Full Stack Assignment Set -- 2

Module 2 – Introduction to Programming

Q1. Research and provide three real-world applications where C programming is extensively used, such as in embedded systems, operating systems, or game development ?

Ans:- 1. **Embedded Systems :-**

In devices like washing machines cars and microwaves.

It works well with hardware and uses little memory.

2. **Operating Systems :-**

It fast and can talk directly to the computer hardware.

In systems like **Linux** or **Windows**.

3. **Game Development :-**

In making game engines like the one used for **Doom** or **Quake**.

It makes games run fast and smooth.

Q2. Install a C compiler on your system and configure the IDE. Write your first program to print "Hello, World!" and run it ?

Ans:-

```
#include <stdio.h>

int main()
{
  printf("Hello, World!\n");
        return 0;
  }
```

1. Save the file as hello.c
2. Compile and run

gcc hello.c -o hello ./hello

Hello, World!

Q3. Write a C program that includes variables, constants, and comments. Declare and use different data types (int, char, float) and display their values.

Ans:-

```
#include<stdio.h>
int main()
{
                    int roll,std;
                    float percentage;
                    char grade;
                    long int fees;

                    printf("Enter your roll no. = ");
                    scanf("%d",&roll);
                    printf("\nEnter your standard = ");
                    scanf("%d",&std);
                    printf("\nEnter your percentage = ");
                    scanf("%f",&percentage);
                    printf("\nEnter your grade = ");
                    scanf(" %c",&grade);
//                  printf("\nEnter your fees = ");
//                  scanf("%lf",&fees);
```

```
                    printf("\n\nRoll no. = %d",roll);
                    printf("\nStd. = %d",std);
                    printf("\nPercentage = %.3f",percentage);
                    printf("\nGrade = %c",grade);
//                  printf("\nTotal fees = %ld",fees);
                    return 0;
}
```

const float PI → A constant

int age, **char grade**, **float height** → Different variable types

Comments are added with //

Q4. Write a C program that accepts two integers from the user and performs arithmetic, relational, and logical operations on them. Display the results.

Ans:-

```
#include<stdio.h>
int main()
{
                    int num1,num2,ans;
                    printf("\nEnter the value in num1 = ");
                    scanf("%d",&num1);
                    printf("\nEnter the value in num2 = ");
                    scanf("%d",&num2);
                    ans = num1 + num2;
                    printf("\nThe addition of %d and %d is =
%d",num1,num2,ans);
return 0;
}
```

```
#include<stdio.h>
int main()
{
                        int n1=10,n2=12,n3=0;
                        int ans;
                        ans = n1<n2;
                        printf("\nThe reult of n1<n2 = %d",ans);
                        printf("\nThe result of n1<=n2 = %d",n1<=n2);
                        printf("\nThe result of n1>n2 = %d",n1>n2);
                        printf("\nThe result of n1>=n2 = %d",n1>=n2);
                        printf("\nThe result of n1==n2 = %d",n1==n2);
                        printf("\nThe result of n1!=n2 = %d",n1!=n2);
                        return 0;
}
#include <stdio.h>

int main() {
   int a, b;

   printf("Enter first number: ");
   scanf("%d", &a);

   printf("Enter second number: ");
   scanf("%d", &b);
   printf("\nLogical AND (a && b): %d\n", a && b);
   printf("Logical OR  (a || b): %d\n", a || b);
```

```
    printf("Logical NOT (!a)    : %d\n", !a);


    return 0;
}
```

Q5. Write a C program to check if a number is even or odd using an if-else statement. Extend the program using a switch statement to display the month name based on the user's input (1 for January, 2 for February, etc.).

Ans:-

```
 #include<stdio.h>
int main()
{
                                int num;
                                printf("\nEnter the number = ");
                                scanf("%d",&num);
                                switch(num)
                                {
                                  case 1:
                                          printf("\nToday is Monday");
                                  break;
                                  case 2:
                                          printf("\nToday is Tuesday");
                                  break;
                                  case 3:
                                          printf("\nToday is Wednesday");
                                  break;
                                  case 4:
                                          printf("\nToday is Thursday");
```

```
                    break;
                    case 5:
                            printf("\nToday is Friday");
                    break;
                    case 6:
                            printf("\nToday is saturday");
                    break;
                    case 7:
                            printf("\nToday is sunday");
                    break;
                    default :
                            printf("\nInvalid day number");
                }
                return 0;
}
```

Q6. Write a C program to print numbers from 1 to 10 using all three types of loops (while, for, do-while).

Ans:-

```
        #include<stdio.h>
int main()
{
   int i;
   printf("\nFor loop := ");
   for(i=10;i<=5;i++)
   {
     printf("\nTops Technologies");
```

```
    }

    printf("\nWhile loop := ");
    i = 10;
    while(i<=5)
    {
        printf("\nTops Technologies");
        printf("\nBye");
        i++;
    }

    printf("\nDo while loop := ");
    i = 10;
    do
    {
        printf("\nTops Technologies");
        printf("\nBye");//5
        i++;//6
    }while(i<=5);
    return 0;
}
```

Q7. Write a C program that uses the break statement to stop printing numbers when it reaches 5. Modify the program to skip printing the number 3 using the continue statement.

Ans:-

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

```
int main() {
    for (int i = 1; i <= 10; i++) {

        if (i == 3) {
            continue;
        }

        if (i == 5) {
            break;
        }

        printf("%d\n", i);
    }

    return 0;
}
```

Q8. Write a C program that calculates the factorial of a number using a function. Include function declaration, definition, and call.

Ans:-

Q9. Write a C program that stores 5 integers in a one-dimensional array and prints them. Extend this to handle a two-dimensional array (3x3 matrix) and calculate the sum of all elements.

Ans:-

```
#include <stdio.h>

int main() {
    int matrix[3][3],i,j;
    int sum = 0;


    printf("Enter elements for matrix:\n");
    for (i = 0; i < 3; i++)
                                {
        for ( j = 0; j < 3; j++)
                                    {
            printf("Element [%d][%d]: ", i, j);
            scanf("%d", &matrix[i][j]);
            sum += matrix[i][j];
        }
    }

    printf("\nThe matrix is:\n");
    for (i = 0; i < 3; i++) {
        for ( j = 0; j < 3; j++) {
            printf("%d", matrix[i][j]);
        }
        printf("\n");
```

```
    }
    printf("\n All elements = %d\n", sum);

    return 0;
}
```

Q10. Write a C program to demonstrate pointer usage. Use a pointer to modify the value of a variable and print the result.

Ans:-

```
#include<stdio.h>
int main()
{
        int a[5]={1,2,3,4,5},i;
        int *ptr = &a;
        for(i=0;i<5;i++)
        {
          printf("\nAddress of a[%d] = %p",i,&a[i]);
        }
        for(i=0;i<5;i++)
        {
          printf("\nValue of a[%d] = %d",i,*ptr+i);
        }
        return 0;
}
```

Q11. Write a C program that takes two strings from the user and concatenates them using strcat(). Display the concatenated string and its length using strlen().

Ans:-

```
#include<stdio.h>
#include<string.h>
int main(){

   char str1[100],str2[100];
                        printf("\n enter the string 1=");
                        gets(str1);
                        printf("\n enter the string 2=");
                        gets(str2);

                        printf("\n original string 1=%s",str1);
                        printf("\n original string 2=%s",str2);

                        strcat(str1,str2);
                        printf("\n concatanated string=%s",str1);

                        int result=strlen(str1);
                        printf("\n Lenth of concatenated string
=%d",result);
                        return 0;
}
```

Q12. Write a C program that defines a structure to store a student's details (name, roll number, and marks). Use an array of structures to store details of 3 students and print them.

Ans:-

```
#include<stdio.h>
struct student{
 char name[100];
 int roll;
 int marks;
};
int main(){
 struct student s[3];
 int i;
 for(i=0;i<3;i++){
  printf("\n Enter Student[%d] Name=",i+1);
  scanf("%s",&s[i].name);
  printf("\n Enter Student[%d] Roll Number=",i+1);
  scanf("%d",&s[i].roll);
  printf("\n Enter Student[%d] Marks=",i+1);
  scanf("%d",&s[i].marks);
 }
 for(i=0;i<3;i++){
  printf("\n Student[%d] Name=%s",i+1,s[i].name);
  printf("\n Student[%d] Roll no=%d",i+1,s[i].roll);
```

```
 printf("\n Student[%d] Marks=%d",i+1,s[i].marks);
 printf("\n");
 printf("\n");
 }

 return 0;
}
```

Q13. Write a C program to create a file, write a string into it, close the file, then open the file again to read and display its contents.

Ans:-

```
                #include<stdio.h>
int main(){
 FILE *fp;
 fp=fopen("demo.txt","a");
 fprintf(fp,"\nhello this is my assignment value");
 fclose(fp);
 char str[100];
 FILE *fr;
 fr=fopen("demo.txt","r");

 if(fr==NULL){
  printf("\n file doesn't exists.");
 }
```

```
 else{
  while(fgets(str,sizeof(str),fr)){
   printf("\n%s",str);
  }
 }

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