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
* close the file

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 |

We must open a file before it can be read, write, or update.

**fopen()**:

function is used to open a file. The syntax of the fopen() is given below.

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,Opens a file in read and write mode. File pointer starts at the beginning of the file. |
| w+ | Opens a file in read and write mode. It creates a new file if it does not exist, if it exists, it erases the contents of the file and the file pointer starts from the beginning. |

**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.

#include<stdio.h>

void main( )

{

FILE \*fp ;

char ch ;

fp = fopen("f1.txt","r") ;

while ( 1 )

{

ch = fgetc ( fp ) ;

if ( ch == EOF )

break ;

printf("%c",ch) ;

}

fclose (fp ) ;

}

**Output**

The content of the file will be printed.

**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:

int fclose( FILE \*fp );

**C fprintf() and fscanf()**

Writing File : fprintf() function

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

**Syntax:**

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

Example:

#include <stdio.h>

main(){

FILE \*fp;

fp = fopen("file.txt", "w");//opening file

fprintf(fp, "Hello file by fprintf...\n");//writing data into file

fclose(fp);//closing file

}

**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:**

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

Example:

#include<stdio.h>

int main()

{

FILE\* ptr = fopen("fscanf.txt","r");

if (ptr==NULL)

{

printf("no such file.");

return 0;

}

char buf[400];

while (fscanf(ptr,"%s",buf)!=EOF)

printf("%s\n", buf);

return 0;

}

**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.

#include <stdio.h>

void main()

{

FILE \*fptr;

int id;

char name[30];

float salary;

fptr = fopen("emp.txt", "w+");/\* open for writing \*/

if (fptr == NULL)

{

printf("File does not exists \n");

return;

}

printf("Enter the id\n");

scanf("%d", &id);

fprintf(fptr, "Id= %d\n", id);

printf("Enter the name \n");

scanf("%s", name);

fprintf(fptr, "Name= %s\n", name);

printf("Enter the salary\n");

scanf("%f", &salary);

fprintf(fptr, "Salary= %.2f\n", salary);

fclose(fptr);

}

**Output:**

Enter the id

1

Enter the name

abcd

Enter the salary

120000

**emp.txt**

Id= 1

Name= abcd

Salary= 120000

C fputc() and fgetc()

Writing File : fputc() function

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

**Syntax:**

int fputc(‘char’, FILE \*stream)

Example:

#include <stdio.h>

main(){

FILE \*fp;

fp = fopen("file1.txt", "w");//opening file

fputc('a',fp);//writing single character into file

fclose(fp);//closing file

}

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:**

int fgetc(FILE \*stream)

Example:

#include <stdio.h>

int main () {

FILE \*fp;

char c;

fp = fopen("fscanf.txt","r");

while((c=fgetc(fp))!=EOF){

printf("%c",c);

}

fclose(fp);

return(0);

}

**C fputs() and fgets()**

The fputs() and fgets() in C programming are used to write and read string from stream. Let's see examples of writing and reading file using fgets() and fgets() functions.

Writing File : fputs() function

The fputs() function writes a line of characters into file. It outputs string to a stream.

**Syntax:**

int fputs(const char \*s, FILE \*stream)

Example:

#include<stdio.h>

void main(){

FILE \*fp;

fp=fopen("myfile2.txt","w");

fputs("hello c programming",fp);

fclose(fp);

getch();

}

myfile2.txt

hello c programming

Reading File : fgets() function

**The fgets()** function reads a line of characters from file. It gets string from a stream.

**Syntax:**

char\* fgets(char \*s, int n, FILE \*stream)

Example:

#include<stdio.h>

void main(){

FILE \*fp;

char text[300];

fp=fopen("myfile2.txt","r");

printf("%s",fgets(text,200,fp));

fclose(fp);

}

**Output:**

hello c programming