K. J. Somaiya College of Engineering, Mumbai-77

A Constituent College of Somaiya Vidyavihar University

Batch: P5-2 Roll No.: 16010422185

Experiment / assignment / tutorial No. 4

Grade: AA / AB / BB / BC / CC / CD /DD

Signature of the Staff In-charge with date

TITLE: Program to print patterns

AIM: Program to print patterns for 'n' rows using nested loop

Expected OUTCOME of Experiment:

Books/ Journals/ Websites referred:

1. Programming in C, second edition, Pradeep Dey and Manas Ghosh, Oxford University Press.
2. Programming in ANSI C, fifth edition, E Balagurusamy, Tata McGraw Hill.
3. Introduction to programming and problem solving , G. Michael Schneider ,Wiley India edition.
4. **http://cse.iitkgp.ac.in/~rkumar/pds-vlab/**

Problem Definition:

The program is to print a pattern as given by the user. The program makes use of a nested loop to print a pattern of characters, numbers or alphabets.

Example:

Input: number of rows = 5, number of columns = 5

Output:

```
        5
      4 5
    3 4 5
  2 3 4 5
1 2 3 4 5
```

Algorithm:

Step 1. START.

Step 2. Input no. of rows and columns.

Step 3. Let integer i = no. of rows.

Step 4. Let j = 1 and it will be incremented by 1 till j <= no. of cols.

Step 5. If j < i, print " " else print value of j.

Step 6. After loop j print line break.

Step 7. If i >=1, i = i - 1, goto step 5.

Step 8. STOP.

Implementation details:

```
#include <stdio.h>
int main()
   {
   int rows;
   printf("Enter no. of rows and columns: ");
   scanf("%d", &rows);

   for (int i = rows; i >= 1; i--)
      {
      for (int j = 1; j <= rows; j++)
         {
         if (j < i)

            {
            printf(" ");
            }
         else
            {
            printf("%d", j);
            }


         }
      printf("\n");
      }
   return 0;
   }
```

Output(s):

```
Enter no. of rows and columns: 5
    5
   45
  345
 2345
12345


...Program finished with exit code 0
Press ENTER to exit console.
```

Conclusion:

The required pattern is displayed on the screen using the correct algorithm

Post Lab Descriptive Questions

a) Write a program to print the following:

```
1
2     4
3     6     9
4     8     12    16
5     10    15    20    25
6     12    18    24    30    36
7     14    21    28    35    42    49
8     16    24    32    40    48    56    64
9     18    27    36    45    54    63    72    81
10    20    30    40    50    60    70    80    90    100
```

b) Write a program to print the following pattern:

```
    A
   ABA
  ABCBA
 ABCDCBA
```

Code of A)

```
#include <stdio.h>
int main()
   {
   for (int i = 1; i <= 10; i++)
      {
      for (int j = 1; j <= i; j++)
         {
         printf("%d\t", i * j);
         }
      printf("\n");
      }
   return 0;
   }
```

Output of A)

```
1
2       4
3       6       9
4       8       12      16
5       10      15      20      25
6       12      18      24      30      36
7       14      21      28      35      42      49
8       16      24      32      40      48      56      64
9       18      27      36      45      54      63      72      81
10      20      30      40      50      60      70      80      90      100


...Program finished with exit code 0
Press ENTER to exit console.
```

Code of B)

```
#include <stdio.h>

int main()

   {


   for (int i = 1; i <= 4; i++)

      {
```

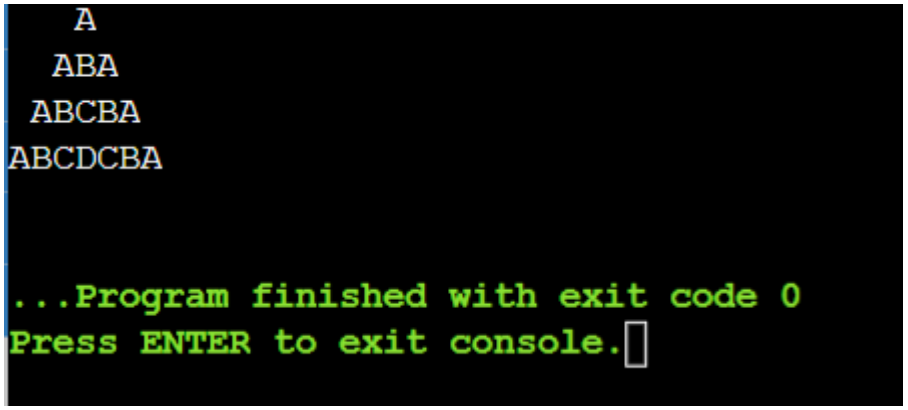
```
    for (int j = 1; j <= 4 - i; j++)
       {
       printf(" ");
       }
    for (int k = 1; k <= i; k++)
       {
       printf("%c", (char)(k + 64));
       }



    for (int m = i - 1; m >= 1; m--)
       {
       printf("%c", (char)(m + 64));
       }
    printf("\n");
    }

return 0;
}
```

Output of B)



Date: _____ **Signature of faculty in-charge**