WOBURN CHALLENGE

2017-18 Online Round 3

Friday, March 23rd, 2018

Junior Division Problems

Automated grading is available for these problems at:
wcipeg.com

For more problems from past contests, visit:
woburnchallenge.com

Problem J1: Like, Comment, and Subscribe!

20 Points / Time Limit: 2.00s / Memory Limit: 16M *Submit online: http://wcipeg.com/problem/wc173j1*

At last, your YouTube channel is really taking off in popularity! You currently have S ($1 \le S \le 100$) subscribers (you created an alternate account to give your channel at least 1 subscription).

To reward your dedicated viewers and encourage more subscriptions, you'd like to put out a special video when your subscriber count reaches the next "milestone" quantity larger than its current value. A milestone is a power of 10 (e.g. 10, 100, 1000, 10,000, etc.). If S is already exactly equal to a power of 10, then you're interested in the next larger one.

Your subscriber count is quickly growing, and you'd like to estimate how much time you'll have to prepare your special video. As such, you'd like to determine the number of additional subscribers required to hit the next milestone count!

Input Format

The first and only line of input consists of a single integer, S.

Output Format

Output a single integer, the number of additional subscribers required to hit the next milestone.

Sample Input 1

```
6
```

Sample Output 1

```
4
```

Sample Input 2

```
10
```

Sample Output 2

```
90
```

Sample Explanation 2

In the first case, the next milestone is 10 subscribers, which you'll hit after gaining another 4 subscribers.
In the second case, the next milestone is 100 subscribers.

Problem J2: Certified Fresh

24 Points / Time Limit: 2.00s / Memory Limit: 16M *Submit online: http://wcipeg.com/problem/wc173j2*

A new science fiction psychological thriller action-comedy film, *The Codefather*, is being released this weekend! You'd love to go see it, but you'll first need to convince your friends that it'll be good. Fortunately, trusted movie review websites such as Rotten Tomatoes exist for this purpose!

Following its release in theatres, *The Codefather* will receive a series of N ($1 \le N \le 100$) reviews from certified Rotten Tomatoes critics, one after another. The i-th review will either be positive (if R_i = "P") or negative (if R_i = "N").

At any given point in time after its first review, each movie on Rotten Tomatoes is considered to have a certain Tomatometer score. This score is a real number, computed as the number of positive reviews received so far divided by the total number of reviews received so far.

You're concerned that *The Codefather*'s final Tomatometer score may end up not being too high, as general audiences may not grasp its subtle competitive programming-driven writing. However, if you keep refreshing its Rotten Tomatoes page as new reviews come in, maybe you can catch a point in time at which it has a higher score, and take a screenshot of it to show to your friends! Determine the maximum Tomatometer score which *The Codefather* will reach at any point after its first review.

Your answer must have at most most 10^{-5} absolute or relative error compared to the judge's answer to be considered correct.

Input Format

The first line of input consists of a single integer, N.
N lines follow, the i-th of which consists of a single character, R_i, for $i = 1..N$.

Output Format

Output a single real number, the maximum Tomatometer score achieved by *The Codefather*.

Sample Input

```
7
N
P
N
P
P
N
P
```

Sample Output

```
0.6
```

Sample Explanation

After the first 5 reviews, *The Codefather* has received 3 positive reviews and 2 negative ones, resulting in a Tomatometer score of 3 / 5 = 0.6. This is the largest score that it achieves at any point in time.

Problem J3: Uncrackable

24 Points / Time Limit: 2.00s / Memory Limit: 16M *Submit online: http://wcipeg.com/problem/wc173j3*

You'd like to register an account on an extremely entertaining website. You've already selected a username, but it seems that the requirements for choosing a password are quite strict, in order to completely protect your account from being hacked into. The password must be a string between 8 and 12 characters long (inclusive), such that every character is either a lowercase letter ("a".."z"), uppercase letter ("A".."Z"), or digit ("0".."9"). Furthermore, it must contain at least three lowercase letters, at least two uppercase letters, and at least one digit.

You've got a potential password in mind, a non-empty string made up of at most 100 characters, each of which is a lowercase letter, uppercase letter, or digit. Rather than entering the password into the site and risking rejection, you'd like to determine for yourself whether or not your password would validly satisfy all of the rules.

Input Format

The first and only line of input consists of a single string, the password.

Output Format

Output a single string, either "Valid" if the password is valid, or "Invalid" otherwise.

Sample Input 1

```
PassW0rd
```

Sample Output 1

```
Valid
```

Sample Input 2

```
CorrectHorseBatteryStaple
```

Sample Output 2

```
Invalid
```

Sample Explanations

In the first case, the password has 8 characters, with 5 lowercase letters, 2 uppercase letters, and 1 digit, meaning that all of the rules are satisfied.

In the second case, the password has two issues – it's more than 12 characters long, and it doesn't contain at least one digit.

Problem J4: Meme Generator

32 Points / Time Limit: 2.00s / Memory Limit: 16M *Submit online: http://wcipeg.com/problem/wc173j4*

As part of your internship at a popular meme generation site, you've been tasked with implementing a new ASCII art feature!

You're given a grid of non-whitespace characters with R rows and C columns ($5 \le R, C \le 100$), representing a meme image. The user will then be able to specify two pieces of custom text to overlay onto the image, near its top and bottom edges, in order to enhance its comedic effect.

The user will first specify a non-empty string T with length no greater than $C - 2$. Each of its characters will be either an uppercase letter or an underscore, and it will neither start nor end with an underscore. This string should be laid on top of the image in the second row from the top, and horizontally centered. If it can't be perfectly centered (for example, if its length is odd while C is even), then it should instead be placed slightly to the left, as close to centered as possible. Underscores should be omitted, allowing the original image's characters to show through at those locations instead.

Finally, the user will specify a non-empty string B with the same constraints as T. It should similarly be laid on top of the image in the second row from the bottom, and horizontally centered.

Your task is to generate the resulting R×C image after both strings T and B have been laid on top of it, and give it back to the user, so that they can go post it on various social media platforms and obtain millions of well-deserved upvotes for their original, creative comedic content.

Input Format

The first line of input consists of two space-separated integers, R and C.
R lines follow, the i-th of which consists of C characters representing the i-th row of the image grid, for $i = 1..R$.
The next line consists of a single string, T.
The next line consists of a single string, B.

Output Format

Output R lines with C characters per line, the i-th of which should be the i-th row of the updated image grid.

Sample Explanation

Much ASCII.

Sample Input

```
17 28
........._.............__...
........|+\.........../++|..
........|__\______.../+++|..
......./==========\_/++++|..
....._/=============\++++|..
..._/================\_++|..
../===/#\==============\_|..
..|==\##/====/##\========\..
.|===========\##/=========\.
.|=================++++====|
|====####=========++++++===|
|===|####=========++++++===|
|===\###___/======++++++===|
|==================++++====|
.|========================|.
..\=======================|.
...\=====================/..
VERY_ART
WOW
```

Sample Output

```
........._.............__...
........|+VERY.ART..../++|..
........|__\______.../+++|..
......./==========\_/++++|..
....._/=============\++++|..
..._/================\_++|..
../===/#\==============\_|..
..|==\##/====/##\========\..
.|===========\##/=========\.
.|=================++++====|
|====####=========++++++===|
|===|####=========++++++===|
|===\###___/======++++++===|
|==================++++====|
.|========================|.
..\=========WOW===========|.
...\=====================/..
```