

With your aid Ivancho managed to restore his finances so he is ready to get back to science! Now he is focused on the problem of solving a system of linear equations.

A system of linear equations is the following:

$$\begin{cases} a_{11}x_1 + a_{12}x_2 + \dots + a_{1n}x_n = b_1 \\ a_{21}x_1 + a_{22}x_2 + \dots + a_{2n}x_n = b_2 \\ \dots \\ a_{n1}x_1 + a_{n2}x_2 + \dots + a_{nn}x_n = b_n \end{cases}$$

Given a_{ij} , $1 \leq i \leq m$, $1 \leq j \leq n$ и b_i , $1 \leq i \leq m$ you are asked to find x_j , $1 \leq j \leq n$.

After some intense thinking Ivancho realized that it would be too ambitious (and sometimes even impossible) to search for a solution of a random system of linear equations. That is why he set a more realistic goal – to find an n -tuple $(x_1, \dots, x_n)$, which is as close as possible to a complete solution.

For this purpose you are given two values $exact_i$ and $aprox_i$ for each equation, which determine the result of a solution. The first value is the bonus for successfully solving the i -th equation. The second value determines the bonus by the following formula (computed separately for each equation i):

$$\frac{1}{|\sum_{j=1}^n a_{ij}x_j - b_i| + 1} \cdot aprox_i$$

The result is formed as a sum of the two bonuses.

It is obvious that any second Ivancho will get bored and will leave the problem to you, but at least he gives you the right to choose – he gives you s m -tuples $(b_1, \dots, b_m)$ and you get to choose which m -tuple to use to form the system which will need to be solved.

Write a program that determines the m -tuple for which you are going to solve the system and then finds an n -tuple of x -es which receives as big of a result as possible for the chosen b 's.

Input

The first line of the input file `equations.in` contains two positive integers m and n – corresponding to the number of equations in the system and the number of variables. It is followed by m lines with $n+2$ integers per line – the coefficients a_{ij} , $exact_i$ and $aprox_i$. The new line contains the number s of m -tuples $(b_1, \dots, b_m)$, and the next s lines contain these m -tuples, i.e. m integers.

Output

On the first line of the output file `equations.out` write the number of the chosen m -tuple (indexed from 1). On the second line output n numbers – $x_1, \dots, x_n$, separated by spaces. They must be integers with their absolute value not exceeding 10^6 .

Scoring

You will receive 0 points if your output does not satisfy the stated conditions and constraints. Otherwise, you will receive $100 \cdot \frac{\text{yourScore}+1}{\text{maxScore}+1}$ percent of the points for each test. We define yourScore as the result of your program for the current test and maxScore as the highest result received by some of the contestants' programs for this test.

Constraints

$$1 \leq m \leq 2000$$

$$1 \leq n \leq 1000$$

$$1 \leq s \leq 20$$

$$0 \leq a_{ij} \leq 10^5$$

$$10^3 \leq \text{exact}_i, \text{aprox}_i \leq 10^6$$

$$0 \leq b_i \leq 10^9 \text{ for each } m\text{-tuple.}$$

Notice: The values of a_{ij} , exact_i , aprox_i and b_i are randomly generated so that they satisfy the constraints.

Number of tests	25%	25%	25%	25%
<i>m</i>	800	1000	1500	2000
<i>n</i>	1000	900	1000	1000
<i>s</i>	1	10	15	20

Time limit: 5 sec

Memory limit: 256 MB

Уравнения

SEASON 6 – ROUND 3



Example

Input (equations.in)	Output (equations.out)
5 4 6456 14482 80443 91712 856827 404250 46603 85084 90886 43276 359810 220421 73805 76890 42862 62163 621170 795841 6324 15062 37884 17771 890601 261041 53674 13346 95893 53116 150825 207655 1 175231511 46012106 293888266 414081012 725440535	1 713 984 870 942

Explanation

The sample output receives result 20212 (the value is casted to integer). It is not guaranteed to be the optimal result.