LAB # 2

(PROGRAMMING SYSTEMS IN COMPUTATIONAL MATHEMATICS: MAPLE)

1. Construct the following polynomials (do not use the command \textit{sum} of Maple):
   1.1. \( p(x) = \sum_{i=0}^{100} i x^i \)
   1.2. \( p(x, y) = \sum_{i=0}^{20} (i + j)x^i y^j \)

2. Create a procedure to compute combinatorial numbers (do not use the commands \textit{!} neither \textit{binomial} of Maple).

3. Create a procedure to order lists of reals numbers (do not use the command \textit{sort}).

4. Design a procedure to compute the maximum and minimum of a list of real numbers (do not use the commands \textit{max}, \textit{min}).

5. A squared matrix \( A = (a_{i,j}) \) is called upper triangular if it verifies that \( a_{i,j} = 0 \) for \( i > j \) and it is called lower triangular if it verifies that \( a_{i,j} = 0 \) for \( i < j \).
   5.1. Design a procedure to generate upper triangular matrices.
   5.2. Design a procedure to generate lower triangular matrices.
   5.3. Design a procedure to compute the inverse of a triangular matrix (do not use the \textit{Inverse} command in Maple).

6. Design a procedure to count the number in a given list of numbers.