Problem C. String

Input file:	`input.txt`
Output file:	`output.txt`
Time limit:	1 second
Memory limit:	256 mebibytes

The Research Institute of the Given Strings (RIGS) is investigating a new method of infinite string construction.

Initially there is an empty string $S_0^{(k)} = \varepsilon$. Each next version of the string is created in the following way. The current version of the string is repeated k times, and an arbitrary symbol is inserted between every two consecutive occurences. The same number k is used for the construction of all versions, however, the inserted symbols may differ. This construction ultimately results in the infinite string $S_\infty^{(k)}$.

To illustrate, let's consider the series of strings ($k = 3$):

$$S_0^{(3)} = \varepsilon(\text{empty})$$
$$S_1^{(3)} = \mathbf{rt} \qquad (S_1^{(3)} = \boxed{\varepsilon}\mathbf{r}\boxed{\varepsilon}\mathbf{t}\boxed{\varepsilon})$$
$$S_2^{(3)} = \boxed{rt}\mathbf{x}\boxed{rt}\mathbf{r}\boxed{rt}$$
$$S_3^{(3)} = \boxed{rtxrtrrt}\mathbf{a}\boxed{rtxrtrrt}\mathbf{r}\boxed{rtxrtrrt}$$
$$\dots$$
$$S_\infty^{(3)} = rtxrtrrtartxrtrrtrrtxrtrrtzrtxrtrrtartxrt\dots$$

Given a string A of length n, which is the prefix of $S_\infty^{(k)}$, find the minimal k, for which this is possible.

In other words, your task is to find the minimal k, for which it is possible to construct a string $S_\infty^{(k)}$ in a way described above, so that it will have A as a prefix.

Input

Each input file contains several tests. The first line of the file contains a single integer T — the number of tests. Then T lines follow; each line describes a single test. The tests are nonempty and contain only lowercase Latin letters.

The number of tests does not exceed 10^5. The sum of lengths of all the tests in the file does not exceed 10^6.

Output

The output file must contain exactly T lines. Each line must contain the minimal value of k for the corresponding test.

Example

input.txt	output.txt
2 abacabab rtxrtrrtartxrtrrtrrtxrt	2 3