

Path in Tree

Problem Code	hw05a_path
Running Time Limit	1 sec
Memory Limit	16 mb

Objective

- Be able to traverse the tree and identify simple path between any pair of nodes.

Introduction

A tree has a special property that for any pair of vertices, there is only one simple path between this pair. Find the path for every pair of vertices in the given tree. The tree has N vertices numbered from 0 to $N - 1$. There will be $N \times (N - 1) / 2$ distinct pairs of vertices. The pairs are given as follows. $(0,0), (0,1), (0,2), \dots (0, N-1), (1,1), (1,2), \dots (N-2, N-1)$.

Task

Given a tree, you have to print the simple path between every pair of vertices in the tree.

Input

The first line contains the number $(1 \leq N \leq 50)$. The tree is assumed to be rooted at vertex 0. This is followed by $N - 1$ lines that describe the tree. The i^{th} line contains a number P_i indicating that the vertex i connects to the vertex P_i .

Output

There must be $N \times (N - 1) / 2$ lines in the output. Each line represents the simple path from vertex A to vertex B, starting from pair $(0,0)$ to pair $(N - 2, N - 1)$. In each line, print all vertices in the path from A to B (inclusive).

Example

Ex1

Input	Output
4 // there is 4 vertices	0 1 // the path from 0 to 1
0 // vertex 1 connects to vertex 0	0 1 2 // the path from 0 to 2
1 // vertex 2 connects to vertex 1	0 1 3 // the path from 0 to 3
1 // vertex 3 connects to vertex 1	1 2 // the path from 1 to 2
	1 3 // the path from 1 to 3
	2 1 3 // the path from 2 to 3