OCC '19 S6 - City Tolls

bruce has recently been teleported to a strange new world. Here violence is common and the world has been split into tiny city-states. As such, to enter each city **bruce** will have to pay a certain entrance fee. Moreover, the only safe way to move through this world is through the roads which connect the cities. However, because cities are very careful, each city will be connected to at most 5 other cities. **bruce** being new to this world, and thinking ahead, has Q queries for you to calculate the danger of the least dangerous path from city a_i to city b_i. Because **bruce** would not like to be robbed, he wants to pay as little as possible at each city to not seem rich. As such, **bruce** defines the danger of a path as the largest entrance fee that he will have to pay on that path.

Note: For each query, **bruce** will start at city a_i and as such will not need to pay the entrance fee of city a_i.

Constraints

$2 \leq N \leq 10^5$

$1 \leq M, Q \leq 10^5$

$1 \leq a_i, b_i \leq N$

$a_i \neq b_i$

$1 \leq v_i \leq 10^9$

Each city will be connected to at most 5 other cities.

No city will have a road to itself, and there will only be at max one road between any two cities.

Subtask 1 [15%]

$2 \leq N \leq 10^3$

$1 \leq M, Q \leq 10^3$

Subtask 2 [30%]

The road network will always be a tree.

Subtask 3 [55%]

No additional constraints.

Input Specification

The first line of input contains N, M, and Q representing the number of cities, roads, and queries respectively.

The next line contains N integers v_i indicating the entrance cost of each city.

The next M lines contain two integers a_i and b_i denoting a road from city a_i to b_i.

The next Q lines contain two integers a_i and b_i requesting the danger of the least dangerous path from city a_i to city b_i.

Output Specification

For each query a_i, b_i, output the danger of the least dangerous path from city a_i to city b_i, and if there is no valid path, output `-1`.

Sample Input

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

Sample Output

```
5
4
4
1
-1
```

Explanation

One of the least dangerous paths from city 1 to city 4 is $1 \to 3 \to 4$ paying entrance fees of 2 and 5 for cities 3 and 4 respectively, and having a danger of 5.

One of the least dangerous paths from city 5 to city 3 is $5 \to 1 \to 3$ paying entrance fees of 4 and 2 for cities 1 and 3 respectively, and having a danger of 4.

One of the least dangerous paths from city 2 to city 3 is $2 \rightarrow 1 \rightarrow 3$ paying entrance fees of 4 and 2 for cities 1 and 3 respectively, and having a danger of 4.

One of the least dangerous paths from city 1 to city 5 is $1 \rightarrow 5$ paying an entrance fee of 1 for city 5, and having a danger of 1.

There is no valid path from city 1 to city 6, thus the output is `-1`.