

## 7469 Distance on Triangulation

You have a convex polygon. The vertices of the polygon are successively numbered from 1 to  $n$ . You also have a triangulation of this polygon, given as a list of  $n - 3$  diagonals.

You are also given  $q$  queries. Each query consists of two vertex indices. For each query, find the shortest distance between these two vertices, provided that you can move by the sides and by the given diagonals of the polygon, and the distance is measured as the total number of sides and diagonals you have traversed.

### Input

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

The first line of the input file contains an integer  $n$  — the number of vertices of the polygon ( $4 \leq n \leq 50000$ ).

Each of the following  $n - 3$  lines contains two integers  $a_i, b_i$  — the ends of the  $i$ -th diagonal ( $1 \leq a_i, b_i \leq n, a_i \neq b_i$ ).

The next line contains an integer  $q$  — the number of queries ( $1 \leq q \leq 100000$ ).

Each of the following  $q$  lines contains two integers  $x_i, y_i$  — the vertices in the  $i$ -th query ( $1 \leq x_i, y_i \leq n$ ).

It is guaranteed that no diagonal coincides with a side of the polygon, and that no two diagonals coincide or intersect.

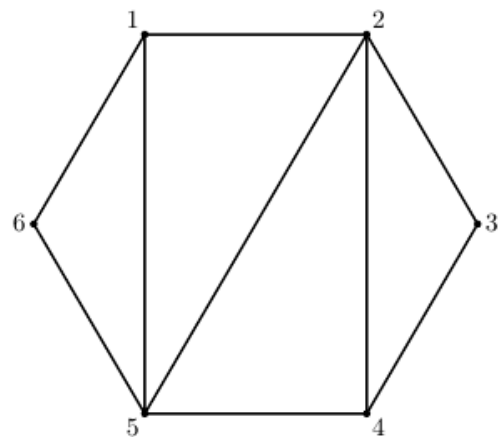
### Output

For each test case, print for each query a line containing the shortest distance.

**Note:** The figure on the right is the polygon of the case from the sample input.

### Sample Input

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



### Sample Output

```
2
1
1
3
0
```