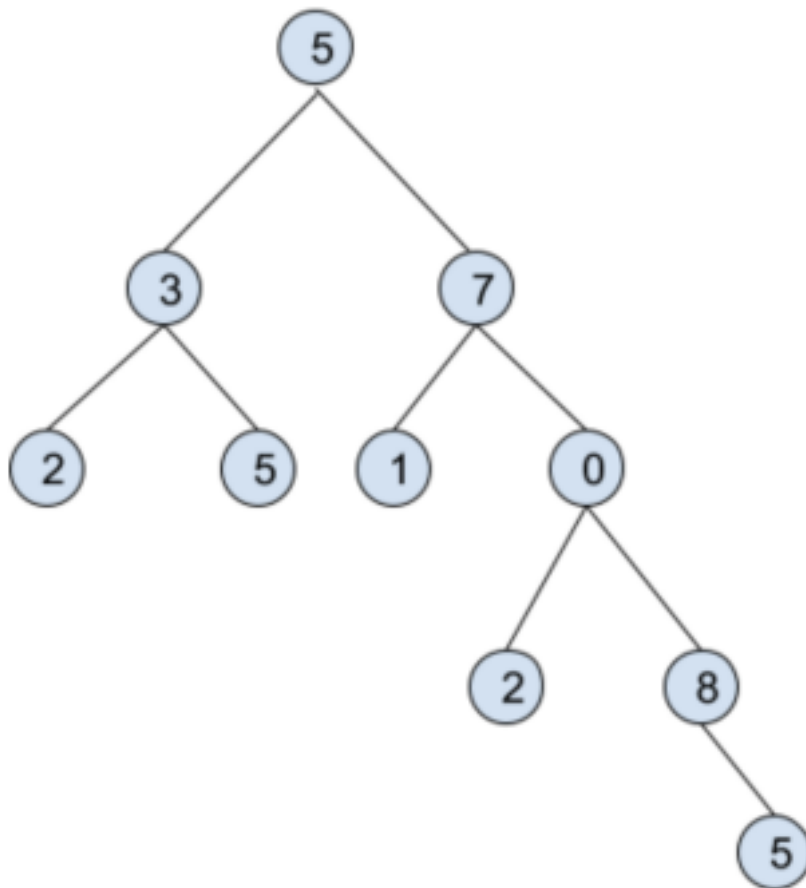




Please provide the solution for **one** of the tasks described below. The solution must be submitted as a link to the GitHub/Bitbucket/GitLab or any other preferred version control system.

### Task 1

Create a data structure which is able to represent the following model (assume that node values are integers).



Taking above data structure, implement features which allow:

1. Calculating the number of nodes that do not have any children. For the example given above, there are 5 leafs (nodes without child), i.e. ∴ 2, 5, 1, 2, 5

2. Calculating the largest number of edges in a path from the root node to a leaf node (node without child). For the example given above the largest number of edges between root node and leaf is 4 for the path  $5 \rightarrow 7 \rightarrow 0 \rightarrow 8 \rightarrow 5$
3. Checking if two instances of above data structures are equivalent to each other. Let us assume that two independent instances of the structure described above are equivalent if each node (starting from the root) in both of them has the same value and children.

A desirable part of a given solution is also a set of tests to verify its correctness.

## Task 2

Using data from links below:

Users: <https://fakestoreapi.com/users>

Carts: <https://fakestoreapi.com/carts/?startdate=2000-01-01&enddate=2023-04-07>

Products: <https://fakestoreapi.com/products>

Implement a program which:

1. Retrieves user, product and shopping cart data
2. Creates a data structure containing all available product categories and the total value of products of a given category
3. Finds a cart with the highest value, determines its value and full name of its owner
4. Finds the two users living furthest away from each other

A desirable part of a given solution is also a set of tests to verify its correctness.