# Problem 7 – Star Clusters

You are given an image of **stars**. Locate all star clusters within the image.

For each star, you know the pixel coordinates of its **center** (if the star is on more than one pixel). The coordinates are given as ordered (X, Y) pairs. The X axis is horizontal and the Y axis is vertical. The top left pixel has coordinates (0, 0). Assume that every star belongs to **exactly one cluster**. The image below is 13 x 9 pixels and contains eight stars in two clusters.

|  |  |
| --- | --- |
|  | (1, 1)  (4, 2)  (2, 6)  (1, 8)  (9, 5)  (12, 3)  (11, 7)  (9, 9) |

## Input

* The input is read from the console.
* On the first line, there is the number of star clusters **C**
* The next **C** lines contain the star cluster names and the coordinates of one representative star from each cluster. Each coordinate is given in the form **(X, Y)**.
* On the next (zero or more) lines, there are all coordinates (except the ones which have already been given). Each coordinate is given in the form **(X, Y)**. Each line contains one or more points separated by a single space. No point is split between lines.
* The last line contains the word **end** only.
* All coordinates in the input are unique.
* You should **not** assume that the points are sorted in any way.

## Output

* The output consists of **C** lines.
* For each star cluster, print the pixel coordinates of its center and the number of stars it contains. Round the coordinates to the nearest integer. Sort the clusters by name in alphabetical order.
  + In the picture above, the centers are at coordinates (2, 4.25) and (10.25, 6). They are rounded to **(2, 4)** and **(10, 6)** since there is no such thing as 0.25 of a pixel.

## Constraints

* **C** is an integer in the interval [1; 100000000].
* Each cluster contains at least one star. The cluster names contain only letters and digits.
* The image is at most 10000 by 10000 pixels large (100 megapixels). There is at most one star at each pixel.
* Time limit: **100 ms**. Allowed memory: **16 MB**.

## Sample Input and Output

|  |  |  |
| --- | --- | --- |
| **Input** | **Output** | **Explanation** |
| 2  NGC7209 (4, 2)  NGC7243 (12, 3)  (1, 1) (2, 6)  (1, 8) (9, 5) (11, 7)  (9, 9)  end | NGC7209 (2, 4) -> 4 stars  NGC7243 (10, 6) -> 4 stars |  |
| 5  NGC133 (1, 1)  NGC189 (12, 0)  NGC129 (7, 5)  NGC103 (1, 8)  NGC225 (12, 8)  (13, 7) (10, 1) (11, 1)  (5, 5) (12, 2)  (0, 9) (6, 4) (10, 8)  (13, 1)  end | NGC103 (0, 8) -> 2 stars  NGC129 (6, 5) -> 3 stars  NGC133 (1, 1) -> 1 stars  NGC189 (12, 1) -> 5 stars  NGC225 (12, 8) -> 3 stars |  |
| 1  NGC884 (11, 4)  (11, 0)  (4, 1) (6, 2) (5, 4)  (8, 3) (7, 6)  (5, 6) (5, 8)  (9, 6)  end | NGC884 (7, 4) -> 10 stars |  |