BIRZEIT UNIVERSITY

Faculty of Engineering and Information Technology
Computer Science Department
COMP242 Project #2

Project Title: Medical Patient Monitoring and Treatment Tracker

Submission Deadline: Thursday, 13/11/2025 at 11:00 PM
Submission Format: Java source files (.java) + input files (.txt)
Tools Allowed: Java only. No arrays. No arrayList. No scene builder. Use **linked lists only**.

Project Objective

Design and implement a Medical Patient Monitoring System using **linked lists only**. The system will manage patient records, medical conditions, treatments, medications, and symptoms. It will read data from input files, allow dynamic updates, and generate reports, all while maintaining the relationships between linked lists. **Figure 1 illustrates the Abstract System Overview: How Everything Connects.**

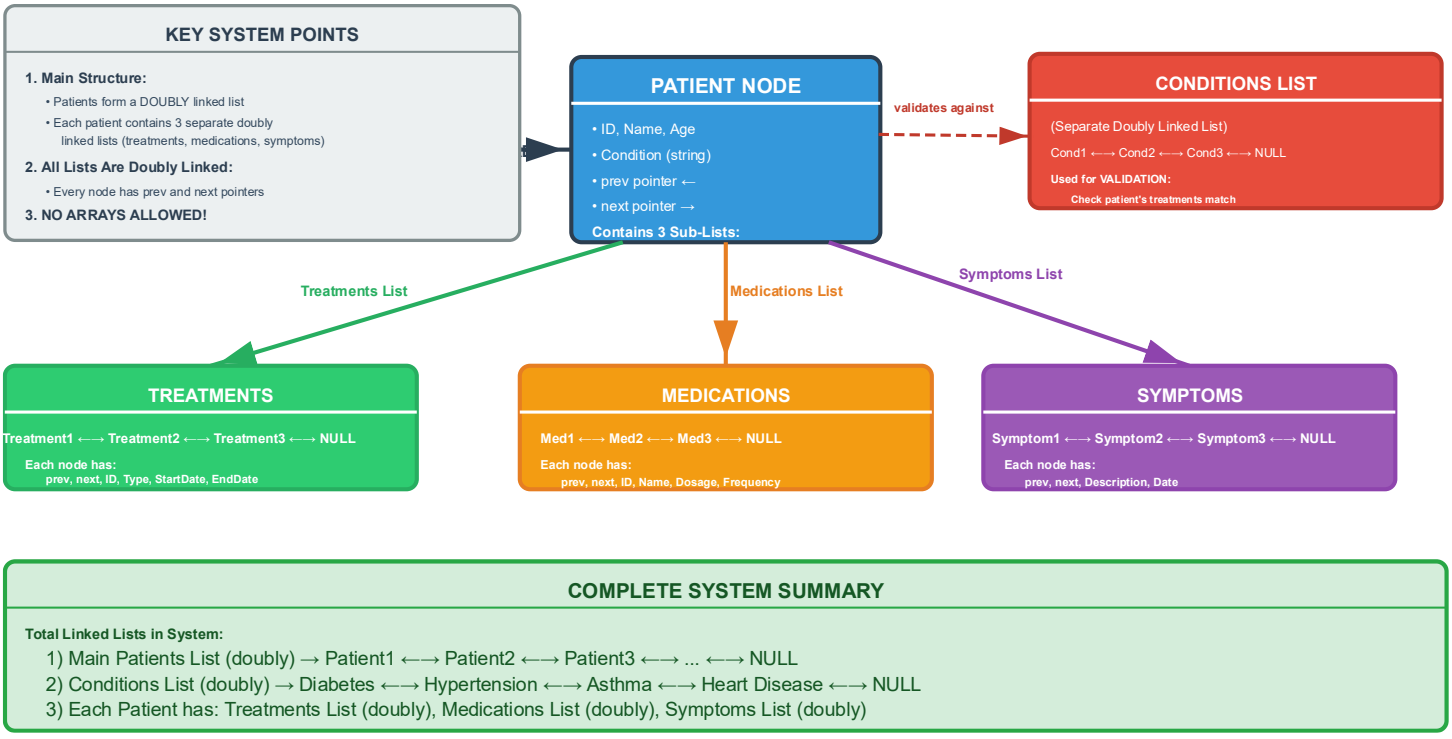


Figure 1: Abstract System Overview

Required Input Files

1. conditions.txt: Defines each medical condition and its recommended treatments and medications.

Format:

ConditionName|Treatment1,Treatment2,...|Medication1,Medication2,...

Example:

```
Diabetes|Insulin Therapy,Diet Counseling|Insulin,Metformin
Hypertension|Blood Pressure Monitoring,Stress Relief|Amlodipine,Lisinopril
Asthma|Inhaler Use,Allergy Testing|Salbutamol,Montelukast
Heart Disease|Cardiac Rehab,Medication Adjustment|Atorvastatin,Beta Blockers
.....
```

2. patients.txt: Contains basic patient information.

Format:

PatientID,Name,Age,Condition

Example:

```
101,Lina,34,Diabetes
102,Omar,45,Hypertension
103,Sara,29,Asthma
104,Bilal,52,Heart Disease
.....
```

3. treatments.txt: Lists treatments assigned to patients.

Format:

TreatmentID,PatientID,TreatmentType,StartDate,EndDate

Example:

```
T001,101,Insulin Therapy,01.10.2025,31.10.2025
T002,101,Diet Counseling,05.10.2025,20.10.2025
T003,102,Blood Pressure Monitoring,03.10.2025,18.10.2025
.....
```

4. medications.txt: Lists medications prescribed to patients.

Format:

MedicationID,PatientID,MedicationName,Dosage,Frequency

Example:

M001,101,Insulin,10 units,Daily

M002,101,Metformin,500 mg,Twice Daily

M003,102,Amlodipine,5 mg,Daily

……

Clarification on Treatments and Medications Based on Conditions

- The **conditions.txt** file defines each medical condition along with its **recommended treatments** and **recommended medications**.
- For example, the condition "Diabetes" recommends treatments like "Insulin Therapy" and "Diet Counseling" and medications like "Insulin" and "Metformin".
- When assigning treatments and medications to patients (in treatments.txt and medications.txt), the treatment types and medication names should correspond to those recommended for the patient's condition.
- This means that for a patient with Diabetes, only treatments and medications listed under Diabetes in conditions.txt should be assigned.
- The system should validate that treatments and medications assigned to a patient match the recommended ones for their condition. If an assignment does not match, it should be flagged or rejected.

Data Structures (Linked Lists Only)

Each entity is represented using a linked list. **Arrays and ArrayLists are not allowed.**

Patient Node

- Patient ID
- Name
- Age
- Condition
- Linked list of:
    - Treatments
    - Medications
    - Symptoms

Condition Node

- Condition Name
- Linked list of:
    - Recommended Treatments
    - Recommended Medications

Treatment Node

- Treatment ID
- Type
- Start Date
- End Date

Medication Node

- Medication ID
- Name
- Dosage
- Frequency

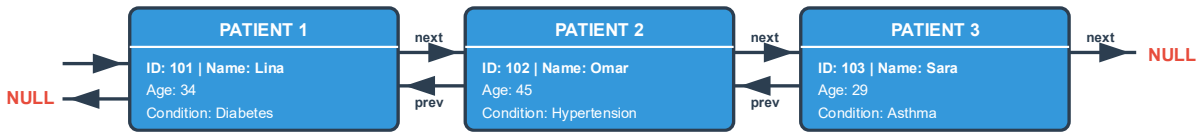
Symptom Node

- Symptom Description
- Date Recorded

Sample Linked List Visualization

Here are diagrams showing how linked lists are structured in this project:

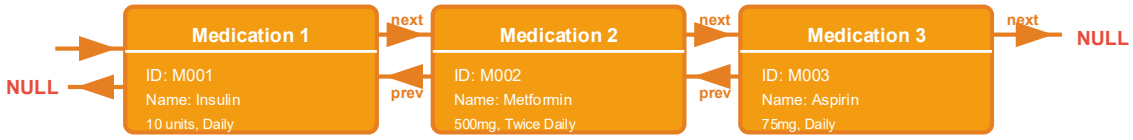
SECTION 1: Patients Doubly Linked List



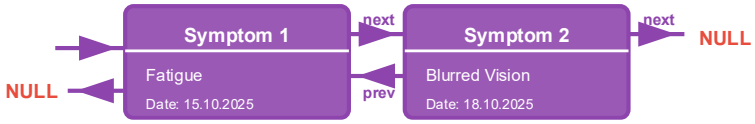
SECTION 2: Patient 1 (Lina) - Internal Doubly Linked Lists

A) Treatments Doubly Linked List

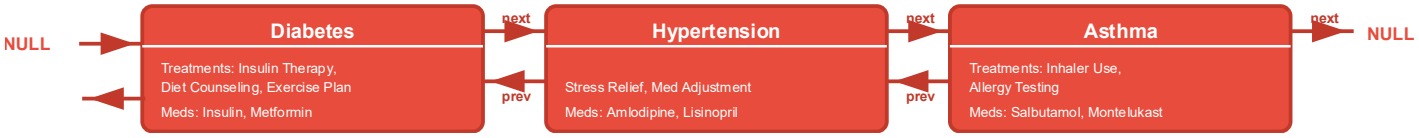
B) Medications Doubly Linked List



C) Symptoms Doubly Linked List



SECTION 3: Conditions Doubly Linked List (Reference for Validation)



Example: Patient Lina (ID: 101)

- Condition: Diabetes
- Treatments:
  [T001: Insulin Therapy] → [T002: Diet Counseling] → NULL
- Medications:
  [M001: Insulin] → [M002: Metformin] → NULL
- Symptoms:
  [Fatigue] → [Blurred Vision] → NULL

Functional Requirements

1. Patient Management

- Add, update, delete, and search patients.
- Assign treatments and medications based on condition.
- Deleting a patient removes all linked lists related to this patient.

2. Condition Management

- Add, update, delete conditions.
- Modify recommended treatments and medications.
- View all patients with a specific condition.

3. Treatment & Medication Management

- Add, update, delete treatments and medications.
- Sort by name, type, or date.

4. Symptom Tracking

- Add/remove symptoms.
- View symptom history.

Reporting Features

A. Condition Summary Report (Sorted in ascending order by condition)

Condition	Patients	Treatments	Medications
Diabetes	10	Insulin Therapy, Diet	Insulin, Metformin
Hypertension	8	BP Monitoring, Stress Relief	Amlodipine, Lisinopril

B. Patient Treatment Report (Sorted in ascending order by name)

Patient Name	Condition	Treatments	Medications
Lina	Diabetes	Insulin Therapy, Diet	Insulin, Metformin
Omar	Hypertension	BP Monitoring, Stress Relief	Amlodipine, Lisinopril

C. Medication Adherence Report (Sorted in ascending order by name)

Patient Name	Medication	Frequency	Last Refill
Lina	Insulin	Daily	20.10.2025
Omar	Amlodipine	Daily	18.10.2025

GUI Requirements

- Table views for patients, treatments, medications.
- Menus for each entity type.
- Date picker for treatment and medication dates.
- Combo box for sorting (ascending/descending).
- Linked list visualizations (include Next Patient and Previous Patient buttons. Pressing Next updates, the table view with the next patient's details, while pressing Previous updates it with the previous patient's details)

Submission Requirements

- Submit .java files and .txt input files.
- Minimum:
    - 30 patients
    - 5 treatments per patient
    - 3 medications per patient
    - 5 conditions in conditions.txt
- Code must be well-commented and follow Java conventions (**Remember COMP2311**).
- GUI must reflect condition-based logic.
- Reports must show condition-patient-treatment-medication relationships.
- This is an **individual Project**. Disciplinary action will be taken against those who **cheat**. Additionally, the use of **AI tools** for generating solutions or **copying from websites** is strictly prohibited. Students found in violation of these policies will face severe consequences. It is crucial to ensure that all work submitted is **your own** and adheres to the **guidelines provided for this project**.
- Please submit your Java files (java) and corresponding test text files (txt) via the ITC by Thursday, 13/11/2025 at 11:00 PM. Late submissions will not be accepted under any circumstances.

All the Best 😊