Batch: G3	Roll No.: 16010421063
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:

CO2: Apply Basic concepts of C programming for Problem solving

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 = 4, number of columns = 4

```
Output:        5

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

Algorithm:

Step-1 - Enter number or 'rows'

Step-2 - Run a for loop for row number of times(i)

Step-3 - Inside the bigger for loop insert two for loops

Step-4 - First for loop for the number of blank spaces required

Step-5 - Second for loop to get the desired numbers.

Step-5.1 - we run the second loop (row-i)times

Step-6 - After each iteration we add a new line
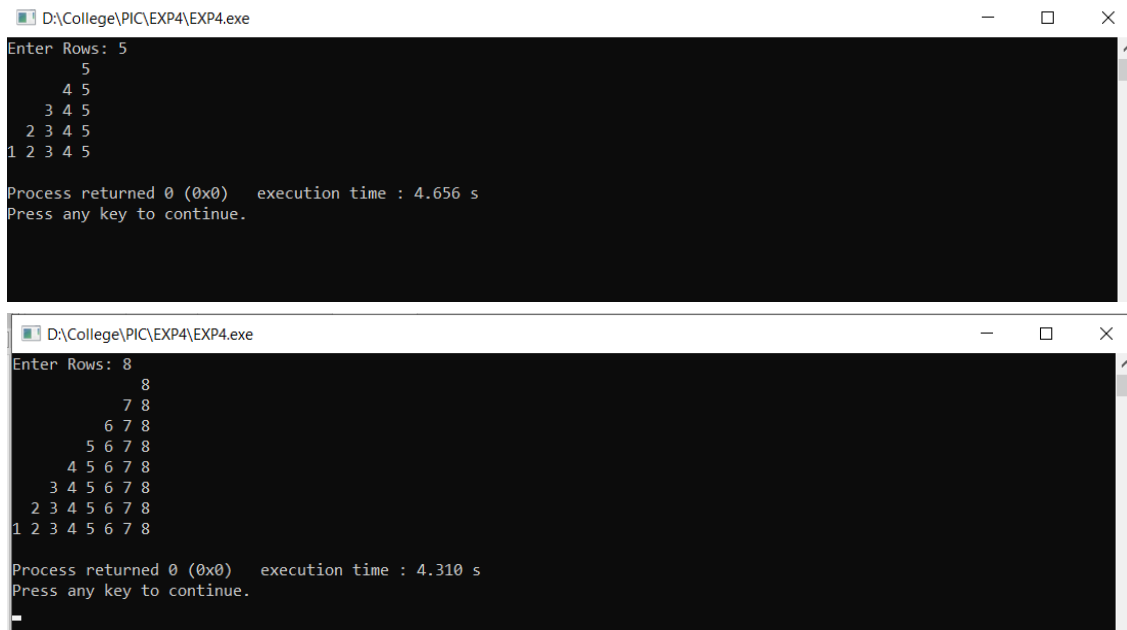
Step-7 - After loop is finished Program Stops

Implementation details:

```c
#include<stdio.h>
//Code by Arya Nair
int main()
{
    int rows;
    printf("Enter Rows: ");
    scanf("%d",&rows);
    for(int i = rows; i >= 1; i--)
    {
        for(int j = 1; j < i; j++)
        {
            printf("  ");
        }
        for(int j =i; j <= rows; j++)
        {
            printf("%d ", j);
        }
        printf("\n");

    }
}
```

Output(s):

```
D:\College\PIC\EXP4\EXP4.exe                                    —    □    ×
Enter Rows: 5
        5
      4 5
    3 4 5
  2 3 4 5
1 2 3 4 5

Process returned 0 (0x0)    execution time : 4.656 s
Press any key to continue.
```

```
D:\College\PIC\EXP4\EXP4.exe                                    —    □    ×
Enter Rows: 8
              8
            7 8
          6 7 8
        5 6 7 8
      4 5 6 7 8
    3 4 5 6 7 8
  2 3 4 5 6 7 8
1 2 3 4 5 6 7 8

Process returned 0 (0x0)    execution time : 4.310 s
Press any key to continue.
```

Conclusion:

By using basic concepts of C programming we are able to create the required output.

Post Lab Descriptive Questions

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
```

```c
#include <stdio.h>
//Code by Arya Nair
int main()
{
    int row = 10;
    for(int i = 1; i <= row; i++)
    {
        for(int j = 1; j <= i; j++)
        {
            printf("%d ", i * j);
        }
        printf("\n");
    }

    return 0;
}
```

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