

## Assignment IX

### Lab MC504

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Send your assignment solution to [mc504lab@gmail.com](mailto:mc504lab@gmail.com).

Deadline: 24.03.2021, 12 midnight.

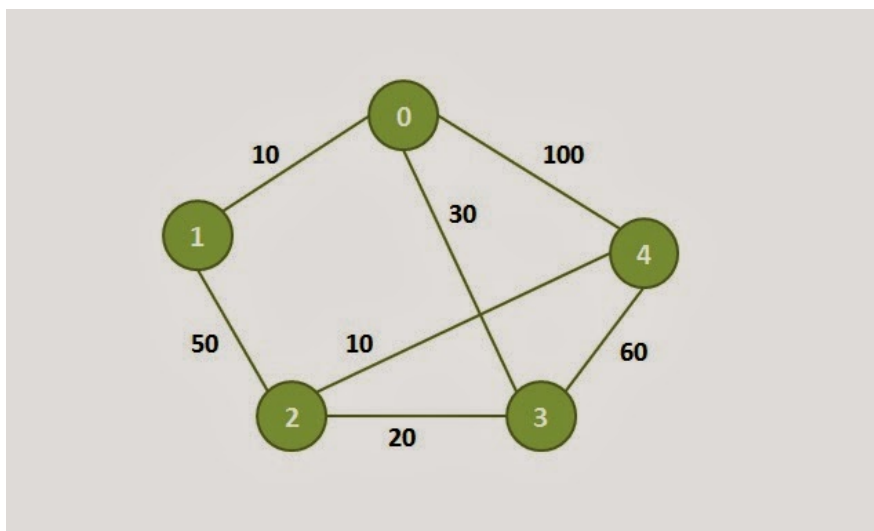
Put all files into one folder, create a zip and name it as <RollNo>\_<Assignment>\_<No> and mention the files name as: Q1.c, Q2.c and so on. **In each file please mention your roll number.**

Subject of mail should be: <RollNo>\_Assignment\_<No>. For example : 1911MC04\_Assignment\_II.

**You have to take inputs from the user. Otherwise marks (40%) will be deducted.**

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1Q.



Suppose your position is at **4**. You want to go **0** position. Value of each edge indicates cost. Which path will be followed to minimize cost.( Hint: Use dijkstra's algorithm)

2Q.

ENGCEET is a National level Engineering Entrance Examination conducted every year in wonderland.

Wonderland is a country with **N** cities and **M** bi-directional roads between these cities. ENGCEET is a pen-paper based exam which is conducted only in **K** number of cities. A candidate who wants to appear in the exam has to choose one of the **K** centers. Vinay is working hard every day to secure a top rank in the exam. Now, he was asked to choose a city to write the exam. He has to travel from his home city to the chosen city to write the exam.

Since he has a lot of work to do, he has asked your help to choose the nearest exam city.

There are **Q** number of queries. Each query denotes the city in which vinay lives. For each query, you have to find out the distance of the nearest exam city.

**Input :-**

First line of the input contains four space separated integers **N, M, K and Q** denoting the number of cities, number of roads, number of centers and number of queries.

Each of the next **M** lines contains three space separated integers **U,V and W** which means that there is a road of length **W** connecting cities **U** and **V** .

Next line contains **K** space separated integers each denoting a city with an exam center.

Each of the next **Q** lines contain a single integer **X** denoting the home city of vinay.

**Output :-**

For each query, find the distance of the nearest exam city and print the distance on a new line.

**CONSTRAINTS -**

$2 \leq N \leq 100000$

$1 \leq M \leq 100000$

$1 \leq K \leq N$

$1 \leq Q \leq 100000$ ;  $1 \leq U \leq N$  ;  $1 \leq V \leq N$  ;  $1 \leq W \leq 1000000000$ ;  $1 \leq X \leq N$

If it's not possible to reach any exam centre print -1.

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Sample Input

4 4 2 2

1 2 1

2 3 3

3 4 2

4 1 1

2 4

3

2

Sample Output

2

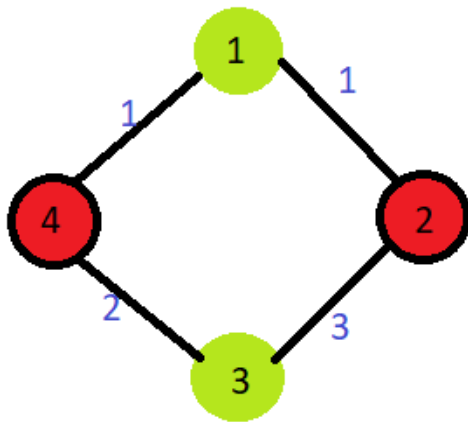
0

Explanation

There are 4 cities out of which 2nd and 4th are exam centres.

For **3rd** city nearest exam centre is CITY 4 which is 2 units far.

For **2nd** city nearest exam centre is CITY 2 itself which is 0 units far.



3Q

James visits Wall Street, the largest trading market in the land. Wall Street has traders from all over the world. There are a total of  $N$  items indexed from 1 to  $N$  that are traded in the market by a total of  $M$  dealers. Each trader is characterized by three integers, say  $i, j, C$ , meaning that the trader will take  $i$ 'th item from you and give you  $j$ 'th item and  $C$  units of money. A negative value of  $C$  signifies that, in order to get  $j$ 'th item from the trader, you will have to give  $i$ 'th item and  $C$  units of money. Note that there can be multiple dealers who deal with the same pair of items and some crazy dealers might trade the same item as well i.e.  $(i = j)$ . James visits Wall street having the item number 1. He collects the data of all the traders and wants to know if there is a way by which he can become infinitely rich if he acts smart! i.e. if there are a series of profits, repeating

which, will always increase the number of units of money with him! Help James find the answer to this question. Note that James can go to any dealer any number of times.

**Input:**

First line contains an integer **T**. **T** test cases follow.

First line of each test case contains two space-separated integers **N**, **M**

Next **M** lines contain three space-separated integers **i**, **j** and **C**, the characteristics of the traders.

**Output:**

Print "Yes"(without the quotes) if such a way exists, "No"(without the quotes) otherwise.

Print the answer to each test case in a new line.

**Constraints:**

$$1 \leq T \leq 10$$

$$1 \leq N \leq 100$$

$$1 \leq M \leq 1000$$

$$1 \leq i, j \leq N$$

$$-1000 \leq C \leq 1000$$

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**Sample input**

```
2
5 6
1 2 2
2 3 -1
3 4 -7
4 5 0
2 3 -7
3 5 6
5 8
1 5 10
2 3 -6
5 2 5
4 5 9
1 5 1
2 4 -10
2 3 -2
```

4 1 1

### **Sample output**

No

Yes

### **Explanation**

For the first test case, there is no such way possible.

For the second test case, James starts with item 1.

Trades it for 5th item gaining 10 units.

Trades 5th for 2nd gaining 5 units.

Trades 2nd for 4th losing 10 units.

Trades 4th for 1st gaining 1 unit.

Thereby, gaining 6 units in this process and it can be repeated indefinitely to make james infinitely rich!