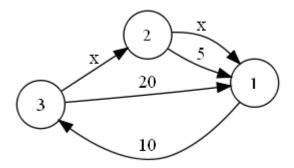# COI '12 #1 Hiperprostor

Time limit: 0.5s   **Memory limit:** 32M

In the distant future, food is transported between planets via **one-way trade routes**. Each route directly connects two planets and has a known **transit time**.

The traders' guild plans to add some new routes utilizing a recently discovered technology – hyperspace travel. Travelling via hyperspace is also one-directional. Since it is still experimental, hyperspace travel time is **not yet known**, however it is known not to depend on distances between planets, so each hyperspace route will take an **equal amount of time** to traverse.

The picture below shows an example of three interconnected planets with transit times shown. The planets are labelled with positive integers, and the hyperspace travel time is denoted by x (the picture corresponds to the second example input):

Transit time is measured in days and is always a **positive integer**.

The traders' guild wishes to analyze the consequences of introducing the new routes: for some two planets A and B, they want to know what are **all the possible values** of the **shortest path** total transit time from A to B, for all possible values of x. For example, in the situation above, shortest path travel from planet 2 to planet 1 could take 5 (if $x \geq 5$), 4, 3, 2, or 1 day (if $x < 5$).

Input Specification

The first line of input contains the two integers P and R, the number of planets and the number of routes, respectively $(1 \leq P \leq 500, 0 \leq R \leq 10\,000)$.

Each of the following R lines contains two integers C and D, the planet labels $(1 \leq C, D \leq P, C \neq D)$, and T, the travel time from C to D. For conventional routes, T is an **integer** $(1 \leq T \leq 1\,000\,000)$, and for hyperspace routes, T is **the character** `x`. Multiple lines can exist between the same two planets.

The following line contains the integer Q, the number of queries $(1 \leq Q \leq 10)$.

Each of the following Q lines contains two integers A and B, the planet labels $(A \neq B)$ representing a **query** by the traders' guild: "what are the possible values of shortest path transit time from A to B?".

Output Specification

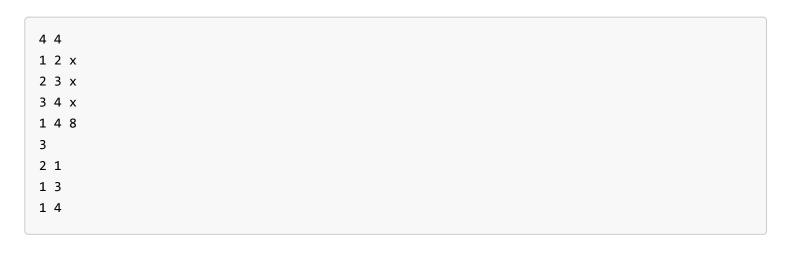The output must contain Q rows, one per query.

Each row must contain two integers: the **number of different values** and **their sum**. If the number of different values is **unbounded**, output only `inf` in that row. If there is no path from A to B, the number of different values and their sum is 0.

Scoring

If the output is incorrect, but the first number in each of the Q rows is correct, the solution will be awarded 50% of points for that test case. *Note:* The output must contain both numbers in each row where the number of values is bounded in order to qualify.

In test data worth a total of 50 points, the following constraints hold: $P \le 30$, $R \le 300$, and $T \le 50$.
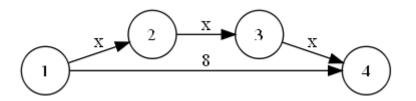
Sample Input 1

```
4 4
1 2 x
2 3 x
3 4 x
1 4 8
3
2 1
1 3
1 4
```

Sample Output 1

```
0 0
inf
3 17
```

Explanation for Sample Output 1

1. There is no possible path from 2 to 1.
2. For any positive integer x, the shortest path from 1 to 3 takes $2x$ time, so the solution is `inf`.
3. The shortest path from 1 to 4 can take 3 (for $x = 1$), 6 (for $x = 2$), or 8 (for $x \ge 3$) time. $3 + 6 + 8 = 17$.

Sample Input 2

```
3 5
3 2 x
2 1 x
2 1 5
1 3 10
3 1 20
6
1 2
2 3
3 1
2 1
3 2
1 3
```

Sample Output 2

```
inf
5 65
15 185
5 15
inf
1 10
```