Trip II (Encore Version)

Time Limit: 1 Second
Memory Limit: 2048 MB

The only different between this version and the normal version is that the fatigue grows as function of t^2 instead of t.

After your exciting but intensive trip, you are exhausted and want to go back home immediately. However, you still might need to make multiple layovers during your trip because there aren't any direct flights back to your home airport. You have looked up the flights for the next a few days and want to book the flights that can get you home (and this time you don't need to worry about the ticket price because they are so cheap!). Moreover, you have decided to give yourself a good rest by booking first-class tickets for all flights! However, you still need to minimize the total time for your layovers because they are very tiring (you have to stay awake not to miss your flight!).

Specifically, you have found that there are m flights connecting n cities. Each flight departs from city a at time t_s and arrives at city b at time t_e (each flight is non-recurring and one-directional). Your fatigue increases by t^2 if you need to stay at any airport for t minutes (including the starting airport but excluding the final destination). You want to select the flights that minimize your total fatigue (you don't need to minimize the total flight time because you can get really good rest in first-class cabin!). Assume that you are currently at airport 1 and your home airport is n.

Input

The first line of input contains two integers n and m ($1 \leq n \leq m \leq 10^5$) - the number of cities and the number of routes between cities.

The next m lines describe the flights. Each line contains four integers a, b, t_s, t_e ($1 \leq a, b \leq n$, $1 \leq t_s < t_e \leq 10^9$), denoting a flight from city a to city b that departs at time t_s and arrives at time t_e.

Output

Output a single integer denoting the minimum fatigue you will get during the trip.

Sample Inputs

```
4 4
1 2 3 20
1 3 5 10
2 3 50 100
3 4 100 120
```

Sample Outputs

```
909
```