

## 2Module 2 – Introduction to Programming

**Q-1 : 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 system : Automotive software
2. Operating system : Windows, linux
3. Game development : Doom

**Q-2 : 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("\n Hello World");

Return 0;
}
```

**Q-3 : 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>
#define pie 3.14
Int main()
{

Int n1=10;
Char  n2='a';
Float n3=10.5;
// Here take  n1 for the any numerical value,
```

```

// Take n2 for the alphabetic value
// Take n3 for float value
// Take pie for constant

printf("\n the value of n1 = %d ",n1);
printf("\n The value of n2 = %c",n2);
printf("\n The value of n3 = %.2f",n3);
printf("\n the value of pie = %.2f",pie);
Return 0;
}

```

**Q-4 : 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 n1,n2;

    printf("\n The value of n1 = ");
    scanf("%d",&n1);
    printf("\n The value of n2 = ");
    scanf("%d",&n2);

    // Arithmetic

    printf("\n The Addition of %d and %d is %d",n1,n2,n1+n2);
    printf("\n The Subtraction of %d and %d is %d",n1,n2,n1-n2);
    printf("\n The multiplication of %d and %d is %d",n1,n2,n1*n2);
    printf("\n The division of %d and %d is
%.2f",n1,n2,(float)n1/(float)n2);

    // Relational operator

    printf("\n\n n1>n2 : %d",n1>n2);
    printf("\n n1<n2 : %d",n1<n2);
    printf("\n n1<=n2 : %d",n1<=n2);
}

```

```

printf("\n n1>=n2 : %d ",n1>=n2);
printf("\n n1==n2 : %d",n1==n2);
printf("\n n1!=n2 : %d",n1!=n2);

//logical operator

printf("\n\n n1>0 && n2>0 : %d",n1>0 && n2>0);
printf("\n n1>0 || n2<0 : %d",n1>0 || n2<0);
printf("\n !(n1>0) :%d",!(n1>0));

return 0;
}

```

**Q-5 : 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 n;
up:
    printf("\n Enter the value = ");
    scanf("%d",&n);
    if(n%2==0)
    {
        printf("\n\n %d is the even number",n);
    }
    else
    {
        printf("\n\n %d is the odd Number",n);
    }

    switch(n)
    {
        case 1 :
            printf("\n %d for January ",n);

```

```
        break;
    case 2 :
        printf("\n %d for February",n);
        break;
    case 3 :
        printf("\n %d for March",n);
        break;
    case 4 :
        printf("\n %d for April",n);
        break;
    case 5 :
        printf("\n %d for May",n);
        break;
    case 6 :
        printf("\n %d for June",n);
        break;
    case 7 :
        printf("\n %d for July",n);
        break;
    case 8 :
        printf("\n %d for August",n);
        break;
    case 9 :
        printf("\n %d for September",n);
        break;
    case 10 :
        printf("\n %d for October",n);
        break;
    case 11 :
        printf("\n %d for November",n);
        break;
    case 12 :
        printf("\n %d for December",n);
        break;
    }
    goto up;
    return 0;
}
```

**Q-6 : 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("\n\n For loop :=");

    for(i=1;i<=10;i++)
    {
        printf("\n%d",i);
    }

    printf("\n\n while loop :=");
    i=1;
    while(i<=10)
    {
        printf("\n%d",i);
        i++;
    }

    printf("\n\n do while loop :=");
    i=1;
    do
    {
        printf("\n%d",i);
        i++;
    }
    while(i<=10);
    return 0;
}
```

**Q-7 : 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()
{
    int n,i;

    printf("\n Enter the value of n = ");
    scanf("%d",&n);

    for(i=1;i<=n;i++)
    {
        if(i%3==0)
        {
            continue;
        }
        if(i%5==0)
        {
            break;
        }
        printf("%d \n",i);
    }
    return 0;
}
```

**Q-8 : Write a C program that calculates the factorial of a number using a function. Include function declaration, definition, and call.**

ANS :

```
#include<stdio.h>

// Without return type with argument
int fact(int n1); //Declaration

int fact(int n1) //definition
{
    // ...
}
```

```

    int ANS,i;
    for(i=1;i<=n1;i++)
    {
        ANS = ANS * i;
    }
    printf("\n The factorial of %d is = %d",n1,ANS);
}
int main()
{
    int num1;
    printf("\n The value of num1 = ");
    scanf("%d",&num1);
    fact(num1); //calling
    return 0;
}

```

**Q-9 : 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 c[5],i;

    for(i=0;i<5;i++)
    {
        printf("\n Enter the element c[%d] = ",i);
        scanf("%d",&c[i]);
    }

    printf("\n Array = ");

    for(i=0;i<5;i++)
    {
        printf("%d ",c[i]);
    }
}

```

```
int a[3][3],b[3][3],j,sum=0;

for(i=0;i<3;i++)
{
    for(j=0;j<3;j++)
    {
        printf("\n Enter the element a[%d][%d] = ",i,j);
        scanf("%d",&a[i][j]);
    }
}

for(i=0;i<3;i++)
{
    for(j=0;j<3;j++)
    {
        printf("\n Enter the element b[%d][%d] = ",i,j);
        scanf("%d",&b[i][j]);
    }
}

printf("\n 1st \t 2nd \t =sum\n");

for(i=0;i<3;i++)
{
    for(j=0;j<3;j++)
    {
        printf("%d ",a[i][j]);
    }
    printf("\t");
    for(j=0;j<3;j++)
    {
        printf("%d ",b[i][j]);
    }
    printf("\t");
    for(j=0;j<3;j++)
    {
        sum = a[i][j]+b[i][j];
    }
}
```



```

        printf("%2d ",sum);
    }
    printf("\n");
}

return 0;
}

```

**Q-10 : 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[100];
    int *ptr = &a;
    printf("\n Enter the value of a = ");
    scanf("%d",&a);

    printf("\n The address of a = %p ",ptr);
    printf("\n The value of a = %d ",*ptr);

    return 0;
}

```

**Q-11 : 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 c1[100],c2[100];

```

```

printf("\n Enter the string c1 = ");
gets(c1);
printf("\n Enter the string c2 = ");
gets(c2);

printf("\n String c1 = %s",c1);
printf("\n String c2 = %s",c2);

strcat(c1,c2);

printf("\n After using concat string 1 = %s",c1);
printf("\n After using concat string 2 = %s",c2);

int length = strlen(c1);
printf("\n After using length of string 1 = %d ",length);
printf("\n After using length of string 2 = %d ",strlen(c2));

return 0;
}

```

**Q-12 : 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 id;
    int mark;
};
int main()
{
    struct student s[50];
    int size,i;

```

```

printf("\n Size = ");
scanf("%d",&size);

for(i=0;i<size;i++)
{
    printf("\n Details of student %d = ",i+1);
    printf("\n Name = ");
    scanf("%s",&s[i].name);
    printf("\n Id = ");
    scanf("%d",&s[i].id);
    printf("\n Mark = ");
    scanf("%d",&s[i].mark);
}

printf("\n Name \t ID \t Mark");

for(i=0;i<size;i++)
{
    printf("\n %s \t %d \t %d",s[i].name,s[i].id,s[i].mark);
}

return 0;
}

```

**Q-13 : 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 *fp1;
    char text[100];
    fp1 = fopen("first.txt","w");

    fprintf(fp1,"\n Hello world");
    fprintf(fp1,"\n How are you");
}

```

```
fclose(fp1);

fp1 = fopen("first.txt", "r");

while(fgets(text, sizeof(text), fp1))
{
    printf("%s", &text);
}
fclose(fp1);

printf("\n Mission successfull");

return 0;
}
```