FACULTY OF COMPUTING
UTM Johor Bahru

Project: Phase 2

<AppointmentPro PKU>

SECD2523 - DATABASE

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1.0 Introduction

In the second phase of our project, our focus is centered on introducing substantial enhancements to the existing clinic appointment system. Building upon the insights gained from the thorough analysis conducted in previous phases, we have identified key areas for improvement and devised a comprehensive plan to elevate the functionality, efficiency, and user experience of the clinic appointment system.

The objective of this phase is to address existing challenges, capitalize on opportunities for optimization, and ultimately deliver a more robust and user-friendly appointment system for the clinic. By leveraging advanced technologies, refining workflows, and incorporating valuable feedback from stakeholders and end-users, we aim to create a solution that not only streamlines the appointment process but also enhances overall clinic operations.

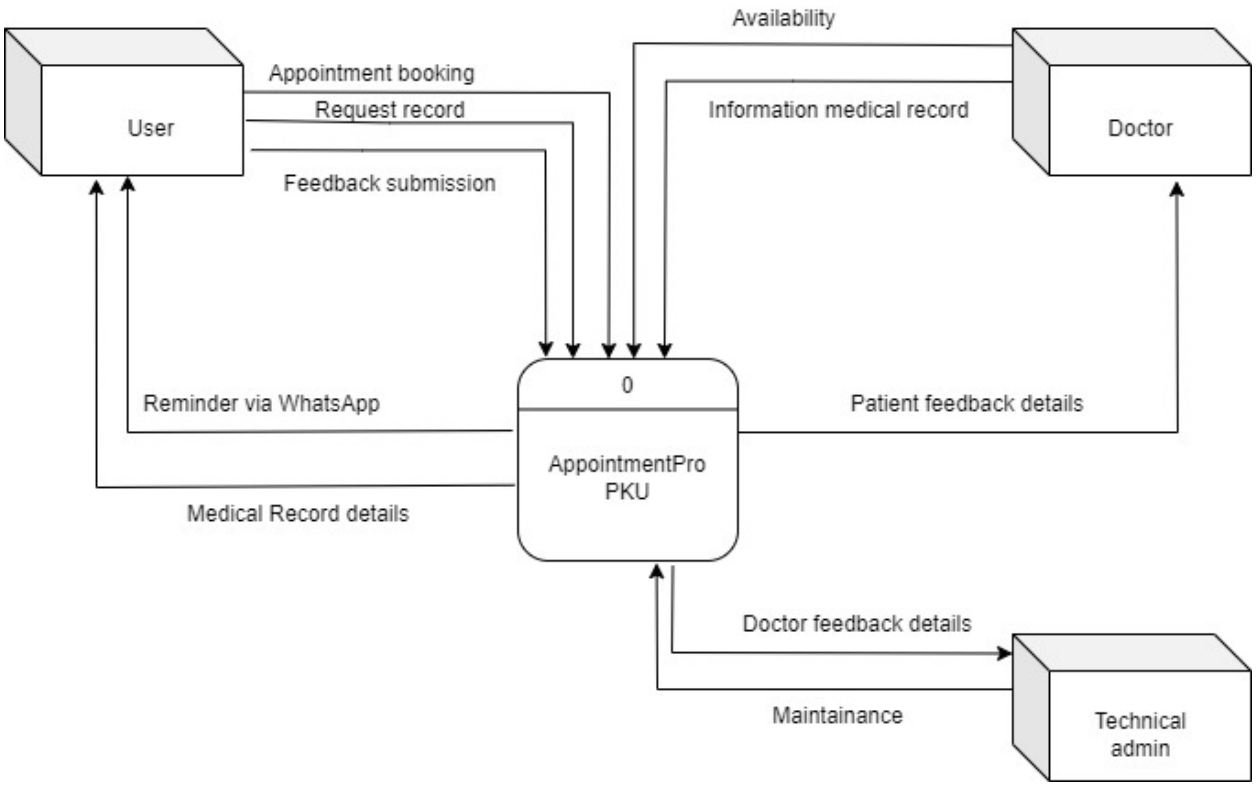
As we delve into this phase, we will systematically implement improvements to various facets of the clinic appointment system. The improvements focused on several aspects such as doctor availability management, medical records management, appointment scheduling and management and feedback mechanisms. Our overarching goal is to create a system that not only meets the current needs of the clinic but also lays the foundation for future scalability and adaptability.

On top of that, we will identify the entities involved in the system and provide a clear visualization of the relationships between entities in order to achieve a systematic and easy-managed system.

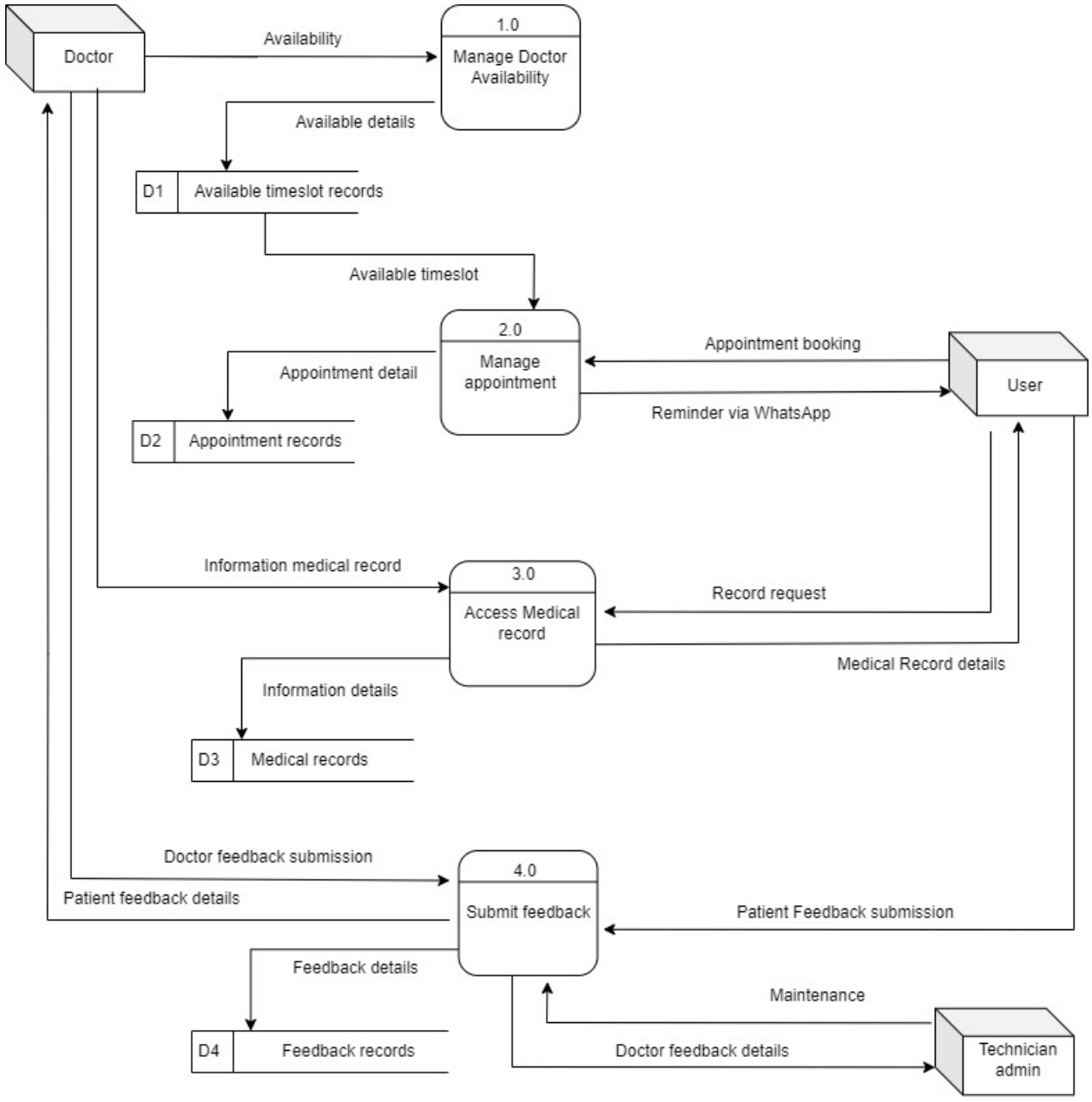
In summary, this project phase represents a pivotal step toward enhancing the clinic appointment system, introducing improvements that will not only address current challenges but also future-proof the system for evolving needs. The collaborative efforts of our team, stakeholders, and end-users will be instrumental in bringing about positive changes that contribute to the overall efficiency and effectiveness of clinic operations.

2.0 DFD (to-be)

2.1 Context Diagram

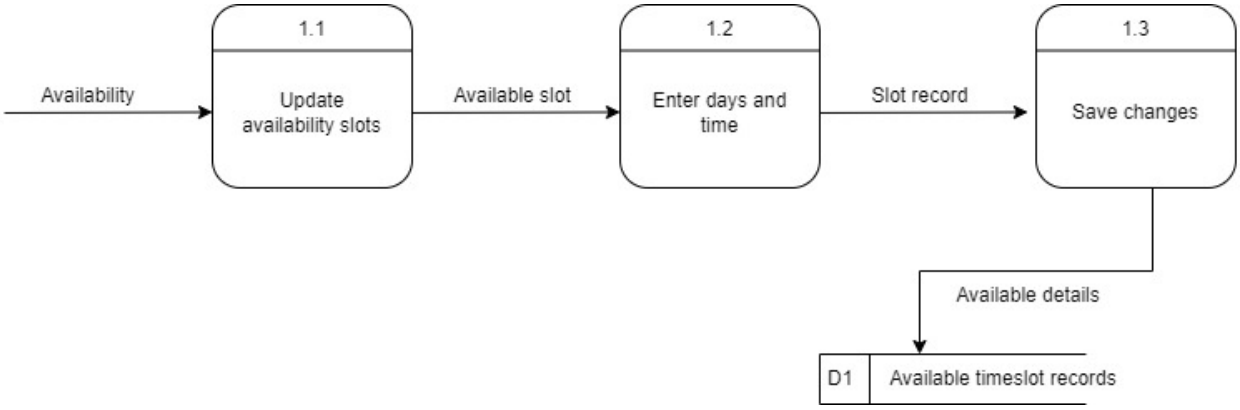


2.2 Level-0 Diagram

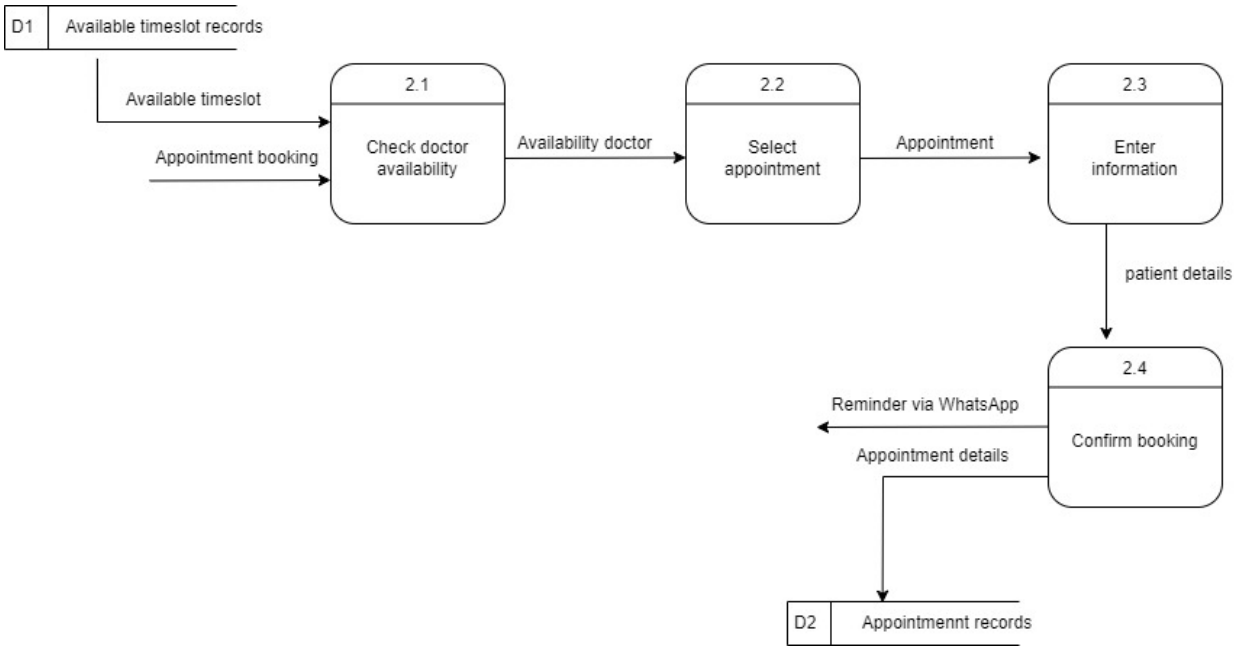


2.3 Level-1 Diagram

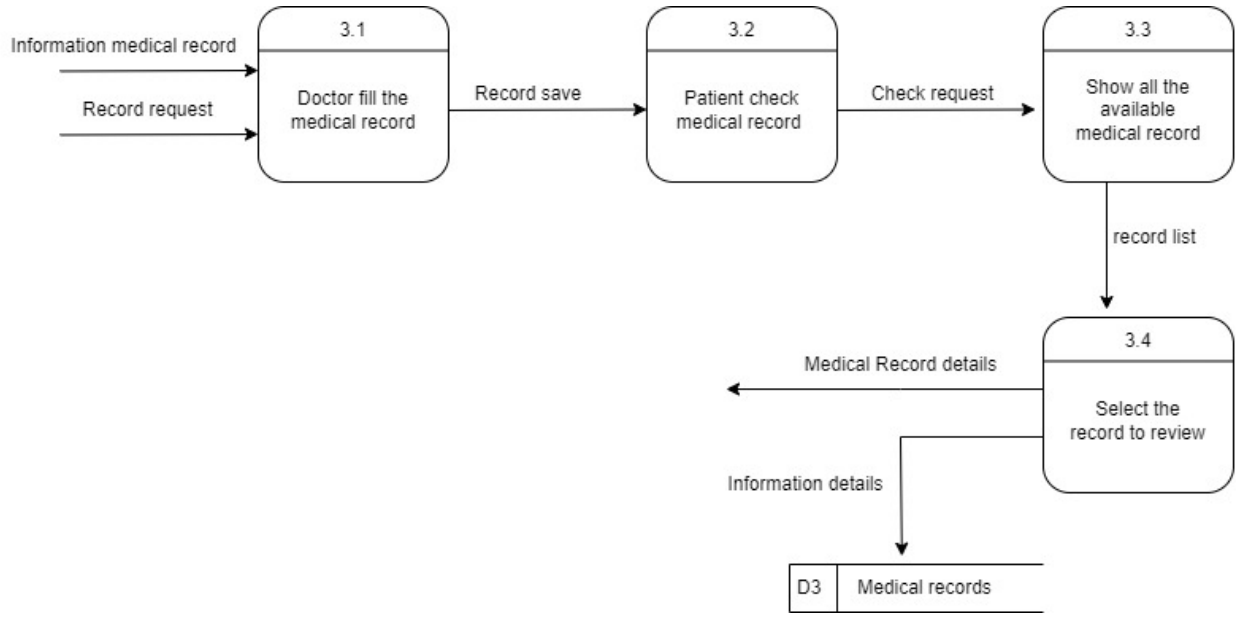
2.3.1 Process 1 (Manage Doctor Availability):



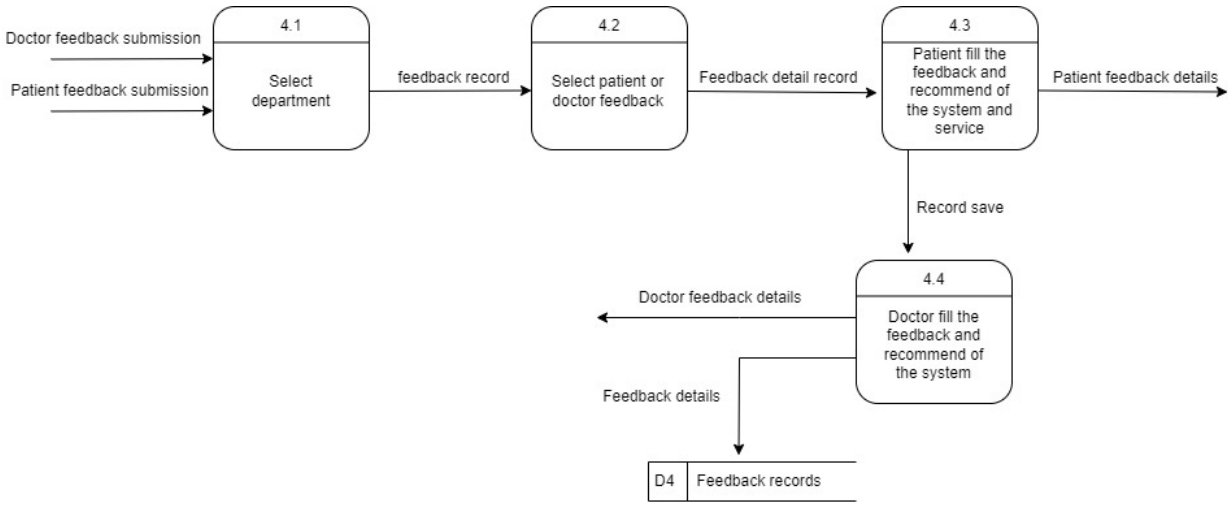
2.3.2 Process 2 (Manage Appointment):



2.3.3 Process 3 (Access Medical Record):



2.3.4 Process 4 (Submit Feedback):



3.0 Data & Transaction requirement

3.1 Proposed business rule

Doctor Workflow:

1. Doctor Registration and Authentication:
    a. Patients can register an account.

2. Doctor Login:
    a. Admin can log in with a registered account.

3. Doctor Dashboard:
    a. Upon successful login, direct the doctor to the admin dashboard.

4. Appointment Management:
    a. Doctors can view upcoming appointments on a color-coded calendar.
    b. Colors vary based on the number of appointments per day.
    c. Doctors can create, modify, or cancel appointments on the calendar.
    d. Doctors can manage and arrange time slots for each appointment.

5. Patient Information:
    a. Doctors can search for patient information by patient ID or name.
    b. Display patient information upon search.
    c. Doctors can update medical records for a patient.

6. Communication:
    a. Doctors can contact patients through an integrated Whatsapp chat box.
    b. Send reminders and confirmations for appointments.

7. Feedback:
    a. Doctors can submit feedback
    b. Display a feedback form for users to fill and submit.

8. Logout:
    a. Provide an option for the admin to securely log out.

Patient Workflow:

1. Patient Registration and Authentication:
    a. Patients can register an account.

2. Patient Login:
    a. Patients can log in securely to their accounts.

3. Patients Dashboard:
    a. Upon successful login, direct the patient to the patient dashboard.

4. Patient Information:
    a. Patients can access and modify personal information.
    b. Patients can access medical records.

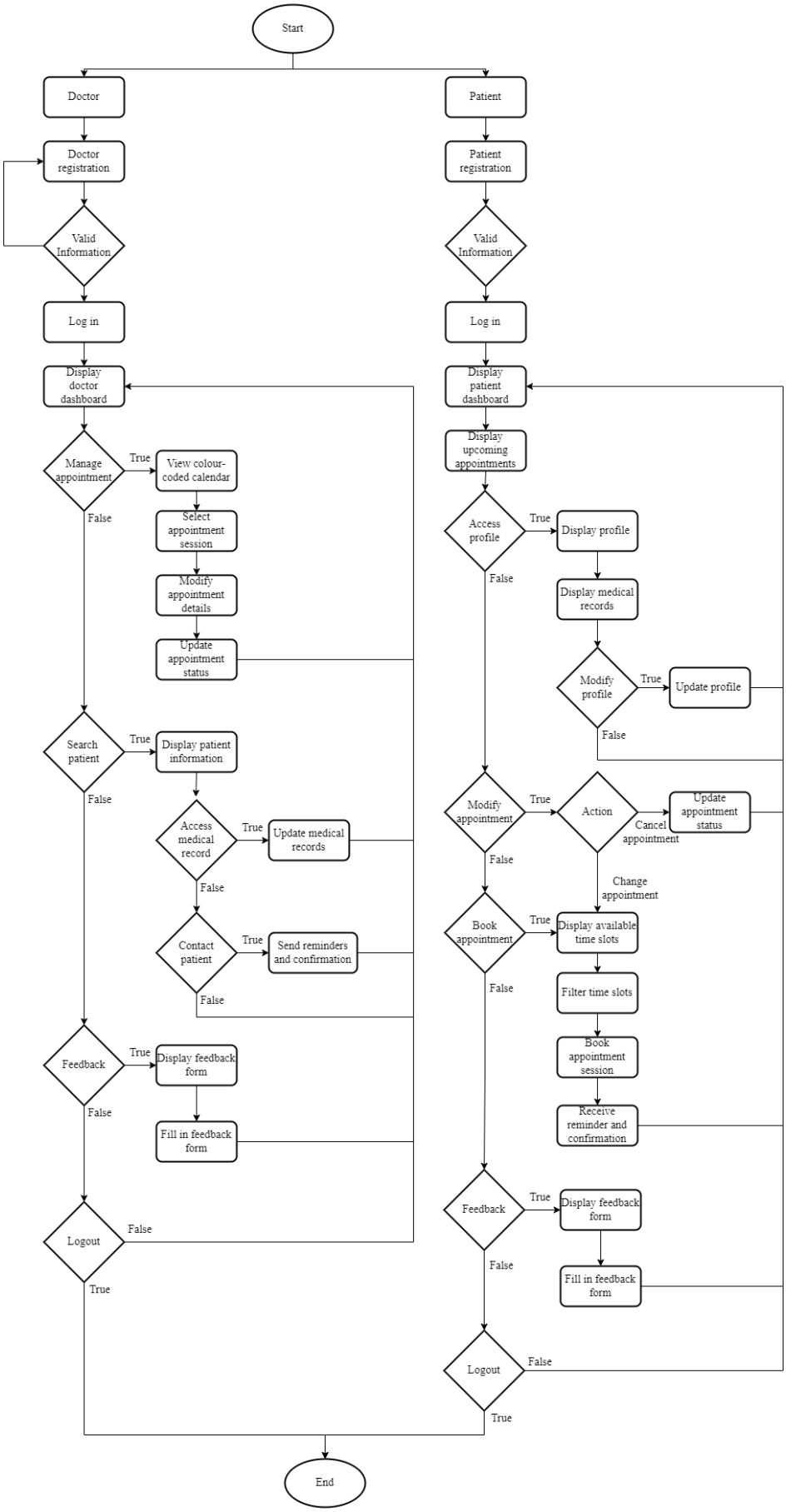
5. Appointment Booking:
    a. Patients can view available time slots for appointments.
    b. Patients can filter time slots based on date and time preferences.
    c. Patients can book appointments on selected time slots.

6. Manage appointments:
    a. Patients can change appointment date and time
    b. Patients can cancel appointments

7. Reminder System:
    a. Patients receive reminders through Whatsapp a day before the scheduled appointment.

8. Feedback Submission:
    a. Patients can submit feedback.
    b. Display a feedback form for users to fill and submit.

9. Logout:
    a. Provide an option for the patients to securely log out.


Start
Doctor
Doctor registration
Valid Information
Log in
Display doctor dashboard
Manage appointment
True
View colour-coded calendar
Select appointment session
Modify appointment details
Update appointment status
False
Search patient
True
Display patient information
Access medical record
True
Update medical records
False
Contact patient
True
Send reminders and confirmation
False
False
Feedback
True
Display feedback form
Fill in feedback form
False
Logout
False
True
Patient
Patient registration
Valid Information
Log in
Display patient dashboard
Display upcoming appointments
Access profile
True
Display profile
Display medical records
Modify profile
True
Update profile
False
False
Modify appointment
True
Action
Update appointment status
Cancel appointment
Change appointment
False
Book appointment
True
Display available time slots
Filter time slots
Book appointment session
Receive reminder and confirmation
False
Feedback
True
Display feedback form
Fill in feedback form
False
Logout
False
True
End

3.2 Proposed data & transactional

3.2.1 Data Requirements

Doctor :
The data stored includes the doctors' ID, name, contact, department, gender, email address, username and password. The doctor ID for each doctor is unique.

Patient Information:
The data stored includes the patients' ID, name, contact, gender, address, date of birth, username and password. The patient ID for each patient is unique.

Appointment:
The data stored includes available appointment ID, time, date, type, reminder and schedule. The appointment ID for each appointment is unique. The patient ID and the doctor ID act as the foreign key.

Medical Record:
The data stored includes record ID and patient history. The record ID for each record is unique. Since a record is entered and modified by doctors and is specific for only a patient, the patient ID and the doctor ID are the foreign keys.

Reminder:
The data stored includes reminder ID and date. The reminder ID is unique. A reminder is binded to only an appointment session which involves a doctor and patient, thus patient ID, doctor ID and appointment ID are the foreign keys.

Feedbacks:
The data stored includes feedback ID, feedback form and date submitted. The feedback ID is unique. Patient ID or doctor ID will be the foreign key based on the individual who did the feedback. The feedback from the doctor will be redirected to the technician while the feedback from the patient will be sent to the doctor of the appointment session.

3.2.2 Transactional Requirements

Data entry

- Enter the details of user during registration
- Enter the appointment details
- Enter medical records
- Enter feedback data

Data update/delete

- Update / delete appointment session details
- Update / delete medical records

Data queries

- List of appointments on the color-coded calendar
- List of appointment session history
- List of patient information
- List of patient medical record
- List of doctor
- Identify the appointment status

4.0 Database conceptual design

4.1 Conceptual ERD

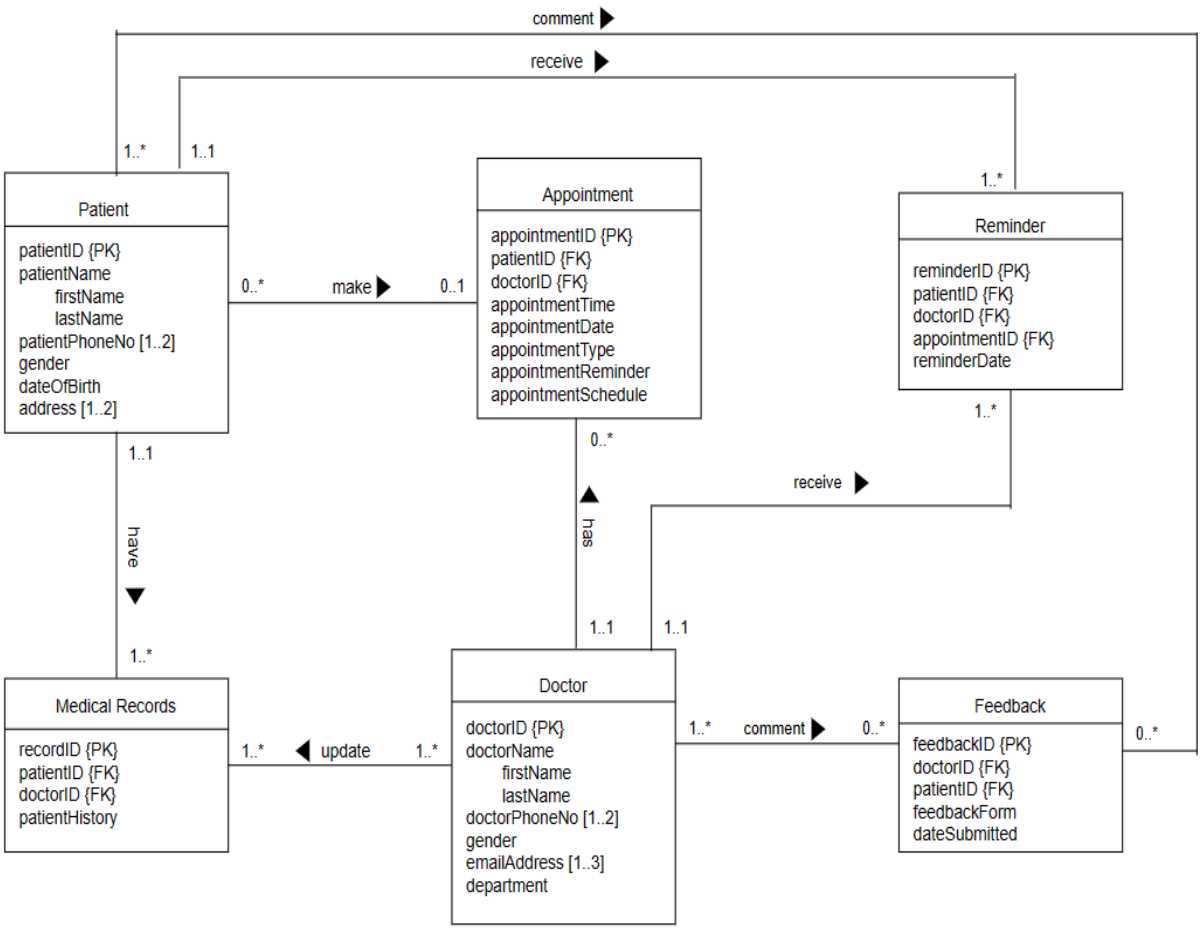


Figure 4.1 Conceptual ERD

4.2 Enhanced ERD (EERD)

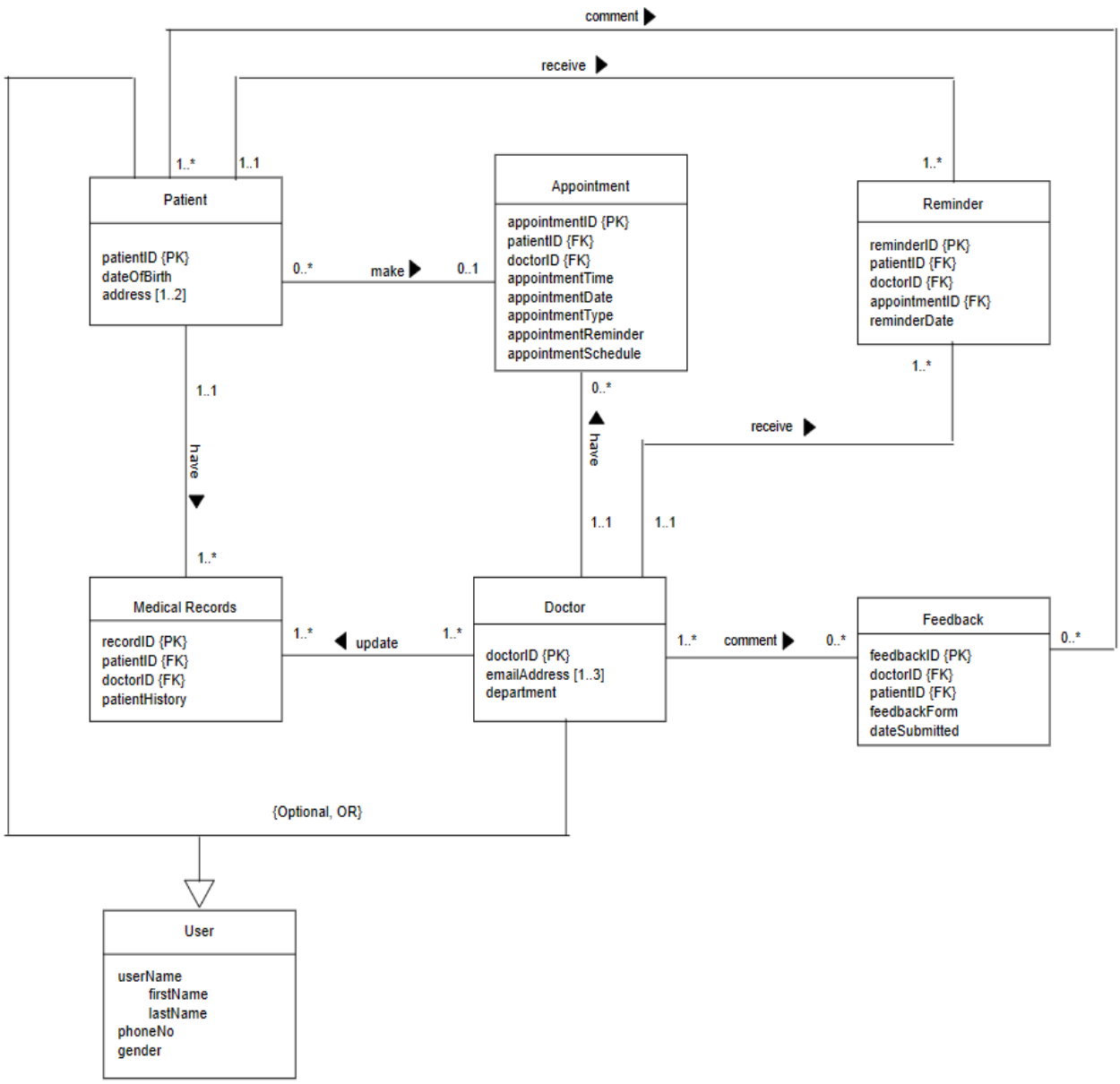


Figure 4.2 Enhanced ERD (EERD)

5.0 Data dictionary

Relation: Patient

Attributes	Data Type	Data length	Constraint	Description
patientID	NUMBER	10	PRIMARY KEY	Identification Number of the patient, automatically generated
dateOfBirth	NUMBER	10	NOT NULL	Date of birth of the patient
address	VARCHAR2	30	NOT NULL	Address of the patient

Relation: Doctor

Attributes	Data Type	Data length	Constraint	Description
doctorID	NUMBER	10	PRIMARY KEY	Identification Number of the doctor, automatically generated
emailAddress	VARCHAR2	20	NOT NULL	Address of the doctor
department	VARCHAR2	20	NOT NULL	Department of the doctor

Relation: User

Attributes	Data Type	Data length	Constraint	Description
userName	VARCHAR2	30	PRIMARY KEY	Name of the user
firstName	VARCHAR2	20	NOT NULL	First name of the user
lastName	VARCHAR2	20	NOT NULL	Last name of the user
phoneNo	NUMBER	11	NOT NULL	Contact number of the user
gender	VARCHAR2	10	NOT NULL	Gender of the user

Relation: Appointment

Attributes	Data Type	Data length	Constraint	Description
appointment ID	NUMBER	10	PRIMARY KEY	Identification Number of the appointment, automatically generated
patientID	NUMBER	10	FOREIGN KEY	Identification Number of the patient, automatically generated
doctorID	NUMBER	10	FOREIGN KEY	Identification Number of the doctor, automatically generated
appointmentTime	NUMBER	10	NOT NULL	Appointment time
appointmentDate	NUMBER	10	NOT NULL	Appointment date
appointmentType	VARCHAR2	20	NOT NULL	Appointment type,eg. psychology
appointmentReminder	VARCHAR2	20	NOT NULL	Reminder of the appointment
appointmentSchedule	VARCHAR2	20	NOT NULL	Schedule of the appointment

Relation: Reminder

Attributes	Data Type	Data length	Constraint	Description
reminderID	NUMBER	10	PRIMARY KEY	Identification Number of the reminder, automatically generated
patientID	NUMBER	10	FOREIGN KEY	Identification Number of the patient, automatically generated
doctorID	NUMBER	10	FOREIGN KEY	Identification Number of the doctor, automatically generated
appointmentID	NUMBER	10	FOREIGN KEY	Identification Number of the appointment, automatically generated
reminderData	VARCHAR2	20	NOT NULL	Content of the reminder

Relation: Medical Records

Attributes	Data Type	Data length	Constraint	Description
recordID	NUMBER	10	PRIMARY KEY	Identification Number of the record, automatically generated
patientID	NUMBER	10	FOREIGN KEY	Identification Number of the patient, automatically generated
doctorID	NUMBER	10	FOREIGN KEY	Identification Number of the doctor, automatically generated
patientHistory	VARCHAR2	20	NOT NULL	History treatment of the patient

Relation: Feedback

Attributes	Data Type	Data length	Constraint	Description
feedbackID	NUMBER	10	PRIMARY KEY	Identification Number of feedback, automatically generated
doctorID	NUMBER	10	FOREIGN KEY	Identification Number of the doctor, automatically generated
patientID	NUMBER	10	FOREIGN KEY	Identification Number of the patient, automatically generated
feedbackForm	VARCHAR2	20	NOT NULL	Feedback of the service
dataSubmitted	VARCHAR2	20	NOT NULL	Context of the feedback

6.0 Summary

In this phase, a new improved system has been proposed which is the AppointmentPro PKU system which solves the problem confronted by the users of the current PKU appointment system. With this system, enhanced user experience will be provided to the users and more functionalities proposed will be implemented. The core functionalities of the proposed system are presented using a context diagram and data flow diagrams.

The context diagram serves as our starting point, offering a high-level view of the system and its interactions with external entities. It provides clarity on system boundaries and the flow of data within the PKU environment. Moving forward, the Diagram 0, or Level 0 Data Flow Diagram (DFD), offers an insightful overview of the entire appointment system. It illustrates core functionalities which includes managing the appointment process, managing doctor availability process, access medical record process and submit feedback process. This diagram acts as a foundational blueprint, guiding the subsequent development of detailed diagrams and workflows. In parallel, child diagrams, or Level 1 DFDs, delve into the intricacies of specific processes identified in the Level 0 DFD. Each child diagram contributes to a granular understanding of the system's internal workings.

A pivotal element in this phase is the workflow diagram, providing a user-centric perspective on the step-by-step flow of activities within the improved appointment system. It outlines interactions between users (doctors and patients) and the system, from login to appointment booking, communication, and feedback submission. This diagram highlights the user experience improvements and streamlined processes introduced in this phase.

The Entity Relationship Diagram (ERD) drawn shows clear connections and characteristics between each entity involved in the system including the variables for the data related to the entities. Moreover, the primary key which is unique for each entity class and foreign that links the data flow in entities are also identified. The data dictionary defines all the variables stated in the ERD providing explanations to each variable so that it is understandable for the stakeholders.

In summary, this phase marks a significant stride forward with the introduction of the AppointmentPro PKU system, addressing challenges faced by users of the current PKU appointment system. The proposed system not only resolves existing issues but also promises an enhanced user experience and the incorporation of additional functionalities.This holistic approach ensures that the AppointmentPro PKU system is not only technically robust but also user-friendly, aiming to significantly enhance the overall clinic appointment experience for both healthcare providers and patients.