Module-2: Introduction to programming

Que1. 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:-

* Description: Embedded systems are specialized computing systems that perform dedicated functions within larger mechanical or electrical systems.
* Use of C: C is widely used because it allows direct manipulation of hardware resources and has minimal runtime overhead.
* Example:
  + Microcontrollers in household appliances (like washing machines or microwave ovens).

🡪2. Operating Systems:-

* Description: Operating systems manage computer hardware and software resources and provide common services for application programs.
* Use of C: Most modern operating systems are either written in C or have C at their core because it provides low-level access while maintaining some abstraction.
* Examples:
  + Linux kernel
  + Windows
  + macOS and Unix variants

🡪3. Game Development (Game Engines and Tools):-

* Description: Game development involves creating software for video games, including rendering engines, physics simulations, and hardware interfacing.
* Use of C: C and C++ are used for performance-critical parts of game engines due to their speed and memory control.
* Examples:
  + Doom and Quake
  + Unreal Engine

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Que2. 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;

}

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Que-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>

/\* constants\*/

#define c 10

int main(){

printf("%d",c);

int roll,std;

float per;

char grade;

long int fees;

printf("\n enter your roll no=");

scanf("%d",&roll);

printf("\n enter your standard=");

scanf("%d",&std);

printf("\n enter your percentage=");

scanf("%f",&per);

printf("\n enter your grade=");

scanf(" %c",&grade);

printf("\n enter your fees=");

scanf("%ld",&fees);

printf("\n roll no=%d",roll);

printf("\n standard=%d",std);

printf("\n percentage=%f",per);

printf("\n grade=%c",grade);

printf("\n fees=%ld",fees);

return 0;

}

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Que-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 num1,num2;

printf("\n Enter value in number 1=");

scanf("%d",&num1);

printf("\n Enter value in number 2=");

scanf("%d",&num2);

//arithmetic operations

printf("\n Addition of %d and %d is =%d",num1,num2,num1+num2);

printf("\n Subtraction of %d and %d is =%d",num1,num2,num1-num2);

printf("\n Multiplication of %d and %d is =%d",num1,num2,num1\*num2);

printf("\n Division of %d and %d is =%d",num1,num2,num1/num2);

printf("\n Remaindor of %d and %d is =%d",num1,num2,num1%num2);

printf("\n");

//relation operation

printf("\n Result of %d>%d is=%d",num1,num2,num1>num2);

printf("\n Result of %d>=%d is=%d",num1,num2,num1>=num2);

printf("\n Result of %d<%d is=%d",num1,num2,num1<num2);

printf("\n Result of %d<=%d is=%d",num1,num2,num1<=num2);

printf("\n Result of %d==%d is=%d",num1,num2,num1==num2);

printf("\n Result of %d!=%d is=%d",num1,num2,num1!=num2);

printf("\n ");

//logical operator

printf("\n Result of %d>=%d && %d<=%d = %d",num1,num2,num1,num2,num1>=num2 && num1<=num2);

printf("\n Result of %d>=%d || %d<=%d = %d",num1,num2,num1,num2,num1>=num2 || num1<=num2);

printf("\n Result of !(%d>=%d)= %d",num1,num2,!(num1>=num2));

return 0;

}

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Que-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(){

//number even or odd check

int num;

printf("\n Enter the value of Number=");

scanf("%d",&num);

if(num%2==0){

printf("\n Number is Even.");

}

else{

printf("\n Number is Odd.");

}

// Display the months

printf("\n");

int month;

printf("\n enter value for month=");

scanf("%d",&month);

switch(month){

case 1:

printf("\n Month='January'");

break;

case 2:

printf("\n Month='February'");

break;

case 3:

printf("\n Month='March'");

break;

case 4:

printf("\n Month='April'");

break;

case 5:

printf("\n Month='May'");

break;

case 6:

printf("\n Month='June'");

break;

case 7:

printf("\n Month='July'");

break;

case 8:

printf("\n Month='August'");

break;

case 9:

printf("\n Month='September'");

break;

case 10:

printf("\n Month='October'");

break;

case 11:

printf("\n Month='November'");

break;

case 12:

printf("\n Month='December'");

break;

default:

printf("\n Invalid Month.");

}

return 0;

}

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Que-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(){

//while loop

printf("\n while loop:");

int num=1,i;

while(num<=10){

printf("\n number=%d",num);

num++;

}

//for loop

printf("\n");

printf("\n for loop :");

num=10;

for(i=1;i<=num;i++){

printf("\n number=%d",i);

}

//do..while loop

printf("\n");

printf("\n do...while loop :");

num=1;

do

{

printf("\nnumber=%d",num);

num++;

}while(num<=10);

return 0;

}

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Que-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 number,i;

printf("\n Enter the Value Of Number=");

scanf("%d",&number);

for(i=1;i<=number;i++){

if(i==5){

break;

}

else if(i==3){

continue;

}

else{

printf("\n number=%d",i);

}

}

return 0;

}

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Que-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>

int fact();//declaration

int main(){

int result;

result=fact();//function call

printf("factorial of given number=%d",result);

return 0;

}

int fact()//definition

{

int num,fact=1,i;

printf("\n enter the number=");

scanf("%d",&num);

for(i=1;i<=num;i++){

fact=fact\*i;

}

return fact;

}

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Que-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 a[5]={1,2,3,4,5},i,j;

For(i=0;i<5;i++)

{

printf(“%d”,a[i]);

}

Int b[3][3];

For(i=0;i<3;i++){

For(j=0;j<3;j++){

Printf(“\n enter the element in b[i][j]=”,i,j);

Scanf(“%d”,&b[i][j]);

}

}

Int sum=0;

For(i=0;i<3;i++){

For(j=0;j<3;j++){

Sum=sum+b[i][j];

}}

Printf(“\n matrix of 3\*3=\n”);

For(i=0;i<3;i++){

For(j=0;j<3;j++){

Printf(“%d”,b[i][j]);

}

Printf(“\n”);

}

Printf(“\n sum of array element is =%d”,sum);

return 0;

}

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Que-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=10;

int \*ptr=&a;

printf("\n address of a=%p",ptr);

\*ptr=20;

printf("\n value of a=%d",a);

return 0;

}

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Que-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 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;

}

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Que-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 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;

}

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