Problem O. Toy car

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

Kate received a present — a remote control car. The remote control has only two buttons: «+» and «-». The first button increases the car's speed by 1 cm/s, and the second one decreases it by 1 cm/s (however, if the car's speed is already equal to zero, then it remains equal to zero). Kate was playing with the car for n seconds.

Initially, the car's speed was zero, then Kate pressed one of the two buttons each second. Calculate how many centimetres the car covered over that time.

Input

The first input line contains the number n ($1 \le n \le 100$). The second line contains the sequence of buttons pressed by Kate.

Output

Print a single integer — the distance the car traveled in n seconds.

Examples

standard input	standard output
4 ++-+	6
3 ---	0
5 +---+	2

Note

In the first example, Kate first presses the «+» button, the speed of the car becomes 1, and the car travels 1 cm; then Kate presses the «+» button again, the speed of the car becomes 2, and it travels 2 cm; then Kate presses the «-» button, the speed of the car decreases to 1 and it travels 1 cm; and finally, Kate presses the «+» button again, the speed of the car becomes 2, and it travels another 2 cm. Thus, the total distance is $1 + 2 + 1 + 2 = 6$ cm.

In the second example, Kate presses only the «-» button, thus the car doesn't move anywhere.

Problem H. Secret Directive

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	256 megabytes

An undercover agent named Bames Jond is waiting for a new directive. He always receives directives via obscure and cryptic means, in order not to raise suspicion. This time, Bames Jond learned that the new directive is encoded into the latest Strall Weet Journal newspaper. Moreover, in order to decode the directive, he has to compare it with a text in another newspaper, the Yew Nork Times. Specifically, Bames Jond must take the first column from each newspaper. Within the scope of this task, a newspaper column is literally a column of words. In these texts, he has to find a column of letters, such that this column:

1. is present in both texts;
2. is the longest of all possible ones.

Consider an example:

free	play
sushi	for
on	blue
mondays	bananas

The hidden directive in these two newspaper columns is "`run`". The articles are too long to do such a task manually. Help Bames Jond decode the directive!

Input

The first line contains an integer n ($1 \le n \le 100$) — the number of words in the first text.

Each of the following n lines contains a single word — the first text.

The following line contains an integer m ($1 \le m \le 100$) — the number of words in the second text.

Each of the following m lines contains a single word — the second text.

The word length in each newspaper does not exceed 20. The words consist of lowercase English letters.

Output

Print the decoded directive. If there is more than one answer, print any of them. If there is no answer, print "`-`".

Examples

standard input	standard output
4 free sushi on mondays 4 play for blue bananas	run
1 dwarves 2 quiz job	-

Problem D. The Packer's Problem

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

You entrusted Petya, who works as a packer, with the responsible task of stacking boxes of different sizes one into another, and the instructions were the following:

- The boxes must fit into each other (the total size of the boxes lying next to each other does not exceed the size of the box in which they are put) — otherwise, they will get damaged.
- To put box B into box A, you must first open A and then open B.
- To close the box, you must first close all the boxes that are in it.
- If there are several boxes next to each other, then you need to close them in the order in which they were opened.

Petya has already ruined a lot of boxes, but you decided to give him one last chance. Check if Petya has packed the boxes correctly.

The nesting depth $d(x)$ of box x that is not inside another box is 1. The nesting depth $d(x)$ of box x that is inside box y is $d(y) + 1$. Check if Petya has packed the boxes correctly and find the maximum nesting depth among all the boxes.

Input

The first line contains a single integer n ($1 \le n \le 10\,000$) — the number of boxes.

Each of the following $2n$ lines contains a character: '`O`' (open, i.e., Petya opens the box) or '`C`' (close, i.e., Petya closes the box), and an integer s ($1 \le s \le 100\,000$), which denotes the size of the box.

Output

Print "`Well done!`" and an integer denoting the maximum nesting depth of the boxes if Petya has packed the boxes correctly, or "`You are fired!`" otherwise.

Examples

standard input	standard output
3 O 4 C 4 O 2 C 2 O 10 C 10	Good Job! 1
3 O 5 O 5 O 4 C 4 C 5 C 5	Good Job! 3
2 O 5 O 6 C 6 C 5	You are fired!
2 O 4 C 5 O 5 C 4	You are fired!

Problem G. Honest island

Input file:	`standard input`
Output file:	`standard output`
Time limit:	3 seconds
Memory limit:	256 megabytes

There are n people living on one very interesting island. Each of them is either a knight or a liar — knights always tell the truth, liars always lie. All of them know who each inhabitant of the island is.

After you arrived at this island, every resident decided to tell you some interesting fact. The i-th of them said that there are no more than a_i liars on the island.

After that, you wondered how many liars there could be on this island?

Input

The first line contains an integer n — the number of people, living on this island ($1 \le n \le 200\,000$).

The second line contains n integers $a_1, a_2, \ldots, a_n$ ($0 \le a_i \le n$) — the statements, that each of the residents made.

Output

Print a sequence of integers separated by a space — all possible variants of the number of liars on the island, in ascending order.

It is guaranteed that there is at least one correct combination of liars and knights.

Example

standard input	standard output
4 0 2 2 3	0 1 3 4

Problem J. Simple Algebra Problem

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

You are given a mathematical function $f(x)$ and a value of a. Your task is to determine if the equation $f(x) = a$ has a solution in real numbers. Although this problem may seem simple at first, be prepared for a challenge, as the function you are given is longer and much more complex than what you may have encountered in a typical algebra class.

The function is a big composition of $\exp(x)$ and $\log(x)$ functions. For a clearer understanding, refer to the examples provided.

The exponential function $\exp(x)$ or e^x raises the constant e (approximately equal to 2.718281828459045) to the power of x, while the logarithmic function $\log(x)$ gives the power to which e must be raised to obtain the value x.

Input

The first line of input contains a string that represents the given function. It is a composition of between 1 and 10^5 $\exp(x)$ and $\log(x)$ functions.

More specifically, $\exp(x)$ and $\log(x)$ are valid functions, and if $f(x)$ is a valid function, so are $\exp(f(x))$ and $\log(f(x))$.

The second line of input contains a decimal number a ($-10^9 \leq a \leq 10^9$), given with exactly two decimal places.

Output

Print "`Yes`" if $f(x) = a$ has a solution in real numbers, or "`No`" otherwise.

Examples

standard input	standard output
`exp(exp(x))` `0.50`	`No`
`log(log(exp(log(x))))` `-2.39`	`Yes`
`exp(x)` `0.00`	`No`
`exp(log(x))` `0.00`	`No`