

CS225 LAB – Functions: Pascal Triangle

Functions: Pascal Triangle using user defined functions

User Requirements

Create a program that displays Pascal's Triangle based on the user input. After the user enters an integer from 1 to 10 a Pascal triangle should display as seen in Table 1.

Table 1: Pascal Triangle Program

```
Enter an integer from 1 to 10: 10
      1
     1 1
    1 2 1
   1 3 3 1
  1 4 6 4 1
 1 5 10 10 5 1
1 6 15 20 15 6 1
1 7 21 35 35 21 7 1
1 8 28 56 70 56 28 8 1
1 9 36 84 126 126 84 36 9 1
```

Software Requirements

Create a flowchart and/or pseudo code to establish an algorithm of how to solve this problem.

The spacing must conform to the following criteria

- Three spaces must be placed after every single digit number.
- Two spaces must be placed after every double digit number.
- One space must be placed after every triple digit number

Your program must use and include the following functions

- **factorial**
 - i) This function must contain one integer argument.
 - ii) This function must return an integer.
 - iii) Description: This function calculates the factorial of the number received.
- **pascalNum**
 - i) This function must contain two integer arguments (i.e. row, element).
 - ii) This function must return an integer.
 - iii) Description: This function calculates the Pascal number based on the *row* and *element* values (use the equation provided below)

Your program **must** use the following equation to determine the Pascal number for any given part of the triangle

$$PascalNumber = \frac{row!}{element! * (row - element)!}$$

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								1	1									Row 0
							1		2	1								Row 1
						1		3	3		1							Row 2
				1		4		6	4			1						Row 3
			1	1		5		10	10		5							Row 4
				6		15		20		15		6						Row 5
		1		7		21		35		35		21		7				Row 6
	1		8		28		56		70		56		28		8			Row 7
1		9		36		84		126		126		84		36		9		Row 8
																	1	Row 9
Element 0		Element 1		Element 2		Element 3		Element 4		Element 5		Element 6		Element 7		Element 8		Element 9

If the user enters an invalid number your program must consider such possibilities and how to handle them.

```

Enter an integer from 1 to 10: 14
Invalid entry:

Enter an integer from 1 to 10: -5
Invalid entry:

Enter an integer from 1 to 10: 3
  1
1  1
1  2  1
    
```