Road Trip

There are n cities in HackerLand. The cities are numbered from 1 to n. There is a directed road from i to $i+1$ $(1 \leq i < n)$ with length w_i kilometer.

If you arrive at i^{th} city, you will get g_i liter gasoline as a present. Also you can buy some gasoline by spending p_i dollars for each liter.

The tank of your car has infinite capacity. Your car spends 1 liter gasoline for each kilometer.

You will be given q queries. For each query, you will be given x_i and y_i and you have to print the minimum price of the road trip from city x_i to city y_i.

Note: It's fine if your car runs out of gasoline in a city but not on a road.

Input Format

The first line contains the number of cities n and the number of queries q.

Next line contains $n-1$ integers where the i^{th} element denotes w_i which is the length of the road from i to $i+1$.

Each of the next n line contains 2 integers g_i and p_i.

Each of the next q line contains a query x_i and y_i.

Constraints

- $1 \leq n, q \leq 2 \times 10^5$
- $1 \leq w_i \leq 10^6$
- $1 \leq g_i, p_i \leq 10^6$
- $1 \leq x_i \leq y_i \leq n$

Subtask

- $1 \leq n, q \leq 10000$ for 40% of max score

Output Format

For each query, print the minimum price on a new line.

Sample Input

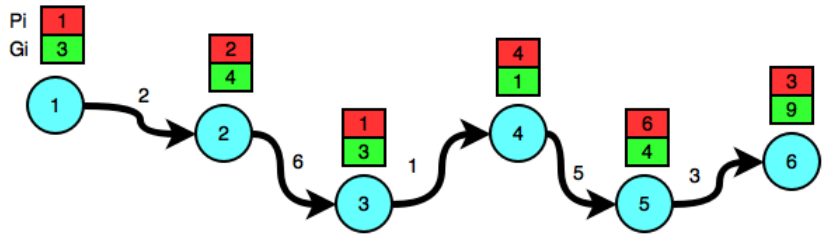
```
6 4
2 6 1 5 3
3 1
4 2
3 1
1 4
4 6
9 3
2 5
1 6
3 5
4 6
```

Sample Output

```
6
3
```

```
2
16
```

Explanation



Let's consider the first query; you are in city 2, and you will go to city 5.

- In city 2, you will get 4 liters of gasoline as present, and you will buy 2 liters by spending $2 \times 2 = 4$ dollars. Now you have 6 liters of gasoline.
- When you arrive at city 3 you will be out of gasoline. You will get 3 liters as present, and you will buy 2 liters by spending $2 \times 1 = 2$ dollars. Now you have 6 liters of gasoline which are enough to reach the fifth city.

So you have to spend total $4 + 2 = 6$ dollars.