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0s, 1s and ? Marks

Input: Standard Input
Output: Standard Output



Given a string consisting of **0**, **1** and **?** only, change all the **?** to **0/1**, so that the size of the largest group is minimized. A group is a substring that contains either all zeros or all ones.

Consider the following example:

0 1 1 ? 0 1 0 ? ? ?

We can replace the question marks (?) to get

0 1 1 0 0 1 0 1 0 0

The groups are (0) (1 1) (0 0) (1) (0) (1) (0 0) and the corresponding sizes are 1, 2, 2, 1, 1, 1, 2. That means the above replacement would give us a maximum group size of 2. In fact, of all the 2^4 possible replacements, we won't get any maximum group size that is smaller than 2.

Input

The first line of input is an integer **T** ($T \leq 5000$) that indicates the number of test cases. Each case is a line consisting of a string that contains '0', '1', and '?' only. The length of the string will be in the range [1,1000].

Output

For each case, output the case number first followed by the size of the minimized largest group.

Sample Input

Output for Sample Input

4	Case 1: 2
011?010???	Case 2: 1
???	Case 3: 3
000111	Case 4: 14
00000000000000	