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A Directi Educational Initiative

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K-good Words   Problem Code: **KGOOD**   Submit (/submit/KGOOD)

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Chef Al Gorithm was reading a book about climate and oceans when he encountered the word "**glaciological**". He thought it was quite curious, because it has the following interesting property: For every two letters in the word, if the first appears **x** times and the second appears **y** times, then **|x - y| ≤ 1**.

Chef Al was happy about this and called such words **1-good** words. He also generalized the concept: He said a word was **K-good** if *for every two letters in the word, if the first appears **x** times and the second appears **y** times, then |x - y| ≤ K*.

Now, the Chef likes **K**-good words a lot and so was wondering: Given some word **w**, how many letters does he have to remove to make it **K**-good?

Input

The first line of the input contains an integer **T** denoting the number of test cases. The description of **T** test cases follows.

Each test case consists of a single line containing two things: a word **w** and an integer **K**, separated by a space.

Output

For each test case, output a single line containing a single integer: the minimum number of letters he has to remove to make the word **K**-good.

Constraints

- **1 ≤ T ≤ 30**
- **1 ≤ |w| ≤ 10^5**
- **0 ≤ K ≤ 10^5**
- **w** contains only lowercase English letters.

Example

```
Input:
4
glaciological 1
teammate 0
possessions 3
defenselessness 3

Output:
0
0
1
2
```

Explanation

Example case 1. The word "**glaciological**" is already 1-good, so the Chef doesn't have to remove any letter.

Example case 2. Similarly, "**teammate**" is already 0-good.

Example case 3. The word "**possessions**" is 4-good. To make it 3-good, the Chef can remove the last **s** to make "**possession**".

Example case 4. The word "**defenselessness**" is 4-good. To make it 3-good, Chef AI can remove an **s** and an **e** to make, for example, "**defenslesness**". Note that the word doesn't have to be a valid English word.

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CodeChef (http://www.codechef.com) - A Platform for Aspiring Programmers

CodeChef was created as a platform to help programmers make it big in the world of algorithms, **computer programming** and **programming contests**. At CodeChef we work hard to revive the geek in you by hosting a **programming contest** at the start of the month and another smaller programming challenge in the middle of the month. We also aim to have training sessions and discussions related to **algorithms**, **binary search**, technicalities like **array size** and the likes. Apart from providing a platform for **programming competitions**, CodeChef also has various algorithm tutorials and forum discussions to help those who are new to the world of **computer programming**.

Practice Section (https://www.codechef.com/problems/easy) - A Place to hone your 'Computer Programming Skills'

Try your hand at one of our many practice problems and submit your solution in a language of your choice. Our **programming contest** judge accepts solutions in over 35+ programming languages. Preparing for coding contests were never this much fun! Receive points, and move up through the CodeChef ranks. Use our practice section to better prepare yourself for the multiple **programming challenges** that take place through-out the month on CodeChef.

Compete (https://www.codechef.com/problems/easy) - Monthly Programming Contests and Cook-offs

Here is where you can show off your **computer programming skills**. Take part in our 10 day long monthly coding contest and the shorter format Cook-off **coding contest**. Put yourself up for recognition and win great prizes. Our **programming contests** have prizes worth up to INR 20,000 (for Indian Community), $700 (for Global Community) and lots more CodeChef goodies up for grabs.

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Online IDE (https://www.codechef.com/ide)	Easy (https://www.codechef.com/problems/easy)
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Domain Registration in India (http://www.bigrock.in/) and Web Hosting (http://www.bigrock.com/web-hosting/) powered by BigRock