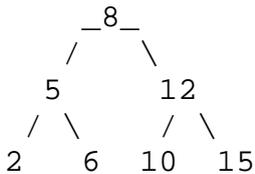# 18 Binary trees
11 points

Introduction

A way to order a sequence of numbers is to do an ordered binary tree. If the tree is made following a given logic it can give us the ordered sequence by processing the tree in in-order traversal.

The logic consists on put the new number in the subtree of the left it is a number smaller or put it into the right subtree if it is greater than the evaluated node. If there is no subtree then a new node is created.

First number is used as the first node (root of the tree).

In-order traversal consists on process first the left child, then the parent and finally the right child.

Given a sequence 8 5 12 2 6 15 10 we have the following tree:

```
     _8_
    /   \
   5     12
  / \   / \
 2   6 10  15
```

So following this example it is easy to order the sequence.

Other way to read binary trees is post-order in which first are processed the children (left first and then right) and finally the parent.

Write a program that reads a sequence of numbers and builds a binary tree from the numbers as they are read, and then outputs the ordered sequence (in-order) and also the post-order sequence.

Input

A list of numbers ending with -1.

Example 1

```
5
65
37
12
89
32
9
4
-1
```

Output

First the inorder (sorted) numbers and then the post-order sequence.

```
4  5  9  12  32  37  65  89
4  9  32  12  37  89  65  5
```