

Objective of the session :

Perform a top-down analysis and the detailed design of a program handling 2D arrays.

1 Building and displaying the Pascal triangle

Create a program that uses a 2-dimensional array to generate a Pascal triangle and then displays it on the screen.

The construction of a Pascal triangle can be done using a matrix of natural numbers with :

- a first row with only the value 1 in the first column
- for each row i , the value 1 in the first column and then for each column j , a value calculated by adding the numbers on the previous line and on the same column ($i - 1$ and j) and the previous one ($i - 1$ and $j - 1$)

This example shows the first lines of the triangle :

```

          1
         1 1
        1 2 1
       1 3 3 1
      1 4 6 4 1
     1 5 10 10 5 1
  
```

The program must first ask the user to enter the number of lines for the triangle. The program should check that this number is between 1 and 15. Then it must build a matrix containing the Pascal triangle with the desired number of lines and then display it on the screen.

Exercices

1. Choose the appropriate data type
2. Perform the top-down analysis,
3. perform the detailed design in pseudo-code of each subprogram.