

2023 Spring CSE222 Homework5 Report

In this project I created a class called TreeProject. The main function of this class is to read data from a given text file, convert this data into a tree structure and visualize this tree structure using a GUI (Graphical User Interface).

JFrame frame: This property is used to render the GUI. JFrame is part of the Swing library and forms the base window of GUI applications.

DefaultMutableTreeNode root: This property holds the root node of the tree. The javax.swing.tree.DefaultMutableTreeNode class is used to create the tree structure.

The constructor of this class (TreeProject()) reads a text file and converts this data into a tree structure. First, the Scanner object is created to read a specific text file ("tree.txt"). The file is read line by line, the data in each line is ; It is split into columns separated by , and added to an ArrayList structure.

Then the data in this ArrayList is added to the tree. Each row represents a specific level of the tree. Each column represents a specific node at that level. Nodes are added to the tree using the addNode method. This method takes the parent node and its value as parameters and adds the new node to the tree.

Finally, the tree structure is converted to a JTree object and inserted into a JScrollPane. This allows the user to easily review different parts of the tree. Next, the JScrollPane is added to the JFrame and the GUI is made visible.

If the file is not found, an error message is printed and a stack trace is printed. This helps the developer determine the cause of the error.

addNode method: This method checks if a particular child node exists under a particular parent node. If this child node does not exist, it creates a new node

and adds it to the parent node. It then returns this child node. If this child node already exists, it returns the current child node. This method is used when creating the tree.

BFS method: This method searches for a specific node in the tree using the Breadth-First Search algorithm. This method traverses the nodes of the tree level by level using a Queue data structure. First, the root node is added to the queue. Then, each node is removed from the queue and child nodes are added to the queue until the queue is empty or the searched node is found. If a node has the same value as the searched node, a message is printed and the search is terminated. If the searched node is not found, it is printed on the screen.

DFS method: This method searches for a specific node in the tree using the Depth-First Search algorithm. The DFS algorithm searches each branch to the extreme. This method takes a node and the value to lookup as parameters and returns true if the searched node is found, and false if not.

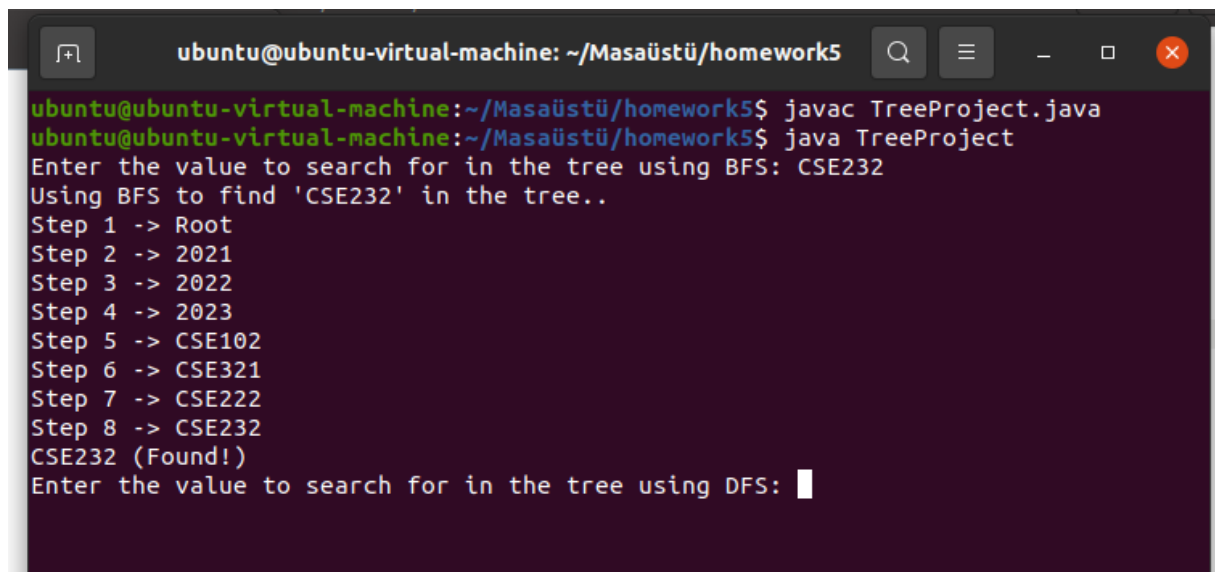
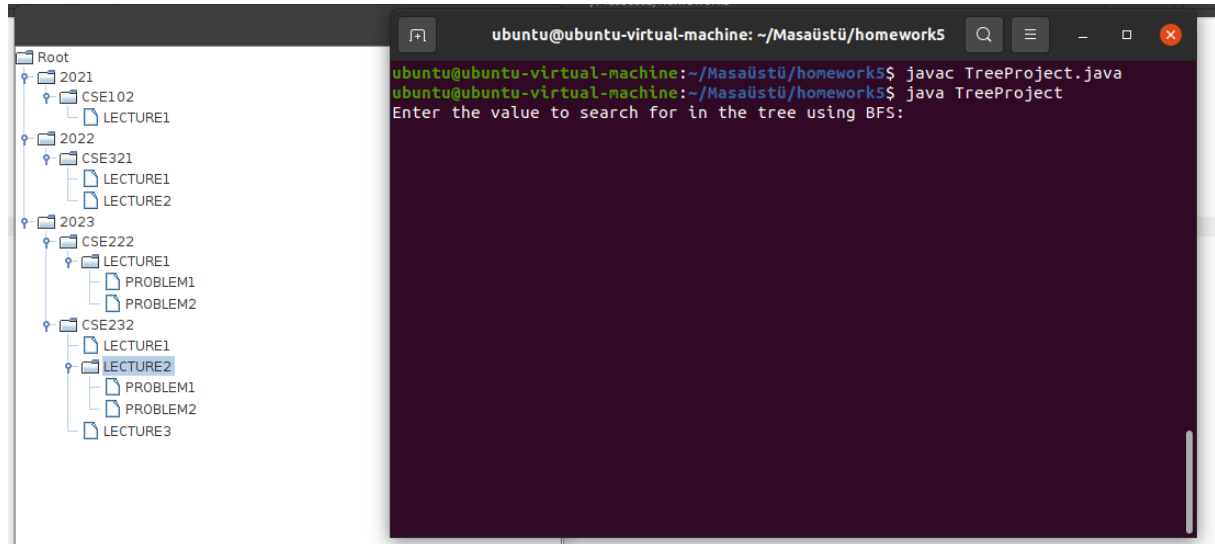
postOrderTraversal method: This method searches for a specific node in the tree using the Post-Order tree traversal method. This method takes a node and the value to be searched as parameters and returns the step number it is in if the searched node is found, and -1 if not found.

main method: This method is the starting point of the program. In this method, the value to be searched in the tree is taken from the user and it is checked whether this value is in the tree by using BFS, DFS and Post-Order navigation methods. In each method, a message is printed whether the searched value is found or not.

Running Command and Test

ubuntu@ubuntu-virtual-machine:~/Masaüstü/homework5\$ javac TreeProject.java

ubuntu@ubuntu-virtual-machine:~/Masaüstü/homework5\$ java TreeProject



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ubuntu@ubuntu-virtual-machine: ~/Masaüstü/homework5
ubuntu@ubuntu-virtual-machine:~/Masaüstü/homework5$ javac TreeProject.java
ubuntu@ubuntu-virtual-machine:~/Masaüstü/homework5$ java TreeProject
Enter the value to search for in the tree using BFS: CSE232
Using BFS to find 'CSE232' in the tree..
Step 1 -> Root
Step 2 -> 2021
Step 3 -> 2022
Step 4 -> 2023
Step 5 -> CSE102
Step 6 -> CSE321
Step 7 -> CSE222
Step 8 -> CSE232
CSE232 (Found!)
Enter the value to search for in the tree using DFS: CSE232
Using DFS to find 'CSE232' in the tree.
Step 1 -> Root
Step 2 -> 2023
Step 3 -> CSE232
CSE232 (Found!)
Enter the value to search for in the tree using Post-Order traversal:
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ubuntu@ubuntu-virtual-machine: ~/Masaüstü/homework5
Step 3 -> CSE232
CSE232 (Found!)
Enter the value to search for in the tree using Post-Order traversal: CSE232
Using Post-Order traversal to find 'CSE232' in the tree...
Step 1 -> LECTURE1
Step 2 -> CSE102
Step 3 -> 2021
Step 4 -> LECTURE1
Step 5 -> LECTURE2
Step 6 -> CSE321
Step 7 -> 2022
Step 8 -> PROBLEM1
Step 9 -> PROBLEM2
Step 10 -> LECTURE1
Step 11 -> CSE222
Step 12 -> LECTURE1
Step 13 -> PROBLEM1
Step 14 -> PROBLEM2
Step 15 -> LECTURE2
Step 16 -> LECTURE3
Step 17 -> CSE232
CSE232 (Found!)
```

```
ubuntu@ubuntu-virtual-machine: ~/Masaüstü/homework5
ubuntu@ubuntu-virtual-machine:~/Masaüstü/homework5$ java TreeProject
Enter the value to search for in the tree using BFS: CSE2332
Using BFS to find 'CSE2332' in the tree..
Step 1 -> Root
Step 2 -> 2021
Step 3 -> 2022
Step 4 -> 2023
Step 5 -> CSE102
Step 6 -> CSE321
Step 7 -> CSE222
Step 8 -> CSE232
Step 9 -> LECTURE1
Step 10 -> LECTURE1
Step 11 -> LECTURE2
Step 12 -> LECTURE1
Step 13 -> LECTURE1
Step 14 -> LECTURE2
Step 15 -> LECTURE3
Step 16 -> PROBLEM1
Step 17 -> PROBLEM2
Step 18 -> PROBLEM1
Step 19 -> PROBLEM2
CSE2332 not found!
Enter the value to search for in the tree using DFS: 
```

```
ubuntu@ubuntu-virtual-machine: ~/Masaüstü/homework5
CSE2332 not found!
Enter the value to search for in the tree using DFS: CSE2332
Using DFS to find 'CSE2332' in the tree.
Step 1 -> Root
Step 2 -> 2023
Step 3 -> CSE232
Step 4 -> LECTURE3
Step 5 -> LECTURE2
Step 6 -> PROBLEM2
Step 7 -> PROBLEM1
Step 8 -> LECTURE1
Step 9 -> CSE222
Step 10 -> LECTURE1
Step 11 -> PROBLEM2
Step 12 -> PROBLEM1
Step 13 -> 2022
Step 14 -> CSE321
Step 15 -> LECTURE2
Step 16 -> LECTURE1
Step 17 -> 2021
Step 18 -> CSE102
Step 19 -> LECTURE1
CSE2332 not found!
Enter the value to search for in the tree using Post-Order traversal: 
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```
~/Masaüstü/homework5
ubuntu@ubuntu-virtual-machine: ~/Masaüstü/homework5
Step 19 -> LECTURE1
CSE2332 not found!
Enter the value to search for in the tree using Post-Order traversal: CSE2332
Using Post-Order traversal to find 'CSE2332' in the tree...
Step 1 -> LECTURE1
Step 2 -> CSE102
Step 3 -> 2021
Step 4 -> LECTURE1
Step 5 -> LECTURE2
Step 6 -> CSE321
Step 7 -> 2022
Step 8 -> PROBLEM1
Step 9 -> PROBLEM2
Step 10 -> LECTURE1
Step 11 -> CSE222
Step 12 -> LECTURE1
Step 13 -> PROBLEM1
Step 14 -> PROBLEM2
Step 15 -> LECTURE2
Step 16 -> LECTURE3
Step 17 -> CSE232
Step 18 -> 2023
CSE2332 not found!
```