Online compiler (https://www.onlinegdb.com/online_c_compiler#).

Assessment 3: (total 12 marks)

Write a C program that performs the following tasks:

(a) Ask the user to enter two numbers (a *base* number and an *exponent*). Implement a power function that calculate the power given by $base^{exponent}$ **using arithmetic operators**. Print the result.
Note: Use of pow or an existing mathematical library is **not allowed**. **(3 marks)**

Hint: Both base and exponent can be a negative number as well.

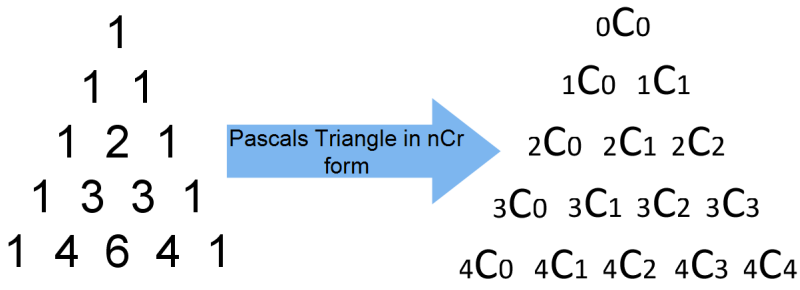
(b) The fibonacci series is a sequence of numbers where each number is the sum of the two preceding ones, usually starting with 0 and 1. The sequence begins 0, 1, 1, 2, 3, 5, 8, 13, 21, and so on.

(i) Now ask the user to input a **positive number** *n*. Check if the user has entered a valid number. If not, prompt the user to re-enter a positive number until this condition has met. **(1 marks)**

(ii) Calculate and output the nth element of the Fibonacci series. Ensure that the program does not use iterative methods for the calculation. **(3 marks)**

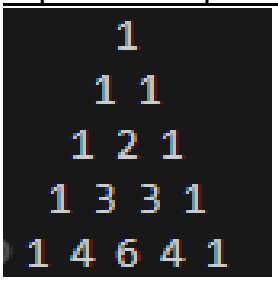
Hint: Element *n = 0* in the series is 0. Use recursion.

(c) The Pascal's triangle is a triangular array of binomial coefficients. Each number within the triangle represents combination ($nCr = \frac{n!}{r!(n-r)!}$, where *n*! is the factorial operation) as shown below:



Generate a Pascal's triangle with the number of rows equal to the **positive number *n*** entered by the user in (b). **(5 marks)**

Expected output for n = 5:



Hint: Pyramid generation exercise was done in Lab 3. Combination was mentioned in Lecture 4.

---- end of assessment exercises ----