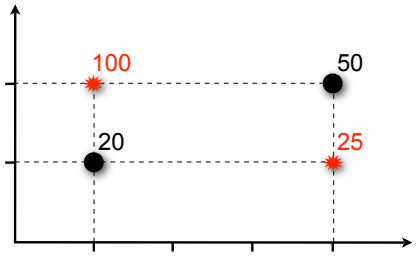
Problem C: Roman Warfare

Romans planned their invasions carefully and this was probably one of the reasons for their military success. They were eager to conquer wealthy enemy populations, and since Roman armies were heavily armed they were always victorious in battle (except for battles near a small Gaul village?), but their equipment made them hard to move and costly to maintain. When planning an attack, Roman generals had to consider the wealth of the enemy targets and the distances armies had to travel as well as their maintenance costs, which was not easy once the number of armies and potential enemy populations grew. The problem was to decide which armies would attack which cities, considering that one army could at most attack one city and one city could at most be attacked by one army, with the aim of conquering as much wealth as possible, minimizing the distance covered by all armies, and choosing the armies with smaller maintenance costs.

One military directive that prevailed at the time was that any two armies with increasing maintenance costs could only attack populations of increasing wealth, as otherwise the maintenance costs might prove to be hard to justify to the emperor. For example, if an army with maintenance value 5 attacks a population of wealth 20 then an army with maintenance value greater than 5 can only attack populations wealthier than 20, and cannot attack populations poorer than 20. Luckily, no two populations had the same wealth value and no two armies had the same maintenance value. Another directive that was consensual was that often the best military choice would be simply not to use an army in an attack, which implied for that army in particular no traveling at all, no maintenance costs and, naturally, no conquered wealth.

Roman armies travelled only in the four cardinal directions (north, east, south and west) so distances were measured in a manhattan like manner. Generals were also smart enough to plan traveling so as to avoid any obstacles along the way, nevertheless guaranteeing that minimal distances were covered. For example, an army placed at location (1,1) can travel 0.2 units eastbound, then 1 unit northbound and finally 0.8 units eastbound so as to arrive at location (2,2), in such way avoiding locations (1,2) and (2,1).

Generals were aware that the decision to attack a population with the army nearest to it could possibly not be the best one. Consider for instance an army with maintenance cost 100 located at (1,2) and a population of wealth 20 located at (1,1), for which, even if nearby, an attack would imply that no other army of lesser maintenance value could attack populations of greater wealth. In such case, some other population of wealth 50 located at (4,2) would not be attacked if there was only another army left with maintenance cost 25 regardless of its position, i.e., even if it was located at (4,1) as shown in the figure.



For the configuration shown in the figure the optimal planning should indicate 70 ($= 20 + 50$) as the maximum conquered wealth, with a minimum distance covered of 6 ($= 3 + 3$) and overall maintenance cost of 125 ($= 100 + 25$) of the used armies.

Task

Write a program that given a set of two-dimensional coordinates for the armies and enemy populations together with their respective maintenance costs and wealth determines after the invasion the total wealth conquered, the total distance covered by the armies and the total maintenance costs incurred. These values should be calculated in such a way that in the first place maximizes the conquered wealth, in the second place minimizes the total distance travelled and lastly minimizes the total maintenance value.

Input

The first line of the input contains two integer values A and P separated by a single white space, that specify the number of armies and populations, respectively. Each of the following A lines describes an army and contains three integers, separated by a single white space, the first two specifying the x, y coordinates and the third the maintenance cost. Any two armies have distinct locations and maintenance values. Each of the following P lines describes a population and contains three integers, separated by a single white space, the first two specifying the x, y coordinates and the third the wealth. Any two populations have distinct locations and distinct wealth values. No army and population have the same location.

Output

The output consists of a single line containing three integers, separated by a single white space, corresponding to the wealth conquered, the distance covered and the maintenance value of the used armies, respectively.

Constraints

$1 \leq A \leq 4\,000$	Number of armies
$1 \leq P \leq 4\,000$	Number of populations
$1 \leq x \leq 10\,000$	x coordinate
$1 \leq y \leq 10\,000$	y coordinate
$1 \leq v \leq 10\,000$	Maintenance/wealth value

Input example 1

```
2 2
1 2 100
4 1 25
1 1 20
4 2 50
```

Output example 1

```
70 6 125
```

Input example 2

```
3 2
1 2 100
1 1 10
2 4 25
2 2 20
1 4 50
```

Output example 2

```
70 3 35
```

Input example 3

```
2 1
1 2 15
1 1 10
2 2 10
```

Output example 3

```
10 1 15
```