Problem 1. Shortest Path

You are lost in the dark walking home. Luckily, you have a map for the shortest path available to your house. Well, sort of a map, you have turn directions. The only possible directions for each turn are straight (written with "S"), left (written with "L") and right ("written with "R"). So the map looks like the following: LSRLRSRLLR, which means – take left turn, straight, right turn, left turn, right turn, straight, right turn, left turn, left turn, right turn and you are home. Well… at least looked like that during the last century, because now the map is quite old and some of symbols cannot be read from it (written with "*"). For example you may have LR**SR*LL, which means – take left turn, right turn, all directions are possible, all directions are possible, straight, right turn, all directions are possible, left turn, left turn and you are home. Every "*" can be either "S", "L" or "R". Your task is to find all possible different paths, which can be formed from the partial map.

Input

The input data should be read from the console.

On the first and only input line there will be the partial map as sequence of "**S**", "**L**", "**R**" and "*****".

The input data will always be valid and in the format described. There is no need to check it explicitly.

Output

The output data should be printed on the console.

On the first output line, print the number of possible different paths.

On the next output lines, print every possible different path (each on separate line), sorted alphabetically.

Constraints

- The length of the map will be maximum 16 symbols, inclusive.
- Allowed working time for your program: 0.1 seconds. Allowed memory: 16 MB.

Examples

Input	Output
LSLLRSRL	1 LSLLRSRL
R*S*L	9 RLSLL RLSRL RLSSL RRSLL RRSRL RRSSL RSSLL RSSRL RSSSL
**RLR*	27

	LLRLRL LLRLRR LLRLRS LRRLRL LRRLRR LRRLRS LSRLRL LSRLRR LSRLRS RLRLRL RLRLRR RLRLRS RRRLRL RRRLRR RRRLRS RSRLRL RSRLRR RSRLRS SLRLRL SLRLRR SLRLRS SRRLRL SRRLRR SRRLRS SSRLRL SSRLRR SSRLRS