is not evident from any area or any part of the map and so this needs to be added to the notes area. The notes area must also contain a description of the method used to show relief on the map.

Cataloging of Manuscripts and Manuscript Collections

AACR2 provides guidelines for the cataloging of an unpublished material. Manuscript books, also known as codex manuscripts, are unpublished materials that can be cataloged according to the AACR2. The title of a manuscript is transcribed from the title page of the manuscript. The publication area of a manuscript is replaced by a date area in the catalog. The publication area does not hold good for a manuscript because a manuscript is an unpublished document or material. The date area of the catalog for a manuscript contains only the date when the manuscript was created. If the place where the manuscript was created is known, the information can be included in a note.

The physical description area of a manuscript in the catalog consists of all the physical aspects of the manuscript. This includes the number of pages, the number of lines per page, the number of columns per page and also the binding information, i.e., the manner in which the manuscript has been bound. Usually, manuscripts are written on papers. If, however, the manuscript is not written on paper, the fact is recorded in the physical details area along with the presence of illustrations. The physical details area also contains information related to the dimensions of the manuscript. The dimensions represent the height of the cover page of the manuscript.

A manuscript collection poses problems for the catalogers to catalog these items because the materials exist in groups rather than as single items, and are unpublished and unique. The AACR2 provides rules for cataloging of collection of manuscripts.

A manuscript collection can be accumulated organically or artificially. In either case, the link tying the manuscript collection together is the creator of the collection. The main entry in AACR2 for a manuscript collection is the creator of the collection.

If the manuscript collection has a formal title, it must be used in the catalog. If the collection does not have any title, the cataloger must provide the necessary and required title. The title for a manuscript collection can be obtained from either the prepared manuscript or from the finding aid used for the manuscript. The title usually has generic terms for characterizing the nature of the material. For example, if the manuscript has been written on papers, the generic terms 'papers' will be used in the title to point to the form of the material used.

If parallel titles, statement of responsibility and other title of information are present in the manuscript, all these must be included in the catalog. General Material Designation or GMD may be added to a title if required or as per the library's policy. For example, if a manuscript collection may consist only of electronic data, then GMD 'electronic resource' may be added to the title in the catalog.

The edition area may be used in a manuscript collection if the individual items appear in different versions. If the item includes an edition statement, it must be added to the catalog. If an edition statement is missing but it is known for a fact that the manuscript collection contains changes from another version, the cataloger must provide the edition statement in the language of the title proper and enclose this statement within brackets.

A statement of extent must be added in the catalog for the manuscript collection if the collection consists of more than one type of material.

The notes area consists of information that does not appear anywhere else but is required for describing the manuscript collection. Bibliographical and historical notes in the notes area give a brief statement about the creator of the manuscript collection and the date of creation of the manuscript collections.

Scope and content notes describe the content, nature and scope of the materials of the manuscript collection. The additional physical form available statement in the notes area of the catalog of a manuscript collection is added when the library has in addition to original materials copies of the manuscript collection in other physical forms. A note is also made in the notes area about the immediate source of acquisition of the manuscript. If there are any restrictions to the access of the manuscript, then a note for the same must be made in the notes area of the catalog. A note regarding copyright, and use and reproduction of the manuscript collection must also be included in the catalog.

Cataloging of Music

The cataloging of music is considered difficult because of the special nature of music. AACR2 provides rules for the cataloging of music. The general rules do

apply to the cataloging of music. For instance, the composer of the music is considered to be the author of the music composition and so the composer is given a main entry in the catalog.

The rules given for music cataloging are concerned with choosing the right heading for musical arrangements, free transcriptions and other arrangements which are in some way different from the original work of the composer.

A simple arrangement is entered under the name of the original composer. When the nature of the content of the musical work is substantially changed, the main entry is under the heading adapter and not the composer. An added entry for name and title is made under the name of the original composer if the adaptation is based on a single work. If the adaptation is based on different works, an added entry for the name of the composer alone is given in the catalog. Musical works that include words are listed under the main heading composer. If the words are fully represented, the author name is given an added entry.

If a musical work includes words based on previously published text, name-title added entry is provided for the original text. AACR2 provides rules for adding entries to the catalog that contain sets of songs or musical compositions with text by one writer and the music composed by several composers. If such a collection of songs has a collective title, the entry is made under the title. Added entries are made for the author of the text as well as the editor of the text, and also for the composer whose name appears first in the information source.

When music has to be cataloged for ballets, the main entry is made under the composer of the music with an additional entry for the choreographer of the ballet. Sometimes a composer takes the music works of others and adds accompaniments or additional parts to the music. In such a case, the newly created work in entered under the main heading of the original music. An added entry is created for the composer of the additional parts or the accompaniments of the music.

The chief source of information for a musical work is the title page. For musical works, a special type of title page, that is, the list title page is used. A list title page is a list of composer's works issued by the publisher or lists of related music by the publisher. The title of the work being cataloged will be included in this list. When cataloging musical works, the cataloger can make use of the list title page, caption title page or cover title page, whichever provides the maximum information related to the musical work. Cataloging musical works on the basis of the desired and complete information helps in the creation of an efficient catalog that can be easily accessed and maintained.

When cataloging music, a generic title can be used to describe the type of composition. The title gives the information regarding what constitutes the name of the type of composition—musical form, genre, liturgical titles, and so on.

The title proper must be transcribed as it is. If the title proper in the chief source of information contains one or more names or more than one type of compositions along with the brief details of the composition, then the name of the composition and the first detail about the composition becomes the title proper. If the title proper has not been taken from the chief source of information, the name of the source from which the cataloger takes the title must be mentioned as a note.

If information, such as medium of performance, key, date of composition and the number of composition, are also present along with the title in the chief source of information, then all this information must be treated as other title information for the musical work and recorded in the other title information area. General material designation may be added immediately after the title in the record to specify the type of the material being cataloged; in this case, music.

Parallel titles must be transcribed as they appear in the chief source of information separated by commas. Each set of parallel titles is preceded with an = sign in case of musical works being cataloged.

The statement of responsibility related to the people or bodies responsible for the musical composition must be recorded as it appears in the chief source of information. If the relationship between the title and the people or bodies of the musical composition is not clear, a short phrase must be added to the statement of responsibility describing this relationship.

If the musical work consists of individual works without a collective title, then the title for each of the individual works must be transcribed in the catalog. A short phrase must also be added to the statement of responsibility to clearly state the relationship between the title and the individual works of music listed in the collection.

The edition area contains the edition statement about the musical work. If the edition statement is missing but it is known that the musical work contains significant changes from other editions, a brief statement regarding this must be provided with the title and enclosed in square brackets. If the edition statement appears in more than one language, the language of the title proper must be selected and a record must be added for the same. The statement of responsibility must be transcribed only for the edition being cataloged and not all editions of the musical work.

The musical presentation statement area is an optional area and is added only for musical compositions if the cataloger feels the need for the same. This area is preceded by full stop-space- dash-space (. -). The musical presentation statement consists of the physical presentation of the music which is transcribed from the chief source of information if it appears in the source. If the physical presentation statement appears in more than one language, then it is transcribed in the language of the title proper. However, if all such statements are in the same language, the first statement must be transcribed and all others must be ignored. If

the musical presentation statement has already been added somewhere else in the catalog, it is not repeated in this area.

The publication and distribution area of a musical work contains information about the place, date and name of all types of publishing and distribution activities of the musical work. For a musical work, the name of the publisher, the name of the distributor, place of publication and date of publication need to be recorded. However, as a general rule, AACR2 does not record the publication and distribution details of an unpublished musical work. If the name of the publisher is not known, but the place and name of printer are found in the chief source of information, these must be recorded.

The physical description area of the catalog for a musical work consists of a statement about the extent of an item. The extent of the item is the physical units or the number of scores or parts in Arabic numerals. This must be recorded in the catalog. For special type of music, an entry for the same must be made in the catalog. In the catalog, the number of scores and parts issued by the publisher must also be recorded. The physical description area should also include the details of the illustrations if any. The dimensions of the work also need to be recorded in the catalog. The number of pages, scores and parts must all be mentioned in the physical description area of the catalog. This area also contains the details of the accompanying material if any along with the musical work.

The series area contains information about the series number and other associated details for the musical work.

The notes area consists of notes specific to the musical composition. If the form of the musical composition is not clear, a form of composition and medium of performance note must be included in the notes area. However, this note must be added only if the form and medium of performance for the musical work is not clear from any other description area of the musical work. A language note must be added to the notes area if the language of the textual content is not specified or clear from any other description area. A note on the duration of the performance must also be included in the notes area if this information has not been included in any other area. The duration must be given in English and in an abbreviated form. A note on the location of the accompanying materials must be included in the notes area if this information does not appear elsewhere. A note is also included about the audience for which the musical work is intended. A note on details of other formats in which the musical work has been issued is also included if necessary.

Cataloging of Sound Recording

The AACR2 provides rules for cataloging of sound recording in all types of media, i.e., disks, tapes, piano rolls and films. The chief sources of information for the major type of sound recordings are as follows:

- **Disk:** For a disk, the chief source of information is the disk and label.

- **Tape:** For an open reel to reel tape, the chief source of information is the reel and the label.

- **Tape cassette:** For a tape cassette, the chief source of information is the cassette and the label.

- **Tape cartridge:** For a tape cartridge, the chief source of information is the cartridge and the label.

- **Roll:** For a roll, the chief source of information is the label.

- **Film:** For sound recording on film, the chief source of information is the container and the label.

If there are two or more chief sources of information, then these must be treated as a single chief source of information. If information is not available on the chief source of information, the information can be obtained from accompanying textual material, container or other sources.

The title proper must be transcribed as it is. If the title proper has not been taken from the chief source of information or it is taken from a container that is a unifying element, then the source of the title must be mentioned as a note.

General material designation may be added immediately after the title in the record to specify the type of the material being cataloged; in this case, sound recording.

Parallel titles must be transcribed as they appear in the chief source of information separated by commas. The statement of responsibility related to the people or bodies responsible for creating the intellectual content of sound recording must be recorded in the catalog description.

If the members of a group, ensemble or a company related with sound recording are mentioned in the chief source of information, these must be recorded in a note if essential and important; else, these must be omitted.

A short phrase or statement must be recorded as a note if the relationship between the title and statement of responsibility is not clear. If the sound recording consists of individual works without a collective title, then the title for each of the individual works must be transcribed in the catalog. A short phrase must also be added to the statement of responsibility to clearly state the relationship between the title and the individual works of sound recording collection. If the sound recording lacks a collective title, the item can be described as a unit as well.

The edition area contains the edition statement about the sound recording. If the edition statement is missing but it is known that the sound recording contains significant changes from other editions, a brief statement regarding this must be provided with the title and enclosed in square brackets. If the edition statement appears in more than one language, the language of the title proper must be selected

and a record must be added for the same. The statement of responsibility must be transcribed only for the edition being cataloged and not all editions of the sound recording.

The publication and distribution area of a sound recording contains information about the place, date and name of all types of publishing and distribution activities of sound recording. For sound recordings, the name of the publisher, the name of the distributor, place of publication and date of publication need to be recorded. However, as a general rule, AACR2 does not record the publication and distribution details of a non-processed sound recording.

If the sound recording bears information about the publishing company and also the name of the sub-division of the company or a trade name or brand name used by the company, the name of the sub-division or trade name or brand name is given as the name of the publisher.

An additional statement regarding the function of the publisher or the distributor may be added to the name of the publisher or distributor, which is considered essential by the cataloger. The date of a non-processed sound recording also needs to be added if it is given in the chief source of information. If the name of the publisher is not known, and the place and name of manufacturer is found in the chief source of information, the place name must be recorded in square brackets. The name of manufacturer, place and date of manufacture of the sound recording must be recorded if this information is different from the name of the publisher and the place of publishing.

The physical description area of the catalog for a sound recording consists of a statement about the extent of an item. The extent of the item is the physical units or the number of scores or parts in Arabic numerals. This must be recorded in the catalog. The playing time of the sound recording must also be included in the physical description. Other physical details, such as type of recording, playing speed, grove characteristics, track configuration, number of tracks, number of sound channels, recording and reproduction characteristics, must be recorded for a sound recording.

The type of recording must be recorded for sound recordings on disk, tapes and films. The playing speed of an analog disk is recorded in revolutions per minute. The playing speed of a digital disk is recorded in meters per second. The playing speed of an analog tape is recorded in inches per second. The playing speed of a sound track film is measures in frames per second. The number of tracks must be recorded for each type of sound recording source unless the number of tracks is standard for all the information sources. The number of sound channels must be recorded using one of the following terms: mono, stereo and quad.

Dimensions of sound recording must also be recorded in the catalog. For a disk, the dimensions are specified in inches. For sound track films, the gauge of the film is recorded in millimeters. The dimensions of a cartridge are given in inches.

The width of a tape is recorded as a fraction of an inch. The diameter of a reel must be recorded in inches. No dimensions are recorded for rolls.

The series area contains information about the series number and other associated details for the sound recording.

The notes area consists of notes specific to the sound recording. If the form of the sound recording is not clear, a form of composition and medium of performance note must be included in the notes area. However, this note must be added only if the form and medium of performance for the sound recording is not clear from any other description area of the sound recording. A language note must be added to the notes area if the language of the textual content is not specified or clear from any other description area. The notes area may also include information on the title if it given in another language along with other title information only if the information is considered important. Notes on location of accompanying material must be recorded in the notes area if these are important and not mentioned anywhere else in the description or the catalog. A brief note related to the intended audience must be recorded in the catalog. A note may also be included for the intellectual level of the sound recording if the information is available.

The notes area may also include a note that includes the list of individual works that are contained on a sound recording. The information about statement of responsibility and duration of each individual piece on sound recording should be included in the note as well.

Cataloging of Motion Picture and Video Recording

AACR2 also provides rules for description or cataloging of motion pictures and video recordings of all kinds including complete films and programs, compilations, trailers, newscasts and news-films, stock shots and unedited materials. The chief source of information for motion pictures and video recordings is the item itself or the container. If the information is not available from the item itself, it can be obtained from accompanying textual material, container and other sources.

The title proper must be transcribed as it is. If the title proper has not been taken from the chief source of information, the name of the source from which the cataloger takes the title must be mentioned as a note. If the motion picture or video-recording lacks the title, a title must be assigned by the cataloger by using reference sources of information. For a commercial, the title consists of the name of the product or the service advertised and also the word 'advertisement'. For unedited material, stock shots and news-films, the title must include all important information, such as place, date of event, place of shooting, personalities and subjects.

General material designation may be added immediately after the title in the record to specify the type of the material being cataloged; in this case, it can be a motion picture or video-recording, commercial, news-films and stock shots.

Parallel titles must be transcribed as they appear in the chief source of information separated by commas. If the original title appears in some other language, it must be recorded as a parallel title for the motion picture or video-recording. For motion pictures and video-recordings, other title information must also be recorded.

The statement of responsibility related to the people or bodies credited in the chief source of information for creating the film must be recorded as it appears in the chief source of information. If the relationship between the title and the people or bodies responsible for creating the film is not clear, a short phrase must be added to the statement of responsibility describing this relationship.

If the chief source of information contains the name of the agency that produced the motion picture or the video-recording as well as the name of agency for which the film has been produced, both must be recorded in the description.

If the motion picture or video-recording consists of individual works without a collective title, then the title for each of the individual works must be transcribed in the catalog. A short phrase must also be added to the statement of responsibility to clearly state the relationship between the title and the individual works of motion picture listed in the collection. If the individual works are not recorded separately, then the collection must be described as a unit.

The edition area contains the edition statement about the graphic material. If the edition statement is missing but it is known that the graphic material contains significant changes from other editions, a brief statement regarding this must be provided with the title and enclosed in square brackets. If the edition statement appears in more than one language, the language of the title proper must be selected and a record must be added for the same. The statement of responsibility must be transcribed only for the edition being cataloged and not all editions.

The publication and distribution area of a motion picture or video recording contains information about the place, date and name of all types of publishing and distribution activities of the motion picture or video recording. For a motion picture or video recording, the name of the publisher, the name of the distributor, place of publication and date of publication need to be recorded. However, as a general rule, AACR2 does not record the publication and distribution details of an unpublished item. If the name of the publisher is not known, but the place and name of manufacture are found in the chief source of information, then these must be recorded.

The physical description area of the catalog for a motion picture or video recording consists of a statement about the extent of an item. The extent of the item is the physical units or the number of scores or parts in Arabic numerals. This must be recorded in the catalog. The extent of items is recorded in the catalog using Arabic numbers and one of the following terms: film cartridge, film cassette, film loop, film reel, video-cartridge, video- cassette, video-disk and video-reel. If

the general material designation is used, then the terms video and film are removed from the extent of items. The physical description area must also include the playing time of the motion picture or the video-recording. The playing time must be recorded only if it is mentioned on the item. If the chief source of information does not list the playing time, then it must not be recorded.

The physical description area may also contain information related to aspect ratio and special projection requirements, sound characteristics, color and projection speed. If a film has specific projection needs, the same must be mentioned and recorded in the catalog. The cataloger must record sd (sound) or si (silent) to denote the presence and absence of sound, respectively, in the film. If the motion picture of video-recording is in color, the cataloger must use the abbreviation col to mention the fact. If the motion picture or video-recording lacks color and is in black and white, it must be mentioned in the description using b&w as the abbreviation. The projection speed of the film must be recorded in frames per second in the description.

The dimensions of the motion picture or video-recording also need to be mentioned in the description or the catalog. The gauge of the film must be recorded in millimeters. The gauge of a video-tape is mentioned in inches or millimeters. The diameter of a video-disk is measured and recorded in inches. The physical description area also includes the details of the accompanying material of the motion picture or video-recording.

The series area contains information about the series number and other associated details for the motion picture or video-recording.

The notes area consists of notes specific to the motion picture or video-recording. If the form of the motion picture or video-recording is not clear, the information must be included in the notes area. A language note must be added to the notes area if the language of the spoken, sung or written content is not specified or clear from any other description area. The notes area may also include a note related to the title proper if it has not been taken from the chief source of information for motion picture or video-recording. The notes area may also include brief note stating information about the cast and people or companies who have major contribution in any aspect of the motion picture or video-recording.

The notes area may also include a note related to the history of the motion picture or video-recording if the information is considered important. If the date of original production differs from the date of publication, the same must be recorded and a note must be added to the catalog. A note related to the country of original release also needs to be added if this information is not provided anywhere else in the description.

Notes related to sound characteristics, length of film or tape, color, form of print, film base, video-recording system, generation of copy, special projection requirements, and so on, must also be included in the notes area if such information

is not available or apparent from any other area of the description. Notes may also be included for location of the accompanying material, the audience for which the motion picture is intended and also the summary of the item.

Standard number and terms of availability area includes information related to the standard number assigned to the motion picture or video recording. It also specifies the terms on which the source is available.

Cataloging of Graphic Materials

AACR2 provides rules for cataloging of all graphic materials. The graphic materials can be opaque, such as two-dimensional art originals and reproductions, charts, photographs, technical drawings, or these can be intended for projection or view, such as filmstrips, radiographs or slides. The chief source of information for graphic materials is the item itself including all labels that are permanently affixed to the item or the container which is an integral part of the item. If the cataloging has to be done for a collection of graphic materials, the entire collection must be treated as the chief source of information.

The title proper must be transcribed as it is. If the title proper has not been taken from the chief source of information, the name of the source from which the cataloger takes the title must be mentioned as a note. If the graphic material lacks the title, a title must be assigned by the cataloger by using reference sources of information.

General material designation may be added immediately after the title in the record to specify the type of the material being cataloged; in this case, it can be a two-dimensional graphic material or a graphic material intended for view or projection.

Parallel titles must be transcribed as they appear in the chief source of information separated by commas. If the original title appears in some other language, it must be recorded as a parallel title for the graphic material. For graphic material, other title information must also be recorded.

The statement of responsibility related to the people or bodies credited in the chief source of information for creating the graphic material must be recorded as it appears in the chief source of information. If the relationship between the title and the people or bodies responsible for creating the graphic material is not clear, a short phrase must be added to the statement of responsibility describing this relationship.

If the graphic material consists of individual works without a collective title, then the title for each of the individual works must be transcribed in the catalog. A short phrase must also be added to the statement of responsibility to clearly state the relationship between the title and the individual works of graphic material listed in the collection. If the individual works are not recorded separately, then the collection must be described as a unit.

The edition area contains the edition statement about the motion picture or video recording. If the edition statement is missing but it is known that the motion picture or vide-recording contains significant changes from other editions, a brief statement regarding this must be provided with the title and enclosed in square brackets. If the edition statement appears in more than one language, the language of the title proper must be selected and a record must be added for the same. The statement of responsibility must be transcribed only for the edition being cataloged and not all editions of the graphic material.

The publication and distribution area of a graphic material contains information about the place, date and name of all types of publishing and distribution activities of the graphic material. For a graphic material, the name of the publisher, the name of the distributor, place of publication and date of publication need to be recorded. However, as a general rule, AACR2 does not record the publication and distribution details of an unpublished item. If the name of the publisher is not known, but the place and name of manufacture are found in the chief source of information, then these must be recorded.

The physical description area of the catalog for a graphic material consists of a statement about the extent of an item. The extent of the item is the physical units or the number of scores or parts in Arabic numerals. This must be recorded in the catalog. The extent of items is recorded in the catalog using Arabic numbers and one of the following terms: activity card, art original, art print, art reproduction, chart, film-chip, film-strip, flash card, flip chart, photograph, picture, post-card, poster, radiograph, slide, stereograph, study print, technical drawing, transparency and wall chart.

If the parts of the graphic material are numerous, an approximate number must be added to the catalog. The physical description area must also include other physical details of the graphic material.

Medium specific details must be provided for the various graphic materials being cataloged. For arts original, the medium specific details include the base and medium used. For art prints, the method of printing must be recorded. For art reproduction, the method of reproduction must be specified. If sound has been used in any of the graphic materials, the same must be mentioned in the catalog. The information about the color of all graphic material that is cataloged is to be mentioned in the physical description area.

The dimensions of the graphic material also need to be mentioned in the description or the catalog. The gauge of the film must be recorded in millimeters. For art world, the width and height in centimeters must be recorded. The physical description area also includes the details of the accompanying material of the graphic material being cataloged.

The series area contains information about the series number and other associated details for the graphic material being cataloged.

The notes area consists of notes specific to the graphic material. If the form of the graphic material is not clear, the information must be included in the notes area. A language note must be added to the notes area if the language of the spoken and written content is not specified or clear from any other description area. The notes area may also include a note related to the title proper if it has not been taken from the chief source of information for graphic material. The notes area may also include a brief note stating information about the donor, source or original owners who have used or owned the graphic material.

The notes area may also include a note related to the history of the graphic material if the information is considered important. If the information about publication and distribution is not mentioned anywhere else in the catalog, a note must be recorded for the same. A note must also be recorded for the physical aspects of the graphic material if these affect the use of the graphic material and are not clear in any other physical description.

Notes related to sound characteristics, color, form of print, film base, generation of copy, special projection requirements, and so on, must also be included in the notes area if such information is not available or apparent from any other area of the description. Notes may also be included for location of the accompanying material, the audience for which the graphic material is intended and also the summary of the item. If the graphic material is issued in different formats, a note must be mentioned in the notes area for the same. If the graphic material consists of several items, a note must be made for each of the individual items. The note must also include information about the physical description of the individual items of the graphic material. If the use of the graphic material is restricted in any manner, a note for the same must be made and recorded in the notes area of the description.

Standard number and terms of availability area includes information related to the standard number assigned to the graphic material. It also specifies the terms on which the source is available. If the art work or any graphic material has been reproduced, a note for the same must be made specifying the original material as well as the fact that the item being cataloged is a reproduction of the original work.

Cataloging of Electronic Resources or Machine Readable Data Files

The Anglo American Cataloging Rules 2 provides rules for the cataloging of electronic resources. Electronic resources consist of data, programs or a combination of data and programs. For cataloging purposes, electronic resources may be divided into two types depending upon whether the resources are accessed directly or remotely. When an electronic resource is accessed directly, a physical carrier can be defined for the same. Such a carrier must be inserted in a computer or a device for use. By remote access, it is meant that there is no physical carrier of the electronic resource. The chief source of information for an electronic resource is the resource itself. If the cataloging information is not available from the source,

it can be taken from the printed or online documentation or the accompanying material of the electronic source.

The title proper must be transcribed as it is. If the title proper has not been taken from the chief source of information, the name of the source from which the cataloger takes the title must be mentioned as a note. If the electronic resource lacks the title, a title must be assigned by the cataloger by using reference sources of information. The file name or the data set name must be recorded for an electronic resource only if it is the only name appearing in the chief source of information. General material designation may be added immediately after the title in the record to specify the type of the material being cataloged; electronic resource, in this case.

Parallel titles must be transcribed as they appear in the chief source of information separated by commas. If the original title appears in some other language, it must be recorded as a parallel title for electronic resource. For electronic resources, other title information must also be recorded.

The statement of responsibility related to the people or bodies credited in the chief source of information for creating the resource must be recorded as it appears in the chief source of information. If the relationship between the title and the people or bodies responsible for creating the electronic resource is not clear, a short phrase must be added to the statement of responsibility describing this relationship.

If the electronic resource consists of individual works without a collective title, then the title for each of the individual works must be transcribed in the catalog. A short phrase must also be added to the statement of responsibility to clearly state the relationship between the title and the individual works listed in the collection. If the individual works are not recorded separately, then the collection must be described as a unit.

The edition area contains the edition statement about the electronic resource. If the edition statement is missing but it is known that the electronic resource contains significant changes from other editions, a brief statement regarding this must be provided with the title and enclosed in square brackets. If the edition statement appears in more than one language, the language of the title proper must be selected and a record must be added for the same. The statement of responsibility must be transcribed only for the edition being cataloged and not all editions.

The publication and distribution area of electronic resources contains information about the place, date and name of all types of publishing and distribution activities of the electronic resource. All electronic resources that can be remotely accessed are considered as published resources. For an electronic resource, the name of the publisher, the name of the distributor, place of publication and date of publication need to be recorded. For an unpublished electronic resource, the date

of creation must be recorded in the catalog. Also, any other dates considered important for the electronic resource must be recorded in the catalog. If the name of the publisher is not known, but the place and name of manufacture are found in the chief source of information, then these must be recorded. AACR2 does not provide for recording of publishing and distribution details of an unpublished electronic resource.

The physical description area of the catalog for an electronic resource consists of a statement about the extent of an item. The extent of the item is the physical units or the number of scores or parts in Arabic numerals. This must be recorded in the catalog. The extent of items is recorded in the catalog using Arabic numbers and one of the following terms: computer chip cartridge, computer disk, computer optical disk, computer tape cartridge, computer tape cassette and computer tape reel. The extent of the electronic resources available by remote access must be recorded. The approximate number of files or bytes that make up the electronic resource must be recorded in the catalog. The physical description area must also have other details about the electronic resource. The presence or absence of sound from the electronic resource must be recorded in the description. Physical characteristics, such as recording, density and sorting related to the electronic resource, must also be recorded in the catalog.

The dimensions of the electronic resource also need to be mentioned in the description or the catalog. The dimensions of the physical carrier need to be specified in inches or centimeters depending upon the carrier being used. The details of the accompanying material also need to be recorded in the description.

The series area contains information about the series number and other associated details for the electronic resource.

The notes area consists of notes specific to the electronic resource. If the form of the electronic resource is not clear, then the information must be included in the notes area. A language note must be added to the notes area if the language of the written content is not specified or clear from any other description area. The notes area may also include a note related to the title proper if it has not been taken from the chief source of information for electronic resource.

The notes area may also include brief note stating information about the people or companies who have major contribution in any aspect of the electronic resource. For creating the electronic resource, several people may be involved. In addition, the notes area must include a note related to the programs and data that make up the electronic resource and how they need to be used in an effective manner.

The notes area may also include a note related to the history of the electronic resource if the information is considered important. If the date of original production differs from the date of publication, the same must be recorded and a note must be added to the catalog. A note regarding the nature and scope of the electronic

resource also needs to be mentioned in the catalog. The system requirements of the electronic resource must also be recorded in a note.

Notes may also be included for location of the accompanying material, the audience for which the electronic is intended and also the summary of the item. For a remotely accessed resource, the date on which the resource was viewed for description must be recorded in a note. If the electronic resource is made available in more than one format, a note must be made for the same in the catalog. Important information related to the publication, distribution and physical description of the electronic resource must also be included in the notes area if such information is not provided in any area of the catalog and has not been already recorded. If the information has already been added to the catalog, it should not be repeated in the notes section.

Standard number and terms of availability area includes information related to the standard number assigned to the electronic resource being cataloged. If there are restrictions on the use of the electronic resource, a note must be made in this area.

Cataloging of Three-Dimensional Artifacts and Realia

The Anglo American Cataloging Rules 2 provides rules for the cataloging of three-dimensional objects of all kinds. These include models, dioramas, games, braille cassettes, sculptures, and so on. The chief source of information for a three-dimensional objects is the object itself including any accompanying material issued by the publisher.

The title proper must be transcribed as it is. If the title proper has not been taken from the chief source of information, the name of the source from which the cataloger takes the title must be mentioned as a note. If the three-dimensional objects lack the title, a title must be assigned by the cataloger by using reference sources of information. The file name or the data set name must be recorded for three-dimensional objects only if it is the only name appearing in the chief source of information. General material designation may be added immediately after the title in the record to specify the type of the material being cataloged; three-dimensional objects, in this case.

Parallel titles must be transcribed as they appear in the chief source of information separated by commas. If the original title appears in some other language, it must be recorded as a parallel title for three-dimensional objects. For three-dimensional objects, other title information must also be recorded.

The statement of responsibility related to the people or bodies credited in the chief source of information for creating or displaying the three-dimensional object must be recorded as it appears in the chief source of information. If the relationship between the title and the people or bodies responsible for creating the three-dimensional objects is not clear, a short phrase must be added to the statement of responsibility describing this relationship.

If the three-dimensional objects consists of individual works without a collective title, then the title for each of the individual works must be transcribed in the catalog. A short phrase must also be added to the statement of responsibility to clearly state the relationship between the title and the individual works listed in the collection. If the individual works are not recorded separately, then the collection must be described as a unit.

The edition area contains the edition statement about the three-dimensional objects. If the edition statement is missing but it is known that the three-dimensional objects contains significant changes from other editions, a brief statement regarding this must be provided with the title and enclosed in square brackets. If the edition statement appears in more than one language, the language of the title proper must be selected and a record must be added for the same. The statement of responsibility must be transcribed only for the edition being cataloged and not all editions.

The publication and distribution area of three-dimensional objects contains information about the place, date and name of all types of publishing and distribution activities of the three-dimensional objects. All three-dimensional objects that can be remotely accessed are considered as published resources. For a three-dimensional objects, the name of the publisher, the name of the distributor, place of publication and date of publication need to be recorded. For an unpublished three-dimensional objects, the date of creation must be recorded in the catalog. Also, any other dates considered important for the three-dimensional objects must be recorded in the catalog. If the name of the publisher is not known, but the place and name of manufacture are found in the chief source of information, then these must be recorded. AACR2 does not provide for recording of publishing and distribution details of an unpublished three-dimensional objects or a naturally occurring three-dimensional object. If the place and name of the body responsible for manufacture of the three-dimensional object has been recorded in the statement of responsibility, the information should not be repeated in this area. Any publication and distribution information which is available in accompanying material must also be recorded in this area.

The physical description area of the catalog for three-dimensional objects consists of a statement about the extent of an item. The extent of the item is the physical units or the number of scores or parts in Arabic numerals. This must be recorded in the catalog. The extent of items is recorded in the catalog using Arabic numbers and one of the following terms: art original, art reproduction, braille cassette, diorama, exhibit, game, microscope slide, mock-up and model. The physical description area must also have other details about the three-dimensional objects. The material used for the creation of a three-dimensional object must be mentioned. Color details for multi-color three-dimensional objects must also be recorded.

The dimensions of the three-dimensional objects also need to be mentioned in the description or the catalog. The dimensions of three-dimensional object are given by the height, width and depth, and is recorded in centimeters.

The series area contains information about the series number and other associated details for the three-dimensional objects.

The notes area consists of notes specific to the three-dimensional objects. If the form of the three-dimensional objects is not clear, the information must be included in the notes area. A language note must be added to the notes area if the language of the written content is not specified or clear from any other description area. The notes area may also include a note related to the title proper if it has not been taken from the chief source of information for three-dimensional objects.

The notes area may also include brief note stating information about the people or companies who have major contribution in any aspect of the three-dimensional objects. The notes area may also include a note related to the history of the three-dimensional objects if the information is considered important. A note regarding the nature and scope of the three-dimensional objects also needs to be mentioned in the catalog.

Notes may also be included for location of the accompanying material, the audience for which the three-dimensional object is intended and also the summary of the item. Important information related to the publication, distribution and physical description of the three-dimensional objects must also be included in the notes area if such information is not provided in any area of the catalog and has not been already recorded. Standard number and terms of availability area includes information related to the standard number assigned to the three-dimensional objects being cataloged. If there are restrictions on the use of the three-dimensional objects, a note must be made in this area.

Example of Cataloging of Non-book Materials

In this section, some important examples on the cataloging of non-book materials are discussed.

Example 1: Cataloging of a Video Cassette

The guidelines for cataloging of a video cassette are written using AACR2 rules.

FIXED FIELDS

Type: g

Tech: l

The Tech code **l** is for **live action**. This is the code used most often for VHS video recordings. If a note states that an animation technique is used, then the

code can be either **a** for **animation** or **c** for a **combination** of live action and animation. If no code is on the record, use **l**.

Time:

This is a three-digit number representing minutes. Enter leading zeros if the number itself is fewer than three digits. If 300 field gives minutes and seconds, round up to the next minute.

Example:

Time: 009 300 field: 1 videocassette (9 min.)

Time: 102 300 field: 1 videocassette (101 min., 20 seconds)

If the running time is unknown, enter three hyphens.

Example: Time: — 300 field: 1 videocassette

Accomp:

This is a field for accompanying (supplementary) material. Generally, you can accept how another library had coded this field. However, if there is accompanying material and nothing is coded, please fill in the appropriate codes. There is a limit of five codes.

blank No accompanying matter

l Stills

m Script material

o Posters

p Pressbooks

q Lobby cards

r Instructional materials

s Score

z Other

Dat tp: and Dates:

Generally, accept the coding that is already on the bibliographic record. If you need clarification, please consult Bibliographic Formats and Standards. **Dat tp** code **p** is commonly used for media materials. All other **Dat tp** codes are the same as for print material.

p: Multiple dates, distribution/release/issue and date of production/recording session. Use **only** if dates **differ** by at least one year. If two dates are on the item, i.e., release date and production date, then use code **p**. Use **Date 1** for the year of release (i.e., the date the material became available for use). Use **Date 2** for the year of production (i.e., the date the material was made).

London : |b BBC-TV, |c 1972 ; |a New York : |b Released by Time-Life Films, |c 1975. Dat tp: p Dates: 1975, 1972

If a work with identical content but in a different medium has a later release date than the original work (e.g., a video recording release of a motion picture), then use code p. Use **Date 1** for the year of release. Use **Date 2** for the year of production.

300 New York : |b MGM-CBS Home Video, |c 1981.

500 Originally produced as a motion picture in 1964. Date tp: p Dates: 1981, 1964

VARIABLE FIELDS

007

If a bibliographic record has 007, accept it. If not, look in Bibliographic Formats and Standards for the appropriate coding for video recordings. The most common coding is:

v |b **f** |d **c** |e **b** |f **a** |g **h** |h **o**

090

Full LC call number is given with the suffix videocassette added.

Example: **090 PN1997 |b .S8 Videocassette**

If the cassette is in **PAL** or **SECAM** format, add **PAL** or **SECAM** before Videocassette.

Example: **090 PN1997 |b .S83 PAL Videocassette**

049

Videocassettes not destined for a specific branch go to Digital/Media, code **EEM7**.

245 field:

The GMD **|h [videorecording]** is used after the |a.

508 field (Credits note):

Accept this information, without expanding on it. If no information is here, add only producers and directors, if they are named somewhere on the package. In this field, names are not standardized and so no authority files need to be consulted or constructed. Since putting these names in a 700 added entry field is optional, we will **not** do so for copy (but leave them if they are already there).

Example:

508 Producer, Sam Thomas ; director, Lesley Selander.

511 field (Participant or Performer note):

Accept this information, without expanding on it. If no information is here, generally accept the cataloger's judgment. Exceptions can be made if a prominent narrator, presenter or performer is not named anywhere in the record.

[Only first indicator **0** (no print constant provided) or **1** (cast), is now valid.]

Example: **511 1 Jackie Gleason, Art Carney**.

520 field (Summary note):

This note is commonly used on these records. If no summary note is on the record and it is easy to construct one, please put a summary note in the bibliographic record.

538 field (System details):

If there is no 538 note that states **VHS**, add one.

If the cassette is in PAL or SECAM format, expand the note to read: **VHS**, **PAL** [or SECAM] **format: not compatible with American VCRs**.

6xx fields (Subjects):

These are treated in the same way as for printed material.

7xx fields (Added entries):

For the most part, accept another library's decision. Exceptions can be made, if necessary. Do whatever authority checking is necessary.

Example 2: Cataloging of Play-Away Devices

Play-away devices were developed in 2005 by Findaway World LLC. A play-away is described as a 'self-playing digital audio book' and is a device that contains a pre-loaded audio file in a proprietary format called ACELP (Algebraic code-excited linear prediction). The device requires one AAA battery and a set of earphones for playback and listening. Play-aways contain almost exclusively spoken word recordings, but some musical content is available as well. According to the distributor, the focus of play-aways will remain audiobooks. Given the nature of a play-away device, these materials include aspects of both sound recordings and electronic resources.

Chief Source of Information: AACR2 6.0B1 states that for sound recordings, textual data is preferred over sound data. So when cataloging play-aways, select the information affixed to the play-away player itself, including labels, as the preferred chief source of information. Information not available from the player itself may be taken from the following sources (in this order of preference): accompanying textual material container (e.g., packaging) other sources.

NOTES

Choice of Record Type: The primary nature of the content for play-away devices is sound, and, thus far, both musical and non-musical sound recordings have been produced.

Bibliographic Level: Play-away devices are monographic in nature.

Title and Statement of Responsibility: Transcribe the title proper, any parallel titles and other title information, and statements of responsibility from the selected chief source of information into the 245 field. As with any electronic resource, give the source of title in a 500 note. Include other title information and variations of titles that may appear on other sources of information related to the resource in 246 fields.

General Material Designation (GMD): Following the precedent of other materials (e.g., sound and video files) issued digitally, play-aways should be assigned a GMD of 'electronic resource'.

Edition: Transcribe an edition statement if one appears in the chief source or in information provided by the publisher. For play-aways, this is often reflected in a statement regarding the content being an 'abridged' or 'unabridged' version. Example: 250 ## Unabridged.

Transcribe the place of publication and/or distribution, and the name(s) of the publisher and/or distributor from the chief source of information or from prescribed sources of information. Include the name(s) of the entities responsible for issuing the recording on the play-away device (usually, Play-away Digital Audio as the 'label name', and/or Findaway World LLC as the manufacturer/distributor). The date(s) entered in the 260 field should always include the publication/distribution date for the sound recording that is held on the play-away device. As play-aways were first commercially available in the second half of 2005, the publication/distribution date entered in the catalog record for the play-away may NOT be dated earlier than 2005. As is the practice for other sound recordings, if the recording has been previously released, such as in a different format, the original publication/distribution date of the sound recording should be noted in the 008 fixed field (Date2) and in a 500 general note. The dates of the print publication may be ignored.

Physical Description: Always include a 300 field for play-away devices. The task force has recommended the term 'sound media player' for the specific material designation (SMD), which is specific enough to describe the device, yet flexible enough to accommodate similar devices lacking the name 'play-away'. The playing time of the audio recording should be included if it is stated or readily ascertainable, as per AACR2 6.5B2. Play-away audio recordings are digitally encoded; therefore, enter the type of recording as 'digital' as specified in AACR2 6.5C2. While either inches or centimeters are permissible units of measurement, the task force recommends entering the dimensions of the play-away device in

inches, which is consistent with other sound media devices discussed in AACR2 6.5D. 8 of 17 play-away devices are usually packaged with and require a set of earphones, and one AAA battery for playback. Since these materials do not contain intellectual content, the task force recommends that these items should be mentioned in a note.

Notes: Include appropriate notes in prescribed order as specified in AACR2. The following list only provides examples of notes the task force has highlighted for play-away devices.

 A. *Source of Title Proper note [Required]:* For play-aways, the title proper is generally taken from the packaging, the container or accompanying textual materials. As noted in AACR2 9.7B3, enter the source of the title proper in a 500 note, using appropriate terminology. Example: 500 ## Title from play-away label.

B. *Statement of Responsibility note [Required, if applicable*]: As specified in AACR2 6.7B6, give the statement of responsibility information regarding individuals on the sound recording or involved in the technical aspects of its production, just as for other sound recordings. For play-aways, this often consists of the name of the narrator entered in a participant/performer note. Example: 511 0# Read by Robert Sean Leonard.

C. *Edition and History note [Optional]:* If it is noted on the packaging or is readily ascertained that the audio recording has been previously released, enter this information in a general 500 note. Example: 500 ## Previously released by HarperAudio on cassettes in 2000 and on CDs in 2005. 9 of 17.

D. *Accompanying Material note [Optional*]: Include a general note regarding the requirement of earphones and battery. Examples: 500 ## One set of earphones and one AAA battery are required for playback. 500 ## In container (21 x 13 x 3 cm.) with earphones and AAA battery.

E. *General Quoted note [Optional]:* When a statement appears on the packaging which describes the device, enter this statement in a 500 quoted note. Examples: 500 ## 'Issued on play-away, a dedicated audio media player'— Container. 500 ## 'Play-away, the first pre-loaded digital audio book'—Container. If a statement does not explicitly appear on the packaging or item, such a statement describing the characteristics of a play-away may be entered in the record as a general unquoted note.

Access Points:

A. *Name access:* Provide access points as with any monographic work in print (or musical work in rare cases) for authors, editors, compilers, and so on, as would make sense for an audio version of the work (i.e., no illustrators, , and so on.). In addition, it provides access to the name(s) of narrator(s) noted in the 511 note field. If desired, access points may be generated for the publishers of the

original recordings, the play-away publishers, and the distributors of the play-away device (Play-away Digital Audio and Findaway World LLC). Example: 100 1# Thoreau, Henry David, Âd 1817-1862. Â4 aut 700 1# Leonard, Robert Sean, Âd 1969- Â4 nrt 710 2# Random House AudioBooks (Firm) 710 2# Play-away Digital Audio. 710 2# Findaway World LLC.

Subject access: Provide subject access appropriate to the work. Optionally, provide the following genre heading if the play-away content is an audiobook. Example: 655 #0 Audiobooks.