1080 – Binary Simulation

Given a binary number, we are about to do some operations on the number. Two types of operations can be here.

'I i j' which means invert the bit from **i** to **j** (inclusive)
'Q i' answer whether the **i^{th}** bit is 0 or 1

The MSB (most significant bit) is the first bit **(i.e. i=1)**. The binary number can contain leading zeroes.

Input

Input starts with an integer **T (≤ 10)**, denoting the number of test cases.

Each case starts with a line containing a binary integer having length **n ($1 \le n \le 10^5$)**. The next line will contain an integer **q (1 ≤ q ≤ 50000)** denoting the number of queries. Each query will be either in the form **'I i j'** where **i, j** are integers and **1 ≤ i ≤ j ≤ n**. Or the query will be in the form **'Q i'** where **i** is an integer and **1 ≤ i ≤ n**.

Output

For each case, print the case number in a single line. Then for each query **'Q i'** you have to print 1 or 0 depending on the **i^{th}** bit.

Sample Input	Output for Sample Input
2 0011001100 6 I 1 10 I 2 7 Q 2 Q 1 Q 7 Q 5 1011110111 6 I 1 10 I 2 7 Q 2 Q 1 Q 7 Q 5	Case 1: 0 1 1 0 Case 2: 0 0 0 1

Note

Dataset is huge, use faster i/o methods.