A - AtCoDeer and Paint Cans

Time Limit: 2 sec / Memory Limit: 256 MB

Score : 100 points

Problem Statement

AtCoDeer the deer recently bought three paint cans. The color of the one he bought two days ago is a, the color of the one he bought yesterday is b, and the color of the one he bought today is c. Here, the color of each paint can is represented by an integer between 1 and 100, inclusive.

Since he is forgetful, he might have bought more than one paint can in the same color. Count the number of different kinds of colors of these paint cans and tell him.

Constraints

- $1 \leqq a, b, c \leqq 100$

Input

The input is given from Standard Input in the following format:

```
a b c
```

Output

Print the number of different kinds of colors of the paint cans.

Sample Input 1

```
3 1 4
```

Sample Output 1

```
3
```

Three different colors: 1, 3, and 4.

Sample Input 2

```
3 3 33
```

Sample Output 2

```
2
```

Two different colors: 3 and 33.

B - Painting Balls with AtCoDeer

Time Limit: 2 sec / Memory Limit: 256 MB

Score : 200 points

Problem Statement

There are N balls placed in a row. AtCoDeer the deer is painting each of these in one of the K colors of his paint cans. For aesthetic reasons, any two adjacent balls must be painted in different colors.

Find the number of the possible ways to paint the balls.

Constraints

- $1 \leqq N \leqq 1000$
- $2 \leqq K \leqq 1000$
- The correct answer is at most $2^{31} - 1$.

Input

The input is given from Standard Input in the following format:

```
N K
```

Output

Print the number of the possible ways to paint the balls.

Sample Input 1

```
2 2
```

Sample Output 1

```
2
```

We will denote the colors by 0 and 1. There are two possible ways: we can either paint the left ball in color 0 and the right ball in color 1, or paint the left in color 1 and the right in color 0.

Sample Input 2

```
1 10
```

Sample Output 2

```
10
```

Since there is only one ball, we can use any of the ten colors to paint it. Thus, the answer is ten.

C - AtCoDeer and Election Report

Time Limit: 2 sec / Memory Limit: 256 MB

Score : 300 points

Problem Statement

AtCoDeer the deer is seeing a quick report of election results on TV. Two candidates are standing for the election: Takahashi and Aoki. The report shows the ratio of the current numbers of votes the two candidates have obtained, but not the actual numbers of votes. AtCoDeer has checked the report N times, and when he checked it for the i-th $(1 \leqq i \leqq N)$ time, the ratio was $T_i : A_i$. It is known that each candidate had at least one vote when he checked the report for the first time.

Find the minimum possible total number of votes obtained by the two candidates when he checked the report for the N-th time. It can be assumed that the number of votes obtained by each candidate never decreases.

Constraints

- $1 \leqq N \leqq 1000$
- $1 \leqq T_i, A_i \leqq 1000 (1 \leqq i \leqq N)$
- T_i and A_i $(1 \leqq i \leqq N)$ are coprime.
- It is guaranteed that the correct answer is at most 10^{18}.

Input

The input is given from Standard Input in the following format:

N
T_1 A_1
T_2 A_2
:
T_N A_N

Output

Print the minimum possible total number of votes obtained by Takahashi and Aoki when AtCoDeer checked the report for the N-th time.

Sample Input 1

```
3
2 3
1 1
3 2
```

Sample Output 1

```
10
```

When the numbers of votes obtained by the two candidates change as $2, 3 \rightarrow 3, 3 \rightarrow 6, 4$, the total number of votes at the end is 10, which is the minimum possible number.

Sample Input 2

```
4
1 1
1 1
1 5
1 100
```

Sample Output 2

```
101
```

It is possible that neither candidate obtained a vote between the moment when he checked the report, and the moment when he checked it for the next time.

Sample Input 3

```
5
3 10
48 17
31 199
231 23
3 2
```

Sample Output 3

```
6930
```

D - AtCoDeer and Rock-Paper

Time Limit: 2 sec / Memory Limit: 256 MB

Score : 300 points

Problem Statement

AtCoDeer the deer and his friend TopCoDeer is playing a game. The game consists of N turns. In each turn, each player plays one of the two *gestures*, *Rock* and *Paper*, as in Rock-paper-scissors, under the following condition:

(※) After each turn, (the number of times the player has played Paper)$\leqq$(the number of times the player has played Rock).

Each player's score is calculated by (the number of turns where the player wins) $-$ (the number of turns where the player loses), where the outcome of each turn is determined by the rules of Rock-paper-scissors.

(For those who are not familiar with Rock-paper-scissors: If one player plays Rock and the other plays Paper, the latter player will win and the former player will lose. If both players play the same gesture, the round is a tie and neither player will win nor lose.)

With his supernatural power, AtCoDeer was able to foresee the gesture that TopCoDeer will play in each of the N turns, before the game starts. Plan AtCoDeer's gesture in each turn to maximize AtCoDeer's score.

The gesture that TopCoDeer will play in each turn is given by a string s. If the i-th $(1 \leqq i \leqq N)$ character in s is g, TopCoDeer will play Rock in the i-th turn. Similarly, if the i-th $(1 \leqq i \leqq N)$ character of s in p, TopCoDeer will play Paper in the i-th turn.

Constraints

- $1 \leqq N \leqq 10^5$
- $N = |s|$
- Each character in s is g or p.
- The gestures represented by s satisfy the condition (※).

Input

The input is given from Standard Input in the following format:

```
s
```

Output

Print the AtCoDeer's maximum possible score.

Sample Input 1

```
gpg
```

Sample Output 1

```
0
```

Playing the same gesture as the opponent in each turn results in the score of 0, which is the maximum possible score.

Sample Input 2

```
ggppggggpgg
```

Sample Output 2

```
2
```

For example, consider playing gestures in the following order: Rock, Paper, Rock, Paper, Rock, Rock, Paper, Paper, Rock, Paper. This strategy earns three victories and suffers one defeat, resulting in the score of 2, which is the maximum possible score.