Spin & Rotate!

Input file:	*standard input*
Output file:	*standard output*
Time limit:	2 seconds
Memory limit:	512 mebibytes

There is a large square $ABCD$ (vertices are listed in counterclockwise order). In each of its vertices, there is a peg. There are also two long ropes, one connecting vertices A and B and the other one connecting vertices C and D. Each peg pins its rope end to the ground. The ropes can stretch and contract indefinitely, but they should never leave the area above the square. Initially, the ropes are *unentangled*: that is, if one shrinks them enough, then one of them lies along one of the sides of the square while the other one lies along the opposite side of the square.

There is a robot called Ka-BAN which can execute two instructions:

- spin, denoted as `S`: all four ends of the ropes are detached from the pegs, spun 90° counterclockwise around the vertical axis, keeping all the entanglement between the ropes, and reattached to the new pegs. Alternatively, one can also illustrate this operation as if the square, pegs, and ropes stay still, but instead the names of the vertices spin 90° clockwise.
  - the new name of vertex A is B;
  - the new name of vertex B is C;
  - the new name of vertex C is D;
  - the new name of vertex D is A;

  For the purposes of this problem, these two operations are equivalent.
- rotate, denoted as `R`: Ka-BAN detaches ropes from pegs A and D, swaps them, and reattaches them back. During the swap, the rope end initially attached to A is passed over the rope end initially attached to D. If one stands outside the square near the side AD and observes this process, it looks like the end A and end D rotate 180° around each other counterclockwise.

You have a string of letters "`S`" and "`R`" which is a program executed by Ka-BAN: the instructions were performed one by one from left to right. Unfortunately, after this process, the square and ropes seem like an incomprehensible mess. To fix that, you bought a new robot Iz-BAN. When you read the manual, you got unpleasantly surprised: Iz-BAN had the same set of two instructions as Ka-BAN! That meant that the unentanglement promised to be difficult: even though any spin can be undone with three more spins, there seemed to be no easy way to undo a rotate.

Nevertheless, it can be proven that these two operations are enough to fix the situation! Given the program executed by Ka-BAN, write the shortest program for Iz-BAN such that, after the execution of this program, the ropes again become unentangled.

Input

The first line contains an integer T, the number of test cases ($1 \le T \le 300\,000$).

Each of the next T lines contains one string s consisting of letters "`S`" and "`R`": the program executed by Ka-BAN ($1 \le |s| \le 300\,000$). The sum of the lengths of strings among all test cases does not exceed 300 000.

Output

For each test case, print one line consisting of letters "`S`" and "`R`": the shortest program that can be given to Iz-BAN to unentangle the ropes. If the ropes are already unentangled, print one letter "`S`" instead. It can be proven that the answer always exists and is unique.

Examples

standard input	*standard output*
14 R S RR SR RS SS RRR SRR RSR SSR RRS SRS RSS SSS	SR S SRSRR S R S SRSRRSRR S S SR RSRR S SR S
5 SRRSRRSRR SRRRSRRR RRRSRRRSRRR SRRSRRSRRSRRSRRSRRSRRSRRSRRSR SRRRSRRRSRRRSRRRSRRRSRRRSRRRS	SRSRRR SRSRRSRR SRSRRSRRRSRRRSRR SRRRRRRRRR RSRRSRRRSRRRSRRRSRRRSRRRSRR