Program Usage Guide

Running the Program:

- Open the terminal or command prompt.
- Type in cargo run and press Enter to initiate the program.

Performing Operations

Insertion:

- Type the selected tree you want to work with: avl for AVL tree, bst for binary tree, or rbt for red-black tree, then press Enter.
- Select the insert option.
- Follow the command line instructions to input the value you want to insert.

```
Please enter your choice
operation > insert
insert value > 55
'insert' operation is performed on the value '55' in the tree.
operation > insert
insert value > 66
'insert' operation is performed on the value '66' in the tree.
operation > insert
insert value > 88
'insert' operation is performed on the value '88' in the tree.
operation > insert
insert value > 99
'insert' operation is performed on the value '99' in the tree.
operation >
```

Deletion:

- After selecting the tree type, choose the delete option.
- Enter the value you wish to delete and press Enter.

```
operation > delete
delete value > 99
'delete' operation is performed on the value '99' in the tree.
operation >
```

Counting Nodes:

- Select the tree type.
- Choose the count option to retrieve the total number of nodes in the tree.

Finding Height:

- Pick the tree type.
- Select the height option to determine the height of the tree.

Printing In Order:

- After choosing the tree type, select print in order to display the elements in ascending order.

Checking if Tree is Empty:

- Select the tree type.
- Choose the empty option to check if the tree is empty.

Printing the Tree:

- After selecting the tree type, choose print tree to visualize the structure of the tree.

Determining Length:

- Select the tree type.
- Choose the length option to find the number of elements in the tree.

```
operation > length
Length: 3
operation >
```

Finding Maximum Value:

- Pick the tree type.
- Select the maximum option to find the maximum value in the tree.

```
operation > maximum
Maximum Value: 88
operation >
```

Finding Minimum Value:

- Select the tree type.
- Choose the minimum option to find the minimum value in the tree.

```
operation > minimum
Minimum Value: 55
operation >
```

Searching for a Value:

- After selecting the tree type, choose the search option.
- Enter the value you want to search for and press Enter.

```
search value > 45
'search' operation is performed on the value '45' in the tree.
values found? false
operation >
```

Exiting the Program:

- Select the exit option to gracefully exit the program.

```
operation > exit
To choose Red Black Tree: Enter -> rbt
To choose AVL Tree: Enter -> avl
To choose Binary Search Tree choose: Enter -> bst
 To Exit from the CLI: Enter -> exit
```

Note:

Make sure to follow the prompts displayed on the command line interface for each operation.

The program will guide you through the steps required for each selected operation for AVL Tree, Red-Black tree, Binary Search tree.