# Antivirus

Input file: `standard input`
Output file: `standard output`
Time limit: 2 seconds
Memory limit: 1024 megabytes

*In the introduction to network flow, the teacher had barely begun explaining when their pet chicken figured out how to solve the problem. The teacher exclaimed: Our avian flu is amazing!*

—Roasted-chicken

Hyrule is entering the flu season.

Hyrule consists of $n$ cities, which are connected by $m$ **directed** roads. The capital (city numbered 1) can be reached from all cities through these roads.

The flu season will last for $q$ days. On the $i$-th day at noon, the flu virus will start spreading from city $a_i$. The virus will spread along the roads to other cities. The virus spreads very quickly, so it can be assumed that all cities reachable from $a_i$ will be infected immediately. As the capital city of Hyrule, city 1 is crucial for the whole country. If the virus that starts spreading on the $i$-th day reaches the capital, there will be an economic loss cost of $b_i$.

To prevent the virus from spreading, Auru can deploy a virus filter in a city each night (including the night before the first day). Deploying a virus filter in city $i$ has a deployment cost of $c_i$. The virus cannot spread through the city equipped with a virus filter, and that city will also remain uninfected. If the virus were to start spreading from a city equipped with a virus filter, the virus would simply disappear without infecting any cities. The deployed virus filter remains effective until Auru deploys a new filter in another city. (In other words, there can be at most one virus filter at a time.)

Auru wants to know: for each $i = 1, 2, \ldots, q$, considering only the viruses in the first $i$ days, what is the minimum value of "economic loss cost + deployment cost".

## Input

Each test file contains multiple test cases. The first line contains the number of test cases $T$ ($1 \le T \le 10^4$). The description of the test cases follows.

The first line contains three integers $n$, $m$, and $q$ ($2 \le n \le 10^5$, $n - 1 \le m \le 2 \times 10^5$, $1 \le q \le 10^5$), representing the number of cities, the number of roads, and the duration of the flu season in days, respectively.

In the next $m$ lines, each contains two integers $u_i$ and $v_i$ ($1 \le u_i, v_i \le n$), representing a **directed** road from city $u_i$ to city $v_i$. It is guaranteed that there are no self-loops, but **there may be multiple edges** between cities. The capital can be reached from all cities.

The next line contains $n$ integers $c_1, c_2, \ldots, c_n$ ($1 \le c_i \le 10^9$), representing the deployment cost of the virus filter in each city.

In the following $q$ lines, the $i$-th one contains two integers $a_i$ and $b_i$ ($2 \le a_i \le n$, $1 \le b_i \le 10^9$), indicating the city where the virus starts to spread on the $i$-th day and the economic loss cost if the virus reaches the capital.

For each test file, it is guaranteed that the sum of $n$ over all test cases does not exceed $10^5$, the sum of $m$ over all test cases does not exceed $2 \times 10^5$, and the sum of $q$ over all test cases does not exceed $10^5$.

## Output

For each test case, output a line containing $n$ integers, where the $i$-th integer represents the minimum value of the "economic loss cost + deployment cost" when only considering the viruses in the first $i$ days.

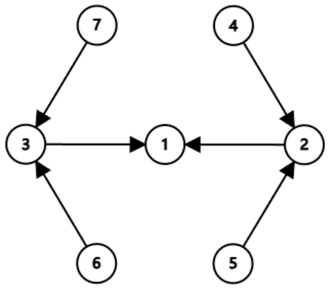
## Example

| standard input | standard output |
|---|---|
| 3<br>7 6 4<br>2 1<br>3 1<br>4 2<br>5 2<br>6 3<br>7 3<br>4 3 5 2 2 1 1<br>4 2<br>5 2<br>6 2<br>7 2<br>5 6 4<br>1 3<br>3 2<br>2 1<br>4 2<br>5 4<br>2 5<br>10000 10000 2 100 5<br>5 1000<br>4 1000<br>3 1000<br>4 1000<br>4 4 1<br>2 1<br>3 1<br>4 2<br>4 3<br>100 1 1 100<br>4 10 | 2 3 4 4<br>5 100 102 202<br>10 |

## Note

In the first test case:

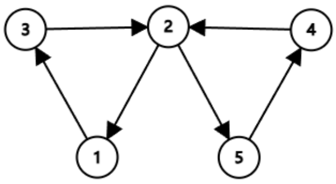
- The minimum cost after day 1 is 2: on night 0, deploy a virus filter in city 4 with a deployment cost of 2.
- The minimum cost after day 2 is 3: on night 0, deploy a virus filter in city 2 with a deployment cost of 3.
- The minimum cost after day 3 is 4: on night 0, deploy a virus filter in city 2 with a deployment cost of 3; on night 2, deploy a virus filter in city 6 with a deployment cost of 1.
- The minimum cost after day 4 is 4: on night 0, deploy a virus filter in city 1 with a deployment cost of 4.




Example 1 Illustration

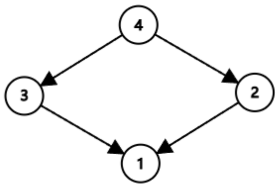
In the second test case:

- The minimum cost after day 1 is 5: on night 0, deploy a virus filter in city 5 with a deployment cost of 5.
- The minimum cost after day 2 is 100: on night 0, deploy a virus filter in city 4 with a deployment cost of 100.
- The minimum cost after day 3 is 102: on night 0, deploy a virus filter in city 4 with a deployment cost of 100; on night 2, deploy a virus filter in city 3 with a deployment cost of 2.
- The minimum cost after day 4 is 202: on night 0, deploy a virus filter in city 4 with a deployment cost of 100; on night 2, deploy a virus filter in city 3 with a deployment cost of 2; on night 3, deploy a virus filter in city 4 again with a deployment cost of 100.




Example 2 Illustration

In the third test case, since only one virus filter can exist at a time, it is not possible to stop the virus from spreading by deploying virus filters in both cities 2 and 3. The deployment costs for cities 1 and 4 are higher than the economic loss cost caused by the virus, so no virus filter is deployed, and the minimum cost is 10 (economic loss cost).




Example 3 Illustration