

A matrix is a rectangular table of letters. A square matrix is a matrix with an equal number of rows and columns. A square matrix M is called **symmetric** if its letters are symmetric with respect to the main diagonal ($M_{ij} = M_{ji}$ for all pairs of i and j).

The following figure shows two symmetric matrices and one which is not symmetric:

AAB	AAA	ABCD	AAB
ACC	ABA	ABCD	ACA
BCC	AAA	ABCD	DAA
		ABCD	
Two symmetric matrices.		Two matrices that are not symmetric.	

Given a collection of available letters, you are to output a **subset of columns** in the **lexicographically smallest symmetric** matrix which can be composed using **all** the letters.

If no such matrix exists, output "IMPOSSIBLE".

To determine if matrix A is lexicographically smaller than matrix B , consider their elements in row-major order (as if you concatenated all rows to form a long string). If the first element in which the matrices differ is smaller in A , then A is lexicographically smaller than B .

INPUT

The first line of input contains two integers N ($1 \leq N \leq 30000$) and K ($1 \leq K \leq 26$). N is the dimension of the matrix, while K is the number of distinct letters that will appear.

Each of the following K lines contains an uppercase letter and a positive integer, separated by a space. The integer denotes how many corresponding letters are to be used. For example, if a line says "A 3", then the letter A must appear three times in the output matrix.

The total number of letters will be exactly N^2 . No letter will appear more than once in the input.

The next line contains an integer P ($1 \leq P \leq 50$), the number of columns that must be output.

The last line contains P integers, the indices of columns that must be output. The indices will be between 1 and N inclusive, given in increasing order and without duplicates.

OUTPUT

If it is possible to compose a symmetric matrix from the given collection of letters, output the required columns on N lines, each containing P character, without spaces. Otherwise, output "IMPOSSIBLE" (quotes for clarity).

SCORING

In test cases worth 60% of points, N will be at most 300.

In test cases worth 80% of points, N will be at most 3000.

EXAMPLES

input 3 3 A 3 B 2 C 4 3 1 2 3 output AAB ACC BCC	input 4 4 A 4 B 4 C 4 D 4 4 1 2 3 4 output AABB AACC BCDD BCDD	input 4 5 E 4 A 3 B 3 C 3 D 3 2 2 4 output AC BE DE ED	input 4 6 F 1 E 3 A 3 B 3 C 3 D 3 4 1 2 3 4 output IMPOSSIBLE
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