Problem D. Mystery Square

This contest is open for practice. You can try every problem as many times as you like, though we won't keep track of which problems you solve. Read the Quick-Start Guide to get started.

Small input 10 points	Solve D-small
Large input 31 points	Solve D-large

Problem

I have written down a large perfect square in binary, and then replaced some of the digits with question marks. Can you figure out what my original number was?

Input

The first line of the input gives the number of test cases, **T**. **T** test cases follow, one per line. Each line contains **S**: a perfect square written in binary, but with some of the digits replaced by question marks.

Output

For each test case, output one line containing "Case #x: **N**", where x is the case number (starting from 1) and **N** is a perfect square written in binary, obtained by replacing each '?' character in **S** with either a '0' character or a '1' character.

Limits

1 ≤ **T** ≤ 25.
S begins with '1'.
S contains only the characters '0', '1', and '?'.
In every test case, there is exactly one possible choice for **N**.

Small dataset

S is at most 60 characters long.
S contains at most 20 '?' characters.

Large dataset

S is at most 125 characters long.
S contains at most 40 '?' characters.

Sample

Input	Output
3 1??? 1 10??110??00??1000??	Case #1: 1001 Case #2: 1 Case #3: 10111101100001000 01