D. Has Anyone Seen Harry?

Score: 1

CPU: 5s
Memory: 1120MB

Harry is given a binary string **A** of **N (1<=N<=100000)** length and **Q (1<=Q<=100000)** queries. Queries are of two types:

1. **0 x** - toggle the x th character of the string
2. **1 x y z** - print 1 if `A[x...x+z-1] == A[y...y+z-1]` , 0 otherwise.

The string is indexed from 0 to N - 1.

Input:

Input starts with an integer T (≤ 20), denoting the number of test cases.

Each case contains two integers **N (1 ≤ N ≤ 100000)** and **Q (1 ≤ Q ≤ 100000)** . Next line contain the string **A** . Each of the next Q lines contains a task in one of the following form:

0 x (0≤x≤N-1)

1 x y z (0 ≤ x,y ≤ N-1)

It is guaranteed that input are valid.

Output:

For each case, print the case number first. Then for each query '1 x y z', print the desired answer. See sample testcase for clarification.

Sample

Input	Output
1 11 3 10000100100 1 0 5 5 0 8 1 0 5 5	Case 1: 0 1

`A[i...j]` means substring of A starting from ith index and ended in j th index inclusive.

Dataset is huge. Use faster i/o methods.