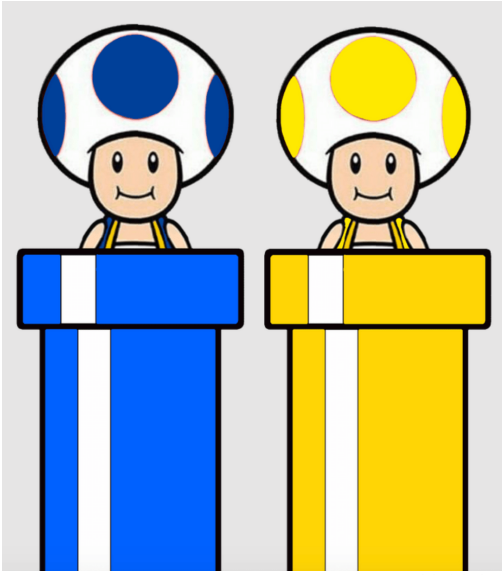
Toads

Problem ID: toads



Toads in their pipes

There are N Toads in the Mushroom Kingdom, and they have been tasked with building a network of pipes between their houses to facilitate quick travel throughout the kingdom. Each Toad i (numbered from 1 to N) chooses another Toad $j \neq i$ and builds a pipe connecting their houses bidirectionally; this pipe takes t_i time to cross in either direction. Captain Toad wants all Toads to be able to reach each other quickly enough, so he might build a few additional pipes between various pairs of houses.

After all pipes are built, Captain Toad wants to check how quickly Toads can travel between houses, so he asks you Q queries consisting of two Toads a and b. For each query, you must figure out the minimum time required to go from Toad a's house to Toad b's house.

Input

The first line of input contains a single integer N ($2 \leq N \leq 10^5$), the number of Toads.

N lines follow representing each Toad's pipe. The i-th of these lines contains two space-separated integers j ($1 \leq j \leq N$, $j \neq i$) and t_i ($1 \leq t_i \leq 10^9$), representing that Toad i's pipe connects their house to Toad j's house and takes t_i time to cross.

The next line contains a single integer L ($0 \leq L \leq 7$), representing the number of additional pipes built by Captain Toad.

The next L lines each contain three space-separated integers x, y, t ($1 \leq x, y \leq N$, $x \neq y$, $1 \leq t \leq 10^9$), representing a pipe built by Captain Toad between Toad x's house and Toad y's house that takes t time to cross in either direction. It is possible that Captain Toad builds a pipe between two houses that already had a pipe between them (the new pipe may even take longer to cross), but he will not build multiple pipes between the same two houses.

The next line of input contains a single integer Q ($1 \leq Q \leq 10^5$), the number of queries.

Finally, Q lines follow representing each of Captain Toad's queries. Each line contains two space-separated integers a and b ($1 \leq a, b \leq N$, $a \neq b$), representing the two Toads for each query.

Output

Output Q lines representing the answers to the queries: for each query, output the minimum time required to go from one house to the other, or -1 if there is no path between the two houses.

Sample Input 1	Sample Output 1
5 3 3 4 2 4 1 5 4 2 7 1 5 3 4 3 1 3 2 5 1 5	3 6 7

Sample Input 2

```
6
2 1
3 1
1 1
5 1
6 1
4 1
2
3 4 4
2 6 7
3
1 3
1 4
2 6
```

Sample Output 2

```
1
5
6
```

Sample Input 3

```
6
2 1
3 1
1 1
5 1
6 1
4 1
0
2
1 3
1 4
```

Sample Output 3

```
1
-1
```