Problem 4 – Nested Rectangles

We are given **N rectangles** in the 2D plane. Rectangles' sides are horizontal and vertical only. A rectangle F_A is **nested** inside another rectangle F_B if the entire area of F_A is inside the rectangle F_B. We denote this as $\mathbf{F_A < F_B}$. Find the **longest sequence of rectangles $\mathbf{F_1 < F_2 < ... < F_K}$**. If several longest sequences exist, find the **first in the alphabetical order**.

Input

- The input data comes from the console. It consists of sequence of lines holding rectangles, ending with "**End**".
- Each rectangle comes in format "**`name: left top right bottom`**" (**`left`** < **`right`**, **`top`** > **`bottom`**).

Output

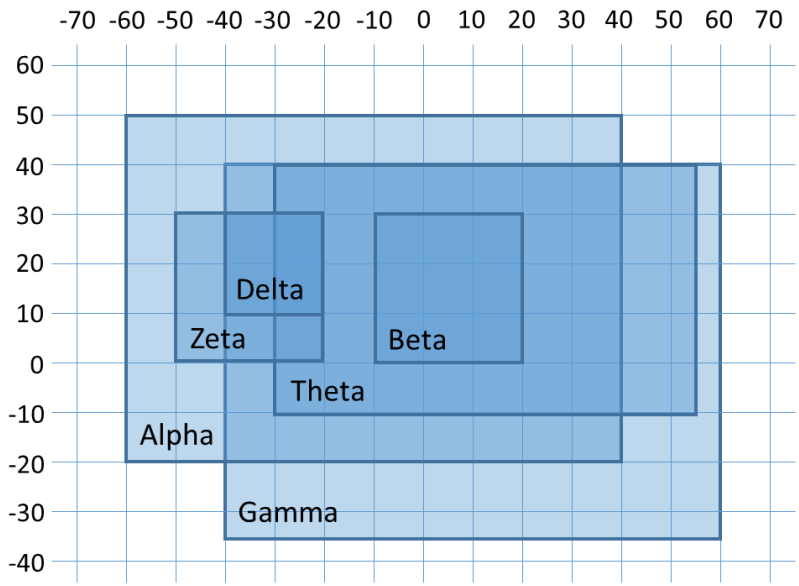
- Print at the console the longest sequence of nested rectangles in format "**`name1 < name2 < …`**".
- If several longest sequences exist, print the **first in the alphabetical order**.

Constraints

- The **number of rectangles** is in the range **[1 … 1 000]**.
- **Rectangle names** consist of Latin letters and digits and are case-sensitive. Duplicated names are not allowed.
- All **coordinates** (**`top`**, **`left`**, **`right`** and **`bottom`**) are integers in the range **[-100 000 … 100 000]**.
- There are no repeating (duplicated) rectangles with the same coordinates.
- Time limit: **150 ms**. Allowed memory: **24 MB**.

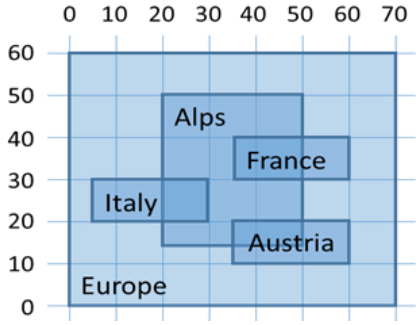
Examples

Input	Visualization

`Theta: -30 40 55 -10`
`Delta: -40 30 -20 10`
`Alpha: -60 50 40 -20`
`Zeta: -50 30 -20 0`
`Beta: -10 30 20 0`
`Gamma: -40 40 60 -35`
`End`
	

Output	
`Alpha < Zeta < Delta`	
Comments	
Two longest sequences of nested rectangles of the same length 3: • Gamma < Theta < Beta • Alpha < Zeta < Delta The first in the alphabetical order is: • Alpha < Zeta < Delta	

Input	Visualization

`Europe: 0 60 70 0`
`Italy: 5 30 30 20`
`Austria: 35 20 60 10`
`France: 35 40 60 30`
`Alps: 20 50 50 15`
`End`
	

Output	
Europe < Alps	