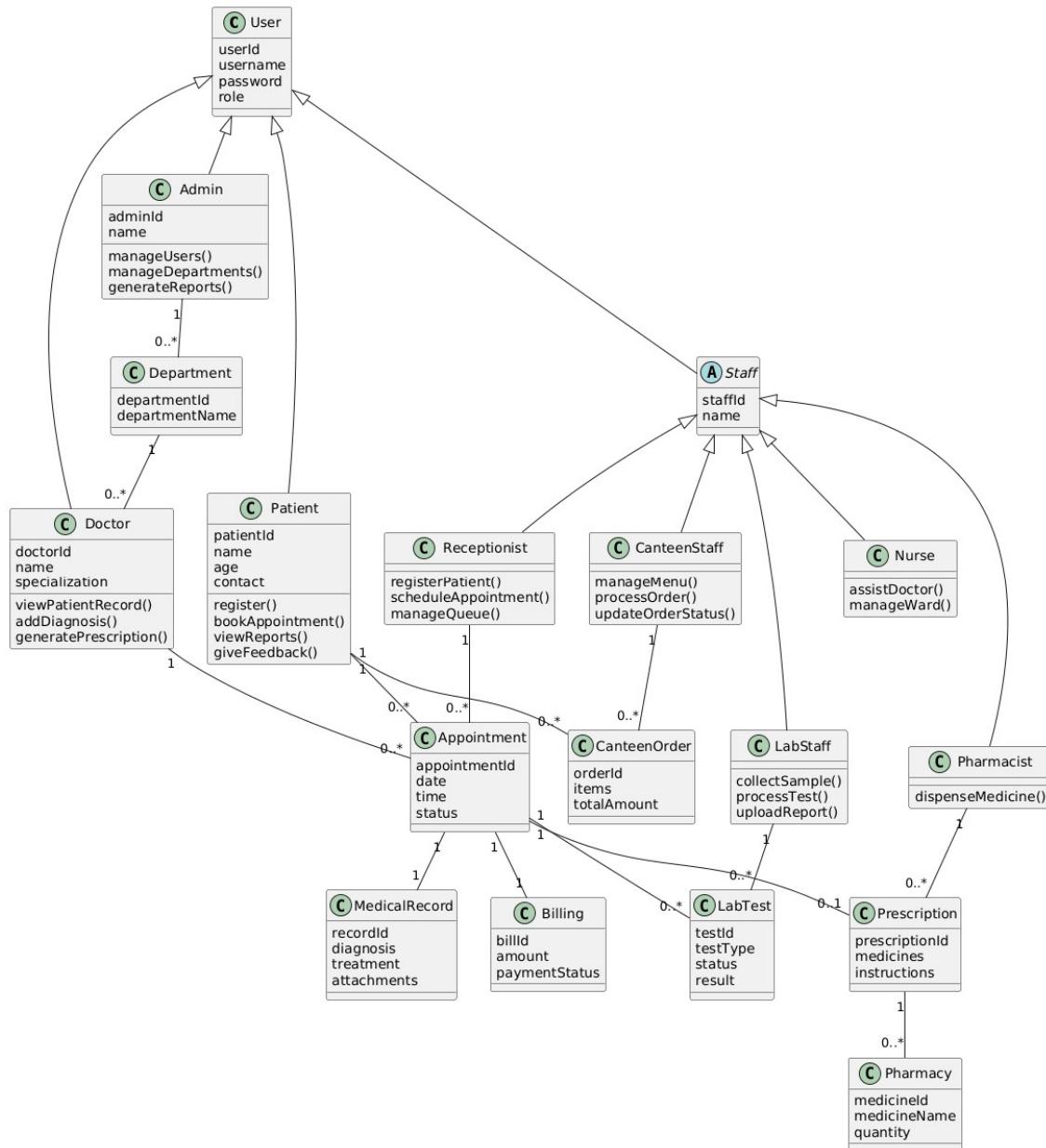


# UML DIAGRAMS

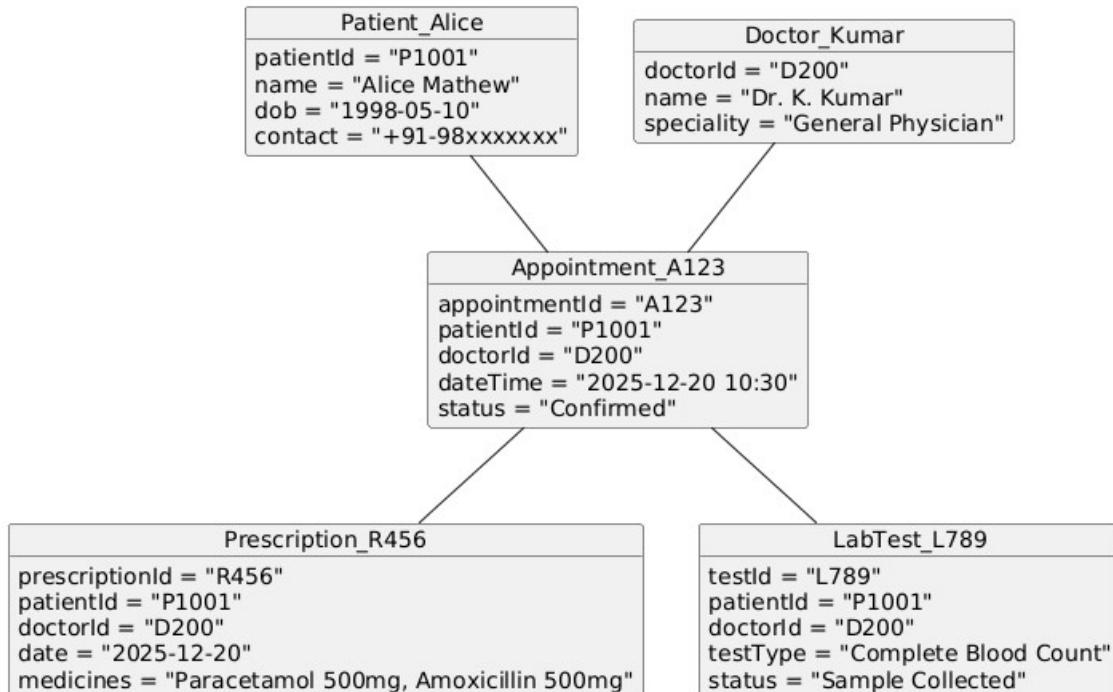
## CLASS DIAGRAM

Shows the system's main classes such as User, Admin, Patient, Doctor, Staff, Appointment, Prescription, LabTest, Billing, Report, MedicalRecord, and CanteenOrder with their attributes and relationships. This diagram helps in understanding the overall structure of the HealCare system and forms the basis for database table design.



## OBJECT DIAGRAM

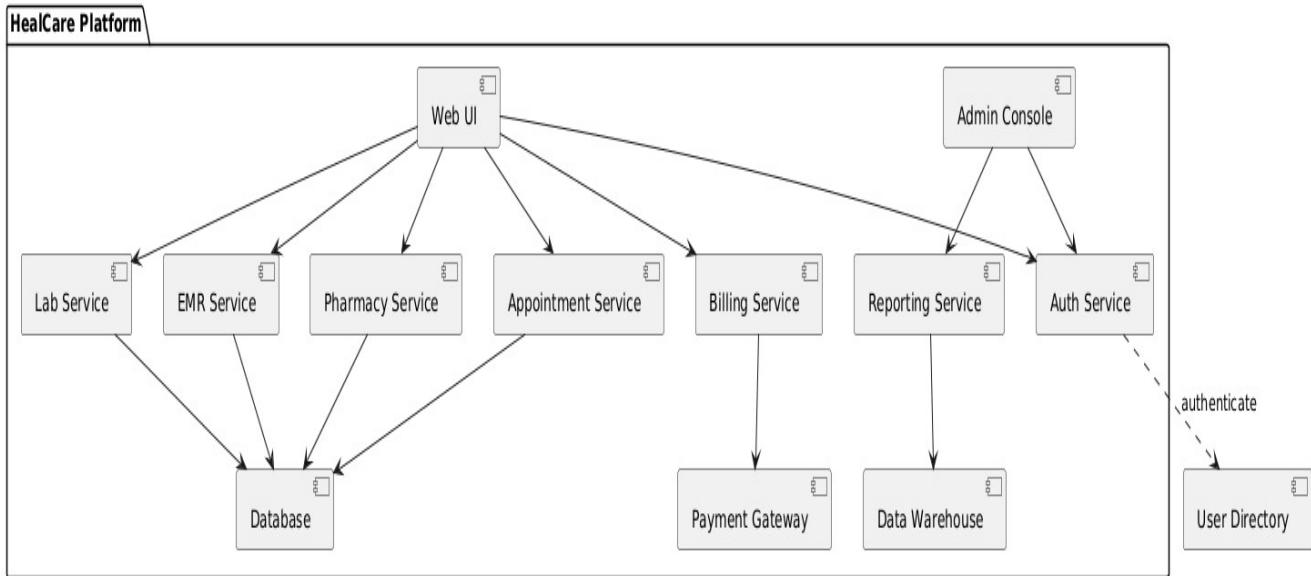
Represents a snapshot of the system at a particular time. Example objects include a Patient object booking an Appointment with a Doctor, a generated Prescription, and a LabTest report, showing how real-time instances interact in HealCare.



## COMPONENT DIAGRAM

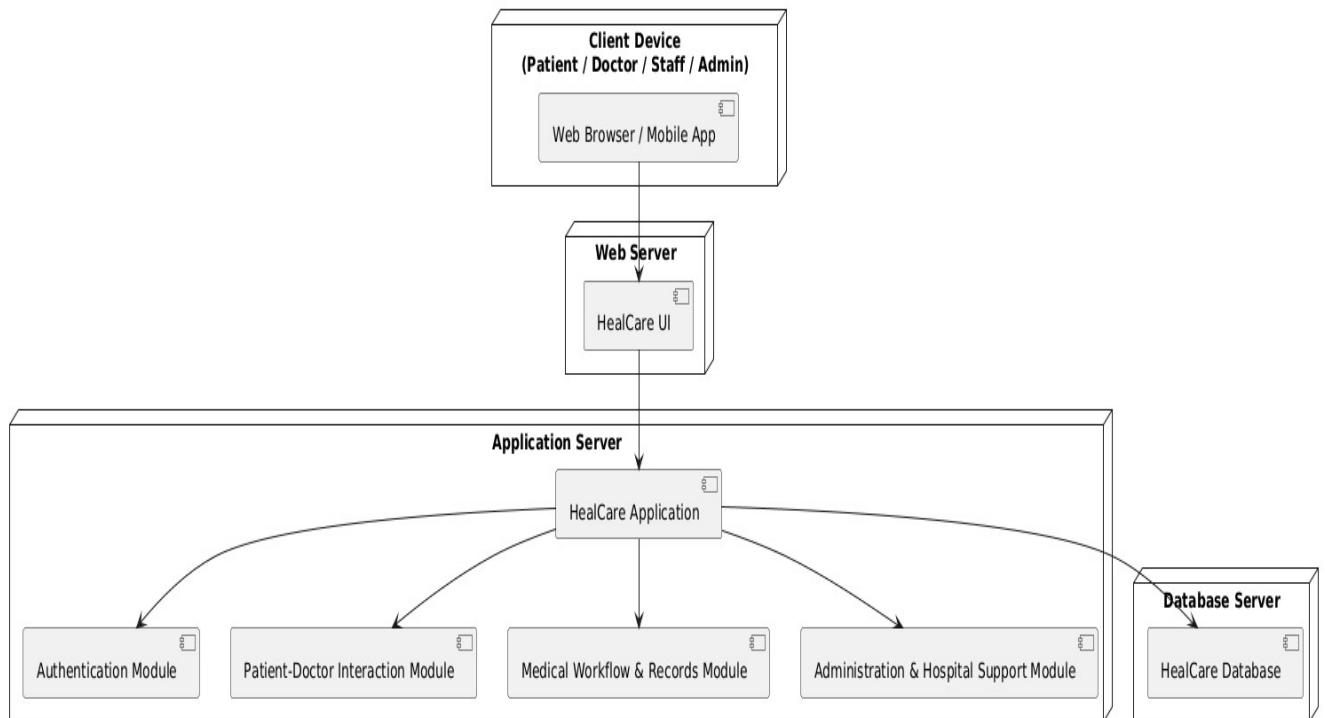
The component diagram displays the **high-level modules** of the HealCare system.

Displays high-level components such as Web Application, Authentication Service, Appointment Module, Medical Records Module, and Database. It provides a clear view of the system's modular architecture.



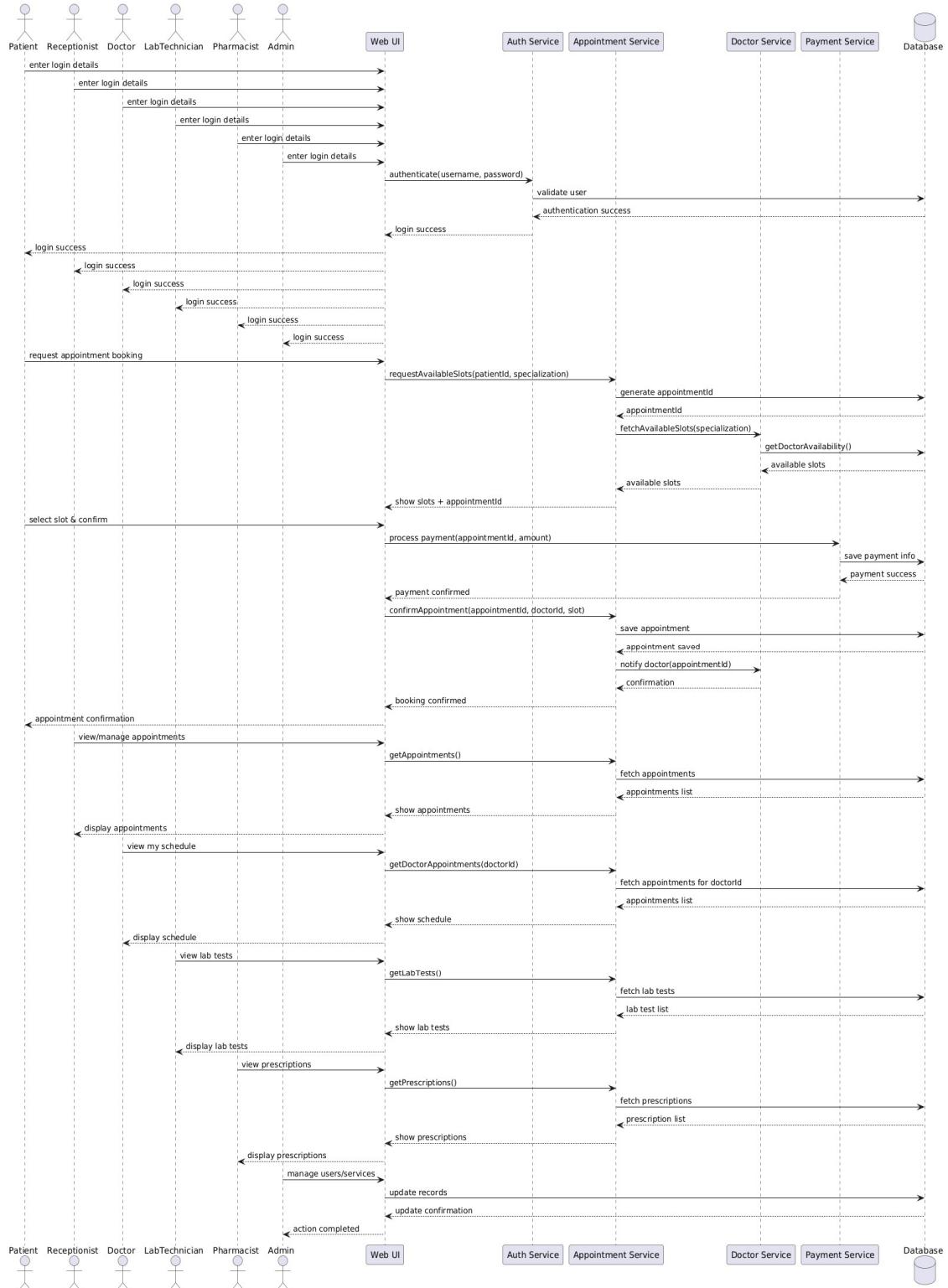
## DEPLOYMENT DIAGRAM

Deployment diagram shows the **physical architecture** of the system, how the HealCare system is physically installed and accessed. Users (patients, doctors, staff, and admins) use a web or mobile interface connected to a web server, which forwards requests to the application server containing all healthcare modules.



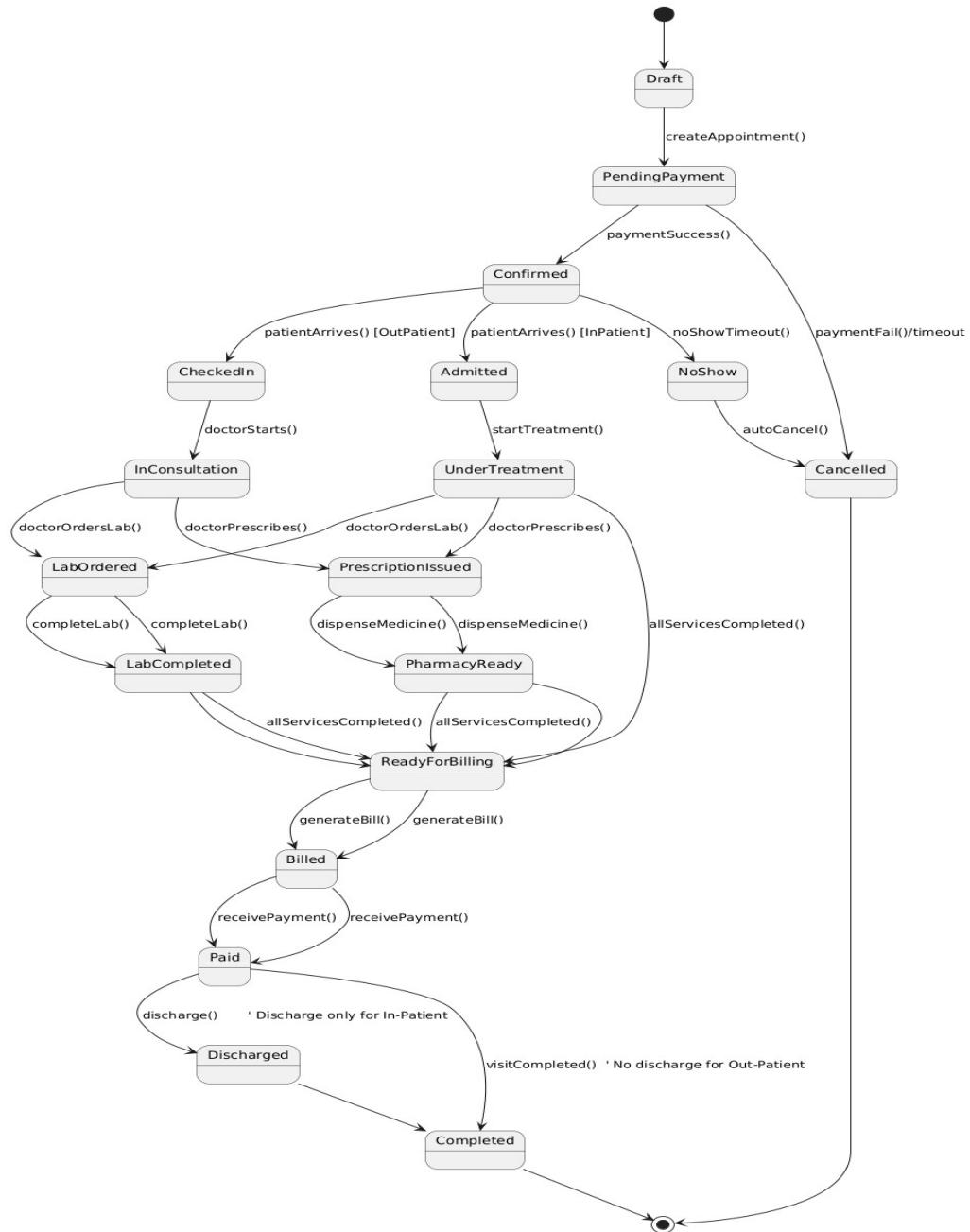
## SEQUENCE DIAGRAM

The sequence diagram shows the **order of interactions over time**. Shows the interaction flow for processes like appointment booking. It explains how requests move between the patient, system, doctor, and database in a time sequence.



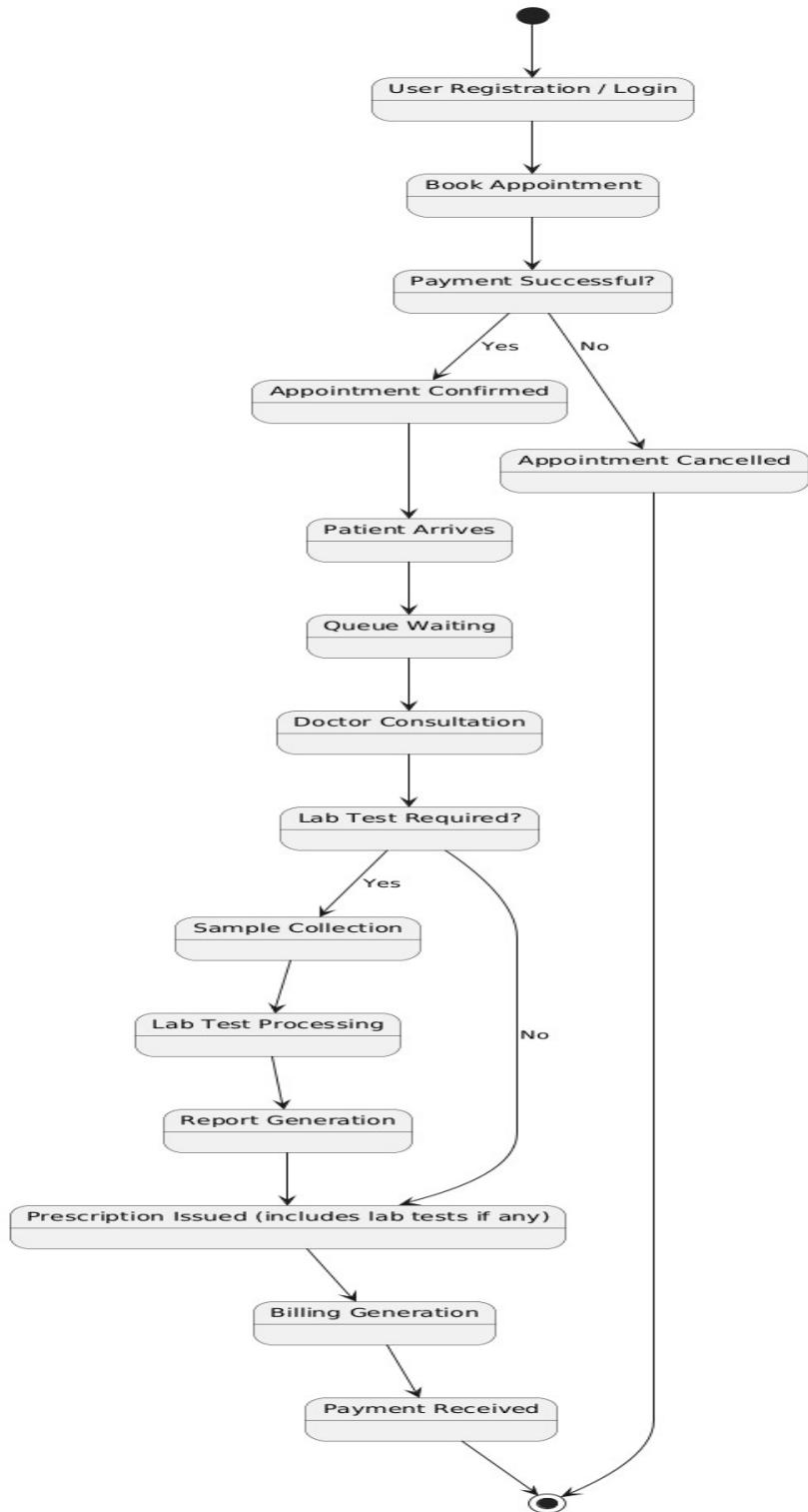
## STATE CHART DIAGRAM

Shows the various states of an appointment or patient visit such as Requested, Confirmed, In Consultation, LabOrdered, PrescriptionIssued, Billed, Paid, Completed, and Closed, along with transitions between these states.



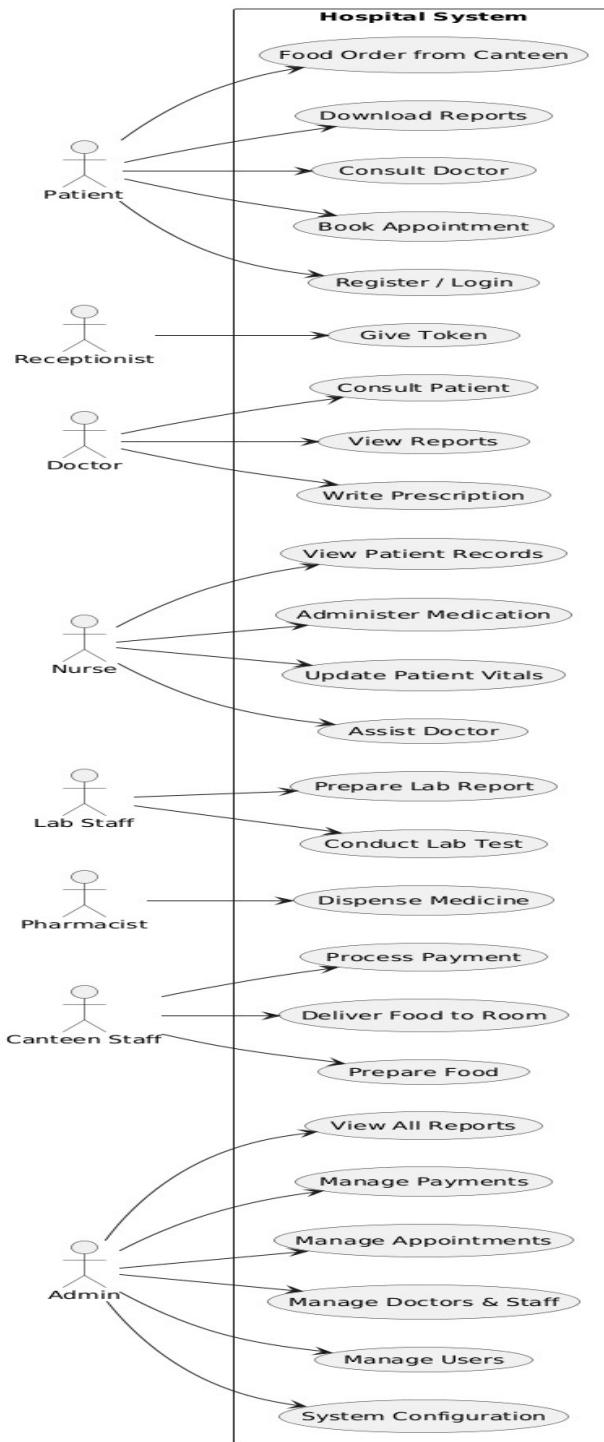
## ACTIVITY DIAGRAM

Represents the workflow of patient care in HealCare. Activities include registration, appointment booking, Queue waiting, doctor consultation, lab testing or prescription, billing, and report generation.



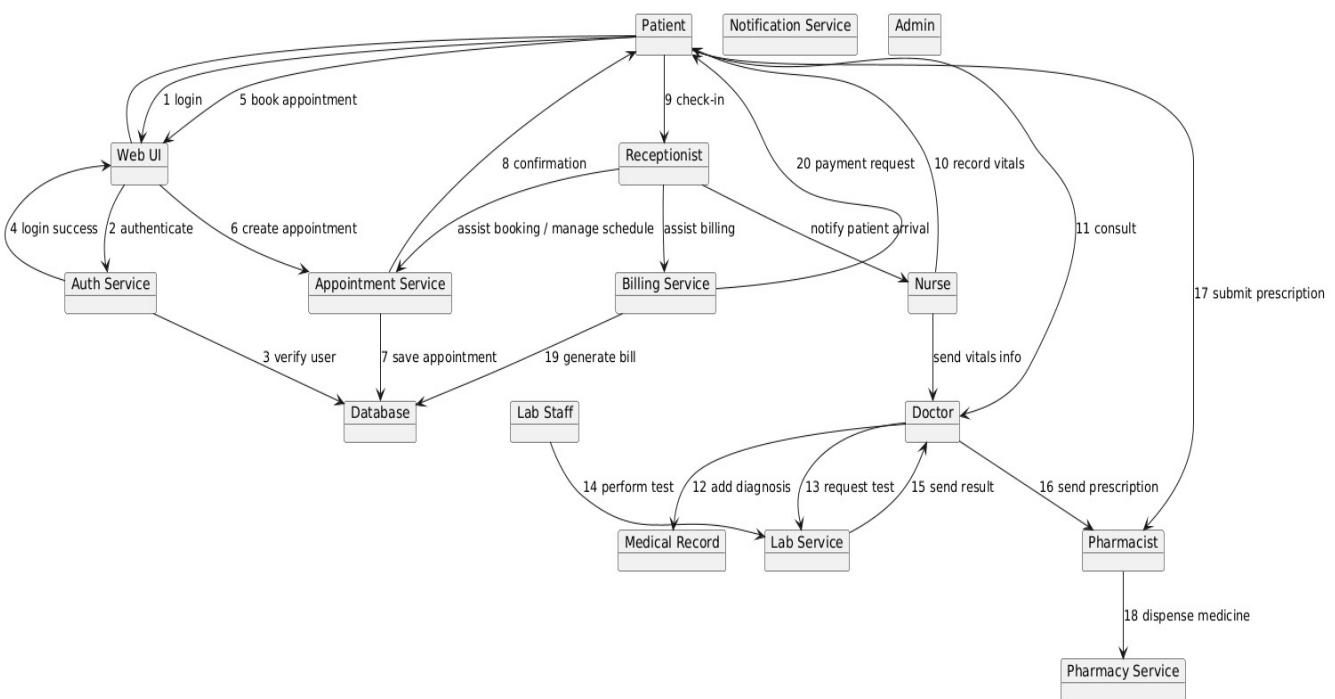
## USE CASE DIAGRAM

Illustrates the interactions between actors (Patient, Doctor, Staff, Admin) and system functionalities such as registration, appointment booking, diagnosis entry, lab test requests, billing, report generation, and system administration.



## COLLABORATION DIAGRAM

Illustrates how system components collaborate to complete healthcare operations such as patient consultation. It focuses on message exchange between modules like Appointment Service, Lab Service, Medical Records, and Billing.



# Table Design

## REGISTRATION TABLE

Field Name	Data Type	Description
registration_id	INT (PK)	Unique registration ID
name	VARCHAR(100)	Full name of user
email	VARCHAR(100)	Email ID
phone	VARCHAR(15)	Mobile number
password	VARCHAR(255)	Encrypted password
user_type	VARCHAR(20)	Patient / Doctor / Staff
status	VARCHAR(20)	Pending / Approved / Rejected
registered_date	DATE	Registration date

## USER TABLE (Base Entity for All Roles)

Attribute Name	Data Type	Description
user_id	INT (PK)	Unique user identifier
registration_id	INT (FK)	Links to Registration table
username	VARCHAR(50)	Login username
email	VARCHAR(100)	User email
password	VARCHAR(255)	Encrypted password
role	VARCHAR(20)	Admin / Patient / Doctor / Staff
status	VARCHAR(20)	Active / Inactive / Blocked
created_at	DATETIME	Account creation date
last_login	DATETIME	Last login time

### **PATIENT\_PROFILE TABLE**

Attribute Name	Data Type	Description
patient_id	INT (PK)	Unique patient ID
user_id	INT (FK)	Links to User table
patient_code	VARCHAR(20)	Hospital patient number
name	VARCHAR(100)	Patient full name
gender	VARCHAR(10)	Male / Female / Other
date_of_birth	DATE	Date of birth
blood_group	VARCHAR(5)	Blood group
phone	VARCHAR(15)	Contact number
address	TEXT	Address
registered_date	DATE	Registration date
status	VARCHAR(20)	Active / Inactive

### **PATIENT\_MEDICAL\_RECORD TABLE**

Attribute Name	Data Type	Description
record_id	INT (PK)	Medical record ID
patient_id	INT (FK)	Links to patient_profile
visit_date	DATE	Date of visit
patient_type	VARCHAR(20)	Inpatient / Outpatient
diagnosis	TEXT	Doctor diagnosis
treatment	TEXT	Treatment given
prescription_id	INT (FK)	Prescription reference
lab_test_required	VARCHAR(10)	Yes / No

Attribute Name	Data Type	Description
doctor_id	INT (FK)	Attending doctor
remarks	TEXT	Notes

### DOCTOR TABLE

Column Name	Data Type	Description
doctor_id	INT (PK)	Unique doctor ID
user_id	INT (FK)	References User(user_id)
specialization	VARCHAR(100)	Medical specialization
qualification	VARCHAR(100)	Degree details
experience	INT	Years of experience
department	VARCHAR(100)	Department
date_of_join	DATE	Date of joining
designation	VARCHAR(50)	Doctor designation (Junior / Senior / Consultant)

### NURSE TABLE

Column Name	Data Type	Description
nurse_id	INT (PK)	Unique nurse ID
user_id	INT (FK)	References User(user_id)
department	VARCHAR(100)	Assigned department
shift	VARCHAR(20)	Day / Night
qualification	VARCHAR(100)	Nursing qualification
experience	INT	Years of experience
date_of_join	DATE	Date of joining
designation	VARCHAR(50)	Staff Nurse / Senior Nurse
status	VARCHAR(20)	Active / On Leave

## **5 LAB STAFF TABLE**

Column Name	Data Type	Description
labstaff_id	INT (PK)	Unique lab staff ID
user_id	INT (FK)	References User(user_id)
lab_type	VARCHAR(100)	Blood / X-Ray / Pathology
shift	VARCHAR(20)	Day / Night
qualification	VARCHAR(100)	Educational qualification
experience	INT	Years of experience
date_of_join	DATE	Date of joining
designation	VARCHAR(50)	Technician / Senior Technician
status	VARCHAR(20)	Active / On Leave

## **PHARMACIST TABLE**

Column Name	Data Type	Description
pharmacist_id	INT (PK)	Unique pharmacist ID
user_id	INT (FK)	References User(user_id)
qualification	VARCHAR(100)	Pharmacy qualification
experience	INT	Years of experience
shift	VARCHAR(20)	Day / Night
date_of_join	DATE	Date of joining
designation	VARCHAR(50)	Pharmacist / Senior Pharmacist
status	VARCHAR(20)	Active / On Leave

## CANTEEN STAFF TABLE

Column Name	Data Type	Description
canteenstaff_id	INT (PK)	Unique canteen staff ID
user_id	INT (FK)	References User(user_id)
role	VARCHAR(50)	Cook / Cashier / Helper
shift	VARCHAR(20)	Morning / Evening
date_of_join	DATE	Date of joining
status	VARCHAR(20)	Active / On Leave

## RECEPTIONIST TABLE

Column Name	Data Type	Description
receptionist_id	INT (PK)	Unique receptionist ID
user_id	INT (FK)	References User(user_id)
desk_no	VARCHAR(20)	Reception desk number
shift	VARCHAR(20)	Day / Night
experience	INT	Years of experience
qualification	VARCHAR(100)	Educational qualification
date_of_join	DATE	Date of joining
language_known	VARCHAR(100)	Languages known
status	VARCHAR(20)	Active / On Leave

## 📍 APPOINTMENT TABLE

Column Name	Data Type	Description
appointment_id	INT (PK)	Unique appointment ID
patient_id	INT (FK)	References Patient(patient_id)
doctor_id	INT (FK)	References Doctor(doctor_id)

Column Name	Data Type	Description
department	VARCHAR(100)	Department of consultation
appointment_date	DATE	Appointment date
appointment_time	TIME	Appointment time
appointment_type	VARCHAR(20)	Online / Walk-in
status	ENUM	Requested / Confirmed / Completed / Cancelled
queue_number	INT	Token / queue number
payment_status	VARCHAR(20)	Pending / Paid
created_at	DATETIME	Booking time
remarks	TEXT	Notes

## 10 MEDICAL RECORD TABLE

Column Name	Data Type	Description
record_id	INT (PK)	Unique medical record
patient_id	INT (FK)	References Patient(patient_id)
doctor_id	INT (FK)	Attending doctor
appointment_id	INT (FK)	Related appointment
diagnosis	TEXT	Diagnosis details
treatment	TEXT	Treatment given
prescription_id	INT (FK)	Prescription reference
lab_test_required	VARCHAR(10)	Yes / No
follow_up_date	DATE	Next visit date
record_status	VARCHAR(20)	Open / Closed

## PRESCRIPTION TABLE

Column Name	Data Type	Description
prescription_id	INT (PK)	Unique prescription ID
patient_id	INT (FK)	References Patient(patient_id)
doctor_id	INT (FK)	Prescribing doctor
prescription_date	DATE	Date of prescription
medicine_details	TEXT	Medicines prescribed
dosage	TEXT	Dosage instructions
duration	VARCHAR(50)	Duration of medication
instructions	TEXT	Special instructions

## LAB TEST TABLE

Column Name	Data Type	Description
labtest_id	INT (PK)	Unique lab test ID
patient_id	INT (FK)	References Patient(patient_id)
doctor_id	INT (FK)	Doctor who requested test
test_name	VARCHAR(100)	Name of lab test
test_type	VARCHAR(50)	Blood / X-Ray / Scan / Pathology
sample_collected	VARCHAR(10)	Yes / No
test_date	DATE	Date of test
result	TEXT	Test result
report_date	DATE	Report generated date
labstaff_id	INT (FK)	Lab staff handling test
status	VARCHAR(20)	Pending / In Progress / Completed

## 1 3 BILLING TABLE

Column Name	Data Type	Description
bill_id	INT (PK)	Unique bill ID
patient_id	INT (FK)	References Patient(patient_id)
appointment_id	INT (FK)	Related appointment
bill_type	VARCHAR(50)	OP / IP / Lab / Pharmacy
total_amount	DECIMAL(10,2)	Total bill amount
Doctor_id	INT(FK)	References Doctor(doctor_id)
payment_mode	VARCHAR(30)	Cash / Card / UPI / Online
payment_status	ENUM	Pending / Paid / Failed
bill_date	DATE	Billing date

## REPORT TABLE

Column Name	Data Type	Description
report_id	INT (PK)	Unique report ID
patient_id	INT (FK)	References Patient(patient_id)
report_type	VARCHAR(100)	Lab / Medical / Radiology / Pathology / Prescription
generated_date	DATE	Report generation date
doctor_id	INT (FK)	References Doctor(doctor_id), the doctor who requested/generated the report
lab_id	INT (FK)	References Lab(lab_id), if it is a lab-related report
diagnosis	TEXT	Diagnosis mentioned in the report (if applicable)
status	VARCHAR(50)	Pending / Completed / Reviewed
report_file	VARCHAR(255)	File path or URL if the report is stored digitally

## PAYMENT TABLE

Column Name	Data Type	Description
payment_id	INT (PK)	Unique payment ID
bill_id	INT (FK)	References Billing(bill_id)
patient_id	INT (FK)	References Patient(patient_id), for easy patient lookup
payment_date	DATE	Date of payment
payment_method	VARCHAR(50)	Cash / Card / UPI / Net Banking / Insurance
payment_amount	DECIMAL(10,2)	Amount paid
payment_status	ENUM	Success / Pending / Failed
transaction_id	VARCHAR(100)	Bank or payment gateway transaction reference

# TABLE NORMALIZATION (1NF → 2NF → 3NF)

## UNNORMALIZED FORM (UNF)

A single table containing patient details, doctor details, appointments, prescriptions, lab reports, billing, and feedback.

### Problems:

- Data redundancy
- Repeating groups
- Update and deletion anomalies

## FIRST NORMAL FORM (1NF)

- All attributes contain atomic values
- Repeating groups removed
- Separate tables created for Users, Appointments, Medical Records, Lab Tests, Billing, and Feedback

## SECOND NORMAL FORM (2NF)

- Partial dependencies removed
- Patient details moved to PATIENTS table
- Doctor details moved to DOCTORS table
- Appointment table contains only appointment-related attributes

## THIRD NORMAL FORM (3NF)

- Transitive dependencies removed
- User authentication details stored only in USERS table
- All non-key attributes depend only on the primary key