COCI 2016/2017

Round #4, December 17th, 2016

Tasks

Task	Time limit	Memory limit	Score
Bridž	1 s	32 MB	50
Kartomat	1 s	32 MB	80
Kas	2 s	512 MB	100
Rekonstruiraj	2 s	128 MB	120
Rima	1 s	256 MB	140
Osmosmjerka	4 s	256 MB	160
Total			650

After a few months of playing on his new phone, Mirko has finally decided to find a new hobby. He discovered a card game called bridge!

It is known that bridge is played by four players using a 52-card deck, 4 suits total (clubs, hearts, diamonds and spades) and 13 values (A, K, Q, J, 10, 9, 8, 7, 6, 5, 4, 3 and 2). At the beginning of the game, each player is dealt 13 cards.

Before starting the game, each player counts their so-called *honor points* in the following way:
  - each ace (A) is worth 4 points
  - each king (K) is worth 3 points
  - each queen (Q) is worth 2 points
  - each jack (J) is worth 1 point
  - the remaining cards (that will be denoted with X in this task) are worth 0 points.

Given the fact that Mirko has started playing bridge only recently, he has decided to practice couting points. He dealt himself cards N times and each time counted his honor points. In the end, he added them up.

He wants to know if he's done a good job. Help Mirko and check!

INPUT

The first line of input contains the integer N ($1 \le N \le 10\ 000$) from the task.
Each of the following N lines contains K_i, a string consisting of characters 'A', 'K', 'Q', 'J', 'X', of length 13, representing the cards Mirko had in his hand after dealing them for the ith time.

OUTPUT

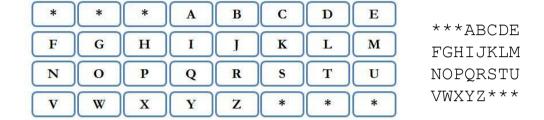The first and only line of output must contain the required sum from the task.

SAMPLE TESTS

input	input
1 AKXAKJXXXAXAQ	4 XXXAXXXXXXJXX KXAXXXQJAXXXX AQKQXXXKXXKQX JXXXXXJXXXXXX
output	**output**
25	40

Clarification of the first test case:

Mirko has a total of 4 aces, 2 kings, 1 queen and 1 jack in his hand. This totals to 4 * 4 + 2 * 3 + 1 * 2 + 1 * 1 = 25 honor points.

A ticket machine is a device similar to an ATM and was introduced by Croatian Railways in order to make purchasing train tickets easier. The first step in buying a ticket is **choosing the destination** of your journey. The destination can be one of N destinations offered in advance, names of local and worldwide places. You choose your destination by typing its name letter by letter. By entering each additional letter, the number of possible destinations reduces.

The initial appearance of the keyboard on the screen is shown in the picture. We will represent it as four arrays of characters of length 8.


```
***ABCDE
FGHIJKLM
NOPQRSTU
VWXYZ***
```

After choosing each letter, the keyboard changes its appearance. Only letters that can be chosen in the next step are left active (depending on the destinations still possible to choose). The remaining letter that can't be chosen are replaced with the character "*".

Write a programme that will, for N given destinations and the first few letters (not all of them) of the chosen destination, output the appearance of the keyboard before entering the next letter. You will never be given the entire word.

INPUT

The first line contains the integer N (1 ≤ N ≤ 50) from the task. Each of the following N lines contains one string of at most 100 characters that contains only uppercase letters of the English alphabet. The last line contains the string that represents the first few letters of the chosen destination.

OUTPUT

You must output the appearance of the keyboard described in the task.

SAMPLE TESTS

input	input	input
4	4	4
ZAGREB	SPLIT	AAAABCD
SISAK	VINKOVCI	AAAABCA
ZADAR	NOVSKA	AAAACDE
ZABOK	RIJEKA	AAAAAAA

ZA

output

```
****B*D*
*G******
********
********
```

VINKO

output

```
********
********
********
V*******
```

AAAA

output

```
***ABC**
********
********
********
```

Clarification of the first test case:

After entering the letters "ZA", the third letter can be "G" if we want a ticket to Zagreb, "D" if we want a ticket to Zadar, and "B" if we want a ticket to Zabok.

Kile and Pogi have found N banknotes on the street. After making sure that the original owner is nowhere to be found, they decided to split the banknotes amongst themselves. Of course, the sum of the banknotes that ended up with nobody was **the least possible**.

Since they couldn't just leave the remaining banknotes on the street, they decided to go to a nearby casino and put everything on **red**, hoping that they would end up getting twice the money they bet. The roulette decided on the (lucky, for this time) number 13 and our heroes decided to split the money they won. The payout is such that Kile and Pogi will always be able to split the money they won into two equal parts.

Because of the immense adrenaline rush, the boys have lost their mathematical abilities. Help them figure out how much money each of them is taking home.

INPUT

The first line of input contains the integer N ($1 \le N \le 500$) that denotes the number of banknotes on the street.
Each of the following N lines contains a single positive integer c_i that denotes the value of the ith banknote in kunas (kn). The total sum of money will not exceed 100 000 kn.

OUTPUT

You must output the amount of money each of them took home.

SCORING

In test cases worth 50 points total, N will be less than or equal to 13.
In test cases worth 70 points total, N will be less than or equal to 50, and the total sum of money will be at most 1000 kn.

SAMPLE TESTS

input	input
4	5
2	2
3	3
1	5
6	8
	13

output	output
6	18

Clarification of the first test case:
Kile took banknotes worth 2, 3 and 1 kn, and Pogi took the banknote worth 6 kn.
Clarification of the second test case:
Kile took the banknotes worth 5 and 8 kn, and Pogi took the banknote worth 13 kn. The remaining banknotes are worth 2 and 3 kn, which the boys have "doubled" in the casino. The total earnings of each of them is 13 + 5 = 18 kn.

Mirko has written down N real numbers with finite decimal notation. Next, for each number, he wrote down the arithmetic sequence that begins with 0 and its difference is the current number. For example, if the current number is x, the corresponding arithmetic sequence will be 0, x, $2x$, $3x$, $4x$, …

On another piece of paper, Mirko has written down **all** members of **all** obtained N sequences that are **in the interval** [A, B], sorted in ascending order, removing possible duplicates. The next day, he seems to have lost the first paper and wants to reconstruct the initial numbers based on the second piece of paper. Help him!

INPUT

The first line of input contains a natural number K, smaller than or equal to 50, the number of different elements in Mirko's sequences in the interval [A, B].
The second line contains integers A and B ($1 \leq A < B \leq 10^6$).
Each of the following K lines contains the K described numbers, sorted in ascending order. These will be real numbers with at most 5 decimal places.

OUTPUT

You must output N lines, where N is the size of Mirko's set of initial numbers, containing Mirko's (mutually distinct) initial numbers, in any order.

If multiple possible sets exist, output the one containing the smallest amount of numbers (the one with the smallest N), and if there are multiple such sets, output any.

SCORING

In test cases worth 50% of total points, all numbers in the input will be natural.

SAMPLE TESTS

input	input
4	5
1 2	10 25
1	12
1.4	13.5
1.5	18
2	20.25
	24

output	output
0.5	6.0

```
0.7
```

```
6.75
```

Clarification of the first example: Another correct solution is {0.5, 1.4}.

Little Adrian is a fan of rhyme. He believes that two words rhyme if and only if their longest common suffix is as long as the longer of the two words, or shorter than the longer word by 1. In other words, A and B rhyme if and only if it holds $LCS(A, B) \geq max(|A|, |B|) - 1$.

One day, while reading a collection of short stories, he decided to compose the longest possible sequence of words such that each two consecutive words rhyme. Each word from the sequence can appear only once.

Adrian has grown tired of this task, so he decided to go back to reading, and is asking you to solve this task instead of him.

INPUT

The first line of input contains the integer N (1 ≤ N ≤ 500 000).
Each of the following N lines contains one word consisting of lowercase letters of the English alphabet. All words are mutually distinct, and their total length is at most 3 000 000.

OUTPUT

You must output the length of the longest sequence.

SCORING

In test cases worth 30% of points, it will hold N ≤ 18.

SAMPLE TESTS

input	input	input
4 honi toni oni ovi	5 ask psk krafna sk k	5 pas kompas stas s nemarime
output	**output**	**output**
3	4	1

Clarification of the second test case:
The only possible sequence is *ask-psk-sk-k*.

Clarification of the third test case:
No two words rhyme.

We have created an infinite eight-directional crossword by taking a letter-filled block of dimensions *M* x *N* and infinitely repeating it. For instance, if we are given the following block:

```
honi
hsin
```

then we create the following crossword:

```
...honihonihonihoni...
...hsinhsinhsinhsin...
...honihonihonihoni...
...hsinhsinhsinhsin...
```

that is inifinite in all directions.

In the created crossword, we randomly choose a field and one of eight directions, then write down a word of length *K* obtained by reading the crossword starting from the initial field, in the chosen direction. If we executed this query twice (independently), we would obtain two words of length *K*. Calculate the probability that the two words are equal.

INPUT

The first line of input contains integers *M, N, K* from the task (1 ≤ *M, N* ≤ 500, 2 ≤ *K* ≤ 10^9). Each of the following *M* lines contains *N* lowercase letters of the English alphabet, and describes a block of the crossword. At least two distinct letters will exist in the block.

OUTPUT

You must output the required probability in the form of a reduced fraction *p/q,* without spaces.

SCORING

In test cases worth 100 total points, it will hold *M* = *N*.

SAMPLE TESTS

input	input	input
1 2 2 ab	2 4 3 honi hsin	3 3 10 ban ana nab
output	**output**	**output**

5/16   19/512   2/27