UNIVERSITI TEKNOLOGI MALAYSIA

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PROJECT: PHASE 2

SECD2523 : DATABASE

SECTION 08

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1.0 Introduction

Effective clinic and appointment administration is essential to providing high-quality patient care in the ever-changing healthcare environment. The foundation of a smoothly operating medical institution is the organisation of healthcare services, patient relations, and appointment scheduling. As is well known, technology developments have improved medicine in numerous ways, including how clinicians identify and care for patients, how precise and effective medical procedures are, how easily information is available, and how convenient it is for patients to get care.
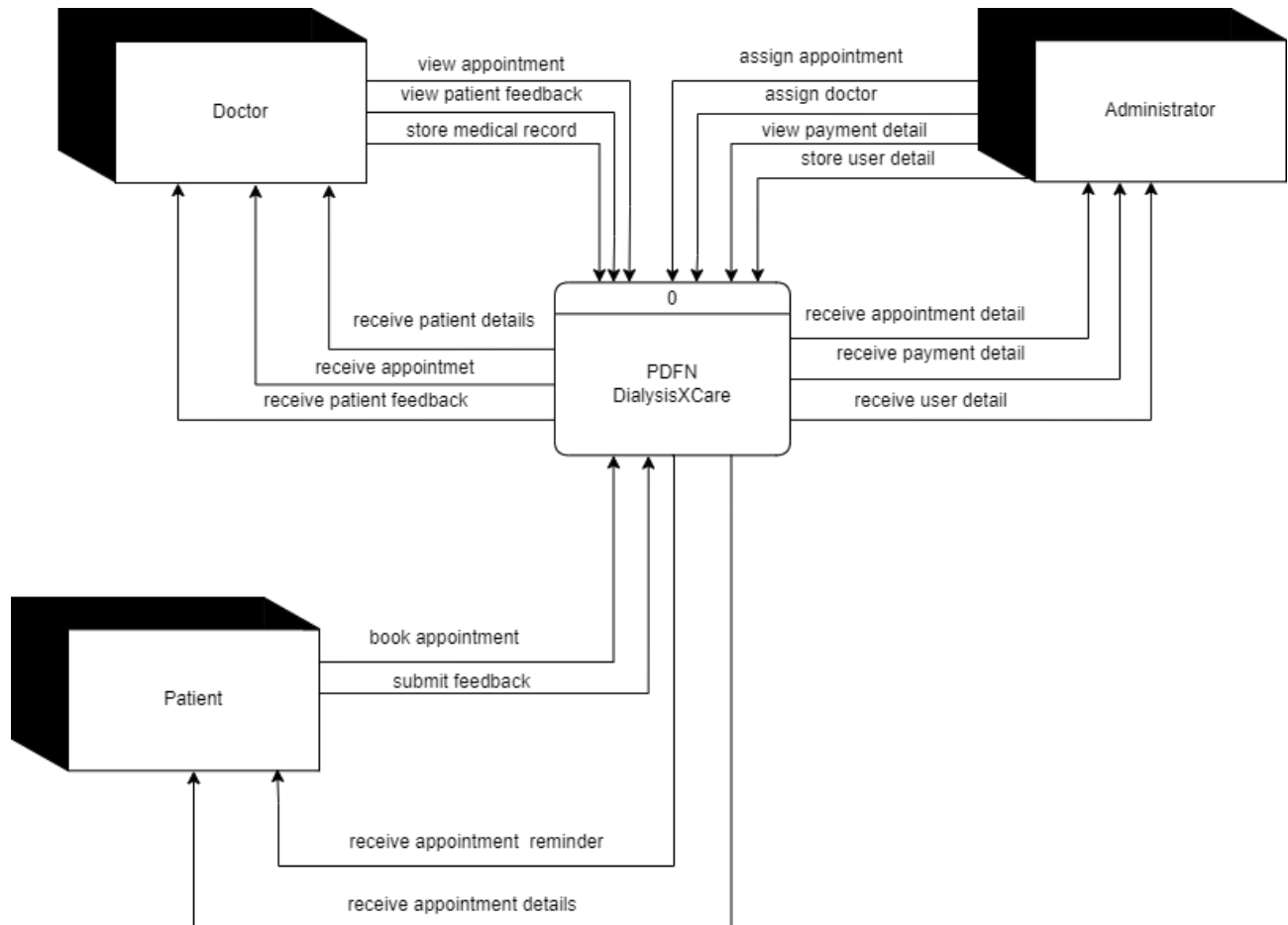
The objective of our project is to create an appointment booking system for Pusat Dialisis FN, a dialysis facility situated in Johor Bahru. Due to faults and inefficiencies, scheduling appointments and making medical reservations has historically required a lot of labour. A few difficult and conventional methods that were in use prior to the use of technology included manually rescheduling and canceling appointments, maintaining records on paper, and booking appointments over the phone. Pusat Dialisis FN continues to apply nearly all of these problems. In this report, we are focusing on the data flow diagram,data and transaction requirement,database conceptual design and data dictionary for the system produced. This includes Proposed Business Rules, Proposed Transaction Requirement and Proposed Data Requirement. The Entity-Relationship Diagram based on the system is also included below of this report.

In order to enhance the efficiency and effectiveness of healthcare services, a robust data management system is proposed, encompassing both business rules and transactional requirements. The system aims to automate key processes while adhering to healthcare regulations and ensuring patient privacy.

2.0 DFD (To-Be)

2.1 Context Diagram

2.2 Level 0 Diagram

2.3 Level 1 Diagram
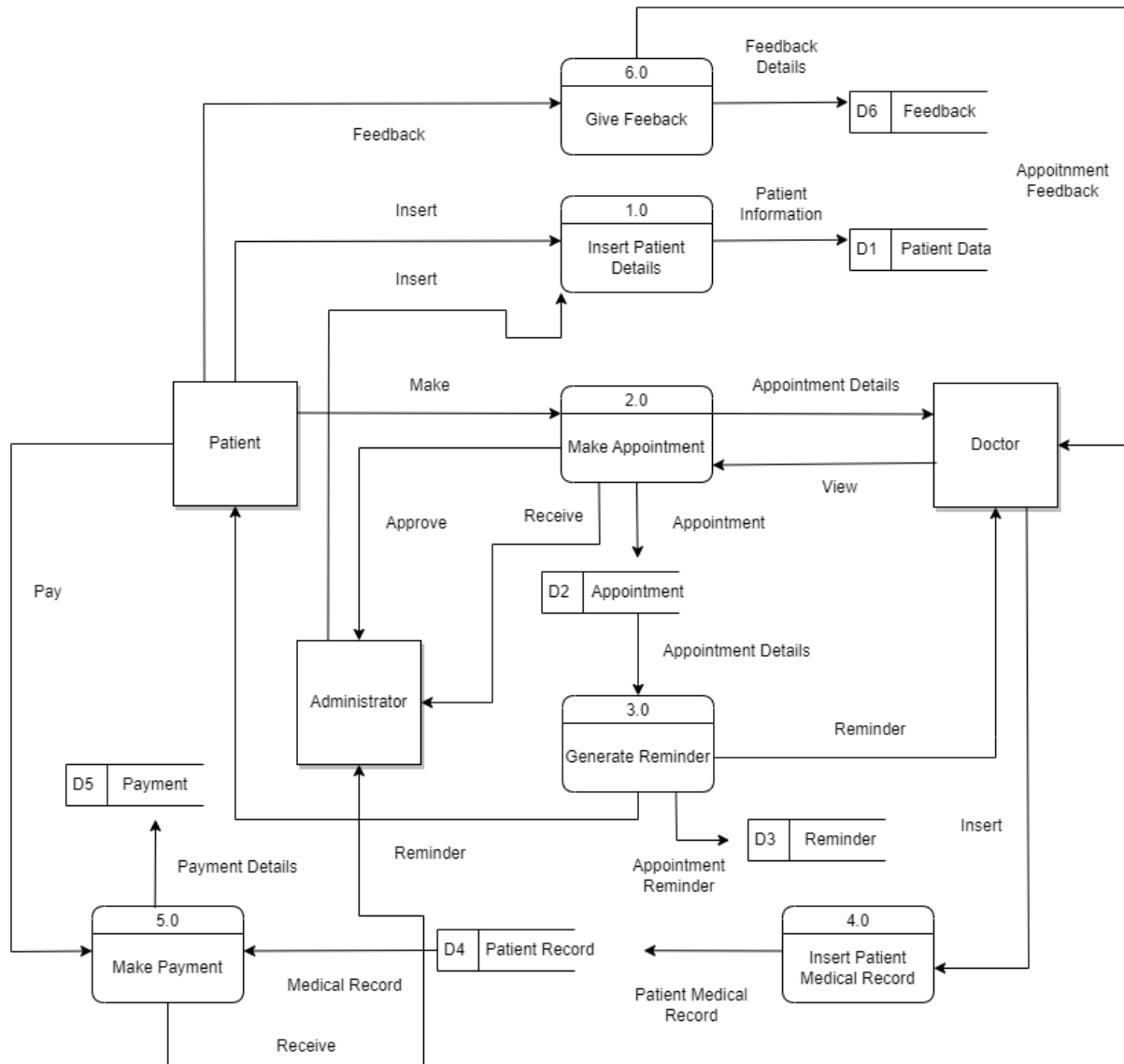
2.3.1 Process 1: Insert Patient's Details

Patient Information

1.1
Register as a patient

Patient Registration

1.2
Fill up personal details

Patient Personal Details

| D1 | Patient Data |
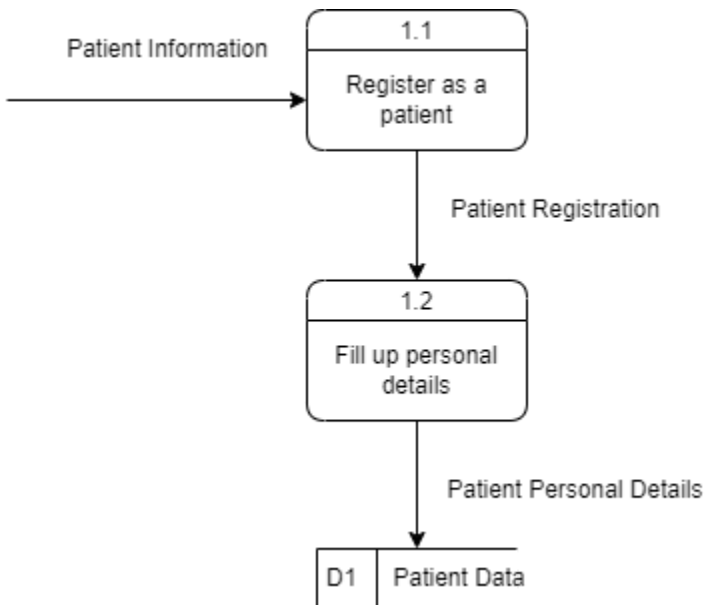
2.3.2 Process 2: Make Appointment

Appointment Date and Time

2.1
Check available slots

Slot Confirmation

2.2
Select desired appointment schedule

Confirmed Appointment Date and Time
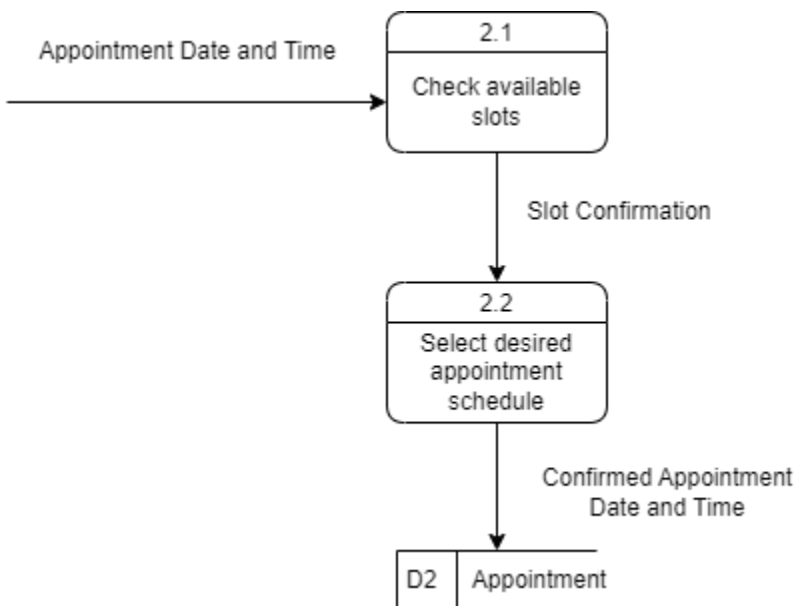
| D2 | Appointment |

2.3.3 Process 3: Generate Reminder

Appointment Details

3.1
Confirmed availability of patient and doctor

Latest Appointment Confirmation

3.2
Generate appointment reminder

Appointment Details and Reminder

Complete Appointment Reminder

3.3
Send appointment reminder

| D3 | Reminder |

Appointment Reminder
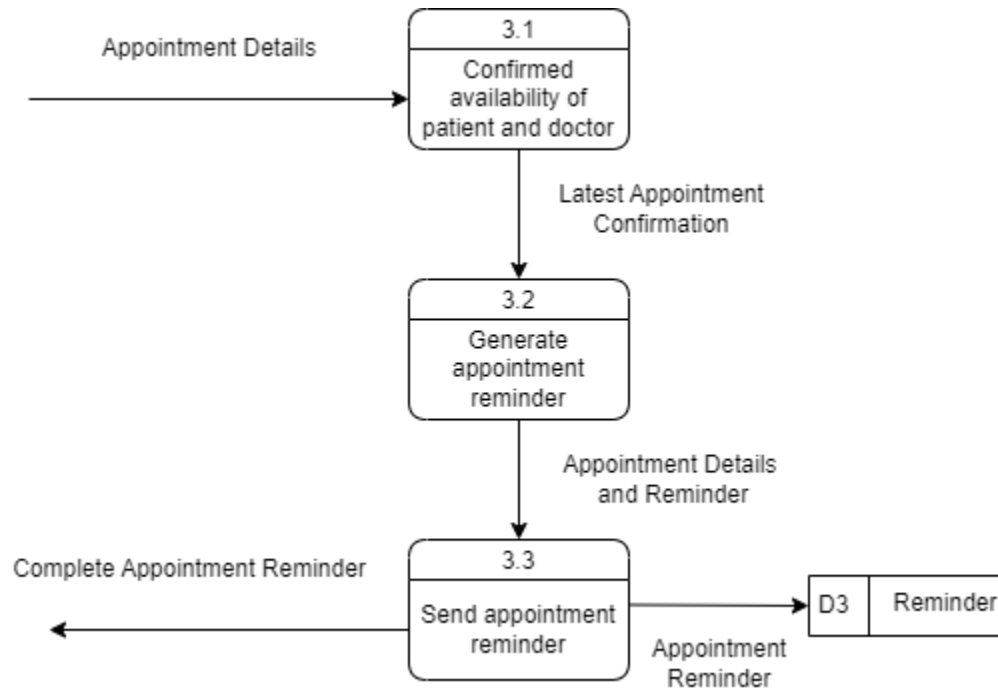
2.3.4 Process 4: Insert Patient Medical Record

Patient Detail's Medical Information

4.1
Identify patient and appointment date

Insert Patient's Updated Medical Record

Complete Patient Medical Record

4.2
Select and identify required treatment or medicine

Patient Medical Record

| D4 | Patient Record |
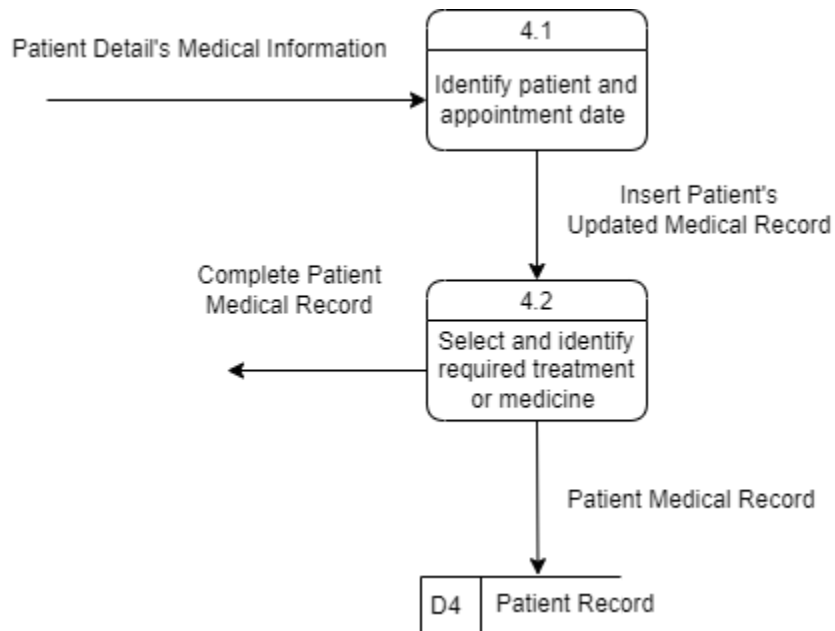
2.3.5 Process 5:   Make Payment
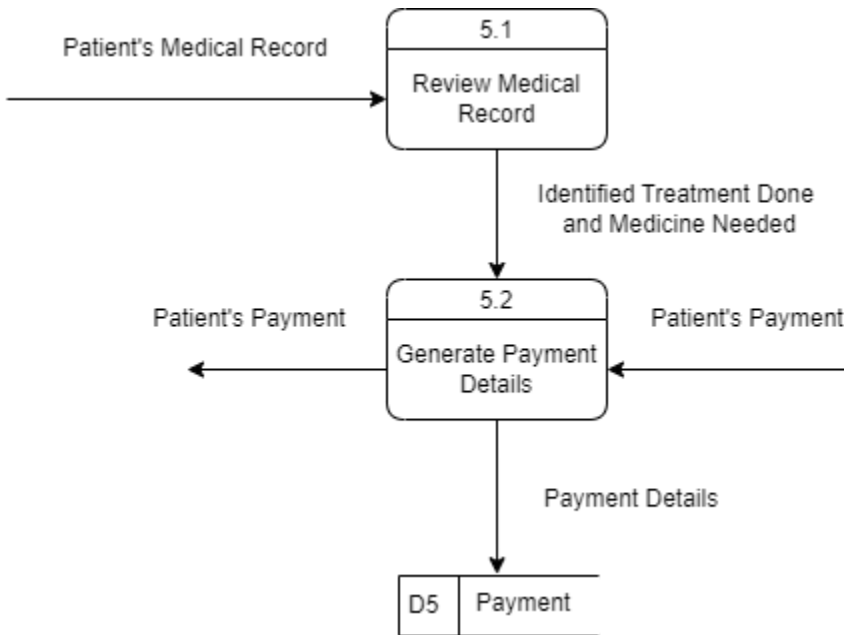
2.3.6 Process 6:   Give Feedback

3.0 Data & Transaction Requirement

3.1 Proposed Business Rules

1. The system should automatically send appointment reminders to patients via email before the appointment within 2 days of the appointment date and time.

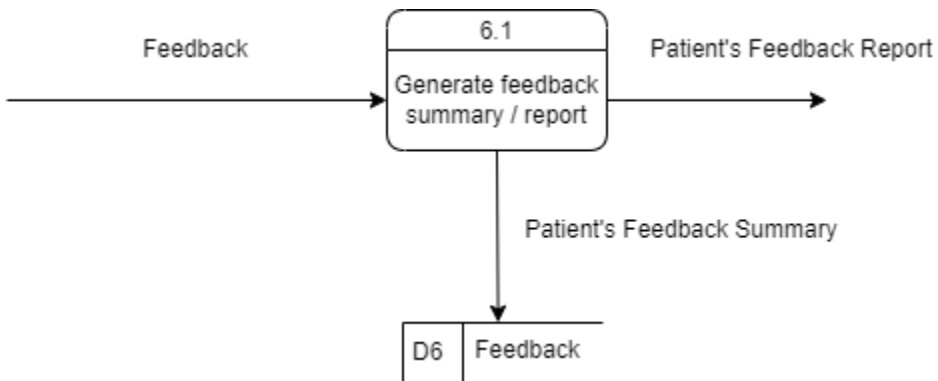2. The patients need to provide personal information when they make the appointment for the first time.

3. The patients can make an appointment at any time as long as they are during clinic opening hours.

4. In compliance with healthcare regulations, patient records are stored securely for a minimum of 7 years after the last appointment, after which they are anonymized or securely deleted.

5. User rights provide access to compiled feedback reports, allowing clinics to regularly assess overall patient satisfaction and individual doctor performance.

6. Doctors can view feedback to follow up on relevant patient experiences or concerns.

7. Patients should be in control of their data privacy and have the option to share or withhold specific information.

3.2   Proposed Transaction Requirement

Data Entry

1. Enter the patient's personal details such as name, contact number, identification, email and address to create a new record.
2. Enter the doctor's personal details such as name, contact number, identification, email and address to create a new record.
3. Enter the details of appointment booking with specifying date and time.
4. Enter the details of the patient's condition.
5. Enter the payment details based on the patient's treatment and date.

Data Update/Delete

1. Update/Delete the patient's personal details.
2. Update/Delete the doctor's personal details.
3. Update/Delete appointment schedule details.
4. Update/Delete patient condition record details.
5. Update/Delete available time slots for each doctor.
6. Update/Delete payment status involving patient treatments and dates.

Data Queries

1. Display the list of patient's information.
2. Display the list of doctor's information.
3. Display the patient's appointment booking schedule.
4. Display the patient's records history.
5. Display the patient's feedback.

3.3 Proposed Data Requirement

Admin:

Patient data storage should include personal information fields such as name, contact number, ID number, contact number, email and gender..

Patient:

Patient data storage should include personal information fields such as name, contact number, ID number, date of birth, address, and email. Additionally, it can store medical history of previous injuries, allergies, treatment details and appointment history.

Doctor:

The doctor data storage should contain personal information fields such as name, doctor ID, contact number, date of birth, qualification level, address, and email. Available schedules, specialized treatments or techniques provided, and patient feedback can also be stored in the doctor data store to help efficiently manage and allocate appointments.

Appointment:

When an appointment is confirmed, appointment details such as appointment ID, patient ID, doctor ID, appointment date and time, and appointment status should be stored in the appointment data store.

Reminder:

Reminder data storage includes patient ID, appointment ID, reminder ID, doctor ID, and reminder time and date. It will ensure patients receive timely notifications about their appointments via preferred communication methods such as email or text messages to help reduce the chance of missed appointments.

Medical Record:

Medical record storage should contain fields such as record ID, patient ID, doctor ID, consultation details, diagnosis, and allergies. Maintaining accurate and updated medical records
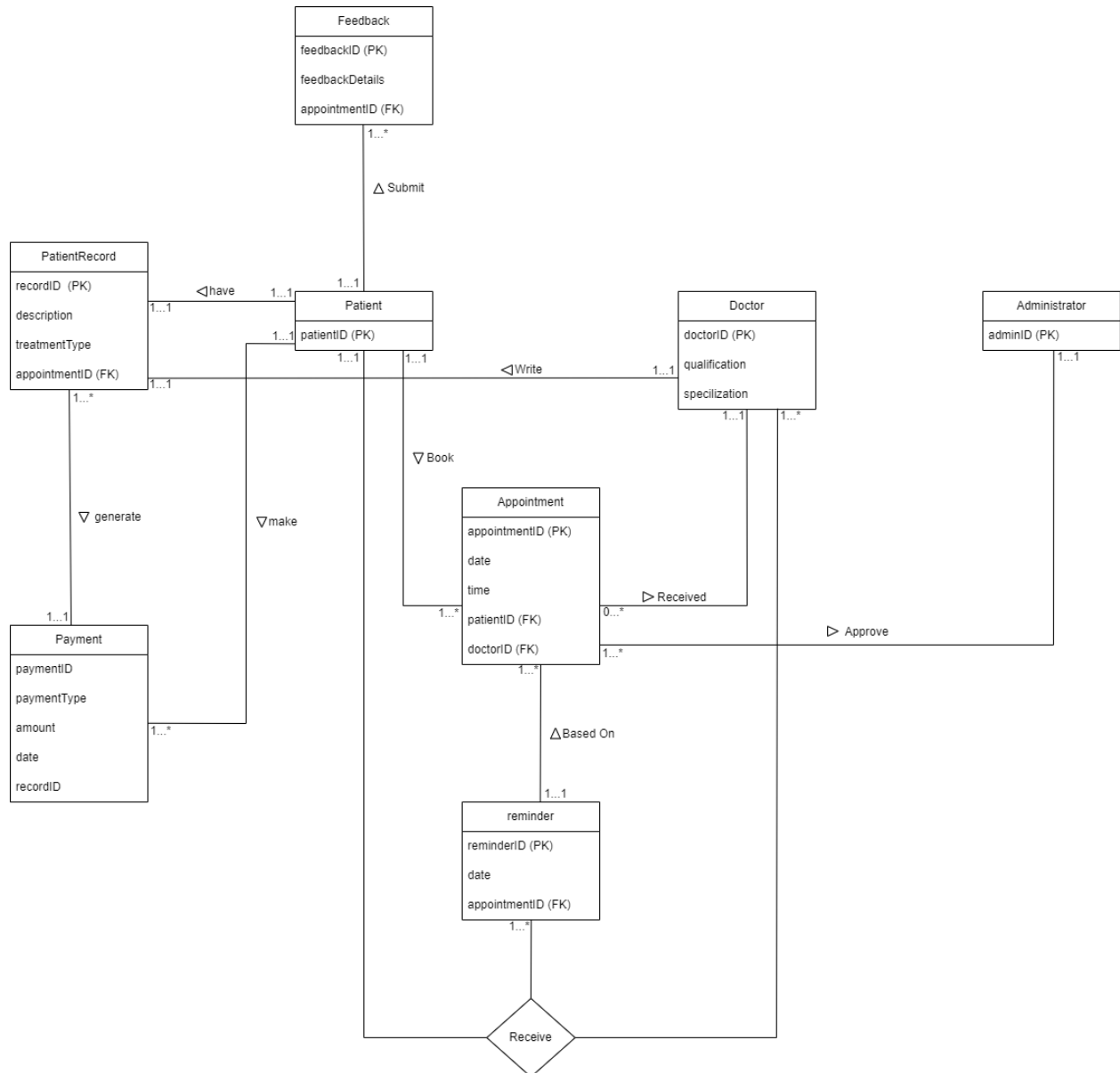
is critical to ensuring continuity of care and promoting effective communication among health care providers.
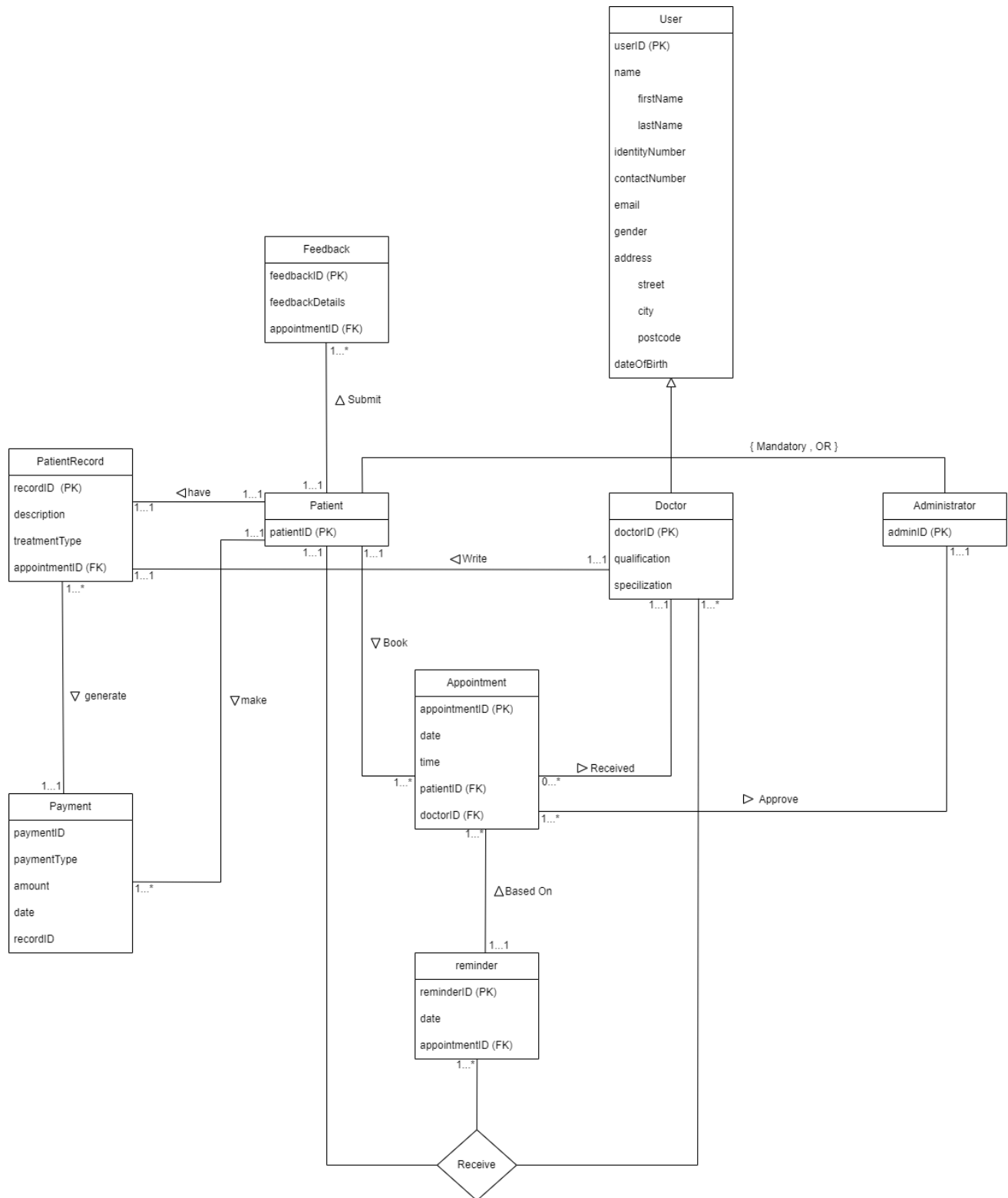
Feedback:

Feedback data storage should include fields for patient ID, feedback ID, and details such as rating, comment or suggestion, and submission date.

4.0   Database Conceptual Design

4.1   Conceptual ERD

4.2 Enhanced ERD (EERD)

5.0   Data Dictionary

5.1   Description of Entities

Entity	Description	Occurrence
User	Holds the data of users.	Users consist of admins, patients and doctors.
Admin	Holds data of admins.	Admin approves appointments and sends reminders to patients and doctors.
Patient	Holds the data of patients.	Patient book appointments and make payments.
Doctor	Holds the data of doctors.	Doctors receive appointments, write patient records and submit prescriptions.
Appointment	Holds the data of appointments made by patients.	Appointments are made by patients, and are approved by the admin.
Reminder	Holds the data of appointment reminders.	Reminders will be sent to the patient and doctor.
PatientRecord	Holds the data of a patient's medical record.	Patient medical record is written by the doctor.
Feedback	Holds the data of feedback given.	Feedback is given by patients.
Payment	Holds the data of payments made.	Payment is made and proceed by patients.

5.2   Description of Relationship

Entity	Multiplicity	Relationship	Multiplicity	Entity
User	1…1	Has	1…*	Admin

	1…1	Has	1…*	Patient
	1…1	Has	1…*	Doctor
Admin	1…1	Approve	1…*	Appointment
Patient	1...1	Book	1…*	Appointment
	1…1	Have	1…1	PatientRecord
	1…1	Submit	1…*	Feedback
	1…1	Make	1…*	Payment
	1…1	Receive	1…*	Reminder
PatientRecord	1…1	Generate	1…*	Payment
Doctor	1…1	Accept	0…*	Appointment
	1…1	Write	1…*	PatientRecord
	1…1	Receive	1…*	Reminder
Reminder	1…1	Based on	1…1	Appointment

5.3   Description of Attributes

Entity	Attribute	Description	Data Type	Constraint
User	userID	User's ID	VARCHAR(10)	PRIMARY KEY
	firstName	First name	VARCHAR(20)	NOT NULL
	lastName	Last name	VARCHAR(20)	NOT NULL
	identityNumber	Ic Number	VARCHAR(20)	NOT NULL
	contactNumber	User's contact number	VARCHAR(15)	NOT NULL
	email	Email	VARCHAR(20)	NOT NULL
	gender	Gender	VARCHAR(10)	NOT NULL
Admin	adminID	Admin's ID	VARCHAR(10)	PRIMARY KEY

Patient	patientID	Patient's ID	VARCHAR(10)	PRIMARY KEY
	dateOfBirth	Date of birth	DATE	NOT NULL
	address	Address of patient	VARCHAR(30)	NOT NULL
	street	Street name	VARCHAR(20)	NOT NULL
	city	City name	VARCHAR(20)	NOT NULL
	postcode	Postcode number	VARCHAR(10)	NOT NULL
	userID	User's ID	VARCHAR(10)	FOREIGN KEY
Doctor	doctorID	Doctor's ID	VARCHAR(10)	PRIMARY KEY
	qualification	Doctor's qualification	VARCHAR(30)	NOT NULL
	specialization	Doctor's specialization	VARCHAR(30)	NOT NULL
	userID	User's ID	VARCHAR(10)	FOREIGN KEY
Appointment	appointmentID	Appointment's ID	VARCHAR(10)	PRIMARY KEY
	date	Appointment's Date	DATE	NOT NULL
	time	Appointment Time	TIME	NOT NULL
	patientID	Patient's ID	VARCHAR(10)	FOREIGN KEY
	doctorID	Doctor's ID	VARCHAR(10)	FOREIGN KEY
Reminder	reminderID	Reminder's ID	VARCHAR(10)	PRIMARY KEY
	date	Date before appointment	DATE	NOT NULL
	appointmentID	Appointment's ID	VARCHAR(10)	FOREIGN KEY
PatientRecord	recordID	Record's ID	VARCHAR(10)	PRIMARY KEY
	description	Description	VARCHAR(100)	NOT NULL

	treatmentType	Type of treatment	VARCHAR(50)	NOT NULL
	appointmentID	Appointment's ID	VARCHAR(10)	FOREIGN KEY
	patientID	Patient's ID	VARCHAR(10)	FOREIGN KEY
	doctorID	Doctor's ID	VARCHAR(10)	FOREIGN KEY
Feedback	feedbackID	Feedback's ID	VARCHAR(10)	PRIMARY KEY
	feedbackDetails	Details of the feedback	VARCHAR(100)	NOT NULL
	appointmentID	Appointment's ID	VARCHAR(10)	FOREIGN KEY
	patientID	Patient's ID	VARCHAR(10)	FOREIGN KEY
Payment	paymentID	Payment's ID	VARCHAR(10)	PRIMARY KEY
	paymentType	Type of payment	VARCHAR(10)	NOT NULL
	amount	Amount of payment	FLOAT(8)	NOT NULL
	date	Date of payment done	TIMESTAMP	NOT NULL
	recordID	Record's ID	VARCHAR(10)	FOREIGN KEY

6.0   Summary

Pusat Dialisis FN suffers from some operational inefficiencies as a result of many antiquated manual techniques. Among them are the difficulties patients have scheduling an appointment, which they encounter whether they physically visit the clinic, fill out paperwork, or make phone calls. In addition, the staff members at the dialysis centers believe that organizing, managing, and retrieving the current appointment data when done by hand is challenging. By integrating a digital platform, the proposed project seeks to enhance and modernize Pusat Dialisis FN, a medical appointment and booking system.

Our background study emphasized the significance of an appropriate system for scheduling appointments and medical care, while also pointing out the pervasive issue with manual methods. The study will especially highlight these issues, which include improperly organised patient data, insufficient, and appointment scheduling. The suggested remedy calls for switching from an antiquated manual procedure to a contemporary computerized one. Using an online appointment system that offers automatic reminders and real-time information, it tackles the difficulties associated with arranging appointments. Patients and staff will benefit from being able to schedule and manage appointments or medical reservations more easily with the implementation of a more digitalized appointment booking system. A dependable process for managing all these facts must be in place in a medical facility.

In this comprehensive report, we present the details of the appointment booking system at Pusat Dialisis FN by presenting engaging visuals through the proposed data flow diagram and entity relationship diagram. We intricately weave in vital elements such as business rules, transaction requirements, data requirements and data dictionary forming a robust foundation for the second stage of our project. This crucial stage acts as the cornerstone, providing a well-designed framework for methodical planning, execution, monitoring, and control,a vital route to the successful accomplishment of our goal, which is the development of an innovative booking system at Pusat Dialisis FN.