VM7WC '15 #4 Gold - Chain Rule

Time limit: 2.5s **Memory limit:** 256M

Melanie, a student at Phillips Exeter Academy has discovered a new theorem regarding relative velocities, which she calls the *Chain Rule*. Now she must drive to Washington, D.C. to show her groundbreaking results to the president.

The world she lives in is made up of N $(2 \leq N \leq 100\,000)$ cities, numbered $0 \ldots N-1$ and M $(1 \leq M \leq 300\,000)$ highways. Phillips Exeter Academy, where Melanie starts, is located in city 0 and Washington, D.C. is city $N-1$. The i^{th} $(1 \leq i \leq M)$ highway connects cities A_i and B_i $(0 \leq A_i, B_i \leq N-1)$, takes t_i $(1 \leq t_i \leq 10\,000)$ minutes to travel on, and can be taken in either direction.

However, Melanie must first visit her rival, Alex Song, to brag about her results. Unfortunately, Melanie has no idea which city Alex actually lives in. Regardless of which city Alex lives in, Melanie wants to travel from Phillips Exeter to Alex's house then to Washington, D.C. in the minimum amount of time possible. Knowing that Alex's house may be extremely inconveniently located, Melanie wants to determine how long of a trip she may need in the worst case. You must consider all possible locations of Alex's house, then determine the longest time that Melanie may need to complete her trip, given that she always takes the fastest route from Phillips Exeter to Alex's house then to Washington, D.C.

Note that Alex may also live in city 0 or $N-1$, in which case Melanie does not need to go out of her way. Also note that Melanie is allowed to pass through Washington, D.C. on her way to Alex's house, however she must still make the journey from Alex's house back to Washington. There will always exist a path between any two cities.

Hint: Learn Dijkstra's algorithm.

Input Specification

The first line of input contains two space-separated integers, N and M.

The next M lines contain three space separated integers, A_i, B_i, and t_i.

Output Specification

Print a single integer, the maximum amount of time that Melanie may need to travel from Exeter to Alex's house to Washington, D.C., given that she always takes the optimal route.

Sample Input

```
5 5
0 1 5
1 2 4
0 3 8
2 3 2
4 2 3
```

Sample Output

```
13
```

Explanation

If Alex lives in city 3, the shortest path from 0 to 3 would take 8 minutes, and the shortest path from 3 to 4 would take 5 minutes. Thus the trip will take $8 + 5 = 13$ minutes. If Alex lived anywhere else, the shortest trip would take 12 minutes. Therefore, the longest trip Melanie may be required to take will take 13 minutes.