

Problem A. Word

Time Limit 2000 ms

Mem Limit 262144 kB

Input File stdin

Output File stdout

Vasya is very upset that many people on the Net mix uppercase and lowercase letters in one word. That's why he decided to invent an extension for his favorite browser that would change the letters' register in every word so that it either only consisted of lowercase letters or, vice versa, only of uppercase ones. At that as little as possible letters should be changed in the word. For example, the word `HoUse` must be replaced with `house`, and the word `ViP` — with `VIP`. If a word contains an equal number of uppercase and lowercase letters, you should replace all the letters with lowercase ones. For example, `maTRiX` should be replaced by `matrix`. Your task is to use the given method on one given word.

Input

The first line contains a word s — it consists of uppercase and lowercase Latin letters and possesses the length from 1 to 100.

Output

Print the corrected word s . If the given word s has strictly more uppercase letters, make the word written in the uppercase register, otherwise – in the lowercase one.

Examples

Input	Output
HoUse	house

Input	Output
ViP	VIP

Input	Output
maTRiX	matrix

Problem B. Police Recruits

Time Limit 1000 ms

Mem Limit 262144 kB

Input File stdin

Output File stdout

The police department of your city has just started its journey. Initially, they don't have any manpower. So, they started hiring new recruits in groups.

Meanwhile, crimes keeps occurring within the city. One member of the police force can investigate only one crime during his/her lifetime.

If there is no police officer free (isn't busy with crime) during the occurrence of a crime, it will go untreated.

Given the chronological order of crime occurrences and recruit hirings, find the number of crimes which will go untreated.

Input

The first line of input will contain an integer n ($1 \leq n \leq 10^5$), the number of events. The next line will contain n space-separated integers.

If the integer is -1 then it means a crime has occurred. Otherwise, the integer will be positive, the number of officers recruited together at that time. No more than 10 officers will be recruited at a time.

Output

Print a single integer, the number of crimes which will go untreated.

Examples

Input	Output
3 -1 -1 1	2

Input	Output
8 1 -1 1 -1 -1 1 1 1	1

Input	Output
11 -1 -1 2 -1 -1 -1 -1 -1 -1 -1 -1	8

Note

Lets consider the second example:

1. Firstly one person is hired.
2. Then crime appears, the last hired person will investigate this crime.
3. One more person is hired.
4. One more crime appears, the last hired person will investigate this crime.
5. Crime appears. There is no free policeman at the time, so this crime will go untreated.
6. One more person is hired.
7. One more person is hired.
8. One more person is hired.

The answer is one, as one crime (on step 5) will go untreated.

Problem C. Shaass and Oskols

Time Limit 2000 ms

Mem Limit 262144 kB

Input File stdin

Output File stdout

Shaass has decided to hunt some birds. There are n horizontal electricity wires aligned parallel to each other. Wires are numbered 1 to n from top to bottom. On each wire there are some oskols sitting next to each other. Oskol is the name of a delicious kind of birds in Shaass's territory. Supposed there are a_i oskols sitting on the i -th wire.



Sometimes Shaass shoots one of the birds and the bird dies (suppose that this bird sat at the i -th wire). Consequently all the birds on the i -th wire to the left of the dead bird get scared and jump up on the wire number $i - 1$, if there exists no upper wire they fly away. Also all the birds to the right of the dead bird jump down on wire number $i + 1$, if there exists no such wire they fly away.

Shaass has shot m birds. You're given the initial number of birds on each wire, tell him how many birds are sitting on each wire after the shots.

Input

The first line of the input contains an integer n , ($1 \leq n \leq 100$). The next line contains a list of space-separated integers a_1, a_2, \dots, a_n , ($0 \leq a_i \leq 100$).

The third line contains an integer m , ($0 \leq m \leq 100$). Each of the next m lines contains two integers x_i and y_i . The integers mean that for the i -th time Shaass shoot the y_i -th (from

left) bird on the x_i -th wire, ($1 \leq x_i \leq n$, $1 \leq y_i$). It's guaranteed there will be at least y_i birds on the x_i -th wire at that moment.

Output

On the i -th line of the output print the number of birds on the i -th wire.

Examples

Input	Output
5 10 10 10 10 10 5 2 5 3 13 2 12 1 13 4 6	0 12 5 0 16

Input	Output
3 2 4 1 1 2 2	3 0 3

Problem D. Free Ice Cream

Time Limit 2000 ms

Mem Limit 262144 kB

After their adventure with the magic mirror Kay and Gerda have returned home and sometimes give free ice cream to kids in the summer.

At the start of the day they have x ice cream packs. Since the ice cream is free, people start standing in the queue before Kay and Gerda's house even in the night. Each person in the queue wants either to take several ice cream packs for himself and his friends or to give several ice cream packs to Kay and Gerda (carriers that bring ice cream have to stand in the same queue).

If a carrier with d ice cream packs comes to the house, then Kay and Gerda take all his packs. If a child who wants to take d ice cream packs comes to the house, then Kay and Gerda will give him d packs if they have enough ice cream, otherwise the child will get no ice cream at all and will leave in distress.

Kay wants to find the amount of ice cream they will have after all people will leave from the queue, and Gerda wants to find the number of distressed kids.

Input

The first line contains two space-separated integers n and x ($1 \leq n \leq 1000$, $0 \leq x \leq 10^9$).

Each of the next n lines contains a character '+' or '-', and an integer d_i , separated by a space ($1 \leq d_i \leq 10^9$). Record "+ d_i " in i -th line means that a carrier with d_i ice cream packs occupies i -th place from the start of the queue, and record "- d_i " means that a child who wants to take d_i packs stands in i -th place.

Output

Print two space-separated integers — number of ice cream packs left after all operations, and number of kids that left the house in distress.

Examples

Input	Output
5 7 + 5 - 10 - 20 + 40 - 20	22 1

Input	Output
5 17 - 16 - 2 - 98 + 100 - 98	3 2

Note

Consider the first sample.

1. Initially Kay and Gerda have 7 packs of ice cream.
2. Carrier brings 5 more, so now they have 12 packs.
3. A kid asks for 10 packs and receives them. There are only 2 packs remaining.
4. Another kid asks for 20 packs. Kay and Gerda do not have them, so the kid goes away distressed.
5. Carrier bring 40 packs, now Kay and Gerda have 42 packs.
6. Kid asks for 20 packs and receives them. There are 22 packs remaining.

Problem E. Young Physicist

Time Limit 2000 ms

Mem Limit 262144 kB

Input File stdin

Output File stdout

A guy named Vasya attends the final grade of a high school. One day Vasya decided to watch a match of his favorite hockey team. And, as the boy loves hockey very much, even more than physics, he forgot to do the homework. Specifically, he forgot to complete his physics tasks. Next day the teacher got very angry at Vasya and decided to teach him a lesson. He gave the lazy student a seemingly easy task: You are given an idle body in space and the forces that affect it. The body can be considered as a material point with coordinates $(0; 0; 0)$. Vasya had only to answer whether it is in equilibrium. "Piece of cake" — thought Vasya, we need only to check if the sum of all vectors is equal to 0. So, Vasya began to solve the problem. But later it turned out that there can be lots and lots of these forces, and Vasya can not cope without your help. Help him. Write a program that determines whether a body is idle or is moving by the given vectors of forces.

Input

The first line contains a positive integer n ($1 \leq n \leq 100$), then follow n lines containing three integers each: the x_i coordinate, the y_i coordinate and the z_i coordinate of the force vector, applied to the body ($-100 \leq x_i, y_i, z_i \leq 100$).

Output

Print the word "YES" if the body is in equilibrium, or the word "NO" if it is not.

Examples

Input	Output
3 4 1 7 -2 4 -1 1 -5 -3	NO

Input	Output
3 3 -1 7 -5 2 -4 2 -1 -3	YES

Problem F. IQ test

Time Limit 2000 ms

Mem Limit 262144 kB

Input File stdin

Output File stdout

Bob is preparing to pass IQ test. The most frequent task in this test is to find out which one of the given n numbers differs from the others. Bob observed that one number usually differs from the others in evenness. Help Bob — to check his answers, he needs a program that among the given n numbers finds one that is different in evenness.

Input

The first line contains integer n ($3 \leq n \leq 100$) — amount of numbers in the task. The second line contains n space-separated natural numbers, not exceeding 100. It is guaranteed, that exactly one of these numbers differs from the others in evenness.

Output

Output index of number that differs from the others in evenness. Numbers are numbered from 1 in the input order.

Examples

Input	Output
5 2 4 7 8 10	3

Input	Output
4 1 2 1 1	2

You are visiting the Centre Pompidou which contains a lot of modern paintings. In particular you notice one painting which consists solely of black and white squares, arranged in rows and columns like in a chess board (no two adjacent squares have the same colour). By the way, the artist did not use the tool of problem A to create the painting.

Since you are bored, you wonder how many 8×8 chess boards are embedded within this painting. The bottom right corner of a chess board must always be white.

Input

The input contains several test cases. Each test case consists of one line with three integers n , m and c . ($8 \leq n, m \leq 40000$), where n is the number of rows of the painting, and m is the number of columns of the painting. c is always 0 or 1, where 0 indicates that the bottom right corner of the painting is black, and 1 indicates that this corner is white.

The last test case is followed by a line containing three zeros.

Output

For each test case, print the number of chess boards embedded within the given painting.

Sample Input

```
8 8 0
8 8 1
9 9 1
40000 39999 0
0 0 0
```

Sample Output

```
0
1
2
799700028
```