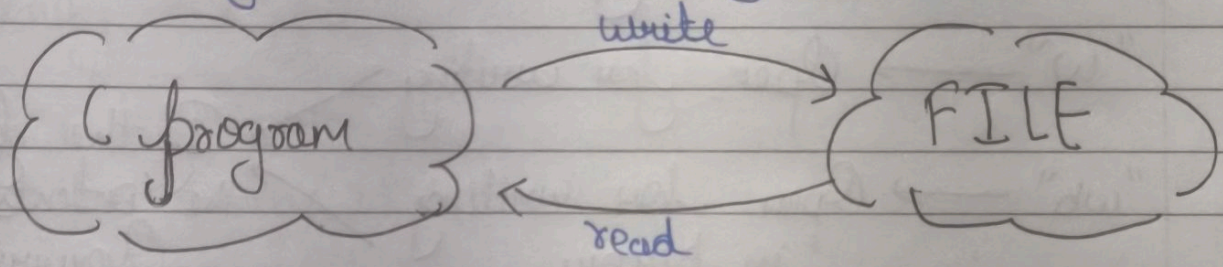
File I/O

The Random Access Memory is Volatile and its content is lost once the program terminates In order to persist the data forever we use files

A file is data stored in a storage device A C program can talk to the file by reading content from it and writing content to it



FILE pointer

A "FILE" is a structure which needs to be created for opening the file.
A file pointer is a pointer to this structure of the file

FILE pointer is needed for communication between the file and the program

A FILE pointer can be created as follows:

```
FILE *ptr
ptr = fopen ("filename.ext", "mode");
```

FILE opening modes
C offers the programmers to select a mode for opening a file
following modes are primarily used in C file I/O

"r" → Open for reading → If the file does not exist, fopen returns NULL

"rb" → Open for reading in binary → If the file does not exist, fopen returns NULL

"w" → Open for writing → If the file exists, the contents will be overwritten

"wb" → Open for writing in binary → If the file exists, the contents will be overwritten

"a" → Open for Append → If the file does not if will be created

Types of files
There are two types of files:
(1) Text files (.txt, .c)
(2) Binary files (.jpg, .dat)

Reading a file
A file can be opened for reading as follows:

```
FILE *ptr;
ptr = fopen("Mohit.txt", "r");
int num;
```

let us assume that "TMdit.txt" contains an integer we can read that integer using

fscanf (ptr, "%d", &num); ⇒ fscanf is file counterpart of scanf

This will read an integer from file in num variable

Quick Quiz :- Modify the program above to check whether the file exist or not before Opening the file.

```
#include <stdio.h>
int main(){
    FILE *ptr;
    ptr = fopen("TMdit.txt", "r");

    if(ptr == NULL){
        printf("File does not Exist");
        return 1;
    }
    Else{
        int num;
        printf("Enter a number you want to
                                generate: \n");
        Scanf("%d", &num
        fprintf(ptr, "Multiplication table of %d\n\n", num);
    for(int i=1; i<=10; i++){
        fprintf(ptr, "%d x %d = %d\n", num, i, num*
    }
    fclose(ptr);
    return 0;
}
```

Closing the file

It is very important to close the file after read or write this is achived using fclose as follows

```
fclose (ptr);
```

This will tell the compiler that we are done working with the file and the associated resources could be freed.

Writing to a file

we can write to a file in a way very similar to read

```
FILE *ptr
fptr = fopen ("Mohit.txt", "w");

int num = 432;
fprintf (fptr, "%d", num);

fclose (fptr);
```

fgetc() and fputc()

fgetc() and fputc() are used to read and write a character from/to a file

fgetc(ptr) ⟶ Used to read a character from file

fputc('c', ptr); ⟶ Used to write character 'c' to the file

EOF: End of file

fgetc returns EOF when all the characters from a file have been read. So we can write a check like below to detect end of file

```
while (1) {
    ch = fgetc(ptr);
    if (ch == EOF) {
        break;
    }
    // code
}
```

⇒ when all the content of a file has been read break the loop!

Practice Set

Q1) write a program to read three integers from a file

```
#include <stdio.h>
int main() {
    FILE *ptr;
    ptr = fopen("Mohit.txt", "r");

    if (ptr == NULL) {
        printf("File no found\n");
        return 1;
    }
```

```
int i=1, num;
while (i<=3){
    fscanf(ptr, "%d", &num);
    printf("The value of num is %d\n", num);
    i++;
}
fclose(ptr);
return 0;
}
```

Q2) Write a program to generate multiplication table of a given number in text format. Make sure that the file is readable and well formatted.

A) (The same answer as the Quick quiz)

Q3 Write a program to generate (read) a text file character by character and write its content twice in a seperate file

A)
```
#include <stdio.h>
int main(){
    char ch;
    FILE *ptr;
    FILE *ptr2;

    ptr = fopen("Mohit.txt", "r");
    ptr2 = fopen("Mohit2.txt", "a");
```

```
while (1)
  {
    ch = fgetc(ptr);
    if (ch == EOF)
      {
        break;
      }
    Else {
      fprintf(ptr2, "%c", ch);
      fprintf(ptr2, "%c", ch);
      printf("%c", ch);
      }
  }
  return 0;
}
```

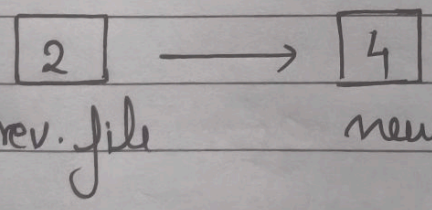
Q#3 Take name and Salary of two Employes as input from the user and write them to a text file in the following format:

name 1, 3300
name 2, 7700

```
# include <stdio.h>
int main()
  {
    FILE * ptr;
    char name1[34], name2[34];
    int Salary1, Salary2;
    ptr = fopen("Salary.txt", "w");
```

```
printf("Enter the name of Employee 1:\n");
Scanf("%s", name1);

printf("Enter the Salary of Employee 1:\n");
Scanf("%d", &Salary1);

printf("Enter the name of Employee 2:\n");
Scanf("%s", name2);

printf("Enter the Salary of Employee 2:\n");
Scanf("%d", &Salary2);

fprintf(ptr, "%s, %d\n", name1, Salary1);
fprintf(ptr, "%s, %d\n", name2, Salary2);

fclose(ptr);
return 0;
}
```

Q5 Write a program to modify a file containing an integer to double its value.




```
# include <stdio.h>
int main() {
    FILE *ptr;
    int num;
```

```
ptr = fopen ("int.txt", "r");
fscanf(ptr, "%d", &num);

fclose (ptr);

ptr = fopen ("int.txt", "w");
fprintf(ptr, "%d", 2 * num);

 fclose (ptr);
   return 0;
}
```