Delivery man P93428_en

A delivery man works on a city modelled as a graph with n vertices and m bidirectional edges with positive distances. The delivery man has to pick and deliver k objects in order from 1 to k. For each object $z \in \{1, \dots, k\}$, he has this information:

- the vertex p_z where the object must be picked;
- the vertex d_z where the object must be delivered, with $d_z \neq p_z$;
- the order o_z to deliver the object.

The set $\{o_z\}$ is a permutation of $\{1, \dots, k\}$. For instance, if $k = 3$, $o_1 = 3$, $o_2 = 1$ and $o_3 = 2$, then the objects must be delivered in this order: 2, 3 and 1. In this case, the delivery man has to pick object 1 and afterwards pick object 2. Then, he can decide to pick object 3, or alternatively to deliver object 2. If he decides to deliver object 2, then he has to pick object 3, and so on.

What is the minimum total time to deliver all the objects? The delivery man can choose where to begin and where to end his journey. Assume that the time to pick and deliver objects is neglectable, and that the delivery man can carry as many objects as he wants.

Input

Input consists of several cases. Each case begins with n and m, followed by m triples $x\ y\ c$ indicating an edge between x and y with cost c, where $x \neq y$. Follow k, and the k triples $p_z\ d_z\ o_z$ in order from 1 to k. Assume $2 \leq n \leq 1000$, $n - 1 \leq m \leq 5n$, that vertices are numbered starting at 0, $1 \leq c \leq 10^9$, that the graph is connected, that there is at most one edge between each pair of vertices, and $1 \leq k \leq 50$.

Output

For each case, print the minimum cost to deliver all the objects.

Sample input 1

```
5 6  0 1 10  0 4 3  1 2 2  1 3 1  1 4 2  2 4 3
2  0 1 2  2 3 1
2 1  1 0 1000000000
3  1 0 3  0 1 2  1 0 1
3 2  1 2 9  1 0 12
2  1 2 1  0 1 2
```

Sample output 1

```
10
5000000000
42
```

Problem information

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Generation: 2026-01-25T12:01:38.228Z

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