

War

2022/2023 SEASON – FIFTH ROUND



You are playing a *Real-time strategy* computer game in 2D space.

You have n groups of soldiers, each characterized by a position (x, y) and a number of soldiers u .

The opponent has m towers, each characterized by a position (x, y) and a number of soldiers guarding it, v .

One your command consists of 5 parameters (x_1, y_1, x_2, y_2, q) , denoting that q of your soldiers from position (x_1, y_1) (there must be at least q soldiers at the position at the start of the command) are teleported to position (x_2, y_2) , using $q * \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$ energy.

If at position (x_2, y_2) there is a tower guarded by p soldiers, then there is a battle between them and your q soldiers, and if:

- 1) $p = q$, the tower is destroyed, the soldiers defending it, as well as your soldiers, die.
- 2) $p > q$, your soldiers die, and $\lceil \sqrt{p^2 - q^2} \rceil$ soldiers survive in the tower.
- 3) $p < q$, the tower is destroyed, the soldiers defending it die, and $\lceil \sqrt{q^2 - p^2} \rceil$ of your soldiers survive.

By $\lceil x \rceil$ we denote the value of x rounded up.

If on the segment between the points (x_1, y_1) and (x_2, y_2) there is a tower that is not in position (x_2, y_2) , then between this tower and your soldiers no battle takes place.

You want to destroy all the enemy towers using the minimum amount of energy.

Your score will be $(\text{total amount of energy used})^{2/3}$. If you use more than 10^{21} energy you will receive 0 points.

Input

The first line of the **war.in** file contains the numbers n and m .

The next n lines contain three natural numbers (x, y, u) each - your soldiers.

The next m lines contain three natural numbers (x, y, u) each - the opponent's towers.

Output

On the first line of the file **war.out**, print the number c - the number of commands.

On the next c lines, print five numbers (x_1, y_1, x_2, y_2, q) , denoting your commands.

They must satisfy the constraints $0 \leq x_1, y_1, x_2, y_2 \leq 10^9$ and $1 \leq q$.

Scoring

For each test, let $minScore$ be the smallest score among all participants' scores and $yourScore$ be your score. You will be awarded $1 - \sqrt{1 - \frac{minScore+1}{yourScore+1}}$ multiplied by the amount of points for the test.

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Constraints

$$n = m = 50\,000$$

$$1 \leq u \leq 100$$

$$0 < x, y < 10^9$$

$$\left(\sum u\right)^2 \geq \sum v^2$$

Time limit: 5 sec.

Memory limit: 256 MB.

The tests are distributed as follows:

Percentage	v
20%	$1 \leq v \leq 100$
20%	$1 \leq v \leq 360$
20%	$1 \leq v \leq 1\,300$
20%	$1 \leq v \leq 4\,690$
20%	$1 \leq v \leq 16\,900$

Sample test

Input (war.in)	Output (war.out)
2 2	4
1 1 2	1 1 2 1 2
3 1 2	3 1 2 1 2
2 2 3	2 1 2 2 4
4 2 3	2 2 4 2 3

Example explanation

The sample test is only for an explanation, in all real tests $n = m = 50\,000$ and $(\sum u)^2 \geq \sum v^2$.

The first command moves 2 soldiers from (1, 1) to (2, 1) for 2 energy.

The second command moves 2 soldiers from (3, 1) to (2, 1) for 2 energy, there are now 4 soldiers in (2, 1).

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The third command moves 4 soldiers from $(2, 1)$ to $(2, 2)$ for 4 energy, after the battle there are $\lfloor \sqrt{4^2 - 3^2} \rfloor = 3$ soldiers left, and the tower is destroyed.

The fourth command moves 3 soldiers from $(2, 2)$ to $(4, 2)$ for 6 energy, after the battle there are $\lfloor \sqrt{3^2 - 3^2} \rfloor = 0$ soldiers left, and the tower is destroyed.

The total energy used is $2 + 2 + 4 + 6 = 14$.

The score is $14^{2/3} \approx 5.80878573356$

Tests generation

The numbers x, y, u, v are randomly generated in the respective intervals that bound them (each number in the interval has an equal probability). It is guaranteed that there are no groups of soldiers or towers at the same (x, y) coordinates at the start.