Problem F

Gauss

The solution of sets of linear equations has applications on electrical circuit analysis, simulations of network traffic, simulations of neurons and in various other fields such as chemistry, physics, biology, economics, engineering and social sciences. In this exercise you must solve a system of linear equations given by $Ax=b$, where $A=\{A_{11}, A_{12}, ..., A_{nn}\}$ is a matrix of size $n \times n$, and $x=\{x_1, x_2, ..., x_n\}$ and $b=\{b_1, b_2, ..., b_n\}$vectors of length n.

To solve a linear system, the program first runs the Gaussian elimination algorithm, which transforms the matrix A into an upper triangular matrix. To this end, for each line i, the algorithm transform in zero all elements from column i for the lines i+1 to n. This is accomplished by summing each element from row i to each elements of each row j below it, multiplied by the factor $-A_{ii}/A_{ji}$.

Once transformed into an upper triangular matrix, one can solve the linear system by evaluating the value $x_n = b_n/A_{nn}$. Then we can calculate x_{n-1} and so on.

Your program should generate the linear system using the function *generateLinearSystem(int n, float *A, float *b, int nS)*, which generates *nS* matrices of size $n \times n$ and a vector b, filled with n values 1. In addition, each solution found is tested using the function *testLinearSystem(float *A, float *b, float *x, int n, int nS)*, which replaces the solutions x of each of the *nS* linear systems, checking if $Ax=b$.

Input

The input contains only one test case. The first line contains two integers: the size of each linear system *N* and the number of linear systems to be solved *nS*, respectively ($N \geq 1.000$; $nS \geq 30$)

The input must be read from the standard input.

Output

The output shows the amount of errors found during the test phase for each line linear system.

The output must be written to the standard output.

Example

Input	Output for the input
`1000 30`	`Errors=0`