Problem F
Finding RPS Strategy

Rock-paper-scissors is a game that everyone knows. A game consists of at least two players. Each player simultaneously chooses one of three shapes: rock, paper, or scissors. Rock beats scissors, scissors beats paper, and paper beats rock. If two players choose the same shape, it's a tie and neither wins nor loses.

Loc has just developed a rock-paper-scissors game on the computer and now he wants to test his game. Loc and the computer will play n rounds of rock-paper-scissors. Knowing the algorithm that the computer will use, Loc can predict the shape that the computer will choose for all n rounds. However, after working on the game all day, Loc is very tired. He doesn't want to make too many decisions during the test, so he will choose a number $k > 1$, and for every k consecutive rounds, Loc will choose only one shape. Specifically:

- In rounds $1, 2, \ldots, k$, Loc will choose the same shape.
- In rounds $k + 1, k + 2, \ldots, 2 \cdot k$, Loc will choose the same shape.
- $\ldots$
- In the last $(n \bmod k)$ rounds, Loc will choose the same shape.

Given the list of all shapes that the computer will choose, help Loc choose the number $k > 1$ such that the total number of rounds that Loc can win is **maximized**. If there are multiple possible values of k, find the **largest** possible value of k so that Loc does not need to make a lot of decisions.

Input

The first line contains an integer t ($1 \le t \le 10\,000$) – the number of test cases. The description of each test case is as follows.

The first and only line of each test case consists of a string s ($2 \le |s| \le 200\,000$, $s_i \in \{\texttt{"R"}, \texttt{"P"}, \texttt{"S"}\}$) – the shapes that the computer will choose in n rounds.

- If $s_i = \texttt{"R"}$, the computer will choose rock in round i;
- If $s_i = \texttt{"P"}$, the computer will choose paper in round i;
- If $s_i = \texttt{"S"}$, the computer will choose scissors in round i.

It is guaranteed that the total length of the given strings in all test cases does not exceed $200\,000$.

Output

For each test case, print a single integer which is the value of $k > 1$ that helps Loc win as many rounds as possible. If there are multiple valid answers, print the **largest** answer.

Sample explanation

In the first example, the computer will have the sequence of shapes as "RRRPPS". The sequence of shapes that Loc can have is "PPPSSS".

Player	Sequence of shapes	Number of winning rounds
Computer	R R R P P S	0
Loc	P P P S S S	5

In the second example, Loc can choose $k = 8$ with the sequence of shapes "PPPPPPPPR"

Player	Sequence of shapes	Number of winning rounds
Computer	R R S R R P R R S	1
Loc	P P P P P P P P R	7

Loc can also choose $k = 2$ with the sequence of shapes "PPRRSSPPR" and still win 7 rounds. However, $k = 2$ is not the maximum answer found.

Sample Input 1	Sample Output 1
3 RRRPPS RRSRRPRRS RPSRPSRPS	3 8 4