CMPE 223 Programming Homework 3

1- Information

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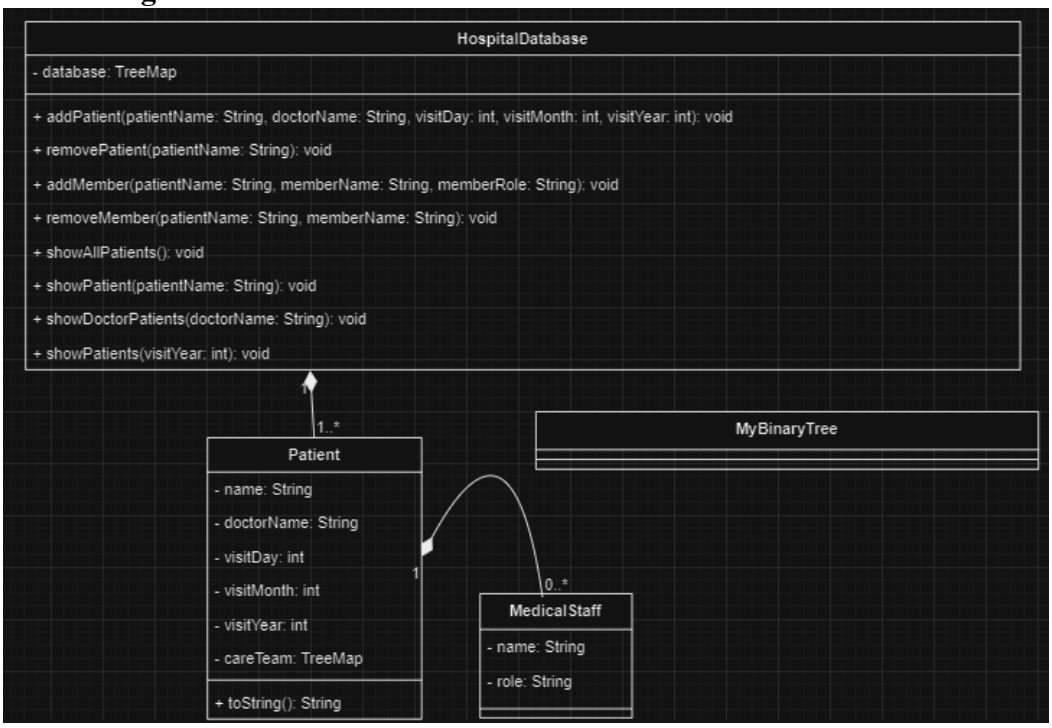
2- Problem Statement & Code Design

The purpose of this programming task is to create a Hospital Database system that manages visits, details about the medical staff assigned to them, and patient information. Our program includes methods such as adding/removing patients, adding/removing medical personnel to patient care teams, and viewing various details about patients and their doctors using our own implementation of Binary Search Tree.

Subtasks:

- Firstly, I created a Patient class to store patient details and care team.
- Then I created a MedicalStaff class to represent individual medical staff members and HospitalDatabase class to manage the overall database, including patient records and transactions on those records.
- I implemented my own binary tree named “MyBinaryTree” to efficiently manage the operations of the program and provided different methods to add, remove and search for patients and their healthcare staff. Further information is available on my Java program inside comment lines.
- I have also provided methods to display patients based on different criteria, such as doctor name, visit year, etc.

Code Design:



3- Implementation & Functionality

The project consists of 5 classes: Patient, MedicalStaff,HospitalDatabase and MyBinaryTree class. There is Node class inside MyBinaryTree Class.

Further explanation is available in java files inside comment lines.

Patient Class:

Attributes:

- “String name”: Patient's name.
- “String doctorName”: Name of the patient's doctor.
- “int visitDay”: Day of the visit.
- “int visitMonth”: Month of the visit. “int visitYear”: Year of the visit.

“TreeMap<String, MedicalStaff> careTeam”: Care team members.

MedicalStaff Class:

Attributes:

- “String name”: Staff member's name.
- “String role”: Staff member's role.

MyBinaryTree Class:

Attributes:

- “Node root”: Root node of the binary tree.

Node Class Attributes:

- “String key”: Key for the node.
- “Patient value”: Patient associated with the node.
- “Node left, right”: Left and right children’s nodes.

HospitalDatabase Class:

Attributes:

- “TreeMap<Integer, MyBinaryTree> database”: Database of patients categorized by visit year.

4- Testing

Testing Case: The program works without error and shows the correct output. To run the program, the user may use java terminal. HospitalDatabase has a main method to run the program.

My program can perform all the necessary tasks mentioned with no problem: adding/removing patients, adding/removing medical staff from patient care teams, showing all the patients, displaying specific patient details, viewing a specific doctor's patients, screening patients by year of visit. As necessary, our program displays an error message when a patient is added twice to ensure information to the user of the program. The output matches with the code as seen from the java files.

5- Final Assessment

My Trouble Points: This task and the algorithm concept in general is not very easy. In this task particularly, I had a hard time while displaying the error message when the patients are duplicated. On the other hand, the in-order traversal methods were also complicated and hard to implement. However, I worked hard and provided effort to solve these issues and succeeded.

Most Challenging Part for me: Ensuring the correct behavior of all methods, especially for edge cases, required extensive testing and validation.

My Likes & Dislikes & Learnings: I really enjoyed implementing the tree-based patient management system and learning how efficiently it processes data. I learned a lot about binary search tree operations, modular design, and the importance of extensive testing. Also, I did not like the difficulties we encountered as it was prepared in a detailed format regarding the Hospital Database system, its design, implementation, and testing. Overall, I believe that this assignment will be beneficial for my career since it requires binary search tree algorithm creation and connecting it with the rest of the project. My knowledge regarding the issue has extended during the process.