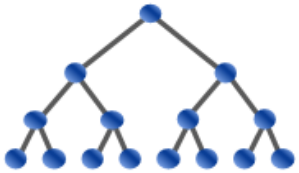

USACO 2023 December Contest, Gold
Problem 3. Haybale Distribution

Return to Problem List

Contest has ended.

Submitted; Results below show the outcome for each judge test case

1	2	3	4	5	6	7	8	9	10	11	12
* 34.0mb 23ms	* 34.0mb 23ms	* 35.7mb 24ms	* 41.2mb 28ms	* 41.1mb 28ms	* 41.2mb 28ms	* 49.2mb 126ms	* 49.2mb 127ms	* 49.2mb 127ms	* 49.2mb 128ms	* 49.2mb 128ms	* 49.2mb 127ms

13	14	15	16
* 49.2mb 128ms	* 49.2mb 127ms	* 49.2mb 127ms	* 49.2mb 128ms

English (en)

Farmer John is distributing haybales across the farm!

Farmer John's farm has N ($1 \le N \le 2 \cdot 10^5$) barns, located at integer points $x_1, \ldots, x_N$ ($0 \le x_i \le 10^6$) on the number line. Farmer John's plan is to first have N shipments of haybales delivered to some integer point y ($0 \le y \le 10^6$) and then distribute one shipment to each barn.

Unfortunately, Farmer John's distribution service is very wasteful. In particular, for some a_i and b_i ($1 \le a_i, b_i \le 10^6$), a_i haybales are wasted per unit of distance left each shipment is transported, and b_i haybales are wasted per unit of distance right each shipment is transported. Formally, for a shipment being transported from point y to a barn at point x, the number of haybales wasted is given by

$$\begin{cases} a_i \cdot (y - x) & \text{if } y \ge x \\ b_i \cdot (x - y) & \text{if } x > y \end{cases}.$$

Given Q ($1 \le Q \le 2 \cdot 10^5$) independent queries each consisting of possible values of (a_i, b_i), please help Farmer John determine the fewest amount of haybales that will be wasted if he chooses y optimally.

INPUT FORMAT (pipe stdin):

The first line contains N.

The next line contains $x_1 \ldots x_N$.

The next line contains Q.

The next Q lines each contain two integers a_i and b_i.

OUTPUT FORMAT (pipe stdout):

Output Q lines, the ith line containing the answer for the ith query.

SAMPLE INPUT:

```
5
1 4 2 3 10
4
1 1
2 1
1 2
1 4
```

SAMPLE OUTPUT:

```
11
13
18
30
```

For example, to answer the second query, it is optimal to select $y = 2$. Then the number of wasted haybales is equal to $2(2-1) + 2(2-2) + 1(3-2) + 1(4-2) + 1(10-2) = 1 + 0 + 1 + 2 + 8 = 13$.

SCORING:

- Input 2: $N, Q \leq 10$
- Input 3: $N, Q \leq 500$
- Inputs 4-6: $N, Q \leq 5000$
- Inputs 7-16: No additional constraints.

Problem credits: Benjamin Qi

Contest has ended. No further submissions allowed.

Previous Submissions:

Sun, Dec 17, 2023 03:15:20 EST (C++11)