

Задача A. Casino

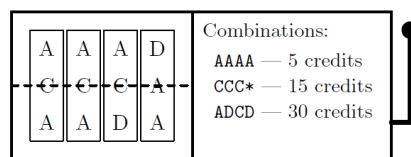
Имя входного файла: `casino.in`

Имя выходного файла: `casino.out`

Some casinos in Las Vegas probably make more money by slot machines than by other means of gambling. Let us describe a classical Las Vegas slot machine.

The slot machine has n windows, each shows k characters from the m -character wheel. Each window has its own wheel. Usually various funny pictures are used as characters, but in this problem we will use letters of the English alphabet.

The gambler pays one credit, pulls the handle, and the wheels start to rotate randomly. After they stop, the machine shows how much the gambler has won. The winnings are determined using the following procedure. After the wheel stops some of its characters are visible through the window. A simple slot machine has one line going across all windows, identifying exactly one character at each wheel. If these characters form a combination, the gambler wins some money.

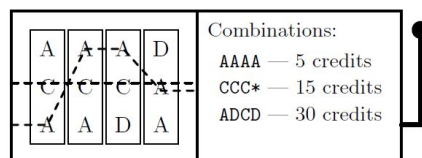


For example, let there be four wheels, each containing 6 characters: 'A', 'A', 'C', 'A', 'C' and 'D', in this order. Let each window show three characters, and the line goes through central characters in all windows. Let the combinations be "AAAA" for 5 credits, "CCC*" for 15 credits, and "ADCD" for 30 credits. Here '*' denotes any character.

Let the machine show "ACA" in the first window, "ACA" in the second window, "ACD" in the third window, and "DAA" in the fourth one. In this case the characters on the line form "CCCA" and the player wins 15 credits.

However, the game with just one winning line is not interesting. Winnings are rare and the player soon gets bored. Therefore the concept of *multiple lines* is introduced in more complicated slot machines. A *line* is the sequence $\langle i_1, i_2, \dots, i_n \rangle$ of indices from 1 to k that tells which character from each window should be taken to check for combination on this line. There can be several lines in the slot machine, the gambler may choose several of them before pulling the handle, and she would get a winning for a combination on each line. Of course, she must pay one credit for each line she plays on.

For example, if in the machine described above in addition to a standard line $\langle 2, 2, 2, 2 \rangle$ there were a line $\langle 3, 1, 1, 2 \rangle$, the gambler played on both lines and got the above outcome, she would also get a combination "AAAA" on the second line and win additional 5 credits.



You are planning to go to Las Vegas and need to prepare a good strategy for playing on a multi-line slot machines. Given a description of a slot machine, you have to determine which lines should one choose to play on to maximize winning ratio. Winning ratio is calculated as the sum of expected winnings on selected lines divided by the number of lines.

Формат входного файла

The first line of the input file contains five integer numbers: n , m , k , c and l — the number of wheels, characters on a wheel, characters in a window, winning combinations, and lines ($1 \leq n, m \leq 40$, $1 \leq k \leq m$, $1 \leq c \leq 20$, $1 \leq l \leq 20$).

The following n lines describe wheels. Each wheel is described by m characters in order they appear on a wheel. You may assume that the machine is honest, that is — each block of k consecutive characters has equal probability of appearance in a window.

The following c lines describe combinations. Each combination is described by n characters needed for this combination and the winning in credits ('*' denotes any character for the corresponding wheel). The winning is a positive integer number not exceeding 10^6 .

The following l lines contain n integer numbers each and describe lines.

Формат выходного файла

Print z — the optimal winning ratio — at the first line of the output file. Print it as an irreducible fraction in a form “**numerator/denominator**”. The second line must contain p — the number of lines that must be used to achieve this ratio. The third line must contain p numbers — the lines to use.

It is possible that the expected winning for any set of lines is not positive, in this case it is better not to play at all, z is 0/1, and p is 0.

Пример

casino.in	casino.out
4 6 3 3 2	1/144
AACACD	2
AACACD	1 2
AACACD	
AACACD	
AAAA 5	
CCC* 15	
ADCD 30	
2 2 2 2	
3 1 1 2	

Задача В. Casino

Имя входного файла: `casino.in`
Имя выходного файла: `casino.out`

The new Greek casino “Las Figas” is opening in Las Vegas. Andrew is going to a celebration of the opening of the casino. Of course he is going to play roulette.

The brand new roulette game is going to be held at “Las Figas”. The roulette has s sectors, and there are m possible types of bets possible. The i -th type of bet is the following. The player bets one chip for some p_i sectors of the roulette and if one of the selected sectors wins the player gets w_i chips in addition to her chip. If none of them wins, the player loses the chip he bets. Each sector of roulette has the same probability of winning equal to $1/s$.

Andrew uses the following strategy. He starts with n chips. He chooses one of the types of bets and bets a chip. If at some moment he has strictly greater than n chips he considers himself winning and walks away from the roulette. If he ends up with no chips he loses. He uses such strategy of choosing which bet type to use that maximizes the probability of winning.

Given the possible types of bets and n find the maximal possible probability of winning that Andrew can achieve.

Формат входного файла

The first line of the input file contains three integer numbers: n , m and s ($1 \leq n \leq 50$, $1 \leq m \leq 20$, $1 \leq s \leq 100$). The following m lines contain two integer numbers each: p_i and w_i ($1 \leq p_i \leq s$, $1 \leq w_i \leq 50$).

Формат выходного файла

Output one real number — the maximal possible probability of winning. Your answer must be accurate up to 10^{-7} .

Примеры

<code>casino.in</code>	<code>casino.out</code>
2 1 2 1 1	0.6666666666666667
10 8 38 18 1 12 2 9 3 6 5 4 8 3 11 2 17 1 35	0.8919856914626223

Задача С. Money, Money, Money

Имя входного файла: `money.in`

Имя выходного файла: `money.out`

The government of Flatland has decided to carry out the money system reform. The purpose of the reform is to reduce the number of different banknotes denominations down to two. After the reform there will be two types of banknotes — a tupiks and b tupiks.

The problem is that the president of Flatland doesn't like the number x . Therefore the minister of finances was instructed to choose such a and b that it is impossible to pay exactly x tupiks without change. On the other hand it must be possible to pay all amounts larger than x .

Now you are asked to help him — choose such a and b , or recommend the minister to retire, if it is impossible.

Формат входного файла

Input file contains one number x ($1 \leq x \leq 10^{12}$).

Формат выходного файла

Output two integer numbers a and b , such that it is impossible to pay x tupiks using banknotes of a and b tupiks without change, but it is possible to pay any larger sum.

If it is impossible, output two zeroes to the output file.

Пример

<code>money.in</code>	<code>money.out</code>
3	2 5
4	0 0
5	3 4

Задача D. Cutting Puzzle

Имя входного файла: `puzzle.in`

Имя выходного файла: `puzzle.out`

A well known puzzle question is: how many cuts are needed to cut a $3 \times 3 \times 3$ cube into unit cubes? After each cut you are allowed to rearrange the parts in a way you like, so you may cut several parts in one action.

The answer is: six, because all six faces of the interior cube must be cut out.

The puzzle can be easily generalized: how many cuts are needed to cut an $a \times b \times c$ parallelepiped into unit cubes? This is exactly the question you have to answer in this problem. Of course, after each cut you are allowed to rearrange the parts in a way you like.

Формат входного файла

Input file contains three integer numbers: a , b , and c ($1 \leq a, b, c \leq 10^{1000}$), separated by spaces.

Формат выходного файла

Output one integer number — the required number of cuts.

Пример

<code>puzzle.in</code>	<code>puzzle.out</code>
3 3 3	6