Problem D: Counting Oranges in Orange County

Filename: *oranges*
Time limit: *12 seconds*

Orange County is named after the fruit that so readily grows here!

UCF has decided to start a large Orange Grove to help with revenue. We can model the grove as a row of n trees from left to right, numbered 1 to n. Initially, tree i has o_i oranges.

At various times, UCF would like to know the number of oranges on the trees with numbers in between i and j, inclusive, where $1 \leq i \leq j \leq n$.

Of course, over time, changes can occur. Ripe oranges could be picked from a given tree (to be sold), reducing the number of oranges on that tree. Also, new oranges could grow on a given tree.

Finally, the math department would like to know how many of the trees with numbers in between i and j, inclusive, where $1 \leq i \leq j \leq n$, have a prime number of oranges on it. (Yeah, those faculty are weird!)

The Problem

Write a program to read in the initial number of oranges on each tree, process modifications to the number of oranges on trees, and handle queries on ranges of trees indicating the total number of oranges on the trees in the range AND the number of those trees with a prime number of oranges.

The Input

The first line of input will contain a single positive integer, c ($c \leq 6$), representing the number of input cases to process. Treat each input case independently. Each of the input cases follow.

The first line of each input case will contain two positive integers, n ($1 \leq n \leq 10^5$), representing the number of trees in the grove for the input case data and q ($1 \leq q \leq 2 \times 10^5$), the number of queries/modifications to handle on the trees.

The next line will have n space-separated integers, $o_1, o_2, \ldots o_n$, the number of oranges on tree number 1, 2, etc. ($1 \leq o_i \leq 10^6$).

The following q lines will each of the q operations/queries, in the order that they occur. If the first number on one of these lines is 1, this indicates an operation either adding or subtracting some oranges from a given tree. If this first number on one of these lines is 2, this represents a query. If a 1 is in a line, this is followed by two integers: t ($1 \leq t \leq n$), and d ($0 < |d| \leq 10^5$), indicating that tree number t will add d number of oranges. (Note: if d is negative, this indicates that tree number t got oranges picked from it and has fewer oranges after the operation.) If a 2 is on one of these lines, this is followed by two integers i ($1 \leq i \leq n$), and j ($i \leq j \leq n$), indicating that the query is for the range of trees start at tree i and ending at tree j, inclusive. **It is guaranteed that no tree will ever have more than 10^7 oranges on it at any point in time and the number of oranges on each tree will never be negative.**

The Output

For each input query, on a line by itself, output two integers separated by a space: the total number of oranges on the trees designated in the query, and the number of trees with a prime number of trees within the range of trees designated in the query.

Sample Input

```
2
6 5
2 4 5 7 3 2
2 2 5
1 2 9
2 1 5
1 6 -1
2 1 6
10 6
1 2 3 4 5 6 7 8 9 10
1 1 6
2 1 3
2 4 10
1 4 -3
2 1 4
2 4 8
```

Sample Output

```
19 3
30 5
31 5
12 3
49 2
13 3
27 2
```