Graph

Given an undirected graph with **n** nodes and **m** weighted edges, every node having one of two colors - black (denoted as 0) and white (denoted as 1). You are to perform **q** operations of two kinds:

1. **C** x: Change the *x*-th node´s color. A black node should be changed into a white node, and vice versa.
2. **Q** A B: Find the sum of weight of edges whose two end points of color A and B. A and B can be either 0 or 1.

Input

The first line contains two integers **n** (1<=**n**<=10^5) and **m**(1<=**m**<= 10^5) specified above.

The second line contains **n** integers, the *i*-th of which represents the color of the *i*-th node, 0 for black and 1 for white.

The following **m** lines represent edges. Each line has three integer u, v and w(1<=u, v<=n, u!=v), indicating there is an edge of weight w between u and v. w fits into 32-bit signed integer.

The next line contains only one integer **q**(1<=**q**<= 10^5), the number of operations.

The following **q** lines - operations mentioned above. See samples for detailed format.

Output

For each **Q** query, print one line containing the desired answer.See samples for detailed format.

Example

Input:
4 3
0 0 0 0
1 2 1
2 3 2
3 4 3
4
Q 0 0
C 2
Q 0 0
Q 0 1

Output:
6
3
3

Input:
4 3
0 1 0 0
1 2 1
2 3 2

```
3 4 3
4
Q 0 0
C 3
Q 0 0
Q 0 1
```

Output:
```
3
0
4
```

This problem has a somewhat strict source limit and time limit.