



Escape the Prison

Mouse Stofl has just been arrested and will soon be put into jail. The jail consists of N chambers which are connected by M corridors. Each corridor is assigned a *level* and a prisoner is only allowed to traverse it (in either direction) if his *rank* is not below the level of the corridor. It is possible to reach any chamber from any other chamber (with a sufficiently high rank and possibly via multiple intermediate chambers). There are exits controlled by a guard in some of the chambers. Each guard is characterized by a minimum bribe which he requires to release a prisoner through the exit he guards.

Mouse Stofl does not yet know which rank he will be assigned nor which chamber he will be put into. There are Q possibilities and for each of them, he would like to know how much money he needs to get from SOI to bribe some of the guards and escape from the prison.

Input

The first line contains four integers: the number of chambers N , the number of corridors M , the number of exits E , and the number of possibilities Q to be checked. ($1 \leq N \leq 10^5$, $1 \leq M \leq 2 \times 10^5$, $1 \leq E \leq 10^5$, $1 \leq Q \leq 10^5$) The next M lines contain three integers each, a_i , b_i and l_i ($0 \leq a_i, b_i < N$, $0 \leq l_i \leq 10^9$), which indicate that chambers a_i and b_i are connected by a corridor with the assigned level l_i . The subsequent E lines contain two integers each, e_i and p_i ($0 \leq e_i < N$, $1 \leq p_i \leq 10^9$), which describe an exit in the chamber e_i controlled by a guard who requires a bribe p_i to open the door. The last Q lines contain two integers each, c_i and r_i ($0 \leq c_i < N$, $0 \leq r_i \leq 10^9$), which provide a chamber and rank to be checked. There can be multiple corridors between the same pair of chambers.

Output

For each of the Q possibilities, output the minimum bribe Mouse Stofl needs to escape the prison. If it is not possible to escape the prison at all, output the string "IMPOSSIBLE" (without quotation marks).

Limits

There are four test groups, each of which is worth 25 points.

- In group 1, we have $Q = 1$ and $M = N - 1$.
- In group 2, we have $E \leq 10$ and $M = N - 1$.
- In group 3, all p_i are equal.
- In group 4, there are no additional assumptions.



Examples

Input	Output
5 4 2 1 0 1 2 1 2 4 2 3 2 3 4 10 0 200 4 100 3 8	200

Input	Output
5 4 1 2 0 1 2 1 2 4 2 3 2 3 4 10 4 100 3 8 3 10	IMPOSSIBLE 100