A. Anton and Letters

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Recently, Anton has found a set. The set consists of small English letters. Anton carefully wrote out all the letters from the set in one line, separated by a comma. He also added an opening curved bracket at the beginning of the line and a closing curved bracket at the end of the line.

Unfortunately, from time to time Anton would forget writing some letter and write it again. He asks you to count the total number of distinct letters in his set.

Input
The first and the single line contains the set of letters. The length of the line doesn't exceed 1000. It is guaranteed that the line starts from an opening curved bracket and ends with a closing curved bracket. Between them, small English letters are listed, separated by a comma. Each comma is followed by a space.

Output
Print a single number — the number of distinct letters in Anton's set.

Examples

input
{a, b, c}
output
3

input
{b, a, b, a}
output
2

input
{}
output
0

B. Kolya and Tandem Repeat

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Kolya got string s for his birthday, the string consists of small English letters. He immediately added k more characters to the right of the string.

Then Borya came and said that the new string contained a *tandem repeat* of length l as a substring. How large could l be?

See notes for definition of a *tandem repeat*.

Input
The first line contains s ($1 \le |s| \le 200$). This string contains only small English letters. The second line contains number k ($1 \le k \le 200$) — the number of the added characters.

Output
Print a single number — the maximum length of the tandem repeat that could have occurred in the new string.

Examples

input
aaba 2
output
6

input
aaabbbb 2
output
6

input
abracadabra 10
output
20

Note
A tandem repeat of length $2n$ is string s, where for any position i ($1 \le i \le n$) the following condition fulfills: $s_i = s_{i+n}$.

In the first sample Kolya could obtain a string aabaab, in the second — aaabbbbbb, in the third — **abracadabrabracadabra**.

C. Borya and Hanabi

Have you ever played Hanabi? If not, then you've got to try it out! This problem deals with a simplified version of the game.

Overall, the game has 25 types of cards (5 distinct colors and 5 distinct values). Borya is holding n cards. The game is somewhat complicated by the fact that everybody sees Borya's cards except for Borya himself. Borya knows which cards he has but he knows nothing about the order they lie in. Note that Borya can have multiple identical cards (and for each of the 25 types of cards he knows exactly how many cards of this type he has).

The aim of the other players is to achieve the state when Borya knows the color and number value of each of his cards. For that, other players can give him hints. The hints can be of two types: color hints and value hints.

A color hint goes like that: a player names some color and points at all the cards of this color.

Similarly goes the value hint. A player names some value and points at all the cards that contain the value.

Determine what minimum number of hints the other players should make for Borya to be certain about each card's color and value.

Input

The first line contains integer n ($1 \le n \le 100$) — the number of Borya's cards. The next line contains the descriptions of n cards. The description of each card consists of exactly two characters. The first character shows the color (overall this position can contain five distinct letters — R, G, B, Y, W). The second character shows the card's value (a digit from 1 to 5). Borya doesn't know exact order of the cards they lie in.

Output

Print a single integer — the minimum number of hints that the other players should make.

Examples

input
2 G3 G3
output
0

input
4 G4 R4 R3 B3
output
2

input
5 B1 Y1 W1 G1 R1
output
4

Note

In the first sample Borya already knows for each card that it is a green three.

In the second sample we can show all fours and all red cards.

In the third sample you need to make hints about any four colors.

D. Andrey and Problem

Andrey needs one more problem to conduct a programming contest. He has n friends who are always willing to help. He can ask some of them to come up with a contest problem. Andrey knows one value for each of his fiends — the probability that this friend will come up with a problem if Andrey asks him.

Help Andrey choose people to ask. As he needs only one problem, Andrey is going to be really upset if no one comes up with a problem or if he gets more than one problem from his friends. You need to choose such a set of people that maximizes the chances of Andrey not getting upset.

Input

The first line contains a single integer n $(1 \leq n \leq 100)$ — the number of Andrey's friends. The second line contains n real numbers p_i $(0.0 \leq p_i \leq 1.0)$ — the probability that the i-th friend can come up with a problem. The probabilities are given with at most 6 digits after decimal point.

Output

Print a single real number — the probability that Andrey won't get upset at the optimal choice of friends. The answer will be considered valid if it differs from the correct one by at most 10^{-9}.

Examples

input
4 0.1 0.2 0.3 0.8
output
0.800000000000

input
2 0.1 0.2
output
0.260000000000

Note

In the first sample the best strategy for Andrey is to ask only one of his friends, the most reliable one.

In the second sample the best strategy for Andrey is to ask all of his friends to come up with a problem. Then the probability that he will get exactly one problem is $0.1 \cdot 0.8 + 0.9 \cdot 0.2 = 0.26$.

E. Artem and Array

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Artem has an array of n positive integers. Artem decided to play with it. The game consists of n moves. Each move goes like this. Artem chooses some element of the array and removes it. For that, he gets $min(a, b)$ points, where a and b are numbers that were adjacent with the removed number. If the number doesn't have an adjacent number to the left or right, Artem doesn't get any points.

After the element is removed, the two parts of the array glue together resulting in the new array that Artem continues playing with. Borya wondered what maximum total number of points Artem can get as he plays this game.

Input

The first line contains a single integer n ($1 \le n \le 5 \cdot 10^5$) — the number of elements in the array. The next line contains n integers a_i ($1 \le a_i \le 10^6$) — the values of the array elements.

Output

In a single line print a single integer — the maximum number of points Artem can get.

Examples

input

```
5
3 1 5 2 6
```

output

```
11
```

input

```
5
1 2 3 4 5
```

output

```
6
```

input

```
5
1 100 101 100 1
```

output

```
102
```