You have n boxes in a line on the table numbered $1 \ldots n$ from left to right. Your task is to simulate 4 kinds of commands:

- 1 X Y: move box X to the left to Y (ignore this if X is already the left of Y)

- 2 X Y: move box X to the right to Y (ignore this if X is already the right of Y)

- 3 X Y: swap box X and Y

- 4: reverse the whole line.

Commands are guaranteed to be valid, i.e. X will be not equal to Y.

For example, if $n = 6$, after executing 1 1 4, the line becomes 2 3 1 4 5 6. Then after executing 2 3 5, the line becomes 2 1 4 5 3 6. Then after executing 3 1 6, the line becomes 2 6 4 5 3 1. Then after executing 4, then line becomes 1 3 5 4 6 2

Input

There will be at most 10 test cases. Each test case begins with a line containing 2 integers n, m $(1 \le n, m \le 100,000)$. Each of the following m lines contain a command.

Output

For each test case, print the sum of numbers at odd-indexed positions. Positions are numbered 1 to n from left to right.

Sample Input

```
6 4
1 1 4
2 3 5
3 1 6
4
6 3
1 1 4
2 3 5
3 1 6
100000 1
4
```

Sample Output

```
Case 1: 12
Case 2: 9
Case 3: 2500050000
```