A logo with blue green and brown squares

Description automatically generated

Health Information System Database Group Project

C-DE 312

Adham Sobhy - 23-101003

Youssef Walid - 22-101048

Mohamed Mostafa - 22-101203

Mohamed Ibrahim - 22-101058

Table of Contents

[Phase 1 3](#_Toc186918428)

[Requirements and Business Rules 3](#_Toc186918429)

[1. Patient Management 3](#_Toc186918430)

[2. Health Provider Management 3](#_Toc186918431)

[3. Appointment System 3](#_Toc186918432)

[4. Health Record Management 4](#_Toc186918433)

[5. Insurance and Payment 4](#_Toc186918434)

[6. Regulatory Compliance 4](#_Toc186918435)

[ERD Diagram 4](#_Toc186918436)

[Phase 2 5](#_Toc186918437)

[Relational Schema 5](#_Toc186918438)

[Phase 3 5](#_Toc186918439)

[Sample of the 8 non-trivial SQL statements 5](#_Toc186918440)

[Phase 4 9](#_Toc186918441)

[Sample of the Functional dependencies 9](#_Toc186918442)

[Phase 5 10](#_Toc186918443)

[HIN Database Application 10](#_Toc186918444)

[Main page including all tables 10](#_Toc186918445)

[Example of operations made for each table 11](#_Toc186918446)

[Select options 11](#_Toc186918447)

[Inserting data into tables 12](#_Toc186918448)

[Updating Data 12](#_Toc186918449)

[Deleting Data 13](#_Toc186918450)

[Joining tables with conditions and join types 13](#_Toc186918451)

# Phase 1

## Requirements and Business Rules

The Health Information Network (HIN) system is a national web-based platform that

manages and exchanges health records in compliance with HIPAA standards. The

system supports three main types of stakeholders: **patients**, **health providers**, and

**government regulators**.

Below are the database requirements and business rules that define the constraints for

the system:

### 1. Patient Management

* A patient must have a **unique ID** in the system.
* A patient can access and view their own **health records**.
* Each patient can maintain a list of **caregivers** (family or friends) who will be

○ notified in case of an emergency.

○ A patient may have zero or more associated caregivers but can add or remove

Caregivers at any time.

○ Caregiver notifications can be sent via **email** and/or **SMS**.

* Health insurance information is **optional** for patients.

○ If a patient has health insurance, it must be linked to only **one** registered

**insurance company** in the system.

○ If a patient does not have insurance, they must pay for services via **credit**

**card**, **bank transfer**, or **cash**.

* A patient can make appointment requests with health providers, and these

○ Requests must be based on the patient's treatment history and illness type.

○ Patients can cancel or change appointments.

### 2. Health Provider Management

● Each health provider in the system must have a **unique ID**, as well as their

**specialty**, **location**, and **availability** for appointments.

● A health provider can have multiple patients, but each patient can only have one

active appointment with a provider at any given time.

● **Emergency appointments take precedence** over regular appointments based

on availability.

### 3. Appointment System

● An **appointment** is identified by a **unique ID** and includes the date, time, type of

illness, and emergency status.

● Patients can request appointments, and the system automatically assigns them

to a health provider.

● **Appointment changes** are possible depending on the provider's availability and

the nature of the illness.

### 4. Health Record Management

● Each patient has a **collection of health records** that must include details such

as the date of the incident, type of illness, and treatment details.

● **Health records must be updated** by health providers after each appointment

and made accessible to patients.

● The system ensures **HIPAA compliance** by tracking all data exchanges between

patients, providers, and regulators.

○ Every time a provider accesses patient health records, pairwise evidence

is generated for regulatory and audit purposes.

### 5. Insurance and Payment

● **A patient’s insurance status** determines their payment method:

○ Patients with insurance are charged through their **health insurance**

**company**, based on their **insurance package**.

○ Uninsured patients must pay using a **credit card**, **bank transfer**, or **cash**.

● **A health insurance company must be registered** in the system before it can

be associated with patients.

● Payments for each appointment must be logged in the system, including the

**amount**, **payment method**, and **payment date**.

### 6. Regulatory Compliance

● **Government regulators** have access to all **health records** which allows them to

monitor nationwide health trends and ensure HIPAA compliance.

● Regulators must be able to track data flows and verify that patient information

shared between providers and the system is compliant with HIPAA standards.

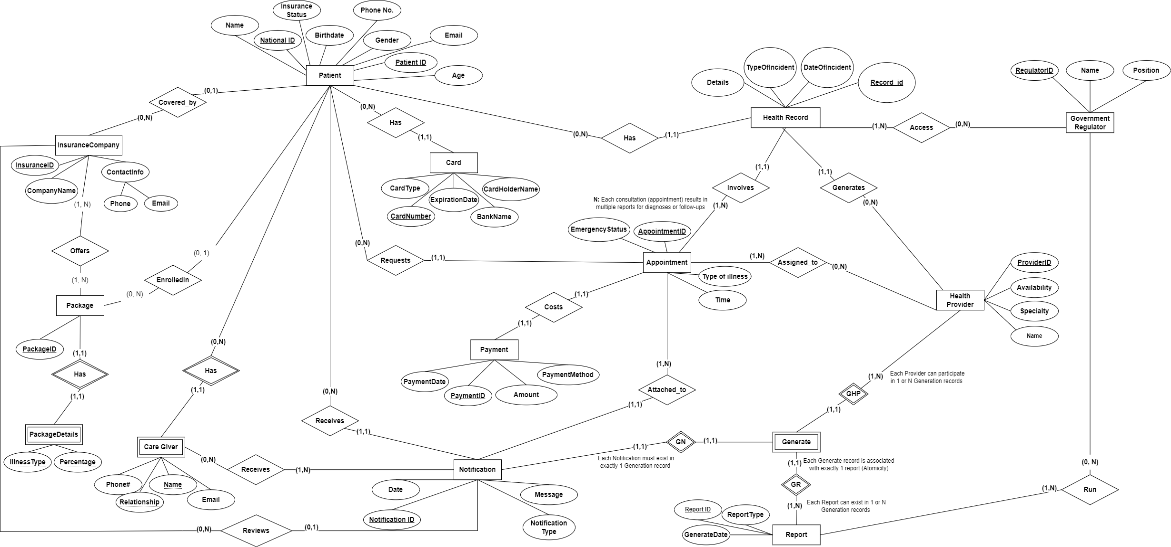
○ **Evidence logs** must be created every time patient information is shared,

recording the data exchanged and the entities involved.

● Regulators can run **custom reports** to monitor trends related to illness,

treatments, and patient outcomes at a national level.

## ERD Diagram



# Phase 2

## Relational Schema

A diagram of a company

Description automatically generated

# Phase 3

## Sample of the 8 non-trivial SQL statements

A screenshot of a computer

Description automatically generated

A screenshot of a computer program

Description automatically generated

A screenshot of a computer

Description automatically generated

A screenshot of a computer

Description automatically generated

# Phase 4

## Sample of the Functional dependencies

1. GovernmentRegualtorReports:

Functional Dependencies:

**Attributes**: ReportID, RegulatorID

ReportID, RegulatorID → {all attributes}

Normalization:

**BCNF**: All attributes are determined by a superkey and there are no transitive dependencies.

1. Report:

Functional Dependencies:

**Attributes**: ReportID, ReportType, GenerateDate

ReportID → {all attributes}

Normalization:

**BCNF**: All attributes are determined by a superkey and there are no transitive dependencies.

1. HealthProvider:

Functional Dependencies:

**Attributes**: ProviderID, Availability, Specialty, Name

ProviderID → {all attributes}

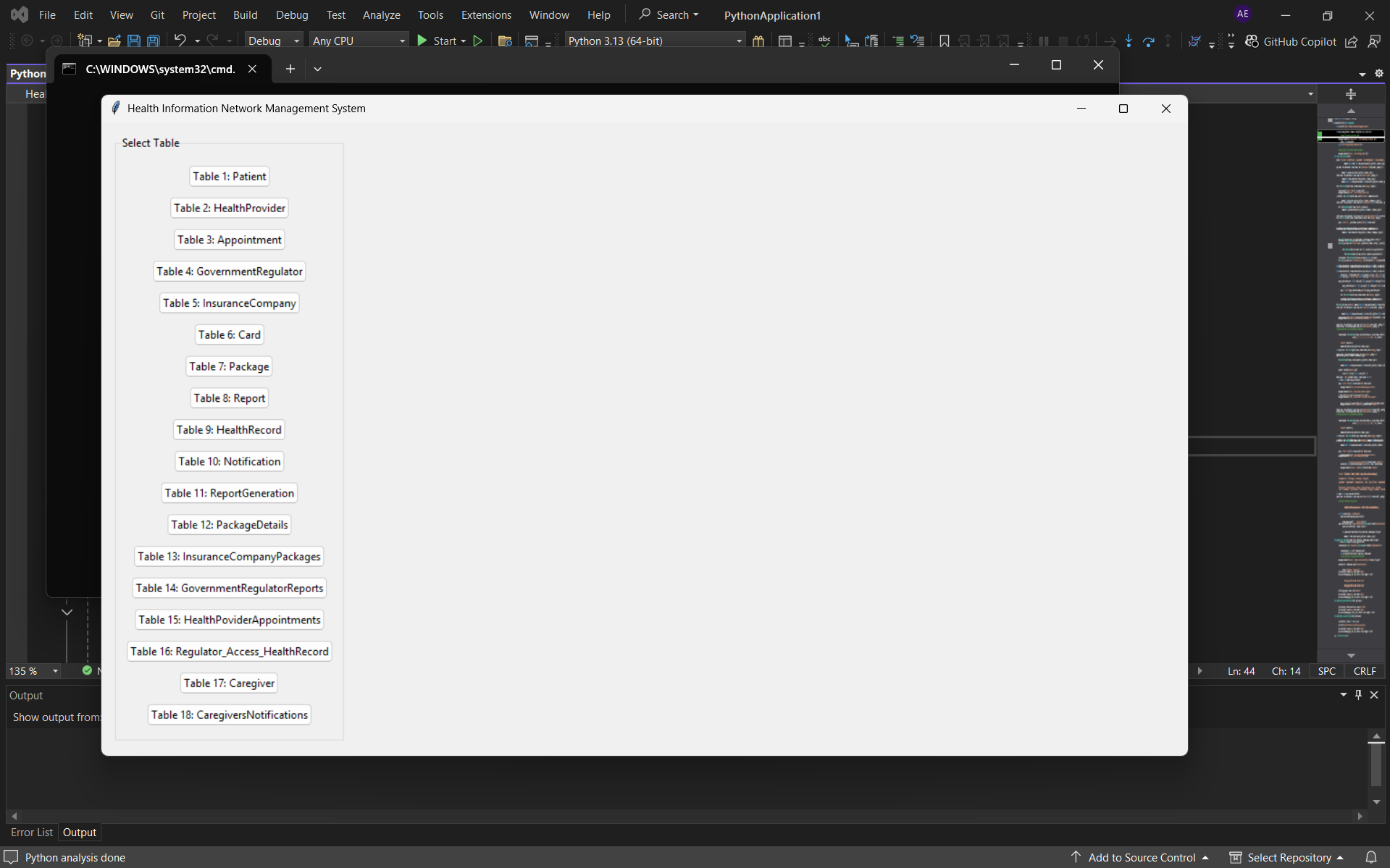
Normalization:

**BCNF**: All attributes are determined by a superkey and there are no transitive dependencies.

# Phase 5

## HIN Database Application

## Main page including all tables

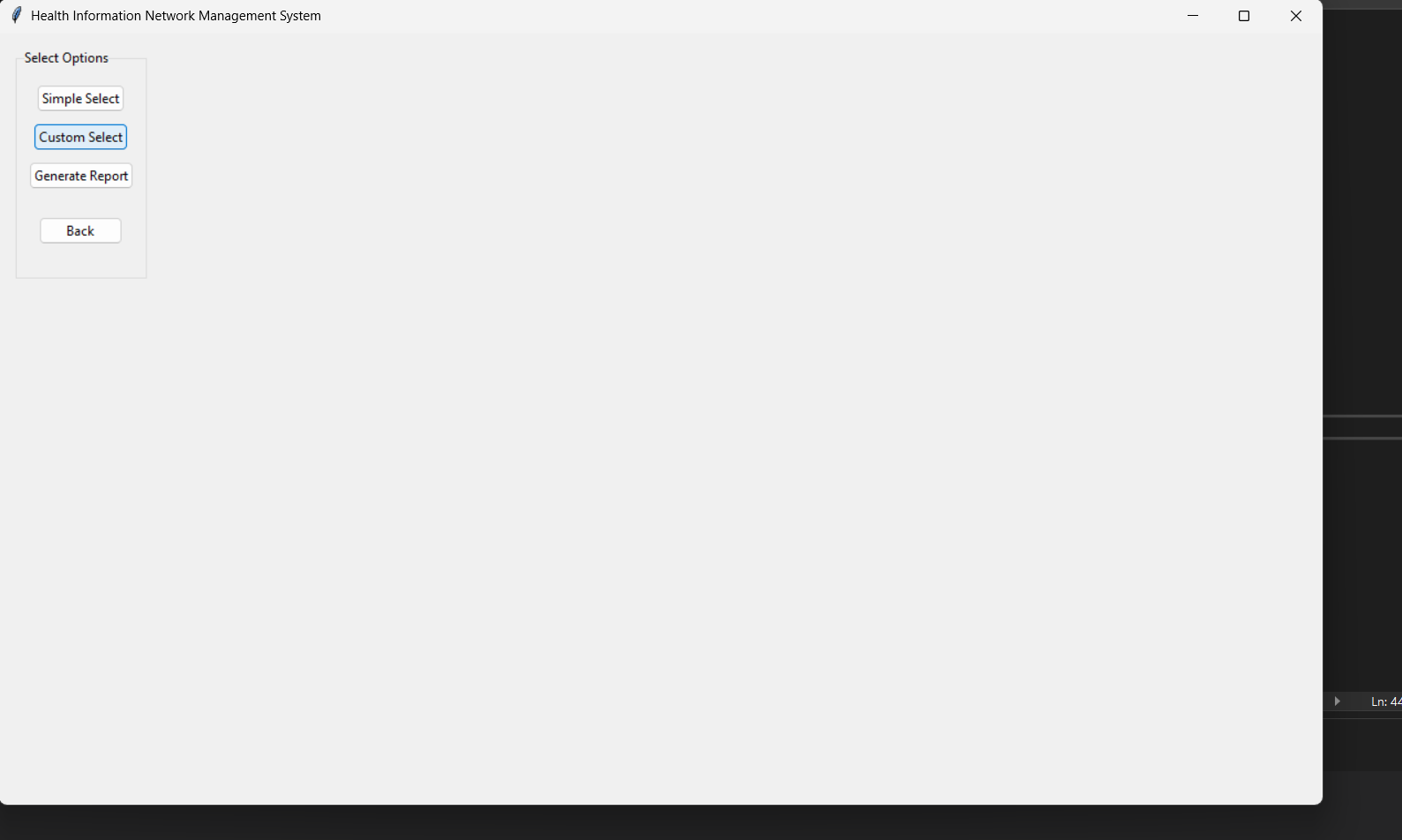


## Example of operations made for each table

A screenshot of a computer

Description automatically generated

## Select options



## Inserting data into tables

A screenshot of a computer

Description automatically generated

## Updating Data

A screenshot of a computer

Description automatically generated

## Deleting Data

A screenshot of a computer

Description automatically generated

## Joining tables with conditions and join types

A screenshot of a computer

Description automatically generated