Practical No. 5

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Aim:- Programs to understand for loops for iterative statements.

Software Required:- Turbo C/C++

Theory:- A loop is used for executing a block of statements repeatedly until a given condition return false.

C For loop:-

This is one of the most frequently used loop in C programming.

Syntax of: For loop

```
for (initialization ; condition test ; increment or decrement)
    {
      // Statements to be executed repeatedly
    }
```

CODE

```
#include <stdio.h>
#include <conio.h>
void main()
{
int i, n, p;
clrscr();
printf(" Enter the number : ");
scanf("%d", &n);
for (i=1 ; i<=10 ; i++)
   {
   p = n*i;
   printf("%d *%d =%d \n", n, i, p);
   }
getch();
}
```

Instructer's Sign

Output of Code 1

Enter the number : 7

7 x 1 = 7
7 x 2 = 14
7 x 3 = 21
7 x 4 = 28
7 x 5 = 35
7 x 6 = 42
7 x 7 = 49
7 x 8 = 56
7 x 9 = 63
7 x 10 = 70

Output of Code 2

```
*
* *
* * *
* * * *
```

Output of Code 3

```
* * * *
* * *
* *
*
```

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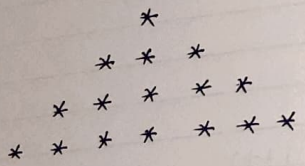
2.
```
#include<stdio.h>
#include<conio.h>
void main()
{
int i,j;
clrscr();
for(i=1;i<=4;i++)
  {
    for(j=1;j<=i;j++)
      {
        printf("*");
      }
    printf("\n");
  }
getch();
}
```

3.
```
#include<stdio.h>
#include<conio.h>
void main()
{
int i,j;
clrscr();
for(i=1;i<=4;i++)
  {
    for(j=1;j<=4;j++)
      {
        printf("*");
      }
    printf("\n");
  }
getch();
}
```

Instructer's Sign

Output of the Code :-



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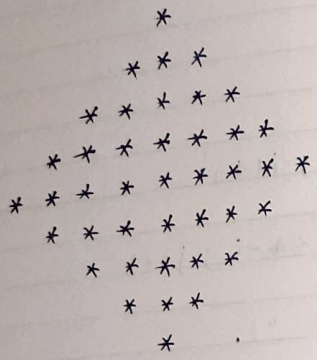
4.
```
#include <stdio.h>
#include <conio.h>
void main()
{
int i, j;
clrscr();
for (i=1; i<=4; i++)
    {
    for (j=1; j<4-i; j++)
        {
        printf(" ");
        }
    for (int k=1; k<=2*i-1; k++)
        {
        printf("*");
        }
    printf("\n");
    }
getch();
}
```

Instructer's Sign

Output of the Code 5



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```
5. #include<stdio.h>
#include<conio.h>
void main()
{
int i, j, k;
clrscr();
for(i=1; i<=5; i++)
    {
    for(j=1; j<5-i+1; j++)
    {
    printf("\t");
    }
for(k=1; k<(2*i); k++)
    {
    printf("*");
    }
printf("\n");
}
for(i=4; i>=1; i--)
    {
    printf("\t");
    }
for(k=1; k<(i*2); k++)
    {
    printf("*");
    }
printf("\n");
}
getch()
}
```

Instructer's Sign

Viva Question

Q1 Is for loop an entry-controlled loop or an exit-controlled loop?

Ans- A for loop is an entry controlled loop. This means that the conditions is checked before the loop is executed. If the statement is false from the start, the loop body will not be executed at all.

Q2 What is the difference between for loop & while loop?

Ans The main difference between for loop and while loop is that a for loop is used when the number of iterations is known, while a while loop is used when the number of iterations is unknown.

Q3 What is a nested-loop?

Ans A nested loop is a loop that appears inside the body of another loop. The inside loop is called the inner loop & the loop outside is called outer loop.

Q4 How many times this loop will execute?

```
int main()
{
int i;
for (i=0; i<10; i++)
{printf("%d\n", i++);
  i = ++i;
} return 0;
}
```

Instructer's Sign

Ans This code will execute the loop 10 times.
initialization ⇒ i=0 ⇒ 1 time
loop condition : i<10 ⇒ 9 values
total 10 times.

Q5 Why is for loop used most frequently in programming compared to other loops.

Ans The for loop is a common programming construct because, it is a concise and intuitive way to repeat a block of code a known number of times. For loops are often easier to parallelize.

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Aim:- Programs to learn about array & string operations.

Software Required:- Turbo C/C++

Theory:-

- **Array-** An array is a group (or collection) of same data types. For example an int array holds the element of int types while a float array holds the elements of float types.

How to declare Array in C.

```
Ex. int num[35]; /* An integer array of 35 elements */
    char ch[10]; /* An array of characters for 10 elements */
```

Similarly an array can be of any data type such as double, float, short etc.

- **String-** String is an array of characters. In this guide, we learn how to declare strings, how to work with strings in C programming and how to use the pre-defined string handling functions.

We will see how to compare two strings, concatenate strings, copy one string to another & perform such operations using the pre-defined functions of "String.h" header file. In

Instructer's Sign

Output of the Code :-

```
Enter number of terms: 4
Enter the elements : 5
2
1
8
Array is:
x[0] = 5
x[1] = 2
x[2] = 1
x[3] = 8
```


Order to use these string functions you must include string.h file in your C program.

Method 1 :-

```
char address[] = {'T', 'E', 'X', 'A', 'S', '0'};
```

Code :-

```
#include <stdio.h>
#include <conio.h>
void main()
{
int x[10], i, n;
printf(" Enter number of terms:");
scanf ("%d", &n);
printf(" Enter the elements : ");
for (i=0; i<n; i++)
  {
   scanf("%d", &x[i]);
  }
printf(" Array is : \n");
for (i = 0; i < n; i++)
  {
   printf("x[%d] = %d\n", i, x[i]);
  }
getch();
}
```

Instructer's Sign

Output of the Code :-

```
Enter the element : 1
 2
 3
 4
 5
 6
 7
 8
 9
Actual matrix is :
 1  2  3
 4  5  6
 7  8  9
Transpose is :
 1  4  7
 2  5  8
 3  6  9
```


Q.

```
#include <stdio.h>
#include <conio.h>
void main()
{
int x[3][3], y[3][3], i, j;
clrscr();
printf("Enter the elements: ");
for(i=0; i<3; i++)
    {
    for(j=0; j<3; j++)
      {
      scanf("%d", &x[i][j]);
      }
    }
printf("Actual matrix is: \n");
    for(i=0; i<3; i++)
      {
      for(j=0; j<3; j++)
        {
        printf("%d\t", x[i][j]);
        }
      printf("\n");
      }
printf("Transpose is: \n");
    for(i=0; i<3; i++)
      {
      for(j=0; j<3; j++)
        {
        y[i][j] = x[j][i];
        printf("%d\t", y[i][j]);
        }
      printf("\n");
      }
getch(); }
```

Instructer's Sign

Output of the Code 3

```
Enter I string: Computer
Enter II string : lab
Enter III string : global
length of I string = 8
Revesed string : bal
Copied string : bal
Contented string : balglobal
BAL GLOBAL
```


3.

```
#include<string.h>
#include<stdio.h>
#include<conio.h>
void main()
{
char a[10], b[10], c[10];
int i;
clrscr();
printf(" Enter I string: ");
gets(a);
printf(" Enter II string: ");
gets(b);
printf(" Enter III string: ");
gets(c);
i = strlen(a);
printf(" length of I string = %d ",i);
strrev(b);
printf("\n Reversed string: ");
puts(b);
strcpy(a,b);
printf("Copied string: ");
puts(a);
strcat (" Catenated string: ");
puts(a);
strupr(a);
puts(a);
getch();
}
```

Instructer's Sign

Viva Questions

Q1. What is the Difference between an array & a variable?

Ans The main difference between an array & a variable is that an array can store multiple values, while a variable can only store one value.

Q2 What do you mean by 2-dimensional array?

Ans A two-dimensional array is a multi-dimensional array data structure that store information in rows and columns, similar to a matrix.

Q3 Differentiate between reading a string using scanf() with "%s" format specifier and using gets()?

Ans gets() considers a whitespace as a part of the string and ends the input upon encountering \n or EOF. On the other hand scanf() ends taking input upon encountering a whitespace, \n and EOF. Scanf() allows to specifying the max character length to be scanned.

Q4 What is the role of "\0" string?

Ans "\0" (pronounced "null") is a special character used to mark the end of a string.

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5. What is the role of strcpy() and strcat()?

AN Strcpy() is used to completely copy one string to another, while strcat() is used to append one string to the end of another string.

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