1069. Prufer Code

Time limit: 0.25 second
Memory limit: 8 MB

A tree (i.e. a connected graph without cycles) with vertices is given ($N \geq 2$). Vertices of the tree are numbered by the integers 1,…,N. A Prufer code for the tree is built as follows: a leaf (a vertex that is incident to the only edge) with a minimal number is taken. Then this vertex and the incident edge are removed from the graph, and the number of the vertex that was adjacent to the leaf is written down. In the obtained graph once again a leaf with a minimal number is taken, removed and this procedure is repeated until the only vertex is left. It is clear that the only vertex left is the vertex with the number N. The written down set of integers ($N-1$ numbers, each in a range from 1 to N) is called *a Prufer code* of the graph.

Your task is, given a Prufer code, to reconstruct a tree, i.e. to find out the adjacency lists for every vertex in the graph.

You may assume that $2 \leq N \leq 7500$

Input

A set of numbers corresponding to a Prufer code of some tree. The numbers are separated with a spaces and/or line breaks.

Output

Adjacency lists for each vertex. Format: a vertex number, colon, numbers of adjacent vertices separated with a space. The vertices inside lists and lists itself should be sorted by vertex number in an ascending order (look at sample output).

Sample

input	output
2 1 6 2 6	1: 4 6 2: 3 5 6 3: 2 4: 1 5: 2 6: 1 2

Problem Author: Magaz Asanov
Problem Source: Ural State Univerisity Personal Contest Online February'2001 Students Session