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# *DoctorAid*

CSE 326 : Information System Design Sessional

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March 3, 2023

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# Chapter 1

## Motivation

The Doctor : Patient ratio in Bangladesh is alarmingly low. As such, doctors face time constraints while conducting check-ups or during patient appointments. They must sieve through past medical records and extract relevant information. Then after making the necessary diagnosis, they must give advice and write prescriptions that are very repetitive in nature. All the while, operating under the aforementioned time crunch. We hope to make the doctor's life easier and more convenient with our project: **DoctorAid**

# Chapter 2

## Introduction

Our project "DoctorAid" aims to make doctor-patient appointments more efficient for the doctor. We have the following key features:

- Doctors can get the opportunity to get a brief overview of all the relevant, and important patient information at a glance. These include:
  - General Information - concise collection from all other tabs
  - Demography - information about the patients hometown, address, occupations
  - Diagnostics - test results, sorted by most recent
  - Prescriptions - records of previous appointments, can be sorted
  - Medications - recent prescribed medications
- They can Search the patient Electronic Health Record effectively, using keywords and search words.
- They can receive smart autocomplete and reminders when filling up a new prescription. These reminders/prompts include:
  - Autocomplete medicine dosages
  - Warn about inter-medicine reactions
  - warn about reactions between past patient conditions and medicines being prescribed
  - prompt common suggestions related to already filled-up prescription

## Chapter 3

# Requirement Analysis using BPMN diagram

### 3.1 Full BPMN Diagram

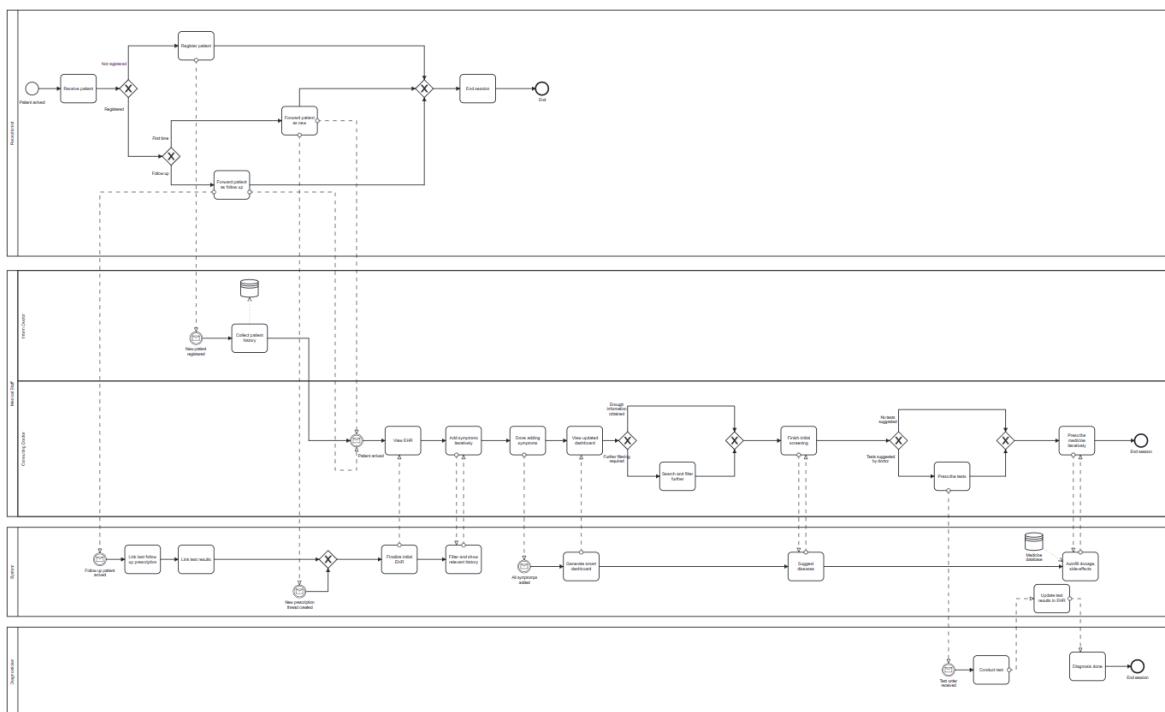


Figure 3.1: Full BPMN Diagram

## Pools

- Receptionist
- Medical Stuff
- System
- Diagnostician

### 3.2 Receptionist

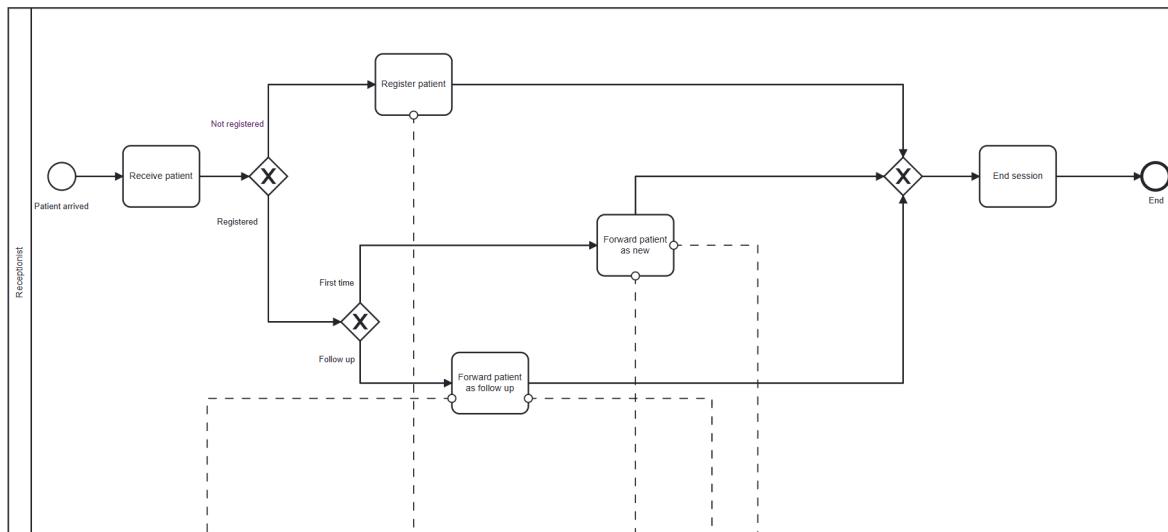


Figure 3.2: Pool1-Receptionist

### 3.3 Medical Stuff

In the medical stuff section, we have two types of actors. One is the intern doctor and other one is the consulting doctor. We have two different lanes for two of these actors.

#### 3.3.1 Intern Doctor

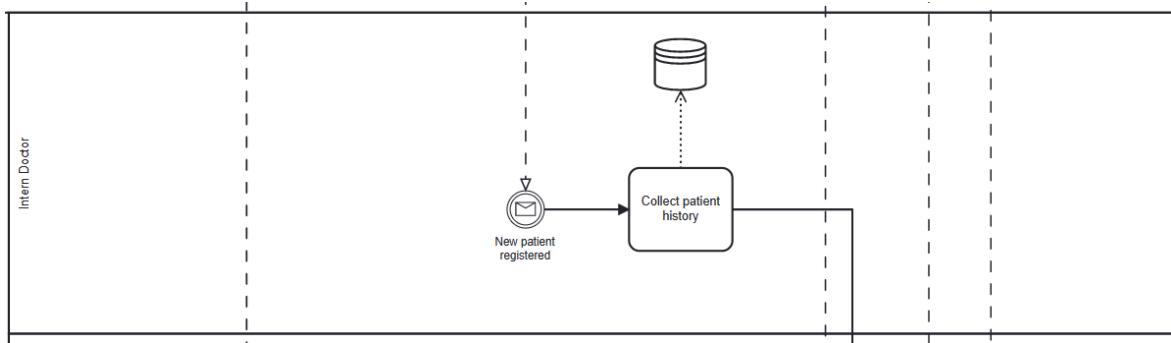


Figure 3.3: Pool2-Medical Stuff (Intern Doctor Lane)

#### 3.3.2 Consulting Doctor

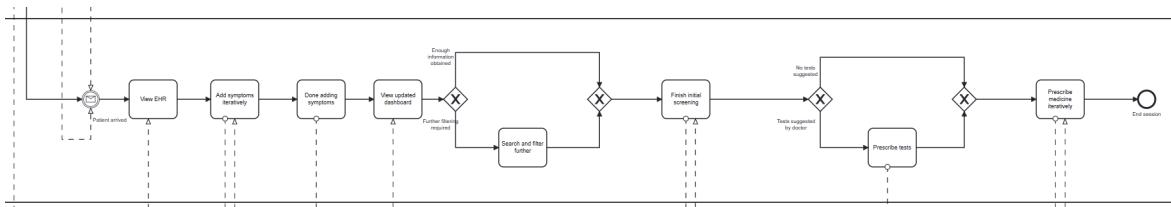


Figure 3.4: Pool2-Medical Stuff (Consulting Doctor Lane)

### 3.3.3 Complete Lane of Medical Stuff

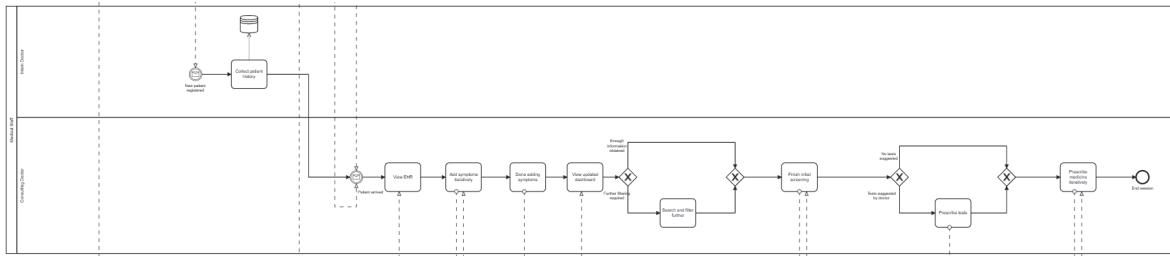


Figure 3.5: Pool2-Medical Stuff (Complete Lane)

## 3.4 System

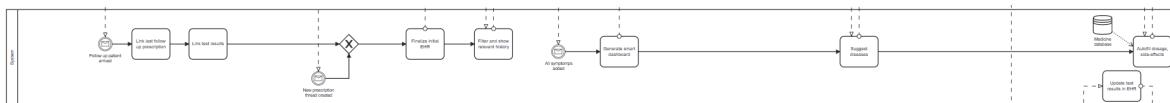


Figure 3.6: Pool3- System

### 3.5 Diagnostician

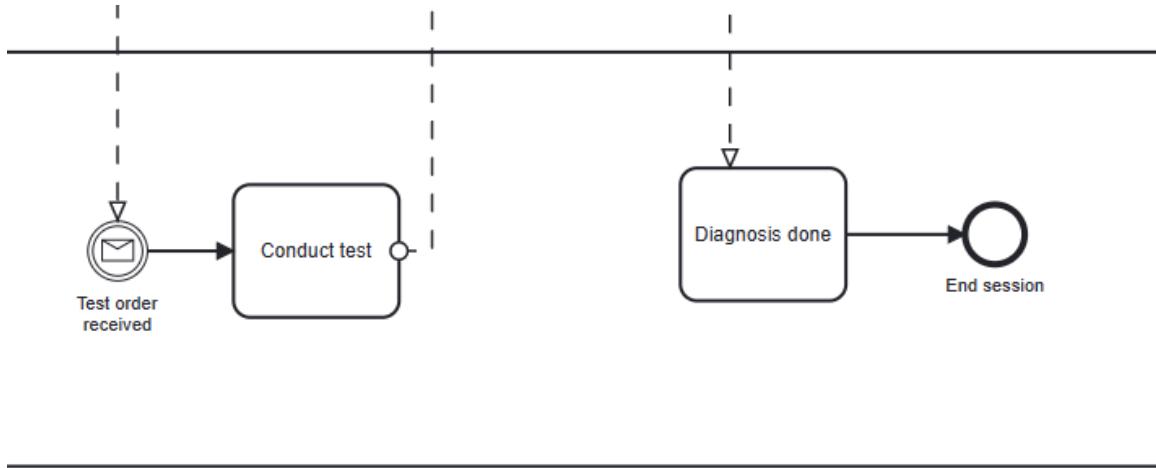


Figure 3.7: Pool4- Diagnostician

This completes the requirement analysis with BPMN diagram section of our project. We have identified 4 actor pools and necessary lanes are added to the pools to better understand the actions of each actor pool.

# Chapter 4

## Class Diagram

### 4.1 Full Class Diagram

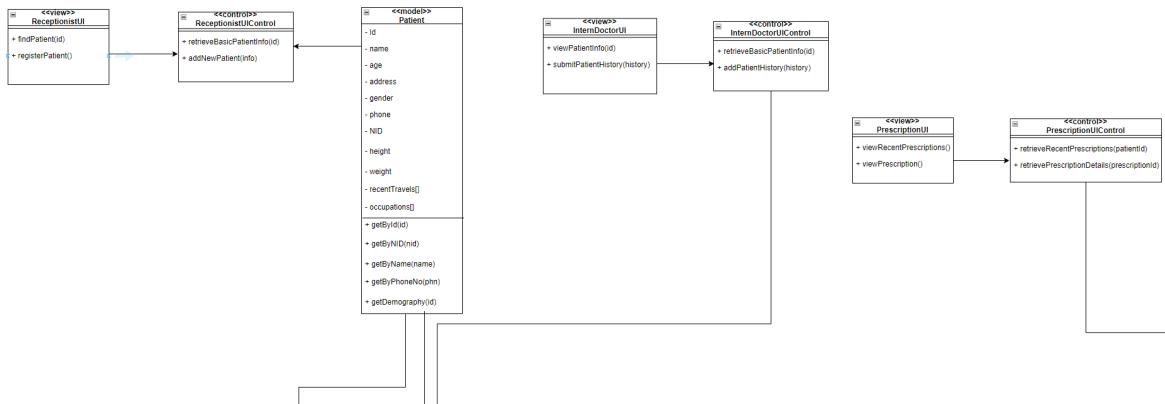


Figure 4.1: Full Class Diagram (Part 1)

## 4.2 Full Class Diagram

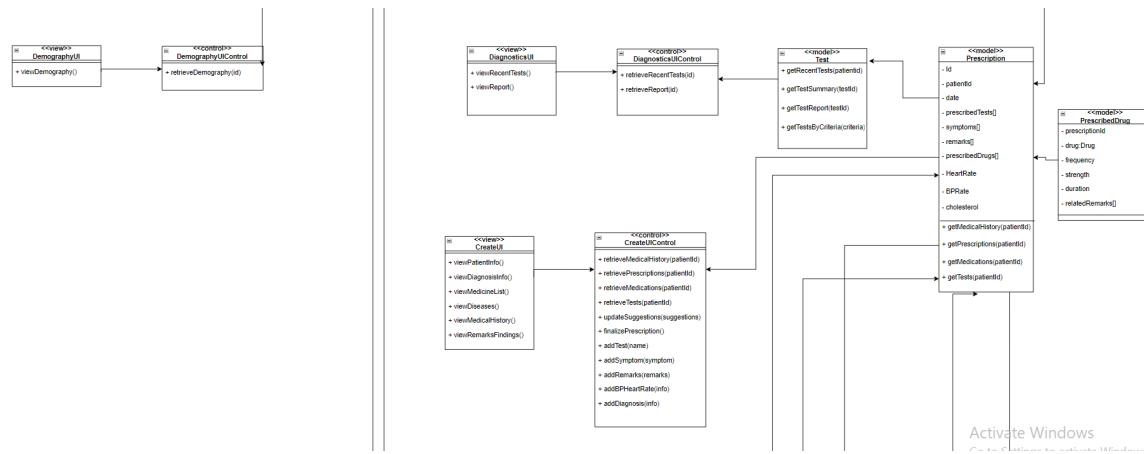


Figure 4.2: Full Class Diagram (Part 1)

### 4.3 Full Class Diagram

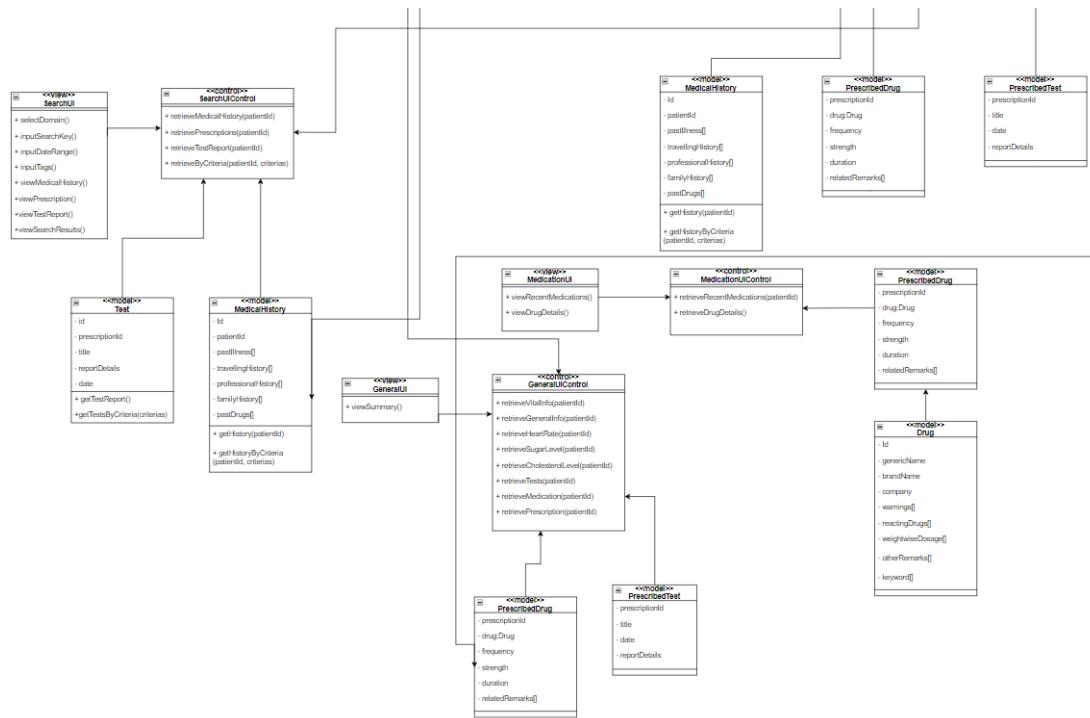


Figure 4.3: Full Class Diagram (Part 1)

#### 4.4 Receptionist Class Diagram

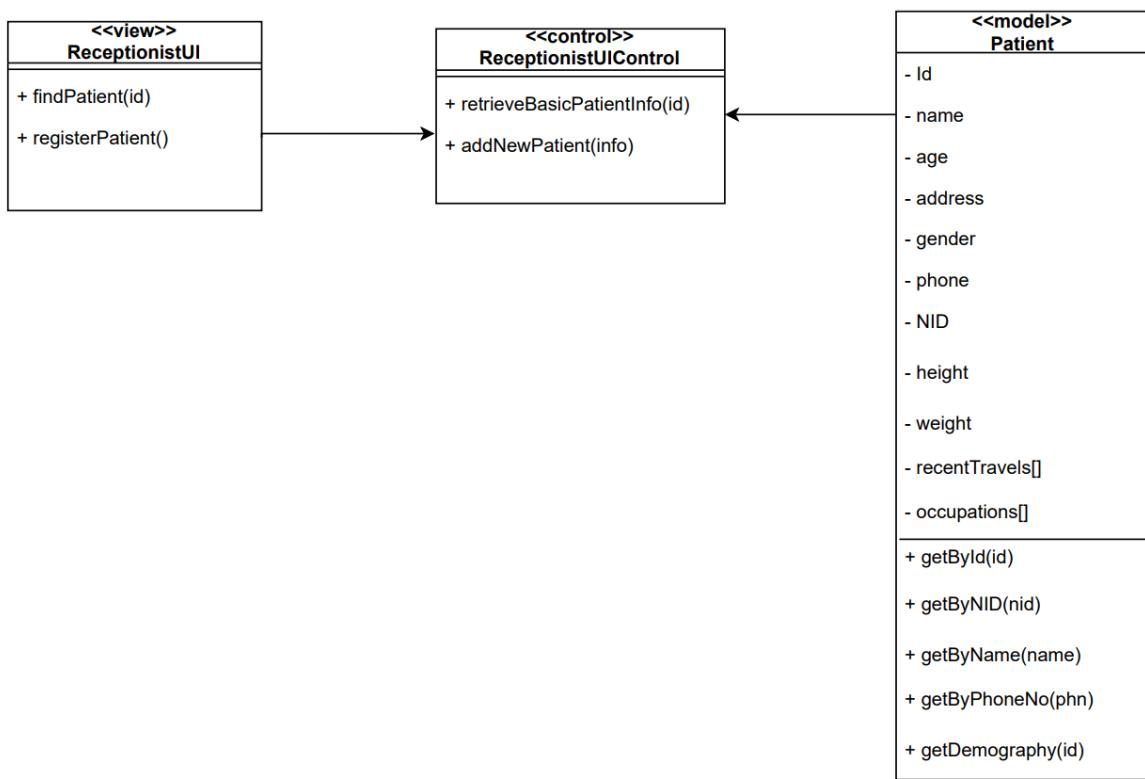


Figure 4.4: Class Diagram related to Receptionist

## 4.5 Intern Doctor Class Diagram

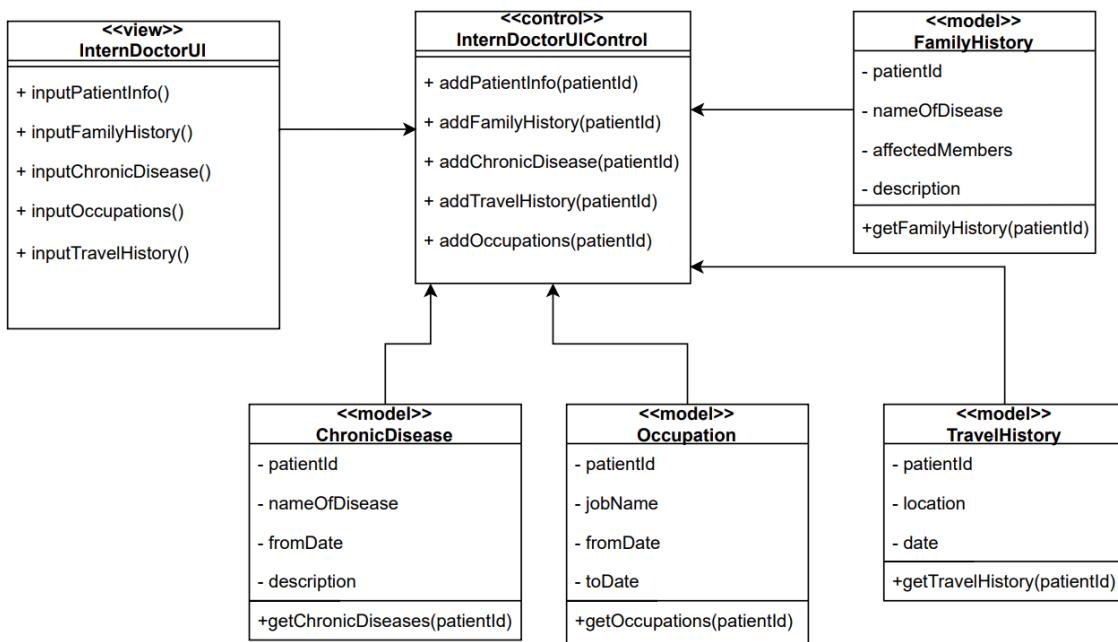


Figure 4.5: Class Diagram related to Intern Doctor

## 4.6 General Tab Class Diagram

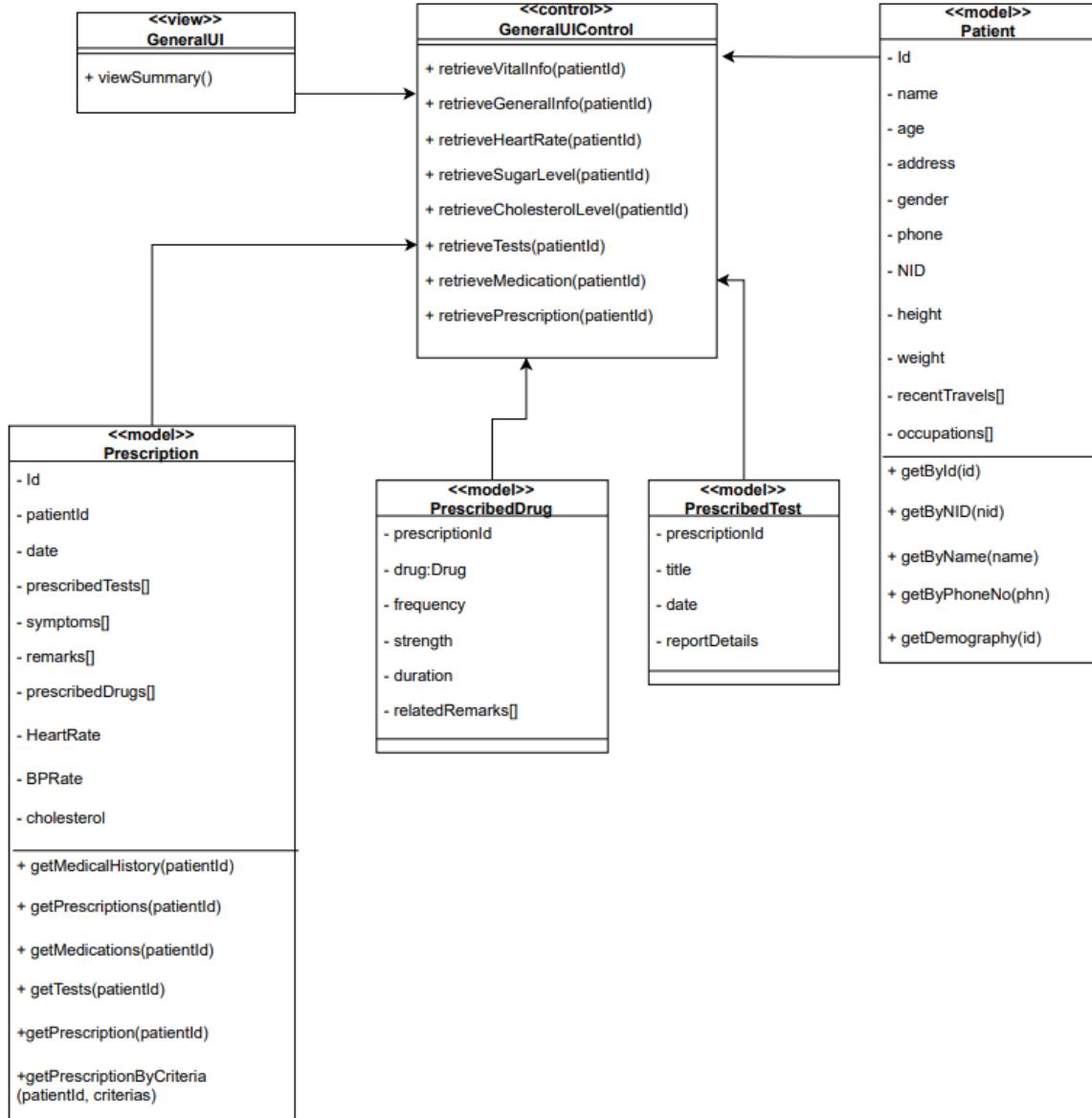


Figure 4.6: Class Diagram related to General Tab

## 4.7 Demography Tab Class Diagram

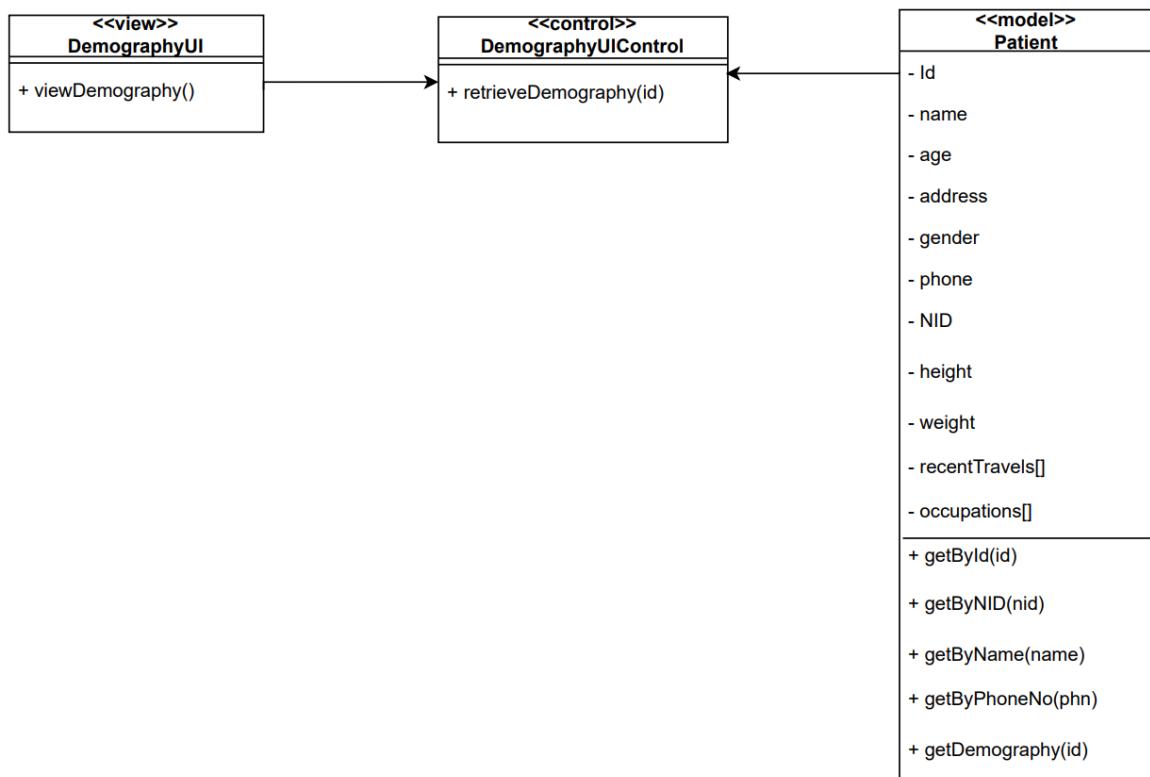


Figure 4.7: Class Diagram related to Demography tab

## 4.8 Diagnostics Tab Class Diagram

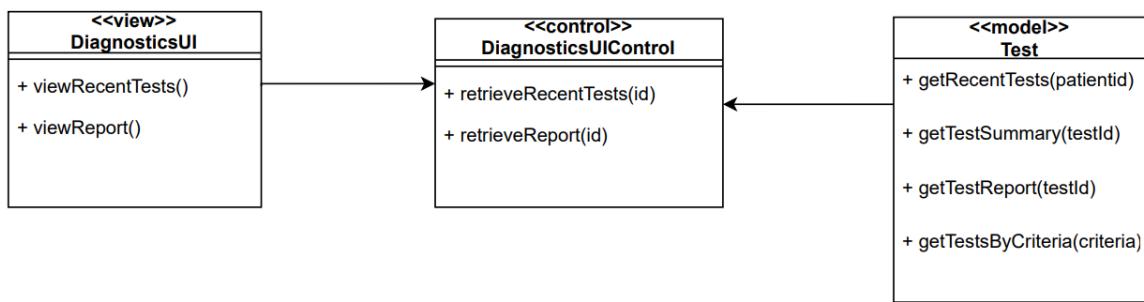


Figure 4.8: Class Diagram related to Diagnosis Tab

## 4.9 Medications Tab Class Diagram

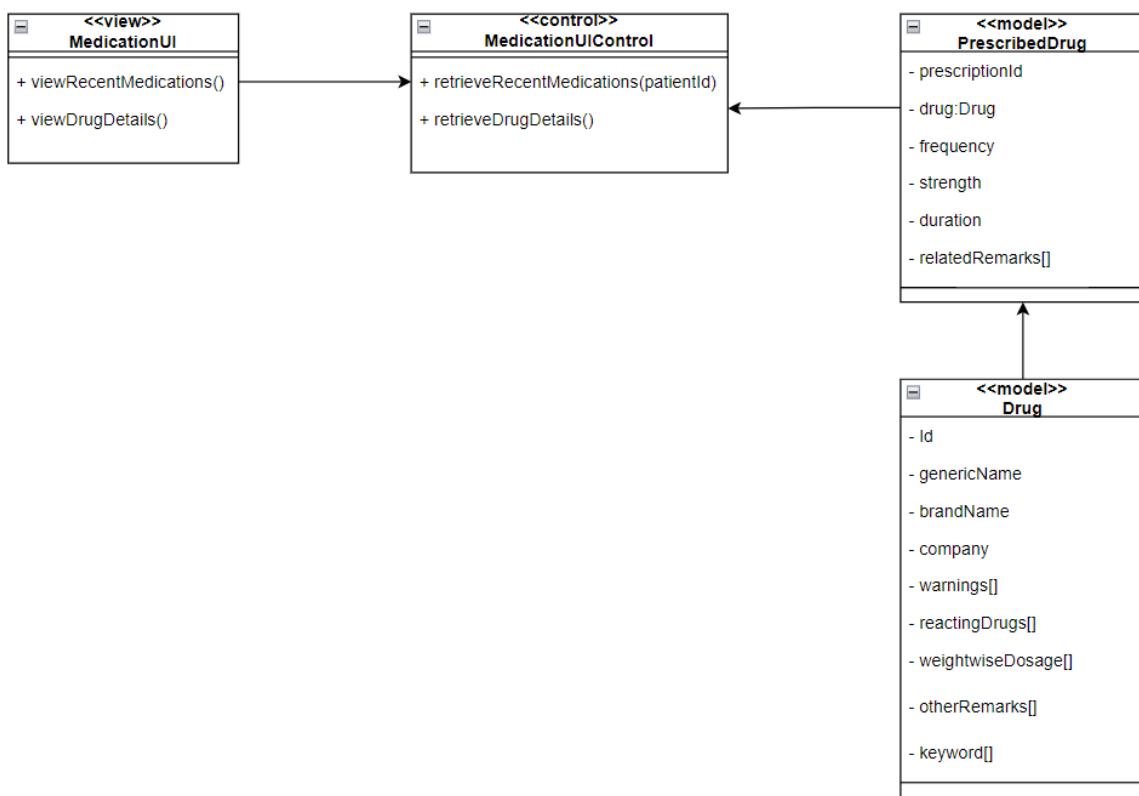


Figure 4.9: Class Diagram related to Medications Tab

## 4.10 View Prescription Class Diagram

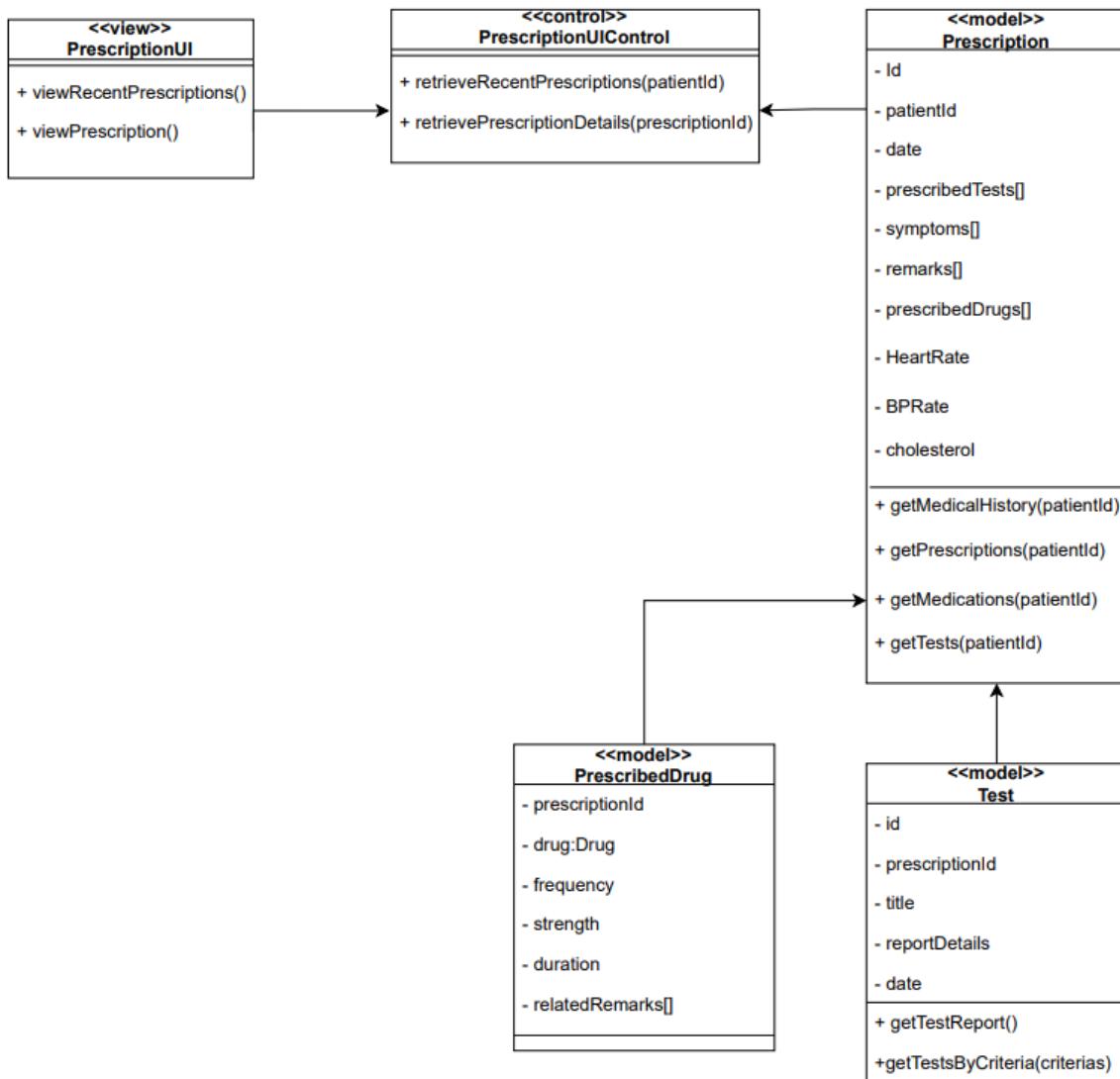


Figure 4.10: Class Diagram related to View Prescription

## 4.11 Create Prescription Class Diagram

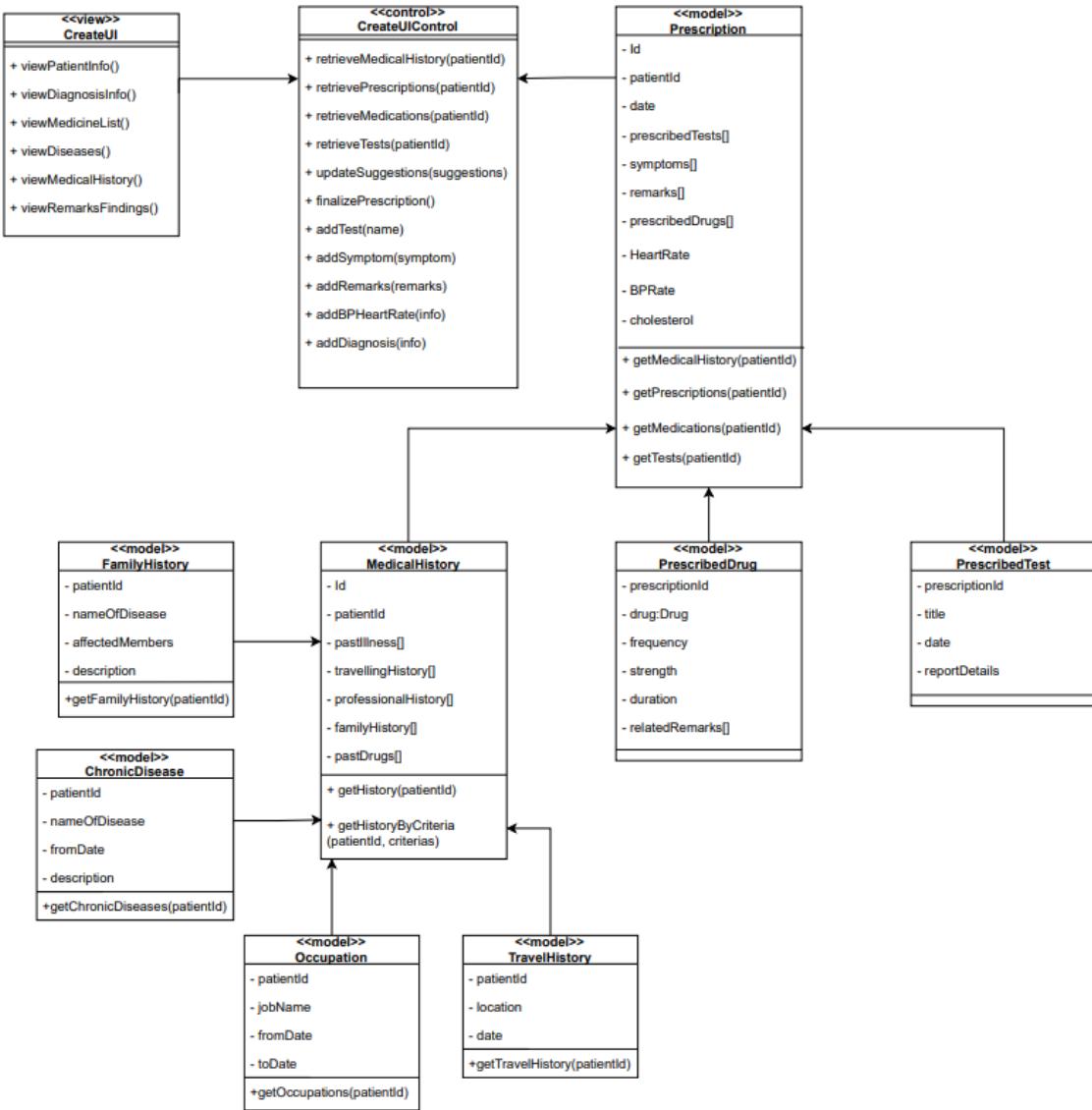


Figure 4.11: Class Diagram related to Create Prescription

## 4.12 Search Class Diagram

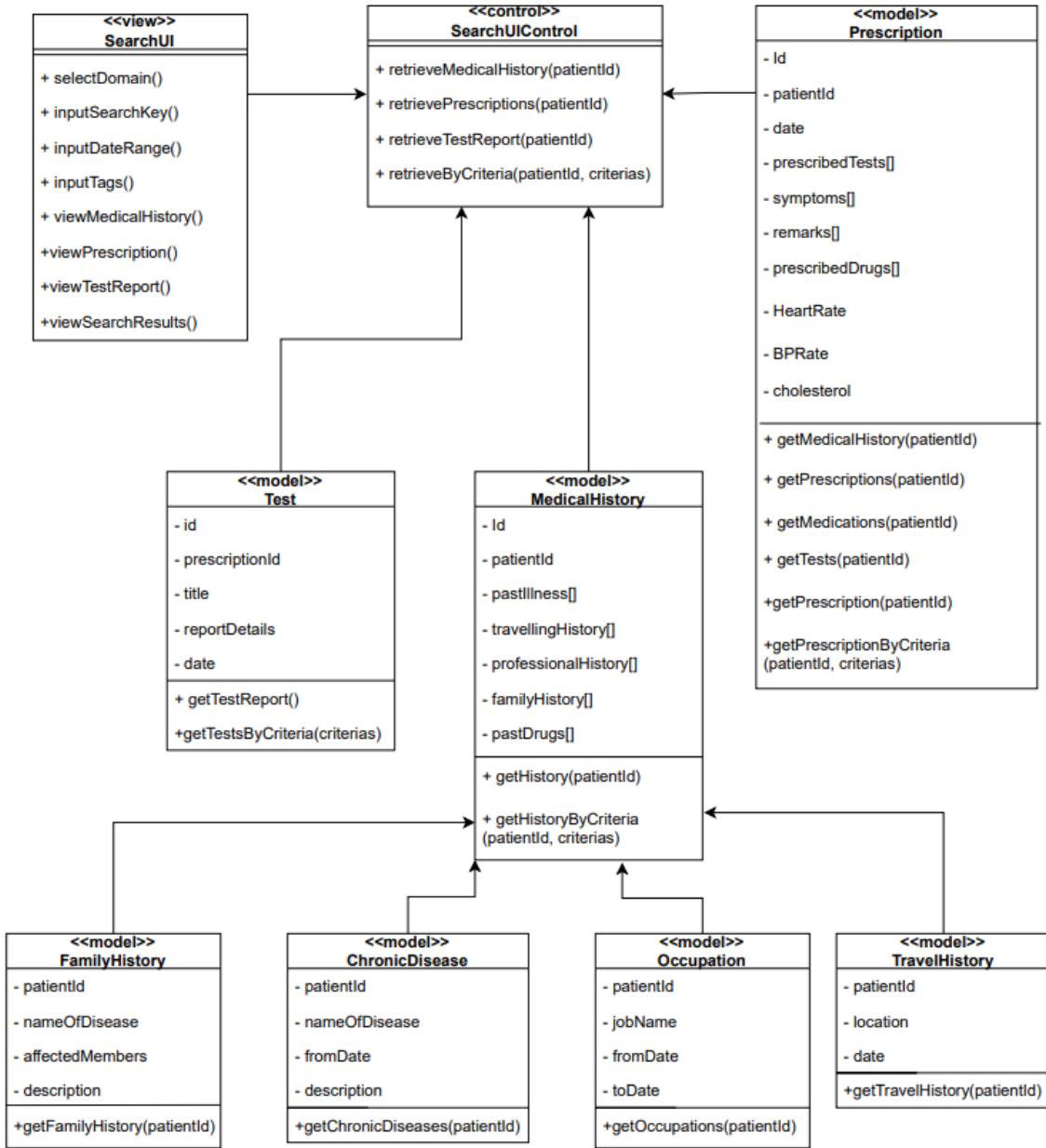


Figure 4.12: Class Diagram related to Search

# Chapter 5

## ER Diagram

### 5.1 ERD

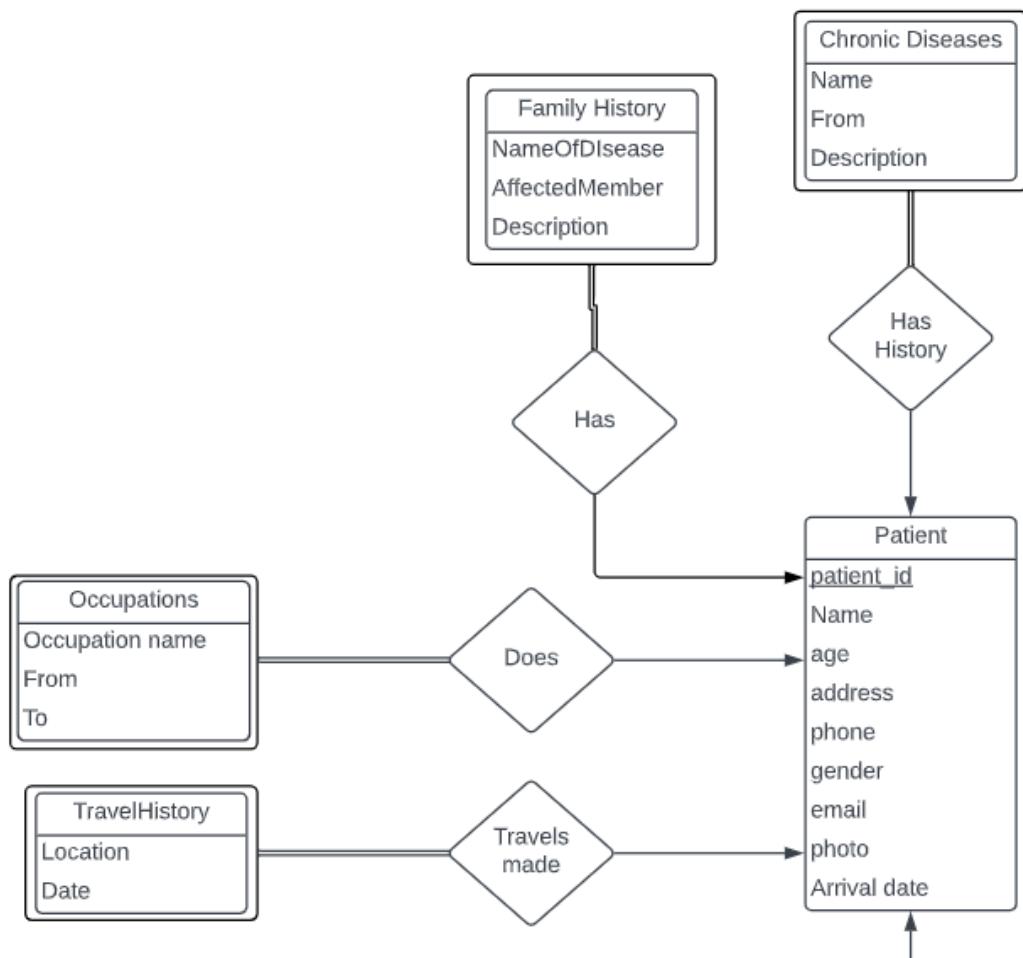


Figure 5.1: ERD 1.1

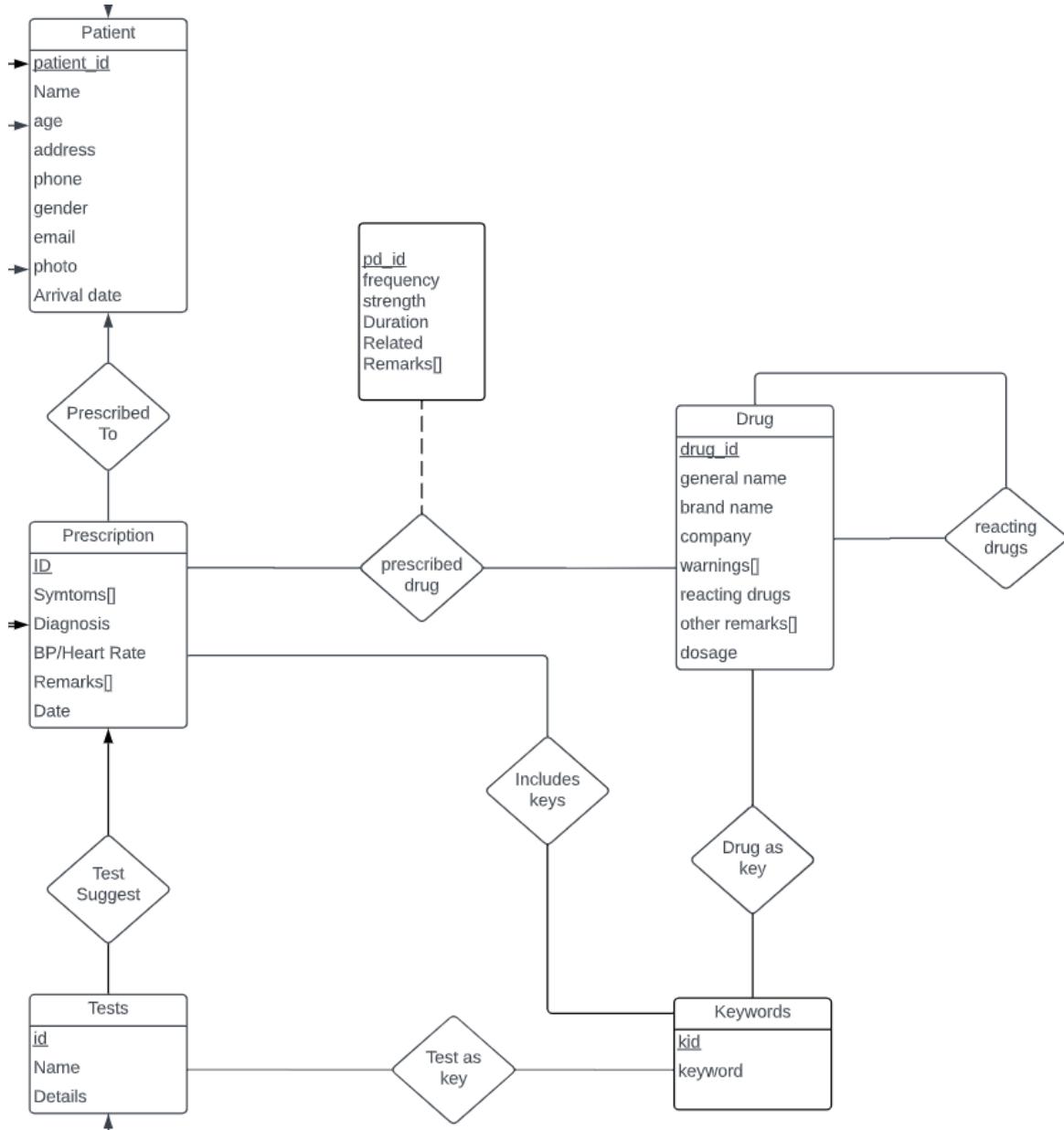


Figure 5.2: ERD 1.2

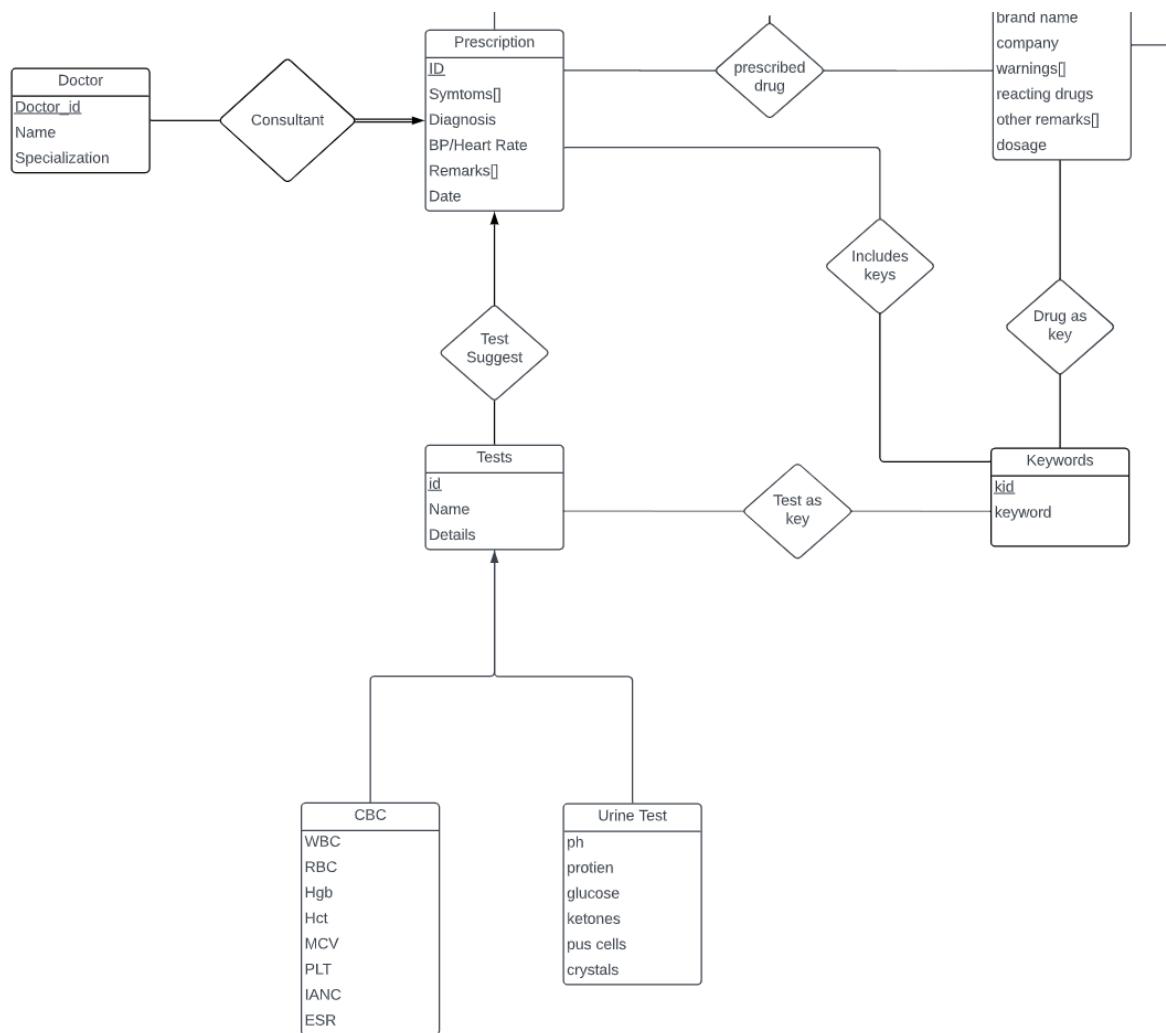


Figure 5.3: ERD 1.3

# Chapter 6

## Sequence Diagram

### 6.1 Receptionist

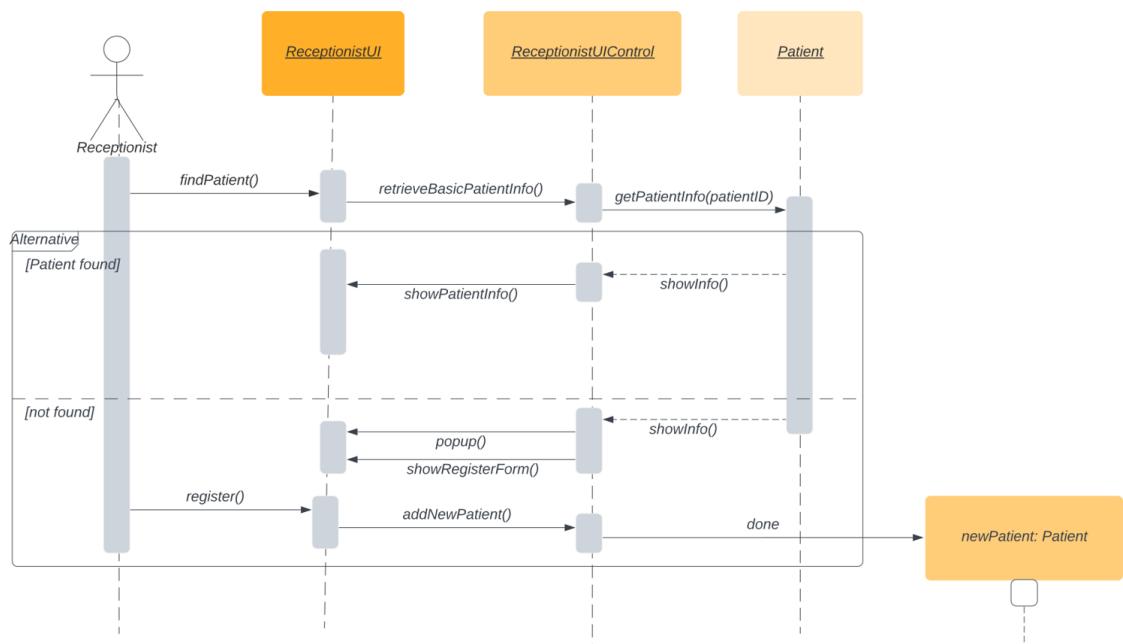


Figure 6.1: Sequence Diagram for Receptionist

## 6.2 Intern

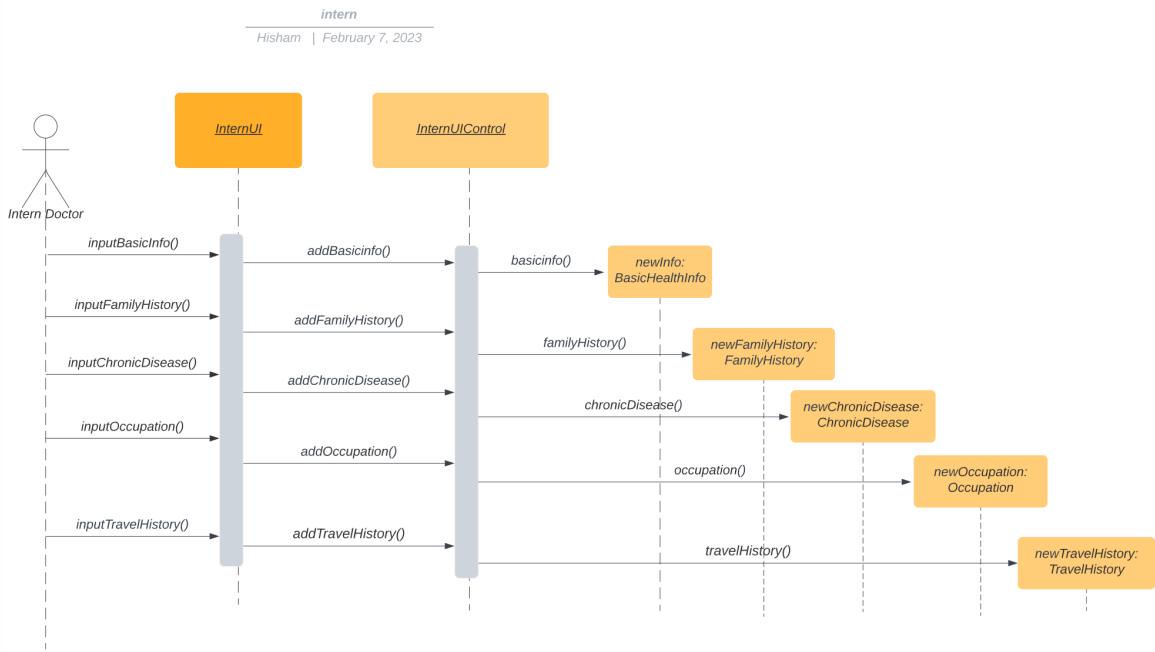


Figure 6.2: Sequence Diagram for Intern Doctor

### 6.3 Doctor's View - General Tab of Patient

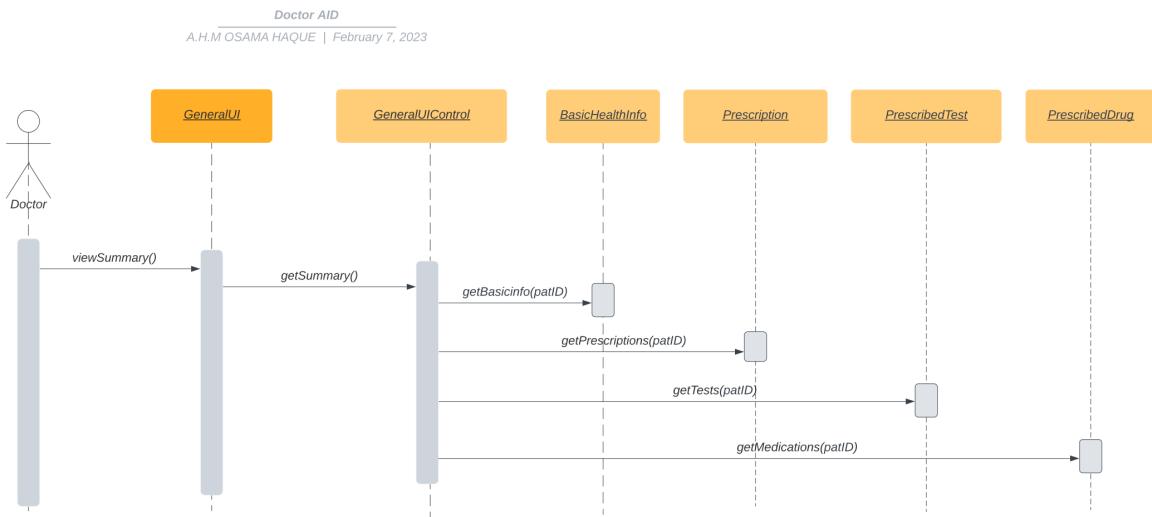


Figure 6.3: Sequence Diagram for General UI

## 6.4 Doctor's View - Diagnosis Tab of Patient

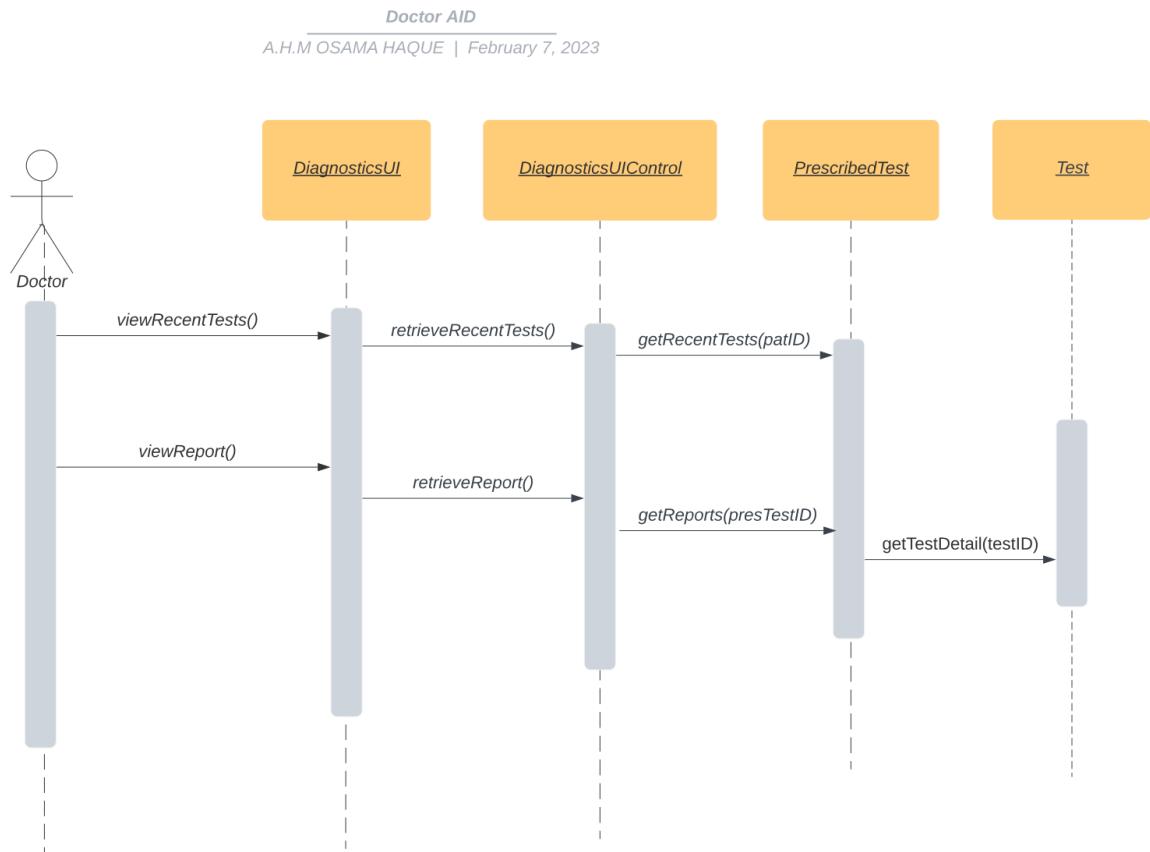


Figure 6.4: Sequence Diagram for Diagnosis UI

## 6.5 Doctor's View - Medication Tab of Patient

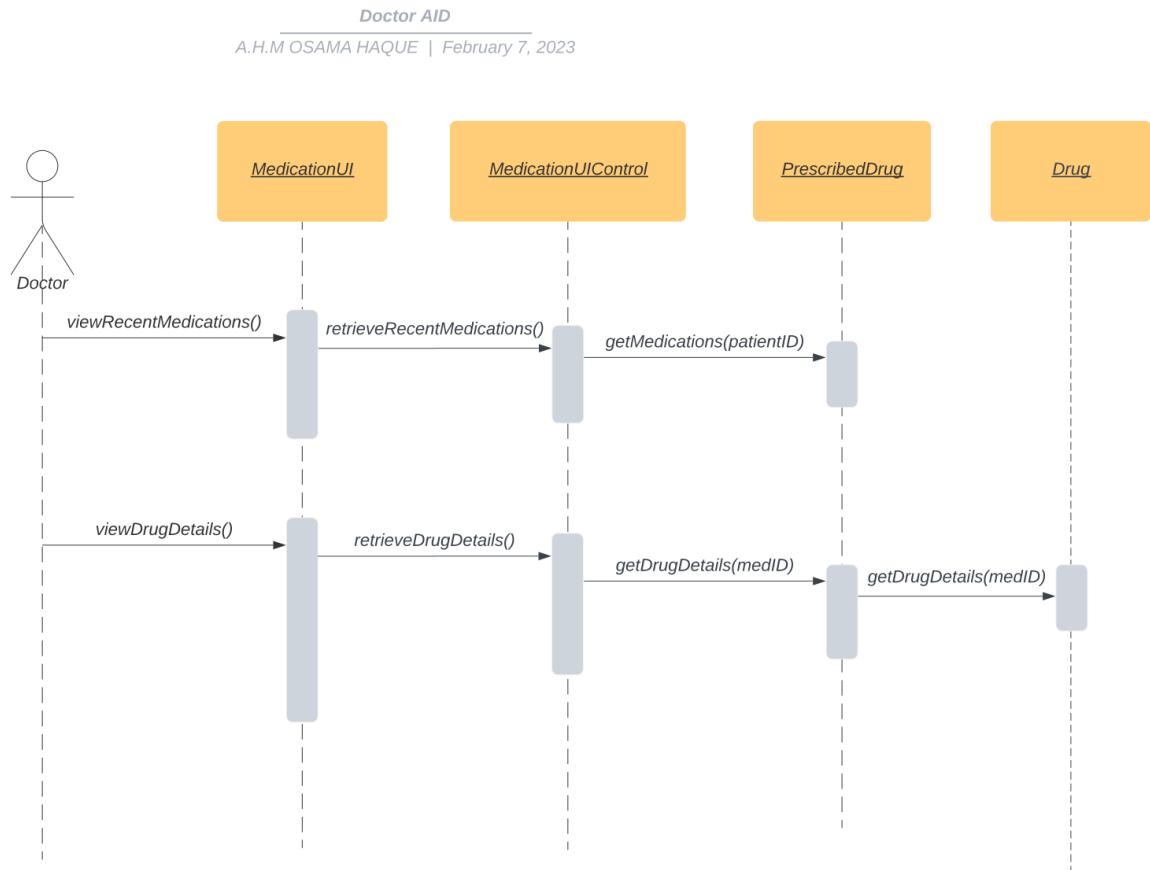


Figure 6.5: Sequence Diagram for Medication UI

## 6.6 Doctor's View - Prescription Tab of Patient

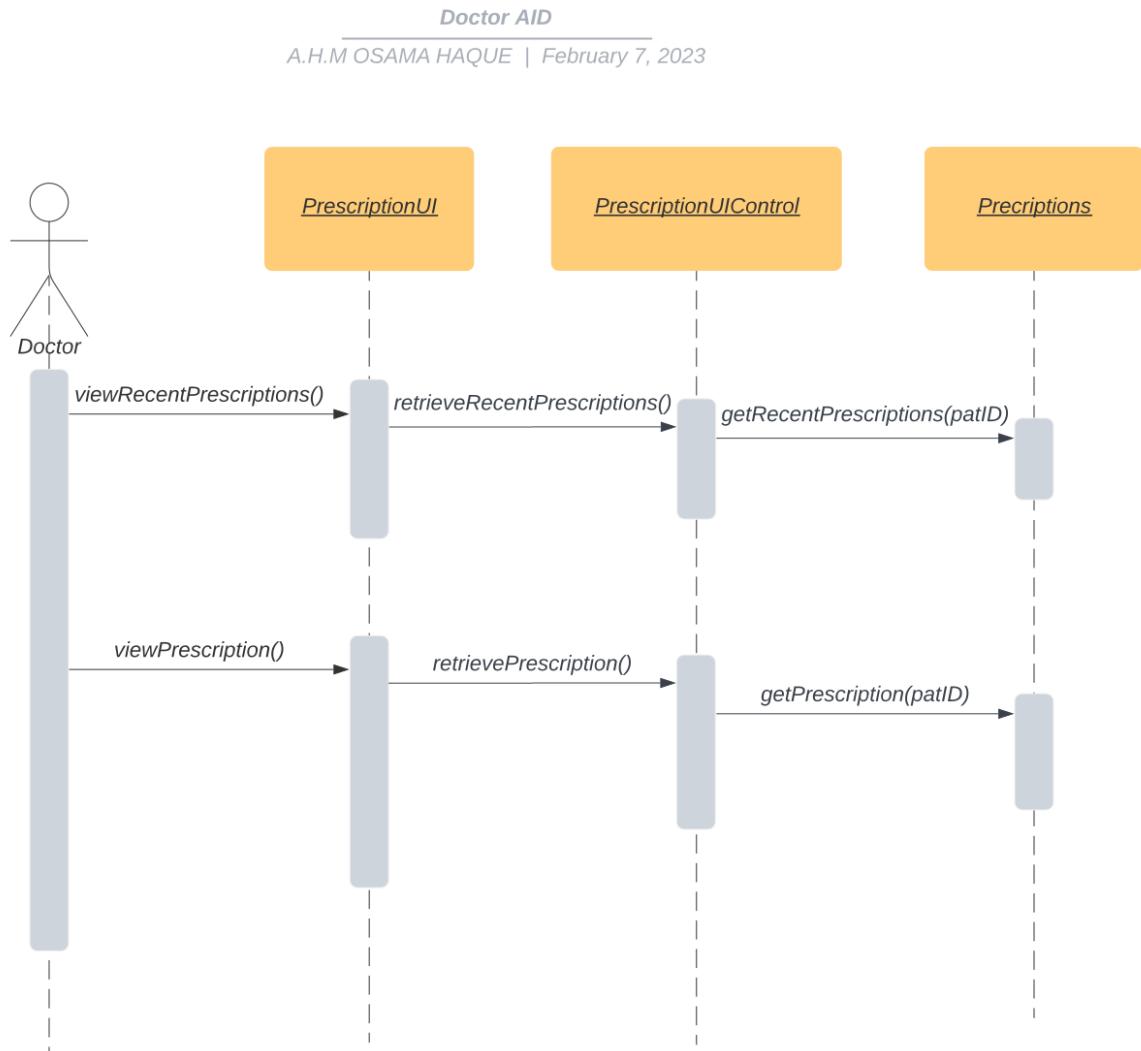


Figure 6.6: Sequence Diagram for Prescription UI

## 6.7 Doctor's View - Search UI Tab

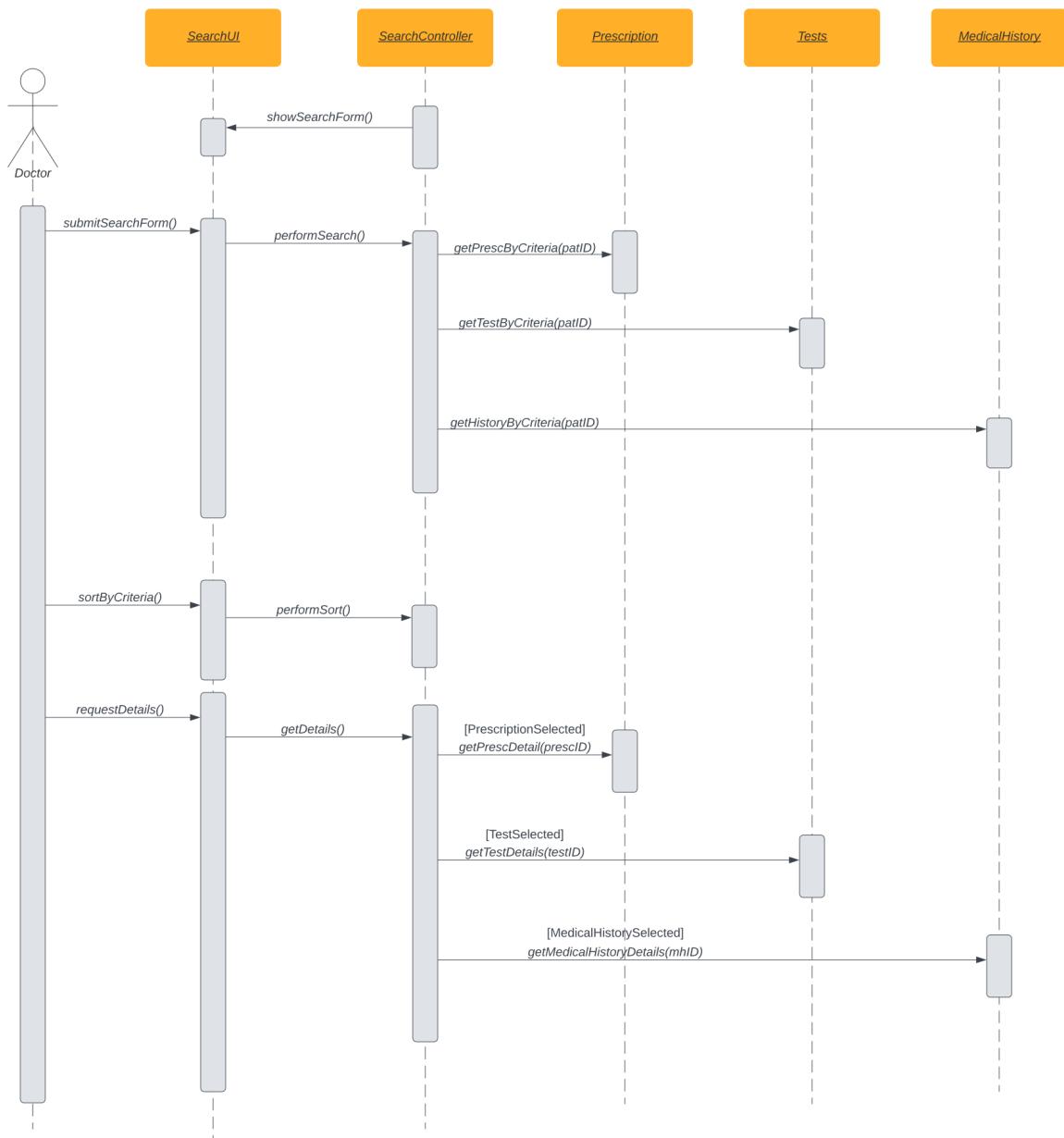


Figure 6.7: Sequence Diagram for Search UI

## 6.8 Doctor's View - Create Prescription

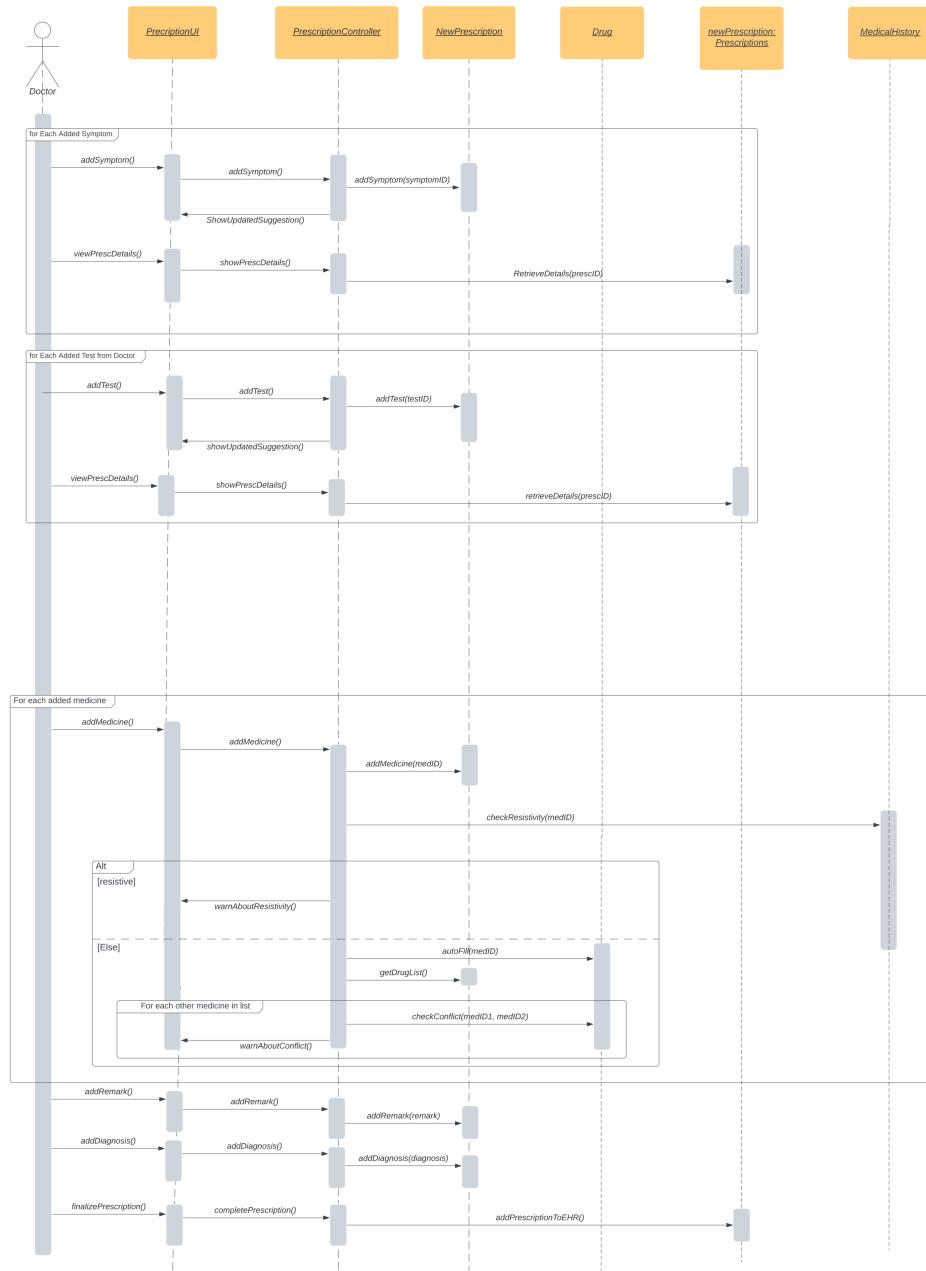


Figure 6.8: Sequence Diagram for Create Prescription UI

# Chapter 7

## Collaboration Diagram

### 7.1 Receptionist

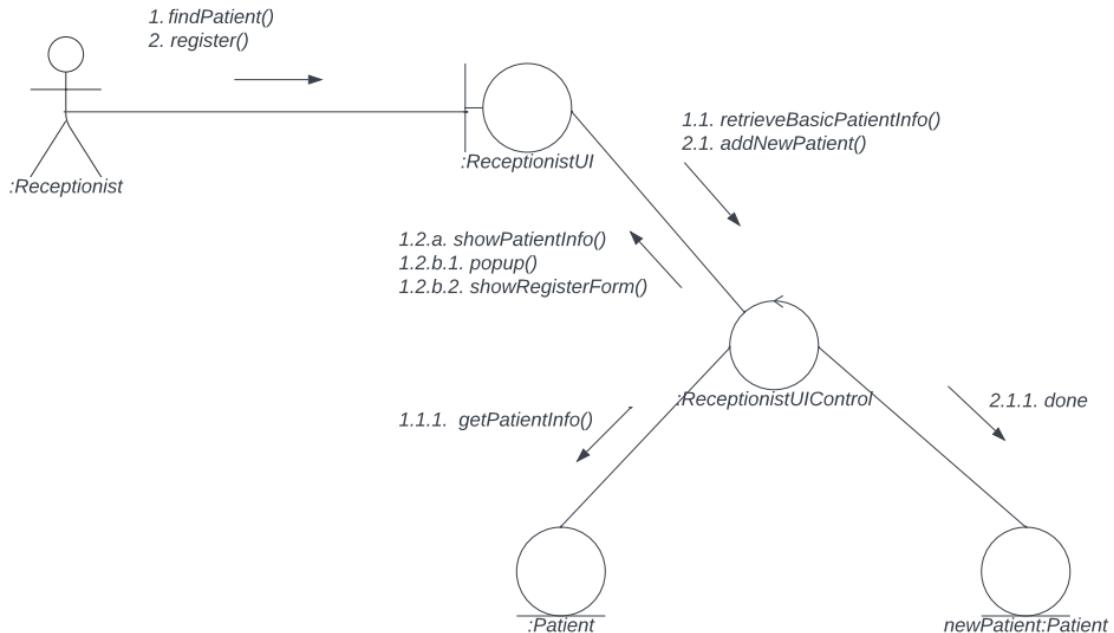


Figure 7.1: Receptionist

## 7.2 Intern Doctor

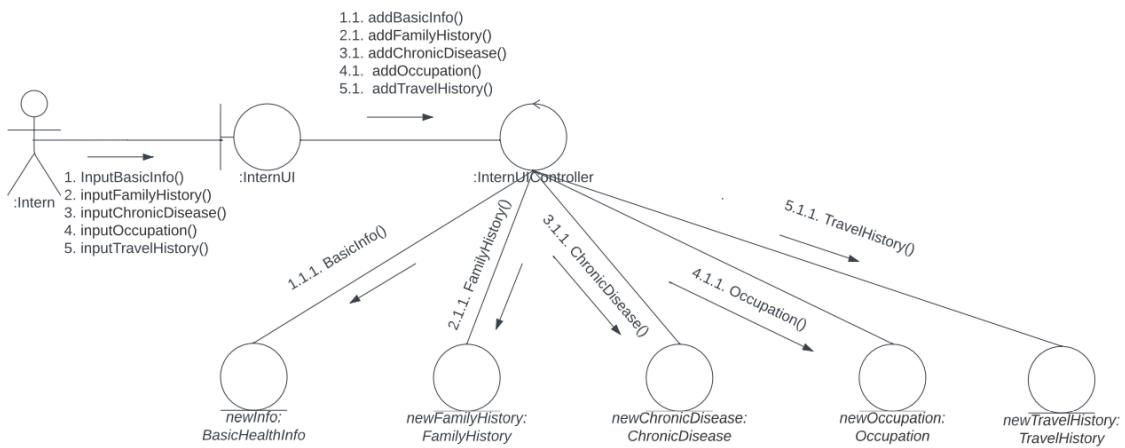


Figure 7.2: Intern Doctor

### 7.3 General Tab

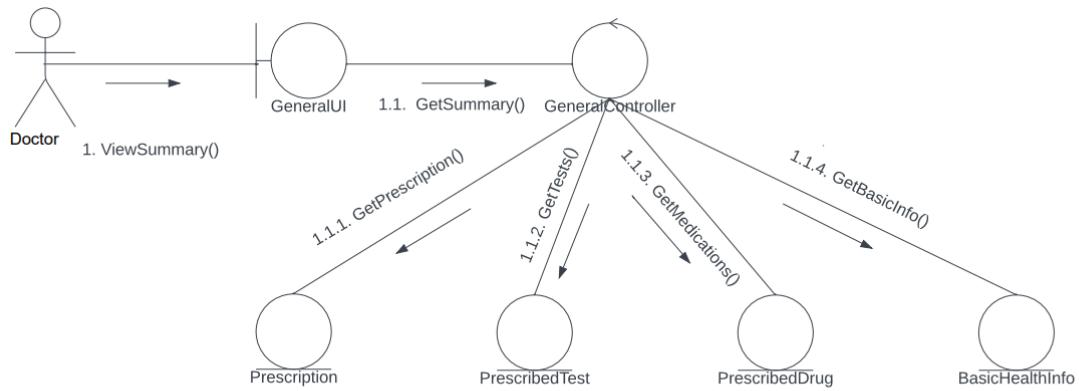


Figure 7.3: General Tab

## 7.4 Diagnosis Tab

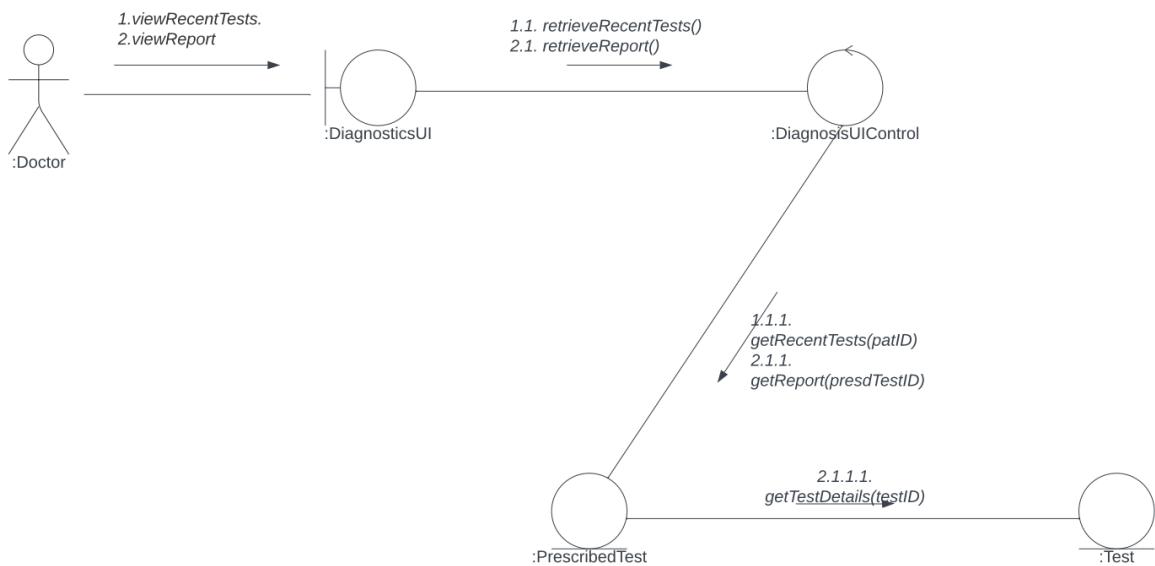


Figure 7.4: Diagnosis Tab

## 7.5 Medication Tab

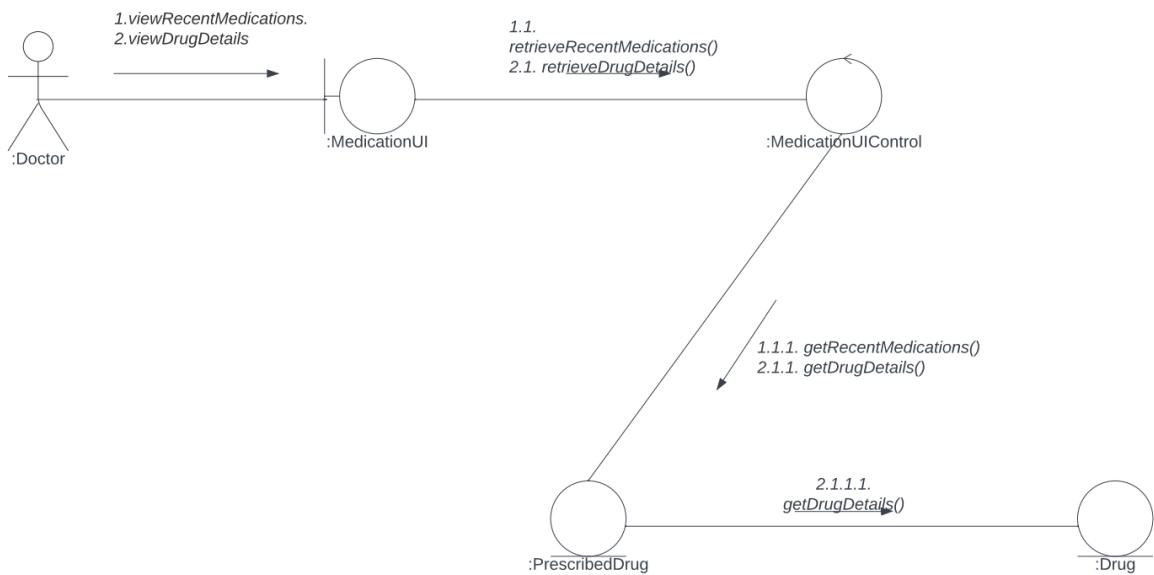


Figure 7.5: Medication Tab

## 7.6 Prescription Tab

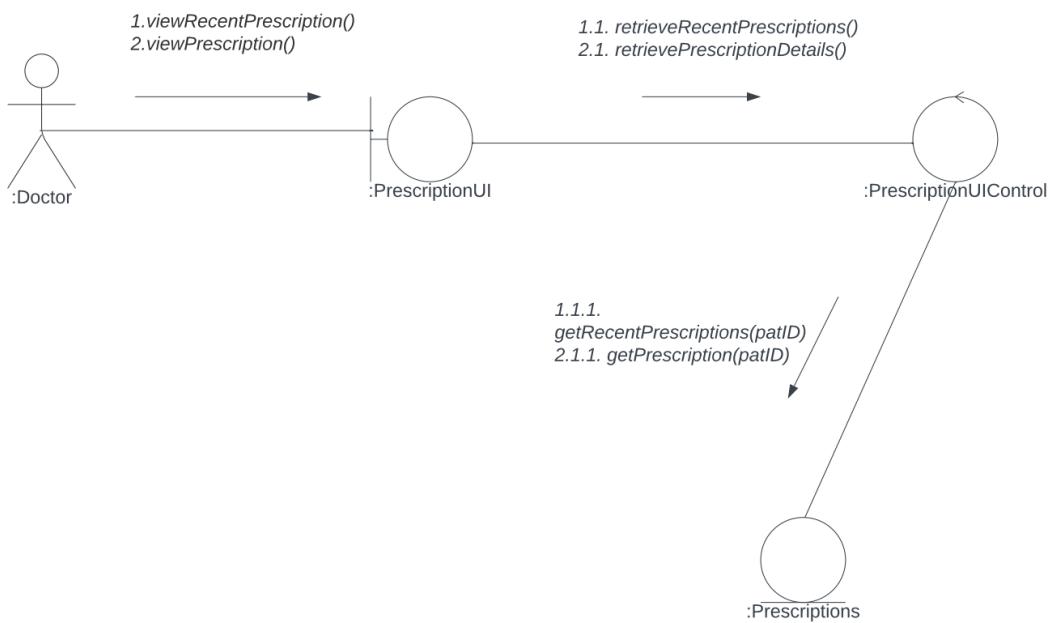


Figure 7.6: Prescription Tab

## 7.7 Search Tab

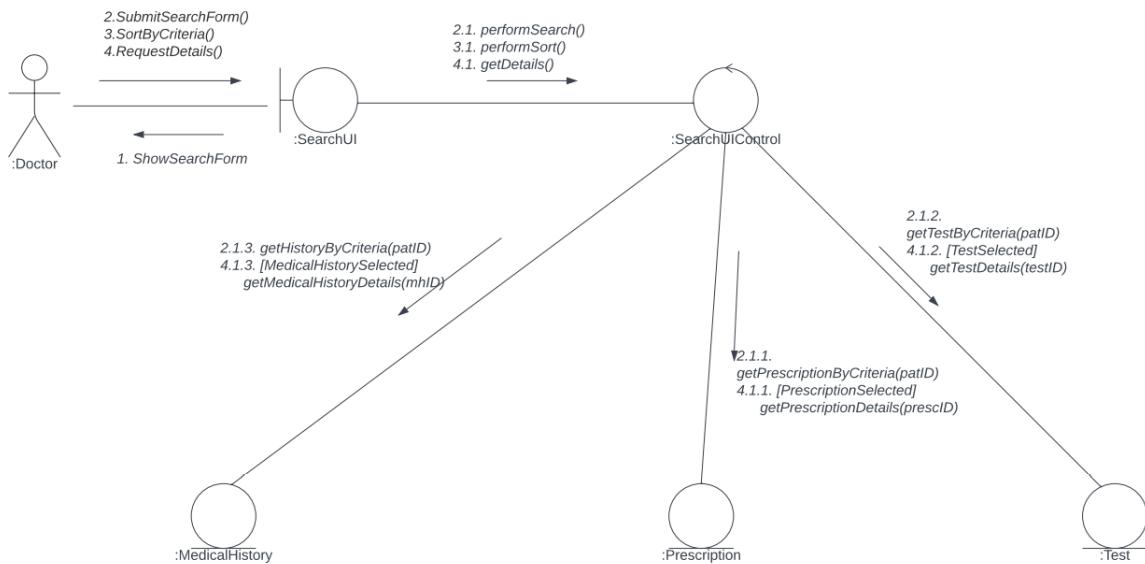


Figure 7.7: Search Tab

## 7.8 Create Prescription Tab

1. \*[for all added symptoms]:  
 addSymptom()  
 2. viewPrescDetails()  
 3. \*[for each added test from doctor] :  
 addtest()  
 4. viewPrescDetails()  
 5. \*[for all added medicine] :  
 addMedicine()  
 6. addRemark()  
 7. addDiagnosis()  
 8. finalizePrescription()

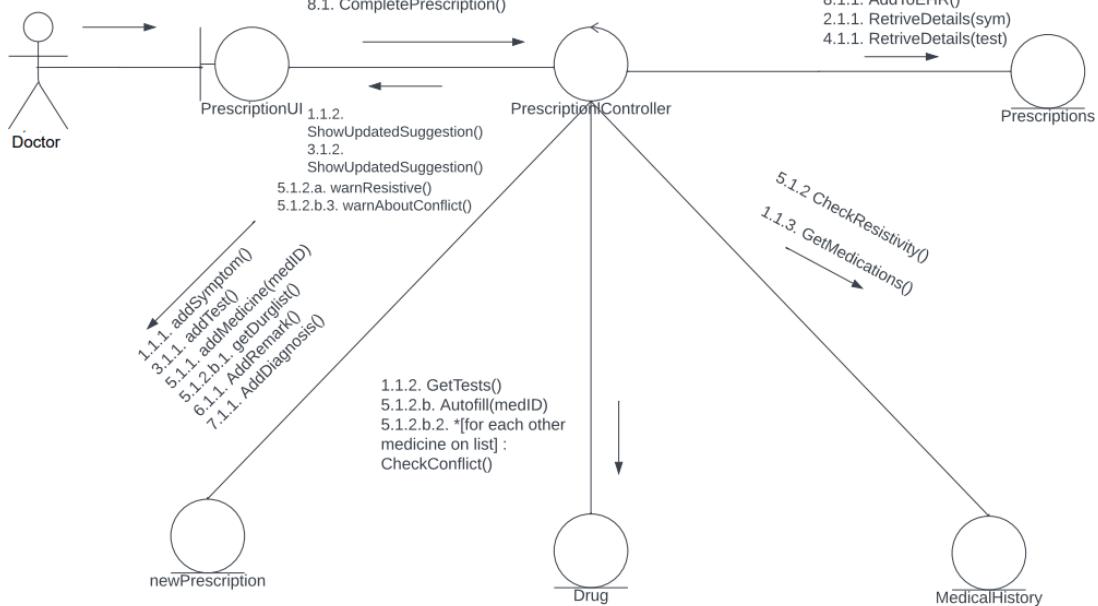


Figure 7.8: Create Prescription Tab

# Chapter 8

## State Diagrams

### 8.1 Full State Diagram

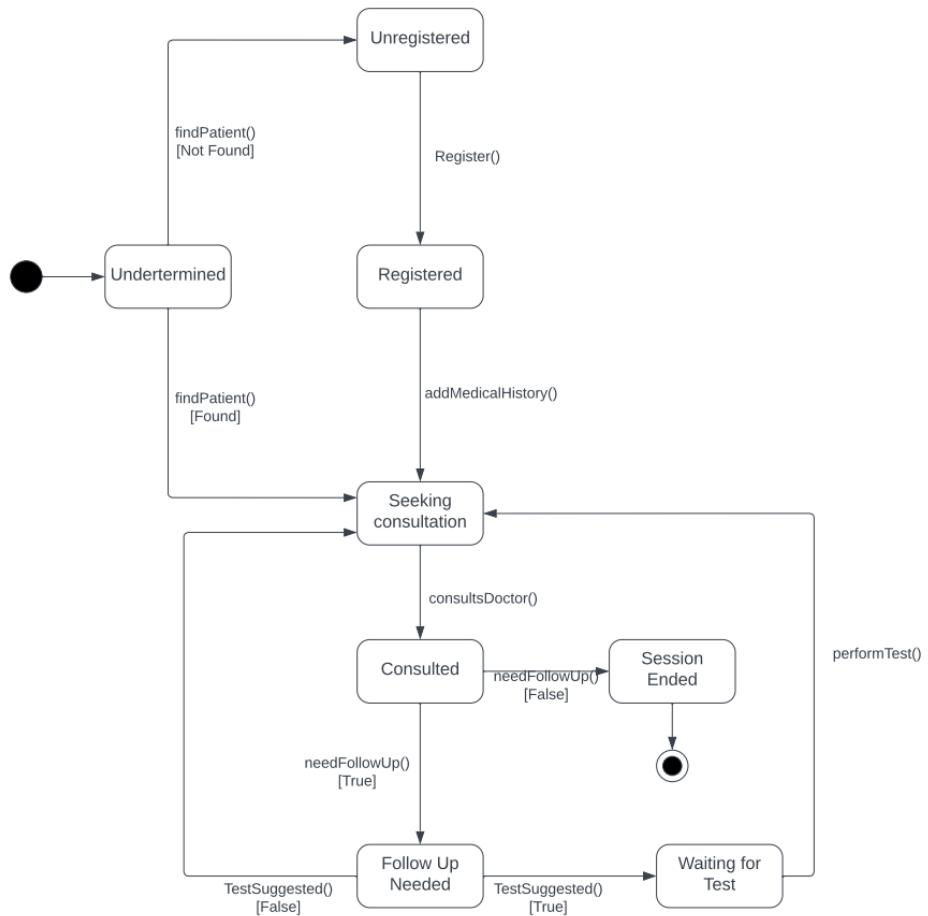


Figure 8.1: State Diagram

# Chapter 9

## Mock UI

### 9.1 Patient Form

<b>General</b>		<b>Previous Addresses</b>		
Patient Gender	<input type="button" value="▼"/>	1. Placeholder 1 From xxxx to xxxx		
Patient Name	<input type="text"/>	2. Placeholder 2 From xxxx to xxxx		
Patient Birth Date	<input type="button" value="▼"/> Month	<input type="button" value="▼"/> Day	<input type="button" value="▼"/> Year	+ Add
Patient Height(cm's)	<input type="text"/>	1. Placeholder 1 From xxxx to xxxx		
Patient Weight(kg's)	<input type="text"/>	2. Placeholder 2 From xxxx to xxxx		
Patient NID	<input type="text"/>	+ Add		
Patient Phone Number	<input type="text"/>	<b>Occupation</b>		
Patient Current Address	<input type="text"/>	1. Placeholder 1 From xxxx to xxxx		
		2. Placeholder 2 From xxxx to xxxx		
		+ Add		
		<b>Travel History</b>		
		1. Placeholder 1 From xxxx to xxxx		
		2. Placeholder 2 From xxxx to xxxx		
		+ Add		
<b>Family History</b>				
Details <input type="text" value="Please enter..."/>				
<b>Past Diseases</b>				
Past Medical History <input checked="" type="checkbox"/> Anemia <input type="checkbox"/> Diabetes <input type="checkbox"/> Pneumonia <input type="checkbox"/> Thyroid				
Past Illness	1. Asthma <a href="#">Prescription Attachment ↗</a>			
	2. Tuberculosis <a href="#">Prescription Attachment ↗</a>			
	+ Add Disease			
	+ Add Attachment ↗			
<b>Chief Complaints</b>				
<input type="text" value="Constant mild chest pain"/>				
+ Add more				

Figure 9.1: Patient Registration Form

## 9.2 General UI - Patients Summary

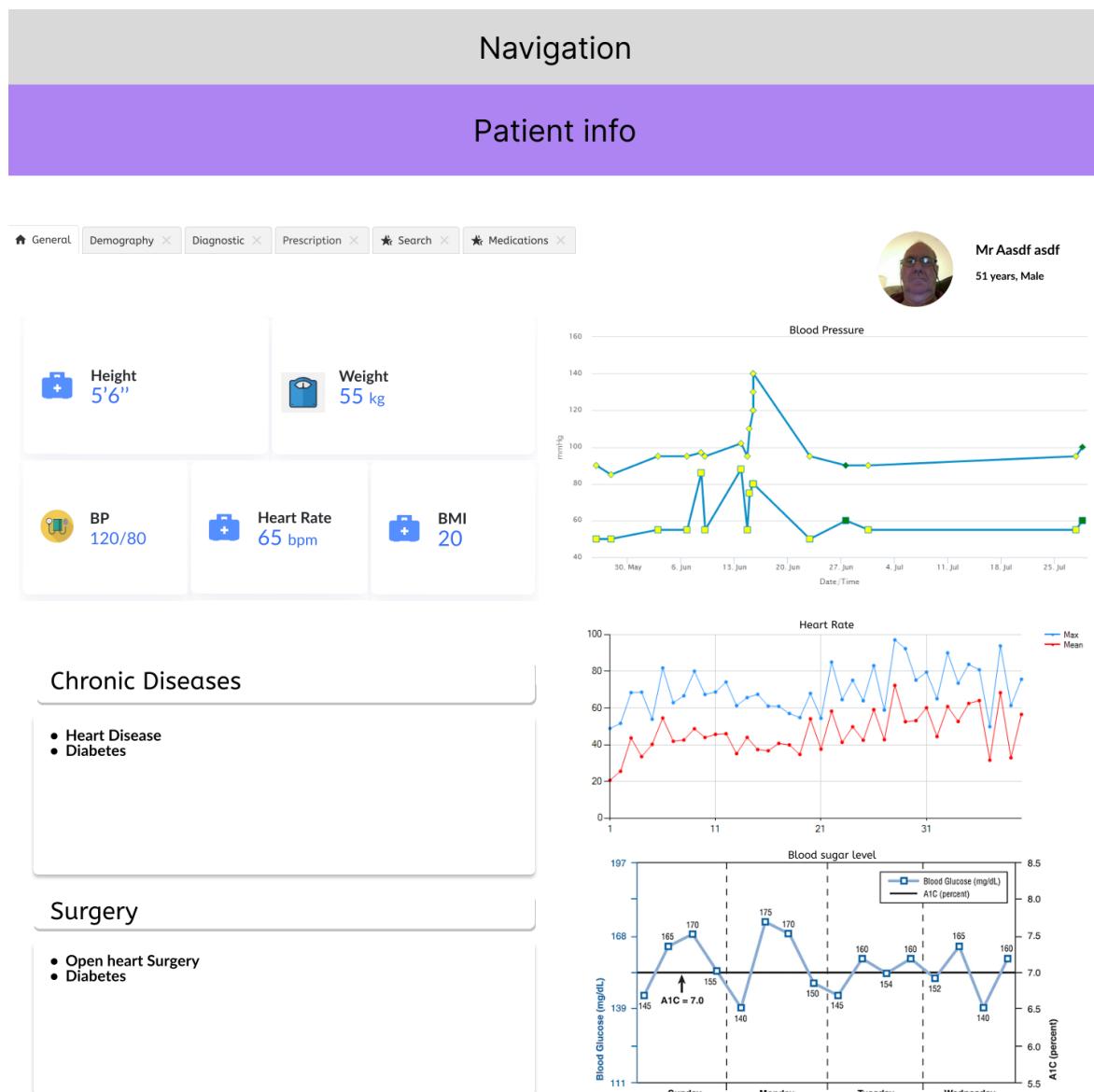


Figure 9.2: General UI

### 9.3 Demography Tab

Demography			
<b>Name</b>			Mr. Hisham Tanjeem
<b>Age</b>	55	<b>Occupations</b>	Jan, 2018 - Present
<b>Gender</b>	Male	Place holder 2	Mar, 2017 - Dec, 2017
<b>Hometown</b>	Bogura	Place holder 3	Feb, 2015 - Feb, 2017
<b>Addresses</b>			<b>Travel History</b>
Place holder 1	Jan, 2018 - Present	Place holder 1	Jan, 2018 - Present
Place holder 2	Mar, 2017 - Dec, 2017	Place holder 2	Mar, 2017 - Dec, 2017
Place holder 3	Feb, 2015 - Feb, 2017	Place holder 3	Feb, 2015 - Feb, 2017

Figure 9.3: Demography UI

## 9.4 Diagnostics Tab

**Recent Tests**

Date: 21.12.2022  
Prescription id: [9123126324](#)  
**Ultrasonography-Thyroid**

Date: 20.12.2022  
Prescription id: [9123126324](#)  
**Complete Blood Count**

Date: 18.12.2022  
Prescription id: [9123126397](#)  
**Complete Blood Count**

Date: 17.12.2022  
Prescription id: [9123126591](#)  
**MRI-Chest**

**Test Report**

LABORATORY REPORT			
Name	Ana Betz	Patient ID	PAC001
Date	2011-08-25 08:32	Age	25y 10m 26d
Doctor	Cameron Cordara	Sex	Female
		Test id	B165AAF4
<b>COMPLETE BLOOD COUNT</b>			
Test Name	Result	Normal Range	Units
Hemoglobin	12	11.0 - 16.0	g/dL
RBC	3.3	3.5-5.50	10 <sup>6</sup> /uL
HCT	36	37.0-50.0	%
MCV	83	82-95	fL
MCH	28	27-31	pg
MCHC	33	32.0-36.0	g/dL
RDW-CV	12	11.5-14.5	%
RDW-SD	44	35-56	fL
WBC	6.7	4.5-11	10 <sup>3</sup> /uL
NEU%	60	40-70	%
LYM%	30	20-45	%
MON%	8	2-10	%
EOS%	2	1-6	%
BAS%	0	0-2	%
LYM#	2	1.5-4.0	10 <sup>3</sup> /uL
GRA#	4.7	2.0-7.5	10 <sup>3</sup> /uL
PLT	256	150-450	10 <sup>3</sup> /uL
ESR	2	Up to 15	mm/hr

[Show In Details](#)

Figure 9.4: Diagnostics UI

## 9.5 Medication Tab

**Recent Medications**

Date: 20.12.2022  
Prescription id: [9123126341](#)  
**Napa Plus**  
Paracetamol

Date: 20.12.2022  
Prescription id: [9123126324](#)  
**Tylenol**  
Acetaminophen

Date: 18.12.2022  
Prescription id: [9123126397](#)  
**Humulin N**  
Insulin

Date: 17.12.2022  
Prescription id: [9123126591](#)  
**Phoslo**  
Calcium Acetate

**Cautions**

**Warnings**  
**Liver warning:** This product contains acetaminophen. Severe liver damage may occur if you take  
■ more than 4,000 mg of acetaminophen in 24 hours  
■ with other drugs containing acetaminophen  
■ 3 or more alcoholic drinks every day while using this product  
**Allergy alert:** acetaminophen may cause severe skin reactions. Symptoms may include:  
■ skin reddening  
■ blisters  
■ rash  
If a skin reaction occurs, stop use and seek medical help right away.

**Do not use**  
■ with any other drug containing acetaminophen (prescription or nonprescription). If you are not sure whether a drug contains acetaminophen, ask a doctor or pharmacist.  
■ if you are allergic to acetaminophen or any of the inactive ingredients in this product

**Ask a doctor before use if you have** liver disease  
**Ask a doctor or pharmacist before use if you are** taking the blood thinning drug warfarin

**Stop use and ask a doctor if**  
■ pain gets worse or lasts more than 10 days  
■ fever gets worse or lasts more than 3 days  
■ new symptoms occur  
■ redness or swelling is present  
These could be signs of a serious condition.

**If pregnant or breast-feeding,** ask a health professional before use.  
**Keep out of reach of children.**  
**Overdose warning:** In case of overdose, get medical help or contact a Poison Control Center right away. (1-800-222-1222) Quick medical attention is critical for adults as well as for children even if you do not notice any signs or symptoms.

Figure 9.5: Medication UI

## 9.6 Prescription Tab

**Recent Prescriptions**

Date: 21.12.2022  
Prescription id: [9123126324](#)  
Bacterial infection

Date: 20.12.2022  
Prescription id: [9123126324](#)  
Probable case of pneumonia

Date: 18.12.2022  
Prescription id: [9123126397](#)  
Common cold

Date: 17.12.2022  
Prescription id: [9123126591](#)  
Migraine pain

**Patient Information:**

Patient ID: 123R1 Prescription No: 561DU3 Date and Time:  
Patient Name: MR.XYZ Address: 12/C, Dhaka Aug 22, 2019, 10:00:30 PM

**Diagnosis**

BP: 120 / 80 mm Hg  
Pulse Rate: 65 / Min

**Description of Disease:**

Viral Fever  
Pain in Hand Joint

**Prescribed Medicine**

Drug	Strength	Freq	Duration	Remark
Rhinal	25 mg	0+0+1	90 Days	No Anti Histamin
Zimax	(?)	(?)	(?)	Resistant to Zimax
Monas	50 mg	0+1+0	30 Days	Might react with Rhinal

**Test Required**

NS3  
Uric Acid

**Remarks:** No Anti Histamin; Resistant to Zimax; Might React with Rhinal; Please drink lots of water

**Findings:** Probable case of Dengue and High Uric Acid; NS3 and Uric acid Test Required

[Show In Details](#)

Figure 9.6: Prescription UI

## 9.7 Search UI Tab

### Search Criteria

Select Domain

- Medical History
- Prescription
- Tests

Search key

Date Range

From To

From: January 2020 To: December 2022

Tags

- headache X
- stroke X
- brain X
- nausea X
- vomiting X
- migraine X
- hea
- head
- headache
- hearing
- hearing-loss
- heart
- heart-attack



### Search Results

Sort By

Tags matched

[Test]

CT-Scan Date: 12.12.2022

Tags Matched: headache, head, brain [see more](#)

[Prescription]

Symptoms: ...Frontal Lobe Headache... Date: 12.12.2022

Tags Matched: headache, stroke [see more](#)

[Medical History]

Family History: ... mother suffered from migraine pain ... Date: 12.12.2022

Tags Matched: headache, head, migraine [see more](#)

[Prescription]

Final Remark: ... migraine pain ... Date: 22.01.2015

Tags Matched: migraine [see more](#)

Figure 9.7: Search UI

## 9.8 Create Prescription

**Patient Information:**

Patient ID: 123R1      Prescription No: 561DU3      Date and Time: Aug 22, 2019, 10:00:30 PM 

Patient Name: MR. XYZ      Address: 12/C, Dhaka 

**Diagnosis**

BP: \_\_\_\_\_ / \_\_\_\_\_ mm Hg

Pulse Rate: \_\_\_\_\_ / Min

**Description of Disease:**

- Viral Fever
- Pain in Hand Joint

**Prescribed Medicine**

Search: mon |  

Drug	Strength	Freq	Duration	Remark
Mononine; 25 mg; 1+1+0				No Anti Histamin
Montelukast; 50 mg; 0+0+1				
Monas; 50 mg; 0+1+0				

**Related Medical History**

5 Jan, 2022 

... Swelling and Itching on skin due to Rise of Histamine ...

- Diagnostic Outcome: Auto-inflammation of Dermato-layer
- Report Finding: ELISA T-peak IgE 2474
- Related Remarks: should be aware of air pollution and antihistamine: Westlife

5 Jan, 2022 

... Swelling and Itching on skin due to Rise of Histamine ...

- Diagnostic Outcome: Auto-inflammation of Dermato-layer
- Report Finding: ELISA T-peak IgE 2474
- Related Remarks: should be aware of air pollution and antihistamine: Westlife

5 Jan, 2022 

... Swelling and Itching on skin due to Rise of Histamine ...

- Diagnostic Outcome: Auto-inflammation of Dermato-layer
- Report Finding: ELISA T-peak IgE 2474
- Related Remarks: should be aware of air pollution and antihistamine: Westlife

5 Jan, 2022 

... Swelling and Itching on skin due to Rise of Histamine ...

- Diagnostic Outcome: Auto-inflammation of Dermato-layer
- Report Finding: ELISA T-peak IgE 2474
- Related Remarks: should be aware of air pollution and antihistamine: Westlife

**Test Required**

NS3	
Uric Acid	

**Remarks:** No Anti Histamin; Resistant to Zimax; Might React with Rhinil; Please drink lots of water

**Findings:** Probable case of Dengue and High Uric Acid; NS3 and Uric acid Test Required

Figure 9.8: Create Prescription

# Chapter 10

## Snippets of Implemented Use Cases

### Implemented Modules

- Doctor Login and Patient Search Form
- View Prescription Tab
- View Medications Tab

### 10.1 Doctor Login and Patient Search Form

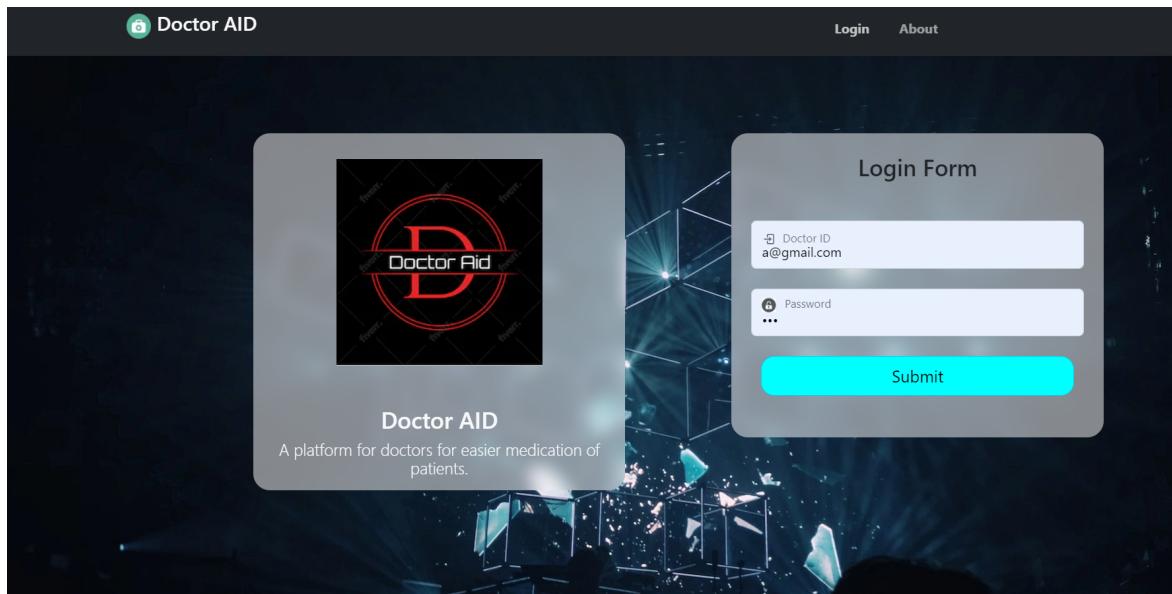


Figure 10.1: Doctor Login Form

Doctor's View

Profile You ▾

### Search Patient

Patient ID  
•

Patient Name  
Toki Ratul

Search

Figure 10.2: Patient Search Form

## 10.2 View Prescription Tab

Patient ID 3	Patient Name Toki Ratul	Age 25
Date Invalid Date	Last Visit Mon Feb 27 2023	

MON FEB 27 2023  
**CANCER**

MON FEB 27 2023  
**OSTEOARTHRITIS**

MON FEB 27 2023  
**UPPER RESPIRATORY**

MON FEB 27 2023  
**TYPE 2 DIABETES**

MON FEB 27 2023  
**HYPERTENSION**

TUE FEB 28 2023  
**ASTHMA**

**Prescription Details**  
Date- Mon Feb 27 2023

**Diagnosis**  
cancer

Blood Pressure  

---

120 / 80 mmHg

Heart Rate  

---

55

**Symptoms**

- headache
- backpain

**Remarks**

- Prescribed Tamiflu
- rest for a week

**Medicines**

Mon Feb 27 2023 <b>Humulin N</b> Insulin 250mg 0-0-1	Mon Feb 27 2023 <b>Napa Plus</b> Paracetamol 250mg 0-0-1	Mon Feb 27 2023 <b>Phoslo</b> Calcium Acetate 250mg 0-0-1	Mon Feb 27 2023 <b>Bayer Aspirin</b> Aspirin 250mg 0-0-1
--	--	---	--

Figure 10.3: View Prescription Tab

## 10.3 View Medication Tab

Patient ID 3	Patient Name Toki Raful	Age 25
Date Invalid Date	Last Visit Mon Feb 27 2023	

MON FEB 27 2023  
**HUMULIN N**  
INSULIN  
250MG  
0-0-1  
  
[SEE PRESCRIPTION](#)

MON FEB 27 2023  
**NAPA PLUS**  
PARACETAMOL  
250MG  
0-0-1  
  
[SEE PRESCRIPTION](#)

MON FEB 27 2023  
**PHOSLO**  
CALCIUM ACETATE  
250MG  
0-0-1  
  
[SEE PRESCRIPTION](#)

MON FEB 27 2023  
**BAYER ASPIRIN**  
ASPIRIN  
250MG

**Medicine Details**  
Humulin N- Insulin  
From: Eli Lilly and Company

**Description**  
Humulin N is a prescription medicine used to treat the symptoms of Type 1 and Type 2 Diabetes Mellitus. Humulin N may be used alone or with to a class of drugs called Antidiabetics, Insulins, Antidiabetics, Intermediate-Acting Insulins

**Dosage**

- doctor decides

**Warnings**

- Don not use in case of low blood pressure episode
- never share a n injection pen with someone else

**Strengths**

- 100 units/mL

**Side Effects**

- low blood sugar
- weight gain
- itching, mild skin rash

**Uses**

- lower blood glucose between meals and overnight

**Reacting Drugs**  
Levothyroxine

- Levothyroxine may interfere with blood glucose control and reduce the effectiveness of insulin

  
Enalapril

- Adverse reaction between insulin and hypertension drug

Figure 10.4: View Medication Tab