

July 2025 CSE 208 Online on APSP

Time: 30 minutes

A logistics company manages a delivery network represented as a weighted directed graph. Each node is a city, and each edge is a direct road with a specific cost (fuel/tolls). The government recently set up a quality control center located at **city V**. To promote quality control, the government is giving a discount campaign. Those vehicles that pass through city V will get a discount of 1 unit to each road cost (edge weights will reduce by 1 if the path passes through vertex V).

Calculate the shortest possible cost to travel between all pairs of cities (i,j).

Input

The first input line has two integers n and m: the number of cities and roads ($1 \leq n \leq 500$, $1 \leq m \leq n^2$).

Then, there are m lines describing the roads. Each line has three integers a, b and c: there is a road between cities a and b whose length is c ($0 \leq a, b < n$, $1 \leq c \leq 10^9$).

Next line will take the city V

Next line contains the number of queries q

Finally, there are q lines describing the queries. Each line has two integers a and b: determine the length of the shortest route between cities a and b.

Output

Print the length of the shortest route for each query. If there is no route, print -1 instead.

Example

Sample Input	Sample Output
4 5 0 2 5 0 1 3 1 2 3 0 3 7 2 3 2 1 2 0 2 0 3	4 5

5 7	4
0 1 2	2
0 2 1 0	2
1 2 2	
2 3 2	
1 3 1 0	
0 3 4	
3 4 2	
1	
3	
0 4	
1 3	
0 2	