WC '18 Finals S5 - Opening Weekend

Time limit: 3.5s **Memory limit:** 256M

Woburn Challenge 2018-19 Finals Round - Senior Division

At last, the time has come for months of hard work to finally pay off — the cows' and monkeys' production is hitting the big screen this weekend!

It will be playing at movie theatres in N $(2 \leq N \leq 400\,000)$ different cities, numbered from 1 to N in increasing order of their theatres' quality. There are $N-1$ roads running amongst these cities, the i-th of which allows vehicles to drive in either direction between cities A_i and B_i $(1 \leq A_i, B_i \leq N, A_i \neq B_i)$. However, each road also passes through a tunnel which imposes a limit on the heights of vehicles which may drive along it — in particular, a vehicle may only travel along the i-th road if its height is at most L_i cm $(1 \leq L_i \leq 10^9)$. It's possible for a 1 cm-high vehicle (if such a thing exists) to travel from any city to any other city by following a sequence of roads.

There are K $(1 \leq K \leq 400\,000)$ moviegoers who have been waiting anxiously to see the film, with the i-th one living in city C_i $(1 \leq C_i \leq N)$ and driving a vehicle with a height of H_i cm $(1 \leq H_i \leq 10^9)$. However, they won't necessarily settle for watching the film in their own cities — they're prepared to drive wherever it takes to get the best possible movie-watching experience! However, they're also not great at planning ahead, so each moviegoer will follow this simple procedure:

1. They'll consider both their current city and all cities they can directly reach from that city (by driving along a single road whose tunnel their vehicle can fit through), and find the one with the highest-quality movie theatre (the largest city number).
2. If that largest-numbered city is their current city, they'll stop to watch the film there.
3. Otherwise, they'll drive to that largest-numbered city, and repeat the procedure from step 1.

The Head Monkey and Bo Vine want to make sure that each theatre has enough seats available for its screening — nobody should be left out from witnessing their masterpiece! In order to help estimate audience sizes, determine which city each of the K moviegoers will end up stopping at to watch the film.

Subtasks

In test cases worth $5/34$ of the points, $N \leq 2\,000$ and $K \leq 2\,000$.
In test cases worth another $12/34$ of the points, each city has at most two roads directly adjacent to it.

Input Specification

The first line of input consists of two space-separated integers, N and K.
$N-1$ lines follow, the i-th of which consists of three space-separated integers, A_i, B_i, and L_i, for $i = 1 \ldots (N-1)$.
K lines follow, the i-th of which consists of two space-separated integers, C_i and H_i, for $i = 1 \ldots K$.

Output Specification

Output K lines, the i-th of which should consist of a single integer, the city at which moviegoer i will stop to watch the film, for $i = 1 \ldots K$.

Sample Input

```
3 3
1 2 10
3 1 5
1 4
2 1
1 10
```

Sample Output

```
3
2
2
```

Sample Explanation

The first moviegoer will drive from city 1 to city 3 and then remain there.
The second moviegoer will remain at city 2.
The third moviegoer will drive from city 1 to city 2 and then remain there.