Files

- A file is a resource which stores information
- Suppose to sort 1,00,000 numbers, it is good to store it in a file
- Eg for files: input.txt, address.doc, hello.c

How to create a file?

- Create a file:
  - using editors such as wordPad, notepad in windows OS
  - using editors such as gedit, vi in linux OS
  - using a C program in any OS

How to create a file using C program?

- How a file is identified by a C program ?
  - C identifies the file using the pointer variable. Hence, for all operations to be performed on the file, we have to specify this variable.
- `FILE *fptr;` creates a pointer variable *fptr* pointing to a file, where *FILE* is a reserved word.

- How do we name a file?
  - While opening the file, we specify the name of the file

How to open & name a file using a C program?

- `file_pointer = fopen("filename" , "mode");` where *fopen* is the keyword to open a file and *mode* says whether the file has to be opened to read/write/append etc.

mode	operation
"r"	Open an existing text file for reading. Fails if the file does not exist.
"w"	Create text file for writing; discard previous contents if any
"a"	append; open or create text file for writing at end of file
"r+"	open text file for update (i.e., reading and writing). Fails if the file does not exist.
"w+"	create text file for update, discard previous contents if any
"a+"	append; open or create text file for update, writing at end

fopen : examples

- `fptr = fopen("input.txt", "r");`
  - opens the file with name *input.txt* to read
- `fptr = fopen("input.txt", "w");`
  - opens the file to write
- `fptr = fopen("input.txt", "a");`
  - opens the file to append (keeps the old contents; adds new contents at the end of the file)

Operations on files

- Open a file using fopen

- Read from a file using fscanf, fgetc or fread

- Write into a file using fprintf or fwrite

- Close a file using fclose

- Move the file position indicator using fseek

Create an empty file

```
main(){
    FILE *fptr;
    fptr = fopen("D:\\student.txt", "w");
    if(fptr == NULL){
        perror("Error in File opening !");
        return 1;}
    fclose(fptr); }
```

- Creates an empty file (student.txt) in the D folder
  - Filename can be a simple name or an absolute/relative path to the file. In case of a simple name like "input.txt" it will create the file in the current folder.

Write into a file

```c
#include <stdio.h>
main(){
    char name[50];
    int marks, i, num;
    printf("Enter number of students: ");
    scanf("%d", &num);
    FILE *fptr;
    fptr = fopen("D:\\student3.txt", "w");
    if(fptr == NULL){
        perror("Error!");
        return 1;}
     for(i = 0; i < num; ++i){
        printf("For student%d\nEnter the name: ", i+1);
        scanf("%s", name);
        printf("Enter marks: ");
        scanf("%d", &marks);
        fprintf(fptr,"Name: %s\tMarks=%d \n", name, marks);}
    fclose(fptr);
}
```

- Writes into a file D:\\student3.txt

Reads the first line from an existing file

```c
#include <stdio.h>
main(){
    char line[1000];
    FILE *fptr;

    fptr = fopen("D:\\student3.txt", "r");

    fscanf(fptr,"%[^\n]", line);
    printf("First line of the file : %s", line);
    fclose(fptr);
}
```

Reads all the contents from an existing file

```c
#include <stdlib.h> // For exit()
#include <stdio.h>
main(){
    FILE *fptr;
    char filename[100], c;
    printf("Enter the filename to open \n");
    scanf("%s", filename);

    fptr = fopen(filename, "r"); // Open file in read mode

    if (fptr == NULL){ //if file does not exist
        perror("Cannot open file \n");
        exit(0);}

    c = fgetc(fptr); // Gets the next character from the file

    while (c != EOF){ //while loop is executed until EOF (End of File) is reached
        printf ("%c", c);
        c = fgetc(fptr);}
}
```

Create a file, write into the file and read from that file

```c
#include<stdlib.h>
main(){
    char name[50],c; int marks, i, num;
    printf("Enter the number of students: ");
    scanf("%d", &num);
    FILE *fptr;
    fptr = (fopen("D:\\student3.txt", "w"));
    if(fptr == NULL){
         perror("Error in opening!");
         return 1;}
    for(i = 0; i < num; ++i){
         printf("For student%d\nEnter the name: ", i+1);
         scanf("%s", name);
         printf("Enter marks: ");
         scanf("%d", &marks);
         fprintf(fptr,"\nName: %s \nMarks=%d \n", name, marks);}
    fclose(fptr);
    fptr = (fopen("D:\\student3.txt", "r"));
    if (fptr == NULL){
         printf("Cannot open file \n");
         exit(0);}
    c = fgetc(fptr);
    while (c != EOF){
         printf ("%c", c);
         c = fgetc(fptr);} }
```

Read from a file, write to another

```c
#include<stdlib.h>
#include<stdio.h>

main(){
    char name[50],c; int marks, i, num;
    FILE *fp_read, *fp_write;
    fp_write   = fopen("student4.txt", "w");
    fp_read    = fopen("student3.txt", "r");
    if(fp_write == NULL || fp_read == NULL){
        perror("Error in opening!");
        return 1;}
    fscanf(fp_read,"%d", &num);
    for(i = 0; i < num; ++i){
        fscanf(fp_read, "%s", name);
        fscanf(fp_read, "%d", &marks);
        fprintf(fp_write,"Name: %s \t", name);
        fprintf(fp_write,"Marks = %d\n",marks);}
    fclose(fp_write);
    fclose(fp_read);
}
```

```
5
Naveen 34
Rahul 45
Vishal 43
Rani  44
Veena 23
```

student3.txt