UTM

UNIVERSITI TEKNOLOGI MALAYSIA

Faculty of Computing

SECD2523 : Database

Project Phase 2

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Section : 08

Group : 10

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1.0 Introduction

In this phase, our main highlight is to handle the issues encountered by Klinik Lee Taman Perling and streamline the clinic operation flow. Thus, we are going to design a more comprehensive and detailed diagram to systematically visualize the processes. We will include all suggested features into the new integrated system to optimize the overall performance.

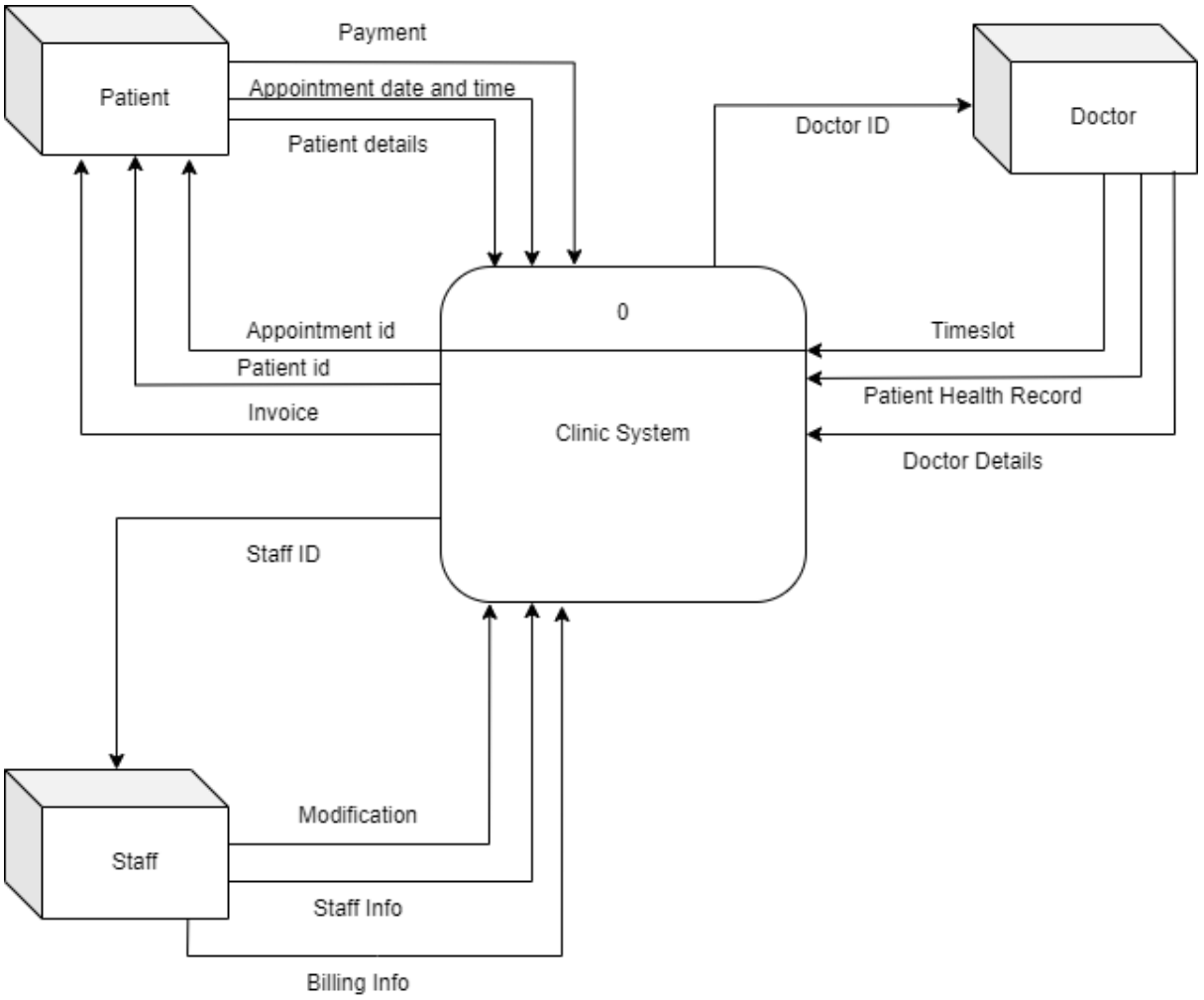
Firstly , we will design a data flow diagram starting from creating a context diagram to show the data flow between the clinical management system and entities such as staff and doctors, patients and administrators. Next, we will develop a level 0 diagram by adding processes and data stores to manifest the key functionality and databases of the to-be clinical management system. Each process will then be magnified in level 1 diagram by breaking the main process into subprocesses.

Besides , the definition of business rules sustains the stability of the clinical management system by regulating the dataflow into the data stores.Hence,the accuracy and precision of data will be undercontrolled to prevent the system from collapsing. Moreover, the conceptual entity-relationship diagram shows the relationship between entities inside the system data model then further improves our understanding by creating enhanced entity-relationship diagram.Lastly, we will construct a data dictionary to list out all necessary data elements and their characteristics.

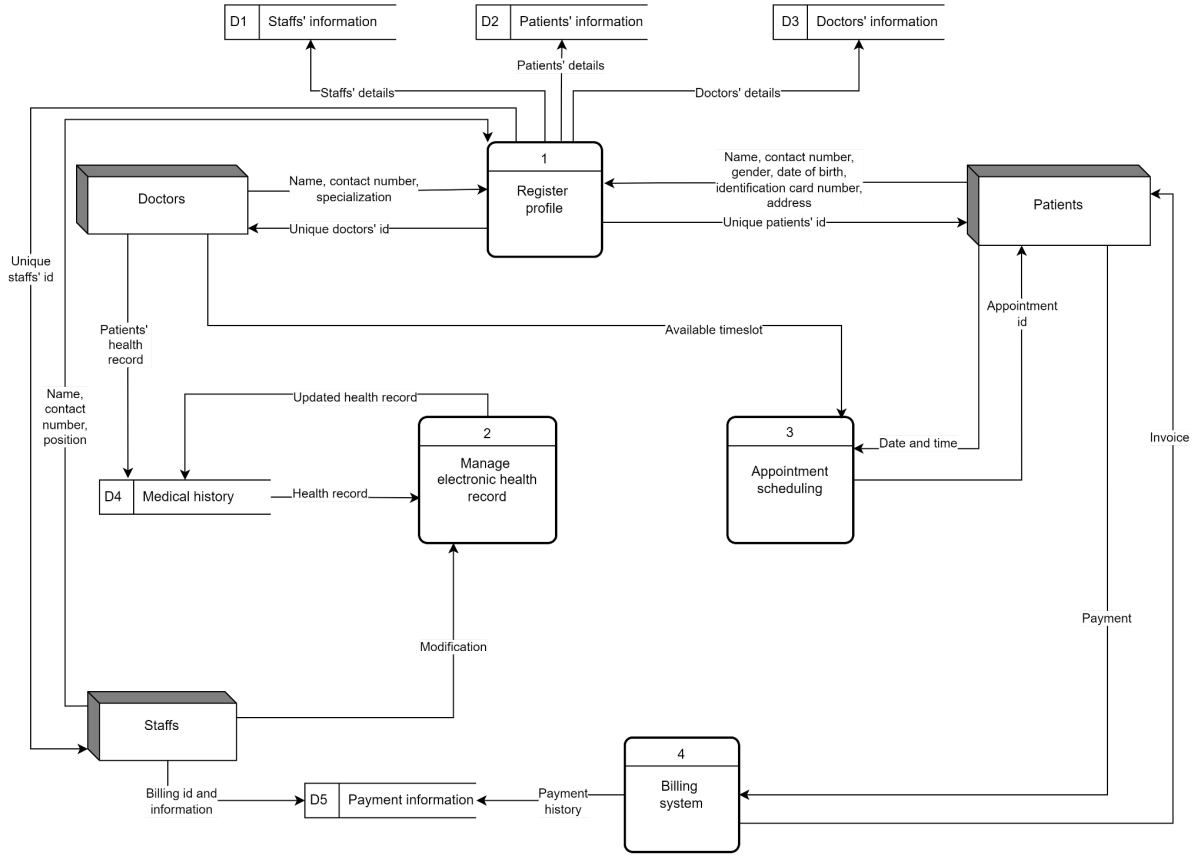
In short, the implementation design process is vital to establish the realization of the to-be system.Therefore, it can solve the issues efficiently by enhancing the current system of Klinik Lee Taman Perling to an improved clinical management system.

2.0 DFD (to-be)

2.1 Context Diagram

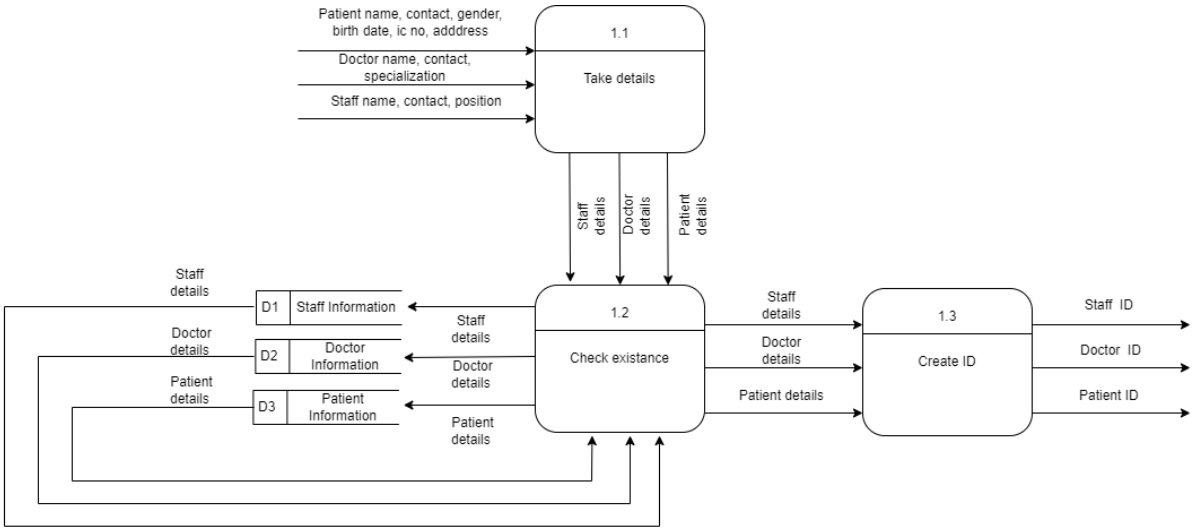


2.2 Level - 0 Diagram

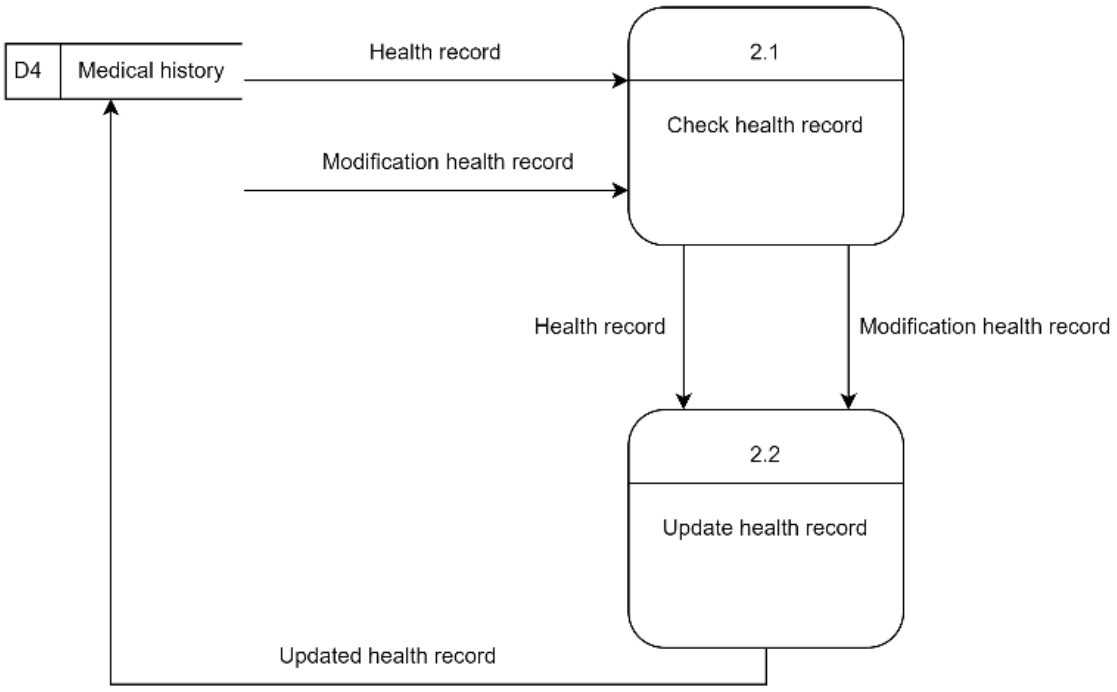


2.3 Level - 1 Diagram

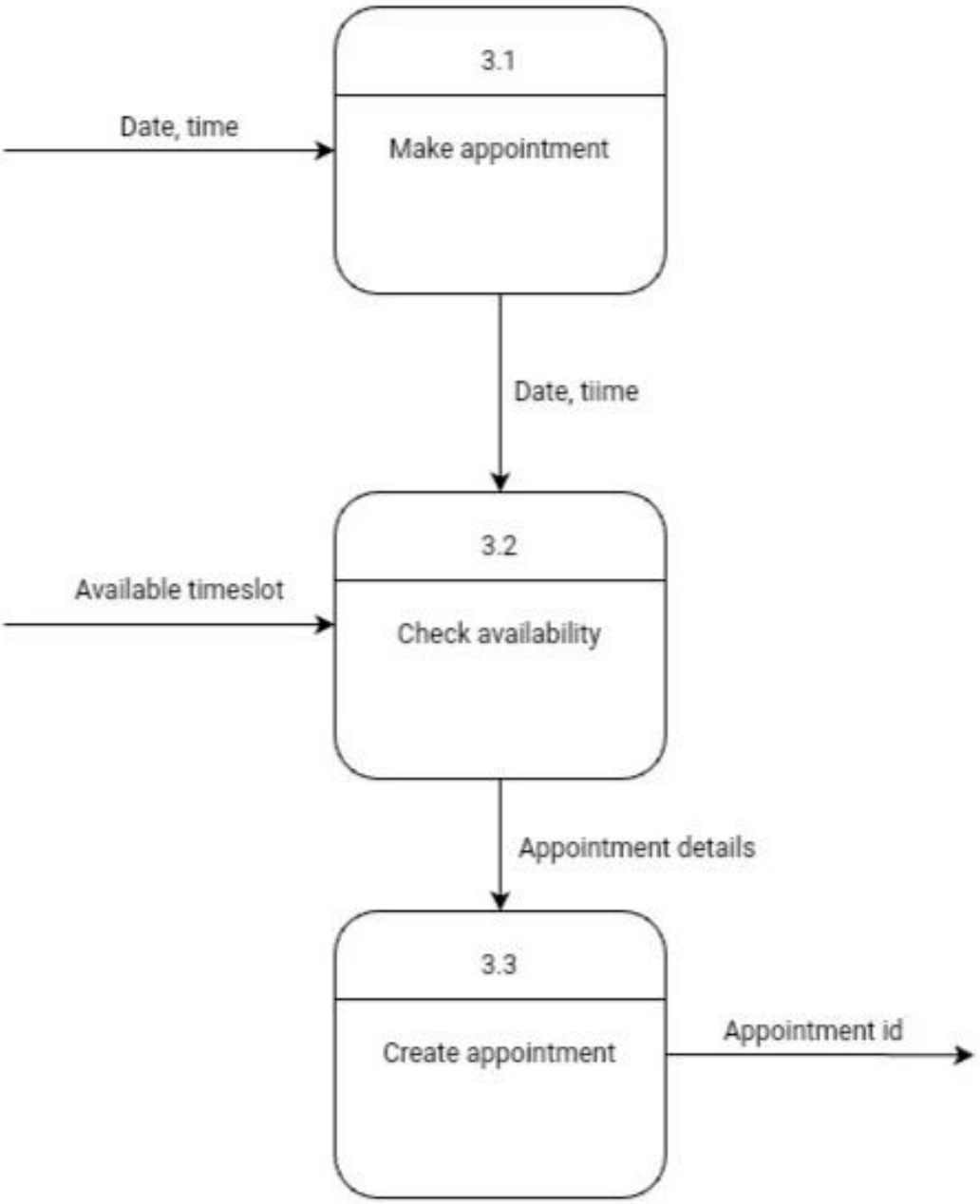
2.3.1 Process 1 : Register Profile



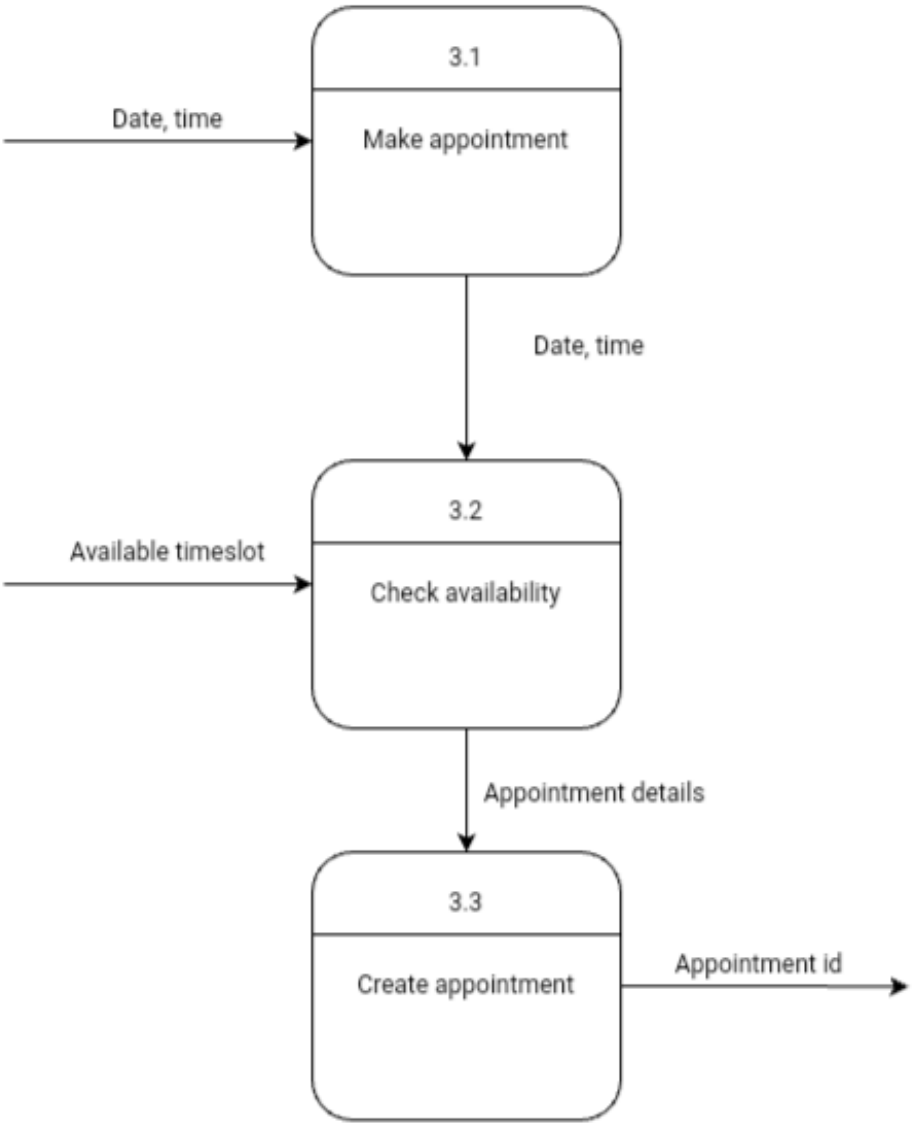
2.3.2 Process 2 : Manage electronic health record



2.3.3 Process 3 : Appointment scheduling



2.3.4 Process 4 : Billing System



3.0 Data & Transaction requirement

3.1 Proposed business rule

Patient Registration

1. Patient must provide a complete and accurate personal information
2. A unique identifier must generate for each registered patients

Appointment Scheduling

1. Appointments can only be scheduled during the available working hours
2. A confirmation message need to send for the patients
3. Patients must confirm or reschedule appointments within a specified timeframe

Electronic Health Records (EHR) Management

1. Only the authorized person can access and update patient health records
2. Health records should be updated in real-time during and after patient consultations.

Billing and Invoicing

1. Billing information must accurately reflect the services provided during the appointment
2. The system should accept various type of payment method

3.2 Proposed data & transactional

3.2.1 Proposed data requirement

1. Patient

   The system will require patients to enter their demographic information and store it into the database. The information includes name, contact number, address, gender, identification card number and date of birth. After they enter their information, the system will generate a unique identifier for each patient. Moreover, the patient id will be set as the primary key to uniquely identify each patient.

2. Doctor

   The data required from the doctor are doctor name, contact number and specialization. The system will generate a unique identification for each doctor. This unique identifier will become the primary key in the entity of the doctor.

3. Staff

   Staff are the non-medical staff members of the clinic. They need to provide their name, contact number and their position for the system and the system will generate a unique identification for each staff member. The primary key for the staff entity will be staffID.

4. Health Records

   Health Records are the health-related information recorded during the patient visit to the clinic. It refers to the patientID for each health record. The data required are diagnosis, medications and allergies. Each record will have their unique identification after the record is created. Therefore, the recordID will become the primary key.

5. Appointment

   Data such as appointment date and time, status (Scheduled, Confirmed, Completed, Canceled) are required. The system will generate a unique identification as appointmentID which will also be set as the primary key. The patientID is referred to during the patient booking an appointment.

6. Billing and Invoice

   This will be generated after finishing the appointment. Therefore, it requires the data such as date and total amount to be billed for the services provided. PatientID as the foreign key and the billingID as primary key to uniquely identify each billing and invoice.

3.2.2 Proposed transaction requirement

Data Entry

1. Add new patient’s demographic information
2. Add new doctor’s details
3. Add new staff’s details
4. Add billing information for services provided
5. Enter new appointment details
6. Enter patient health information

Data Update / Delete

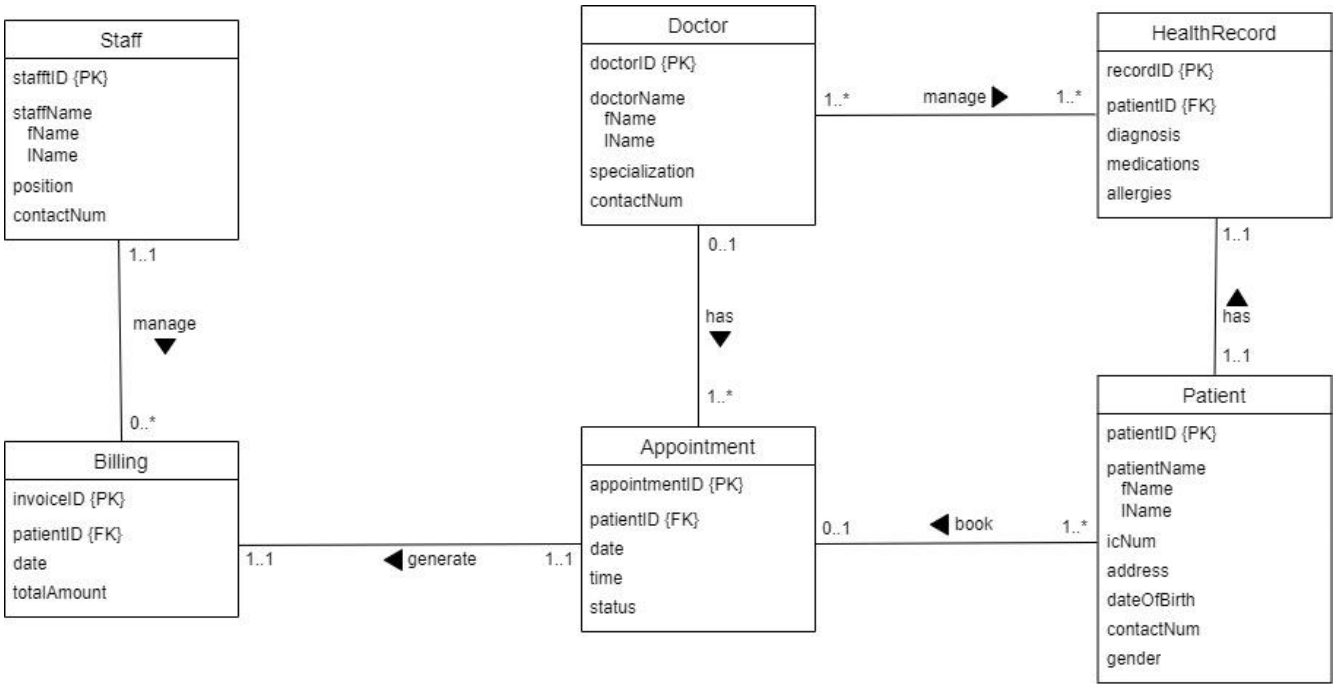
1. Update patient information
2. Update/delete the appointment
3. Update health records
4. Update billing information
5. Delete incorrect services during billing process

Data Queries

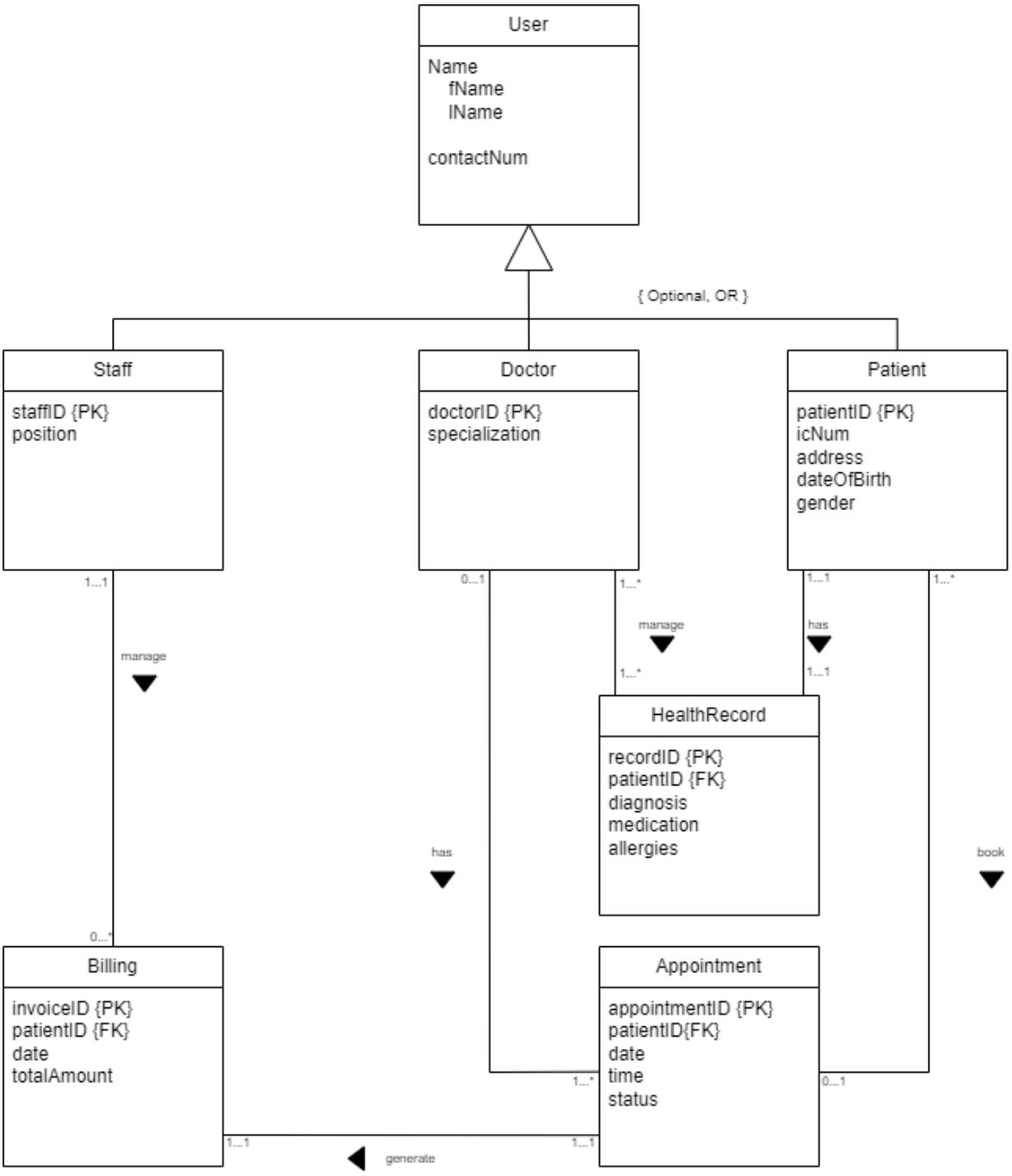
1. Retrieving patient information
2. Checking available time slots
3. Accessing a patient's health record for review or update
4. Retrieving billing details for a specific patient

4.0 Database conceptual design

4.1 Conceptual ERD



4.2 Enhanced ERD (EERD)



5.0 Data dictionary

Relation : User

Attribute	Data type	Data length	Constraint	Description
fName	VARCHAR2	20	NOT NULL	user's first name
lName	VARCHAR2	20	NOT NULL	user's last name
contactNum	NUMBER	12	NOT NULL	user's contact number

Relation : Staff

Attribute	Data type	Data length	Constraint	Description
staffID	NUMBER	10	PRIMARY KEY	auto-generated staff's ID
position	VARCHAR2	20	NOT NULL	staff position

Relation : Doctor

Attribute	Data type	Data length	Constraint	Description
doctorID	NUMBER	10	PRIMARY KEY	auto-generated doctor's ID
specialization	VARCHAR2	60	NOT NULL	the treatments of doctors provided

Relation : Patient

Attribute	Data type	Data length	Constraint	Description
patientID	NUMBER	10	PRIMARY KEY	auto-generated patient's ID
icNum	VARCHAR2	20	NOT NULL	the treatments of doctors provided

address	VARCHAR2	60	NOT NULL	patient's residential address
dateOfBirth	DATE	10	NOT NULL	patient's birth date
gender	VARCHAR2	10	NOT NULL	patient's gender

Relation : HealthRecord

Attribute	**Data type**	**Data length**	**Constraint**	**Description**
recordID	NUMBER	10	PRIMARY KEY	auto-generated patient's record ID
patientID	NUMBER	10	FOREIGN KEY	auto-generated patient's ID
dianogsis	VARCHAR2	60	NOT NULL	doctor's examination of the patient's situation
medication	VARCHAR2	60	NOT NULL	doctor's provided treatment
allergies	VARCHAR2	60	NOT NULL	patient's allergy to something

Relation : Appointment

Attribute	**Data type**	**Data length**	**Constraint**	**Description**
appointmentID	NUMBER	10	PRIMARY KEY	auto-generated appointment ID
patientID	NUMBER	10	FOREIGN KEY	auto-generated patient's ID
date	DATE	10	NOT NULL	appointment date
time	TIMESTAMP	10	NOT NULL	appointment time
status	VARCHAR2	20	NOT NULL	appointment status like success or fail

6.0 Summary

In this phase 2, we have been analyzing and designing the operation flow for the Clinic Lee Taman Perling. First of all, we are using a Data Flow Diagram (DFD) to show the data flow through a process or system. The DFD has been divided into three parts which is Context diagram, Level-0 diagram and Level-1 diagram. The context diagram shows the overall data flow of a system, level-0 diagram will show more clearly for the data flow which include 4 different features for the new system and level-1 diagram is the child diagram for each feature or process of the system.

After the DFD, we have been listed out the data and transaction requirements. This allows us to better understand the operation of the proposed system. We propose the business rule on four different processes which are the main function of our system. The next part will be the data requirement which helps us to identify which data need to be collected from different entities. After study on the data requirements, we proceed to the transaction requirement. This allows us to get to know what are the data entry, data update or delete and data queries of the proposed system.

Lastly, we were also designing a database conceptual design by using the entity relationship diagram (ERD) which was divided into conceptual ERD and enhanced ERD. These diagrams help us to deeply understand the relationship between different entities. Hence, we can develop a database for the proposed system easily. Below the part of ERD, we also list down the data dictionary to describe all the attributes to avoid confusion during the development process.