Codeforces Beta Round #18 (Div. 2 Only)

A. Triangle

time limit per test: 2 seconds
memory limit per test: 64 megabytes
input: standard input
output: standard output

At a geometry lesson Bob learnt that a triangle is called right-angled if it is nondegenerate and one of its angles is right. Bob decided to draw such a triangle immediately: on a sheet of paper he drew three points with integer coordinates, and joined them with segments of straight lines, then he showed the triangle to Peter. Peter said that Bob's triangle is not right-angled, but is *almost* right-angled: the triangle itself is not right-angled, but it is possible to move one of the points exactly by distance 1 so, that all the coordinates remain integer, and the triangle become right-angled. Bob asks you to help him and find out if Peter tricks him. By the given coordinates of the triangle you should find out if it is right-angled, almost right-angled, or neither of these.

Input

The first input line contains 6 space-separated integers $x_1, y_1, x_2, y_2, x_3, y_3$ — coordinates of the triangle's vertices. All the coordinates are integer and don't exceed 100 in absolute value. It's guaranteed that the triangle is nondegenerate, i.e. its total area is not zero.

Output

If the given triangle is right-angled, output `RIGHT`, if it is almost right-angled, output `ALMOST`, and if it is neither of these, output `NEITHER`.

Sample test(s)

input
0 0 2 0 0 1
output
RIGHT

input
2 3 4 5 6 6
output
NEITHER

input
-1 0 2 0 0 1
output
ALMOST

B. Platforms

time limit per test: 2 seconds
memory limit per test: 64 megabytes
input: standard input
output: standard output

In one one-dimensional world there are n platforms. Platform with index k (platforms are numbered from 1) is a segment with coordinates $[(k - 1)m, (k - 1)m + l]$, and $l < m$. Grasshopper Bob starts to jump along the platforms from point 0, with each jump he moves exactly d units right. Find out the coordinate of the point, where Bob will fall down. The grasshopper falls down, if he finds himself not on the platform, but if he finds himself on the edge of the platform, he doesn't fall down.

Input

The first input line contains 4 integer numbers n, d, m, l ($1 \le n, d, m, l \le 10^6, l < m$) — respectively: amount of platforms, length of the grasshopper Bob's jump, and numbers m and l needed to find coordinates of the k-th platform: $[(k - 1)m, (k - 1)m + l]$.

Output

Output the coordinates of the point, where the grosshopper will fall down. Don't forget that if Bob finds himself on the platform edge, he doesn't fall down.

Sample test(s)

input
2 2 5 3
output
4

input
5 4 11 8
output
20

C. Stripe

time limit per test: 2 seconds
memory limit per test: 64 megabytes
input: standard input
output: standard output

Once Bob took a paper stripe of n squares (the height of the stripe is 1 square). In each square he wrote an integer number, possibly negative. He became interested in how many ways exist to cut this stripe into two pieces so that the sum of numbers from one piece is equal to the sum of numbers from the other piece, and each piece contains positive integer amount of squares. Would you help Bob solve this problem?

Input

The first input line contains integer n ($1 \leq n \leq 10^5$) — amount of squares in the stripe. The second line contains n space-separated numbers — they are the numbers written in the squares of the stripe. These numbers are integer and do not exceed 10000 in absolute value.

Output

Output the amount of ways to cut the stripe into two non-empty pieces so that the sum of numbers from one piece is equal to the sum of numbers from the other piece. Don't forget that it's allowed to cut the stripe along the squares' borders only.

Sample test(s)

input
9 1 5 -6 7 9 -16 0 -2 2
output
3

input
3 1 1 1
output
0

input
2 0 0
output
1

D. Seller Bob

time limit per test: 2 seconds
memory limit per test: 128 megabytes
input: standard input
output: standard output

Last year Bob earned by selling memory sticks. During each of n days of his work one of the two following events took place:

- A customer came to Bob and asked to sell him a 2^x MB memory stick. If Bob had such a stick, he sold it and got 2^x berllars.
- Bob won some programming competition and got a 2^x MB memory stick as a prize. Bob could choose whether to present this memory stick to one of his friends, or keep it.

Bob never kept more than one memory stick, as he feared to mix up their capacities, and deceive a customer unintentionally. It is also known that for each memory stick capacity there was at most one customer, who wanted to buy that memory stick. Now, knowing all the customers' demands and all the prizes won at programming competitions during the last n days, Bob wants to know, how much money he could have earned, if he had acted optimally.

Input

The first input line contains number n ($1 \le n \le 5000$) — amount of Bob's working days. The following n lines contain the description of the days. Line `sell x` stands for a day when a customer came to Bob to buy a 2^x MB memory stick ($0 \le x \le 2000$). It's guaranteed that for each x there is not more than one line `sell x`. Line `win x` stands for a day when Bob won a 2^x MB memory stick ($0 \le x \le 2000$).

Output

Output the maximum possible earnings for Bob in berllars, that he would have had if he had known all the events beforehand. Don't forget, please, that Bob can't keep more than one memory stick at a time.

Sample test(s)

input
7 win 10 win 5 win 3 sell 5 sell 3 win 10 sell 10
output
1056

input
3 win 5 sell 6 sell 4
output
0

E. Flag 2

time limit per test: 2 seconds
memory limit per test: 128 megabytes
input: standard input
output: standard output

According to a new ISO standard, a flag of every country should have, strangely enough, a chequered field $n \times m$, each square should be wholly painted one of 26 colours. The following restrictions are set:

- In each row at most two different colours can be used.
- No two adjacent squares can be painted the same colour.

Pay attention, please, that in one column more than two different colours can be used.

Berland's government took a decision to introduce changes into their country's flag in accordance with the new standard, at the same time they want these changes to be minimal. By the given description of Berland's flag you should find out the minimum amount of squares that need to be painted different colour to make the flag meet the new ISO standard. You are as well to build one of the possible variants of the new Berland's flag.

Input

The first input line contains 2 integers n and m ($1 \le n, m \le 500$) — amount of rows and columns in Berland's flag respectively. Then there follows the flag's description: each of the following n lines contains m characters. Each character is a letter from `a` to `z`, and it stands for the colour of the corresponding square.

Output

In the first line output the minimum amount of squares that need to be repainted to make the flag meet the new ISO standard. The following n lines should contain one of the possible variants of the new flag. Don't forget that the variant of the flag, proposed by you, should be derived from the old flag with the minimum amount of repainted squares. If the answer isn't unique, output any.

Sample test(s)

input
3 4 aaaa bbbb cccc
output
6 abab baba acac

input
3 3 aba aba zzz
output
4 aba bab zbz