



	Problem B	Input: Standard Input Output: Standard Output	
	Bracket Sequence		

You are given a bracket sequence **B**. The bracket sequence may contain 4 types of brackets:

1. Round brackets (or)
2. Curly brackets { or }
3. Square brackets [or]
4. Angle brackets < or >

For each position in the bracket sequence **B**, you need to output the length of the longest balanced contiguous bracket sequence starting from (and including) that particular position.

Formally, a bracket sequence **T** is balanced if-

- **T** is empty
- **T** is **(P)**, **[P]**, **{P}**, **<P>** where **P** is a balanced bracket sequence
- **T** is **PQ** where **P** and **Q** are balanced bracket sequences.

For example, for **B = (<>)><**, the answer is "4 2 0 0 0".

Input

First line of the input will contain a single positive integer **T** ($T \leq 10$) denoting the number of test cases. Hence **T** cases follow. Each case is a single line of non-empty bracket sequence, containing only **8** types of characters (,), {, }, [,], <, >. Each of these bracket sequences will not contain more than 10^5 characters.

If it helps, most of the judge data is produced randomly. First a random bracket sequence (not necessarily balanced) of certain length is generated. Say it is **X**. Then we change **X** by replacing some substring of it with a random balanced bracket sequence several times.

Output

For each test case, output case number (no trailing space after **Case x:**), followed by the answers in separate line. There is **NO** empty line between cases. For details, please see the sample.



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Sample Input

Output for Sample Input

5 () <> (<>)× () {[[]}	Case 1: 2 0 Case 2: 2 0 Case 3: 4 2 0 0 0 0 Case 4: 4 0 2 0 Case 5: 0 0 0 0
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