

5988 Magical Bridges

Hogwarts School of Witchcraft and Wizardry has a circular lane having N towers numbered 1 to N . Towers i and $i + 1$ are adjacent to each other for $1 \leq i < N$ and also towers 1 and N are adjacent to each other. Each of these towers has exactly F number of floors, numbered $1, 2, 3, \dots, F - 1, F$ from bottom to top. Floors i and $i + 1$ in a tower are adjacent to each other and it takes one second to move between them. It also takes one second to move between floor 1 of a tower and floor 1 of its adjacent tower. Apart from these, there are M bridges designed for a quick escape in case of a Death Eater attack, each of which connects two floors of different towers. Each of these bridges is given as $b_i f_i b_j f_j t$, meaning it takes t seconds to move along this bridge that connects the floor f_i of tower b_i and the floor f_j of tower b_j . All ways are bidirectional.

Given (qb_i, qf_i) and (qb_j, qf_j) , find the minimum time in seconds it takes to reach floor qf_j of tower qb_j , starting from floor qf_i of tower qb_i . You have to answer a lot of such queries.

Input

The first line contains the number of test cases T . T cases follow. Each test case consists of ' $N F M$ ' in the first line. N is the number of towers, F is the number of floors in each tower and M is the number of bridges. M lines follow, each of the form ' $b_i f_i b_j f_j t$ ', as mentioned in the problem statement. Next line contains Q , the number of queries and Q lines follow, each of the form ' $qb_i qf_i qb_j qf_j$ '.

Output

For each query of the form ' $qb_i qf_i qb_j qf_j$ ', output one line denoting the minimum time in seconds it takes to reach the floor qf_j of tower qb_j , starting from the floor qf_i of tower qb_i .

Constraints:

- $1 \leq T \leq 15$
- $2 \leq N, M \leq 100$
- $2 \leq F \leq 1,000,000$
- $1 \leq t \leq 1,000,000$
- $1 \leq Q \leq 100,000$
- $1 \leq b_i, b_j, qb_i, qb_j \leq N$
- $1 \leq f_i, f_j, qf_i, qf_j \leq F$

Sample Input

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

```
1 3 3 2
1 1 3 4
3 3 4 4
4 3 4 4
```

Sample Output

```
4
5
4
6
1
```