



THE 2024 ICPC ASIA PACIFIC CHAMPIONSHIP

VNU UNIVERSITY OF ENGINEERING AND TECHNOLOGY

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Problem B

Attraction Score

Time limit: 4 seconds

There are n cities, numbered from 1 to n , in the fictional country of Manteiv. We can consider these cities to be on a flat plane with a 2D coordinate system, where city i is at coordinates (x_i, y_i) . No two cities are located at the same position.

There are m highways, numbered from 1 to m , each of which is a line segment with two different cities as its endpoints and has a number of attraction points alongside it. Specifically, highway j has a_j attraction points and connects cities u_j and v_j as its endpoints. Having intersections on highways causes traffic jams, and building a highway on top of another highway costs a lot of money. Therefore, it is guaranteed that

- no two highways intersect at any point other than at a city,
- no highway passes through a city other than its two endpoints, and
- there is at most one highway connecting each pair of cities.

The Manteiv Ministry of Tourism would like to choose a subset of cities as tourist attractions. Intuitively, the ministry would like many pairs of chosen cities to be connected by a highway with many attraction points. Formally, the *attraction score* of a non-empty subset of cities S is defined as follows:

- For every pair of integers (a, b) where $a < b$, cities a and b are in S , and they are connected by a highway, add the number of attraction points on the highway to the score.
- Let $f(S)$ be the number of pairs of integers (a, b) where $a < b$, cities a and b are in S , and they are **not** connected by a highway. The score incurs a penalty (negative) score of 10^6 multiplied by **the square of** $f(S)$. In other words, subtract $10^6 \times f(S)^2$ from the score.

For example, let $n = 3$, cities 1 and 2 be connected by a highway with 10 attraction points, cities 2 and 3 be connected by a highway with 20 attraction points, and cities 1 and 3 not be connected by a highway.

- The attraction score of the subset of cities $\{1\}$ is 0.
- The attraction score of the subset of cities $\{1, 2\}$ is $10 - 10^6 \times 0^2 = 10$.
- The attraction score of the subset of cities $\{2, 3\}$ is $20 - 10^6 \times 0^2 = 20$.
- The attraction score of the subset of cities $\{1, 2, 3\}$ is $10 + 20 - 10^6 \times 1^2 = -999\,970$.

As an advisor to the ministry, you would like to find the maximum attraction score among all possible non-empty subsets of cities S .

Input

The first line of input contains two integers n and m ($1 \leq n \leq 100\,000; 0 \leq m \leq 300\,000$). Each of the next n lines contains two integers. The i -th line contains x_i and y_i ($0 \leq x_i, y_i \leq 10^9$). Each of the next m lines contains three integers. The j -th line contains u_j, v_j , and a_j ($1 \leq u_j < v_j \leq n; 0 \leq a_j \leq 10^6$). The highways are guaranteed to satisfy the conditions in the problem statement.



Output

Output an integer representing the maximum attraction score among all possible non-empty subsets of cities S .

Sample Input #1

```
3 2
0 0
0 1
1 0
1 2 10
2 3 20
```

Sample Output #1

```
20
```

Explanation for the sample input/output #1

This sample is the example given in the problem statement above. The subset of cities $\{2, 3\}$ gives the highest attraction score of 20.

Sample Input #2

```
3 3
0 0
0 1
1 0
1 2 10
2 3 20
1 3 30
```

Sample Output #2

```
60
```

Explanation for the sample input/output #2

The cities and highways are illustrated by Figure B.1. By choosing cities 1, 2, and 3 in S , the attraction score would be $10 + 20 + 30 - 10^6 \times 0^2 = 60$.

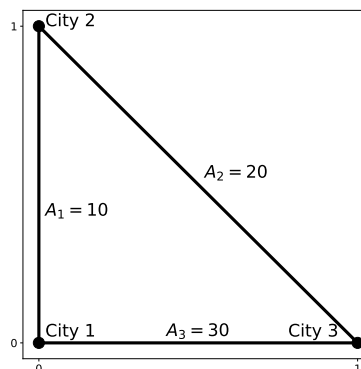


Figure B.1: Illustration of sample input #2.