CSE108 – Computer Programming Lab.

Lab 4

Date: 15.03.2024

In this lab assignment, you need to create a simple programme that generates 2 different patterns. The programme should draw the patterns on the console using the size properties received from the user and the '*' and space characters.

The patterns can be one of two types: diamond or pascal's triangle. A drawing function should be designed for each type of pattern, as well as a main function that provides a menu view where user input is taken for the desired shapes and their attributes.

In the main function, the programme should receive input about which pattern the user wants to draw and the size of the shape. It is important to note that you are not allowed to program in the main function the steps that are specified to be done as a separate function.

A menu will be shown to the user at the start of the programme. In this menu the user can make a selection for the pattern he/she wants to draw or end the programme. If the user chooses a pattern, the size of the selected pattern will be requested from the user and after the drawing of the pattern is completed, the user will be asked if he/she wants to draw another pattern. According to the answer of this question, the menu reappears or the programme is exited.

$\frac{n!}{r!(n-r)!}$

See below for details on the required functions.

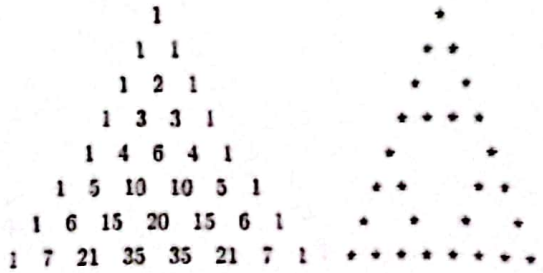
Part 1. Menu Design and User Interaction (30 points):

- Correct display of the menu and selection from the user (10 points)
- Receiving user inputs correctly and providing appropriate feedback in case of incorrect inputs (10 points)
- The programme calls the correct functions according to user selection (10 points)

```
1. Pascal's Triangle Pattern
2. Diamond Pattern
3. Exit
Make your choice: 1
Enter the pattern size: 8
       *
      * *
     *   *
    * * * *
   *       *
  * *     * *
 *   *   *   *
* * * * * * * *

Would you like to draw another pattern? (Yes: 1, No: 0). 0
Exiting programme..
```

Part 2. Pascal's Triangle Pattern Function (35 points): Pascal's Triangle is a mathematical order consisting of numbers arranged in a triangular pattern, which plays an important role in combinatorics. Each number is the sum of the two numbers immediately preceding it.



- Correct calculation of Pascal's Triangle and checking for odd or even for each element (15 points)
- Correct printing of the '*' or ' ' character according to whether each number is odd or even (20 points)

Part 3. Diamond Pattern Function and Odd Number Check (35 points): The diamond pattern is a symmetrical shape consisting of stars (*) with the widest point in the centre and narrowing upwards and downwards. In order to draw this pattern properly, it should be checked whether the size value received from the user is an odd number, and if an even number is entered, 1 more than the entered number should be accepted as the valid size and the pattern should be drawn. +1

- Correct drawing of the diamond pattern with the widest point in the centre (25 points)
- Correctly checking the odd number limitation for the dimension (10 points)

```
1. Pascal's Triangle Pattern
2. Diamond Pattern
3. Exit
Make your choice: 2
Enter the pattern size: 7
   *
  ***
 *****
*******
 *****
  ***
   *
```

```
Would you like to draw another pattern? (Yes: 1, No: 0): 1

1. Pascal's Triangle Pattern
2. Diamond Pattern
3. Exit
Make your choice: 2
Enter the pattern size: 6
   *
  ***
 *****
*******
 *****
  ***
   *

Would you like to draw another pattern? (Yes: 1, No: 0): 0
Exiting programme..
```