

2186 Software Dispatcher

The new boss of a rural fire service of the “rectangular state”, whose map is drawn on a grid, with integer coordinates that are multiples of a meter, (0 0) for the lower left corner and (10000 10000) for the upper right corner, in a nation far away used to be an IT person. She believes that a good computer system, especially one based on provably correct algorithms, can outperform humans in stressful situations. That is the reason, when asked; she could not pass the opportunity of posing this problem to the best problem-solvers in the southern hemisphere.

75																			
70																			
65																			
60																			
55																			
50	F									F									
45																			
40																			
35																			
30																			
25						H													
20																			
15																			
10																			
5																			
0	H					F				H					F				
	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90

It is easy to describe, the boss said: At the height of the fire season, the department maintains a database of fire fighter unit locations and the reported sightings of fire. The horizontal and vertical distance, of the closest grid point, from the left lower corner of the state is used to describe the location of a fire or a fire fighter unit. An experienced team of officers dispatches each of the units to one of the fires, with the objective that the longest time for a unit to reach a fire is minimized. At the end of a long day, members of the team are exhausted and their judgement may not be the best possible. The above example shows 4 fires (marked by the letter F) and 3 units (marked by the letter H) already deployed in the field.

Your task is to program a method for dispatching the fire fighter units to fire locations so that they arrive at their destinations in the shortest possible time.

Input

Input to this problem consists of a sequence of one or more scenarios. Several lines describe each scenario as follows:

- The first line consists of three integers: the number of fire fighters, H , $0 < H < 100$; the number of fires, F , $H < F < 200$, and the speed that all fire fighters' travels, V (in meters/second). The integers are separated by a single space.
- The third line consists of $2 * H$ integers (i.e., H 2-dimensional coordinates) that describe positions of the fire fighters to be handled. The integers are separated by a single space.

- The second line consists of $2 * F$ integers (i.e., F 2-dimensional coordinates) that describe positions of the bush fires to be handled. The integers are separated by a single space.

The input will be terminated by a line that consists of three zeros (0 0 0). This line should not be processed.

Output

For each scenario, the output is a single line that contains the shortest time, rounded-up if necessary (e.g., all values larger than 3 and less than 4 are rounded-up to 4), in seconds for the H fire fighters to arrive at H different fire locations.

Sample Input

```
3 4 10
0 0 25 25 50 0
0 50 50 50 25 0 75 0
0 0 0
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Sample Output

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4
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