Rivers Are Trees Specifications Document

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Program Features

Option Selection

Purpose

The purpose of option selection for the user is for them to decide what they want to do within the scope of the program.

Assumptions

Selections are always available and displayed after each input. The program will only accept valid integers as input for option selections to proceed.

Inputs

The user will input integers corresponding to the respective option menu function they want to execute.

Outputs

A secondary menu prompting the user for further actions considering what previous option chosen i.e. selecting the option to navigate to either the right or left child node and a menu selection option will allow the user to return to the parent node or visit the other child node.

State Changes

The menu will change depending on which node is being visited.

Expected Behavior

The terminal menu will show all available options and perform operations if the input is valid.

Tree Navigation

Purpose

To allow the user to navigate through the Columbia River tree to rivers, tributaries, and dams that are connected to it.

Assumptions

The binary tree is constructed correctly, and the user's input is valid.

Inputs

The user will input integers corresponding to the option selection to visit from the parent node to either left or right child nodes and can visit the other child node or return to the parent.

Outputs

A secondary menu prompting the user with options to visit the other child node or parent node.

State Changes

The tree node being visited by the user changes when they choose to visit a child node or return to parent.

Expected Behavior

The user must be able to traverse throughout the tree.

Class Features

Printing

Purpose

Print out desired information about rivers, lakes, or dams while visiting a node.

Assumptions

Each node type of river, lake, or dam has numerical data or information tied to it along with its name.

Inputs

The user inputs an integer in the menu to print the information from the node that is visited.

Outputs

The information from the nodes will be printed in the terminal when printing is executed such as names, length, height, area, and power output depending on the type of node being visited.

State Changes

No state change when printing information.

Expected Behavior

The information from the node should be output into the terminal when the user chooses the option to print.

Insertion

Purpose

Insert nodes of rivers, dams, and lakes into the binary tree of the Columbia River.

Assumptions

The rivers, dams, and lakes are nodes

Inputs

RiverNodes, DamNodes, and LakeNodes are inserted into the binary tree carrying their information variables like names, length, height, area, and power output.

Outputs

Terminal messages for when child nodes already exist.

State Changes

The state of the tree changes when a new node is added.

Expected Behavior

The nodes should be inserted into the tree such that the tree is as complete as can be.