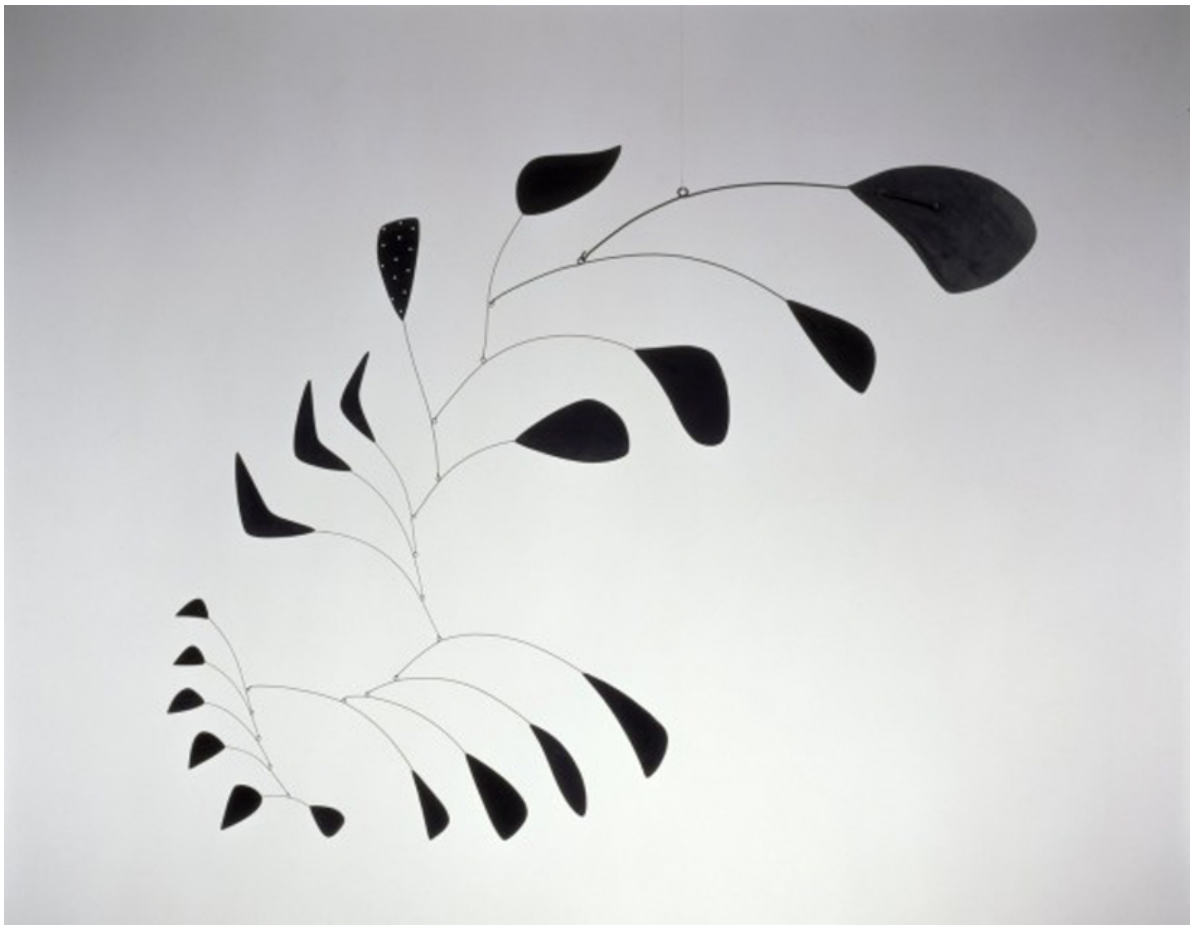
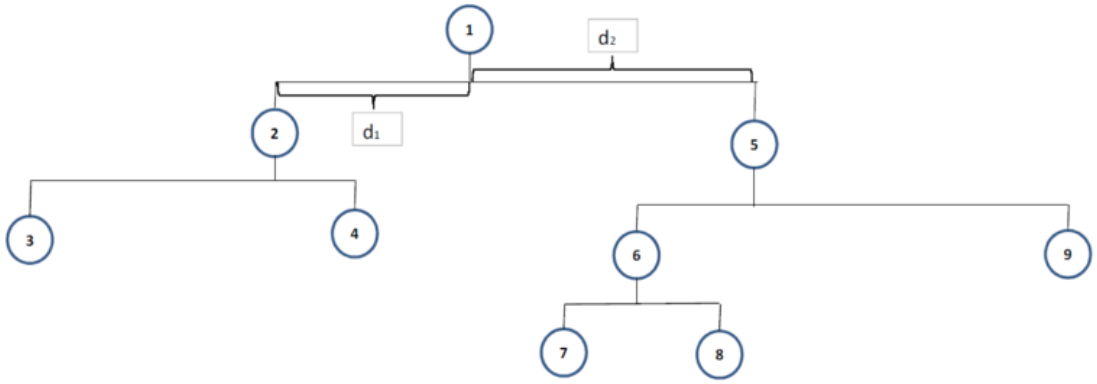
PSH: Mobile Weighter, Check Please

Alexander Calder was an American artist famous for his mobiles. Bob hopes to become famous for digital mobiles, but he needs your help to check to see if his mobiles are balanced.



Vertical Foliage, Alexander Calder © Calder Foundation, www.calder.org

Each of Bob's mobiles have a structure like the one in the diagram below. Each node in the tree contains the weight of an element and the distance of the element from the pivot point at its parent above. For example, in the diagram below, node 1 is the root of the tree, node 2 would contain the weight for node 2 plus the distance d1, and node 5 would contain its weight and distance d2.



Input Format

The input for this program is a tree representation of the mobile. For each node, the following quantities are listed:

```
id w id_l d_l id_r d_r
```

where

- `id` is a unique id for the node.
- `w` is the weight of node
- `id_l` is the id of the node's left child, or -1 if the node has no left subtree
- `d_l` is the distance of the of the node's left subtree from the pivot point, or -1 if the node has no left subtree (for node 1 above this would be distance d1)
- `id_r` is the id of the node's right child, or -1 if the node has no left subtree
- `d_r` is the distance of the of the node's right subtree from the pivot point, or -1 if the node has no right subtree (for node 2 above this would be distance d2)

With the exception of the -1 values, all of these quantities are integers in the range [1..100].

Note that a mobile, with no nodes, is a balanced mobile.

Constraints

You should use TreeMaps and/or TreeSets to encode the relationships in the tree.

While it is not necessary to pass the test caes, you should be able to write an algorithm that runs in O(n log n). (This will involve n recursive calls, which because of the calls to get, will each run in O(log n), ignoring the work done by other recursive calls.)

Output Format

The output will be "Balanced" if the mobile is balanced or "Unbalanced" if the mobile is not balanced. The mobile is balanced if the torque created at any node by the left subtree is equal to the torque created at any node by the right subtree. The torque created by a subtree is equal to the subtree weight times the distance of the root of that subtree from the pivot point at its parent. (We will assume that the rods and chains that connect the nodes are weightless).

Sample Input

```
1 16 -1 -1 -1 -1
2 5 1 10 3 20
3 8 -1 -1 -1 -1
```

Sample Output

```
Balanced
```

Explanation

Note that there are two additional sample inputs available if you click on the "Run" button.