# Problem 8 – Packaging Figures

You are given ***N* figures** (rectangles, squares and circles) in a two-dimensional Cartesian coordinate system. A figure is **nested** inside another figure if **all points of are contained within**. We denote this as. Find the **longest sequence of figures**. If several longest sequences exist, find the **first in the alphabetical order**.

A **rectangle** is defined by two corners: top-left and bottom-right. A **square** is defined by its top-left point and side. All square and rectangle sides are parallel to the coordinate axes. A **circle** is defined by its center and radius.

The coordinates increase form left to right by horizontal and from bottom to top by vertical.

## Input

* The input is read from the console.
* Each line contains a single figure in one of the following formats:
  + **rectangle name Ax Ay Bx By**
  + **square name Ax Ay S**
  + **circle name Ox, Oy, R**
* The last line contains the single word **End**.

## Output

* Print at the console the longest sequence of nested figures in the following format:
  + **name1 < name2 < ... < nameK**
* If several longest sequences exist, print the **first in the alphabetical order**.

## Constraints

* The numbers ***N*** and ***K*** are integers in the interval [1; 2500].
* , , , , , , and are integer numbers in the range [-10000; 10000]. and are positive.
* **Figure names** consist of Latin letters and digits and are case-sensitive. Duplicate names are not allowed.
* No two figures have the same coordinates.
* Time limit: **200 ms**. Allowed memory: **32 MB**.

## Sample Input and Output

|  |  |
| --- | --- |
| **Input** | **Visualization** |
| rectangle Theta -30 40 55 -10  square Delta -40 30 20  rectangle Alpha -60 50 40 -20  square Zeta -50 30 30  circle Beta 5 15 15  circle Lambda 50 30 20  rectangle Gamma -40 40 60 -35  End |  |
| **Output** |
| Alpha < Zeta < Delta |
| **Comments** |
| Two longest sequences of the same length 3 exist:   * Gamma < Theta < Beta * Alpha < Zeta < Delta   The first in the alphabetical order is Alpha < Zeta < Delta. |

|  |  |
| --- | --- |
| **Input** | **Visualization** |
| rectangle Europe 0 60 70 0  rectangle Italy 5 30 30 20  rectangle Austria 35 20 60 10  rectangle France 35 40 60 30  circle Alps 30 30 20  End |  |
| **Output** |
| Europe < Alps |