

5005 Battle over Cities

It is vitally important to have all the cities connected by highways in a war, but some of them are destroyed now because of the war. Furthermore, if a city is conquered, all the highways from/toward that city will be closed by the enemy, and we must repair some destroyed highways to keep other cities connected, with the minimum cost if possible.

Given the map of cities which have all the destroyed and remaining highways marked, you are supposed to tell the cost to connect other cities if each city is conquered by the enemy.

Input

The input contains multiple test cases. The first line is the total number of cases T ($T \leq 10$). Each case starts with a line containing 2 numbers N ($0 < N \leq 20000$), and M ($0 \leq M \leq 100000$), which are the total number of cities, and the number of highways, respectively. Then M lines follow, each describes a highway by 4 integers:

City1 City2 Cost Status

where *City1* and *City2* are the numbers of the cities the highway connects (the cities are numbered from 1 to N), *Cost* ($0 < Cost \leq 20000$) is the effort taken to repair that highway if necessary, and *Status* is either '0', meaning that highway is destroyed, or '1', meaning that highway is in use.

Note: It is guaranteed that the whole country was connected before the war and there is no duplicated high ways between any two cities.

Output

For each test case, output N lines of integers. The integer in the i -th line indicates the cost to keep the cities connected if the i -th city is conquered by the enemy. In case the cities cannot be connected after the i -th city is conquered by the enemy, output 'inf' instead in the corresponding place.

Sample Input

```
3
4 5
1 2 1 1
1 3 1 1
2 3 1 0
2 4 1 1
3 4 2 0
4 5
1 2 1 1
1 3 1 1
2 3 1 0
2 4 1 1
3 4 1 0
3 2
1 2 1 1
1 3 1 1
```

Sample Output

```
1
2
0
0
1
1
0
0
inf
0
0
```