Problem L
Save lives or money

Time limit: 3 seconds
Memory limit: 1024 megabytes

Problem Description

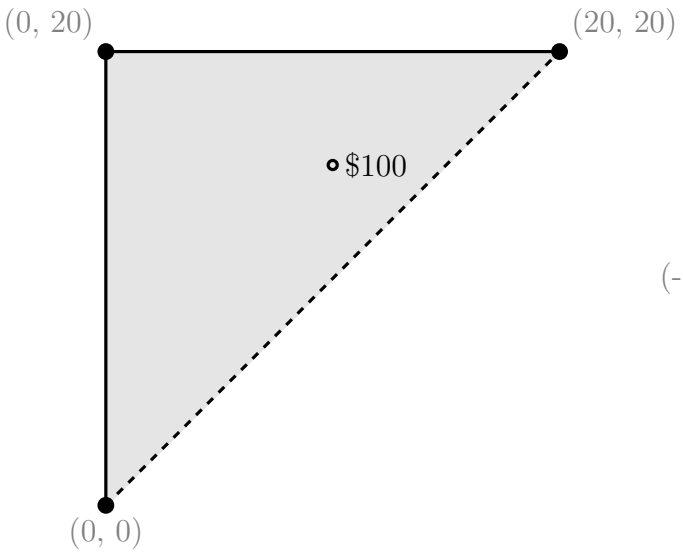
Village "Under The Sea" is located inside a valley. There is a big river in front of the only entry of the village. This year, they encounter a flood that happens roughly once in a century. Because the government is lack of awareness, it is too late to evacuate the residents. The water will flow into the village soon.

Fortunately, this village has walls and gates that could block the water. But we cannot block all the water outside. Otherwise there will be too much water flowing through the river and destroy a nuclear plant in a neighborhood of the village, and brings incalculable damage to everyone. We need to allow some water flowing in, with a manageable way.

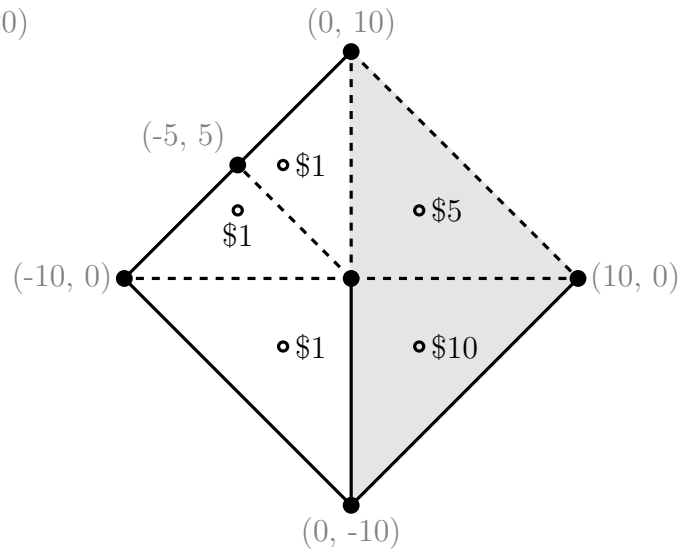
The walls and gates separate the village into many closed regions. Any two different regions could reach each other with exactly one path through the gates if we open all of them. To be clear, the sample 1 is a village consists of 1 region with 2 walls and 1 gate. The solid lines are walls and the dashed line is a gate in the figure below. And the sample 2 is another village consists of 5 regions with 5 walls and 5 gates. Given the estimated water volume, the government could decide to close some gates and leave the rest open. Let the floodwater destroy some regions and leave others safe. The shaded regions in the figures are destroyed regions of the best plans in the sample outputs.

A government official asks you to write a program to help them choosing which gates to open. They give you a list consisted of all the residents with the place they live and money they own. The government official wants you to find a way to save people with the most total wealth. You feel not good to treat rich and poor people differently. So you want to do something different in secret. You will give a plan which save the most people instead. In case there are different plans that save the same number of people, then you choose the one that saves the most money among them.

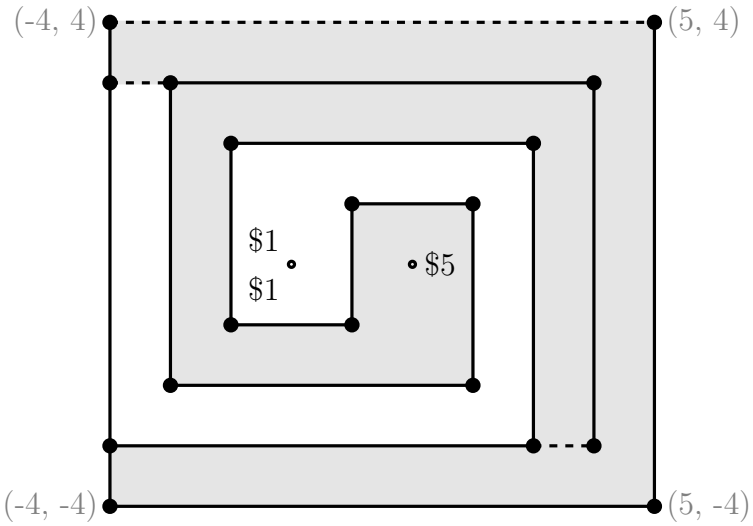
Sample 1



Sample 2



Sample 3



Input Format

The first line contains 1 integer *Area* – the estimated area that the flood will destroy.

The second line contains 3 integers G, W, and R – the number of the gates, walls, and the residents.

Then G lines follow. Each line contains 4 integers x_{1_g}, y_{1_g}, x_{2_g}, y_{2_g} that represent the coordinates of the two endpoints of a gate.

Then W lines follow. Each line contains 4 integers x_{1_w}, y_{1_w}, x_{2_w}, y_{2_w} that represent the coordinates of the two endpoints of a wall.

Finally, there are R lines. Each line contains 3 integers x_r, y_r, and $money_r$ that represent the coordinates of a resident and the amount of money they owns.

Output Format

You should output 2 lines.

The first line has 1 real number and then 3 integers *area*, *money*, *people*, and *gate_n*, which represent the result of the plan. *area* is a real number rounding to the nearest tenth after the decimal point, which is the total area of destroyed regions. *money* is the total amount of money of the victims. *people* is the number of the victims. *gate_n* is the number of the opened gates.

The second line has *gate_n* integers which are the indices of the opened gates in an arbitrary order. Note that the gates are indexed from 1 to G.

If the *Area* in the input is larger than the village, the *area* you output should be the whole size of the village, the *money* should be the total amount of money of all the people in the village, and the *people* should be all the people in the village. And you should open all the gates.

If the *Area* in the input is no more than the village, the *area* you output should be equal to or larger than *Area*.

If there are multiple solutions that can save the same number of people, choose the one which loses less money. If there are still multiple solutions which lose the same amount of money, choose the one with smaller destroyed area. If there are still multiple solutions which destroy the same size of area, anyone will do.

Technical Specification

- $0 < area, G, W, R < 5000$
- $-5000 < x, y < 5000$
- $0 \leq money < 5000$
- There is exactly one gate on the boundary of the village. The water will flood into the village through this gate. This gate should be opened in a workable plan.
- All the regions are simple polygons. They do not intersect themselves and have no holes.
- All the walls or gates will not intersect with each other. They will touch others only at the endpoints.
- Each endpoint will connect to at least two walls or gates. There is no hanging wall or gate.
- All the positions of the residents will locate in the interior of regions. They will not be outside of the village. And they will not sit right on a wall, a gate, nor a junction.

Sample Input 1

```
20
1 2 1
0 0 20 20
20 20 0 20
0 20 0 0
10 15 100
```

Sample Output 1

```
200.0 100 1 1
1
```

Sample Input 2

```
100
5 5 5
0 10 10 0
0 0 0 10
0 0 10 0
0 0 -10 0
0 0 -5 5
0 -10 -10 0
-10 0 -5 5
0 10 -5 5
10 0 0 -10
0 0 0 -10
3 3 5
-5 3 1
-3 5 1
-3 -3 1
3 -3 10
```

Sample Output 2

```
100.0 15 2 2
1 3
```

Sample Input 3

```
33
3 17 3
-4 4 5 4
-4 3 -3 3
3 -3 4 -3
0 1 0 -1
-4 3 -4 -3
-3 -2 -3 3
-2 2 -2 -1
2 1 2 -2
3 2 3 -3
4 3 4 -3
-3 3 4 3
-2 2 3 2
-2 -1 0 -1
0 1 2 1
-3 -2 2 -2
-4 -3 3 -3
-4 -4 5 -4
-4 -4 -4 -3
-4 3 -4 4
5 -4 5 4
1 0 5
-1 0 1
-1 0 1
```

Sample Output 3

```
48.0 5 1 2
1 3
```

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