Database Design for a Children's Hospital

Milestone Report 2

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EXECUTIVE SUMMARY

The following project report documents the design and development of a comprehensive database for a children's hospital, modeling a potential subset of its operations that could be implemented in production. This database system is designed from the ground up to manage critical healthcare data effectively, enabling the hospital to leverage robust data collection practices. By centralizing information, the system provides hospital administrators and stakeholders with actionable insights to support business decision-making and operational efficiency. The database models various aspects of the hospital's operations, including medical insurance, charitable contributions, guardians, financial payments, patient data, medical history, equipment usage, visits, and residencies. These elements are vital to ensuring that hospital workflows are accurate and well-documented.

The project scope intentionally excludes several areas to maintain focus on essential operations. Out-of-scope elements include medications, physical spaces within the hospital, hospital staff, non-healthcare services such as parking and cafeteria management, and outpatient services. By narrowing the scope, the project aims to provide a precise, scalable framework for the most critical aspects of healthcare delivery within the hospital.

The development of the database followed a structured methodology, beginning with the creation of business rules and data logic to inform the conceptual design. A detailed Entity-Relationship Diagram (ERD) was produced to define the cardinality and participation of tracked entities. This conceptual design served as the foundation for building a logical ERD, a relational schema, and a referential integrity diagram, which established the tables and their interrelationships. These foundational designs ensured a clear, consistent, and comprehensive representation of the hospital's data structure.

Subsequently, over five hundred lines of SQL commands were executed to create and populate the database's twenty-one tables with realistic sample data. This data was carefully constructed to mimic real-world hospital operations, maintaining accurate relationships between entities such as patients, guardians, payments, and equipment usage. Once populated, the database was tested using complex, business-driven queries designed to simulate practical use cases, including financial analysis, resource tracking, and patient management. Furthermore, update and delete commands were implemented to demonstrate the database's dynamic functionality, with examples showing the impact of data manipulations before and after execution.

The database was designed not only for operational accuracy but also for adaptability. Its structure ensures scalability to accommodate future needs, such as adding new hospital services or integrating with advanced analytics tools. The system also supports compliance with healthcare regulations like HIPAA, ensuring that patient confidentiality and data security remain priorities. These features position the database as a reliable and efficient solution for modern hospital operations.

This report demonstrates the potential of the proposed database to enhance hospital operations through robust data management and insightful reporting capabilities. By integrating well-defined

business rules, scalable data architecture, and realistic testing scenarios, the project lays a strong foundation for future implementation and expansion.

(1) PROJECT STATEMENT

1.1 Overall Goals of the System

The goal of this project is to develop a comprehensive database management system for a children's hospital. The system aims to streamline critical hospital operations by managing patient appointments, medical records, financial transactions, equipment usage, and healthcare-related information. By centralizing data, the system enhances efficiency, ensures accuracy, and provides medical staff with quick access to essential data. This enables the hospital to improve patient care, reduce administrative burden, and support informed decision-making for hospital management and stakeholders.

1.2 Context and Importance of the System

A children's hospital requires a reliable database system to manage complex healthcare-related data efficiently. Paper-based or isolated systems are prone to errors, delays, and inefficiencies, which can compromise patient care. A centralized system ensures streamlined workflows, accurate recordkeeping, and enhanced data accessibility for staff. Furthermore, the database adheres to healthcare regulations such as HIPAA to ensure patient confidentiality and data security, supporting the hospital's mission of delivering high-quality, secure, and patient-centric care.

1.3 Scope of the Project

1.3.1 IN-Scope

The following features are included within the scope of this project:

- **Patient Management**: Recording patient details, including personal information, medical history, and allergies.
- **Appointment Scheduling**: Tracking patient appointments, doctor schedules, and future visits.
- **Billing**: Managing payments, insurance claims, and invoices for services provided.
- **Equipment Management**: Tracking hospital equipment usage, maintenance schedules, and vendor information.
- **Medical History**: Recording details of patient allergies, chronic conditions, and past surgeries.

1.3.2 Out-Scope

The following features are excluded from the scope of this project:

- **Non-Healthcare Services**: Management of services such as cafeteria, parking, or laundry.
- **Outpatient Services**: Only in-hospital services are addressed in this system.
- **Pharmaceutical Management**: The system does not include medication inventory or dispensing records.
- **Provider information:** This project does not include records pertaining to medical providers at the hospital location

1.4 Related systems and any open-source tools

The project leverages Oracle SQL Developer for database design and implementation. Additionally, tools such as Draw.io were used for conceptual modeling, and SQL scripts were created to generate realistic sample data. The system is designed to be interoperable with existing hospital management systems and electronic health record (EHR) platforms, ensuring seamless integration and adherence to healthcare standards.

(2) REQUIREMENTS SPECIFICATION

2.1 Data Requirements

The database system must support a wide array of data requirements for managing hospital operations. Key data requirements include:

- **Patient Information**: Tracking details such as name, date of birth, social security number, medical history, allergies, and past surgeries.
- **Residence Information**: Recording patient addresses, including street, city, state, zip code, and residence type.
- **Guardian Details**: Maintaining guardian information, such as contact details, relationship to the patient, and hours of availability.
- **Visit Information**: Capturing details of patient visits, including the date, chief complaint, total cost, and services used.
- **Service Details**: Storing a catalog of medical services, including service description, cost, and associated medical codes.
- **Equipment Management**: Logging information about hospital equipment, such as purchase date, warranty expiration, last serviced date, and vendor details.
- **Insurance Policies**: Recording insurance details, including policyholder information, policy expiration date, and insurer contact details.

- **Payments and Financial Transactions**: Tracking payment amounts, payment methods, and timestamps for each transaction.
- **Charitable Contributions**: Logging contributions from charitable organizations to patient payments.

2.2 Business Rules and Data Logic

Key business rules govern the relationships and logic within the database:

- **Patient and Residence**: Each patient must have a linked residence, and multiple patients can share the same residence.
- **Patient and Guardian**: A patient must have at least one guardian, and a guardian can manage multiple patients.
- **Patient and Visit**: Each patient can have zero or many visits, and each visit must be associated with one patient.
- **Visit and Services**: Each patient visit may include zero or many services, with service details recorded in the system.
- **Equipment Usage**: Equipment is tracked for each patient visit to monitor its usage and maintenance status.
- **Insurance and Payments**: Payments can be made by the patient, a guardian, or a charitable organization. Insurance policies are linked to a single patient's guardian.
- **Charitable Contributions**: Charitable organizations may provide funds to assist with patient bills, and these payments must be logged and traceable.
- **Referential Integrity**: All foreign keys are enforced to maintain database integrity.

2.3 Sample Output

Key screens and reports leveraging our database structure:

- A list of patients with upcoming appointments and their scheduled services.
- Reports on equipment usage and maintenance schedules.
- Summaries of financial contributions by charitable organizations.
- Screens displaying outstanding payments and linked patients.
- Detailed patient summaries, including medical history and visit details.
- A report of the top services provided, based on usage and revenue.

2.4 Other Assumptions

- **Scope Limitation:** The database only models healthcare-related operations, excluding non-medical services such as cafeteria or parking management.

- **Data Granularity:** The focus is on high-level operations, including only the essential details for patients, guardians, and medical resources.

2.5 The Software the Database was Designed in

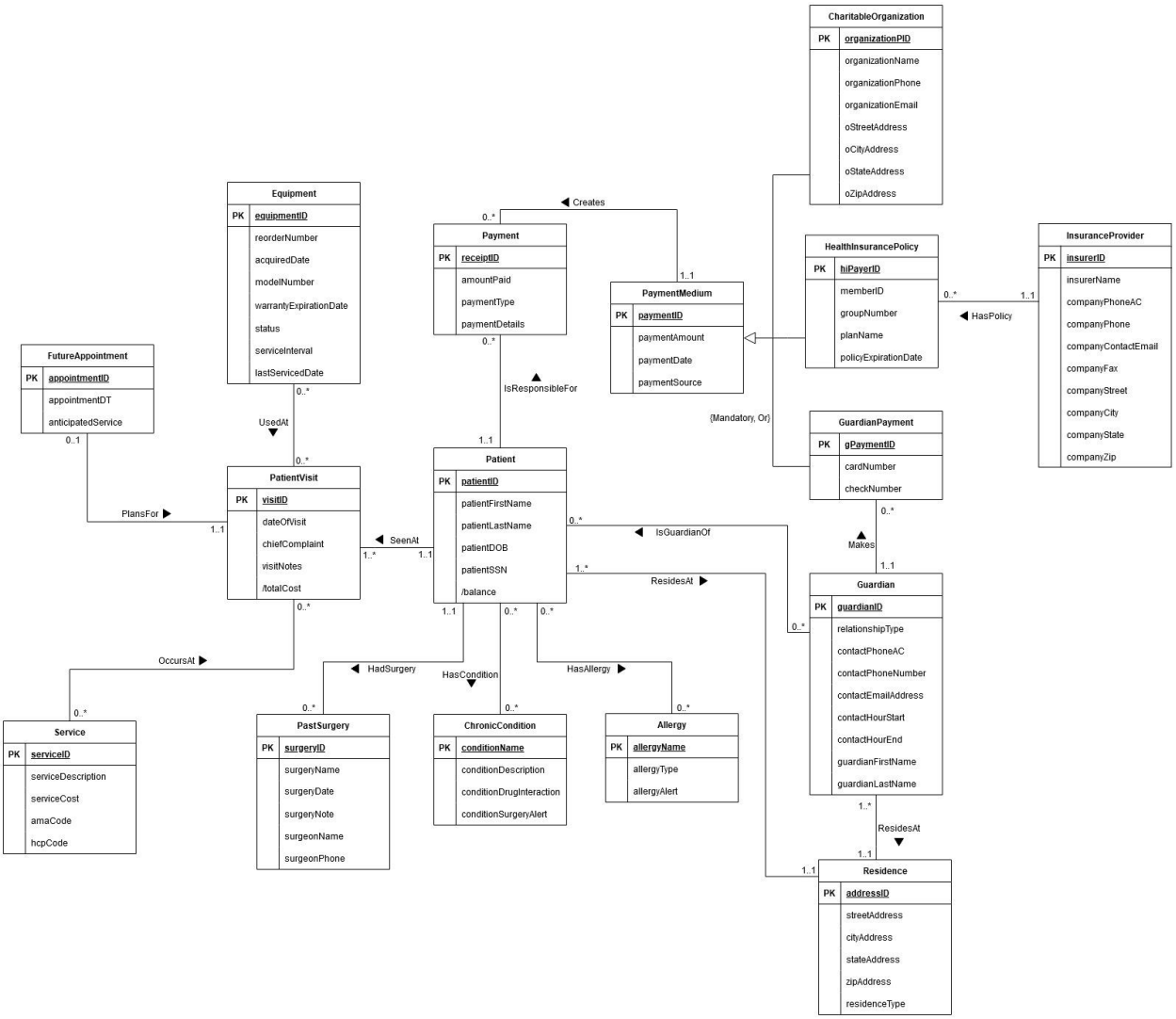
The database was designed in Oracle's LiveSQL environment, an open-source relational database management system (RDBMS). LiveSQL was chosen for its robustness, compatibility with various operating systems, and extensive support for SQL commands. The conceptual design was initially created using draw.io, a visual tool for diagramming, which helped in developing the ERD. This ERD was then converted into the logical and relational schemas to define the structure of the database. The SQL scripts for creating tables, populating data, and running queries were developed and tested using the LiveSQL Workbench. LiveSQL's support for foreign keys and referential integrity made it particularly suitable for modeling the hospital's complex relationships and constraints.

2.6 How the Fake Data was Created

Fake data was created to populate all 21 tables of our database. The goal was to create a substantial amount of data to enable meaningful queries that could simulate real world situations. The data was created using a random string generator, which then populated an Excel document. From there, Excel formulas were used to convert the data into insert commands to prepare it for database entry. A critical element of this process was ensuring the data could tell a logical story of the database usage. For example, even though random numbers were used, a patient should not have an appointment prior to their date of birth. While not actual constraints on the data from the database, these acted as logical constraints in the story of our data.

(3) CONCEPTUAL DESIGN

3.1 Conceptual model



3.2 Explanations on the ERD

The Entity-Relationship Diagram (ERD) captures the logical structure of the database for a children's hospital, organizing it into entities, attributes, relationships, and cardinalities. The core entity is Patient, which stores essential patient details, including a unique identifier, name, date of birth, and social security number. Each patient resides at an address represented by the Residence entity, which holds attributes like street address, city, state, zip code, and type of residence. This forms a one-to-many relationship where multiple patients can share a single address.

The PatientVisit entity logs all visits a patient makes to the healthcare facility, storing attributes such as the visit ID, date of visit, chief complaint, and notes. Each visit is uniquely identified and linked to one patient (one-to-many relationship). A visit can involve zero to multiple services, represented by the

ServiceAtVisit entity. The ServiceListing entity defines available services with attributes such as service ID, description, cost, and associated medical codes (AMA and HCP). Although each patient may have 0 to many services, there will be 0 to 1 corresponding service listings.

Each patient can have zero or multiple PatientCondition and PatientAllergy entries, reflecting their diagnosed conditions and known allergies. These entities map patients to the ChronicCondition and Allergy entities, which store standardized details about medical conditions and allergy types, including attributes such as severity, drug interactions, and reaction notes. The relationships ensure detailed tracking of a patient's health data.

The PastSurgery entity records a patient's surgical history, including details such as the surgery date, surgeon name, and follow-up notes. Similarly, the FutureAppointment entity schedules anticipated services for patients, linking appointments to specific patient visits. Each patient may have 0 or many past surgeries. Each patient can schedule 0 or 1 future appointments at a time.

Guardianship is managed through the Guardian entity, which holds information about individuals responsible for patients, such as contact details, relationship type, and availability hours. The Guardianship associative entity connects guardians to patients in a one-to-many relationship.

Financial data is managed through entities like HealthInsurancePolicy, GuardianPayment, and CharitableOrganization. The Payment entity is tied to all 3 of these entities and tracks payments made by or on behalf of patients, including attributes such as amount, type, and payment details. It connects to the PaymentMedium entity, which categorizes the source of payment as mentioned.

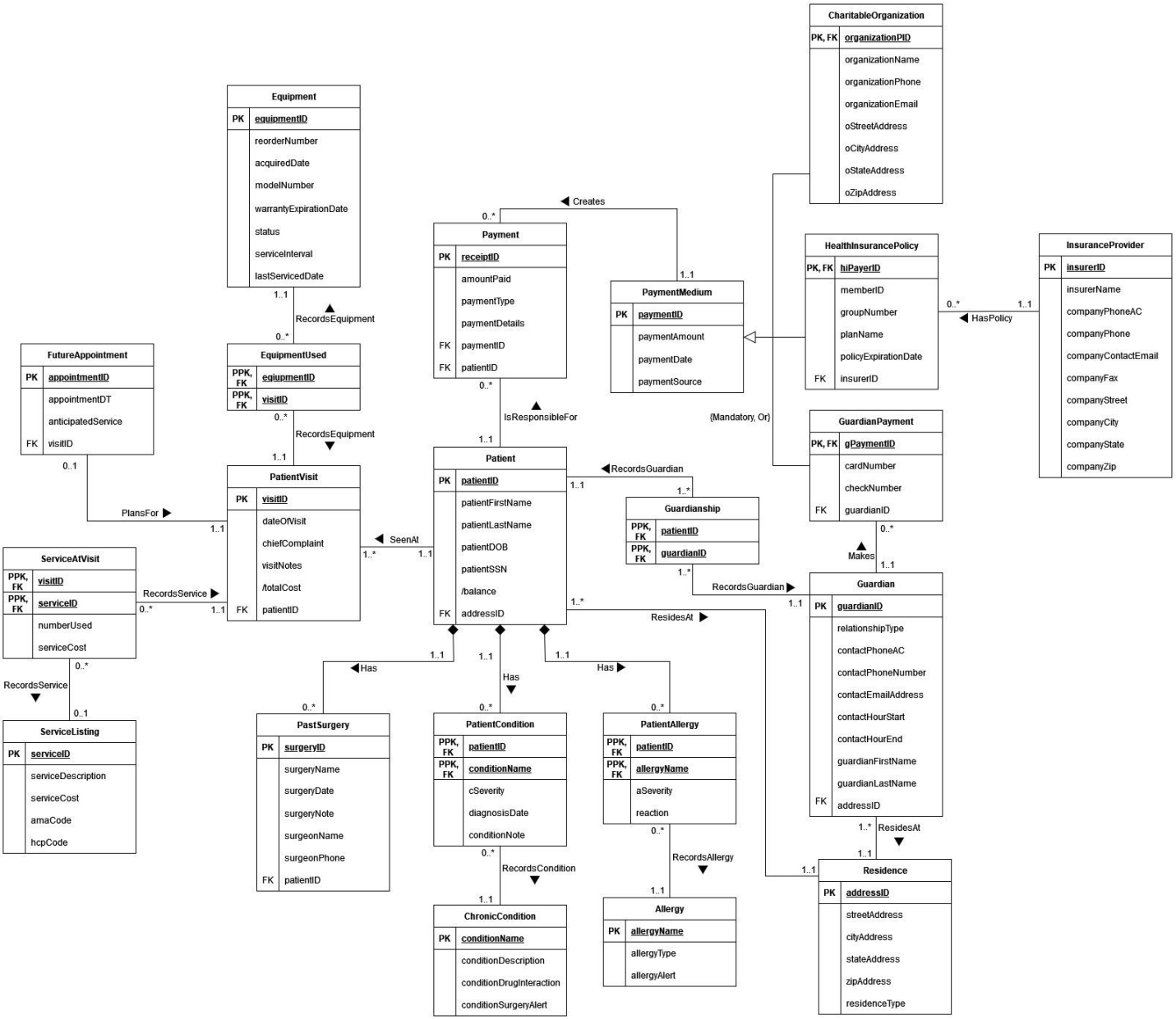
Insurance data is captured through HealthInsurancePolicy, which links patients to their policies and insurers. The InsuranceProvider entity stores insurer details, including contact information and addresses. Each insurance policy is associated with one insurer, but a patient can have zero or multiple policies, creating a zero-to-many relationship between HealthInsurancePolicy and InsuranceProvider.

Entities such as Equipment and EquipmentUsed are used to manage medical devices. The Equipment entity records attributes like model number, and last serviced date. Through the EquipmentUsed associative entity, equipment is linked to specific patient visits, establishing a zero-to-many relationship between EquipmentUsed and PatientVisit.

This ERD provides a comprehensive framework for managing patient care, financial transactions, and operational resources within a healthcare system. Its design supports scalability and detailed recordkeeping, ensuring the system can handle complex workflows while maintaining data integrity.

(4) RELATIONAL SCHEMA

4.1 Logical ERD



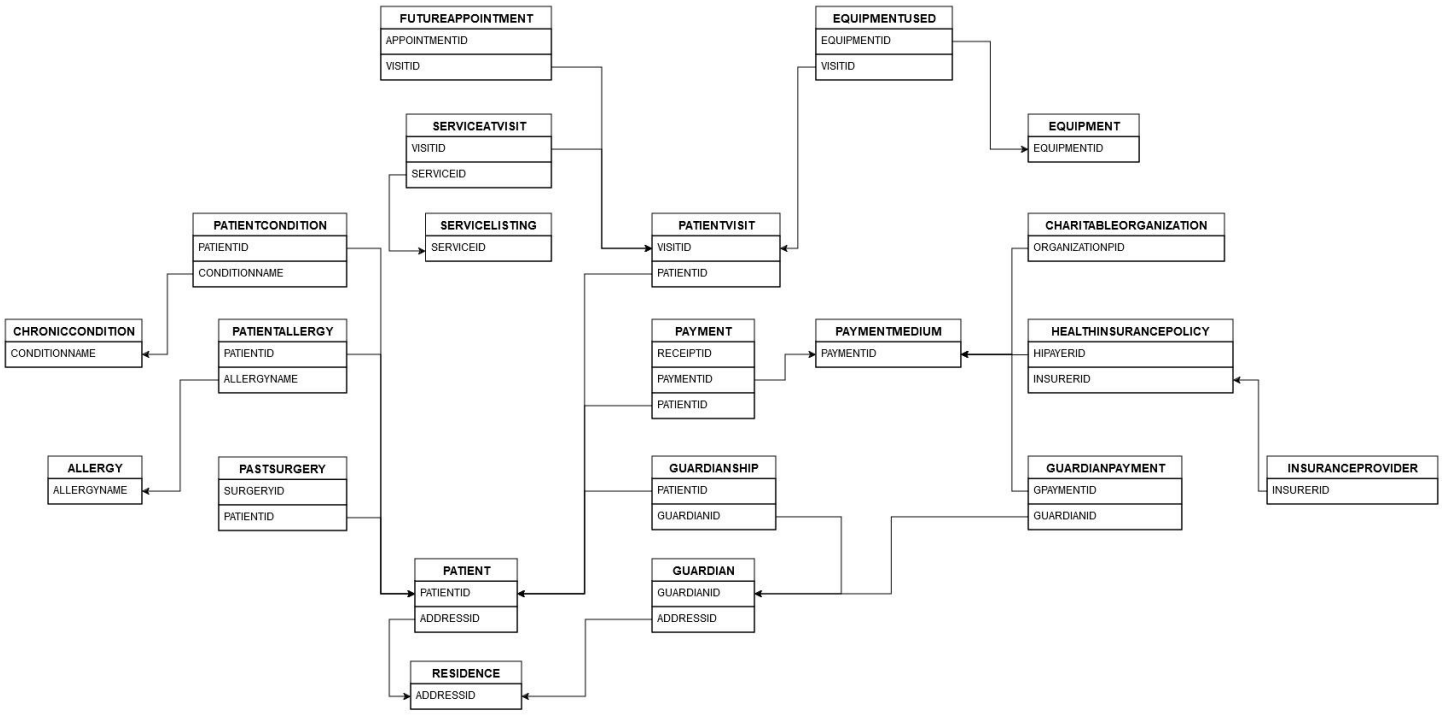
4.2 Relational Schema

Alphabetical List of Relational Schemas

Relation	Schema
Allergy	• **Allergy** (allergyName, allergyType, allergyAlert)
CharitableOrganization	• **CharitableOrganization** (organizationPID, organizationName, organizationPhone, organizationEmail, oStreetAddress, oCityAddress, oStateAddress, oZipAddress) o Foreign key **organizationPID** references **PaymentMedium** (**paymentID**)
ChronicCondition	• **ChronicCondition** (conditionName, conditionDescription, conditionDrugInteraction, conditionSurgeryAlert)
Equipment	• **Equipment** (equipmentID, reorderNumber, acquiredDate, modelNumber, warrantyExpirationDate, status, serviceInterval, lastServicedDate)
EquipmentUsed	• **EquipmentUsed** (equipmentID, visitID) o Foreign key **equipmentID** references **Equipment** (**equipmentID**) o Foreign key **visitID** references **PatientVisit** (**visitID**)
FutureAppointment	• **FutureAppointment** (appointmentID, appointmentDT, anticipatedService, visitID) o Foreign key **visitID** references **PatientVisit** (**visitID**)
Guardian	• **Guardian** (guardianID, relationshipType, contactPhoneAC, contactPhoneNumber, contactEmailAddress, contactHourStart, contactHourEnd, guardianFirstName, guardianLastName, addressID) o Foreign key **addressID** references **Residence** (**addressID**)
GuardianPayment	• **GuardianPayment** (gPaymentID, cardNumber, checkNumber, guardianID) o Foreign key **gPaymentID** references **PaymentMedium** (**paymentID**) o Foreign key **guardianID** references **Guardian** (**guardianID**)
Guardianship	• **Guardianship** (patientID, guardianID) o Foreign key **patientID** references **Patient** (**patientID**) o Foreign key **guardianID** references **Guardian** (**guardianID**)
HealthInsurancePolicy	• **HealthInsurancePolicy** (hiPayerID, memberID, groupNumber, planName, policyExpirationDate, insurerID) o Foreign key **hiPayerID** references **PaymentMedium** (**paymentID**) o Foreign key **insurerID** references **InsuranceProvider (insurerID)**

InsuranceProvider	• **InsuranceProvider** (insurerID, insurerName, companyPhoneAC, companyPhone, companyContactEmail, companyFax, companyStreet, companyCity, companyState, companyZip)
PastSurgery	• **PastSurgery** (surgeryID, surgeryName, surgeryDate, surgeryNote, surgeonName, surgeonPhone, patientID) o Foreign key **patientID** references **Patient** (**patientID**)
Patient	• **Patient** (patientID, patientFirstName, patientLastName, patientDOB, patientSSN, /balance, addressID) o Foreign key **addressID** references **Residence** (**addressID**)
PatientAllergy	• **PatientAllergy** (patientID, allergyName, aSeverity, reaction) o Foreign key **patientID** references **Patient** (**patientID**) o Foreign key **allergyName** references **Allergy** (**allergyName**)
PatientCondition	• **PatientCondition** (patientID, conditionName, cSeverity, diagnosisDate, conditionNote) o Foreign key **patientID** references **Patient** (**patientID**) o Foreign key **conditionName** references **ChronicCondition** (**conditionName**)
PatientVisit	• **PatientVisit** (visitID, dateofVisit, chiefComplaint, visitNotes, /totalcost, patientID) o Foreign key **patientID** references **Patient** (**patientID**)
Payment	• **Payment** (receiptID, amountPaid, paymentType, paymentDetails, paymentID, patientID) o Foreign key **paymentID** references **PaymentMedium** (**paymentID**) o Foreign key **patientID** references **Patient** (**patientID**)
PaymentMedium	• **PaymentMedium** (paymentID, paymentAmount, paymentDate, paymentSource)
Residence	• **Residence** (addressID, streetAddress, cityAddress, stateAddress, zipAddress, residenceType)
ServiceAtVisit	• **ServiceAtVisit** (visitID, serviceID, numberUsed, serviceCost) o Foreign key **visitID** references **PatientVisit** (**visitID**) o Foreign key **serviceID** references **ServiceListing** (**serviceID**)
ServiceListing	• **ServiceListing** (serviceID, serviceDescription, serviceCost, amaCode, hcpCode)

4.3 Referential Integrity Diagram



(5) DATA DICTIONARY

INSURANCEPROVIDER

INSURERID	NOT NULL	VARCHAR2(4)	Primary Key
INSURERNAME	NOT NULL, UNIQUE	VARCHAR2(20)	Name of insurance company
COMPANYPHONEAC	-	CHAR(3)	Area code
COMPANYPHONE	-	CHAR(7)	Phone number (without area code)
COMPANYCONTACTEMAIL	-	VARCHAR2(20)	Email address for contact person
COMPANYFAX	-	CHAR(10)	Fax number
COMPANYSTREET	-	VARCHAR2(30)	Street address
COMPANYCITY	-	VARCHAR2(15)	City
COMPANYSTATE	-	CHAR(2)	State abbreviation
COMPANYZIP	-	CHAR(5)	5-digit ZIP Code

RESIDENCE

ADDRESSID	NOT NULL	VARCHAR2(6)	Primary Key
STREETADDRESS	-	VARCHAR2(30)	Street address
CITYADDRESS	-	VARCHAR2(15)	City
STATEADDRESS	-	CHAR(2)	State abbreviation

ZIPADDRESS	-	CHAR(5)	5-digit ZIP Code
RESIDENCETYPE	CHECK	VARCHAR2(10)	Valid residence types include: 'permanent', 'temporary', 'transient'

ALLERGY

ALLERGYNAME	NOT NULL	VARCHAR2(20)	Name of the allergy and Primary Key
ALLERGYTYPE	-	VARCHAR2(20)	Major class of allergy
ALLERGYALERT	-	VARCHAR2(40)	Allergy alerts for the patient's treatment

CHRONICCONDITION

CONDITIONNAME	NOT NULL	VARCHAR2(20)	Name of the condition and Primary Key
CONDITIONDESCRIPTION	-	VARCHAR2(60)	A longer description of the condition
CONDITIONDRUGINTERACTION	-	VARCHAR2(30)	Any serious drug interactions with the condition
CONDITIONSURGERYALERT	-	VARCHAR2(60)	Condition alerts for the patient's treatment

SERVICELISTING

SERVICEID	NOT NULL	VARCHAR2(6)	Primary Key
SERVICEDESCRIPTION	-	VARCHAR2(40)	Description of medical service
SERVICECOST	NOT NULL	NUMBER(7,2)	Cost of medical service
AMACODE	UNIQUE	VARCHAR2(3)	American Medical Association code
HCPCODE	UNIQUE	VARCHAR2(3)	Healthcare Common Procedure code

EQUIPMENT

EQUIPMENTID	NOT NULL	VARCHAR2(10)	Primary Key
REORDERNUMBER	-	VARCHAR2(5)	Reorder number for equipment
ACQUIREDDATE	-	DATE	Date the equipment was acquired at the hospital
MODELNUMBER	-	VARCHAR2(5)	Equipment model number
WARRANTYEXPIRATIONDATE	-	DATE	Date of warranty expiration
STATUS	CHECK	VARCHAR2(11)	Valid status types include: 'service', 'maintenance', 'repair', 'storage', 'disposed'
SERVICEINTERVAL	-	NUMBER(4,0)	Recommended interval for equipment maintenance
LASTSERVICEDDATE	-	DATE	Date of equipment's last maintenance

PAYMENTMEDIUM

PAYMENTID	NOT NULL	VARCHAR2(12)	Primary Key
PAYMENTAMOUNT	-	NUMBER(8,2)	Amount that was paid towards services rendered
PAYMENTDATE	-	DATE	Date of payment
PAYMENTSOURCE	CHECK	CHAR(1)	Valid payment source includes: 'g', 'i', 'c', 'o'

PATIENT

PATIENTID	NOT NULL	VARCHAR2(10)	Primary Key
PATIENTFIRSTNAME	-	VARCHAR2(20)	First name
PATIENTLASTNAME	-	VARCHAR2(20)	Last name
PATIENTDOB	-	DATE	Date of birth
PATIENTSSN	NOT NULL, UNIQUE	CHAR(9)	Social security number
ADDRESSID	-	VARCHAR2(6)	Patient's residence PK

GUARDIAN

GUARDIANID	NOT NULL	VARCHAR2(10)	Primary Key
RELATIONSHIPTYPE	-	VARCHAR2(15)	Relationship to patient
CONTACTPHONEAC	-	CHAR(3)	Phone area code
CONTACTPHONENUMBER	-	VARCHAR2(10)	Phone number (excluding area code)
CONTACTEMAILADDRESS	-	VARCHAR2(20)	Guardian's email address
CONTACTHOURSTART	-	CHAR(5)	Start of preferred contact hours (e.g. 12:30, 19:45)
CONTACTHOUREND	-	CHAR(5)	End of preferred contact hours (e.g. 16:00, 22:30)
GUARDIANFIRSTNAME	-	VARCHAR2(20)	Guardian's first name
GUARDIANLASTNAME	-	VARCHAR2(20)	Guardian's last name
ADDRESSID	-	VARCHAR2(6)	Guardian's residence PK

HEALTHINSURANCEPOLICY

HIPAYERID	NOT NULL	VARCHAR2(12)	Primary Key
MEMBERID	NOT NULL, UNIQUE	VARCHAR2(10)	Policy member number
GROUPNUMBER	-	VARCHAR2(9)	Policy group number
PLANNAME	-	VARCHAR2(15)	Name of health insurance plan
POLICYEXPIRATIONDATE	-	DATE	Expiration date of health insurance plan
INSURERID	-	VARCHAR2(4)	Insurance provider's PK

CHARITABLEORGANIZATION

ORGANIZATIONPID	NOT NULL	VARCHAR2(12)	Primary Key
ORGANIZATIONNAME	UNIQUE	VARCHAR2(20)	Name of charity
ORGANIZATIONPHONE	-	CHAR(10)	Contact phone number (including area code)
ORGANIZATIONEMAIL	-	VARCHAR2(20)	Email address of charity
OSTREETADDRESS	-	VARCHAR2(30)	Street address
OCITYADDRESS	-	VARCHAR2(15)	City
OSTATEADDRESS	-	CHAR(2)	State abbreviation
OZIPADDRESS	-	CHAR(5)	5-digit ZIP Code

GUARDIANPAYMENT

GPAYMENTID	NOT NULL	VARCHAR2(12)	Primary Key
CARDNUMBER	-	VARCHAR2(20)	Card number (if used)
CHECKNUMBER	-	VARCHAR2(20)	Check number (if used)
GUARDIANID	-	VARCHAR2(10)	Guardian's PK

PAYMENT

RECEIPTID	NOT NULL	VARCHAR2(16)	Primary Key
AMOUNTPAID	-	NUMBER(8,2)	Amount paid
PAYMENTTYPE	CHECK	VARCHAR2(10)	Valid type of payment includes: 'check', 'cash', 'credit', 'transfer', 'debit'
PAYMENTDETAILS	-	VARCHAR2(30)	Additional information about the payment
PAYMENTID	-	VARCHAR2(12)	Payment Medium's PK
PATIENTID	-	VARCHAR2(10)	Patient's PK

GUARDIANSHIP

PATIENTID	NOT NULL	VARCHAR2(10)	Partial Primary Key
GUARDIANID	NOT NULL	VARCHAR2(10)	Partial Primary Key

PATIENTALLERGY

PATIENTID	NOT NULL	VARCHAR2(10)	Partial Primary Key
ALLERGYNAME	NOT NULL	VARCHAR2(20)	Partial Primary Key
ASEVERITY	CHECK	VARCHAR2(20)	Valid severity includes: 'undetectable', 'mild', 'moderate', 'severe', 'life-threatening'
REACTION	-	VARCHAR2(25)	Allergic reaction (e.g. hives, anaphylaxis)

PATIENTCONDITION

PATIENTID	NOT NULL	VARCHAR2(10)	Partial Primary Key
CONDITIONNAME	NOT NULL	VARCHAR2(20)	Partial Primary Key
CSEVERITY	CHECK	VARCHAR2(20)	Valid severity includes: 'undetectable', 'mild', 'moderate', 'severe', 'life-threatening'
DIAGNOSISDATE	-	DATE	Date of condition diagnosis
CONDITIONNOTE	-	VARCHAR2(50)	Notes about condition

PATIENTVISIT

VISITID	NOT NULL	VARCHAR2(16)	Primary Key
DATEOFVISIT	-	DATE	Date of the visit
CHIEFCOMPLAINT	-	VARCHAR2(40)	Patient's chief complaint
VISITNOTES	-	VARCHAR2(80)	Notes on the visit
PATIENTID	-	VARCHAR2(10)	Patient's PK

PASTSURGERY

SURGERYID	NOT NULL	VARCHAR2(12)	Primary Key
SURGERYNAME	-	VARCHAR2(30)	Name of surgery
SURGERYDATE	-	DATE	Date of surgery
SURGERYNOTE	-	VARCHAR2(80)	Surgeon's notes
SURGEONNAME	-	VARCHAR2(40)	Name of surgeon
SURGEONPHONE	-	VARCHAR2(15)	Surgeon's phone (including area code)
PATIENTID	-	VARCHAR2(10	Patient's PK

EQUIPMENTUSED

EQUIPMENTID	NOT NULL	VARCHAR2(10)	Partial Primary Key
VISITID	NOT NULL	VARCHAR2(16)	Partial Primary Key

FUTUREAPPOINTMENT

APPOINTMENTID	NOT NULL	VARCHAR2(16)	Primary Key
APPOINTMENTDT	NOT NULL	DATE	Datetime of appointment
ANTICIPATEDSERVICE	-	VARCHAR2(40)	Anticipated service at appointment
VISITID	-	VARCHAR2(16)	Patient Visit's PK

SERVICEATVISIT

VISITID	NOT NULL	VARCHAR2(16)	Partial Primary Key
SERVICEID	NOT NULL	VARCHAR2(6)	Partial Primary Key
NUMBERUSED	-	NUMBER(3,0)	Number of a particular service used
SERVICECOST	-	NUMBER(8,2)	Cost of the service

(6) DATABASE IMPLEMENTATION

6.1 CREATE TABLE Commands (in separate .SQL file)

(7) DATA

7.1 INSERT INTO Commands (in separate .SQL file)

7.2 Data from SELECT * QUERIES (in separate MS Word file)

(8) DATA QUERIES

8.1 Queries by Astrid Ellis

8.2 Queries by David Gorski

1. ***Display the first name and last name of the patient, the first and last name of their guardian and the full contact phone number of their guardian for any patients who have an outstanding balance.***

```
SELECT (Patient.patientFirstName || ' ' || Patient.patientLastName) AS patient_full_name,
(Guardian.guardianFirstName || ' ' || Guardian.guardianLastName) AS guardian_full_name,
(Guardian.contactPhoneAC || Guardian.contactPhoneNumber) AS phone_number,
(SUM(ServiceAtVisit.numberUsed * ServiceAtVisit.serviceCost)  - (SUM(amountPaid))) AS outstanding_balance

FROM Guardian
JOIN Guardianship ON Guardian.guardianID = Guardianship.guardianID
JOIN Patient ON Guardianship.patientID = Patient.patientID
JOIN Payment ON Patient.patientID = Payment.patientID
JOIN PatientVisit ON Patient.patientID = PatientVisit.patientID
JOIN ServiceAtVisit ON PatientVisit.visitID = ServiceAtVisit.visitID
```

```
GROUP BY patient.patientFirstName, Patient.patientLastName, Guardian.contactPhoneAC,
Guardian.contactPhoneNumber, Guardian.guardianFirstName, guardian.guardianLastName

HAVING (SUM(ServiceAtVisit.numberUsed * ServiceAtVisit.serviceCost)  - (SUM(amountPaid))) > 0;
```

PATIENT_FULL_NAME	GUARDIAN_FULL_NAME	PHONE_NUMBER	OUTSTANDING_BALANCE
Morganica Vedenyapin	Conrad Livock	1179123816	463585.39
Kristopher Hauxley	Randolph Raven	1116960014	934521.94
Bekki Lemary	Martina Gribbell	8521924452	58635.08
Joshuah Roscow	Felipa Cobson	2329462265	4134.37
Clement Goreisr	Birgit De Hailes	7255211944	151678.46
Lee Rignall	Tanney Pacquet	5429605216	319164.75
Hermann Bewicke	Damita Bains	3539327770	299056.32
Quill Voak	Robin Eliot	4052060167	534610.87

Download CSV

8 rows selected.

2. ***We need to mail out letters to patients to ensure that they were not injured by equipment that was in disrepair. Show all the patients (and their full addresses) who have had visits at the hospital in which the equipment used was listed as in service when it should have been receiving maintenance. Also show the ID numbers of the equipment so it can be repaired.***

```
SELECT Patient.patientFirstName AS first_name,
Patient.patientLastName AS lastName,
Residence.streetAddress,
Residence.stateAddress,
Residence.zipAddress,
```

```
Equipment.equipmentID

FROM Patient
JOIN Residence ON Patient.addressID = Residence.addressID
JOIN PatientVisit ON Patient.patientID = PatientVisit.patientID
JOIN EquipmentUsed ON PatientVisit.visitID = EquipmentUsed.visitID
JOIN Equipment ON EquipmentUsed.equipmentID = Equipment.equipmentID

WHERE (patientVisit.dateOfVisit > (Equipment.lastServicedDate + Equipment.ServiceInterval))
AND Equipment.status = 'service'

ORDER BY Patient.patientFirstName, Patient.patientLastName;
```

FIRST_NAME	LASTNAME	STREETADDRESS	STATEADDRESS	ZIPADDRESS	EQUIPMENTID
Bekki	Lemary	29087 Eggendart Circle	ID	18230	6
Caroline	Windress	209 Almo Parkway	CA	19930	1
Florina	McArt	483 Hauk Circle	TX	51302	15

Download CSV

3 rows selected.

3. ***St. Jude, one of the charitable organizations with which we work, needs some financial information for an upcoming marketing campaign. For each patient in 2023 on which they spent at least $200, they would like to know the total amount spent on the patient and the patient's first name.***

```
SELECT SUM(PaymentMedium.paymentAmount) as total_paid_for_patient,
Patient.patientFirstName

FROM CharitableOrganization
JOIN PaymentMedium ON CharitableOrganization.organizationPID = PaymentMedium.paymentID
JOIN Payment ON PaymentMedium.paymentID = Payment.paymentID
JOIN Patient ON Payment.patientID = Patient.patientID

WHERE CharitableOrganization.organizationName = 'St. Jude'
AND PaymentMedium.paymentDate BETWEEN '01-JAN-2023' AND '31-DEC-2023'

GROUP BY Patient.patientFirstName
```

```
HAVING SUM(PaymentMedium.paymentAmount) >= 200
ORDER BY Patient.patientFirstName;
```

TOTAL_PAID_FOR_PATIENT	PATIENTFIRSTNAME
294937.28	Caroline

Download CSV

8.3 Queries by Josh Hoffman

1. The hospital has been accused of malpractice for not taking into account patient allergies in surgery prep. Show all of the surgeries performed on patients with allergies from 2010 to 2015, what kind of allergy the patient had, and the number of surgeries per kind of allergy.

```
SELECT PastSurgery.surgeryName AS surgery, PatientAllergy.allergyName AS allergy, PastSurgery.surgeryDate,

COUNT(PastSurgery.surgeryID) AS num_surgeries

FROM PatientAllergy

JOIN Patient ON PatientAllergy.patientID = Patient.patientID

JOIN PastSurgery ON Patient.patientID = PastSurgery.patientID

WHERE pastSurgery.surgeryDate BETWEEN '01-JAN-2010' AND '31-DEC-2015'

GROUP BY PastSurgery.surgeryName, PatientAllergy.allergyName, PastSurgery.surgeryDate
```

SURGERY	ALLERGY	SURGERYDATE	NUM_SURGERIES
Angioplasty	Insect	19-JUL-12	1
Bronchotomy	Mold	08-SEP-13	1
Pneumonectomy	Pet	06-FEB-14	1

Download CSV

3 rows selected.

2. Keeping on top of scheduling appointments is a vital part of ensuring your patients receive the medical care they need. To aid administrative staff in finding the patients who might have slipped through the cracks, show the patients who have visited the hospital but do not yet have a future appointment booked. These patients would then be called to book an appointment.

```
SELECT P.PATIENTFIRSTNAME as "Patient First Name", P.PATIENTLASTNAME as "Patient Last Nane",
G.CONTACTPHONEAC as "Area Code", G.CONTACTPHONENUMBER as "Phone Number", FA.APPOINTMENTDT
as "Appointment Date"
FROM PATIENT P
JOIN PATIENTVISIT PV ON P.PATIENTID = PV.PATIENTID
JOIN GUARDIANSHIP GS ON P.PATIENTID = GS.PATIENTID
JOIN GUARDIAN G ON GS.GUARDIANID = G.GUARDIANID
LEFT JOIN FUTUREAPPOINTMENT FA ON PV.VISITID = FA.VISITID
WHERE (FA.APPOINTMENTDT <= SYSDATE OR FA.APPOINTMENTDT IS NULL)
```

Patient First Name	Patient Last Nane	Area Code	Phone Number	Appointment Date
Benedict	Klimko	506	1526574	-
Florina	McArt	901	7351093	-
Devonne	Saggs	664	9823711	-
Kristopher	Hauxley	111	6960014	-
Morganica	Vedenyapin	117	9123816	-
Currey	Soldan	418	7853837	-
Quill	Voak	405	2060167	-

Download CSV

7 rows selected.

3. The hospital is considering expanding staff who provide medical services but wants to ensure they add positions where it will have the most impact. They want to evaluate which services are being used the most and add more positions for those departments. Rank the services used and how many times they have been used.

```
SELECT SL.SERVICEDESCRIPTION as "Service Used", SUM(SV.numberUsed) as "Number Of Uses"
FROM SERVICELISTING SL
JOIN SERVICEATVISIT SV ON SL.SERVICEID = SV.SERVICEID
JOIN PATIENTVISIT PV ON SV.VISITID = PV.VISITID
JOIN PATIENT P ON PV.PATIENTID = P.PATIENTID
GROUP BY SL.SERVICEDESCRIPTION
ORDER BY (SUM(SV.numberUsed)) DESC
```

Service Used	Number Of Uses
Supplies	23
Medicine	16
Operation	16

Download CSV

3 rows selected.

8.4 Queries by Steven Sullivan

1. **Total Service Costs for Patients with Allergies:**
Display the first name and last name of patients, their allergy details, and the total service cost incurred by each patient.

```
SELECT
  Patient.patientFirstName || ' ' || Patient.patientLastName AS patient_full_name,
  Allergy.allergyName AS allergy_name,
  SUM(ServiceAtVisit.numberUsed * ServiceAtVisit.serviceCost) AS total_service_cost
FROM
  Patient
JOIN
  PatientAllergy ON Patient.patientID = PatientAllergy.patientID
JOIN
  Allergy ON PatientAllergy.allergyName = Allergy.allergyName
JOIN
  PatientVisit ON Patient.patientID = PatientVisit.patientID
JOIN
  ServiceAtVisit ON PatientVisit.visitID = ServiceAtVisit.visitID
GROUP BY
  Patient.patientFirstName, Patient.patientLastName, Allergy.allergyName
HAVING
  SUM(ServiceAtVisit.numberUsed * ServiceAtVisit.serviceCost) > 0
ORDER BY
  total_service_cost DESC;
```

```
/* 1. Total Service Costs for Patients with Allergies:
    Display the first name and last name of patients, their allergy details,
    and the total service cost incurred by each patient during visits where
    they required medical attention for their allergies. */

SELECT
    Patient.patientFirstName || ' ' || Patient.patientLastName AS patient_full_name,
    Allergy.allergyName AS allergy_name,
    SUM(ServiceAtVisit.numberUsed * ServiceAtVisit.serviceCost) AS total_service_cost
FROM
    Patient
JOIN
    PatientAllergy ON Patient.patientID = PatientAllergy.patientID
JOIN
```

PROBLEMS OUTPUT DEBUG CONSOLE PORTS QUERY RESULT SCRIPT OUTPUT SQL HISTORY TASK MONITOR

All rows fetched: 12 in 0.039 seconds

	PATIENT_FULL_NAME	ALLERGY_NAME	TOTAL_SERVICE_COST
1	Kristopher Hauxley	Drug	754364.96
2	Quill Voak	Pollen	635827.68
3	Hermann Bewicke	Mold	415220.31
4	Morganica Vedenyapin	Insect	402189.12
5	Clement Goreisr	Drug	180966.08
6	Aloysius Mailey	Pet	146760.48
7	Joshuah Roscow	Food	67262.85
8	Benedict Klimko	Pollen	55685.07
9	Currey Soldan	Pet	52065.12
10	Ali Casterton	Insect	34679.43
11	Florina McArt	Latex	28850.49
12	Devonne Saggs	Food	14894.12

2. Total Healthcare Expenditure by City:

Identify and display the total healthcare expenditure incurred by patients grouped by their city of residence. This query helps to analyze healthcare costs at the community level, showcasing which cities contribute the most to healthcare spending.

```
SELECT Residence.cityAddress AS city,
    SUM(ServiceAtVisit.numberUsed * ServiceAtVisit.serviceCost) AS total_expenditure
FROM Patient
JOIN Residence ON Patient.addressID = Residence.addressID
JOIN PatientVisit ON Patient.patientID = PatientVisit.patientID
JOIN ServiceAtVisit ON PatientVisit.visitID = ServiceAtVisit.visitID
GROUP BY Residence.cityAddress
ORDER BY total_expenditure DESC;
```

```
1209  -- Q2
1210  /* Total Healthcare Expenditure by City
1211  Identify and display the total healthcare expenditure incurred by patients grouped
1212  by their city of residence. This query helps to analyze healthcare costs at the community level,
```

PROBLEMS OUTPUT DEBUG CONSOLE PORTS QUERY RESULT SCRIPT OUTPUT SQL HISTORY TASK MONITOR

All rows fetched: 20 in 0.031 seconds

	CITY	TOTAL_EXPENDITURE
1	Atlanta	754364.96
2	Baltimore	635827.68
3	Oklahoma City	415220.31
4	Las Vegas	415166.56
5	Saint Paul	402189.12
6	Boise	284479.47
7	Philadelphia	180966.08
8	Salt Lake City	174055.36
9	Santa Barbara	160347.92
10	Minneapolis	146760.48
11	Pasadena	140807.08
12	Des Moines	67262.85
13	Pittsburgh	55685.07
14	Phoenix	52065.12
15	San Francisco	46489.19
16	Irvine	41637.69
17	Honolulu	34679.43
18	Austin	28850.49
19	Madison	17079
20	San Antonio	14894.12

3. Total Healthcare Expenditure by Guardians

This query calculates the total healthcare expenditure incurred by each guardian's associated patients across all their visits. It displays the guardian's full name and the total costs of services consumed by their linked patients, ordered by expenditure from highest to lowest. This is useful for analyzing the financial responsibility of guardians in the system.

```
SELECT
  (Guardian.guardianFirstName || ' ' || Guardian.guardianLastName) AS guardian_full_name,
  SUM(ServiceAtVisit.numberUsed * ServiceAtVisit.serviceCost) AS total_expenditure
FROM Guardian
JOIN Guardianship ON Guardian.guardianID = Guardianship.guardianID
JOIN Patient ON Guardianship.patientID = Patient.patientID
JOIN PatientVisit ON Patient.patientID = PatientVisit.patientID
JOIN ServiceAtVisit ON PatientVisit.visitID = ServiceAtVisit.visitID
GROUP BY Guardian.guardianFirstName, Guardian.guardianLastName
ORDER BY total_expenditure DESC;
```

```
1225  /* Total Healthcare Expenditure by Guardians
1226  Calculate the total healthcare expenditure for each guardian based on their associated patients' visits.
1227  This query helps identify guardians responsible for patients with the highest healthcare costs. */
1228
1229  SELECT
1230      (Guardian.guardianFirstName || ' ' || Guardian.guardianLastName) AS guardian_full_name,
```

PROBLEMS OUTPUT DEBUG CONSOLE PORTS QUERY RESULT SCRIPT OUTPUT SQL HISTORY TASK MONITOR

All rows fetched: 20 in 0.070 seconds

	GUARDIAN_FULL_NAME	TOTAL_EXPENDITURE
1	Randolph Raven	754364.96
2	Robin Eliot	635827.68
3	Damita Bains	415220.31
4	Tanney Pacquet	415166.56
5	Conrad Livock	402189.12
6	Martina Gribbell	284479.47
7	Birgit De Hailes	180966.08
8	Leanora Timlin	174055.36
9	Sacha Gother	160347.92
10	Freda Cockland	146760.48
11	Hamil Adaway	140807.08
12	Felipa Cobson	67262.85
13	Robb Jolly	55685.07
14	Dalenna Tordiffe	52065.12
15	Bondon Nials	46489.19
16	Lonni Hawkeswood	41637.69
17	Lezlie McLenahan	34679.43
18	Fredek Traut	28850.49
19	Boonie Greaser	17079
20	Mile Ebbers	14894.12

(9) DATA MANIPULATION

9.1 DML by Astrid Ellis

9.2 DML by David Gorski

Data before the UPDATE command:

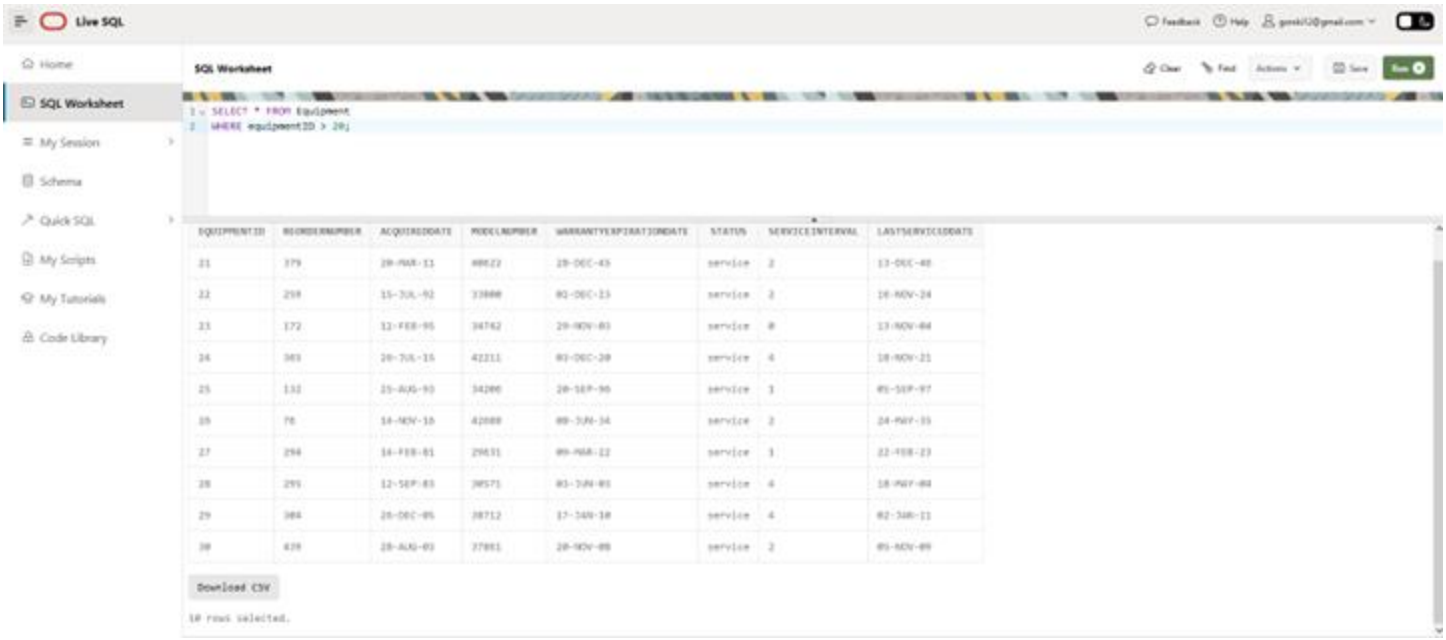
```
SELECT * FROM Equipment

WHERE equipmentID > 20;
```

Oracle output:

EQUIPMENTID	REORDERNUMBER	ACQUIREDDATE	MODELNUMBER	WARRANTYEXPIRATIONDATE	STATUS	SERVICEINTERVAL	LASTSERVICEDDATE
21	379	20-MAR-11	40622	28-DEC-45	service	2	13-DEC-46
22	259	15-JUL-92	33800	02-DEC-23	service	2	16-NOV-24
23	172	12-FEB-95	34742	29-NOV-03	service	0	13-NOV-04
24	365	26-JUL-15	42211	03-DEC-20	service	4	18-NOV-21
25	132	25-AUG-93	34206	20-SEP-96	service	1	05-SEP-97
26	76	14-NOV-16	42688	08-JUN-34	service	2	24-MAY-35
27	294	14-FEB-81	29631	09-MAR-22	service	1	22-FEB-23
28	295	12-SEP-83	30571	03-JUN-03	service	4	18-MAY-04
29	304	26-DEC-05	38712	17-JAN-10	service	4	02-JAN-11
30	439	28-AUG-03	37861	20-NOV-08	service	2	05-NOV-09

10 rows selected.

Screenshot – Data before the UPDATE command



UPDATE command:

UPDATE Equipment

SET status = 'repair'

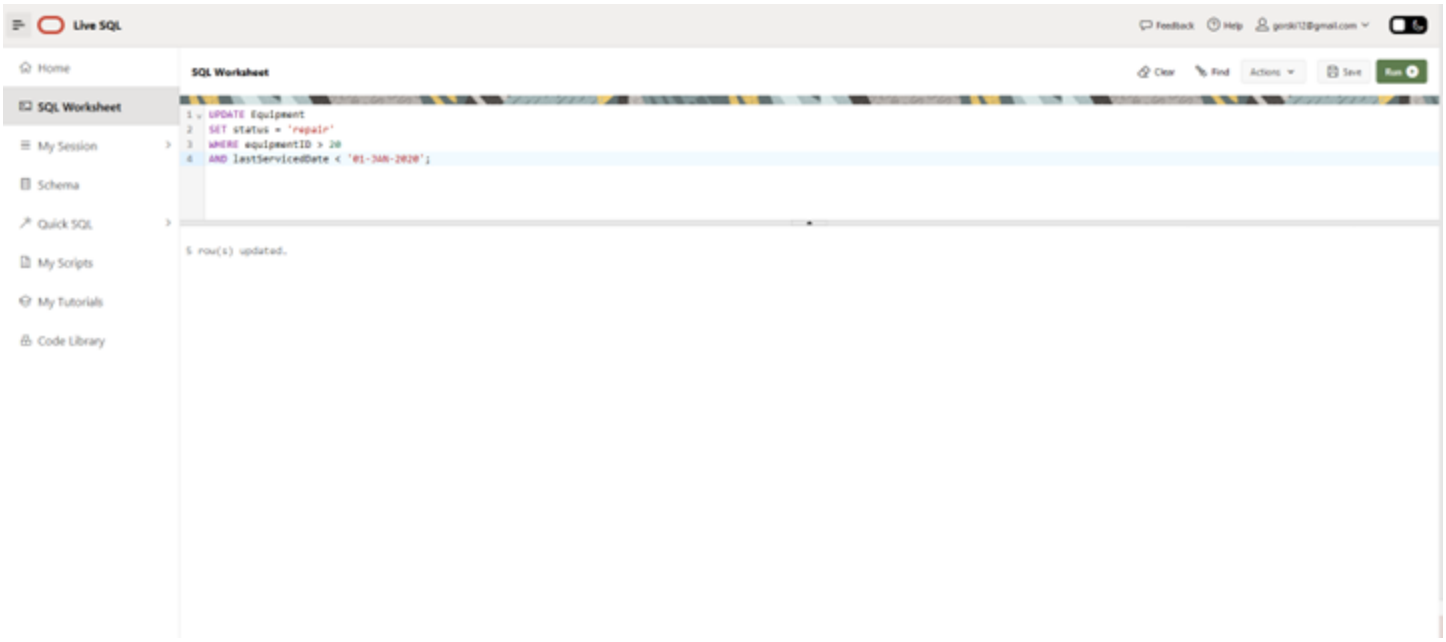
WHERE equipmentID > 20

AND lastServicedDate < '01-JAN-2020';

Oracle output:

5 row(s) updated.

Screenshot – UPDATE command


Live SQL
Feedback
Help
Home
SQL Worksheet
My Session
Schema
Quick SQL
My Scripts
My Tutorials
Code Library
SQL Worksheet
Clear
Find
Actions
Save
Run
UPDATE Equipment
SET status = 'repair'
WHERE equipmentID > 20
AND lastServicedDate < '01-JAN-2020';
5 row(s) updated.

Data after the UPDATE command:

SELECT * FROM Equipment

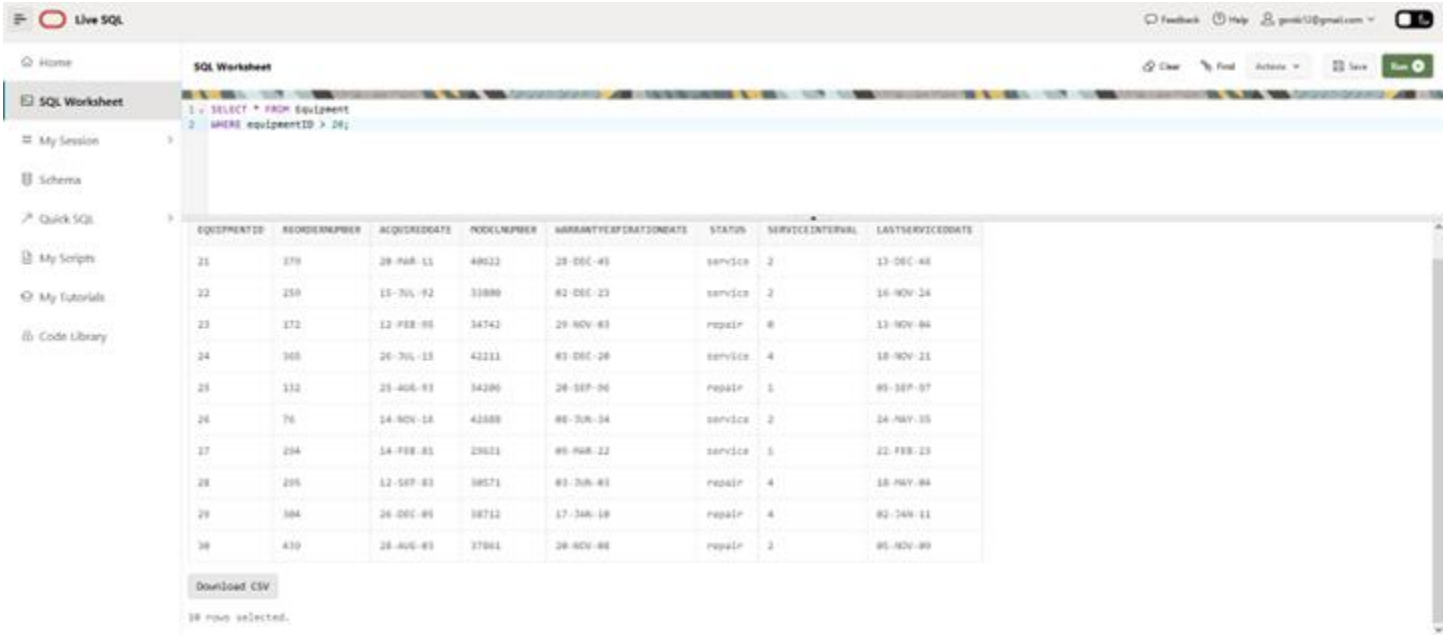
WHERE equipmentID > 20;

Oracle output:

EQUIPMENTID	REORDERNUMBER	ACQUIREDDATE	MODELNUMBER	WARRANTYEXPIRATIONDATE	STATUS	SERVICEINTERVAL	LASTSERVICEDDATE
21	379	20-MAR-11	40622	28-DEC-45	service	2	13-DEC-46
22	259	15-JUL-92	33800	02-DEC-23	service	2	16-NOV-24
23	172	12-FEB-95	34742	29-NOV-03	repair	0	13-NOV-04
24	365	26-JUL-15	42211	03-DEC-20	service	4	18-NOV-21
25	132	25-AUG-93	34206	20-SEP-96	repair	1	05-SEP-97
26	76	14-NOV-16	42688	08-JUN-34	service	2	24-MAY-35
27	294	14-FEB-81	29631	09-MAR-22	service	1	22-FEB-23
28	295	12-SEP-83	30571	03-JUN-03	repair	4	18-MAY-04
29	304	26-DEC-05	38712	17-JAN-10	repair	4	02-JAN-11
30	439	28-AUG-03	37861	20-NOV-08	repair	2	05-NOV-09

10 rows selected.

Screenshot – Data after the UPDATE command



Data before the DELETE command:

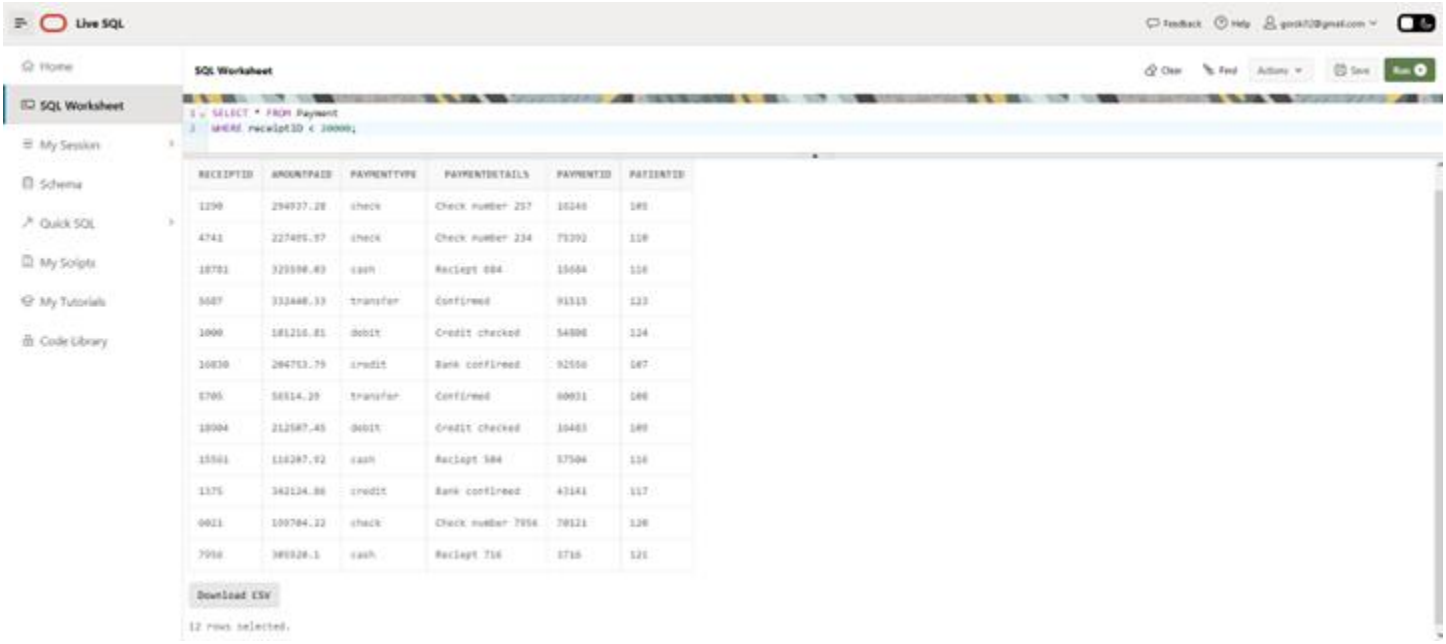
```
SELECT * FROM Payment
WHERE receiptID < 20000;
```

Oracle output:

RECEIPTID	AMOUNTPAID	PAYMENTTYPE	PAYMENTDETAILS	PAYMENTID	PATIENTID
1290	294937.28	check	Check number 257	16246	105
4741	227495.97	check	Check number 234	75392	110
18781	325590.03	cash	Reciept 684	15684	116
5687	332440.33	transfer	Confirmed	91515	123
1000	101216.81	debit	Credit checked	54808	124
16830	204753.79	credit	Bank confirmed	92556	107
5705	56514.29	transfer	Confirmed	60031	108
18904	212507.45	debit	Credit checked	16483	109
15561	116207.92	cash	Reciept 504	57504	116
1375	342124.86	credit	Bank confirmed	43141	117
6021	199704.22	check	Check number 7956	70121	120
7956	305920.1	cash	Reciept 716	3716	121

12 rows selected.

Screenshot – Data before the DELETE command



DELETE command:

DELETE FROM Payment

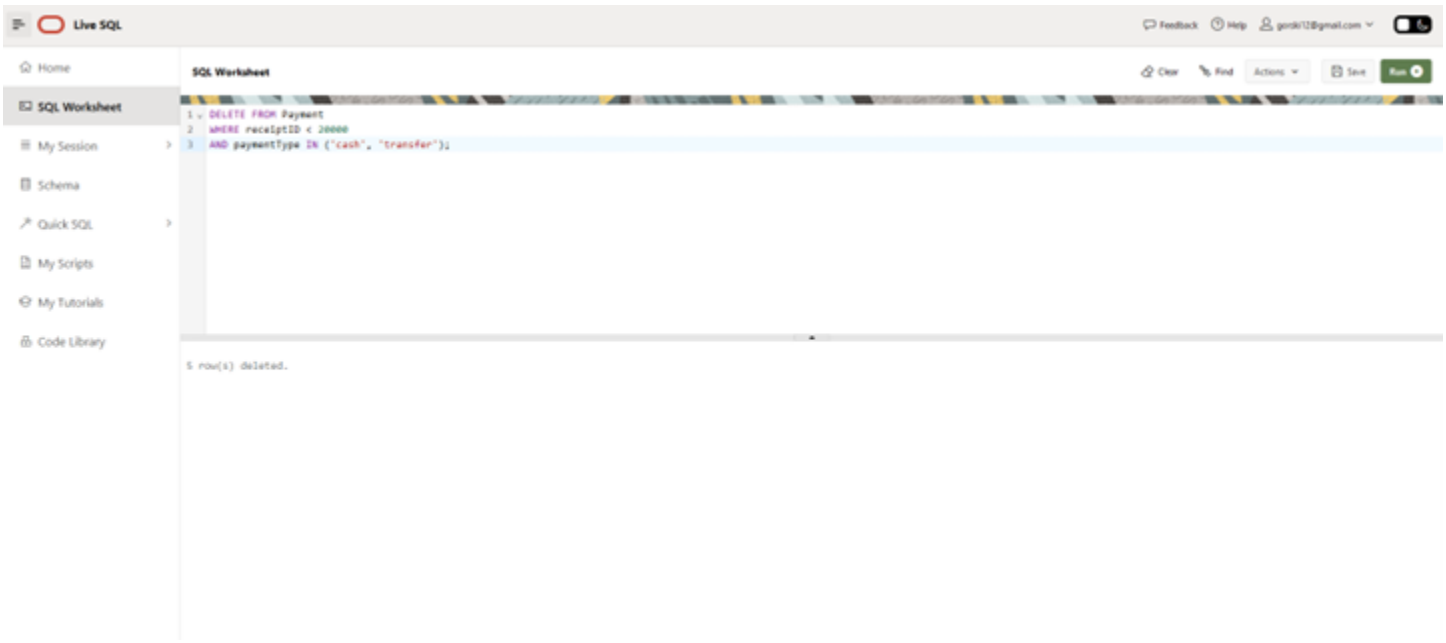
WHERE receiptID < 20000

AND paymentType IN ('cash', 'transfer');

Oracle output:

5 row(s) deleted.

Screenshot – DELETE command



Data after the DELETE command:

SELECT * FROM Payment

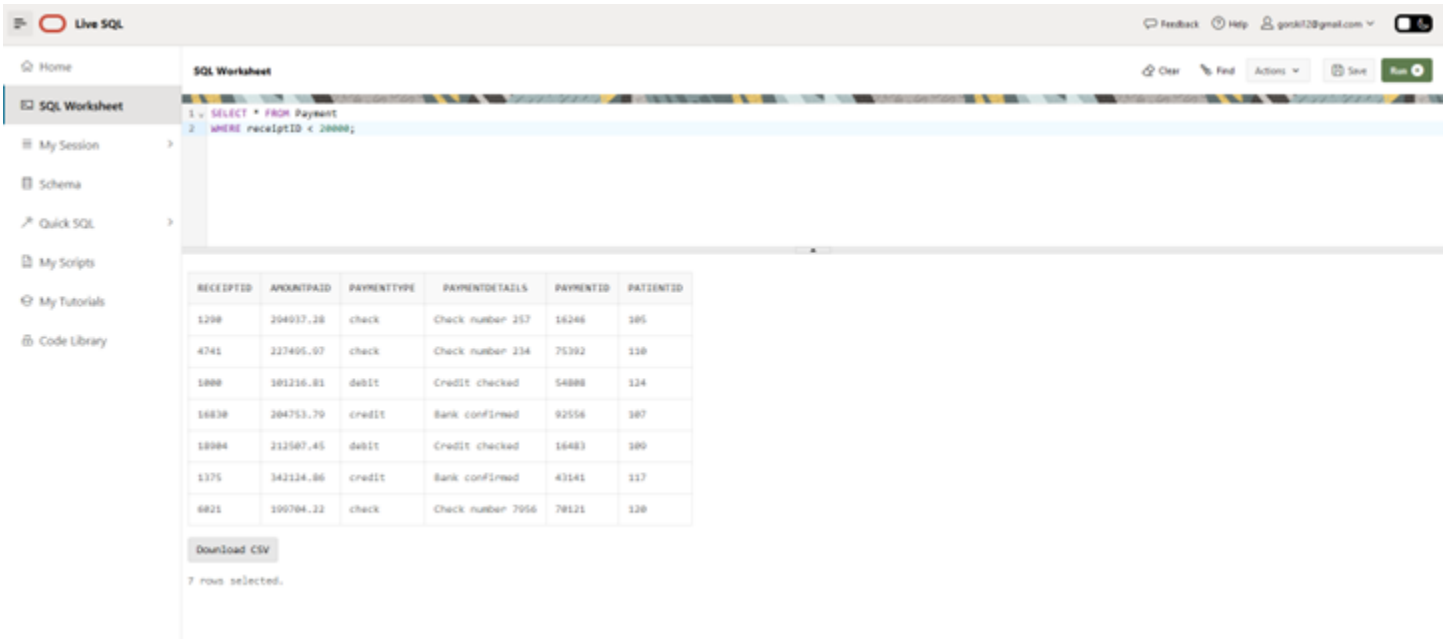
WHERE receiptID < 20000;

Oracle output:

RECEIPTID	AMOUNTPAID	PAYMENTTYPE	PAYMENTDETAILS	PAYMENTID	PATIENTID
1290	294937.28	check	Check number 257	16246	105
4741	227495.97	check	Check number 234	75392	110
1000	101216.81	debit	Credit checked	54808	124
16830	204753.79	credit	Bank confirmed	92556	107
18904	212507.45	debit	Credit checked	16483	109
1375	342124.86	credit	Bank confirmed	43141	117
6021	199704.22	check	Check number 7956	70121	120

7 rows selected.

Screenshot – Data after the DELETE command



9.3 DML by Josh Hoffman

Update Command

Change a future appointment for patent Caroline Windress from June 12th, 2029 to December 15th, 2024. The patient called, and they need to move up their appointment due to changing orders from their doctor.

UPDATE FutureAppointment
SET APPOINTMENTDT = '15-DEC-2024'
WHERE VISITID = '537'

BEFORE

```
1 SELECT *
2 FROM FutureAppointment
```

APPOINTMENTID	APPOINTMENTDT	ANTICIPATEDSERVICE	VISITID
664	12-JUN-29	Check-in	537
405	26-JUN-29	Check-in	809
892	15-NOV-28	Surgery	627
499	26-APR-29	Post-op	507
414	12-JUL-30	Treatment	690
517	17-NOV-30	Pre-op	749
401	16-AUG-28	Check-in	465
836	23-SEP-29	Check-in	520
766	17-MAR-27	Surgery	883
689	31-JAN-30	Post-op	547
709	13-APR-30	Treatment	812
865	02-DEC-27	Pre-op	491
821	09-JUN-28	Treatment	833

AFTER

```
SELECT *
FROM FutureAppointment
```

APPOINTMENTID	APPOINTMENTDT	ANTICIPATEDSERVICE	VISITID
664	15-DEC-24	Check-in	537
405	26-JUN-29	Check-in	809
892	15-NOV-28	Surgery	627
499	26-APR-29	Post-op	507
414	12-JUL-30	Treatment	690
517	17-NOV-30	Pre-op	749
401	16-AUG-28	Check-in	465
836	23-SEP-29	Check-in	520
766	17-MAR-27	Surgery	883
689	31-JAN-30	Post-op	547
709	13-APR-30	Treatment	812
865	02-DEC-27	Pre-op	491
821	09-JUN-28	Treatment	833

Delete Command

The hospital has discovered that during the intake process, contact information was given for an individual who does not have guardianship over patient Bat Mason. Their information needs to be deleted to prevent the hospital from contacting them with privileged information. The name of the false-guardian is Lonni Hawkeswood.

```
DELETE FROM GUARDIANSHIP
WHERE GUARDIANID = '99316';

DELETE FROM GUARDIANPAYMENT
WHERE GUARDIANID = '99316';

DELETE FROM GUARDIAN
```

WHERE GUARDIANID = '99316';

BEFORE

```
1 SELECT *
2 FROM GUARDIAN
```

GUARDIANID	RELATIONSHIPTYPE	CONTACTPHONEAC	CONTACTPHONENUMBER	CONTACTEMAILADDRESS	CONTACTHOURSTART	CONTACTHOUREND	GUARDIANFIRSTNAME	GUARDIANLASTNAME	ADDRESSID
41406	Mother	803	1868671	hadway0@privacy.gov	12:01	06:01	Hamil	Adaway	244
99316	Father	669	7011776	lhawod1@yolasite.com	12:21	06:21	Lonni	Hawkeswood	402
21460	Foster parent	542	9605216	tpacuet2@alibaba.com	12:41	06:41	Tanney	Pacquet	191
36496	Step-parent	566	9070240	bnials3@flickr.com	13:01	07:01	Bondon	Nials	234
22847	Mother	385	8821720	sgotr4@amazonaws.com	13:21	07:21	Sacha	Gother	390
46755	Father	852	1924452	mgbell5@newsvine.com	13:41	07:41	Martina	Gribbell	359
37244	Foster parent	853	5915279	bgrser6@gravatar.com	14:01	08:01	Boonie	Greaser	113
37168	Step-parent	998	4850613	ltimlin7@state.gov	14:21	08:21	Leanora	Timlin	497
20680	Mother	232	9462265	fcobson8@last.fm	14:41	08:41	Felipa	Cobson	500
93444	Father	725	5211944	bdehailes9@ele.com	15:01	09:01	Birgit	De Hailes	182
17195	Foster parent	334	1607101	lmclhana@plala.or.jp	15:21	09:21	Lezlie	McLenahan	440
84566	Step-parent	451	1433039	fcondb@people.com.cn	15:41	09:41	Freda	Cockland	170
53567	Mother	353	9327770	dbainsc@insider.com	16:01	10:01	Damita	Bains	334
62860	Father	506	1526574	rjolld@over-blog.com	16:21	10:21	Robb	Jolly	494
53155	Foster parent	901	7351093	ftraute@nbcnews.com	16:41	10:41	Fredek	Traut	478
93985	Step-parent	664	9823711	mebbersf@ebay.co.uk	17:01	11:01	Mile	Ebbers	351
60749	Mother	111	6960014	rraveng@sphinn.com	17:21	11:21	Randolph	Raven	195
41218	Father	117	9123816	clivockh@wsj.com	17:41	11:41	Conrad	Livock	501
91424	Foster parent	418	7853837	dfei@advertising.org	18:01	12:01	Dalenna	Tordiffe	251

AFTER

```
SELECT *
FROM GUARDIAN
```

GUARDIANID	RELATIONSHIPTYPE	CONTACTPHONEAC	CONTACTPHONENUMBER	CONTACTEMAILADDRESS	CONTACTHOURSTART	CONTACTHOUREND	GUARDIANFIRSTNAME	GUARDIANLASTNAME	ADDRESSID
41406	Mother	803	1868671	hadway0@privacy.gov	12:01	06:01	Hamil	Adaway	244
21460	Foster parent	542	9605216	tpacuet2@alibaba.com	12:41	06:41	Tanney	Pacquet	191
36496	Step-parent	566	9070240	bnials3@flickr.com	13:01	07:01	Bondon	Nials	234
22847	Mother	385	8821720	sgotr4@amazonaws.com	13:21	07:21	Sacha	Gother	390
46755	Father	852	1924452	mgbell5@newsvine.com	13:41	07:41	Martina	Gribbell	359
37244	Foster parent	853	5915279	bgrser6@gravatar.com	14:01	08:01	Boonie	Greaser	113
37168	Step-parent	998	4850613	ltimlin7@state.gov	14:21	08:21	Leanora	Timlin	497
20680	Mother	232	9462265	fcobson8@last.fm	14:41	08:41	Felipa	Cobson	500
93444	Father	725	5211944	bdehailes9@ele.com	15:01	09:01	Birgit	De Hailes	182
17195	Foster parent	334	1607101	lmclhana@plala.or.jp	15:21	09:21	Lezlie	McLenahan	440
84566	Step-parent	451	1433039	fcondb@people.com.cn	15:41	09:41	Freda	Cockland	170
53567	Mother	353	9327770	dbainsc@insider.com	16:01	10:01	Damita	Bains	334
62860	Father	506	1526574	rjolld@over-blog.com	16:21	10:21	Robb	Jolly	494
53155	Foster parent	901	7351093	ftraute@nbcnews.com	16:41	10:41	Fredek	Traut	478
93985	Step-parent	664	9823711	mebbersf@ebay.co.uk	17:01	11:01	Mile	Ebbers	351
60749	Mother	111	6960014	rraveng@sphinn.com	17:21	11:21	Randolph	Raven	195
41218	Father	117	9123816	clivockh@wsj.com	17:41	11:41	Conrad	Livock	501
91424	Foster parent	418	7853837	dfei@advertising.org	18:01	12:01	Dalenna	Tordiffe	251
30547	Step-parent	405	2060167	reliotj@ow.ly	18:21	12:21	Robin	Eliot	256

9.4 DML by Steven Sullivan

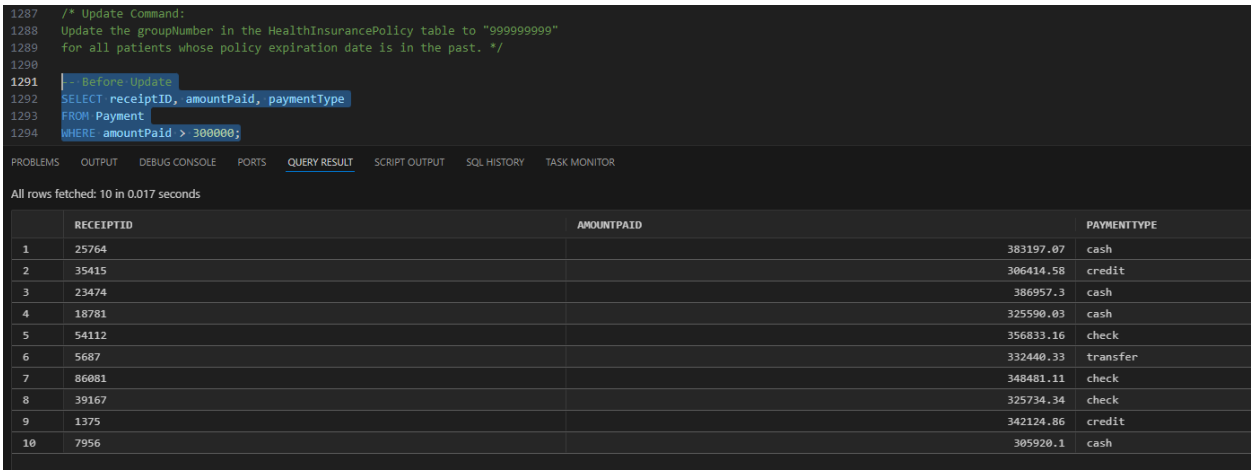
Update Command:

Update the groupNumber in the HealthInsurancePolicy table to "999999999" for all patients whose policy expiration date is in the past.

```
-- Before Update
SELECT receiptID, amountPaid, paymentType
FROM Payment
WHERE amountPaid > 300000;


-- Update Command
UPDATE Payment
SET paymentType = 'transfer'
WHERE amountPaid > 300000;


-- After Update
SELECT receiptID, amountPaid, paymentType
FROM Payment
```

WHERE amountPaid > 300000;

Before Screenshot:



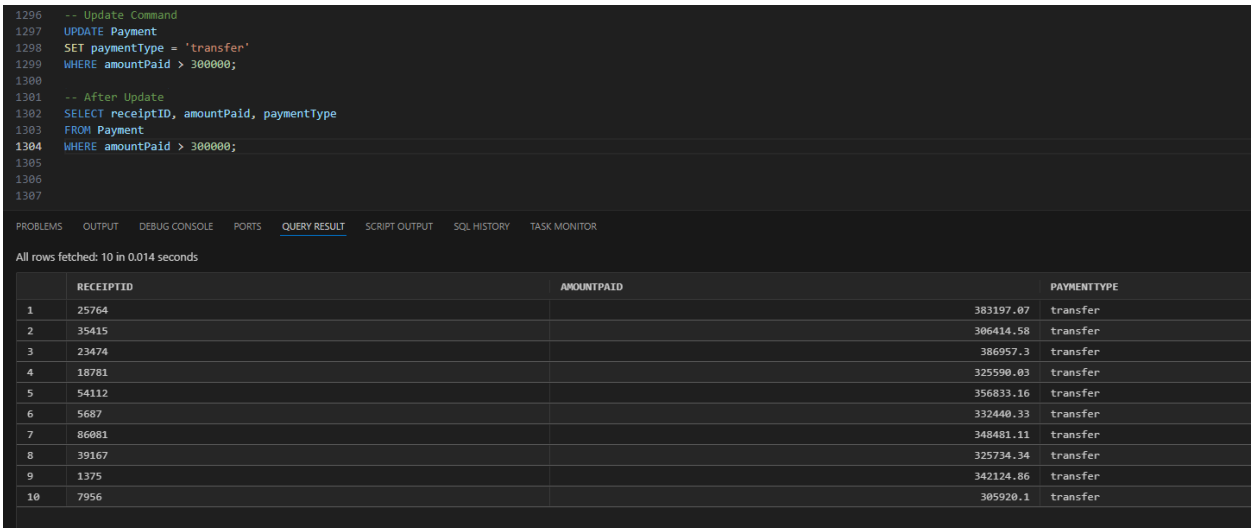
```
/* Update Command:
Update the groupNumber in the HealthInsurancePolicy table to "999999999"
for all patients whose policy expiration date is in the past. */

-- Before Update
SELECT receiptID, amountPaid, paymentType
FROM Payment
WHERE amountPaid > 300000;
```

PROBLEMS OUTPUT DEBUG CONSOLE PORTS QUERY RESULT SCRIPT OUTPUT SQL HISTORY TASK MONITOR

All rows fetched: 10 in 0.017 seconds

	RECEIPTID	AMOUNTPAID	PAYMENTTYPE
1	25764	383197.07	cash
2	35415	306414.58	credit
3	23474	386957.3	cash
4	18781	325590.03	cash
5	54112	356833.16	check
6	5687	332440.33	transfer
7	86081	348481.11	check
8	39167	325734.34	check
9	1375	342124.86	credit
10	7956	305920.1	cash

After Screenshot:



```
-- Update Command
UPDATE Payment
SET paymentType = 'transfer'
WHERE amountPaid > 300000;

-- After Update
SELECT receiptID, amountPaid, paymentType
FROM Payment
WHERE amountPaid > 300000;
```

PROBLEMS OUTPUT DEBUG CONSOLE PORTS QUERY RESULT SCRIPT OUTPUT SQL HISTORY TASK MONITOR

All rows fetched: 10 in 0.014 seconds

	RECEIPTID	AMOUNTPAID	PAYMENTTYPE
1	25764	383197.07	transfer
2	35415	306414.58	transfer
3	23474	386957.3	transfer
4	18781	325590.03	transfer
5	54112	356833.16	transfer
6	5687	332440.33	transfer
7	86081	348481.11	transfer
8	39167	325734.34	transfer
9	1375	342124.86	transfer
10	7956	305920.1	transfer

Delete Command:

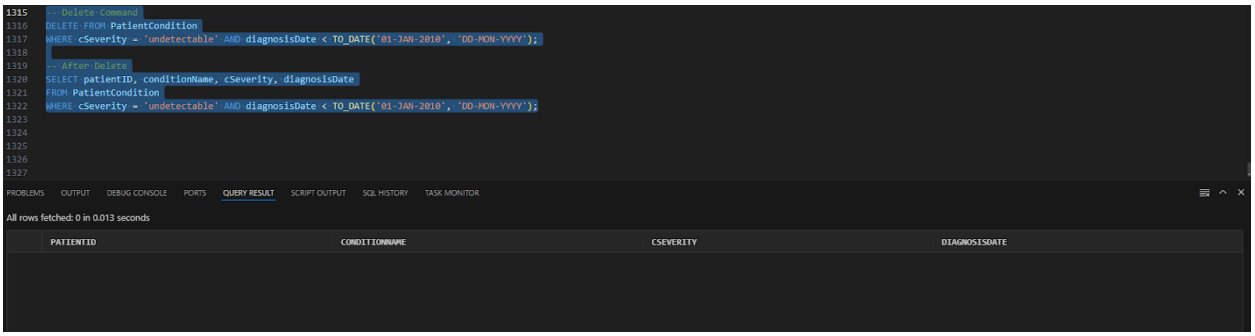
Delete all rows from the PatientCondition table where the severity (cSeverity) is marked as undetectable and the diagnosisDate is before January 1, 2010.

-- Before Delete
SELECT patientID, conditionName, cSeverity, diagnosisDate
FROM PatientCondition
WHERE cSeverity = 'undetectable' AND diagnosisDate < TO_DATE('01-JAN-2010', 'DD-MON-YYYY');

```
-- Delete Command
DELETE FROM PatientCondition
WHERE cSeverity = 'undetectable' AND diagnosisDate < TO_DATE('01-JAN-2010', 'DD-MON-YYYY');

-- After Delete
SELECT patientID, conditionName, cSeverity, diagnosisDate
FROM PatientCondition
WHERE cSeverity = 'undetectable' AND diagnosisDate < TO_DATE('01-JAN-2010', 'DD-MON-YYYY');
```

Before Screenshot:

After Screenshot:



(10) SUMMARY

10.1 Summary by Astrid Ellis

10.2 Summary by David Gorski

Our team project for INFO 605, developing a database for a Children's Hospital, provided a comprehensive foundation of database architecture. By translating the hospital's real-world system into conceptual and logical ERDs, I significantly improved my database design skills and found a real passion

for the process. This project also deepened my SQL knowledge. I learned to write more accurate and efficient queries by understanding their logical processing order, effectively seeing what goes on 'under the hood.' The practical application of these concepts to a real-world scenario solidified my understanding and gave me the confidence to tackle complex database challenges. I was so engaged with this project that, given more time, I would have loved to fully implement a functional hospital database, exploring the complex relationships and data requirements of a working medical facility. This hands-on experience was incredibly beneficial to my learning, and I feel much more confident in my database construction and management skills. I am eager to apply these newfound skills to future projects and explore more advanced database concepts.

10.3 Summary by Josh Hoffman

In conclusion, this project shepherds the creation of a database for a hospital from start to finish. It begins in the initial stages of understanding the requirements of the system, the conceptual level understanding the involved entities, the logical level of creating the relationships in the data, as well as the physical level in designing the database itself, and ends with the operation of the database to satisfy operational goals. The final product of this process is a database representing a subsect of a viable database used to aid in the operation of a hospital. To make the project feasible in the class timeframe, the scope was limited to include payments, equipment, patients, guardians, medical history, appointments, and insurance. To fully implement such a database in production, several additional entities would need to be added to the scope, like medication, staff, locations, and room information. The lesson learned that stands out to me the most is how supportive having a fully fleshed logical ERD is in the process of creating an Oracle database. As demonstrated through the business goal-driven SQL queries, our database allows the hospital to answer critical business questions like who needs to make an appointment, who still needs to pay for services, evaluate liability exposure, and where to add more staff strategically. If more time permitted, I would add staff information to the database as they have a critical role in the operation of a hospital.

10.4 Summary by Steven Sullivan

This project focuses on developing a comprehensive database system for a children's hospital, addressing the domain of healthcare management and patient care. The database effectively organizes critical information, including patient records, visit logs, guardian details, surgical histories, allergies, chronic conditions, financial transactions, and medical equipment tracking. The database's scope ensures that essential entities such as Patient, Guardian, Residence, InsuranceProvider, and Equipment are connected through logical relationships. These relationships facilitate seamless workflows for patient care, scheduling appointments, tracking services provided, and managing insurance and payment

records. By employing a normalized design, the database minimizes redundancy, enhances data integrity, and supports efficient data retrieval.

The project offered valuable lessons. Understanding the importance of normalization was vital for creating a strong and scalable database. Writing SQL queries involving joins, aggregation functions, and conditional criteria provided hands-on experience with relational database management. Moreover, mapping real-world healthcare requirements into the database model highlighted the necessity of domain knowledge in database design. Collaboration within the team ensured unique contributions and required efficient communication to avoid redundancy in tasks, reinforcing teamwork and version control practices.

The database aligns with the hospital's goals by supporting efficient and accurate data management. It enhances patient care through detailed health records, improves financial transparency, and optimizes resource allocation, such as tracking medical equipment usage and insurance claims. In the future, the database could be expanded to incorporate predictive analytics for patient health trends, additional non-healthcare services like cafeteria management, and advanced reporting tools for hospital administrators. This project demonstrates how structured data management can address complex organizational needs in a healthcare setting.