

# File Handling in C

In programming, we may require some specific input data to be generated several numbers of times. Sometimes, it is not enough to only display the data on the console. The data to be displayed may be very large, and only a limited amount of data can be displayed on the console, and since the memory is volatile, it is impossible to recover the programmatically generated data again and again. However, if we need to do so, we may store it onto the local file system which is volatile and can be accessed every time. Here, comes the need of file handling in C.

File handling in C enables us to create, update, read, and delete the files stored on the local file system through our C program. The following operations can be performed on a file.

- Creation of the new file
- Opening an existing file
- Reading from the file
- Writing to the file
- Deleting the file

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## Functions for file handling

There are many functions in the C library to open, read, write, search and close the file. A list of file functions are given below:

No.	Function	Description
1	fopen()	opens new or existing file
2	fprintf()	write data into the file
3	fscanf()	reads data from the file
4	fputc()	writes a character into the file
5	fgetc()	reads a character from file

6	fclose()	closes the file
7	fseek()	sets the file pointer to given position
8	fputw()	writes an integer to file
9	fgetw()	reads an integer from file
10	ftell()	returns current position
11	rewind()	sets the file pointer to the beginning of the file

## Opening File: fopen()

We must open a file before it can be read, write, or update. The fopen() function is used to open a file. The syntax of the fopen() is given below.

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1. **FILE** \*fopen( **const char** \* filename, **const char** \* mode );

The fopen() function accepts two parameters:

- The file name (string). If the file is stored at some specific location, then we must mention the path at which the file is stored. For example, a file name can be like "**c://some\_folder/some\_file.ext**".
- The mode in which the file is to be opened. It is a string.

We can use one of the following modes in the fopen() function.

Mode	Description
r	opens a text file in read mode
w	opens a text file in write mode

a	opens a text file in append mode
r+	opens a text file in read and write mode
w+	opens a text file in read and write mode
a+	opens a text file in read and write mode
rb	opens a binary file in read mode
wb	opens a binary file in write mode
ab	opens a binary file in append mode
rb+	opens a binary file in read and write mode
wb+	opens a binary file in read and write mode
ab+	opens a binary file in read and write mode

The fopen function works in the following way.

- Firstly, It searches the file to be opened.
- Then, it loads the file from the disk and place it into the buffer. The buffer is used to provide efficiency for the read operations.
- It sets up a character pointer which points to the first character of the file.

Consider the following example which opens a file in write mode.

1. `#include<stdio.h>`
2. `void main()`
3. `{`
4. `FILE *fp ;`
5. `char ch ;`

```
6. fp = fopen("file_handle.c","r");
7. while ( 1 )
8. {
9. ch = fgetc ( fp );
10. if ( ch == EOF )
11. break ;
12. printf("%c",ch);
13.}
14. fclose (fp ) ;
15.}
```

### Output

The content of the file will be printed.

```
#include;
void main( )
{
FILE *fp; // file pointer
char ch;
fp = fopen("file_handle.c","r");
while ( 1 )
{
ch = fgetc ( fp ); //Each character of the file is read and stored in the
character file.
if ( ch == EOF )
break;
printf("%c",ch);
}
fclose (fp );
}
```

## Closing File: fclose()

The fclose() function is used to close a file. The file must be closed after performing all the operations on it. The syntax of fclose() function is given below:

```
1. int fclose( FILE *fp );
```

## C fprintf() and fscanf()

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### Writing File : fprintf() function

The fprintf() function is used to write set of characters into file. It sends formatted output to a stream.

### Syntax:

1. **int** fprintf(**FILE** \*stream, **const char** \*format [, argument, ...])

### Example:

1. #include <stdio.h>
  2. main(){
  3. **FILE** \*fp;
  4. fp = fopen("file.txt", "w");//opening file
  5. fprintf(fp, "Hello file by fprintf...\n");//writing data into file
  6. fclose(fp);//closing file
  7. }
- 

## Reading File : fscanf() function

The fscanf() function is used to read set of characters from file. It reads a word from the file and returns EOF at the end of file.

### Syntax:

1. **int** fscanf(**FILE** \*stream, **const char** \*format [, argument, ...])

### Example:

1. #include <stdio.h>
2. main(){
3. **FILE** \*fp;
4. **char** buff[255];//creating char array to store data of file
5. fp = fopen("file.txt", "r");
6. **while**(fscanf(fp, "%s", buff)!=EOF){

```
7. printf("%s ", buff);
8. }
9. fclose(fp);
10.}
```

Output:

```
Hello file by fprintf...
```

## C File Example: Storing employee information

Let's see a file handling example to store employee information as entered by user from console. We are going to store id, name and salary of the employee.

```
1. #include <stdio.h>
2. void main()
3. {
4.     FILE *fptr;
5.     int id;
6.     char name[30];
7.     float salary;
8.     fptr = fopen("emp.txt", "w+");/* open for writing */
9.     if (fptr == NULL)
10.    {
11.        printf("File does not exists \n");
12.        return;
13.    }
14.    printf("Enter the id\n");
15.    scanf("%d", &id);
16.    fprintf(fptr, "Id= %d\n", id);
17.    printf("Enter the name \n");
18.    scanf("%s", name);
19.    fprintf(fptr, "Name= %s\n", name);
20.    printf("Enter the salary\n");
21.    scanf("%f", &salary);
```

22. `fprintf(fp, "Salary= %.2f\n", salary);`
23. `fclose(fp);`
24. `}`

Output:

```
Enter the id
1
Enter the name
sonoo
Enter the salary
120000
```

Now open file from current directory. For windows operating system, go to TC\bin directory, you will see emp.txt file. It will have following information.

**emp.txt**

```
Id= 1
Name= sonoo
Salary= 120000
```

## C fputc() and fgetc()

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### Writing File : fputc() function

The `fputc()` function is used to write a single character into file. It outputs a character to a stream.

**Syntax:**

1. `int fputc(int c, FILE *stream)`

**Example:**

1. `#include <stdio.h>`
2. `main(){`
3. `FILE *fp;`
4. `fp = fopen("file1.txt", "w");//opening file`

5. `fputc('a',fp);`//writing single character into file
6. `fclose(fp);`//closing file
7. `}`

### file1.txt

```
a
```

## Reading File : fgetc() function

The `fgetc()` function returns a single character from the file. It gets a character from the stream. It returns EOF at the end of file.

### Syntax:

1. `int fgetc(FILE *stream)`

### Example:

1. `#include<stdio.h>`
2. `#include<conio.h>`
3. `void main(){`
4. `FILE *fp;`
5. `char c;`
6. `clrscr();`
7. `fp=fopen("myfile.txt","r");`
- 8.
9. `while((c=fgetc(fp))!=EOF){`
10. `printf("%c",c);`
11. `}`
12. `fclose(fp);`
13. `getch();`
14. `}`

### myfile.txt

```
this is simple text message
```