GTU Department of Computer Engineering
CSE 222/505 - Spring 2023
Homework #05 Report

Selim Aynigül

200104004004

Problem Solution Approach

In this homework we are asked to design various search algorithms in a tree and move any node within the tree. There are some requirement for all 5 parts.

We have 2 class with names ***Main.java*** and ***Tree.java***. In main method we are calling tree functions and testing them. In the tree class we have our tree structure with search and move methods.

Part A

In this part we are creating our tree object in main method and reading "tree.txt" input file and converting the input to string array in the constructor method of tree class with ***readFromFile()*** and ***createTree()*** methods.

Part B

In this part we are using BFS algorithm in ***findBFS()*** method to visit level by level all the nodes in the tree until find the serching node with the help of a queue.

Part C

In this part we are using DFS algorithm in ***findDFS()*** method to visit all the nodes from right to left in the tree until find the serching node with the help of a stack.

Part D

In this part we are using post order traversal method in ***findPostOrder()*** method to visit all the nodes from left deepest node to right in the tree until find the seraching node with the help of two stacks, one for visited nodes and one for nodes to be visited.

Part E

In this part we are calling ***moveNode()*** method in main. In here we are controlling the validation of the inputs using ***getNode()*** method to see if the given node exist in the tree. After the validation we are getting input nodes which are moving location and the node to be moved with ***getNode()*** and ***getYear()*** methods and sending this nodes to ***removeNode()*** and ***addNode()*** methods to locate our node in the new location.

Controlled Conditions

- Read the txt file line by line and save the information in a 2D String array.
- Use JTree to create a tree structure. The tree have a root with a label “Root”
- When moving a node, if all the path exists in the destination year, overwrite it and inform the user about it.
- No static variables.
- Read input from user.
- Print every step while searching.
- When moving a node, if the node is the only child of the parent node delete the parent folder as well.
- When moving a node if the given location to move does not exist in the tree add it.

Running Command and Results

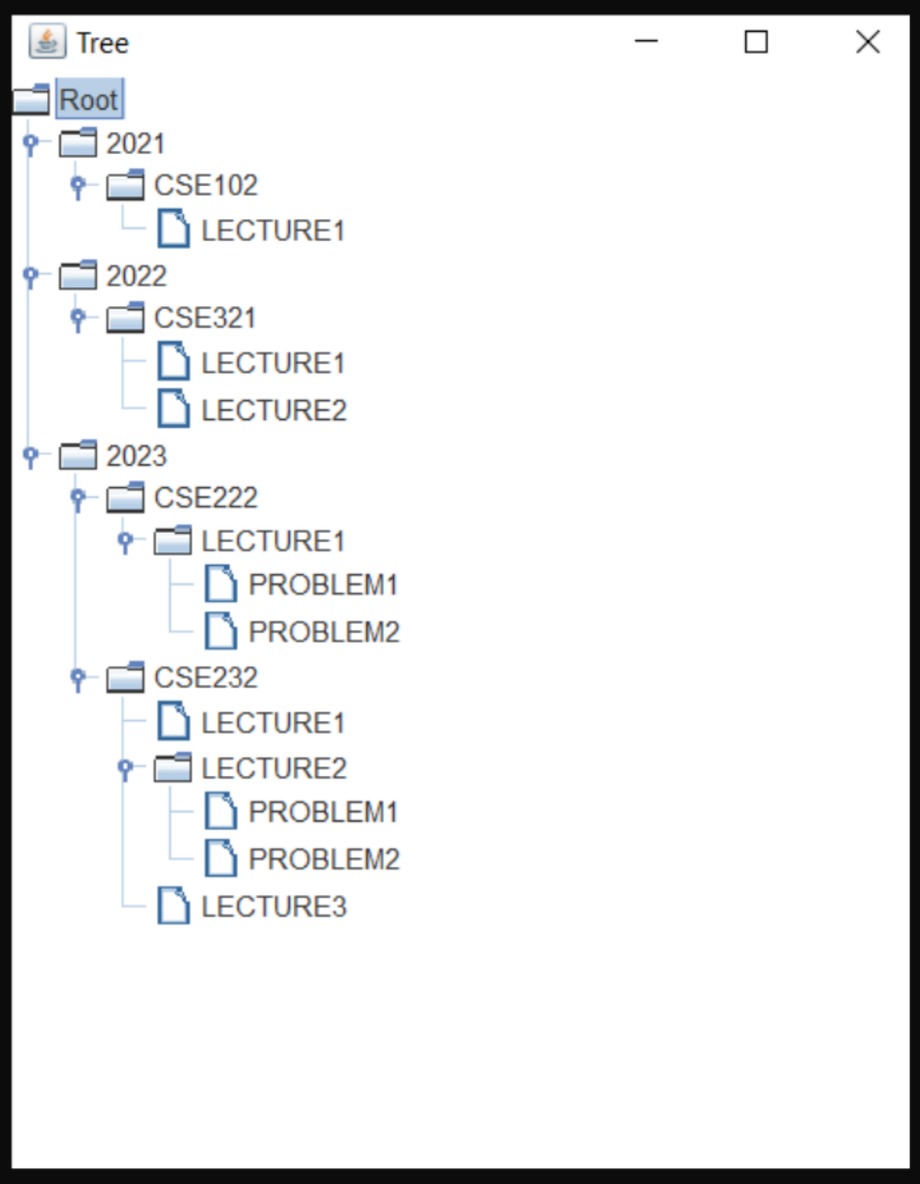
Compiling commands:

cd homework5
javac *.java
cd..

Running commands:

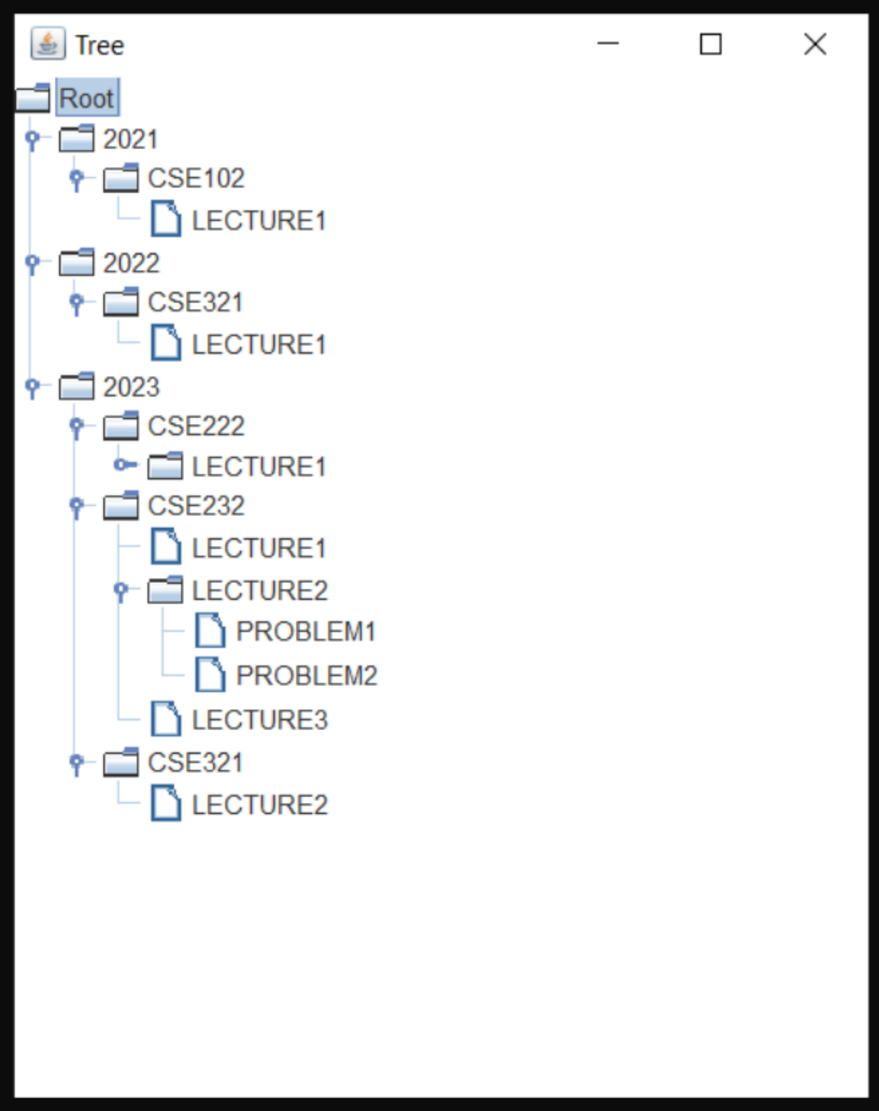
java homework5.Main

```
C:\Users\Administrator\Desktop\OKUL\cse222\homework5>java Main.java
Please enter to search:
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 (Found!)

Using DFS to find 'CSE232' in the tree...
Step 1 -> Root
Step 2 -> 2023
Step 3 -> CSE232 (Found!)

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 (Found!)
```

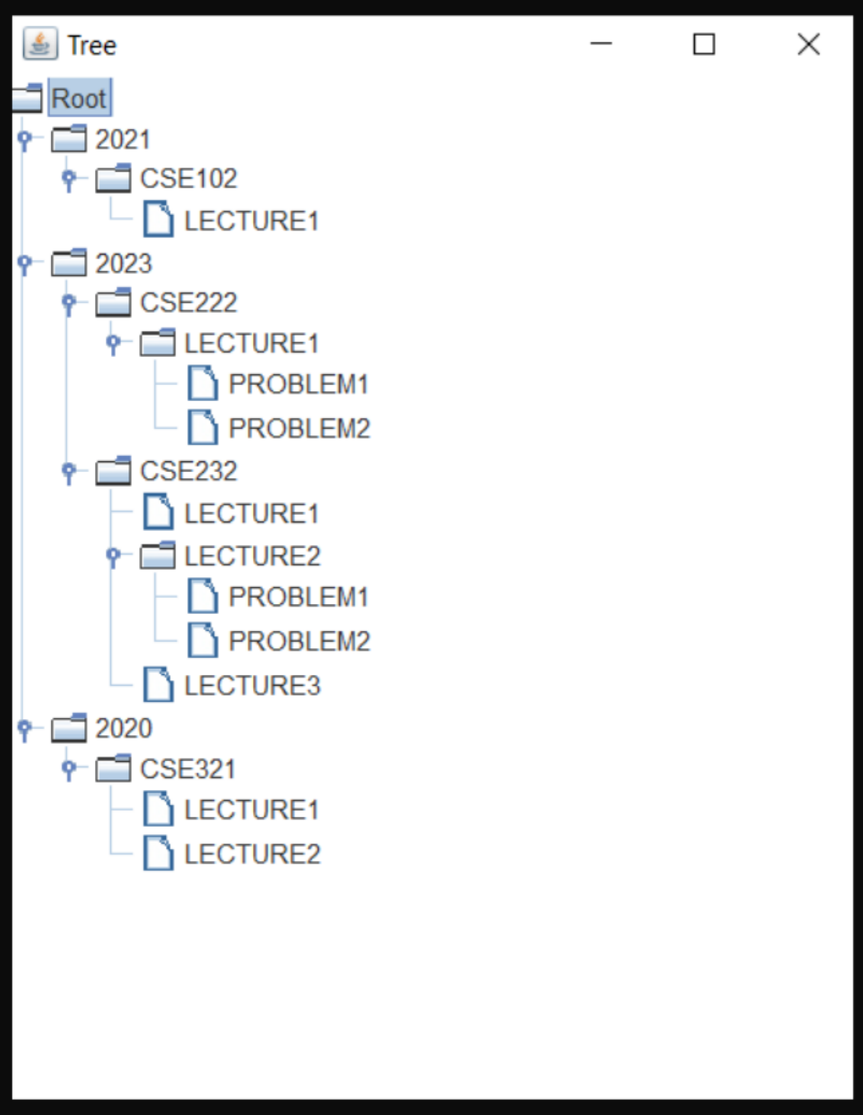



```
Please enter to search:
CSE2332

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 in the tree.

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 in the tree.
```

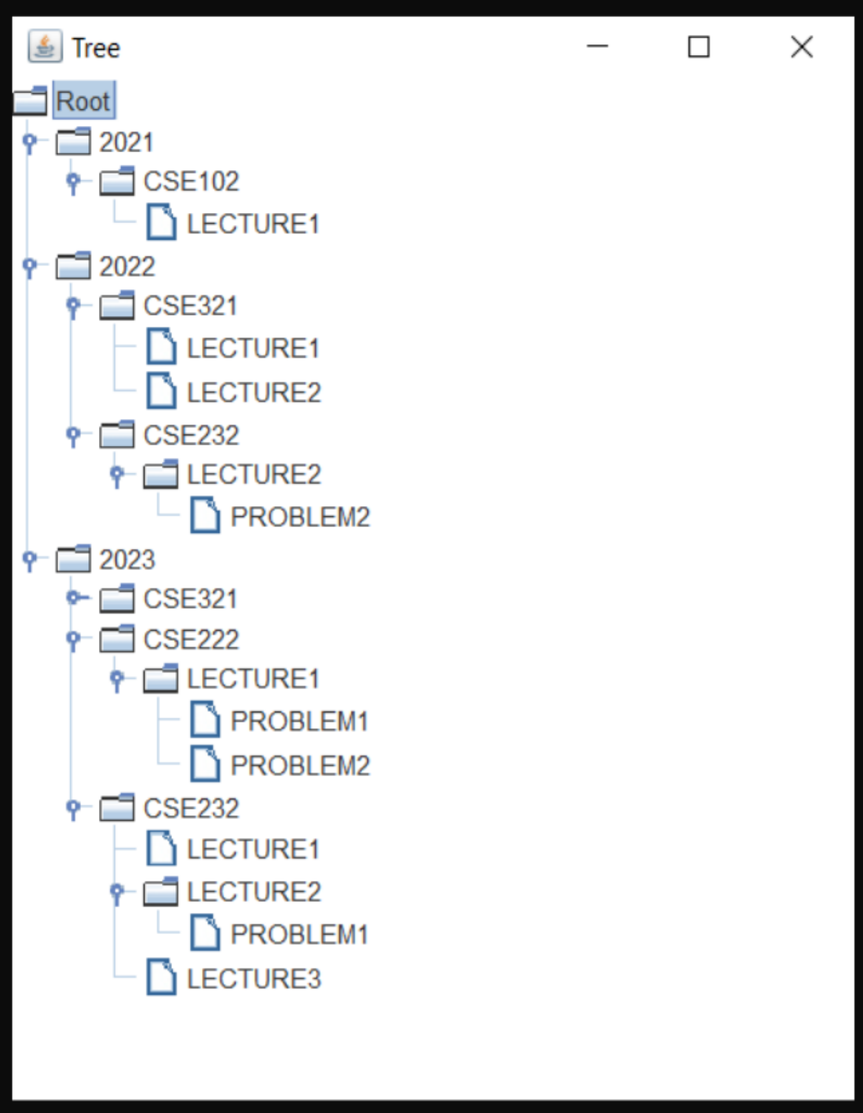
```
Please enter to move: (ex: 2023,CSE321,LECTURE1)
2022,CSE321,LECTURE2

Please enter the year:
2023

Moved 2022->CSE321->LECTURE2 to 2023
```




```
Please enter to move: (ex: 2023,CSE321,LECTURE1)
2022,CSE321

Please enter the year:
2020

Moved 2022->CSE321 to 2020
```




```
Please enter to move: (ex: 2023,CSE321,LECTURE1)
2023,CSE232,LECTURE2,PROBLEM2

Please enter the year:
2022

Moved 2023->CSE232->LECTURE2->PROBLEM2 to 2022
```



```
Please enter to move: (ex: 2023,CSE321,LECTURE1)
2022,CSE222

Please enter the year:
2021
Cannot move 2022->CSE222 because it doesn't exist in the tree.
```

```
Please enter to move: (ex: 2023,CSE321,LECTURE1)
2023,CSE321,LECTURE1

Please enter the year:
2022
2023->CSE321->LECTURE1 has been overwritten

Moved 2023->CSE321->LECTURE1 to 2022
```