Overcycle

The Nightlight failed to reach the fabled *Darkroom*, and now *The Logician* rules Gotham. To prevent *The Nightlight* from fighting crime, *The Logician* has made sweeping changes to Gotham's N suburbs. Suburb names have been outlawed, and now suburbs must be referred to by their unique index from 1 to N. Additionally, all but $N-1$ roads have been demolished. The ith surviving road connects suburbs i and $i+1$ bidirectionally and takes d_i minutes to traverse.

The Nightlight is unphased and has a new plan. She will use her network of spies to secretly build shortcuts, known as *Overcycles*, to allow her to quickly travel Gotham and defeat *The Logician* once and for all. In particular, *The Nightlight* will build $A+B$ *Overcycles*:

- The first A *Overcycles* begin at suburb 1. The ith such *Overcycle* connects suburbs 1 and x_i bidirectionally, and takes k_i minutes to traverse.
- The other B *Overcycles* begin at suburb N. The ith such *Overcycle* connects suburbs N and y_i bidirectionally, and takes l_i minutes to traverse.

The Nightlight is planning for Q scenarios. In the ith scenario, she begins in suburb s_i and needs to travel to suburb t_i. You must compute the length (in minutes) of the shortest route from s_i to t_i using any combination of roads and *Overcycles*. Good luck, Gotham is counting on you.

Subtasks and Constraints

For all subtasks:

- $2 \leq N \leq 200\,000$.
- $1 \leq Q \leq 200\,000$.
- $0 \leq A, B \leq 100\,000$.
- $1 \leq d_i, k_i, l_i \leq 1\,000\,000\,000$ for all i.
- $1 < x_i \leq N$ for all i.
- $1 \leq y_i < N$ for all i.
- $1 \leq s_i < t_i \leq N$ for all i.

Additional constraints for each subtask are given below.

Subtask	Points	Additional constraints
1	10	$A = 0$ and $B = 0$.
2	20	$N, Q, A, B \leq 1\,000$.
3	15	$B = 0$ and $A \leq 10$.
4	10	$B = 0$.
5	30	$d_i = 1$, $k_i = 1$, and $l_i = 1$ for all i.
6	15	No additional constraints.

Input

- The first line of input contains the integer N.
- The next line contains $N-1$ integers $d_1, d_2, \ldots, d_{N-1}$.
- The next line of input contains the integer A.
- The next A lines describe the first A *Overcycles*. The ith line contains two integers x_i and k_i.
- The next line contains the integer B.
- The next B lines describe the other B *Overcycles*. The ith line contains two integers y_i and l_i.
- The next line contains the integer Q.

- The next Q lines describe the scenarios. The ith line contains two integers s_i and t_i.

Output

Output Q lines, each with a single integer. The ith line should contain the length (in minutes) of the shortest route from suburb s_i to t_i.

Note: Your solution may involve integers which are large. Consider using 64-bit integers ('long long' in C++) in your solution.

Sample Input 1

```
5
3 1 2 4
0
0
3
1 5
2 3
3 5
```

Sample Output 1

```
10
1
6
```

Sample Input 2

```
5
2 8 2 2
1
5 1
1
3 5
2
1 5
2 3
```

Sample Output 2

```
1
7
```

Explanation

In the first sample case, there are $Q = 3$ scenarios:

- In the first scenario, *The Nightlight* travels from suburb 1 to suburb 5. She can use roads to travel $1 \to 2 \to 3 \to 4 \to 5$ for a total of $3 + 1 + 2 + 4 = 10$ minutes.
- In the second scenario, *The Nightlight* travels from suburb 2 to suburb 3. She can use one road to travel $2 \to 3$ in 1 minute.
- In the third scenario, *The Nightlight* travels from suburb 3 to suburb 5. She can use roads to travel $3 \to 4 \to 5$ for a total of $2 + 4 = 6$ minutes.

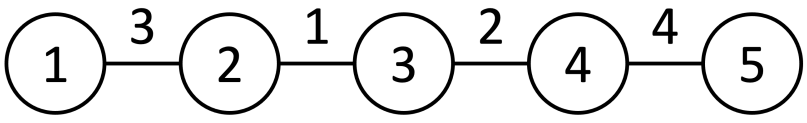

Figure 1: Sample Case 1

In the second sample case, there are $Q = 2$ scenarios:

- In the first scenario, *The Nightlight* travels from suburb 1 to suburb 5. She can use an *Overcycle* to directly travel from suburb 1 to 5 in 1 minute.
- In the second scenario, *The Nightlight* travels from suburb 2 to suburb 3. She can use a mixture of roads and *Overcycles* to travel $2 \to 1 \to 5 \to 4 \to 3$ for a total of $2 + 1 + 2 + 2 = 7$ minutes.

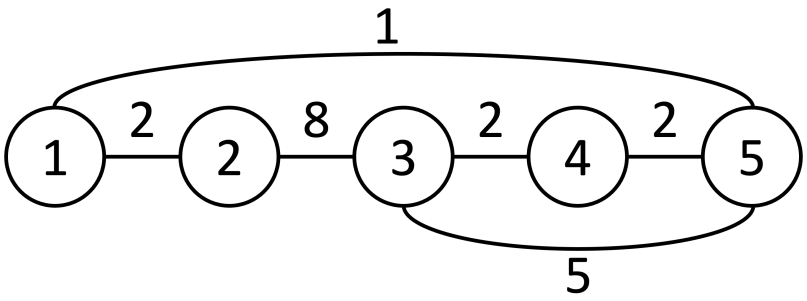

Figure 2: Sample Case 2