UTM UNIVERSITI TEKNOLOGI MALAYSIA

FACULTY OF COMPUTING
UTM Johor Bahru

Project: Phase 3

Pulse+

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Section: 08

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1. Introduction

Pulse+ is an advanced electronic health record system designed especially to meet the specific requirements of Foo Ong Hoe, a well-known clinic focusing on traditional Chinese medicine. Previously dependent on traditional paper-based data storage techniques, the clinic recognized the urgent need for a modern alternative, which led to the ideation and creation of Pulse+.

The prevalent use of paper records has highlighted shortcomings and inefficiencies in the current information management system. As the ultimate solution to these problems, Pulse+ is a paradigm shift toward an electronic integrated, and modern medical data management system.

2. Overview of Project

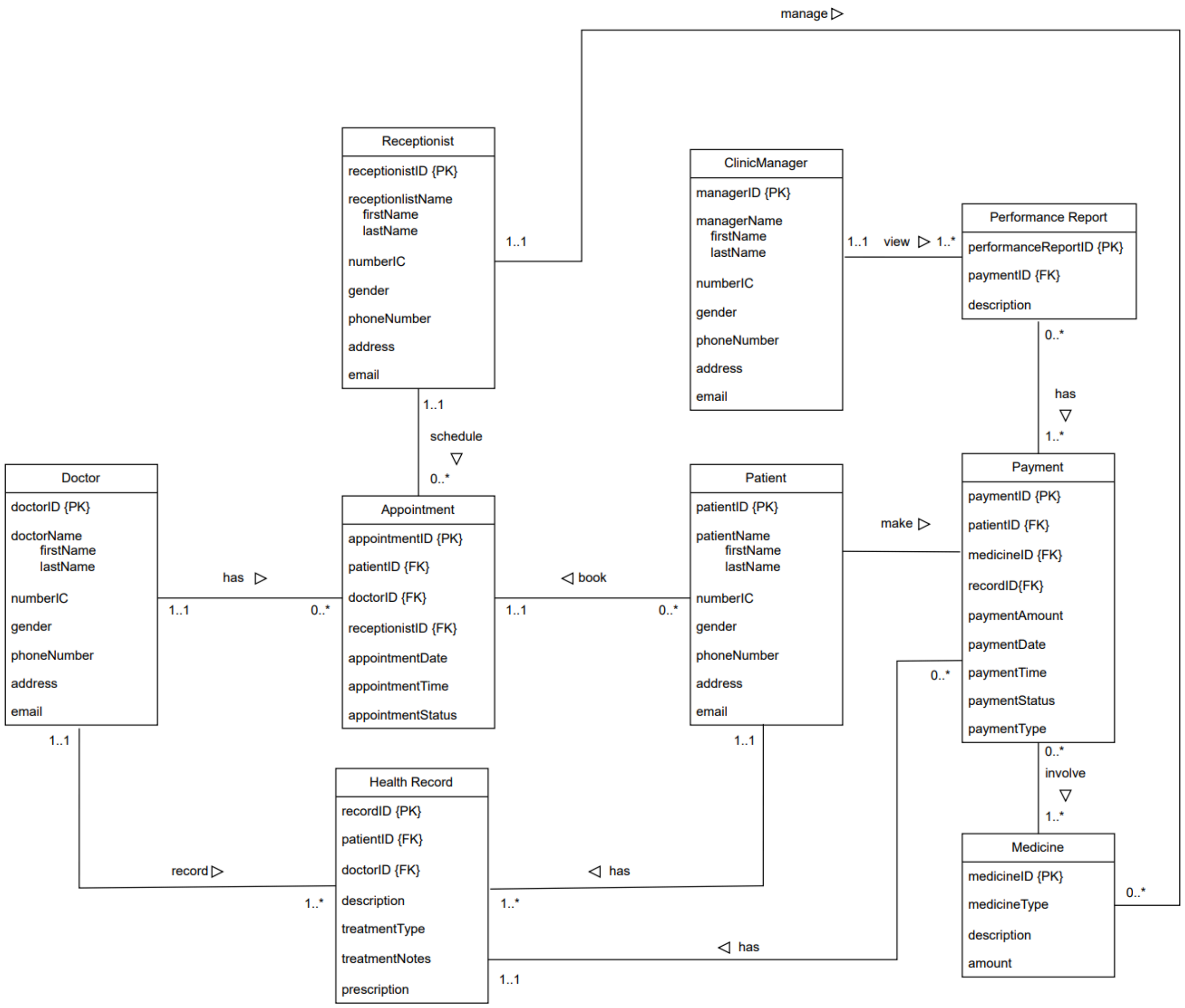
This report aims to delineate the conceptual and logical design of the Pulse+ database, serving as a roadmap for implementing an efficient electronic health record system. It delves into conceptualizing the database structure, defining business rules, constructing Entity-Relationship Diagrams (ERD), logical design, normalization, and ultimately formulating relational database schemas with corresponding SQL statements.

3. Database Conceptual Design

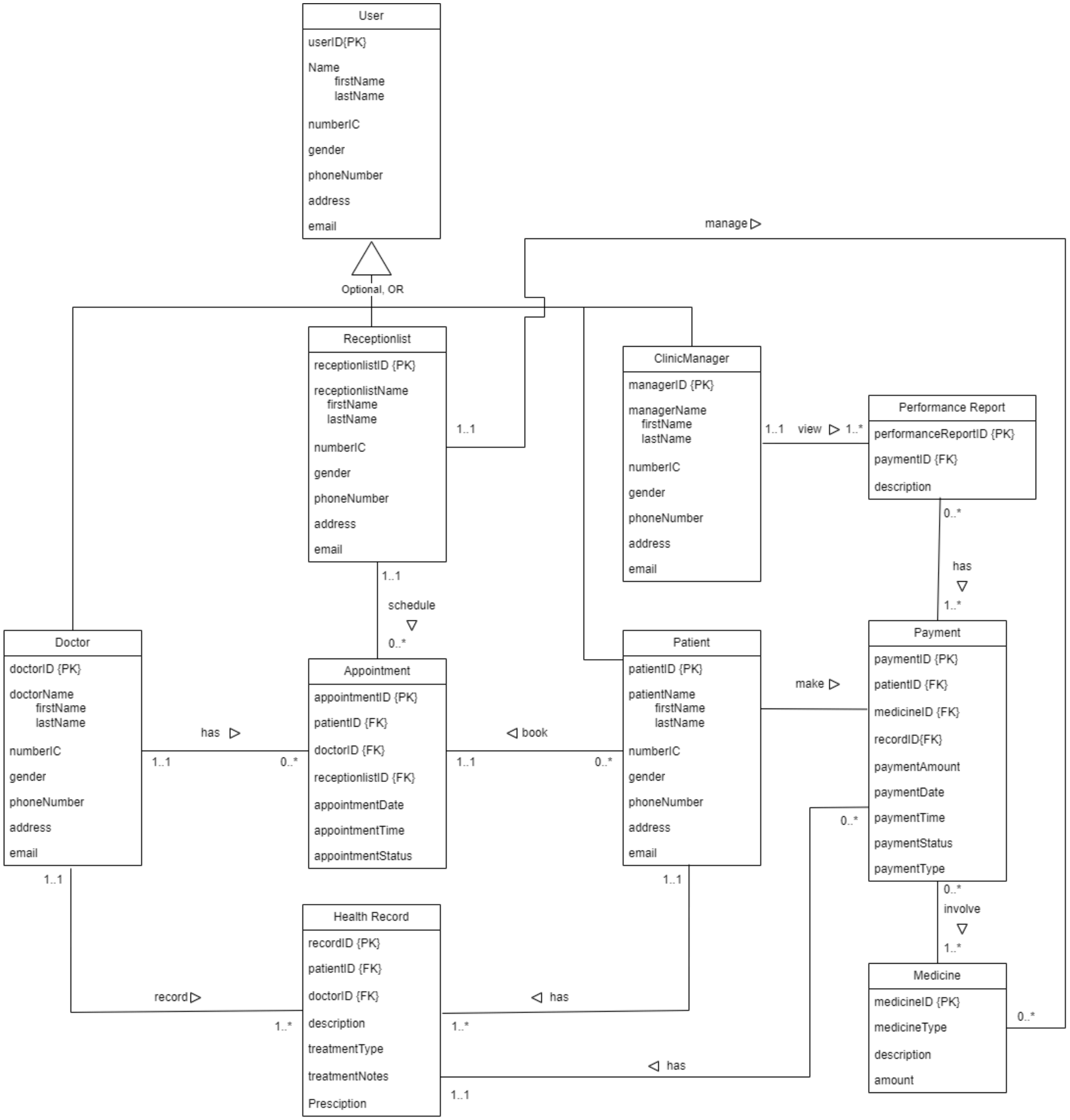
3.1 Updated business rule

1. Patients are required to provide comprehensive personal details, including first name, last name, IC number, gender, phone number, address and email during their initial visit to the clinic.
2. For every appointment, patients must verify their identity, ensuring the accuracy and security of their medical records.
3. Patients have the flexibility to schedule appointments at any time within the clinic's operational hours.
4. In the event of unavailability, patients are responsible for proactively rescheduling appointments to accommodate both their and the clinic's schedules.
5. Each patient is limited to having one active appointment at a time, preventing overlapping or conflicting scheduling.
6. Patients are provided with the choice of making payments using either cash or cashless methods. However, they must choose and adhere to a single payment method.
7. Access to patient health records is restricted solely to authorized healthcare professionals, ensuring confidentiality and compliance with privacy regulations.
8. Doctors are obligated to complete all required patient treatment details fields when submitting information, ensuring the accuracy and completeness of medical records.
9. For every treatment session, doctors must receive and document the patient's comprehensive health history to inform and tailor their care appropriately.
10. Clinic managers are entitled to receive a detailed and accurate clinic performance report on a daily basis. This report should encompass key metrics, such as daily revenue and individual payment information.

3.2 Conceptual ERD

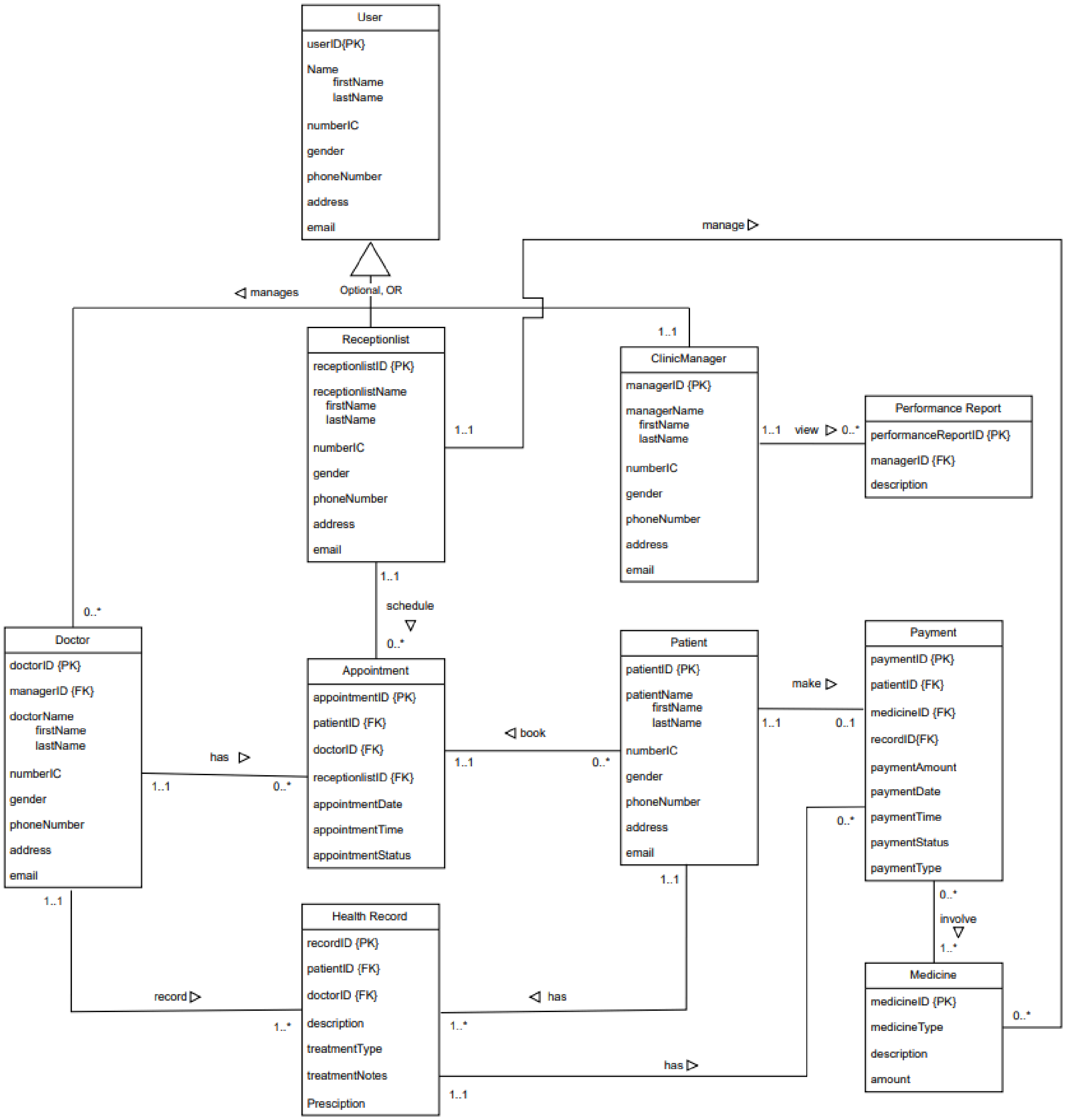


3.3 Enhanced ERD



4. DB Logical Design

4.1 Logical ERD



4.2 Updated Data Dictionary

Relation:User

Attribute	**Data Type**	**Data Length**	**Constraint**	**Description**
userID	NUMBER	10	PRIMARY KEY	User ID, auto generated
firstName	VARCHAR2	20	NOT NULL	First name of user
lastName	VARCHAR2	20	NOT NULL	Last Name of user
numberIC	NUMBER	12	NOT NULL,UNIQUE	Identity Card number of user
gender	VARCHAR2	10	NOT NULL	Gender of user
phoneNumber	NUMBER	11	NOT NULL	Contact number of user
address	VARCHAR2	100	NOT NULL	Address of user
email	VARCHAR2	50	NOT NULL	Email of user

Relation:ClinicManager

Attribute	**Data Type**	**Data Length**	**Constraint**	**Description**
managerID	NUMBER	10	PRIMARY KEY	Manager ID, auto generated
firstName	VARCHAR2	20	NOT NULL	First name of manager
lastName	VARCHAR2	20	NOT NULL	Last Name of manager
numberIC	NUMBER	12	NOT NULL,UNIQUE	Identity Card number of manager
gender	VARCHAR2	10	NOT NULL	Gender of manager
phoneNumber	NUMBER	11	NOT NULL	Contact number of manager
address	VARCHAR2	100	NOT NULL	Address of manager
email	VARCHAR2	50	NOT NULL	Email of user

Relation:Patient

Attribute	Data Type	Data Length	Constraint	Description
patientID	NUMBER	10	PRIMARY KEY	Patient ID, auto generated
firstName	VARCHAR2	20	NOT NULL	First name of patient
lastName	VARCHAR2	20	NOT NULL	Last Name of patient
numberIC	NUMBER	12	NOT NULL,UNIQUE	Identity Card number of patient
gender	VARCHAR2	10	NOT NULL	Gender of patient
phoneNumber	NUMBER	11	NOT NULL	Contact number of patient
address	VARCHAR2	100	NOT NULL	Address of patient
email	VARCHAR2	50	NOT NULL	Email of patient

Relation:Doctor

Attribute	Data Type	Data Length	Constraint	Description
doctorID	NUMBER	10	PRIMARY KEY	Doctor ID, auto generated
managerID	NUMBER	10	FOREIGN KEY	ID of manager in charge
firstName	VARCHAR2	20	NOT NULL	First name of doctor
lastName	VARCHAR2	20	NOT NULL	Last Name of doctor
numberIC	NUMBER	12	NOT NULL,UNIQUE	Identity Card number of doctor
gender	VARCHAR2	10	NOT NULL	Gender of doctor
phoneNumber	NUMBER	11	NOT NULL	Contact number of doctor
address	VARCHAR2	100	NOT NULL	Address of doctor
email	VARCHAR2	50	NOT NULL	Email of doctor

Relation:Receptionist

Attribute	Data Type	Data Length	Constraint	Description
receptionist	NUMBER	10	PRIMARY KEY	Receptionist ID, auto generated
firstName	VARCHAR2	20	NOT NULL	First name of receptionist
lastName	VARCHAR2	20	NOT NULL	Last Name of receptionist
numberIC	NUMBER	12	NOT NULL,UNIQUE	Identity Card number of receptionist
gender	VARCHAR2	10	NOT NULL	Gender of receptionist
phoneNumber	NUMBER	11	NOT NULL	Contact number of receptionist
address	VARCHAR2	100	NOT NULL	Address of receptionist
email	VARCHAR2	50	NOT NULL	Email of receptionist

Relation:Appointment

Attribute	Data Type	Data Length	Constraint	Description
appointmentID	NUMBER	10	PRIMARY KEY	Appointment ID, auto generated
patientID	NUMBER	10	FOREIGN KEY	Patient ID from relation patient
doctorID	NUMBER	10	FOREIGN KEY	Doctor ID from relation doctor
receptionistID	NUMBER	10	FOREIGN KEY	Receptionist ID from relation receptionist
appointmentDate	DATE	10	NOT NULL	Date of making appointment
appointmentTime	TIMESTAMP	10	NOT NULL	Time of making appointment
appointmentStatus	VARCHAR2	20	NOT NULL	Status of making

				appointment

Relation:Health Record

Attribute	Data Type	Data Length	Constraint	Description
recordID	NUMBER	10	PRIMARY KEY	Record ID, auto generated
patientID	NUMBER	10	FOREIGN KEY	Patient ID from relation patient
doctorID	NUMBER	10	FOREIGN KEY	Doctor ID from relation doctor
description	VARCHAR2	10000	NOT NULL	Record Description
treatmentType	VARCHAR2	30	NOT NULL	Type of treatment
treatmentNotes	VARCHAR2	10000	NOT NULL	Notes of treatment
prescription	VARCHAR2	100	NOT NULL	Prescription gave by doctor

Relation:Payment

Attribute	Data Type	Data Length	Constraint	Description
paymentID	NUMBER	10	PRIMARY KEY	Payment ID, auto generated
patientID	NUMBER	10	FOREIGN KEY	Patient ID from relation patient
medicineID	NUMBER	10	FOREIGN KEY	Medicine ID from relation medicine
recordID	NUMBER	10	FOREIGN KEY	Record ID from relation record
paymentAmount	NUMBER	10	NOT NULL	Payment amount needed
paymentDate	DATE	10	NOT NULL	Date of making payment
paymentTime	TIMESTAMP	10	NOT NULL	Time of making payment
paymentStatus	VARCHAR2	20	NOT NULL	Check whether it is paid

				or not
paymentType	VARCHAR2	10	NOT NULL	Type of payment , etc: credit card or bank payment

Relation:Medicine

Attribute	Data Type	Data Length	Constraint	Description
medicineID	NUMBER	10	PRIMARY KEY	Medicine ID, auto generated
medicineType	VARCHAR2	10	NOT NULL	Type of medicine
description	VARCHAR2	10000	NOT NULL	Medicine description
amount	NUMBER	100	NOT NULL	Amount of medicine

Relation:Performance Report

Attribute	Data Type	Data Length	Constraint	Description
performanceReportID	NUMBER	10	PRIMARY KEY	Performance Report ID, auto generated
managerID	NUMBER	10	FOREIGN KEY	ID of manager that generated the report
description	VARCHAR2	10000	NOT NULL	Performance Report description

4.3 Normalization

1. User(userID, firstName, lastName, numberIC, gender, phoneNumber, address, email)
   fd1: userID -> firstName, lastName, numberIC, gender, phoneNumber, address, email

   Normalized table after 1NF, 2NF, 3NF and BCNF:

   User(userID, firstName, lastName, numberIC, gender, phoneNumber, address, email)

   PRIMARY KEY: userID

2. ClinicManager(managerID, firstName, lastName, numberIC, gender, phoneNumber, address, email)
   fd1: managerID -> firstName, lastName, numberIC, gender, phoneNumber, address, email

   Normalized table after 1NF, 2NF, 3NF and BCNF:

   ClinicManager(managerID, firstName, lastName, numberIC, gender, phoneNumber, address, email)

   PRIMARY KEY: managerID

3. Patient(patientID, firstName, lastName, numberIC, gender, phoneNumber, address, email)
   fd1: patientID -> firstName, lastName, numberIC, gender, phoneNumber, address, email

   Normalized table after 1NF, 2NF, 3NF and BCNF:

   Patient(patientID, firstName, lastName, numberIC, gender, phoneNumber, address, email)

   PRIMARY KEY: patientID

4. Doctor(doctorID, managerID, firstName, lastName, numberIC, gender, phoneNumber, address, email)

   fd1: doctorID -> firstName, lastName, numberIC, gender, phoneNumber, address, email

   Normalized table after 1NF, 2NF, 3NF and BCNF:

   Doctor(doctorID, managerID, firstName, lastName, numberIC, gender, phoneNumber, address, email)

   PRIMARY KEY: doctorID

   FOREIGN KEY: managerID (references ClinicManager)

5. Receptionist(receptionistID, firstName, lastName, numberIC, gender, phoneNumber, address, email)

   fd1: receptionistID -> firstName, lastName, numberIC, gender, phoneNumber, address, email

   Normalized table after 1NF, 2NF, 3NF and BCNF:

   Receptionist(receptionistID, firstName, lastName, numberIC, gender, phoneNumber, address, email)

   PRIMARY KEY: receptionistID

6. Appointment(appointmentID, patientID, doctorID, receptionistID, appointmentDate, appointmentTime, appointmentStatus)

   fd1: appointmentID -> appointmentDate, appointmentTime, appointmentStatus

   Normalized table after 1NF, 2NF, 3NF and BCNF:

   Appointment(appointmentID, patientID, doctorID, receptionistID, appointmentDate, appointmentTime, appointmentStatus)

   PRIMARY KEY: appointmentID

   FOREIGN KEY: patientID (references Patient),
   doctorID (references Doctor),

receptionistID (references Receptionist)

7. HealthRecord(recordID, patientID, doctorID, description, treatmentType, treatmentNotes, prescription)
   fd1: recordID -> description, treatmentType, treatmentNotes, prescription

   Normalized table after 1NF, 2NF, 3NF and BCNF:
   HealthRecord(recordID, patientID, doctorID, description, treatmentType, treatmentNotes, prescription)

   PRIMARY KEY: recordID
   FOREIGN KEY: patientID (references Patient),
   doctorID (references Doctor)

8. Payment(paymentID, patientID, medicineID, recordID, paymentAmount, paymentDate, paymentTime, paymentStatus, paymentType)
   fd1: paymentID -> paymentAmount, paymentDate, paymentTime, paymentStatus, paymentType

   Normalized table after 1NF, 2NF, 3NF and BCNF:
   Payment(paymentID, patientID, medicineID, recordID, paymentAmount, paymentDate, paymentTime, paymentStatus, paymentType)

   PRIMARY KEY: paymentID
   FOREIGN KEY: patientID (references Patient),
   medicineID (references Medicine),
   recordID (references HealthRecord)

9. Medicine(medicineID, medicineType, description, amount)
   fd1: medicineID -> medicineType, description, amount

Normalized table after 1NF, 2NF, 3NF and BCNF:
Medicine(medicineID, medicineType, description, amount)

PRIMARY KEY: medicineID

10. PerformanceReport(performanceReportID, managerID, description)
fd1: performanceReportID -> description

Normalized table after 1NF, 2NF, 3NF and BCNF::
PerformanceReport(performanceReportID, managerID, description)

PRIMARY KEY: performanceReportID
FOREIGN KEY: managerID (references ClinicManager),

5. Relational DB Schemas (after normalization)

List of relational database schemas after normalization

1. User(userID, firstName, lastName, numberIC, gender, phoneNumber, address, email)
2. ClinicManager(managerID, firstName, lastName, numberIC, gender, phoneNumber, address, email)
3. Patient(patientID, firstName, lastName, numberIC, gender, phoneNumber, address, email)
4. Doctor(doctorID, managerID, firstName, lastName, numberIC, gender, phoneNumber, address, email)
5. Receptionist(receptionistID, firstName, lastName, numberIC, gender, phoneNumber, address, email)
6. Appointment(appointmentID, patientID, doctorID, receptionistID, appointmentDate, appointmentTime, appointmentStatus)
7. HealthRecord(recordID, patientID, doctorID, description, treatmentType, treatmentNotes, prescription)
8. Payment(paymentID, patientID, medicineID, recordID, paymentAmount, paymentDate, paymentTime, paymentStatus, paymentType)
9. Medicine(medicineID, medicineType, description, amount)
10. PerformanceReport(performanceReportID, managerID, description)

6. SQL Statements (DDL & DML)

```
CREATE TABLE Medicine (
medicineID NUMBER(10) PRIMARY KEY,
medicineType VARCHAR2(30) NOT NULL,
description VARCHAR2(100) NOT NULL,
amount NUMBER(20) NOT NULL
);
CREATE TABLE ClinicManager (
managerID NUMBER(10) PRIMARY KEY,
firstName VARCHAR2(20) NOT NULL,
lastName VARCHAR2(20) NOT NULL,
numberIC NUMBER(12) NOT NULL UNIQUE,
gender VARCHAR2(10) NOT NULL,
phoneNumber NUMBER(11) NOT NULL,
address VARCHAR2(100) NOT NULL,
email VARCHAR2(50) NOT NULL
);
CREATE TABLE Patient (
patientID NUMBER(10) PRIMARY KEY,
firstName VARCHAR2(20) NOT NULL,
lastName VARCHAR2(20) NOT NULL,
numberIC NUMBER(12) NOT NULL UNIQUE,
gender VARCHAR2(10) NOT NULL,
phoneNumber NUMBER(11) NOT NULL,
address VARCHAR2(100) NOT NULL,
email VARCHAR2(50) NOT NULL
);
CREATE TABLE Doctor (
doctorID NUMBER(10) PRIMARY KEY,
managerID NUMBER(10) REFERENCES ClinicManager(managerID),
firstName VARCHAR2(20) NOT NULL,
lastName VARCHAR2(20) NOT NULL,
numberIC NUMBER(12) NOT NULL UNIQUE,
gender VARCHAR2(10) NOT NULL,
phoneNumber NUMBER(11) NOT NULL,
address VARCHAR2(100) NOT NULL,
email VARCHAR2(50) NOT NULL
);
CREATE TABLE Receptionist (
receptionistID NUMBER(10) PRIMARY KEY,
firstName VARCHAR2(20) NOT NULL,
lastName VARCHAR2(20) NOT NULL,
numberIC NUMBER(12) NOT NULL UNIQUE,
gender VARCHAR2(10) NOT NULL,
phoneNumber NUMBER(11) NOT NULL,
address VARCHAR2(100) NOT NULL,
email VARCHAR2(50) NOT NULL
);
CREATE TABLE Appointment (
appointmentID NUMBER(10) PRIMARY KEY,
patientID NUMBER(10) REFERENCES Patient(patientID),
doctorID NUMBER(10) REFERENCES Doctor(doctorID),
receptionistID NUMBER(10) REFERENCES Receptionist(receptionistID),
appointmentDate DATE NOT NULL,
appointmentTime TIMESTAMP NOT NULL,
appointmentStatus VARCHAR2(20) NOT NULL
);
CREATE TABLE HealthRecord (
recordID NUMBER(10) PRIMARY KEY,
patientID NUMBER(10) REFERENCES Patient(patientID),
doctorID NUMBER(10) REFERENCES Doctor(doctorID),
description VARCHAR2(100) NOT NULL,
treatmentType VARCHAR2(30) NOT NULL,
treatmentNotes VARCHAR2(100) NOT NULL,
prescription VARCHAR2(100) NOT NULL
);
CREATE TABLE Payment (
paymentID NUMBER(10) PRIMARY KEY,
patientID NUMBER(10) REFERENCES Patient(patientID),
medicineID NUMBER(10) REFERENCES Medicine(medicineID),
recordID NUMBER(10) REFERENCES HealthRecord(recordID),
paymentAmount NUMBER(10) NOT NULL,
paymentDate DATE NOT NULL,
paymentTime TIMESTAMP NOT NULL,
paymentStatus VARCHAR2(20) NOT NULL,
paymentType VARCHAR2(20) NOT NULL
);
CREATE TABLE PerformanceReport (
performanceReportID NUMBER(10) PRIMARY KEY,
managerID NUMBER(10) REFERENCES ClinicManager(managerID),
description VARCHAR2(100) NOT NULL
);

--DATA LIST
```

```
--RECEPTIONIST DATA
INSERT INTO Receptionist
VALUES (1, 'Anne', 'Smith', '123456789101', 'Female', '01123456789', '1 First St', 'anne@clinic.com');

INSERT INTO Receptionist
VALUES (2, 'John', 'Doe', '123456789021', 'Male', '01223456789', '2 Second St', 'john@clinic.com');

INSERT INTO Receptionist
VALUES (3, 'Jane', 'Boe', '123456789031', 'Female', '01323456789', '3 Third St', 'jane@clinic.com');

--MEDICINE DATA
INSERT INTO Medicine
VALUES (1, 'Pain reliever', 'Acetaminophen (Tylenol) 500mg', 100);

INSERT INTO Medicine
VALUES (2, 'NSAID', 'Ibuprofen (Advil) 200mg', 200);

INSERT INTO Medicine
VALUES (3, 'Antihistamine', 'Diphenhydramine 25mg', 300);

INSERT INTO Medicine
VALUES (4, 'Decongestant', 'Pseudoephedrine 30mg', 150);

INSERT INTO Medicine
VALUES (5, 'Antibiotic', 'Amoxicillin 500mg', 250);

INSERT INTO Medicine
VALUES (6, 'Antibiotic', 'Azithromycin 500mg', 200);

INSERT INTO Medicine
VALUES (7, 'Steroid','Prednisone 5mg', 5000);

INSERT INTO Medicine
VALUES (8, 'Proton-pump inhibitor','Omeprazole (Prilosec) 20mg', 100);

INSERT INTO Medicine
VALUES (9, 'SSRI antidepressant','Sertraline (Zoloft) 50mg',1000);

INSERT INTO Medicine
VALUES (10,'ACE inhibitor', 'Lisinopril (Prinivil, Zestril) 10mg', 200);

INSERT INTO Medicine
VALUES (11,'Diuretic','Furosemide (Lasix) 40mg',300);
```

```
INSERT INTO Medicine
VALUES (12,'Beta blocker','Metoprolol (Lopressor) 50mg',250);

INSERT INTO Medicine
VALUES (13,'Antifungal','Fluconazole (Diflucan) 150mg',100);

INSERT INTO Medicine
VALUES (14,'Antiviral','Acyclovir (Zovirax) 400mg',1000);

INSERT INTO Medicine
VALUES (15,'Anticonvulsant','Levetiracetam (Keppra) 500mg',2000);

INSERT INTO Medicine
VALUES (16,'Inhaler','Albuterol (Ventolin, Proair) 90mcg/inh', 150);

INSERT INTO Medicine
VALUES (17,'Antiemetic','Ondansetron (Zofran) 4mg',250);

INSERT INTO Medicine
VALUES (18,'Vaccine','Influenza (Flu) 0.5 mL', 100);

INSERT INTO Medicine
VALUES (19,'Anesthetic','Lidocaine (Xylocaine) 1% 50 mL',20);

INSERT INTO Medicine
VALUES (20,'Calcium channel blocker','Amlodipine (Norvasc) 5mg',1000);


--CLINIC MANAGER DATA
INSERT INTO ClinicManager
VALUES (1,'Amanda', 'Clarke', '123456781011', 'Female', '01412345678', '11 First Ave',
'amanda@clinic.com');

INSERT INTO ClinicManager
VALUES (2, 'Michael', 'Roy', '123456781012', 'Male', '01422345678', '12 Second Ave',
'michael@clinic.com');


--DOCTOR DATA
INSERT INTO Doctor
VALUES (1, 1, 'David', 'Lee', '123456789041', 'Male', '01567890123', '41 Fourth St',
'david@clinic.com');
```

```
INSERT INTO Doctor
VALUES (2, 2, 'Sarah', 'Williams', '123456789042', 'Female', '01567890124', '42 Fifth St',
'sarah@clinic.com');

INSERT INTO Doctor
VALUES (3, 2, 'David', 'Khoo', '123456789043', 'Male', '01568890126', '12 Tmn Muda',
'david@clinic.com');


-- PATIENT DATA
INSERT INTO Patient
VALUES (1, 'John', 'Tan', '123456781021', 'Male', '01612345671', '21 First Lane',
'john.tan@email.com');

INSERT INTO Patient
VALUES (2, 'Sarah', 'Lim', '123456781022', 'Female', '01612345672', '22 Second Lane',
'sarah.lim@email.com');

INSERT INTO Patient
VALUES (3, 'Mary', 'Lee', '123456781031', 'Female', '01612345681', '31 Second Lane',
'mary.lee@email.com');

INSERT INTO Patient
VALUES (4, 'Mark', 'Chin', '123456781041', 'Male', '01612345691', '41 Third Lane',
'mark.chin@email.com');

INSERT INTO Patient
VALUES (5, 'Sophia', 'Goh', '123456781051', 'Female', '01612345701', '51 Fourth Lane',
'sophia.goh@email.com');

INSERT INTO Patient
VALUES (6, 'David', 'Lim', '123456781061', 'Male', '01612345711', '61 Fifth Lane',
'david.lim@email.com');

INSERT INTO Patient
VALUES (7, 'Olivia', 'Ng', '123456781071', 'Female', '01612345721', '71 Sixth Lane',
'olivia.ng@email.com');

INSERT INTO Patient
VALUES (8, 'Lucas', 'Lee', '123456781081', 'Male', '01612345731', '81 Seventh Lane',
'lucas.lee@email.com');
```

```sql
INSERT INTO Patient
VALUES (9, 'Emma', 'Toh', '123456781091', 'Female', '01612345741', '91 Eighth Lane',
'emma.toh@email.com');

INSERT INTO Patient
VALUES (10, 'Noah', 'Gwee', '123456781101', 'Male', '01612345751', '101 Ninth Lane',
'noah.gwee@email.com');

INSERT INTO Patient
VALUES (11, 'Oliver', 'Ng', '123456781111', 'Male', '01612345761', '111 Tenth Lane',
'oliver.ng@email.com');

INSERT INTO Patient
VALUES (12, 'Isabella', 'Lim', '123456781121', 'Female', '01612345771', '121 Eleventh Lane',
'isabella.lim@email.com');

INSERT INTO Patient
VALUES (13, 'Charlotte', 'Foong', '123456781131', 'Female','01612345781', '131 Twelfth Lane',
'charlotte.foong@email.com');

INSERT INTO Patient
VALUES (14, 'James', 'Toh', '123456781141', 'Male', '01612345791', '141 Thirteenth Lane',
'james.toh@email.com');

INSERT INTO Patient
VALUES (15, 'Amelia', 'Lee', '123456781151', 'Female', '01612345801', '151 Fourteenth Lane',
'amelia.lee@email.com');

INSERT INTO Patient
VALUES (16, 'Benjamin', 'Ng', '123456781161', 'Male', '01612345811', '161 Fifteenth Lane',
'benjamin.ng@email.com');

INSERT INTO Patient
VALUES (17, 'Chloe', 'Goh', '123456781171', 'Female', '01612345821', '171 Sixteenth Lane',
'chloe.goh@email.com');

INSERT INTO Patient
VALUES (18, 'Mason', 'Chin', '123456781181', 'Male', '01612345831', '181 Seventeenth Lane',
'mason.chin@email.com');

INSERT INTO Patient
VALUES (19, 'Zoe', 'Foong', '123456781191', 'Female', '01612345841', '191 Eighteenth Lane',
'zoe.foong@email.com');
```

```
INSERT INTO Patient
VALUES (20, 'Jacob', 'Toh', '123456781201', 'Male', '01612345851', '201 Nineteenth Lane', 'jacob.toh@email.com');


--APPOINTMENT DATA
INSERT INTO Appointment
VALUES (1, 1, 1, 1, TO_DATE('2023-01-05', 'YYYY-MM-DD'), TO_TIMESTAMP('2023-01-05 10:00:00', 'YYYY-MM-DD HH24:MI:SS'), 'Completed');

INSERT INTO Appointment
VALUES (2, 2, 2, 1, TO_DATE('2023-01-07', 'YYYY-MM-DD'), TO_TIMESTAMP('2023-01-07 11:00:00', 'YYYY-MM-DD HH24:MI:SS'), 'Upcoming');

INSERT INTO Appointment
VALUES (3, 3, 3, 2, TO_DATE('2023-01-09', 'YYYY-MM-DD'), TO_TIMESTAMP('2023-01-09 09:00:00', 'YYYY-MM-DD HH24:MI:SS'), 'Completed');

INSERT INTO Appointment
VALUES (4, 4, 1, 2, TO_DATE('2023-01-11', 'YYYY-MM-DD'), TO_TIMESTAMP('2023-01-11 10:30:00', 'YYYY-MM-DD HH24:MI:SS'), 'Completed');

INSERT INTO Appointment
VALUES (5, 5, 2, 3, TO_DATE('2023-01-13', 'YYYY-MM-DD'), TO_TIMESTAMP('2023-01-13 14:00:00', 'YYYY-MM-DD HH24:MI:SS'), 'Upcoming');

INSERT INTO Appointment
VALUES (6, 6, 3, 3, TO_DATE('2023-01-15', 'YYYY-MM-DD'), TO_TIMESTAMP('2023-01-15 15:30:00', 'YYYY-MM-DD HH24:MI:SS'), 'Completed');

INSERT INTO Appointment
VALUES (7, 7, 1, 1, TO_DATE('2023-01-17', 'YYYY-MM-DD'), TO_TIMESTAMP('2023-01-17 13:00:00', 'YYYY-MM-DD HH24:MI:SS'), 'Upcoming');

INSERT INTO Appointment
VALUES (8, 8, 2, 2, TO_DATE('2023-01-21', 'YYYY-MM-DD'), TO_TIMESTAMP('2023-01-21 11:00:00', 'YYYY-MM-DD HH24:MI:SS'), 'Completed');

INSERT INTO Appointment
VALUES (9, 9, 3, 1, TO_DATE('2023-01-23', 'YYYY-MM-DD'), TO_TIMESTAMP('2023-01-23 16:00:00', 'YYYY-MM-DD HH24:MI:SS'), 'Upcoming');
```

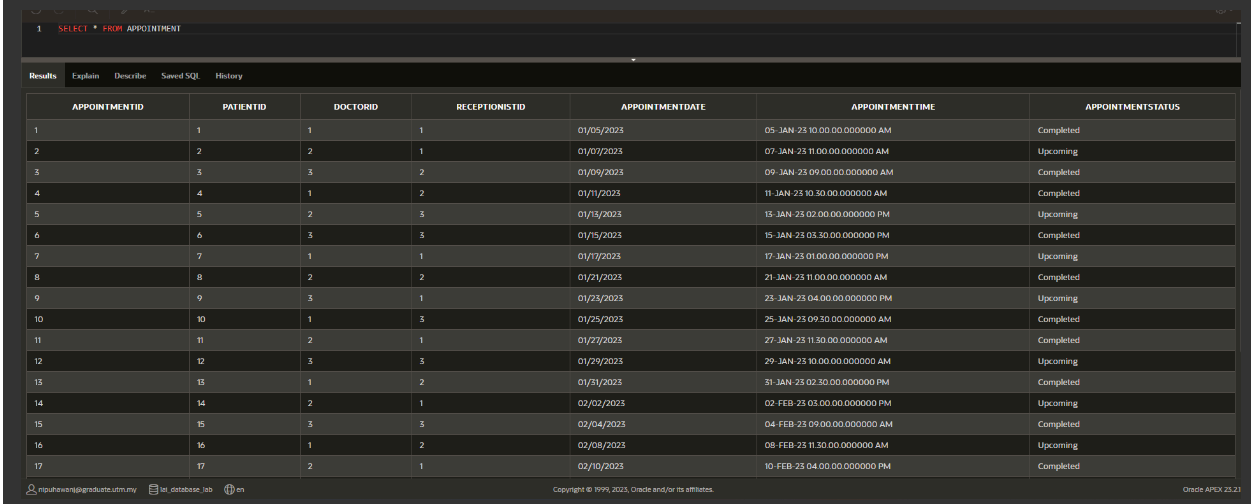
```
INSERT INTO Appointment
VALUES (10, 10, 1, 3, TO_DATE('2023-01-25', 'YYYY-MM-DD'), TO_TIMESTAMP('2023-01-25 09:30:00', 'YYYY-MM-DD HH24:MI:SS'), 'Completed');

INSERT INTO Appointment
VALUES (11, 11, 2, 1, TO_DATE('2023-01-27', 'YYYY-MM-DD'), TO_TIMESTAMP('2023-01-27 11:30:00', 'YYYY-MM-DD HH24:MI:SS'), 'Completed');

INSERT INTO Appointment
VALUES (12, 12, 3, 3, TO_DATE('2023-01-29', 'YYYY-MM-DD'), TO_TIMESTAMP('2023-01-29 10:00:00', 'YYYY-MM-DD HH24:MI:SS'), 'Upcoming');

INSERT INTO Appointment
VALUES (13, 13, 1, 2, TO_DATE('2023-01-31', 'YYYY-MM-DD'), TO_TIMESTAMP('2023-01-31 14:30:00', 'YYYY-MM-DD HH24:MI:SS'), 'Completed');

INSERT INTO Appointment
VALUES (14, 14, 2, 1, TO_DATE('2023-02-02', 'YYYY-MM-DD'), TO_TIMESTAMP('2023-02-02 15:00:00', 'YYYY-MM-DD HH24:MI:SS'), 'Upcoming');

INSERT INTO Appointment
VALUES (15, 15, 3, 3, TO_DATE('2023-02-04', 'YYYY-MM-DD'), TO_TIMESTAMP('2023-02-04 09:00:00', 'YYYY-MM-DD HH24:MI:SS'), 'Completed');

INSERT INTO Appointment
VALUES (16, 16, 1, 2, TO_DATE('2023-02-08', 'YYYY-MM-DD'), TO_TIMESTAMP('2023-02-08 11:30:00', 'YYYY-MM-DD HH24:MI:SS'), 'Upcoming');

INSERT INTO Appointment
VALUES (17, 17, 2, 1, TO_DATE('2023-02-10', 'YYYY-MM-DD'), TO_TIMESTAMP('2023-02-10 16:00:00', 'YYYY-MM-DD HH24:MI:SS'), 'Completed');

INSERT INTO Appointment
VALUES (18, 18, 3, 3, TO_DATE('2023-02-14', 'YYYY-MM-DD'), TO_TIMESTAMP('2023-02-14 13:30:00', 'YYYY-MM-DD HH24:MI:SS'),  'Upcoming');

INSERT INTO Appointment
VALUES (19, 19, 1, 2, TO_DATE('2023-02-18', 'YYYY-MM-DD'), TO_TIMESTAMP('2023-02-18 15:00:00', 'YYYY-MM-DD HH24:MI:SS'), 'Completed');

INSERT INTO Appointment
VALUES (20, 20, 2, 1, TO_DATE('2023-02-22', 'YYYY-MM-DD'), TO_TIMESTAMP('2023-02-22 17:00:00', 'YYYY-MM-DD HH24:MI:SS'), 'Upcoming');
```

```
INSERT INTO Appointment
VALUES (21, 6, 3, 3, TO_DATE('2023-02-26', 'YYYY-MM-DD'), TO_TIMESTAMP('2023-02-26 11:00:00', 'YYYY-MM-DD HH24:MI:SS'), 'Completed');

INSERT INTO Appointment
VALUES (22, 7, 1, 2, TO_DATE('2023-02-27', 'YYYY-MM-DD'), TO_TIMESTAMP('2023-02-27 09:30:00', 'YYYY-MM-DD HH24:MI:SS'), 'Upcoming');

INSERT INTO Appointment
VALUES (23, 8, 2, 1, TO_DATE('2023-03-01', 'YYYY-MM-DD'), TO_TIMESTAMP('2023-03-01 14:00:00', 'YYYY-MM-DD HH24:MI:SS'), 'Completed');

INSERT INTO Appointment
VALUES (24, 9, 3, 3, TO_DATE('2023-03-05', 'YYYY-MM-DD'), TO_TIMESTAMP('2023-03-05 16:30:00', 'YYYY-MM-DD HH24:MI:SS'), 'Upcoming');

INSERT INTO Appointment
VALUES (25, 10, 2, 2, TO_DATE('2023-03-08', 'YYYY-MM-DD'), TO_TIMESTAMP('2023-03-08 15:00:00', 'YYYY-MM-DD HH24:MI:SS'), 'Upcoming');


--HEALTHRECORD DATA
INSERT INTO HealthRecord
VALUES (1, 1, 1, 'Fever, cough, sore throat', 'Medication', 'Prescribed antiviral', 'Take Tamiflu twice daily');

INSERT INTO HealthRecord
VALUES (2, 3, 3, 'Skin rash symptoms', 'Topical cream', 'Given hydrocortisone cream', 'Apply twice daily');

INSERT INTO HealthRecord
VALUES (3, 15, 3, 'Stomach ache, vomiting', 'Medication', 'Given antacid', 'Take omeprazole 20mg twice daily');

INSERT INTO HealthRecord
VALUES (4, 4, 1, 'Physical injury symptoms', 'First aid', 'Basic wound dressing applied','Rest injury and observe for infection');

INSERT INTO HealthRecord
VALUES (5, 2, 1, 'Eye infection', 'Antibiotics', 'Prescribed eye drops', 'Use Ciprofloxacin drops 4 times a day');
```

```
INSERT INTO HealthRecord
VALUES (6, 6, 3, 'Sciatica pain', 'Pain medication', 'Prescribed muscle relaxants','Take cyclobenzaprine 10mg tablet daily');

INSERT INTO HealthRecord
VALUES (7, 8, 2, 'Flu symptoms', 'Medication', 'Prescribed antiviral medication', 'Take oseltamivir twice daily');

INSERT INTO HealthRecord
VALUES (8, 10, 1, 'Skin allergy', 'Antihistamine', 'Prescribed loratadine', 'Take 10mg tablet daily');

INSERT INTO HealthRecord
VALUES (9, 11, 2, 'Asthma flare-up', 'Inhaler', 'Prescribed salbutamol inhaler', 'Use inhaler as needed');

INSERT INTO HealthRecord
VALUES (10, 13, 1, 'Sprained wrist', 'Wrapping', 'Wrist wrapped with compression bandage','Keep wrapped and rest wrist');

INSERT INTO HealthRecord
VALUES (11, 17, 2, 'Stomach flu', 'Medication', 'Given medication for nausea and diarrhea', 'Take loperamide as needed');

INSERT INTO HealthRecord
VALUES (12, 19, 1, 'Tension headache', 'Pain medication','Prescribed acetaminophen', 'Take 500mg tablet as needed');


--PAYMENT DATA
INSERT INTO Payment
VALUES (1, 1, 1, 1, 50, TO_DATE('2023-01-05','YYYY-MM-DD'), TO_TIMESTAMP('2023-01-05 12:00:00','YYYY-MM-DD HH24:MI:SS'), 'Paid', 'Cash');

INSERT INTO Payment
VALUES (2, 3, 5, 2, 20, TO_DATE('2023-01-08','YYYY-MM-DD'), TO_TIMESTAMP('2023-01-08 15:00:00','YYYY-MM-DD HH24:MI:SS'), 'Unpaid', 'Credit Card');

INSERT INTO Payment
VALUES (3, 15, 4, 3, 30, TO_DATE('2023-01-10','YYYY-MM-DD'), TO_TIMESTAMP('2023-01-10 11:30:00','YYYY-MM-DD HH24:MI:SS'), 'Paid', 'Online Transfer');

INSERT INTO Payment
VALUES (4, 4, 1, 4, 100, TO_DATE('2023-01-12','YYYY-MM-DD'), TO_TIMESTAMP('2023-01-12 12:30:00','YYYY-MM-DD HH24:MI:SS'), 'Paid', 'Cash');
```

```
INSERT INTO Payment
VALUES (5, 2, 6, 5, 30, TO_DATE('2023-01-15','YYYY-MM-DD'), TO_TIMESTAMP('2023-01-15
09:00:00','YYYY-MM-DD HH24:MI:SS'), 'Unpaid', 'Cash');

INSERT INTO Payment
VALUES (6, 6, 1, 6, 25, TO_DATE('2023-01-17','YYYY-MM-DD'), TO_TIMESTAMP('2023-01-17
16:30:00','YYYY-MM-DD HH24:MI:SS'), 'Paid', 'Debit Card');

INSERT INTO Payment
VALUES (7, 8, 14, 7, 30, TO_DATE('2023-01-05','YYYY-MM-DD'), TO_TIMESTAMP('2023-01-05
13:00:00','YYYY-MM-DD HH24:MI:SS'), 'Paid', 'Credit Card');

INSERT INTO Payment
VALUES (8, 10, 15, 8, 15, TO_DATE('2023-01-07','YYYY-MM-DD'), TO_TIMESTAMP('2023-01-07
09:30:00','YYYY-MM-DD HH24:MI:SS'),'Unpaid', 'Cash');

INSERT INTO Payment
VALUES (9, 11, 16, 9, 20, TO_DATE('2023-01-10','YYYY-MM-DD'), TO_TIMESTAMP('2023-01-10
12:45:00','YYYY-MM-DD HH24:MI:SS'), 'Paid', 'Debit Card');

INSERT INTO Payment
VALUES (10, 13, 1, 10, 80, TO_DATE('2023-01-14','YYYY-MM-DD'),
TO_TIMESTAMP('2023-01-14 11:15:00','YYYY-MM-DD HH24:MI:SS'), 'Unpaid', 'Cash');

INSERT INTO Payment
VALUES (11, 17, 5, 11, 55, TO_DATE('2023-01-18','YYYY-MM-DD'),
TO_TIMESTAMP('2023-01-18 17:20:00','YYYY-MM-DD HH24:MI:SS'), 'Paid', 'Online Transfer');

INSERT INTO Payment
VALUES (12, 19, 1, 12, 35, TO_DATE('2023-01-25','YYYY-MM-DD'),
TO_TIMESTAMP('2023-01-18 11:20:00','YYYY-MM-DD HH24:MI:SS'), 'Paid', 'Online Transfer');


--PERFORMANCEREPORT DATA
INSERT INTO PerformanceReport
VALUES(1, 1, 'Total daily revenue for 12/1/2023 is RM5702');

INSERT INTO PerformanceReport
VALUES(2, 2, 'Total daily revenue for 13/1/2023 is RM8702');
```

```
--DML Skills

--SHOW ALL DATA FROM APPOINTMENT TABLE
SELECT * FROM APPOINTMENT
```



Results
Explain
Describe
Saved SQL
History
nipuhawanj@graduate.utm.my
lai_database_lab
en
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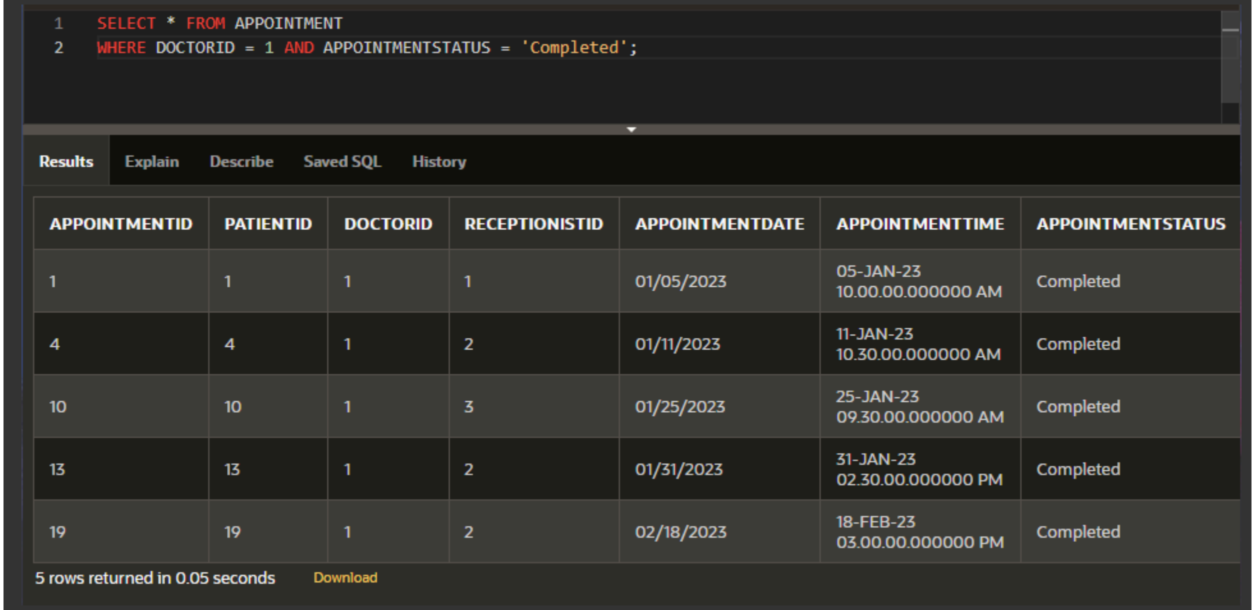
Oracle APEX 23.2.1

```
SELECT * FROM APPOINTMENT
```

APPOINTMENTID	PATIENTID	DOCTORID	RECEPTIONISTID	APPOINTMENTDATE	APPOINTMENTTIME	APPOINTMENTSTATUS
1	1	1	1	01/05/2023	05-JAN-23 10.00.00.000000 AM	Completed
2	2	2	1	01/07/2023	07-JAN-23 11.00.00.000000 AM	Upcoming
3	3	3	2	01/09/2023	09-JAN-23 09.00.00.000000 AM	Completed
4	4	1	2	01/11/2023	11-JAN-23 10.30.00.000000 AM	Completed
5	5	2	3	01/13/2023	13-JAN-23 02.00.00.000000 PM	Upcoming
6	6	3	3	01/15/2023	15-JAN-23 03.30.00.000000 PM	Completed
7	7	1	1	01/17/2023	17-JAN-23 01.00.00.000000 PM	Upcoming
8	8	2	2	01/21/2023	21-JAN-23 11.00.00.000000 AM	Completed
9	9	3	1	01/23/2023	23-JAN-23 04.00.00.000000 PM	Upcoming
10	10	1	3	01/25/2023	25-JAN-23 09.30.00.000000 AM	Completed
11	11	2	1	01/27/2023	27-JAN-23 11.30.00.000000 AM	Completed
12	12	3	3	01/29/2023	29-JAN-23 10.00.00.000000 AM	Upcoming
13	13	1	2	01/31/2023	31-JAN-23 02.30.00.000000 PM	Completed
14	14	2	1	02/02/2023	02-FEB-23 03.00.00.000000 PM	Upcoming
15	15	3	3	02/04/2023	04-FEB-23 09.00.00.000000 AM	Completed
16	16	1	2	02/08/2023	08-FEB-23 11.30.00.000000 AM	Upcoming
17	17	2	1	02/10/2023	10-FEB-23 04.00.00.000000 PM	Completed

```
--SHOW APPOINTMENT WITH DOCTORID = 1 AND APPPOINTMENTSTATUS =
'COMPLETED'
SELECT * FROM APPOINTMENT
WHERE DOCTORID = 1 AND APPOINTMENTSTATUS = 'Completed';
```

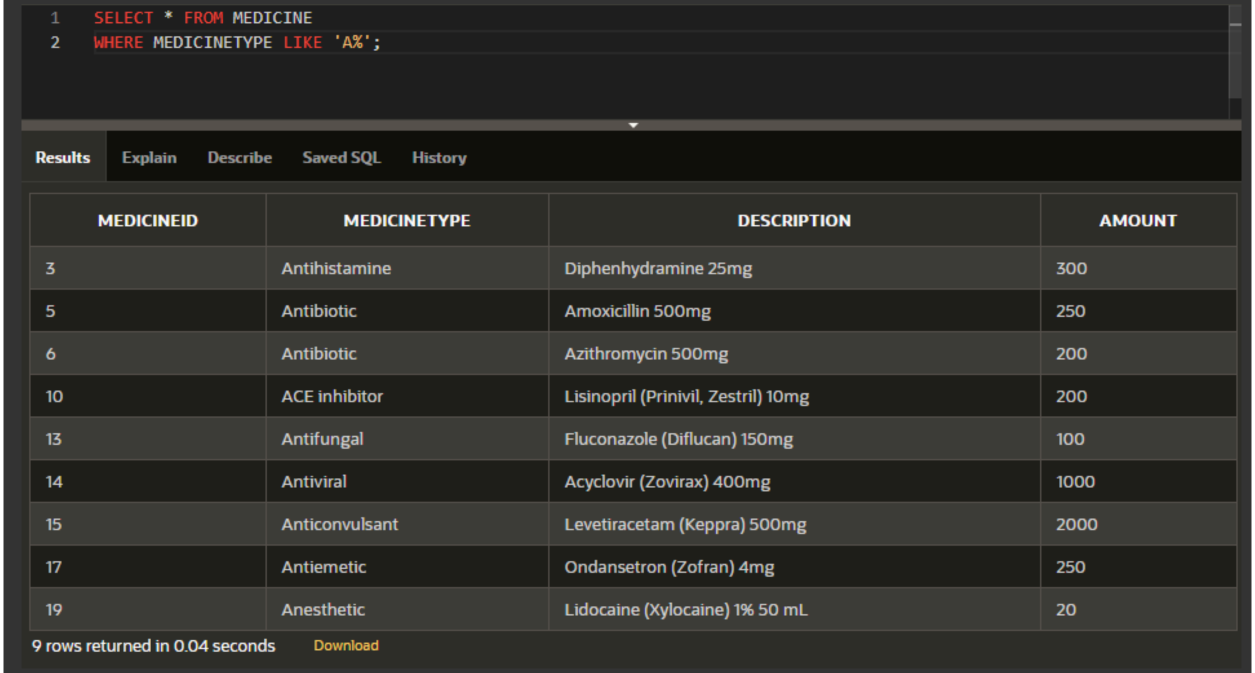


```
SELECT * FROM APPOINTMENT
WHERE DOCTORID = 1 AND APPOINTMENTSTATUS = 'Completed';
```

APPOINTMENTID	PATIENTID	DOCTORID	RECEPTIONISTID	APPOINTMENTDATE	APPOINTMENTTIME	APPOINTMENTSTATUS
1	1	1	1	01/05/2023	05-JAN-23 10.00.00.000000 AM	Completed
4	4	1	2	01/11/2023	11-JAN-23 10.30.00.000000 AM	Completed
10	10	1	3	01/25/2023	25-JAN-23 09.30.00.000000 AM	Completed
13	13	1	2	01/31/2023	31-JAN-23 02.30.00.000000 PM	Completed
19	19	1	2	02/18/2023	18-FEB-23 03.00.00.000000 PM	Completed

5 rows returned in 0.05 seconds

```
--SHOW MEDICINETYPE WITH NAME STARTING WITH 'A'
SELECT * FROM MEDICINE
WHERE MEDICINETYPE LIKE 'A%';
```

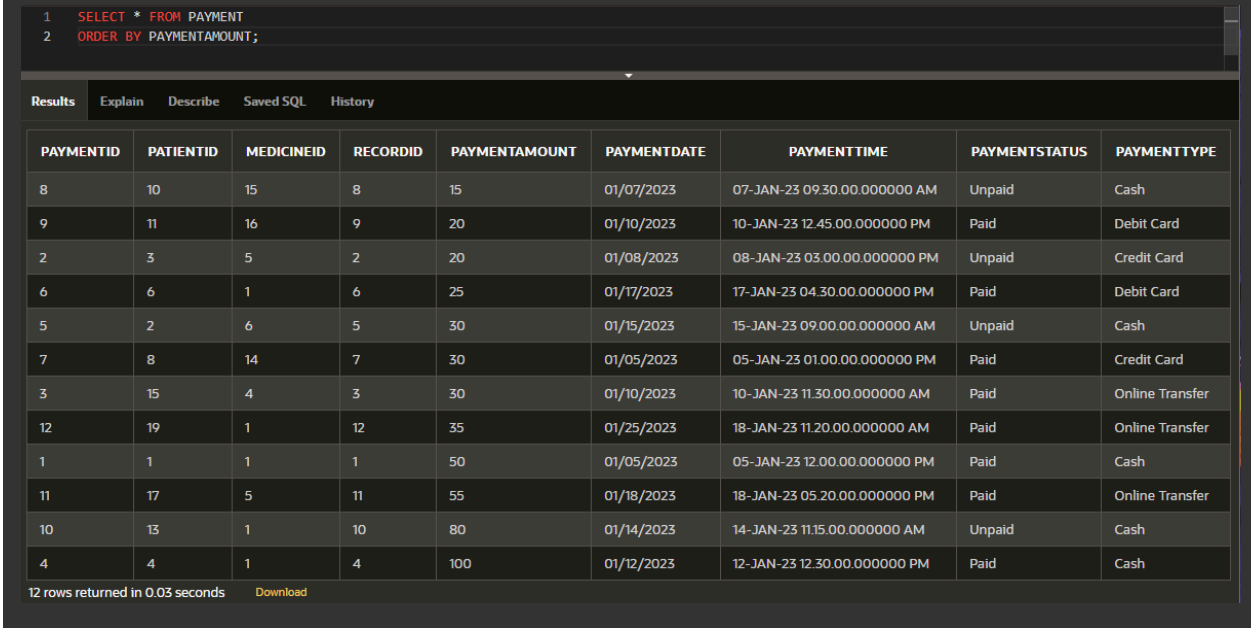


```
SELECT * FROM MEDICINE
WHERE MEDICINETYPE LIKE 'A%';
```

MEDICINEID	MEDICINETYPE	DESCRIPTION	AMOUNT
3	Antihistamine	Diphenhydramine 25mg	300
5	Antibiotic	Amoxicillin 500mg	250
6	Antibiotic	Azithromycin 500mg	200
10	ACE inhibitor	Lisinopril (Prinivil, Zestril) 10mg	200
13	Antifungal	Fluconazole (Diflucan) 150mg	100
14	Antiviral	Acyclovir (Zovirax) 400mg	1000
15	Anticonvulsant	Levetiracetam (Keppra) 500mg	2000
17	Antiemetic	Ondansetron (Zofran) 4mg	250
19	Anesthetic	Lidocaine (Xylocaine) 1% 50 mL	20

9 rows returned in 0.04 seconds

```
--SHOW PAYMENT TABLE WITH PAYMENTAMOUNT SORTED
SELECT * FROM PAYMENT
ORDER BY PAYMENTAMOUNT;
```

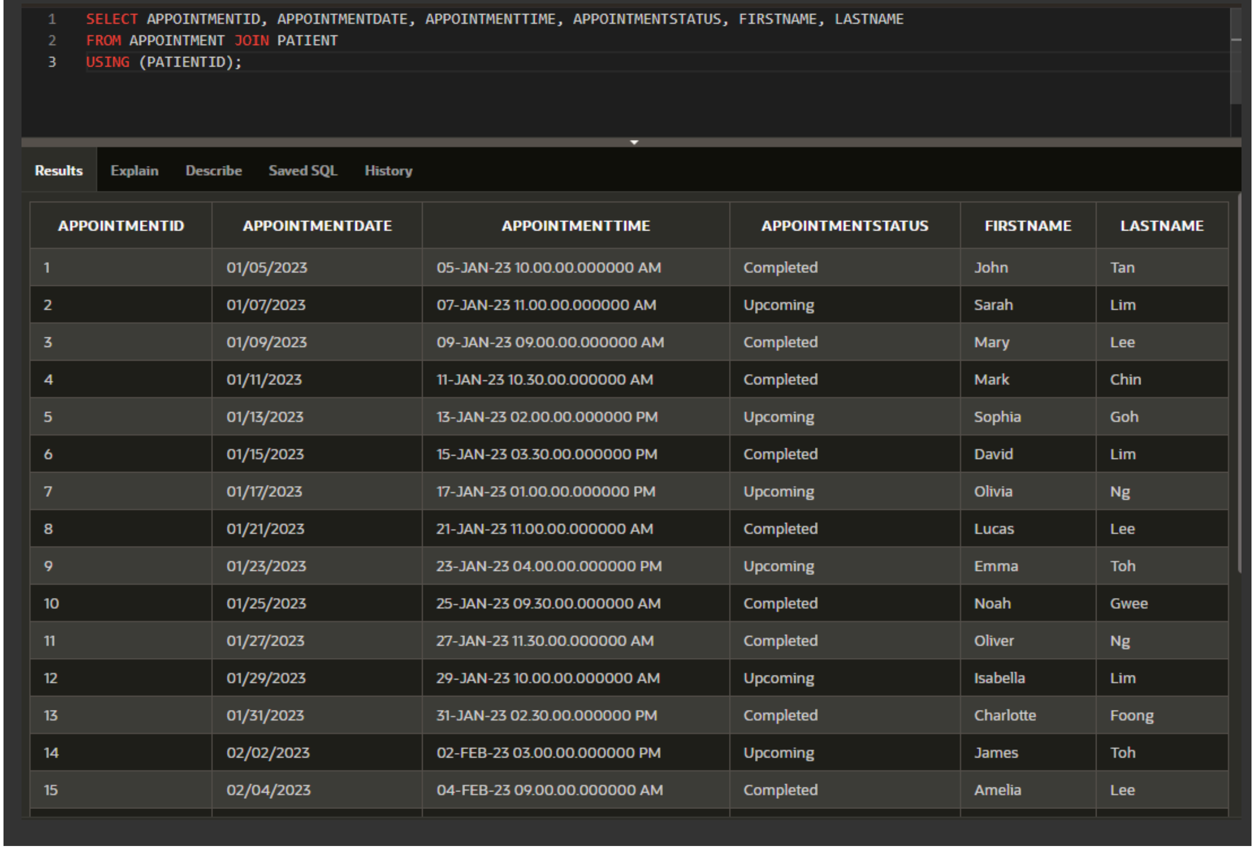


```
SELECT * FROM PAYMENT
ORDER BY PAYMENTAMOUNT;
```

PAYMENTID	PATIENTID	MEDICINEID	RECORDID	PAYMENTAMOUNT	PAYMENTDATE	PAYMENTTIME	PAYMENTSTATUS	PAYMENTTYPE
8	10	15	8	15	01/07/2023	07-JAN-23 09.30.00.000000 AM	Unpaid	Cash
9	11	16	9	20	01/10/2023	10-JAN-23 12.45.00.000000 PM	Paid	Debit Card
2	3	5	2	20	01/08/2023	08-JAN-23 03.00.00.000000 PM	Unpaid	Credit Card
6	6	1	6	25	01/17/2023	17-JAN-23 04.30.00.000000 PM	Paid	Debit Card
5	2	6	5	30	01/15/2023	15-JAN-23 09.00.00.000000 AM	Unpaid	Cash
7	8	14	7	30	01/05/2023	05-JAN-23 01.00.00.000000 PM	Paid	Credit Card
3	15	4	3	30	01/10/2023	10-JAN-23 11.30.00.000000 AM	Paid	Online Transfer
12	19	1	12	35	01/25/2023	18-JAN-23 11.20.00.000000 AM	Paid	Online Transfer
1	1	1	1	50	01/05/2023	05-JAN-23 12.00.00.000000 PM	Paid	Cash
11	17	5	11	55	01/18/2023	18-JAN-23 05.20.00.000000 PM	Paid	Online Transfer
10	13	1	10	80	01/14/2023	14-JAN-23 11.15.00.000000 AM	Unpaid	Cash
4	4	1	4	100	01/12/2023	12-JAN-23 12.30.00.000000 PM	Paid	Cash

12 rows returned in 0.03 seconds

```
--SHOW APPOINTMENT TABLE JOINING PATIENT
SELECT APPOINTMENTID, APPOINTMENTDATE, APPOINTMENTTIME,
APPOINTMENTSTATUS, FIRSTNAME, LASTNAME
FROM APPOINTMENT JOIN PATIENT
USING (PATIENTID);
```

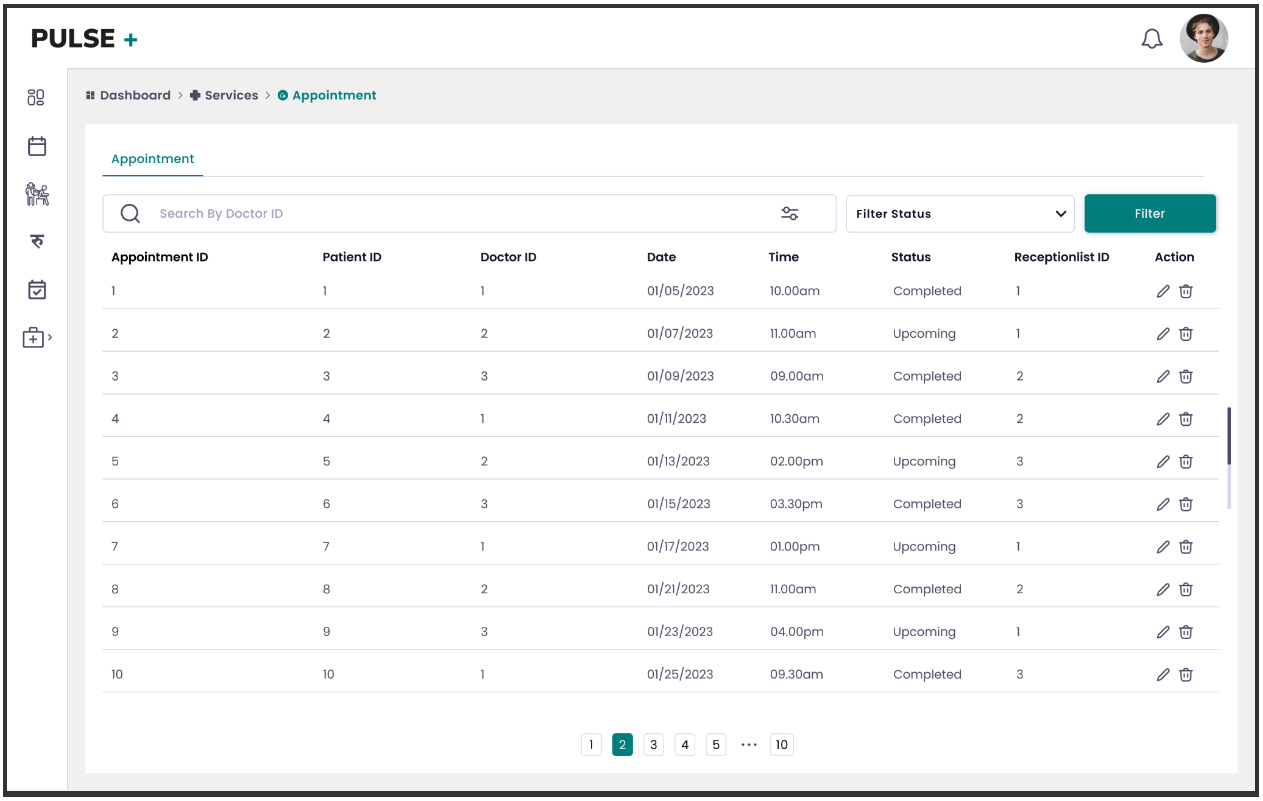


```
SELECT APPOINTMENTID, APPOINTMENTDATE, APPOINTMENTTIME, APPOINTMENTSTATUS, FIRSTNAME, LASTNAME
FROM APPOINTMENT JOIN PATIENT
USING (PATIENTID);
```

APPOINTMENTID	APPOINTMENTDATE	APPOINTMENTTIME	APPOINTMENTSTATUS	FIRSTNAME	LASTNAME
1	01/05/2023	05-JAN-23 10.00.00.000000 AM	Completed	John	Tan
2	01/07/2023	07-JAN-23 11.00.00.000000 AM	Upcoming	Sarah	Lim
3	01/09/2023	09-JAN-23 09.00.00.000000 AM	Completed	Mary	Lee
4	01/11/2023	11-JAN-23 10.30.00.000000 AM	Completed	Mark	Chin
5	01/13/2023	13-JAN-23 02.00.00.000000 PM	Upcoming	Sophia	Goh
6	01/15/2023	15-JAN-23 03.30.00.000000 PM	Completed	David	Lim
7	01/17/2023	17-JAN-23 01.00.00.000000 PM	Upcoming	Olivia	Ng
8	01/21/2023	21-JAN-23 11.00.00.000000 AM	Completed	Lucas	Lee
9	01/23/2023	23-JAN-23 04.00.00.000000 PM	Upcoming	Emma	Toh
10	01/25/2023	25-JAN-23 09.30.00.000000 AM	Completed	Noah	Gwee
11	01/27/2023	27-JAN-23 11.30.00.000000 AM	Completed	Oliver	Ng
12	01/29/2023	29-JAN-23 10.00.00.000000 AM	Upcoming	Isabella	Lim
13	01/31/2023	31-JAN-23 02.30.00.000000 PM	Completed	Charlotte	Foong
14	02/02/2023	02-FEB-23 03.00.00.000000 PM	Upcoming	James	Toh
15	02/04/2023	04-FEB-23 09.00.00.000000 AM	Completed	Amelia	Lee

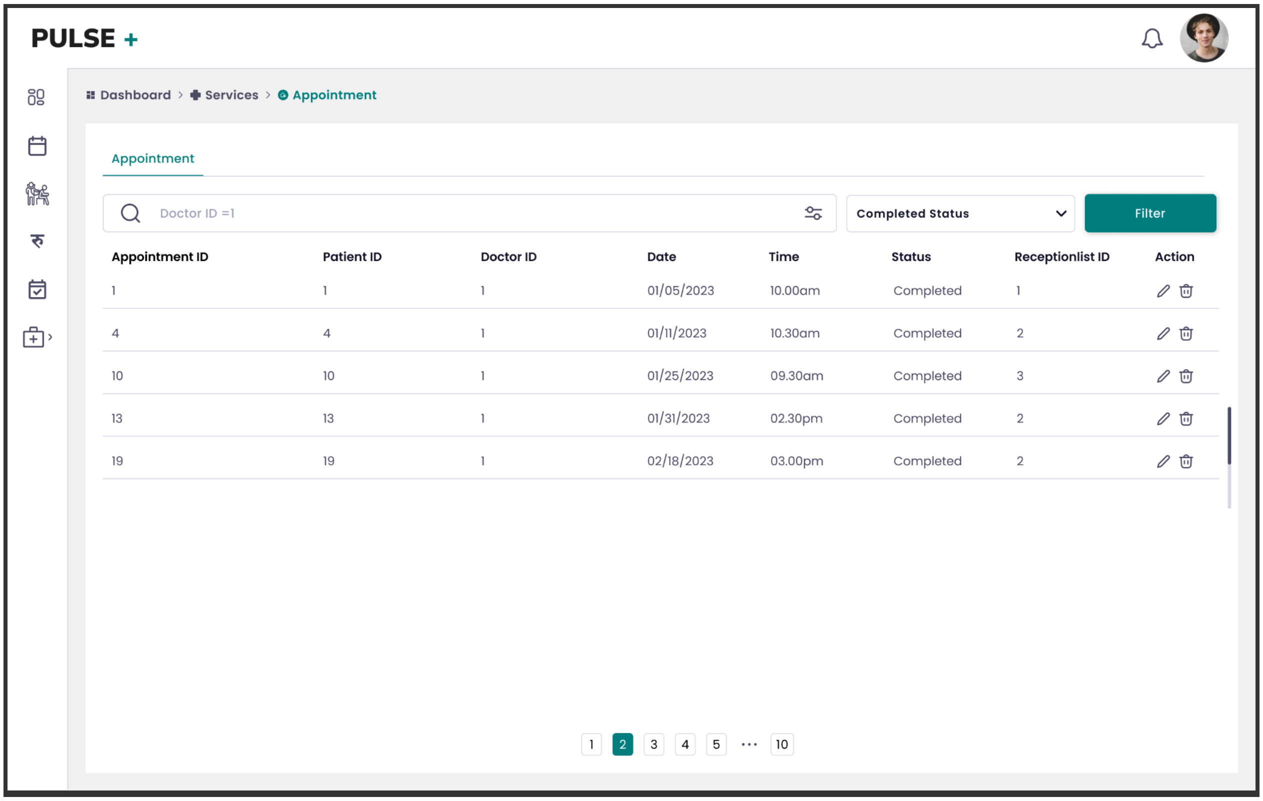
7. User Interface

```
SELECT * FROM APPOINTMENT
```



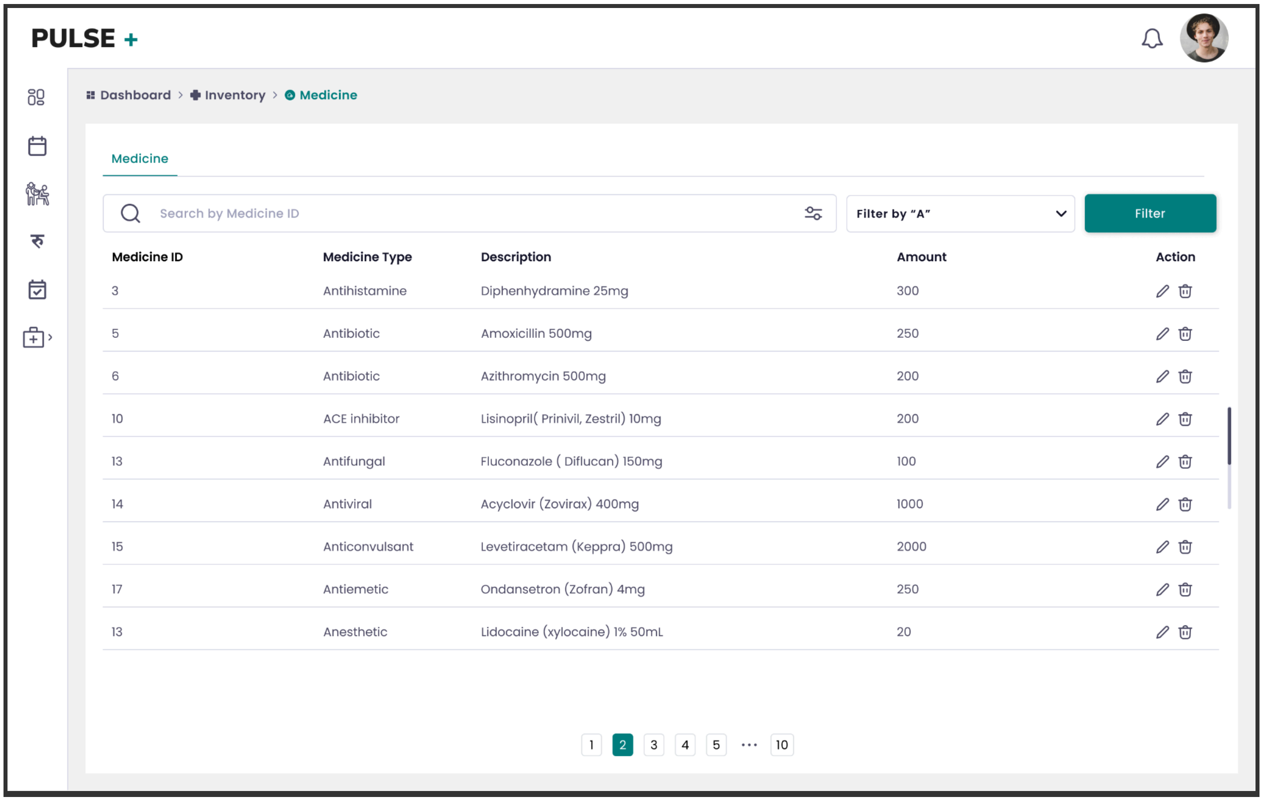
Appointment ID	Patient ID	Doctor ID	Date	Time	Status	Receptionlist ID	Action
1	1	1	01/05/2023	10.00am	Completed	1	✎ 🗑
2	2	2	01/07/2023	11.00am	Upcoming	1	✎ 🗑
3	3	3	01/09/2023	09.00am	Completed	2	✎ 🗑
4	4	1	01/11/2023	10.30am	Completed	2	✎ 🗑
5	5	2	01/13/2023	02.00pm	Upcoming	3	✎ 🗑
6	6	3	01/15/2023	03.30pm	Completed	3	✎ 🗑
7	7	1	01/17/2023	01.00pm	Upcoming	1	✎ 🗑
8	8	2	01/21/2023	11.00am	Completed	2	✎ 🗑
9	9	3	01/23/2023	04.00pm	Upcoming	1	✎ 🗑
10	10	1	01/25/2023	09.30am	Completed	3	✎ 🗑

```
--SHOW APPOINTMENT WITH DOCTORID = 1 AND APPPOINTMENTSTATUS = 'COMPLETED'
SELECT * FROM APPOINTMENT
WHERE DOCTORID = 1 AND APPOINTMENTSTATUS = 'Completed';
```



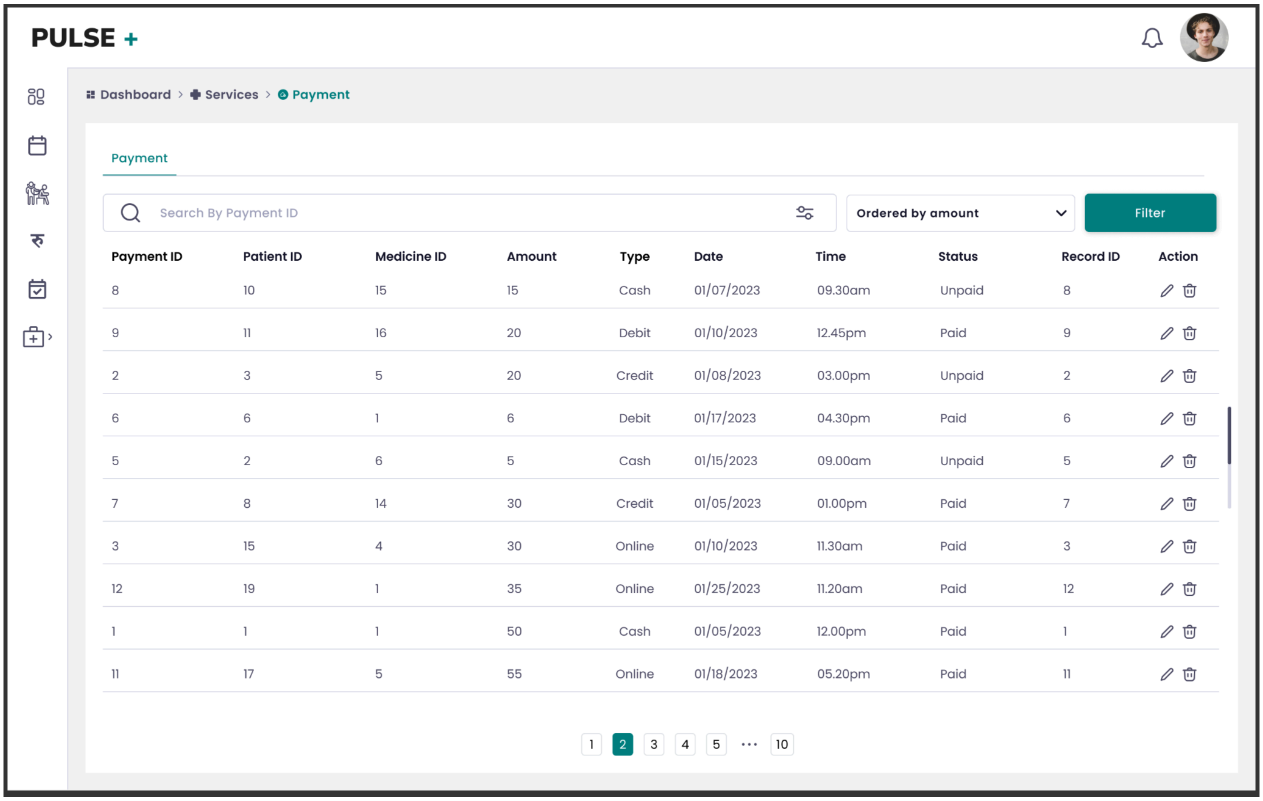
Appointment ID	Patient ID	Doctor ID	Date	Time	Status	Receptionlist ID	Action
1	1	1	01/05/2023	10.00am	Completed	1	
4	4	1	01/11/2023	10.30am	Completed	2	
10	10	1	01/25/2023	09.30am	Completed	3	
13	13	1	01/31/2023	02.30pm	Completed	2	
19	19	1	02/18/2023	03.00pm	Completed	2	

```
--SHOW MEDICINETYPE WITH NAME STARTING WITH 'A'
SELECT * FROM MEDICINE
WHERE MEDICINETYPE LIKE 'A%';
```



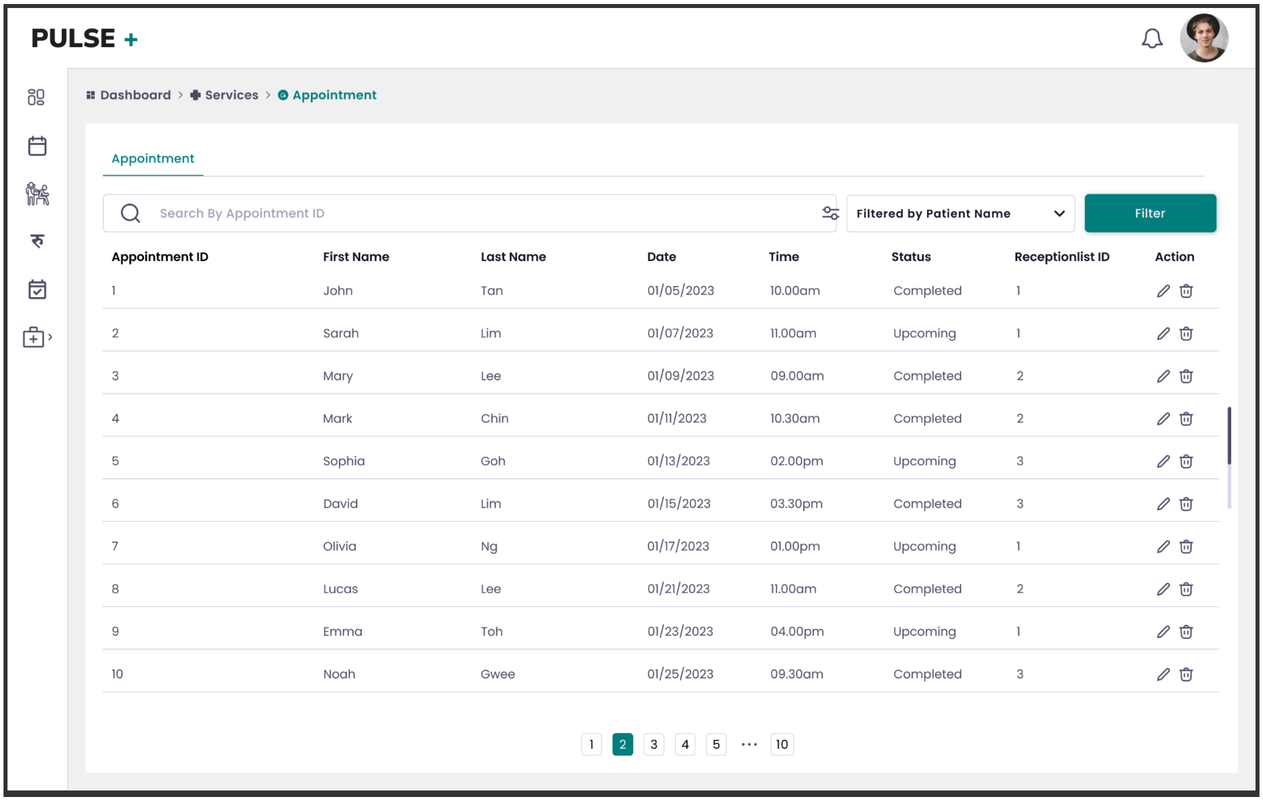
Medicine ID	Medicine Type	Description	Amount	Action
3	Antihistamine	Diphenhydramine 25mg	300	
5	Antibiotic	Amoxicillin 500mg	250	
6	Antibiotic	Azithromycin 500mg	200	
10	ACE inhibitor	Lisinopril(Prinivil, Zestril) 10mg	200	
13	Antifungal	Fluconazole (Diflucan) 150mg	100	
14	Antiviral	Acyclovir (Zovirax) 400mg	1000	
15	Anticonvulsant	Levetiracetam (Keppra) 500mg	2000	
17	Antiemetic	Ondansetron (Zofran) 4mg	250	
13	Anesthetic	Lidocaine (xylocaine) 1% 50mL	20	

```
--SHOW PAYMENT TABLE WITH PAYMENTAMOUNT SORTED
SELECT * FROM PAYMENT
ORDER BY PAYMENTAMOUNT;
```



Payment ID	Patient ID	Medicine ID	Amount	Type	Date	Time	Status	Record ID	Action
8	10	15	15	Cash	01/07/2023	09.30am	Unpaid	8	
9	11	16	20	Debit	01/10/2023	12.45pm	Paid	9	
2	3	5	20	Credit	01/08/2023	03.00pm	Unpaid	2	
6	6	1	6	Debit	01/17/2023	04.30pm	Paid	6	
5	2	6	5	Cash	01/15/2023	09.00am	Unpaid	5	
7	8	14	30	Credit	01/05/2023	01.00pm	Paid	7	
3	15	4	30	Online	01/10/2023	11.30am	Paid	3	
12	19	1	35	Online	01/25/2023	11.20am	Paid	12	
1	1	1	50	Cash	01/05/2023	12.00pm	Paid	1	
11	17	5	55	Online	01/18/2023	05.20pm	Paid	11	

```
--SHOW APPOINTMENT TABLE JOINING PATIENT
SELECT APPOINTMENTID, APPOINTMENTDATE, APPOINTMENTTIME,
APPOINTMENTSTATUS, FIRSTNAME, LASTNAME
FROM APPOINTMENT JOIN PATIENT
USING (PATIENTID);
```



Appointment ID	First Name	Last Name	Date	Time	Status	Receptionlist ID	Action
1	John	Tan	01/05/2023	10.00am	Completed	1	
2	Sarah	Lim	01/07/2023	11.00am	Upcoming	1	
3	Mary	Lee	01/09/2023	09.00am	Completed	2	
4	Mark	Chin	01/11/2023	10.30am	Completed	2	
5	Sophia	Goh	01/13/2023	02.00pm	Upcoming	3	
6	David	Lim	01/15/2023	03.30pm	Completed	3	
7	Olivia	Ng	01/17/2023	01.00pm	Upcoming	1	
8	Lucas	Lee	01/21/2023	11.00am	Completed	2	
9	Emma	Toh	01/23/2023	04.00pm	Upcoming	1	
10	Noah	Gwee	01/25/2023	09.30am	Completed	3	

8. Summary

We completed the Pulse+'s SQL implementation and database logical architecture during this phase. By identifying the functional dependencies between the relationships, we were able to convert the conceptual entity relationship diagram (ERD) from phase 2 into a logical ERD for this assignment.

according to the most recent business standards. In order to minimise data redundancy and improve website accessibility and manipulation while maintaining data integrity for use in future research, we create relation schemas from the logical ERD that is generated and then normalise the data from the first normal form (1NF) to BoyceCodd normal form (BCNF).

However, because of the modifications from the logical ERD, the data dictionary is updated based on the normalised relations. Since the data dictionary offers comprehensive details on every attribute, entities, and relationships, it is imperative that it be updated. Not to mention, we used the SQL commands using Oracle Apex to build the tables.

Finally, we believed that this phase would enable us to create a useful and efficient system to support Mr. Fook Onn Hoe in his Perak-based Traditional Chinese Medicine Clinic.