You can use any programming language that you prefer. This is an exercise in structuring a problem and then using base code to solve it. No pre-built classes are allowed.

## Problem 1

Write a function that takes a number $n$ and then creates a square matrix that has ones along the main diagonal, and then for every line parallell to the main diagonal will have numbers that constitutes the main diagonal plus the number of lines it is above the main diagonal. Example: if $n = 3$ you should get

$$\begin{bmatrix} 1 & 2 & 3 \\ 2 & 1 & 2 \\ 3 & 2 & 1 \end{bmatrix}.$$

## Problem 2 - vector multiplication

Write a function that computes the dot-product of two $n$-vectors. If the two vectors are not of the same length, then the function should return an error message stating that "The vectors must be of the same length."

## Problem 3 - matrix multiplication

Write a function that multiplies two square matrices. If the two matrices are not of the same size, then the function should return an error message stating that "The matrices must be of the same size."