CCO '12 P2 - The Hungary Games

Time limit: 1.0s **Memory limit:** 1G

Canadian Computing Competition: 2012 Stage 2, Day 1, Problem 2

Welcome to the Hungary Games! The streets of Budapest form a twisted network of one-way streets. You have been forced to join a race as part of a "Reality TV" show where you race through these streets, starting at the *Szechenyi* thermal bath (s for short) and ending at the Tomb of *Gul Baba* (t for short).

Naturally, you want to complete the race as quickly as possible, because you will get more promotional contracts the better you perform. However, there is a catch: any person who is smart enough to take a shortest s-t route will be thrown into the *Palvolgyi* cave system and kept as a national treasure. You would like to avoid this fate, but still be as fast as possible. Write a program that computes a strictly-second-shortest s-t route.

Sometimes the strictly second-shortest route visits some nodes more than once; see Sample Input 2 for an example.

Input Specification

The first line will have the format $N\ M$, where N is the number of nodes in Budapest and M is the number of edges. The nodes are $1, 2, \ldots, N$; node 1 represents s; node N represents t. Then there are M lines of the form $A\ B\ L$, indicating a one-way street from A to B of length L. You can assume that $A \neq B$ on these lines, and that the ordered pairs (A, B) are distinct.

Output Specification

Output the length of a strictly-second-shortest route from s to t. If there are less than two possible lengths for routes from s to t, output -1.

Limits

Every length L will be a positive integer between 1 and $10\,000$. For 50% of the test cases, we will have $2 \leq N \leq 40$ and $0 \leq M \leq 1000$. All test cases will have $2 \leq N \leq 20\,000$ and $0 \leq M \leq 100\,000$.

Sample Input 1

```
4 6
1 2 5
1 3 5
2 3 1
2 4 5
3 4 5
1 4 13
```

Output for Sample Input 1

```
11
```

Explanation for Sample Output 1

There are two shortest routes of length 10 ($1 \to 2 \to 4$, $1 \to 3 \to 4$) and the strictly-second-shortest route is $1 \to 2 \to 3 \to 4$ with length 11.

Sample Input 2

```
2 2
1 2 1
2 1 1
```

Output for Sample Input 2

```
3
```

Explanation for Sample Output 2

The shortest route is $1 \to 2$ of length 1, and the strictly-second route is $1 \to 2 \to 1 \to 2$ of length 3.