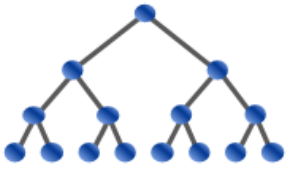
USA Computing Olympiad



USACO 2024 US Open Contest, Platinum
Problem 2. Splitting Haybales

Return to Problem List

Contest has ended.

Log in to allow submissions in analysis mode

English (en)

Farmer John wants to fairly split haybales between his two favorite cows Bessie and Elsie. He has N ($1 \leq N \leq 2 \cdot 10^5$) haybales sorted in non-increasing order, where the i-th haybale has a_i units of hay ($2 \cdot 10^5 \geq a_1 \geq a_2 \geq \cdots \geq a_N \geq 1$).

Farmer John is considering splitting a contiguous range of haybales $a_l, \ldots, a_r$ between Bessie and Elsie. He has decided to process the haybales in order from l to r, and when processing the i-th haybale he will give it to the cow who currently has less hay (if it is a tie, he will give it to Bessie).

You are given Q ($1 \leq Q \leq 2 \cdot 10^5$) queries, each with three integers l, r, x ($1 \leq l \leq r \leq N$, $|x| \leq 10^9$). For each query, output how many more units of hay Bessie will have than Elsie after processing haybales l to r, if Bessie starts with x more units than Elsie. Note that this value is negative if Elsie ends up with more haybales than Bessie.

INPUT FORMAT (input arrives from the terminal / stdin):

First line contains N.

Second line contains $a_1 \ldots a_N$.

Third line contains Q.

Next Q lines contain l, r, x.

OUTPUT FORMAT (print output to the terminal / stdout):

Output Q lines, containing the answer for each query.

SAMPLE INPUT:

```
2
3 1
15
1 1 -2
1 1 -1
1 1 0
1 1 1
1 1 2
1 2 -2
1 2 -1
1 2 0
1 2 1
1 2 2
2 2 -2
2 2 -1
2 2 0
2 2 1
2 2 2
```

SAMPLE OUTPUT:

```
1
2
3
-2
-1
0
1
2
-1
0
-1
0
1
0
```

1

For the 1st query, Elsie starts with 2 more hay than Bessie. Then, after processing haybale 1, Bessie will receive 3 hay, and Bessie will have 1 more hay than Elsie.

For the 3rd query, Elsie and Bessie start with the same number of hay. After processing haybale 1, Bessie will receive 3 hay, and Bessie will have 3 more hay than Elsie.

For the 9th query, Bessie starts with 1 more hay than Elsie, then after processing the 1st haybale, has 2 less hay than Elsie, and after processing the 2nd haybale, has 1 less hay than Elsie.

SAMPLE INPUT:

```
5
4 4 3 1 1
7
1 1 20
1 2 20
1 5 20
1 1 0
1 5 0
1 4 0
3 5 2
```

SAMPLE OUTPUT:

```
16
12
7
4
1
2
1
```

In the 5th query, there are 5 haybales to process. Bessie receives 4 hay, then Elsie receives 4 hay, then Bessie receives 3 hay, then Elsie receives 1 hay, then Elsie receives 1 hay.

SCORING:

- Input 3: $Q \leq 100$
- Inputs 4-6: At most 100 distinct a_i
- Inputs 7-22: No additional constraints.

Problem credits: Benjamin Qi

Contest has ended. No further submissions allowed.