Two Currencies

There are N cities in JOI Kingdom, numbered from 1 to N. There are $N-1$ roads in JOI Kingdom, numbered from 1 to $N-1$. The road i ($1 \leq i \leq N-1$) connects the city A_i and the city B_i bi-directionally. It is possible to travel from any city to any other city by passing through some of the roads.

There are checkpoints on some of the roads in JOI Kingdom. There are M checkpoints, numbered from 1 to M. The checkpoint j ($1 \leq j \leq M$) is located on the road P_j. In order to pass through it, you need to pay either one gold coin or C_j silver coins.

There are Q citizens in JOI Kingdom, numbered from 1 to Q. The citizen k ($1 \leq k \leq Q$) has X_k gold coins and Y_k silver coins, and wants to travel from the city S_k to the city T_k. Since gold coins are valuable, all the citizens want to keep as many gold coins as possible.

Write a program which, given information of the cities, the roads, the checkpoints, and the citizens in JOI Kingdom, for each k ($1 \leq k \leq Q$), determines whether it is possible for the citizen k to travel from the city S_k to the city T_k, and, if it is possible, calculates the maximum possible number of gold coins the citizen k can keep.

Input

Read the following data from the standard input.

N M Q
A_1 B_1
A_2 B_2
$\vdots$
A_{N-1} B_{N-1}
P_1 C_1
P_2 C_2
$\vdots$
P_M C_M
S_1 T_1 X_1 Y_1
S_2 T_2 X_2 Y_2
$\vdots$
S_Q T_Q X_Q Y_Q

Output

Write Q lines to the standard output. In the k-th line ($1 \leq k \leq Q$), if the citizen k can travel from the city S_k to the city T_k, output the maximum possible number of gold coins the citizen k can keep. Otherwise, output -1 in the k-th line.

Constraints

- $2 \leq N \leq 100\,000$.
- $1 \leq M \leq 100\,000$.
- $1 \leq Q \leq 100\,000$.
- $1 \leq A_i \leq N$ $(1 \leq i \leq N-1)$.
- $1 \leq B_i \leq N$ $(1 \leq i \leq N-1)$.
- It is possible to travel from any city to any other city by passing through some of the roads.
- $1 \leq P_j \leq N-1$ $(1 \leq j \leq M)$.
- $1 \leq C_j \leq 10^9$ $(1 \leq j \leq M)$.
- $1 \leq S_k \leq N$ $(1 \leq k \leq Q)$.
- $1 \leq T_k \leq N$ $(1 \leq k \leq Q)$.
- $S_k \neq T_k$ $(1 \leq k \leq Q)$.
- $0 \leq X_k \leq 10^9$ $(1 \leq k \leq Q)$.
- $0 \leq Y_k \leq 10^{18}$ $(1 \leq k \leq Q)$.
- Given values are all integers.

Subtasks

1. (10 points) $N \leq 2\,000$, $M \leq 2\,000$, $Q \leq 2\,000$.
2. (28 points) $C_1 = C_2 = \cdots = C_M$.
3. (30 points) $A_i = i$, $B_i = i + 1$ $(1 \leq i \leq N-1)$.
4. (32 points) No additional constraints.

Sample Input and Output

Sample Input 1	Sample Output 1
5 4 3 1 2 1 3 2 4 2 5 2 9 2 4 3 5 4 7 3 4 2 11 5 3 4 5 2 3 1 1	1 2 -1

The citizen 1 can travel from the city 3 to the city 4 as follows. After the travel, the citizen 1 keeps one gold coin.

1. The citizen 1 travels from the city 3 to the city 1 by passing through the road 2. There are the checkpoints 1, 2 on the road 2. The citizen 1 pays one gold coin at the checkpoint 1 and passes through it, and 4 silver coins at the checkpoint 2 and passes through it, respectively. After that, the citizen 1 keeps one gold coin and 7 silver coins.
2. The citizen 1 travels from the city 1 to the city 2 by passing through the road 1. Since there is no checkpoint on the road 1, the citizen 1 keeps one gold coin and 7 silver coins.
3. The citizen 1 travels from the city 2 to the city 4 by passing through the road 3. There is the checkpoint 3 on the road 3. The citizen 1 pays 5 silver coins at the checkpoint 3 and passes through it. After that, the citizen 1 keeps one gold coin and 2 silver coins.

Since it is impossible for the citizen 1 to travel by finally keeping more than or equal to 2 gold coins, output 1 in the first line.

The citizen 2 can travel from the city 5 to the city 3 as follows. After the travel, the citizen 2 keeps two gold coins.

1. The citizen 2 travels from the city 5 to the city 2 by passing through the road 4. There is the checkpoint 4 on the road 4. The citizen 2 pays one gold coin at the checkpoint 4 and passes through it. After that,

the citizen 2 keeps 3 gold coins and 5 silver coins.

2. The citizen 2 travels from the city 2 to the city 1 by passing through the road 1. Since there is no checkpoint on the road 1, the citizen 2 keeps 3 gold coins and 5 silver coins.
3. The citizen 2 travels from the city 1 to the city 3 by passing through the road 2. On the road 2, there are the checkpoints $1, 2$. The citizen 2 pays one gold coin at the checkpoint 1 and passes through it, and 4 silver coins at the checkpoint 2 and passes through it, respectively. After that, the citizen 2 keeps 2 gold coins and one silver coin.

Since it is impossible for the citizen 2 to travel by finally keeping more than or equal to 3 gold coins, output 2 in the second line.

Since it is impossible for the citizen 3 to travel from the city 2 to the city 3, output -1 in the third line.

This sample input satisfies the constraints of Subtasks $1, 4$.

Sample Input 2	Sample Output 2
10 7 9 1 8 6 3 5 9 7 9 3 1 3 4 10 1 2 6 5 6 9 4 7 4 7 4 2 4 7 4 7 4 1 4 8 6 5 3 3 9 8 0 4 7 6 15 7 4 9 3 6 4 8 0 9 10 5 16 5 3 2 4 2 8 4 3 6 1 3 3	3 6 6 7 7 3 1 2 2

This sample input satisfies the constraints of Subtasks 1, 2, 4.

Sample Input 3	Sample Output 3
8 7 11 1 2 2 3 3 4 4 5 5 6 6 7 7 8 4 4 3 7 2 10 5 2 4 1 4 4 5 6 6 3 7 69 7 1 5 55 3 1 6 8 8 2 5 45 4 6 4 45 6 1 3 33 2 1 0 19 3 7 2 31 7 1 2 31 7 2 4 58 8 3 5 63	7 5 5 5 4 2 0 2 1 4 5

This sample input satisfies the constraints of Subtasks 1, 3, 4.

Sample Input 4	Sample Output 4
8 7 11 1 8 1 4 3 1 3 6 6 7 2 1 5 2 5 5 5 8 4 7 6 6 4 1 6 4 1 7 4 7 2 18 2 4 5 1 4 2 1 32 1 5 7 21 2 5 0 50 8 4 4 33 1 7 6 16 4 8 7 18 1 2 8 13 5 4 10 42 7 1 6 40	1 3 1 7 0 4 5 7 8 10 6

This sample input satisfies the constraints of Subtasks 1, 4.