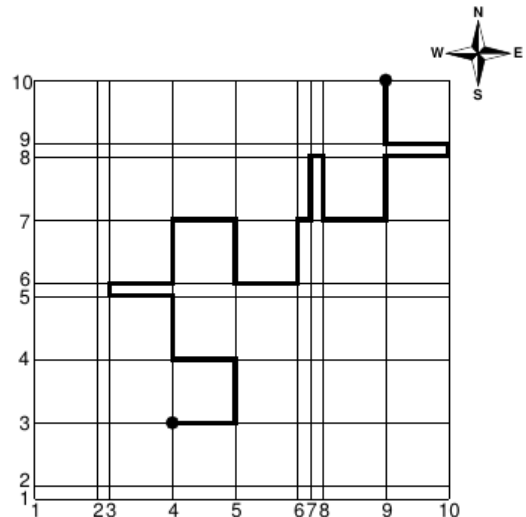


8199 Linearville

The city of Linearville has N parallel two-way streets going in the West-East direction and N parallel two-way streets going in the South-North direction, making up a grid with $(N-1) \times (N-1)$ blocks. The distance between two consecutive parallel streets is either 1 or 5. The Linearville Transit Authority is conducting an experiment and now requires all cars to always follow a path that alternates direction between W-E and S-N at every crossing, meaning they must turn either left or right when reaching a crossing. The LTA is developing a new navigation app and needs your help to write a program to compute the lengths of shortest alternating paths between many pairs of start and target crossings. The alternating path in the figure, as an example for $N = 10$, is clearly not a shortest alternating path. But beware! Linearville may be huge.



Input

The input file contains several test cases, each of them as described below.

The first line contains an integer N ($2 \leq N \leq 10^5$) representing the number of streets in each direction. For each direction, the streets are identified by distinct integers from 1 to N starting at the S-W corner of the city. The second line contains $N-1$ integers D_1, D_2, \dots, D_{N-1} ($D_i \in \{1, 5\}$ for $i = 1, 2, \dots, N-1$) indicating the distances between consecutive streets going S-N (that is, D_i is the distance between street i and street $i+1$). The third line contains $N-1$ integers E_1, E_2, \dots, E_{N-1} ($E_i \in \{1, 5\}$ for $i = 1, 2, \dots, N-1$) indicating the distances between consecutive streets going W-E (that is, E_i is the distance between street i and street $i+1$). The fourth line contains an integer Q ($1 \leq Q \leq 10^5$) representing the number of shortest path queries. Each of the next Q lines describes a query with four integers A_X, A_Y, B_X and B_Y ($1 \leq A_X, A_Y, B_X, B_Y \leq N$), indicating that the start crossing is (A_X, A_Y) and the target crossing is (B_X, B_Y) ; the values A_X and B_X are streets going S-N while the values A_Y and B_Y are streets going W-E. There are no repeated queries.

Output

For each test case, output Q lines, each line with an integer indicating the length of a shortest alternating path for the corresponding query of the input.

Sample Input

```

10
5 1 5 5 5 1 1 5 5
1 5 5 5 1 5 5 1 5
3
4 3 9 10
9 2 2 9
5 1 5 10
5

```

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

Sample Output

```
46
50
49
23
0
```