

Computer Science

Class:10th

Ch#05

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Function of loop

Ans: Function of Loop:

Loops are used in programs to repeat a block of statements. Repeating a block of statements is a very common and useful task in programming. Loops make the task of writing programs easier and efficient.

Three types of loops are used in C program. These are **for**, **while** and **do while** loops.

Loop & elements of loop:

Ans: Loop:

A loop is a statement in a programming language that allows one or more statements to be repeatedly executed as many times as required.

Essential elements of a loop:

There are two essential elements of a loop. The block of statements forms the body of the loop that is to be executed repeatedly until loop condition is true. Loops terminate based on test conditions.

Programmer might want to execute a loop:

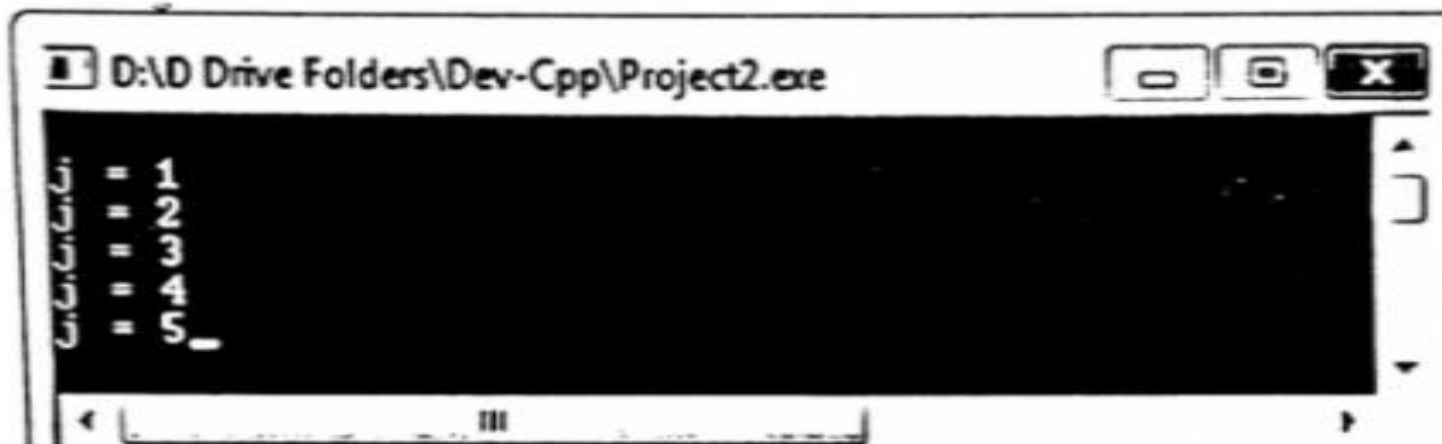
- i. A given number of times
- ii. Until a given value exceeds another value
- iii. Until a particular character is entered

Write a program to print numbers from 1 to 5 by using for () loop.

```
#include <stdio.h>
#include <conio.h>
void main(void)
{
    int j;
    for (j=1; j<=5; j++)
        printf("\n] = %d", j);
    getch();
}
```

Program to print numbers from 1 to 5

When the program is compiled and executed it will produce the output shown in Fig.



```
D:\D Drive Folders\Dev-Cpp\Project2.exe
] = 1
] = 2
] = 3
] = 4
] = 5
```

...

- The expression $j=1$ inside the parenthesis initializes the j variable to 1. Initialization is done as soon as the loop is entered.
- The second expression (test condition) $j \leq 5$ tests each time through the loop to see if j is less than or equal to 5. If the test is true, the body of the loop is executed. If the test is false, the loop will be terminated and control will be transferred to the next statement following the for loop.
- The third expression $j++$ increments the loop variable j , each time the loop is executed. In general, any expression can be used for incrementing the loop variable. When a for loop terminates, the loop variable is still defined and contains the value assigned by the last increment. In Program 1, the last value assigned to j will be 6. However, a well designed program will not use this feature.


Write a program to read a number and prints its table by using for () loop.

Ans: Program to read a number and print its table using for () loop:

- The execution of program is shown in Fig, when the value of n is 7. The program will print the value of n in first column, the value of j in second column and the product of $n*j$ in the third column according to the format given in printf() function.

Write a program to read a number and print its factorial by using for loop.

Ans: Program to read a number and print its factorial:

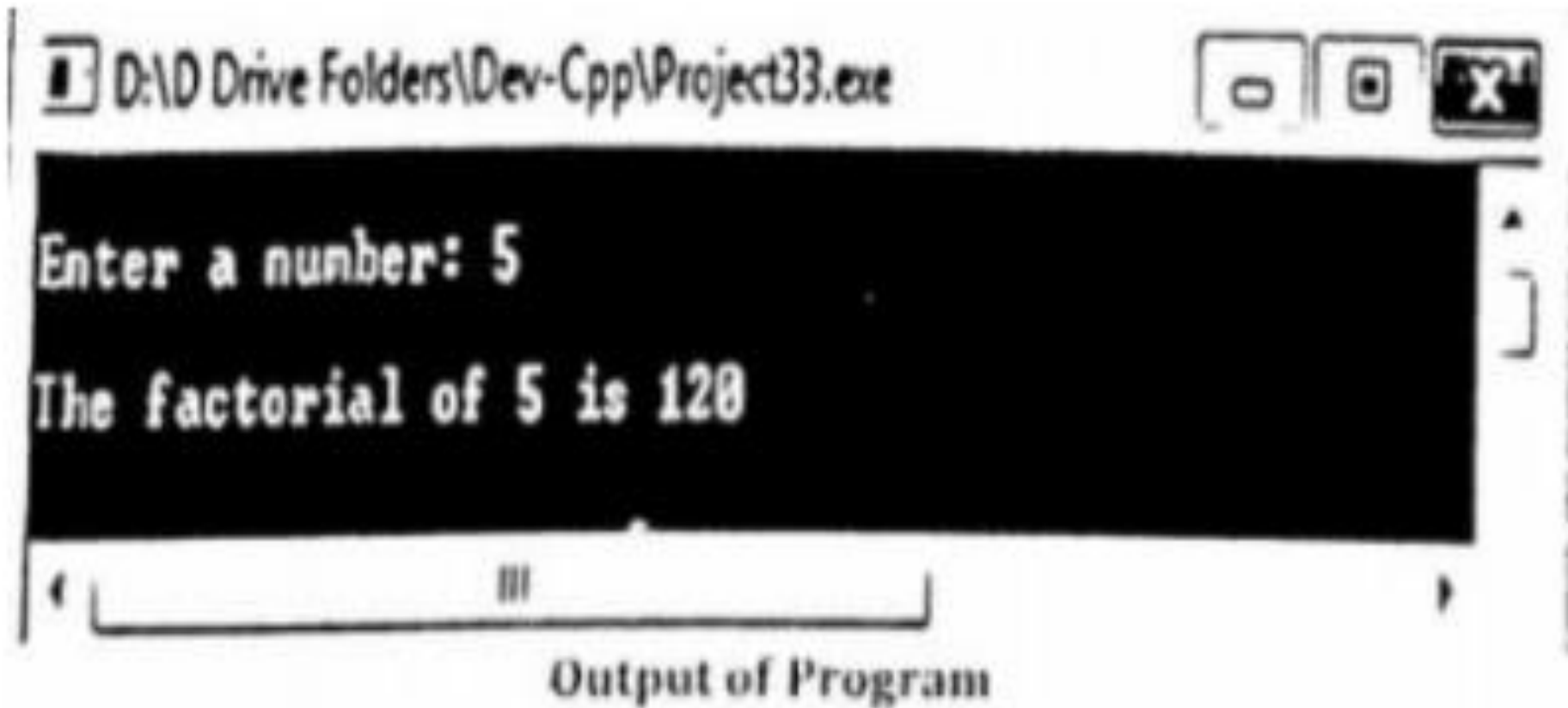


The image shows a screenshot of the Dev-C++ IDE. The window title is "Dev-C++ 4.9.9.2 - [Project33] - Project33.dev". The menu bar includes File, Edit, Search, View, Project, Execute, Debug, Tools, CVS, Window, and Help. The toolbar contains various icons for file operations and editing. The main editor window shows a C program in a file named "main.c". The code is as follows:

```
#include<stdio.h>
#include<conio.h>
void main(void)
{
    int n, j, fact;
    printf("\nEnter a number: ");
    scanf("%d", &n);
    fact=1;
    for (j=1; j<=n; j++)
        fact=fact*j;
    printf("\nThe factorial of %d is %d", n, fact);
    getch();
}
```

Below the code editor, the text "Program to print factorial of a number" is displayed.

output



```
D:\D Drive Folders\Dev-Cpp\Project33.exe  
Enter a number: 5  
The factorial of 5 is 120
```

Output of Program

Write a program to find the Greatest Common Division of two numbers by using for () loop.

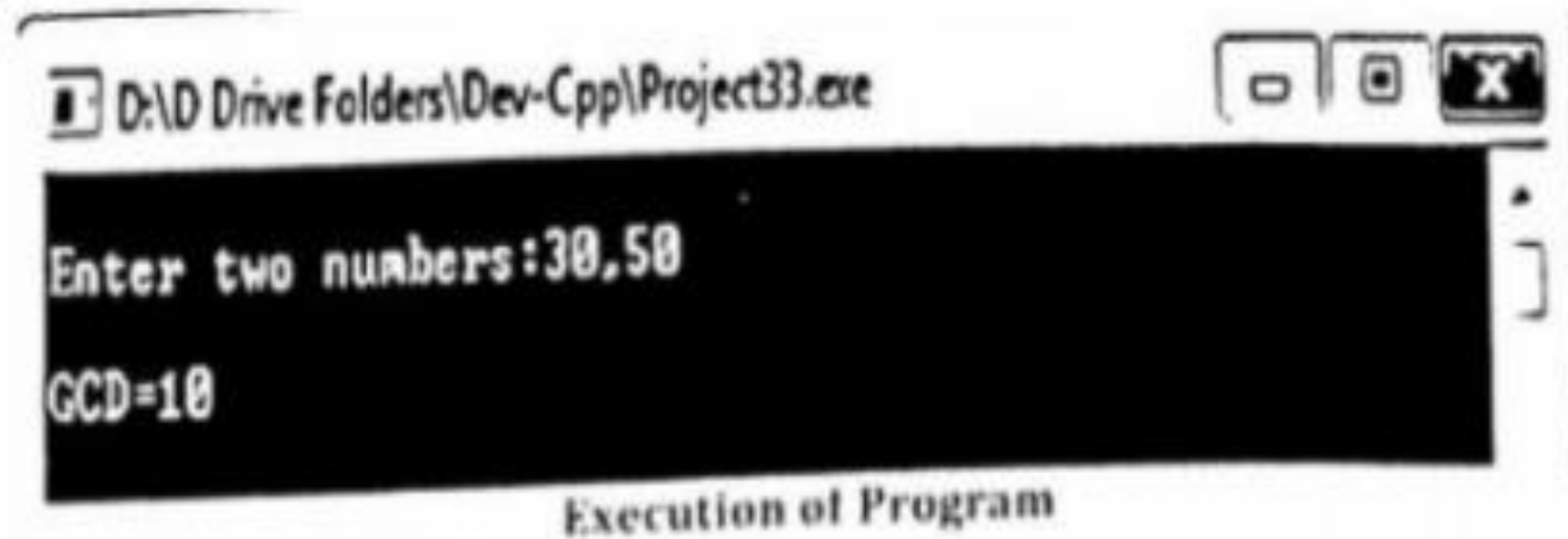


```
#include<stdio.h>
#include<conio.h>
void main(void)
{
    int a,b,small,rem1,rem2,j,gcd;
    printf("\nEnter two numbers:");
    scanf("%d,%d",&a,&b);
    if(a<b)
        small=a;
    else
        small=b;
    for(j=1; j<=small; j++)
    {
        rem1=a%j;  rem2=b%j;
        if((rem1==0)&&(rem2==0))
            gcd=j;
    }
    printf("\nGCD=%d",gcd);
    getch();
}
```

Program to find GCD of two numbers

- In this program a and b are two variables whose GCD is required. After reading the two numbers from the keyboard, if-else statement will determine the smaller of the two numbers and assign it on the variable small.
- The GCD is in the range of 1 to the smaller number. The two variables rem1 and rem2 are used to determine whether the numbers a and b are exactly divisible j by using the remainder operator.
- The greatest value of j that exactly divides both variables without any remainder is assigned to the variable gcd. Execution of this program is shown in Fig.

Output:



```
D:\D Drive Folders\Dev-Cpp\Project33.exe  
Enter two numbers:30,50  
GCD=10
```

Execution of Program