Assignment 01 – Interaction and Functional design of a software solution based on a case study

Case Study 1

Smart Healthcare System for Urban Hospitals
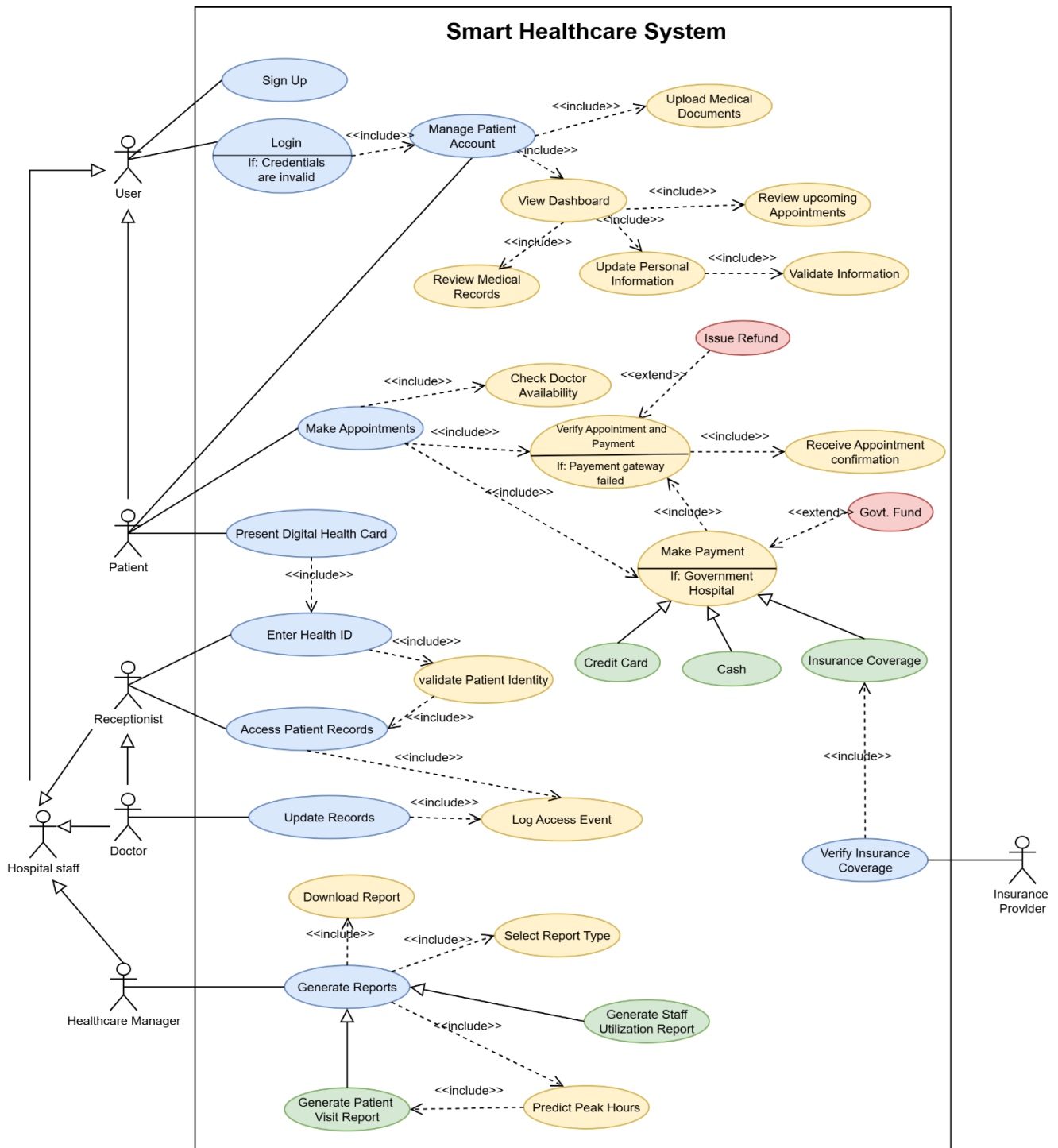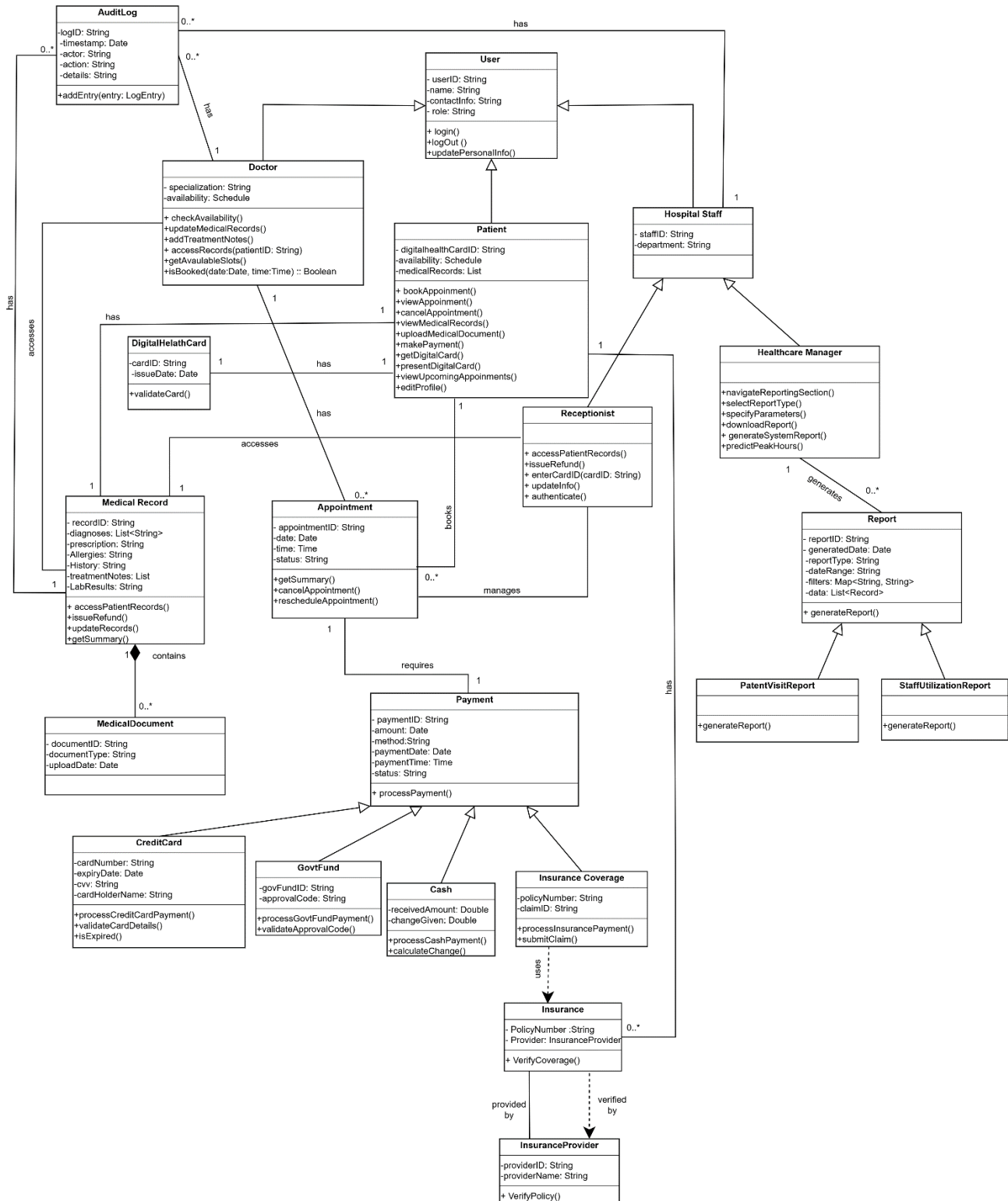
Group – Y3.S1.SE.WE.02.01 - 41

Y3S1-WE-41

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IT23263130	R D I M R WATALIYADDA
IT23270060	H M D NIMESHANI
IT23142800	H M S U HERATH

As a group:

High-level use case diagram (Link)

Class diagram (link)

Individual Component:

IT23243712 - D M S N DHANASEKARA
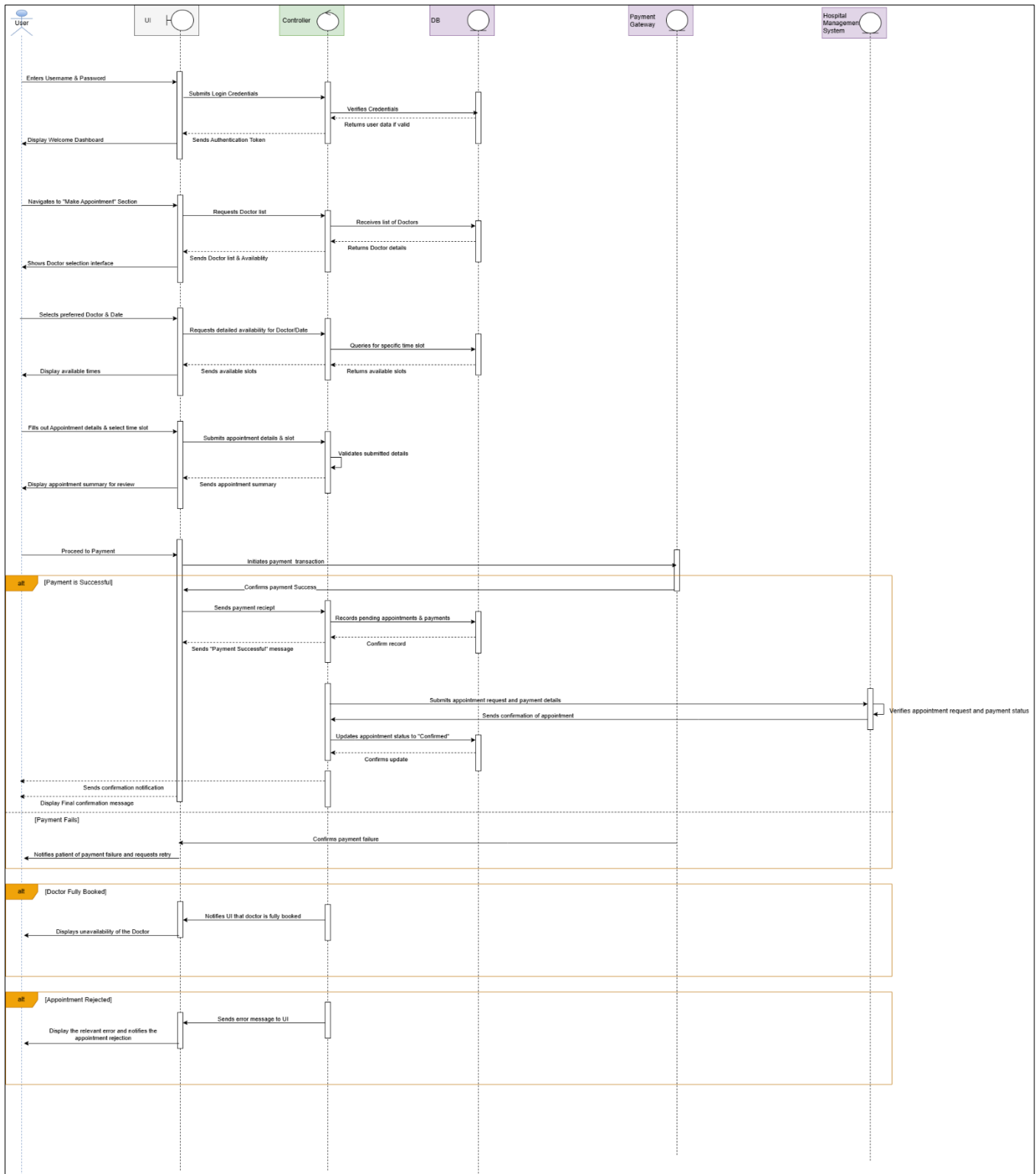
Use Case Scenario

Number	UC02
Name	**Make an Appointment**
Summary	This case allows a patient to log into the hospital's digital healthcare system, select their preferred doctor, choose an available date/time, and make the required payment. The hospital management team then verifies the appointment and payment details before confirming the booking.
Priority	04
Preconditions	1. The patient must have a valid account with the hospital's digital healthcare system. 2. The patient must be logged into the website or mobile application. 3. Doctor availability schedules must be updated in the system. 4. A valid online payment method should be available.
Postconditions	1. The appointment is recorded in the hospital system. 2. The patient receives appointment confirmation after hospital verification. 3. Payment details are securely stored for billing purposes.
Primary Actor(s) and Secondary Actor(s)	Patient Healthcare Receptionist
Trigger	The patient initiates the appointment request through the hospital's website or mobile app.

Main Scenarios	Step	Action
	1	The patient logs into the healthcare system using their digital health card account.
	2	The patient navigates to the "Make an Appointment" section.
	3	The patient selects the preferred doctor and reviews available dates/times.
	4	The patient provides appointment details (reason, preferred time slot, etc.).
	5	The system displays the appointment summary with doctor details, date/time, and fee amount.

	6	The patient proceeds with payment through the available online methods (e.g., credit card, digital wallet).
	7	The appointment request, along with payment details, is submitted to the hospital management system.
	8	Hospital management verifies the appointment request and confirms payment status.
	9	The system sends a notification the appointment details to the patient.
Alternate Flows	**Step**	**Branching Action**
	4a.	If Doctor Fully Booked: • System suggests alternative dates/times or other doctors. • Patient selects new date/doctor and proceeds with the flow.
	6a	If Payment Failure: • System notifies the patient of payment failure. • Patients can retry payment or choose another payment method.
	8a	If Appointment Rejected: • If the appointment or payment verification fails, the system notifies the patient with reasons and possible next steps.
Exception Flows	1	Handling cases where the patient cancels the appointment after payment—refund policies need clarification.
	2	Integrating insurance claims (if applicable) before final appointment confirmation.
	3	Managing real-time doctor availability if multiple patients try to book the same slot simultaneously.
	4	Addressing system downtime or connectivity issues during payment or confirmation steps.

Sequence Diagram

Storyboard

Scene Description:

This case allows a patient to log into the hospital's digital healthcare system, select their preferred doctor, choose an available date/time, and make the required payment. The hospital management team then verifies the appointment and payment details before confirming the booking.

Shot: 01

Patient Login

Shot: 02

Patient select Appointment Option

Shot: 03

Choose Doctor & Date

Shot: 04

Fill Appointment Details

Shot: 05

Review Summary

Shot: 06

Make Payment

Submit Request
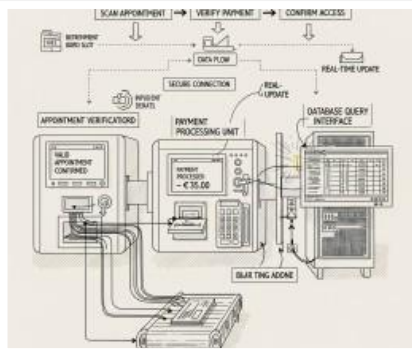
Hospital Verification

Send Confirmation

Doctor Fully Booked

Hospital Staff Reviewing
Appointment Details

Hospital Staff Verifying Payment and sends
notification to the patient about
appointment details

Low-Fidelity Wireframe
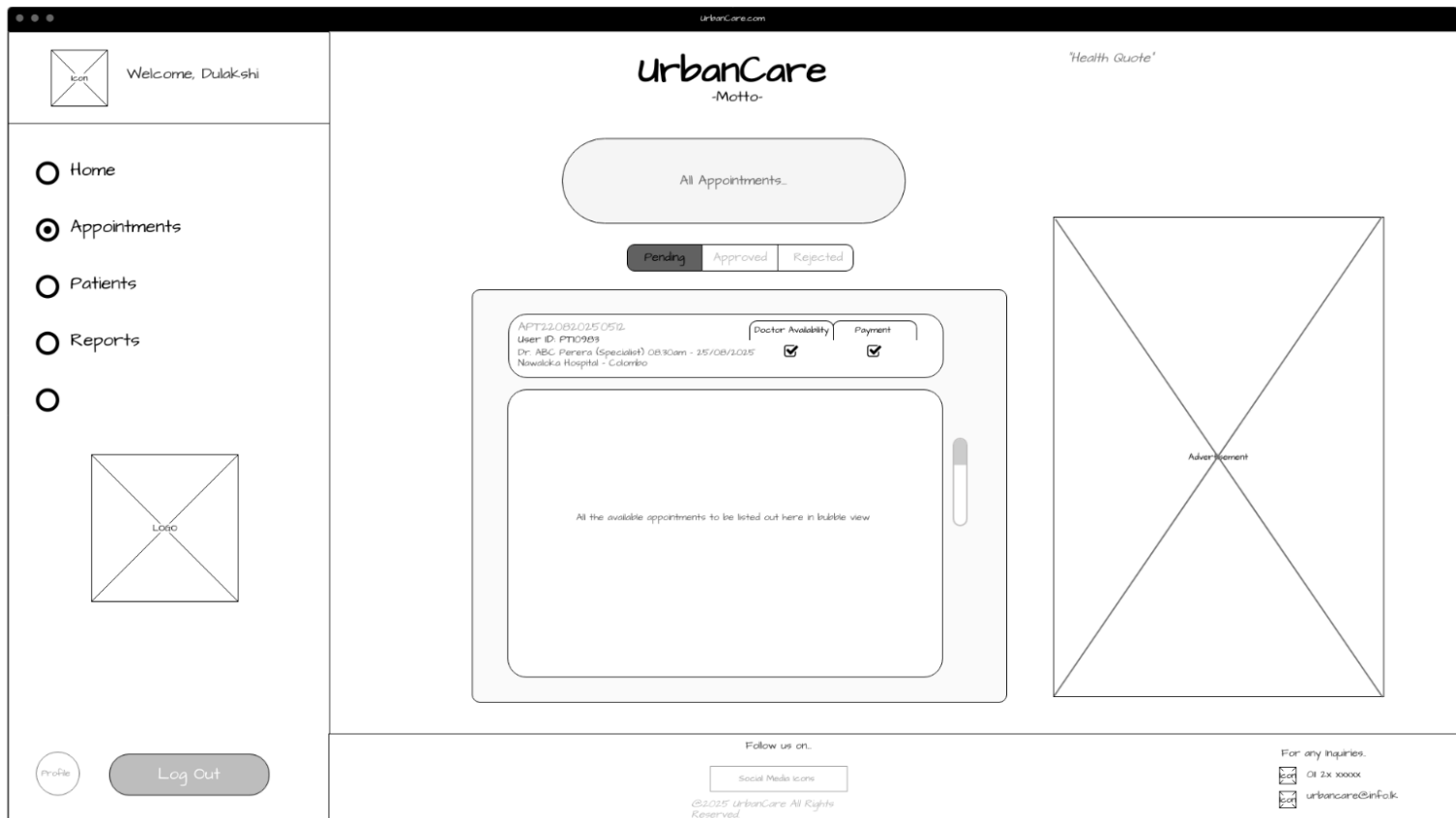
High-Fidelity Wireframe

IT23263130 - R D I M R WATALIYADDA

Use Case scenario

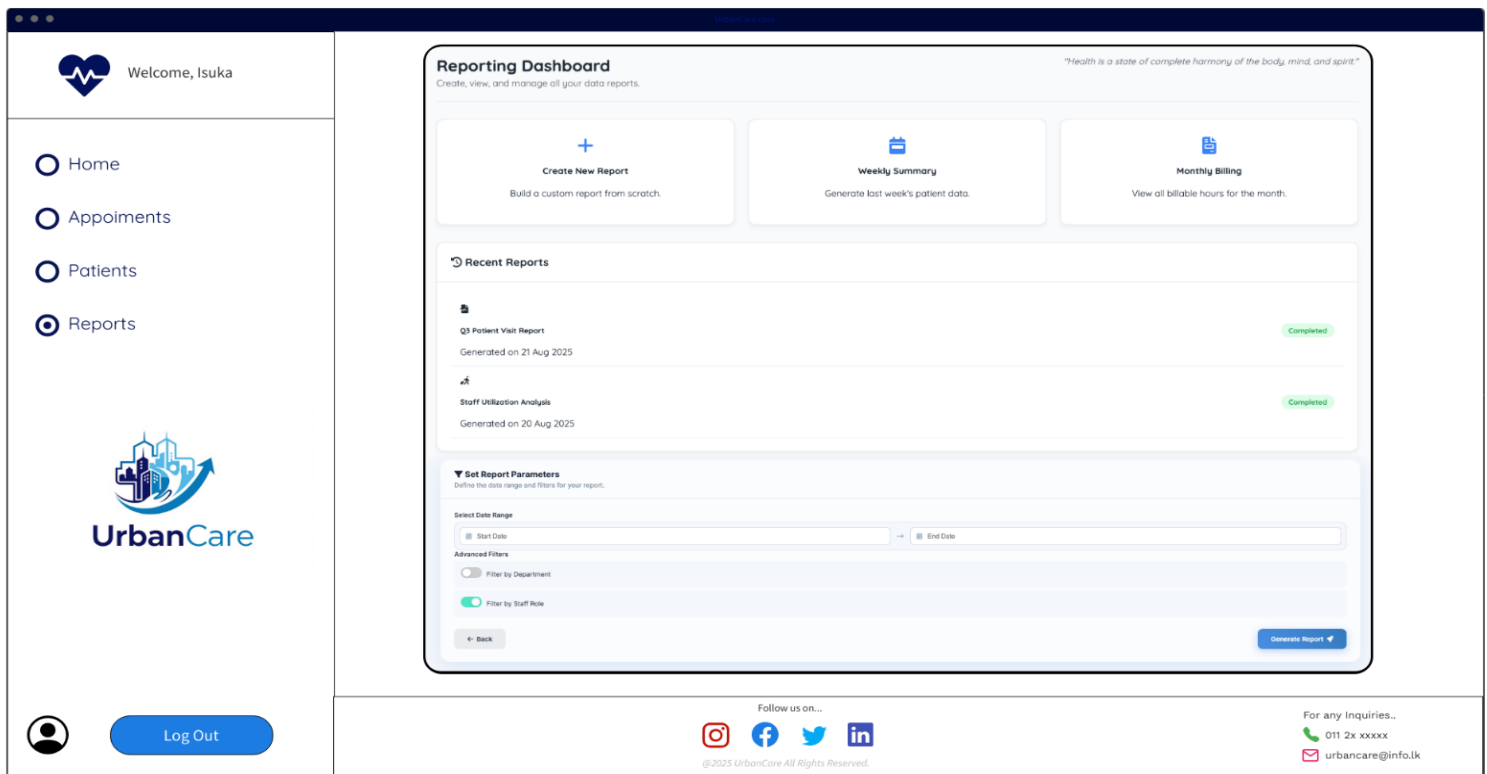| Number	UC04	
Name	**Generate Reports**	
Summary	Healthcare managers can access and download various statistical reports (e.g:- patient visit, staff utilization) to aid in resource planning and decision-making.	
Priority	03	
Preconditions	The healthcare manager must be logged into the system with appropriate access rights.	
Postconditions	The healthcare manager has a downloaded report (PDF or other format) with the requested data. The system has logged the report generation event for auditing purposes.	
Primary Actor(s) and Secondary Actor(s)	Healthcare Manager	
Trigger	A healthcare manager needs to analyze data for resource planning, identifying peak hours, or assessing service utilization.	
Main Scenarios	**Step**	**Action**
	1	The healthcare manager logs into the system.
	2	They navigate to the "Reporting" or "Data Analysis" section.
	3	The manager selects the desired report type (e.g:- "Patient Visit Report" or "Staff Utilization Report").
	4	The manager specifies the parameters for the report, such as a date range (start and end date) and filters (e.g:- specific departments, staff roles).
	5	The system displays a preview or summary of the generated report.
	6	The manager reviews the summary and, if satisfied, clicks "Download."
	7	The system generates and provides a downloadable PDF version of the detailed report.
	8	The healthcare manager saves the report for offline use or sharing with relevant stakeholders.
Alternate Flows	**Step**	**Branching Action**
	6a	If there are no records for the selected parameters, the system displays a message, "No data available for the selected period."

Exception Flows	1	The system may slow down when generating reports with very large datasets.
	2	Data discrepancies or incomplete records could lead to inaccurate report findings.
	3	Managing a variety of different report types and ensuring all have up-to-date information can be a challenge.

Sequence Diagram
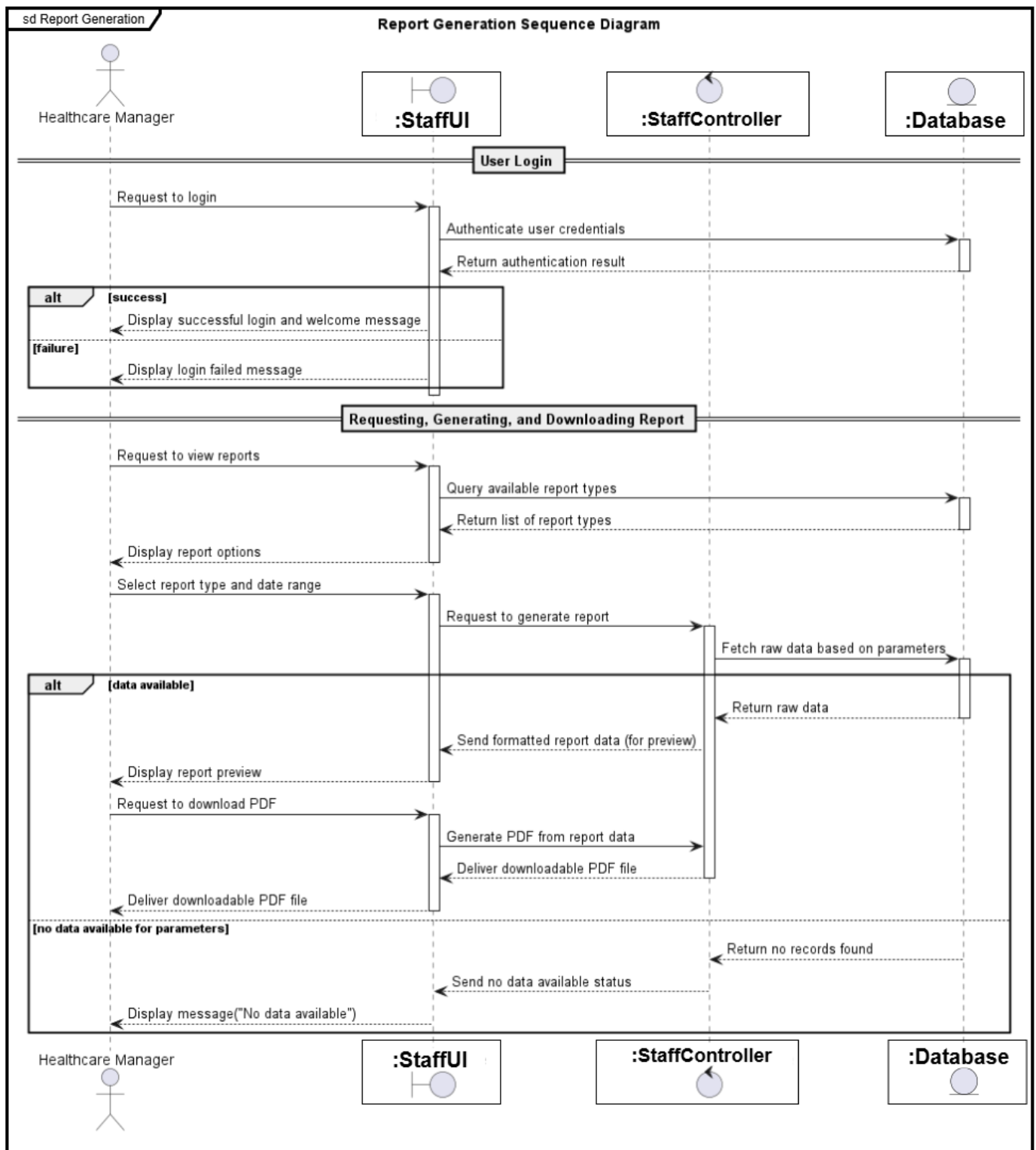
Storyboard

Scene Description:

Healthcare managers can access and download various statistical reports to aid in resource planning and decision-making.(Generate Reports)

01

A healthcare manager logs into the system

02

They navigate to the Reporting or Data Analysis section

03
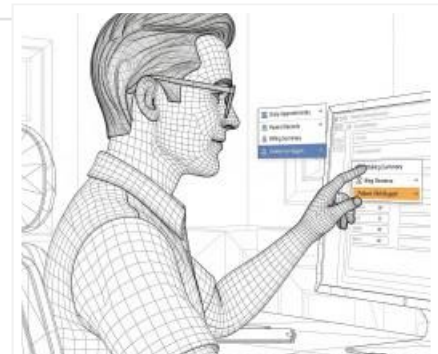
The manager selects the desired report type

04

The manager specifies the parameters for the report

05

The system displays a preview or summary of the generated report

06

The manager reviews the summary and if satisfied clicks Download

07
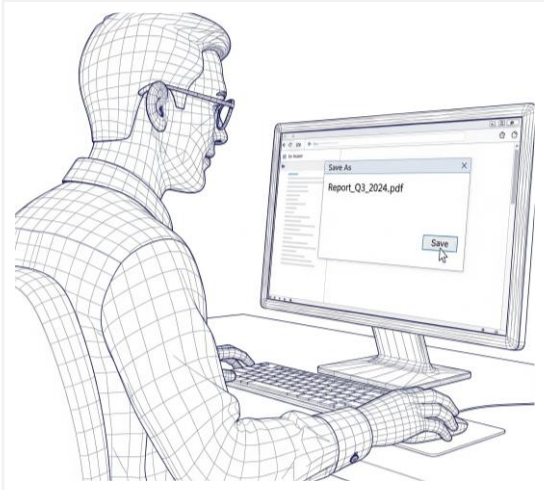
The healthcare manager saves the report for offline use

Low-Fidelity Wireframe

High-Fidelity Wireframe

IT23270060 - H M D NIMESHANI
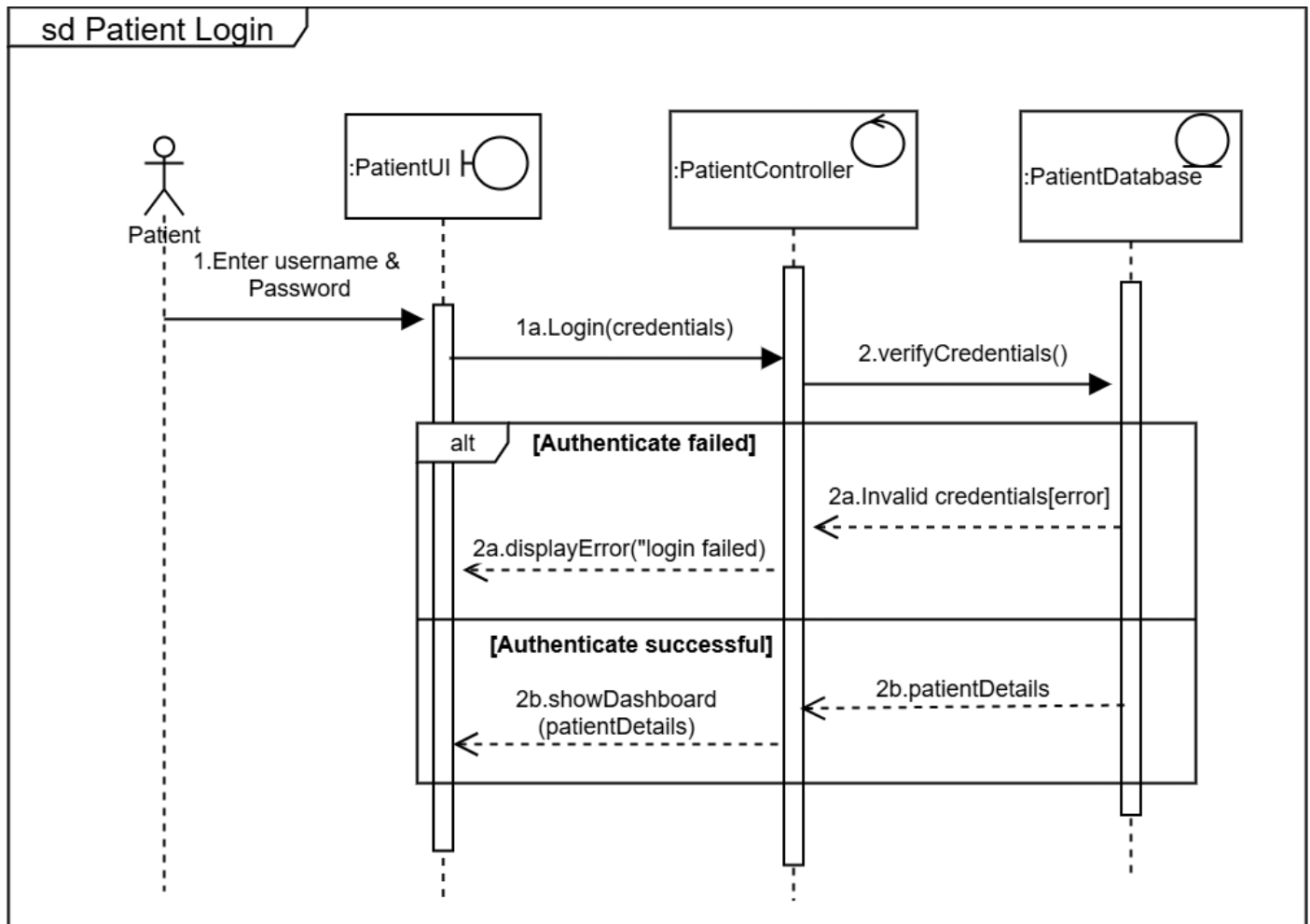
Use Case scenario

Number	UC03
Name	Patient Identification and Record Access
Summary	This use case describes how a patient presents their digital health card, allowing hospital staff and doctors to access the patient's medical records securely. The system validates the patient's identity, provides visual confirmation, and enables authorized personnel to view and update medical information.
Priority	High
Preconditions	• The patient has a valid digital health card linked to an active account. • Hospital staff and doctors have authenticated access to the system.
Postconditions	• Patient's identity is confirmed. • Medical records are retrieved and accessible to authorized personnel. • Any updates made to the patient's records are saved and logged. • Access event is logged for security and auditing purposes.
Primary Actor(s) and Secondary Actor(s)	• Primary: Patient, Hospital Staff, Doctor
Trigger	•Patient arrives at the hospital and presents their digital health card to hospital staff.

Main Scenarios	Step	Action
	1	Patient logs into the system
	2	Navigates to My digital card
	3	Get the digital card
	4	Patient presents digital health card to staff.
	5	Hospital staff or doctor enter the digital card ID to the system
	6	System validates the patient's identity by matching the card Id or details with the patient database.
	7	System provides visual confirmation
	8	Hospital staff or doctor accesses the patient's medical records.
	9	System shows patient history, allergies, current prescriptions, and appointments.

	10	Hospital staff updates other information and Doctor updates /add treatment notes and if required.
	11	System securely saves updates and logs all access details (who, when, what accessed).
Alternate Flows	**Step**	**Branching Action**
	5a	**If Multiple Matches Found,** System prompts staff to confirm with additional info (DOB, phone, NIC).
	6a	**If Card ID Not Recognized,** • System cannot match the card with patient records. • System prompts staff to retry manually enter patient card ID. • If manual entry fails, staff contacts support or verifies identity with ID document.
	7a	System provides visual feedback confirming successful identification or error message if failed.
	8a	**If Partial Access,** • Certain records may be restricted due to privacy or consent settings. • System notifies staff that only limited information is available.
	10a	**If doctor/staff** ,System prompts for doctor or staff credentials (re-authentication) before sensitive updates
Exception Flows	1	**Unauthorized Access Attempt** If a user without proper authorization attempts to access records: • System blocks access. • Alerts security
	2	**System Offline (network failure)** If the hospital system offline: • Staff is prompted to record patient details manually. • Data will be synchronized once the system is restored.
	3	**System Database Error** - Access temporarily unavailable, staff advised to use manual records.

Sequence Diagram (links to diagrams)

sd Patient Identification and Accessing Patient details

Actors/Participants: Hospital Staff, Patient, :StaffUI, :StaffController, :PatientUI, PatientController, :Authenticate system, :AuditLogSystem, :Patient Database

ref — sd Patient Login

1. Present digital health card ID
2. enterCardID(cardID)
2a. lookupPatient(cardID)

alt
  [Unauthorized Access]
    [Failure]showAccessDenied()
    logUnauthorizedAccess(staffID, timestamp)
    logConfirmation
    [Failure]showAccessDenied()

  [Authorized Access]
    3. validateID(cardID)

    alt
      [ID Validation]
        [success]patientData
        4. displayVisualConfirmation(patientData)
        4. displayVisualConfirmation()
        5. requestMedicalRecords()
        5a. getMedicalRecords(patientID)
        6. getMedicalRecords(patientID)
        medicalRecords

        alt
          [Records are restricted]
            7. displayLimitedRecords(records)
            7a. displayLimitedRecords(records)
          [Full Accesss]
            7. displayFullRecords(records)
            7a. displayFullRecords(records)

        loop [Update Records]
          8. updateDetails(notes,appointmentdetails)
          8a. updateDetailst notes, appointmentdetails)

          alt [Reauthentication Required]
            9. requestAuthPrompt()
            displayPrompt()
            a. promptForCredentials
            9a. promptForCredentials()
            9b. enterCredentials(credentials)
            9c. verifyCredentials(credentials)
            9c. verifyCredentials(credentials)

            alt [valid Credentials]
              authSucess()
              10. saveUpdates(patientID,notes,appointmentdetails)
            [Invalid Credentials]
              authfailed()
              10. diaplayError()
              10. diaplayError()

            [No reauthentication required]
              10. saveUpdates(patientID,notes, appointmentdetails)
              saveConfirmation()

          11. logAccessEvent()
          logConfirmation()
          12. displayUpdateSuccess()
          12. displayUpdateSuccess()

      [ID Not Found / multiple matches]
        [failure]no data or multiple matches
        4. displayError()
        4. displayError()

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Storyboard

Scene Description:

This describes how a patient presents their digital health card, allowing hospital staff and doctors to access the patient's medical records securely by entering patient digital card ID. The system validates the patient's identity, provides visual confirmation, and enables authorized personnel to view and update medical information.

Shot: **01**

Patient presents digital health card to staff.

Shot: **02**

Hospital staff enter the digital card ID to the system.

Shot: **03**

System validates the patient's identity and provides visual confirmation.

Shot: **04**

Hospital staff or doctor accesses the patient's medical records.

Shot: **05**

Staff/doctor updates treatment notes if required.

Shot: **06**

System securely saves updates and logs all access details (who, when ,what accessed)

Low-Fidelity Wireframe

link

High-Fidelity Wireframe

link

IT23142800 - H M S U HERATH

Use Case scenario

Number	UC02
Name	Patient Account Management
Summary	Patient logs in, views medical records & upcoming appointments, and updates profile (contact, emergency contact, allergies/conditions summary, medications, preferences). System validates and saves; dashboard refreshes
Priority	High
Preconditions	• Patient account already exists • Patients have valid credentials. • AuthDB, RecordsDB, AppointmentDB, PatientDB available.
Postconditions	• Valid profile updates are saved in PatientDB. • Patient has viewed records/appointments (or saw non-blocking "temporarily unavailable").
Primary Actor(s) and Secondary Actor(s)	Patient
Trigger	Patient needs to manage his/her account so that the patient logs into their account.

Main Scenarios	Step	Action
	1	Patient logs into the account
	2	System authenticates and loads the Account Dashboard
	3	DashboardUI shows tiles: **Medical Records**, **Treatment History**, **Upcoming Appointments**, **Profile & Preferences**, **Billing**, **Alerts**.
	4	Patients select **Medical Records**.
	5	System gets summaries from RecordsDB; DashboardUI shows results
	6	Patient selects **Upcoming Appointments**.
	7	System displays the upcoming appointments

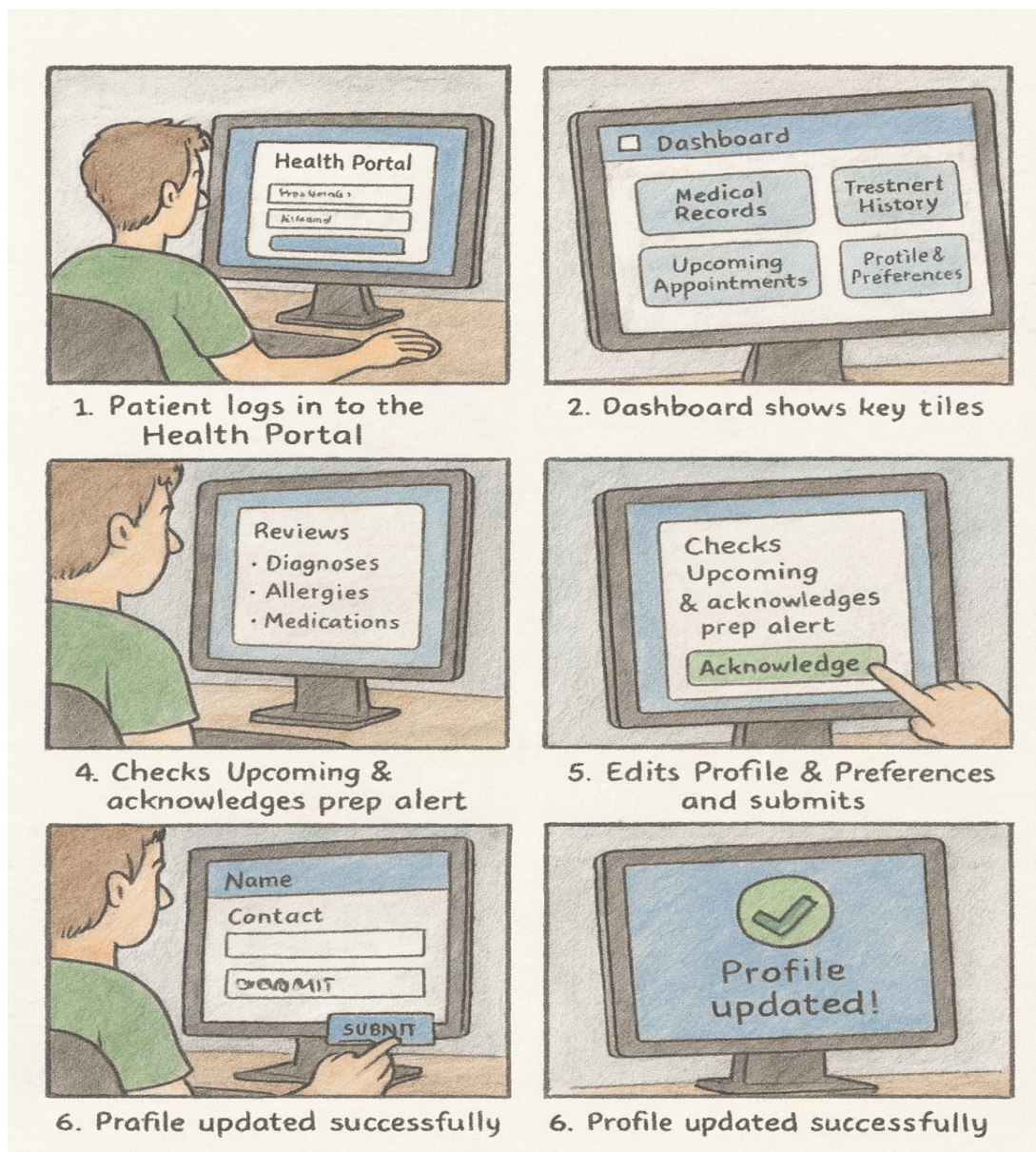|	8	Patient returns to Profile & Preferences, edits contact details, emergency contact, and updates allergies/conditions summary; sets communication preferences (SMS/email/app).
	9	System validates required fields, formats, and consent/acknowledgement
	10	If valid, System persists changes to PatientDB and ProfileUI shows a success banner; DashboardUI refreshes cached profile
Alternate Flows	**Step**	**Branching Action**
	2a	credentials invalid → LoginUI shows error message. Patient may retry login. If successful, continue at Step 2 → 3.
	3a	if **RecordsDB** or **AppointmentDB** is unavailable/slow → DashboardUI displays a non-blocking banner on that tile. Patient may still proceed to other sections
	6a	At Step 6, Appointments returns empty list → DashboardUI shows "No upcoming appointments" + "Make Appointment" link.
	9a	**Validation errors** → System highlights fields and messages; patient corrects and resubmits.
Exception Flows	1	Step 2, cannot reach AuthDB → LoginUI shows "Sign-in temporarily unavailable."
	2	At Step 5, an unrecoverable error occurs (eg: query exception) → DashboardUI shows error page for Records and disables that tile for this session.
	3	At Step 7, unrecoverable error → DashboardUI shows error page for Appointments; tile disabled for this session.
	4	DB/network failure on saving updated information

Sequence Diagram
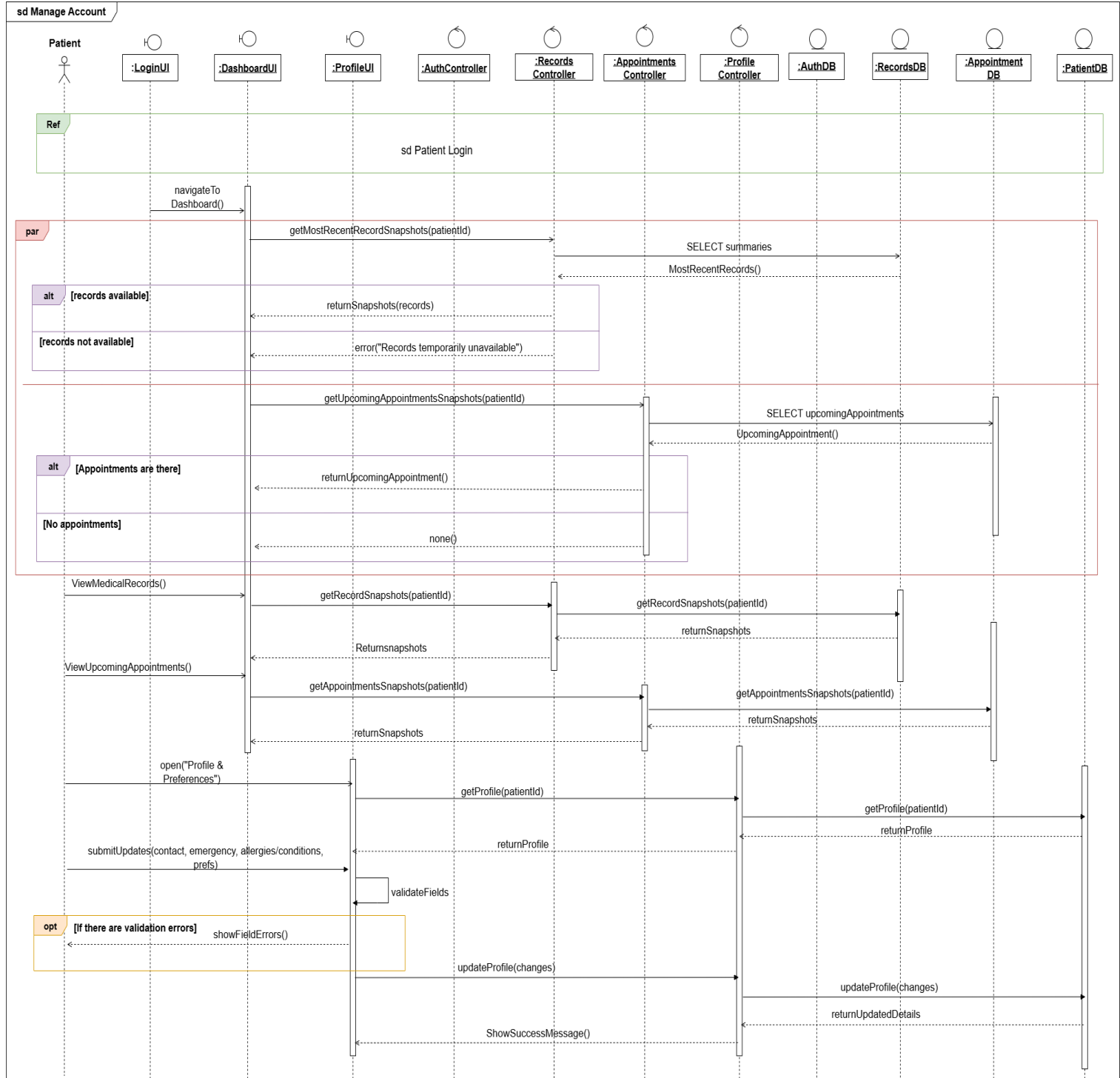
Storyboard

Scene Description:

Patient securely logs in to an already-provisioned account (created when the Digital Health Card was issued) to review medical records and treatment history, check upcoming appointments and relevant alerts, update profile details (contact, emergency contact, allergies/conditions summary, preferences). All actions are validated and audit logged.

1. Patient logs in to the Health Portal
2. Dashboard shows key tiles
4. Checks Upcoming & acknowledges prep alert
5. Edits Profile & Preferences and submits
6. Prafile updated successfully
6. Profile updated successfully

Low-Fidelity Wireframe

High-Fidelity Wireframe

APPENDIX

-AI prompts used when creating storyboards-

For Making Story Board(s)

[*The relevant use case scenario*], I would like to request a series of storyboard sketches to visually depict the user flow outlined in the attached use case.