

# Travelling

SEASON 2021/2022 – SIXTH ROUND



From so much taking care of the maintenance of the buses, Kyusho forgot about his own car. And just as he set off to collect the parts for repair with his faithful driver, Ivatz, the engine refused to accelerate. The best it could do was to maintain the speed at which it was already working. This was a problem given the speed limits on the road, because once Kyusho slows down to  $V$  km / h, he can travel with at most  $V$  km/h from then on. For example, if his current speed is 100 km / h and the speed limit is 80 km / h, he will be able to travel with at most 80 km / h until the end of the trip.

To repair the engine, he must collect all the parts that are conveniently sold in  $N$  different cities, numbered from 1 to  $N$ . They are connected by  $M$  two-way road segments, each with a speed limit on it -  $S$ . Every city is reachable by any other with the direct roads.

Kyusho doesn't want to risk with the unstable engine, so he wants to keep the difference between its initial speed and the final one, travelling between given two cities, as minimal as possible.

He hasn't yet determined the order in which he will collect the parts, so he has prepared a list of  $Q$  questions of the kind: "What is the minimal possible difference between the initial speed  $V$  and the final one if he has to travel from city  $A$  to city  $B$ ." Prepare your seatbelts and write a program **travelling** which gives the answers to the list of questions from given road network.

## Input

From the first line of the file `travelling.in` the natural numbers  $N$  and  $M$  are given - the number of cities and the number of road segments. The next  $M$  lines contain three numbers each -  $A$ ,  $B$  and  $S$ , indicating that there is a direct two-way road between cities  $A$  and  $B$  with a speed limit on it  $S$ . The next line contains the numbers  $Q$  and  $W$  - the number of questions and a number used in the formulas below. On the next 3 lines the numbers  $X_1$ ,  $Y_1$ ,  $Z_1$ ,  $X_2$ ,  $Y_2$ ,  $Z_2$ ,  $X_3$ ,  $Y_3$ ,  $Z_3$  are given. They are the two cities and the initial speed for the first, second and third question respectively. The following questions are generated by the following formulas:

- $X_i = ((X_{i-3} + (X_{i-2} \oplus X_{i-1}))) \bmod N + 1$
- $Y_i = ((Y_{i-3} + (Y_{i-2} \oplus Y_{i-1}))) \bmod N + 1$
- $Z_i = ((Z_{i-3} + (Z_{i-2} \oplus Z_{i-1}))) \bmod W + 1$

Where " $\oplus$ " denotes the bitwise "exclusive OR". In C++ and Java, the operator for it is " $\wedge$ ". If at some point it turns out that  $X_i = Y_i$ , Kyusho was not very careful when coding the questions, and the answer is 0, because there is no travelling between cities.

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## Output

On one line in the file `travelling.out`, print the sum of the answers to the questions.

## Constraints

$$2 \leq N \leq 10^5$$

$$2 \leq M \leq 10^6$$

$$3 \leq Q \leq 10^7$$

$$1 \leq A, B, X_1, X_2, X_3, Y_1, Y_2, Y_3, \leq N \text{ и } A \neq B$$

$$1 \leq S, Z_1, Z_2, Z_3, W \leq 10^9$$

**Time limit: 3.0 sec.**

**Memory limit: 256 MB.**

## Sample testcase

Input (travelling.in)	Output (travelling.out)	Explanation
7 11 1 2 70 2 3 80 3 4 90 4 1 70 2 5 40 3 6 100 6 5 60 6 1 50 7 3 50 7 4 80 7 5 60 6 120 3 1 70 5 2 90 1 6 80	85	<p>A possible route for the first question is <math>3 \rightarrow 4 \rightarrow 1</math>. This way Kyusho does not have to slow down even once.</p> <p>For the second question it is: <math>5 \rightarrow 6 \rightarrow 3 \rightarrow 2</math>. The final speed is 60 km / h due to the road section between 5 and 6.</p> <p>The fourth, fifth and sixth questions are: 1 6 81 6 3 92 2 5 94</p>