

**Course-Code: CS2005**

**Database Systems**

# Assignment 3

# Topic: Healthcare Scheduling System

# Diagraming Software Tool Used: Lucid Chart

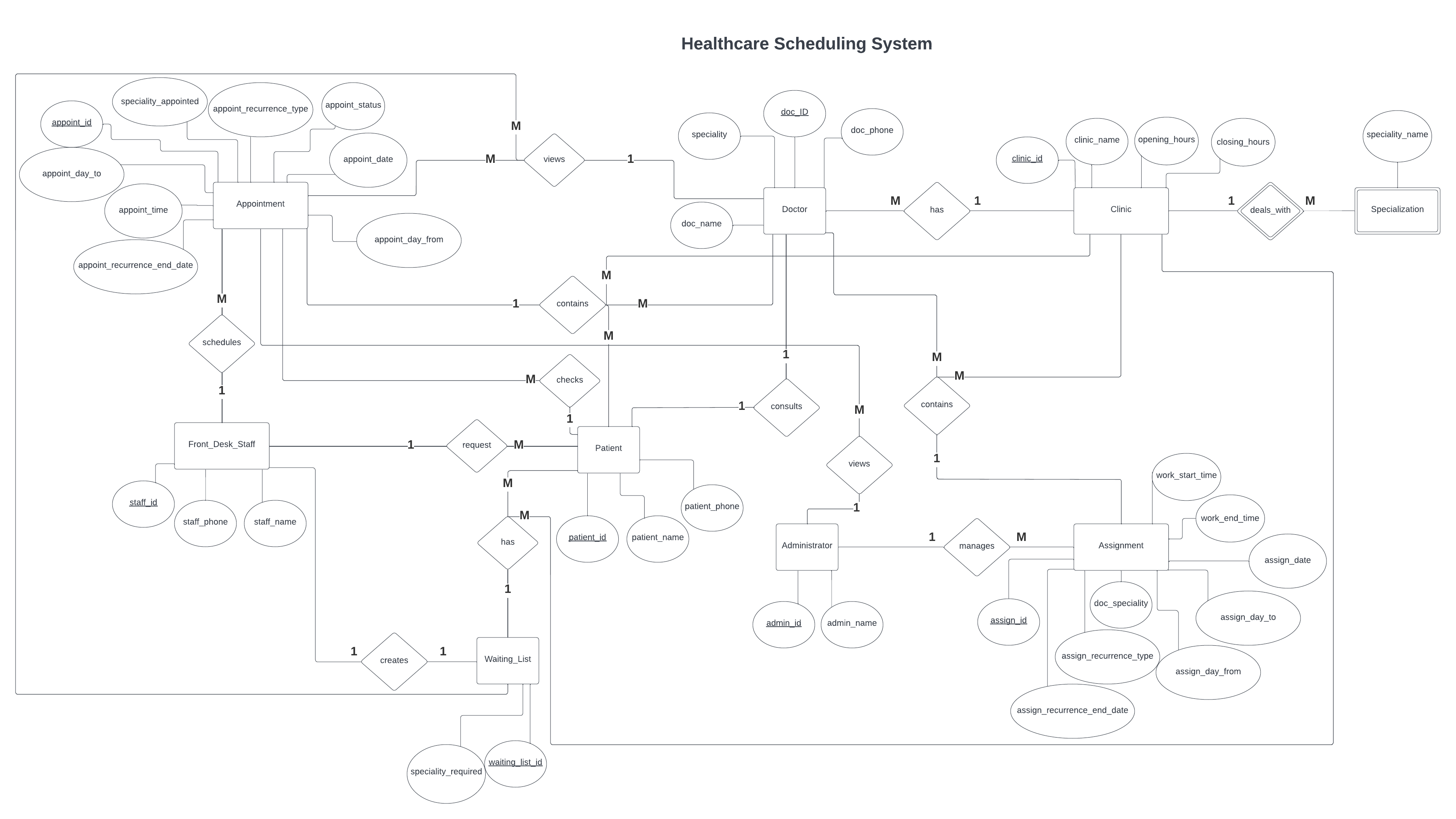
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**ER Diagram:** Healthcare Scheduling System

* In my ERD, I identified the following Entities:
* Doctor
* Patient
* Clinic
* Administrator
* Front\_Desk\_Staff
* Assignment
* Appointment
* Waiting\_List
* Specialization

The attributes that I identified for **Doctor** includes the following:

* Doc\_Id
* Doc\_Name
* Doc\_Phone
* Speciality

The attributes that I identified for **Patient** includes the following:

* Patient\_Id
* Patient\_Name
* Patient\_Phone

The attributes that I identified for **Clinic** includes the following:

* Clinic\_Id
* Clinic\_Name
* Opening\_Hours
* Closing\_Hours

The attributes that I identified for **Administrator** includes the following:

* Admin\_Id
* Admin\_Name

The attributes that I identified for **Front\_Desk\_Staff** includes the following:

* Staff\_Id
* Staff\_Name
* Staff\_Phone

The attributes that I identified for **Assignment** includes the following:

* Assign\_Id
* Doc\_Speciality
* Assign\_Recurrence\_Type
* Assign\_Recurrence\_End\_Date
* Assign\_Day\_From
* Assign\_Day\_To
* Assign\_Date
* Work\_Start\_Time
* Work\_End\_Time

The attributes that I identified for **Appointment** includes the following:

* Appoint\_Id
* Speciality\_Appointed
* Appoint\_Recurrence\_Type
* Appoint\_Recurrence\_End\_Date
* Appoint\_Day\_From
* Appoint\_Day\_To
* Appoint\_Date
* Appoint\_Time
* Appoint\_Status

The attributes that I identified for **Waiting\_List** includes the following:

* Waiting\_List\_Id
* Speciality\_Required

The attributes that I identified for **Specialization** includes the following:

* Speciality\_Name
* In my ERD, I also identified the following Primary keys for the following Entities:

1. **Doctor:**

Primary Key: Doc\_Id

1. **Patient:**

Primary Key: Patient\_Id

1. **Clinic:**

Primary Key: Clinic\_Id

1. **Administrator:**

Primary Key: Admin\_Id

1. **Front\_Desk\_Staff:**

Primary Key: Staff\_Id

1. **Assignment:**

Primary Key: Assign\_Id

1. **Appointment:**

Primary Key: Appoint\_Id

1. **Waiting\_List:**

Primary Key: Waiting\_List\_Id

\* An Important note is that for the Entity **Specialization,**  I have not included any primary key because **Specialization** is a weak entity.

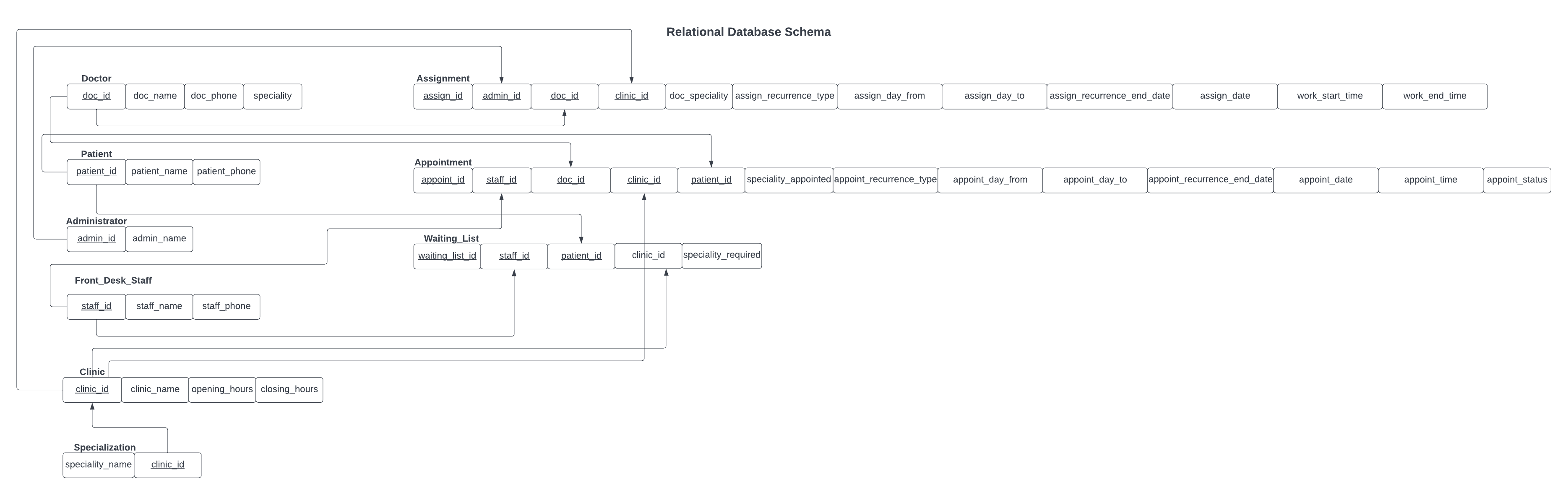
* In my ERD, I have also identified the following relationships between the entities:

1. **One-to-One:**

* Front\_Desk\_Staff – Creates - Waiting\_List
* Patient – Consults – Doctor

1. **One-to-Many**

* Doctor – Views – Appointment
* Doctor – Views – Waiting\_List
* Patient – Request – Front\_Desk\_Staff
* Waiting\_List – Has – Patient
* Waiting\_List – Has – Clinic
* Patient – Checks – Appointment
* Appointment – Contains – Clinic
* Appointment – Contains – Doctor
* Appointment – Contains – Patient
* Administrator – Manages – Assignment
* Administrator – Views – Appointment
* Assignment – Contains – Doctor
* Assignment – Contains – Clinic
* Clinic – Deals\_With – Specialization
* Clinic – Has – Doctor
* Front\_Desk\_Staff – Schedules – Appointment

**Relational Database Schema:** Healthcare Scheduling System

* My Relational Database Schema includes following important information for each Relation/Table:

1. **Doctor:**

* Doc\_Id
* Doc\_Name
* Doc\_Phone
* Specialty

\*Here the Primary Key is: Doc\_Id.

1. **Patient:**

* Patient\_Id
* Patient\_Name
* Patient\_Phone

\*Here the Primary Key is: Patient\_Id.

1. **Administrator:**

* Admin\_Id
* Admin\_Name

\*Here the Primary Key is: Admin\_Id.

1. **Front\_Desk\_Staff:**

* Staff\_Id
* Staff\_Name
* Staff\_Phone

\*Here the Primary Key is: Staff\_Id.

1. **Clinic:**

* Clinic\_Id
* Clinic\_Name
* Opening\_Hours
* Closing\_Hours

\*Here the Primary Key is: Clinic\_Id.

1. **Specialization:**

* Speciality\_Name
* Clinic\_Id

\*Here I am using Clinic\_Id as a foreign from referenced from the table **Clinic**

1. **Assignment:**

* Assign\_Id
* Admin\_Id
* Doc\_Id
* Clinic\_Id
* Doc\_Speciality
* Assign\_Recurrence\_Type
* Assign\_Day\_From
* Assign\_Day\_To
* Assign\_Recurrence\_End\_Date
* Assign\_Date
* Work\_Start\_Time
* Work\_End\_Time

\*Here the Primary Key is: Assign\_Id.

\*Here I am using Admin\_Id as a foreign from referenced from the table **Administrator**

\*Here I am using Doc\_Id as a foreign from referenced from the table **Doctor**

\*Here I am using Clinic\_Id as a foreign from referenced from the table **Clinic**

1. **Appointment:**

* Appoint\_Id
* Staff\_Id
* Doc\_Id
* Clinic\_Id
* Patient\_Id
* Speciality\_Appointed
* Appoint\_Recurrence\_Type
* Appoint\_Day\_From
* Appoint\_Day\_To
* Appoint\_Recurrence\_End\_Date
* Appoint\_Date
* Appoint\_Time
* Appoint\_Status

\*Here the Primary Key is: Appoint\_Id.

\*Here I am using Staff\_Id as a foreign from referenced from the table **Front\_Desk\_Staff**

\*Here I am using Doc\_Id as a foreign from referenced from the table **Doctor**

\*Here I am using Clinic\_Id as a foreign from referenced from the table **Clinic**

\*Here I am using Patient\_Id as a foreign from referenced from the table **Patient**

1. **Waiting\_List:**

* Waiting\_List\_Id
* Staff\_Id
* Patient\_Id
* Clinic\_Id
* Speciality\_Required

\*Here the Primary Key is: Waiting\_List\_Id.

\*Here I am using Staff\_Id as a foreign from referenced from the table **Front\_Desk\_Staff**

\*Here I am using Patient\_Id as a foreign from referenced from the table **Patient**

\*Here I am using Clinic\_Id as a foreign from referenced from the table **Clinic**

**SQL queries for Table, Constraints Creation:** Healthcare Scheduling System

* I have used the following SQL Queries and constraints while creating the tables for each entity:

1. **Doctor:**

-- Create Doctor Table

CREATE TABLE DOCTOR

( Doc\_Id INT NOT NULL,

Doc\_Name VARCHAR(255) NOT NULL,

Doc\_Phone VARCHAR(255) NOT NULL,

Speciality VARCHAR(255) NOT NULL

PRIMARY KEY (Doc\_Id)

);

\*The constraints:

* Doc\_Id is primary Key of type integer and it cannot be NULL
* Doc\_Name is a Varchar(255) data type that cannot be NULL
* Doc\_Phone is a Varchar(255) data type that cannot be NULL
* Speciality is a Varchar(255) data type that cannot be NULL

1. **Patient:**

-- Create Patient Table

CREATE TABLE PATIENT

( Patient\_Id INT NOT NULL,

Patient\_Name VARCHAR(255) NOT NULL,

Patient\_Phone VARCHAR(255) NOT NULL,

PRIMARY KEY (Patient\_Id)

);

\*The constraints:

* Patient\_Id is primary Key of type Integer and it cannot be NULL
* Patient\_Name is a Varchar(255) data type that cannot be NULL
* Patient\_Phone is a Varchar(255) data type that cannot be NULL

1. **Administrator:**

-- Create Administrator Table

CREATE TABLE ADMINISTRATOR

( Admin\_Id INT NOT NULL,

Admin\_Name VARCHAR(255) NOT NULL,

PRIMARY KEY (Admin\_Id)

);

\*The constraints:

* Admin\_Id is primary Key of type Integer and it cannot be NULL
* Admin\_Name is a Varchar(255) data type that cannot be NULL

1. **Front\_Desk\_Staff:**

-- Create Front\_Desk\_Staff Table

CREATE TABLE FRONT\_DESK\_STAFF

( Staff\_Id INT NOT NULL,

Staff\_Name VARCHAR(255) NOT NULL,

Staff\_Phone VARCHAR(255) NOT NULL,

PRIMARY KEY (Staff\_Id)

);

\*The constraints:

* Staff\_Id is primary Key of type Integer and it cannot be NULL
* Staff\_Name is a Varchar(255) data type that cannot be NULL
* Staff\_Phone is a Varchar(255) data type that cannot be NULL

1. **Clinic:**

-- Create Clinic Table

CREATE TABLE CLINIC

( Clinic\_Id INT NOT NULL,

Clinic\_Name VARCHAR(255) NOT NULL,

Opening\_hours TIME NOT NULL,

Closing\_hours TIME NOT NULL,

PRIMARY KEY (Clinic\_Id)

);

\*The constraints:

* Clinic\_Id is primary Key of type Integer and it cannot be NULL
* Clinic\_Name is a Varchar(255) data type that cannot be NULL
* Opening\_Hours is a TIME data type that cannot be NULL
* Closing\_Hours is a TIME data type that cannot be NULL

1. **Specialization:**

-- Create Specialization Table

CREATE TABLE SPECIALIZATION

( Speciality\_Name VARCHAR(255) NOT NULL,

Clinic\_Id INT FOREIGN KEY REFERENCES CLINIC(Clinic\_Id)

);

\*The constraints:

* Speciality\_Name is a Varchar(255) data type that cannot be NULL
* Clinic\_Id is Foreign Key of type Integer that cannot be NULL, and it is referenced from the table **Clinic**

1. **Assignment:**

-- Create Assignment Table

CREATE TABLE ASSIGNMENT

( Assign\_Id INT NOT NULL,

Admin\_ID INT FOREIGN KEY REFERENCES ADMINISTRATOR(Admin\_Id),

Doc\_Id INT FOREIGN KEY REFERENCES DOCTOR(Doc\_Id),

Clinic\_Id INT FOREIGN KEY REFERENCES CLINIC(Clinic\_Id),

Doc\_Speciality VARCHAR(255) NOT NULL,

Assign\_Recurrence\_Type VARCHAR(255) CHECK(Assign\_Recurrence\_Type = 'Daily' or Assign\_Recurrence\_Type = 'Weekly' or Assign\_Recurrence\_Type = 'Monthly') NOT NULL,

Assign\_Day\_From VARCHAR(255) CHECK(Assign\_Day\_From = 'Monday' or Assign\_Day\_From = 'Tuesday' or Assign\_Day\_From = 'Wednesday' or Assign\_Day\_From = 'Thursday' or Assign\_Day\_From = 'Friday' or Assign\_Day\_From = 'Saturday' or Assign\_Day\_From = 'Sunday') NOT NULL,

Assign\_Day\_To VARCHAR(255) CHECK(Assign\_Day\_To = 'Monday' or Assign\_Day\_To = 'Tuesday' or Assign\_Day\_To = 'Wednesday' or Assign\_Day\_To = 'Thursday' or Assign\_Day\_To = 'Friday' or Assign\_Day\_To = 'Saturday' or Assign\_Day\_To = 'Sunday') NOT NULL,

Assign\_Recurrence\_End\_Date DATE NOT NULL,

Assign\_Date DATE NOT NULL,

Work\_Start\_Time TIME NOT NULL,

Work\_End\_Time TIME NOT NULL,

PRIMARY KEY (Assign\_Id)

);

\*The constraints:

* Assign\_Id is primary Key of type Integer and it cannot be NULL
* Admin\_Id is Foreign Key of type Integer that cannot be NULL, and it is referenced from the table **Administrator**
* Doc\_Id is Foreign Key of type Integer that cannot be NULL, and it is referenced from the table **Doctor**
* Clinic\_Id is Foreign Key of type Integer that cannot be NULL, and it is referenced from the table **Clinic**
* Doc\_Speciality is a Varchar(255) data type that cannot be NULL
* Assign\_Recurrence\_Type is Varchar(255) data type that cannot be null and it has a check condition that the Assign\_Recurrence\_Type can only contain ‘Weekly’, ‘Monthly’, or ‘Daily’ strings
* Assign\_Day\_From is Varchar(255) data type that cannot be null and it has a check condition that the Assign\_Day\_From can only contain ‘Monday’, ‘Tuesday’, ‘Wednesday’, ‘Thursday’, ‘Friday’, ‘Saturday’, or ‘Sunday’ strings
* Assign\_Day\_To is Varchar(255) data type that cannot be null and it has a check condition that the Assign\_Day\_To can only contain ‘Monday’, ‘Tuesday’, ‘Wednesday’, ‘Thursday’, ‘Friday’, ‘Saturday’, or ‘Sunday’ strings
* Assign\_Recurrence\_End\_Date is a Date data type that cannot be NULL
* Assign\_Date is a Date data type that cannot be NULL
* Work\_Start\_Time is a Time data type that cannot be NULL
* Work\_End\_Time is a Time data type that cannot be NULL

1. **Appointment:**

-- Create Appointment Table

CREATE TABLE APPOINTMENT

( Appoint\_Id INT NOT NULL,

Staff\_ID INT FOREIGN KEY REFERENCES FRONT\_DESK\_STAFF(Staff\_Id),

Doc\_Id INT FOREIGN KEY REFERENCES DOCTOR(Doc\_Id),

Clinic\_Id INT FOREIGN KEY REFERENCES CLINIC(Clinic\_Id),

Patient\_Id INT FOREIGN KEY REFERENCES PATIENT(Patient\_Id),

Speciality\_Appointed VARCHAR(255) NOT NULL,

Appoint\_Recurrence\_Type VARCHAR(255) CHECK(Appoint\_Recurrence\_Type = 'Daily' or Appoint\_Recurrence\_Type = 'Weekly' or Appoint\_Recurrence\_Type = 'Monthly') NOT NULL,

Appoint\_Day\_From VARCHAR(255) CHECK(Appoint\_Day\_From = 'Monday' or Appoint\_Day\_From = 'Tuesday' or Appoint\_Day\_From = 'Wednesday' or Appoint\_Day\_From = 'Thursday' or Appoint\_Day\_From = 'Friday' or Appoint\_Day\_From = 'Saturday' or Appoint\_Day\_From = 'Sunday') NOT NULL,

Appoint\_Day\_To VARCHAR(255) CHECK(Appoint\_Day\_To = 'Monday' or Appoint\_Day\_To = 'Tuesday' or Appoint\_Day\_To = 'Wednesday' or Appoint\_Day\_To = 'Thursday' or Appoint\_Day\_To = 'Friday' or Appoint\_Day\_To = 'Saturday' or Appoint\_Day\_To = 'Sunday') NOT NULL,

Appoint\_Recurrence\_End\_Date DATE NOT NULL,

Appoint\_Date DATE NOT NULL,

Appoint\_Time TIME NOT NULL,

Appoint\_Status VARCHAR(255) CHECK(Appoint\_Status = 'Active' or Appoint\_Status = 'Completed'),

PRIMARY KEY (Appoint\_ID)

);

\*The constraints:

* Appoint\_Id is primary Key of type Integer and it cannot be NULL
* Staff\_Id is Foreign Key of type Integer that cannot be NULL, and it is referenced from the table **Front\_Desk\_Staff**
* Doc\_Id is Foreign Key of type Integer that cannot be NULL, and it is referenced from the table **Doctor**
* Clinic\_Id is Foreign Key of type Integer that cannot be NULL, and it is referenced from the table **Clinic**
* Patient\_Id is Foreign Key of type Integer that cannot be NULL, and it is referenced from the table **Patient**
* Speciality\_Appointed is a Varchar(255) data type that cannot be NULL
* Appoint\_Recurrence\_Type is Varchar(255) data type that cannot be null and it has a check condition that the Appoint\_Recurrence\_Type can only contain ‘Weekly’, ‘Monthly’, or ‘Daily’ strings
* Appoint\_Day\_From is Varchar(255) data type that cannot be null and it has a check condition that the Appoint\_Day\_From can only contain ‘Monday’, ‘Tuesday’, ‘Wednesday’, ‘Thursday’, ‘Friday’, ‘Saturday’, or ‘Sunday’ strings
* Appoint\_Day\_To is Varchar(255) data type that cannot be null and it has a check condition that the Appoint\_Day\_To can only contain ‘Monday’, ‘Tuesday’, ‘Wednesday’, ‘Thursday’, ‘Friday’, ‘Saturday’, or ‘Sunday’ strings
* Appoint\_Recurrence\_End\_Date is a Date data type that cannot be NULL
* Appoint\_Date is a Date data type that cannot be NULL
* Appoint\_Time is a Time data type that cannot be NULL
* Appoint\_Status is a Varchar(255) data type that cannot be NULL and it has a check condition that the Appoint\_Status can only contain either an ‘Active’ or a ‘Completed’ string status

1. **Waiting\_List:**

-- Create Waiting\_List Table

CREATE TABLE WAITING\_LIST

( Waiting\_List\_Id INT NOT NULL,

Staff\_Id INT FOREIGN KEY REFERENCES FRONT\_DESK\_STAFF(Staff\_Id),

Patient\_Id INT FOREIGN KEY REFERENCES PATIENT(Patient\_Id),

Clinic\_Id INT FOREIGN KEY REFERENCES CLINIC(Clinic\_Id),

Speciality\_required VARCHAR(255) NOT NULL,

PRIMARY KEY (Waiting\_List\_Id)

);

\*The constraints:

* Waiting\_List\_Id is primary Key of type Integer and it cannot be NULL
* Staff\_Id is Foreign Key of type Integer that cannot be NULL, and it is referenced from the table **Front\_Desk\_Staff**
* Patient\_Id is Foreign Key of type Integer that cannot be NULL, and it is referenced from the table **Patient**
* Clinic\_Id is Foreign Key of type Integer that cannot be NULL, and it is referenced from the table **Clinic**
* Speciality\_required is a Varchar(255) data type that cannot be NULL

**SQL queries for Data insertion and Fetching:** Healthcare Scheduling System

* I have used the following SQL Queries to insert data into the tables for each entity:

1. **Doctor:**

-- Insert Data into DOCTOR Table--

INSERT INTO DOCTOR(Doc\_Id, Doc\_Name, Doc\_Phone, Speciality)

VALUES(1000, 'Khursheed', '9100-8864523', 'Gastology');

INSERT INTO DOCTOR(Doc\_Id, Doc\_Name, Doc\_Phone, Speciality)

VALUES(1001, 'John', '0900-1234567', 'Orthopedics');

INSERT INTO DOCTOR(Doc\_Id, Doc\_Name, Doc\_Phone, Speciality)

VALUES(1002, 'Oliver', '0400-7534237', 'Oncology');

INSERT INTO DOCTOR(Doc\_Id, Doc\_Name, Doc\_Phone, Speciality)

VALUES(1003, 'Watson', '1200-3736831', 'Cardiology');

INSERT INTO DOCTOR(Doc\_Id, Doc\_Name, Doc\_Phone, Speciality)

VALUES(1004, 'Khan', '0350-836782', 'Dermatology');

INSERT INTO DOCTOR(Doc\_Id, Doc\_Name, Doc\_Phone, Speciality)

VALUES(1005, 'Adam', '0120-466672', 'Radiology');

INSERT INTO DOCTOR(Doc\_Id, Doc\_Name, Doc\_Phone, Speciality)

VALUES(1006, 'Jimmy', '222-222476', 'Gastology');

INSERT INTO DOCTOR(Doc\_Id, Doc\_Name, Doc\_Phone, Speciality)

VALUES(1007, 'Zafina', '876-23453226', 'Oncology');

1. **Patient:**

-- Insert Data into PATIENT Table--

INSERT INTO PATIENT(Patient\_Id, Patient\_Name, Patient\_Phone)

VALUES(500, 'Willow', '100-234523');

INSERT INTO PATIENT(Patient\_Id, Patient\_Name, Patient\_Phone)

VALUES(501, 'Tina', '123-244555');

INSERT INTO PATIENT(Patient\_Id, Patient\_Name, Patient\_Phone)

VALUES(502, 'Lida', '231-321333');

INSERT INTO PATIENT(Patient\_Id, Patient\_Name, Patient\_Phone)

VALUES(503, 'Olivia', '892-333444');

INSERT INTO PATIENT(Patient\_Id, Patient\_Name, Patient\_Phone)

VALUES(504, 'Bella', '999-111222');

INSERT INTO PATIENT(Patient\_Id, Patient\_Name, Patient\_Phone)

VALUES(505, 'Luna', '666-666623');

INSERT INTO PATIENT(Patient\_Id, Patient\_Name, Patient\_Phone)

VALUES(506, 'Bahadur', '777-677773');

INSERT INTO PATIENT(Patient\_Id, Patient\_Name, Patient\_Phone)

VALUES(507, 'Wong', '873-123423');

INSERT INTO PATIENT(Patient\_Id, Patient\_Name, Patient\_Phone)

VALUES(508, 'Jhonny', '9023-46624');

INSERT INTO PATIENT(Patient\_Id, Patient\_Name, Patient\_Phone)

VALUES(509, 'Peter', '9112-31344');

INSERT INTO PATIENT(Patient\_Id, Patient\_Name, Patient\_Phone)

VALUES(510, 'Veronica', '7823-783551');

1. **Administrator:**

-- Insert Data into Administrator Table--

INSERT INTO ADMINISTRATOR(Admin\_Id, Admin\_Name)

VALUES(1, 'Frenzo');

1. **Front\_Desk\_Staff:**

-- Insert Data into FRONT\_DESK\_STAFF Table--

INSERT INTO FRONT\_DESK\_STAFF(Staff\_Id, Staff\_Name, Staff\_Phone)

VALUES(10, 'Xardas', '331-333331');

1. **Clinic:**

-- Insert Data into CLINIC Table--

INSERT INTO CLINIC(Clinic\_Id, Clinic\_Name, Opening\_Hours, Closing\_Hours)

VALUES(200, 'Broklyn', '07:15:00', '18:00:00');

INSERT INTO CLINIC(Clinic\_Id, Clinic\_Name, Opening\_Hours, Closing\_Hours)

VALUES(201, 'Manhattan', '05:00:00', '12:00:00');

INSERT INTO CLINIC(Clinic\_Id, Clinic\_Name, Opening\_Hours, Closing\_Hours)

VALUES(202, 'Yorker', '08:30:00', '21:00:00');

INSERT INTO CLINIC(Clinic\_Id, Clinic\_Name, Opening\_Hours, Closing\_Hours)

VALUES(203, 'SandyShore', '05:30:00', '23:30:00');

INSERT INTO CLINIC(Clinic\_Id, Clinic\_Name, Opening\_Hours, Closing\_Hours)

VALUES(204, 'Miami', '09:15:00', '19:00:00');

INSERT INTO CLINIC(Clinic\_Id, Clinic\_Name, Opening\_Hours, Closing\_Hours)

VALUES(205, 'Bermuda', '04:00:00', '23:59:00');

1. **Specialization:**

-- Insert Data into SPECIALIZATION Table--

INSERT INTO SPECIALIZATION(Speciality\_Name, Clinic\_Id)

VALUES('Orthopedics', 200);

INSERT INTO SPECIALIZATION(Speciality\_Name, Clinic\_Id)

VALUES('Oncology', 200);

INSERT INTO SPECIALIZATION(Speciality\_Name, Clinic\_Id)

VALUES('Gastology', 201);

INSERT INTO SPECIALIZATION(Speciality\_Name, Clinic\_Id)

VALUES('Orthopedics', 201);

INSERT INTO SPECIALIZATION(Speciality\_Name, Clinic\_Id)

VALUES('Oncology', 201);

INSERT INTO SPECIALIZATION(Speciality\_Name, Clinic\_Id)

VALUES('Dermatology', 202);

INSERT INTO SPECIALIZATION(Speciality\_Name, Clinic\_Id)

VALUES('Gastology', 202);

INSERT INTO SPECIALIZATION(Speciality\_Name, Clinic\_Id)

VALUES('Radiology', 203);

INSERT INTO SPECIALIZATION(Speciality\_Name, Clinic\_Id)

VALUES('Cardiology', 204);

INSERT INTO SPECIALIZATION(Speciality\_Name, Clinic\_Id)

VALUES('Oncology', 204);

INSERT INTO SPECIALIZATION(Speciality\_Name, Clinic\_Id)

VALUES('Cardiology', 205);

INSERT INTO SPECIALIZATION(Speciality\_Name, Clinic\_Id)

VALUES('Dermatology', 205);

1. **Assignment:**

-- Insert Data into ASSIGNMENT Table--

INSERT INTO ASSIGNMENT(Assign\_Id, Admin\_id, Doc\_Id, Clinic\_Id, Doc\_Speciality, Assign\_Recurrence\_Type, Assign\_Day\_From, Assign\_Day\_To, Assign\_Recurrence\_End\_Date, Assign\_Date, Work\_Start\_Time, Work\_End\_Time)

VALUES(300, 1, 1000, 202, 'Gastology', 'Weekly', 'Monday', 'Tuesday', '2022-12-31', '2021-05-10', '09:00:00', '12:00:00');

INSERT INTO ASSIGNMENT(Assign\_Id, Admin\_id, Doc\_Id, Clinic\_Id, Doc\_Speciality, Assign\_Recurrence\_Type, Assign\_Day\_From, Assign\_Day\_To, Assign\_Recurrence\_End\_Date, Assign\_Date, Work\_Start\_Time, Work\_End\_Time)

VALUES(301, 1, 1004, 202, 'Dermatology', 'Monthly', 'Monday', 'Wednesday', '2022-08-15', '2021-01-01', '09:30:00', '12:30:00');

INSERT INTO ASSIGNMENT(Assign\_Id, Admin\_id, Doc\_Id, Clinic\_Id, Doc\_Speciality, Assign\_Recurrence\_Type, Assign\_Day\_From, Assign\_Day\_To, Assign\_Recurrence\_End\_Date, Assign\_Date, Work\_Start\_Time, Work\_End\_Time)

VALUES(302, 1, 1005, 203, 'Radiology', 'Daily', 'Monday', 'Friday', '2023-12-31', '2022-01-03', '06:00:00', '18:59:00');

INSERT INTO ASSIGNMENT(Assign\_Id, Admin\_id, Doc\_Id, Clinic\_Id, Doc\_Speciality, Assign\_Recurrence\_Type, Assign\_Day\_From, Assign\_Day\_To, Assign\_Recurrence\_End\_Date, Assign\_Date, Work\_Start\_Time, Work\_End\_Time)

VALUES(303, 1, 1000, 201, 'Gastology', 'Monthly', 'Thursday', 'Friday', '2024-12-12', '2020-01-13', '08:00:00', '10:30:00');

INSERT INTO ASSIGNMENT(Assign\_Id, Admin\_id, Doc\_Id, Clinic\_Id, Doc\_Speciality, Assign\_Recurrence\_Type, Assign\_Day\_From, Assign\_Day\_To, Assign\_Recurrence\_End\_Date, Assign\_Date, Work\_Start\_Time, Work\_End\_Time)

VALUES(304, 1, 1001, 200, 'Orthopedics', 'Daily', 'Monday', 'Wednesday', '2024-11-11', '2020-03-15', '08:30:00', '14:59:00');

INSERT INTO ASSIGNMENT(Assign\_Id, Admin\_id, Doc\_Id, Clinic\_Id, Doc\_Speciality, Assign\_Recurrence\_Type, Assign\_Day\_From, Assign\_Day\_To, Assign\_Recurrence\_End\_Date, Assign\_Date, Work\_Start\_Time, Work\_End\_Time)

VALUES(305, 1, 1002, 200, 'Oncology', 'Weekly', 'Saturday', 'Sunday', '2025-09-07', '2019-06-23', '09:00:00', '13:30:00');

INSERT INTO ASSIGNMENT(Assign\_Id, Admin\_id, Doc\_Id, Clinic\_Id, Doc\_Speciality, Assign\_Recurrence\_Type, Assign\_Day\_From, Assign\_Day\_To, Assign\_Recurrence\_End\_Date, Assign\_Date, Work\_Start\_Time, Work\_End\_Time)

VALUES(306, 1, 1001, 201, 'Orthopedics', 'Weekly', 'Friday', 'Saturday', '2024-11-11', '2020-03-15', '07:30:00', '10:30:00');

INSERT INTO ASSIGNMENT(Assign\_Id, Admin\_id, Doc\_Id, Clinic\_Id, Doc\_Speciality, Assign\_Recurrence\_Type, Assign\_Day\_From, Assign\_Day\_To, Assign\_Recurrence\_End\_Date, Assign\_Date, Work\_Start\_Time, Work\_End\_Time)

VALUES(307, 1, 1002, 201, 'Oncology', 'Daily', 'Monday', 'Wednesday', '2025-09-07', '2019-06-23', '06:00:00', '09:30:00');

INSERT INTO ASSIGNMENT(Assign\_Id, Admin\_id, Doc\_Id, Clinic\_Id, Doc\_Speciality, Assign\_Recurrence\_Type, Assign\_Day\_From, Assign\_Day\_To, Assign\_Recurrence\_End\_Date, Assign\_Date, Work\_Start\_Time, Work\_End\_Time)

VALUES(308, 1, 1003, 204, 'Cardiology', 'Daily', 'Monday', 'Tuesday', '2025-03-10', '2018-01-23', '10:00:00', '17:30:00');

INSERT INTO ASSIGNMENT(Assign\_Id, Admin\_id, Doc\_Id, Clinic\_Id, Doc\_Speciality, Assign\_Recurrence\_Type, Assign\_Day\_From, Assign\_Day\_To, Assign\_Recurrence\_End\_Date, Assign\_Date, Work\_Start\_Time, Work\_End\_Time)

VALUES(309, 1, 1002, 204, 'Oncology', 'Daily', 'Thursday', 'Friday', '2025-09-07', '2019-06-23', '11:00:00', '18:30:00');

INSERT INTO ASSIGNMENT(Assign\_Id, Admin\_id, Doc\_Id, Clinic\_Id, Doc\_Speciality, Assign\_Recurrence\_Type, Assign\_Day\_From, Assign\_Day\_To, Assign\_Recurrence\_End\_Date, Assign\_Date, Work\_Start\_Time, Work\_End\_Time)

VALUES(310, 1, 1003, 205, 'Cardiology', 'Daily', 'Wednesday', 'Friday', '2025-03-10', '2018-01-23', '10:00:00', '20:30:00');

INSERT INTO ASSIGNMENT(Assign\_Id, Admin\_id, Doc\_Id, Clinic\_Id, Doc\_Speciality, Assign\_Recurrence\_Type, Assign\_Day\_From, Assign\_Day\_To, Assign\_Recurrence\_End\_Date, Assign\_Date, Work\_Start\_Time, Work\_End\_Time)

VALUES(311, 1, 1004, 205, 'Dermatology', 'Daily', 'Thursday', 'Friday', '2022-08-15', '2021-01-01', '09:30:00', '12:30:00');

INSERT INTO ASSIGNMENT(Assign\_Id, Admin\_id, Doc\_Id, Clinic\_Id, Doc\_Speciality, Assign\_Recurrence\_Type, Assign\_Day\_From, Assign\_Day\_To, Assign\_Recurrence\_End\_Date, Assign\_Date, Work\_Start\_Time, Work\_End\_Time)

VALUES(312, 1, 1006, 202, 'Gastology', 'Weekly', 'Monday', 'Tuesday', '2022-09-30', '2022-05-10', '09:00:00', '12:00:00');

INSERT INTO ASSIGNMENT(Assign\_Id, Admin\_id, Doc\_Id, Clinic\_Id, Doc\_Speciality, Assign\_Recurrence\_Type, Assign\_Day\_From, Assign\_Day\_To, Assign\_Recurrence\_End\_Date, Assign\_Date, Work\_Start\_Time, Work\_End\_Time)

VALUES(313, 1, 1007, 200, 'Oncology', 'Daily', 'Monday', 'Friday', '2022-10-30', '2022-05-10', '08:00:00', '12:30:00');

1. **Appointment:**

-- Insert Data into APPOINTMENT Table--

INSERT INTO APPOINTMENT(Appoint\_Id, Staff\_id, Doc\_Id, Clinic\_Id, Patient\_Id, Speciality\_Appointed, Appoint\_Recurrence\_Type, Appoint\_Day\_From, Appoint\_Day\_To, Appoint\_Recurrence\_End\_Date, Appoint\_Date, Appoint\_Time, Appoint\_Status)

VALUES(700, 10, 1000, 202, 503, 'Gastology', 'Weekly', 'Monday', 'Tuesday', '2022-06-22', '2022-05-22', '09:30:00', 'Active');

INSERT INTO APPOINTMENT(Appoint\_Id, Staff\_id, Doc\_Id, Clinic\_Id, Patient\_Id, Speciality\_Appointed, Appoint\_Recurrence\_Type, Appoint\_Day\_From, Appoint\_Day\_To, Appoint\_Recurrence\_End\_Date, Appoint\_Date, Appoint\_Time, Appoint\_Status)

VALUES(701, 10, 1001, 200, 500, 'Orthopedics', 'Monthly', 'Tuesday', 'Wednesday', '2022-05-10', '2022-04-10', '09:00:00', 'Active');

INSERT INTO APPOINTMENT(Appoint\_Id, Staff\_id, Doc\_Id, Clinic\_Id, Patient\_Id, Speciality\_Appointed, Appoint\_Recurrence\_Type, Appoint\_Day\_From, Appoint\_Day\_To, Appoint\_Recurrence\_End\_Date, Appoint\_Date, Appoint\_Time, Appoint\_Status)

VALUES(702, 10, 1003, 204, 504, 'Cardiology', 'Daily', 'Monday', 'Tuesday', '2022-07-30', '2022-03-12', '12:00:00', 'Active');

INSERT INTO APPOINTMENT(Appoint\_Id, Staff\_id, Doc\_Id, Clinic\_Id, Patient\_Id, Speciality\_Appointed, Appoint\_Recurrence\_Type, Appoint\_Day\_From, Appoint\_Day\_To, Appoint\_Recurrence\_End\_Date, Appoint\_Date, Appoint\_Time, Appoint\_Status)

VALUES(703, 10, 1002, 201, 505, 'Oncology', 'Weekly', 'Tuesday', 'Wednesday', '2022-08-10', '2022-02-10', '08:00:00', 'Active');

INSERT INTO APPOINTMENT(Appoint\_Id, Staff\_id, Doc\_Id, Clinic\_Id, Patient\_Id, Speciality\_Appointed, Appoint\_Recurrence\_Type, Appoint\_Day\_From, Appoint\_Day\_To, Appoint\_Recurrence\_End\_Date, Appoint\_Date, Appoint\_Time, Appoint\_Status)

VALUES(704, 10, 1004, 205, 502, 'Dermatology', 'Monthly', 'Thursday', 'Friday', '2022-10-10', '2022-01-10', '10:00:00', 'Active');

INSERT INTO APPOINTMENT(Appoint\_Id, Staff\_id, Doc\_Id, Clinic\_Id, Patient\_Id, Speciality\_Appointed, Appoint\_Recurrence\_Type, Appoint\_Day\_From, Appoint\_Day\_To, Appoint\_Recurrence\_End\_Date, Appoint\_Date, Appoint\_Time, Appoint\_Status)

VALUES(705, 10, 1005, 203, 501, 'Radiology', 'Monthly', 'Thursday', 'Friday', '2022-12-10', '2022-03-15', '11:30:00', 'Active');

INSERT INTO APPOINTMENT(Appoint\_Id, Staff\_id, Doc\_Id, Clinic\_Id, Patient\_Id, Speciality\_Appointed, Appoint\_Recurrence\_Type, Appoint\_Day\_From, Appoint\_Day\_To, Appoint\_Recurrence\_End\_Date, Appoint\_Date, Appoint\_Time, Appoint\_Status)

VALUES(706, 10, 1004, 202, 509, 'Dermatology', 'Monthly', 'Tuesday', 'Wednesday', '2022-04-20', '2022-03-20', '10:45:00', 'Active');

INSERT INTO APPOINTMENT(Appoint\_Id, Staff\_id, Doc\_Id, Clinic\_Id, Patient\_Id, Speciality\_Appointed, Appoint\_Recurrence\_Type, Appoint\_Day\_From, Appoint\_Day\_To, Appoint\_Recurrence\_End\_Date, Appoint\_Date, Appoint\_Time, Appoint\_Status)

VALUES(707, 10, 1000, 202, 510, 'Gastology', 'Monthly', 'Monday', 'Tuesday', '2022-09-22', '2022-03-22', '10:30:00', 'Active');

INSERT INTO APPOINTMENT(Appoint\_Id, Staff\_id, Doc\_Id, Clinic\_Id, Patient\_Id, Speciality\_Appointed, Appoint\_Recurrence\_Type, Appoint\_Day\_From, Appoint\_Day\_To, Appoint\_Recurrence\_End\_Date, Appoint\_Date, Appoint\_Time, Appoint\_Status)

VALUES(708, 10, 1007, 201, 505, 'Oncology', 'Weekly', 'Tuesday', 'Wednesday', '2022-08-10', '2022-02-10', '10:00:00', 'Active');

1. **Waiting\_List:**

-- Insert Data into Waiting\_List Table--

INSERT INTO Waiting\_List(Waiting\_List\_Id, Staff\_Id, Patient\_Id, Clinic\_Id, Speciality\_Required)

VALUES(420, 10, 506, 205, 'Cardiology');

INSERT INTO Waiting\_List(Waiting\_List\_Id, Staff\_Id, Patient\_Id, Clinic\_Id, Speciality\_Required)

VALUES(421, 10, 507, 202, 'Gastology');

INSERT INTO Waiting\_List(Waiting\_List\_Id, Staff\_Id, Patient\_Id, Clinic\_Id, Speciality\_Required)

VALUES(422, 10, 508, 203, 'Radiology');

* I have used the following SQL Queries to Fetch data for the following Queries:

-- (1) All patients with appointments on the clinic with the ID 202 (weekly, monthly, daily).

SELECT PATIENT.Patient\_Id, PATIENT.Patient\_Name

FROM PATIENT

INNER JOIN APPOINTMENT

ON APPOINTMENT.Patient\_Id = PATIENT.Patient\_Id

WHERE APPOINTMENT.Clinic\_Id = 202;

-- (2) All patients with appointments related to a specialty of Gastology on all clinics (weekly, monthly, daily)

SELECT PATIENT.Patient\_Id, PATIENT.Patient\_Name

FROM PATIENT

INNER JOIN APPOINTMENT

ON APPOINTMENT.Patient\_Id = PATIENT.Patient\_Id

WHERE APPOINTMENT.Speciality\_Appointed = 'Gastology';

-- (3) All patient appointments with the doctor ID 1002 (weekly, monthly, daily)

SELECT PATIENT.Patient\_Id, PATIENT.Patient\_Name

FROM PATIENT

INNER JOIN APPOINTMENT

ON APPOINTMENT.Patient\_Id = PATIENT.Patient\_Id

WHERE APPOINTMENT.Doc\_Id = 1002;

-- (4) All appointments or assignments on clinic(s) between 08:00:00 and 12:00:00

SELECT \*

FROM APPOINTMENT

WHERE APPOINTMENT.Appoint\_Time >= '08:00:00' AND APPOINTMENT.Appoint\_Time <= '12:00:00';

-- (5) Doctors of same specialty of Gastology with overlapping assignments on clinic id 202 (weekly, monthly, daily)

SELECT \*

FROM ASSIGNMENT a1, ASSIGNMENT a2

WHERE a1.Doc\_Speciality = 'Gastology' AND (a1.Work\_Start\_Time = a2.Work\_Start\_Time AND a1.Work\_End\_Time = a2.Work\_End\_Time) AND a1.Clinic\_Id = 202;

-- (6) Doctors with least number of appointments on a clinic(s) (weekly, monthly, daily).

SELECT APPOINTMENT.Doc\_Id, COUNT(APPOINTMENT.Doc\_Id) As Doctors\_With\_Minimum\_Appointments

FROM APPOINTMENT

GROUP BY APPOINTMENT.Doc\_Id

HAVING COUNT(APPOINTMENT.Doc\_Id) =

(SELECT MIN(No\_Of\_Appointments)

FROM (SELECT COUNT(APPOINTMENT.Doc\_Id) As No\_Of\_Appointments

FROM APPOINTMENT

GROUP BY APPOINTMENT.Doc\_Id) as [Min]);

-- (7) Doctors with maximum number of appointments related to a specialty. (weekly, monthly, daily)

SELECT APPOINTMENT.Doc\_Id, COUNT(APPOINTMENT.Doc\_Id) As Doctors\_With\_Maximum\_Appointments\_With\_Speciality\_Gastology

FROM APPOINTMENT

WHERE APPOINTMENT.Speciality\_Appointed = 'Gastology'

GROUP BY APPOINTMENT.Doc\_Id

HAVING COUNT(APPOINTMENT.Doc\_Id) =

(SELECT MAX(No\_Of\_Appointments)

FROM (SELECT COUNT(APPOINTMENT.Doc\_Id) As No\_Of\_Appointments

FROM APPOINTMENT

WHERE APPOINTMENT.Speciality\_Appointed = 'Gastology'

GROUP BY APPOINTMENT.Doc\_Id) as [Max]);

-- (8) Patient whose recurrent appointment is with the same doctor with ID 1000.

SELECT \*

FROM APPOINTMENT a1, APPOINTMENT a2

WHERE a1.Patient\_Id = a2.Patient\_Id AND (a1.Doc\_Id = 1000 AND a2.Doc\_Id = 1000);

-- (9) Patient whose recurrent appointment is with different doctors.

SELECT \*

FROM APPOINTMENT a1, APPOINTMENT a2

WHERE a1.Patient\_Id = a2.Patient\_Id AND a1.Doc\_Id != a2.Doc\_Id;

-- (10) Patients who are in the waiting list with Speciality Required 'Cardiology'

SELECT \*

FROM WAITING\_LIST

WHERE WAITING\_LIST.Speciality\_required = 'Cardiology';

-- (11) Doctors who work in clinics at 9 P.M.

SELECT \*

FROM ASSIGNMENT

WHERE ASSIGNMENT.Work\_Start\_Time = '09:00:00';

-- (12) Patients who are appointed in clinic id 203

SELECT \*

FROM APPOINTMENT

WHERE APPOINTMENT.Clinic\_Id = 203;

-- (13) Patients who have an Active Appointment Status

SELECT \*

FROM APPOINTMENT

WHERE APPOINTMENT.Appoint\_Status = 'Active';

-- (14) Patients who have a Completed Appointment Status

SELECT \*

FROM APPOINTMENT

WHERE APPOINTMENT.Appoint\_Status = 'Completed';

-- (15) Name of doctor appointed to a patient who requires speciality of Gastology

SELECT DISTINCT DOCTOR.Doc\_Id, DOCTOR.Doc\_Name

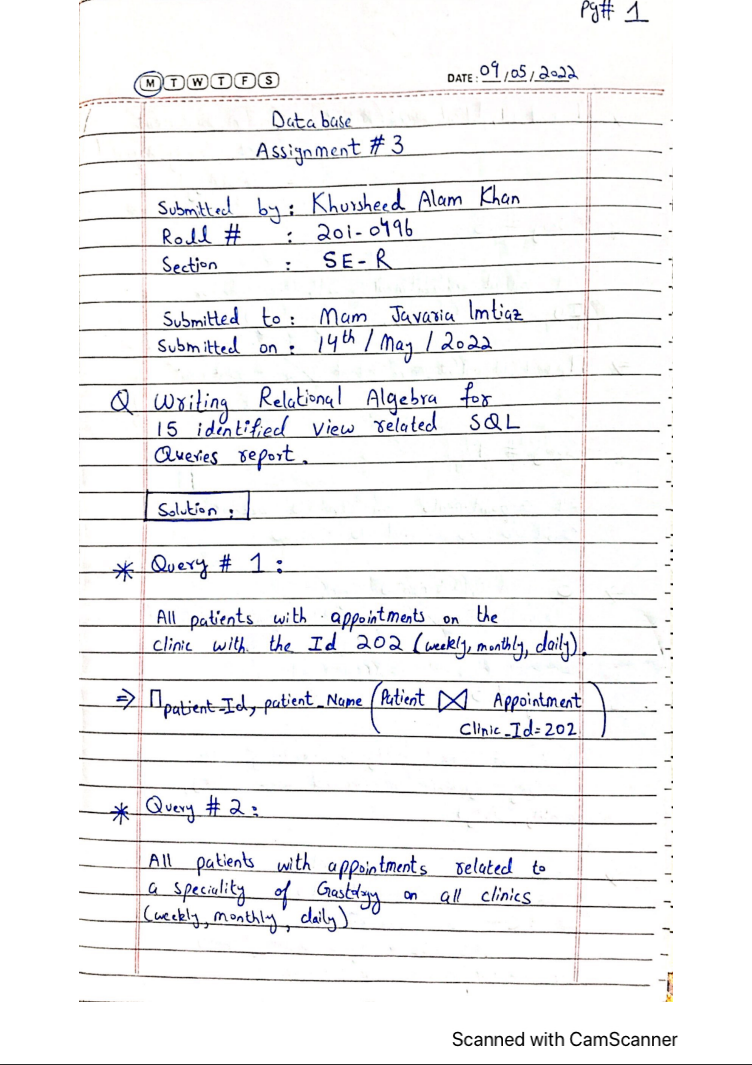
FROM DOCTOR

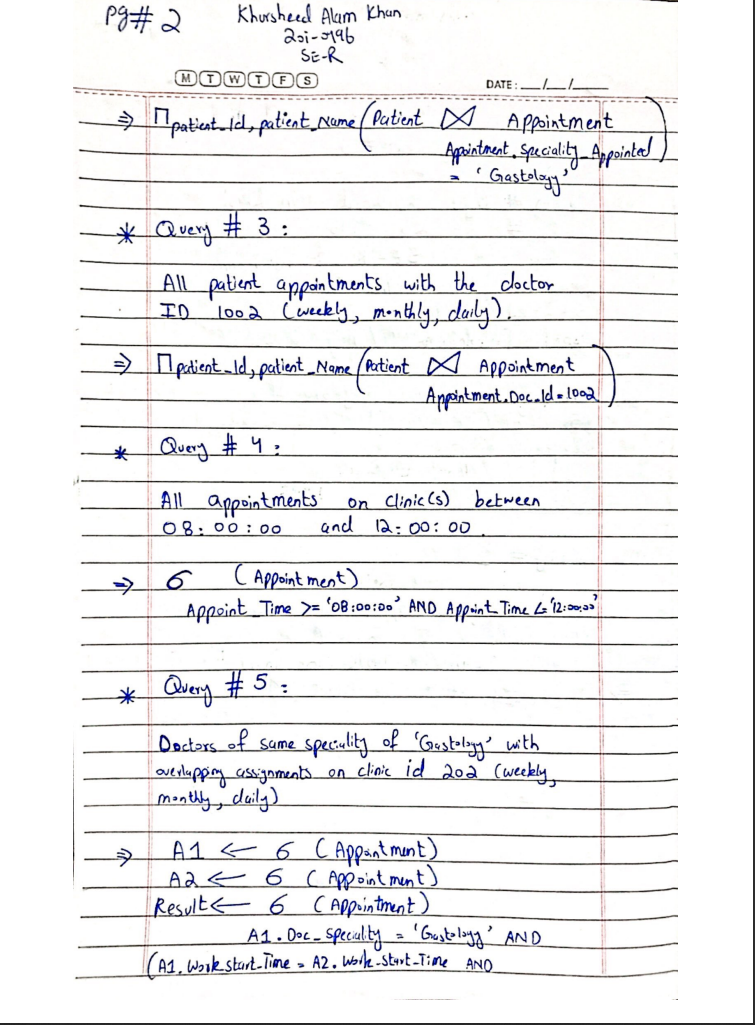
INNER JOIN APPOINTMENT

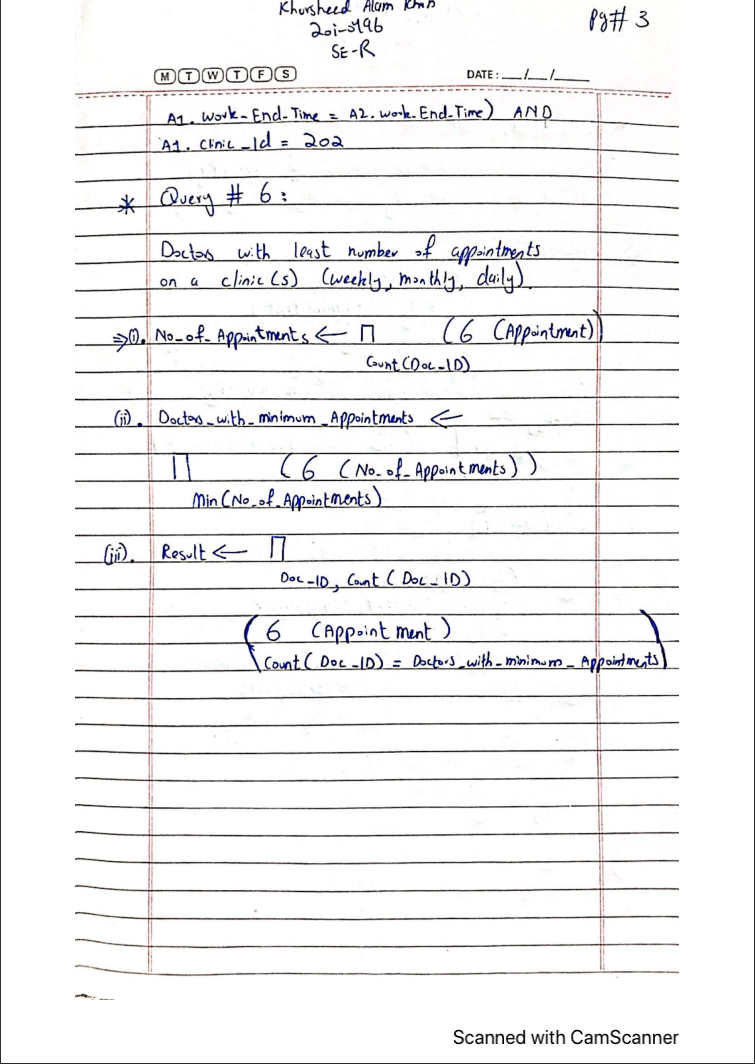
ON APPOINTMENT.Doc\_Id = DOCTOR.Doc\_Id

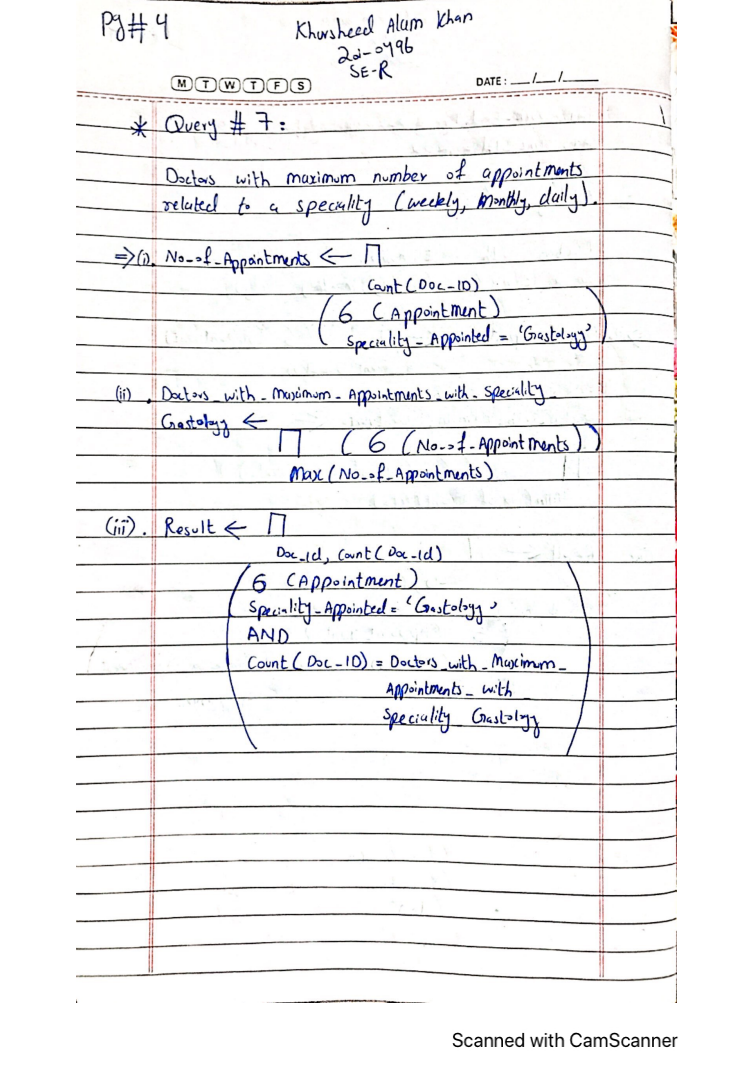
WHERE APPOINTMENT.Speciality\_Appointed = 'Gastology';

**SQL and Relational Algebra Queries:** Healthcare Scheduling System

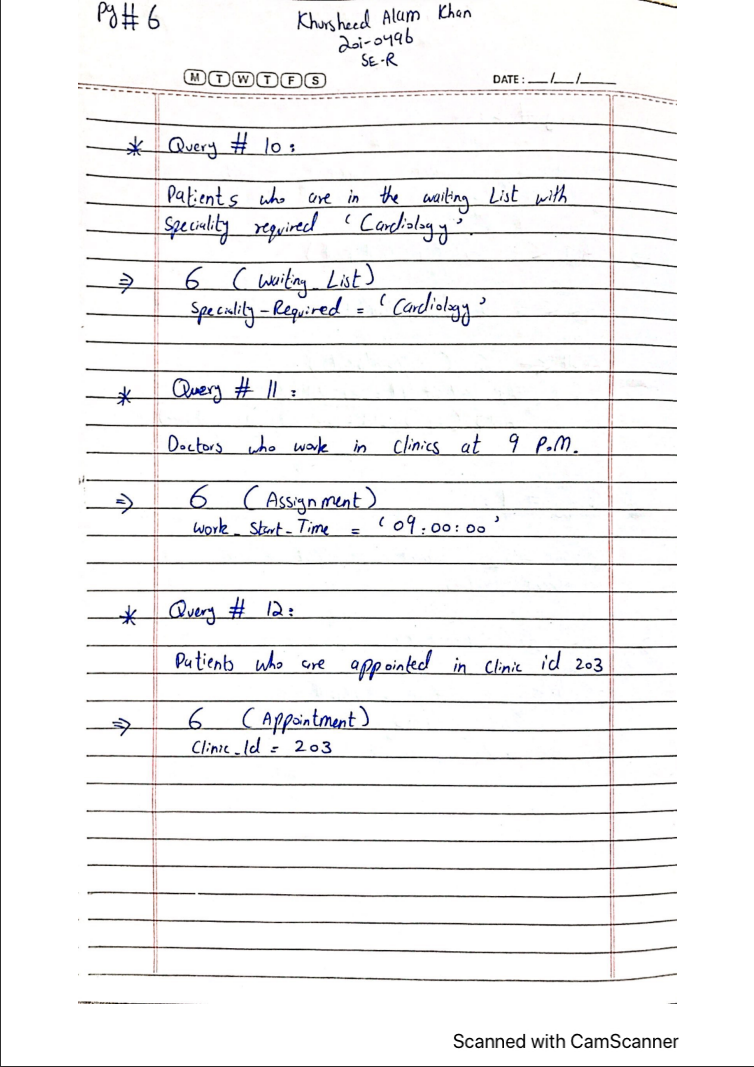
* The Following Images show the Relational Algebra Queries that I have written for the 15 SQL queries mentioned above:

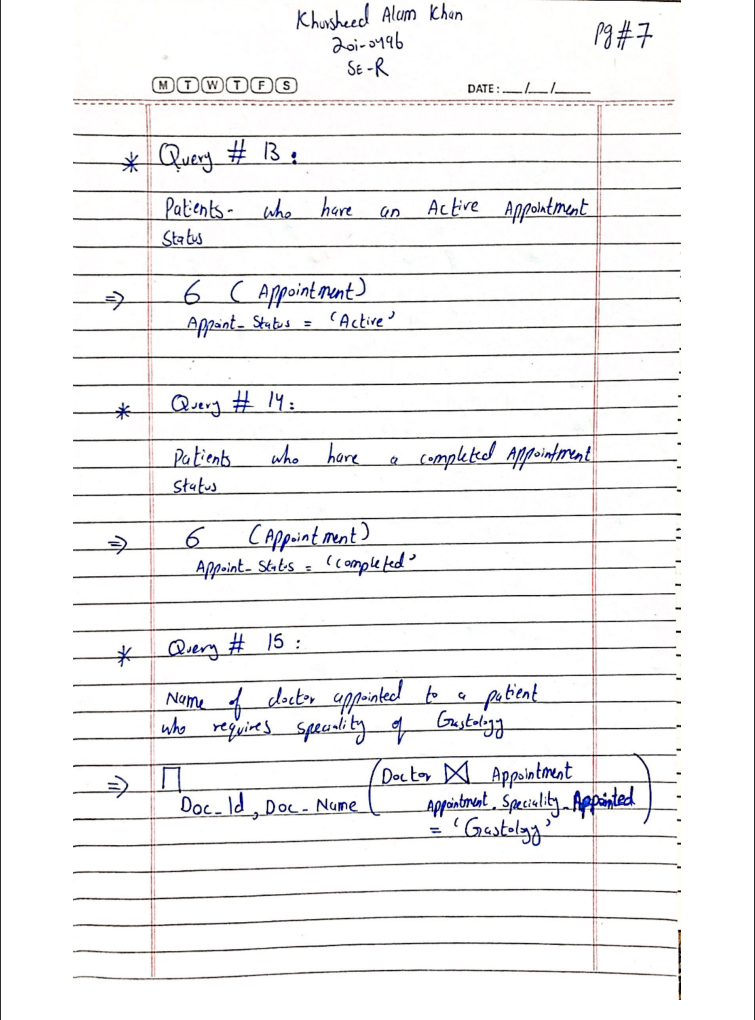






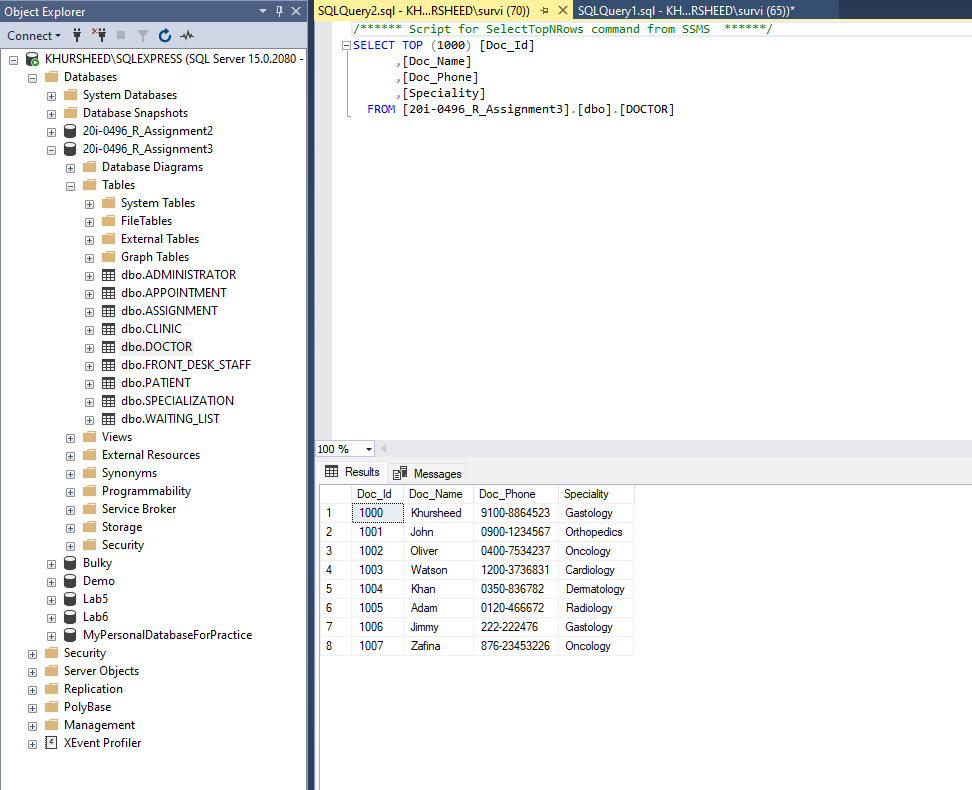
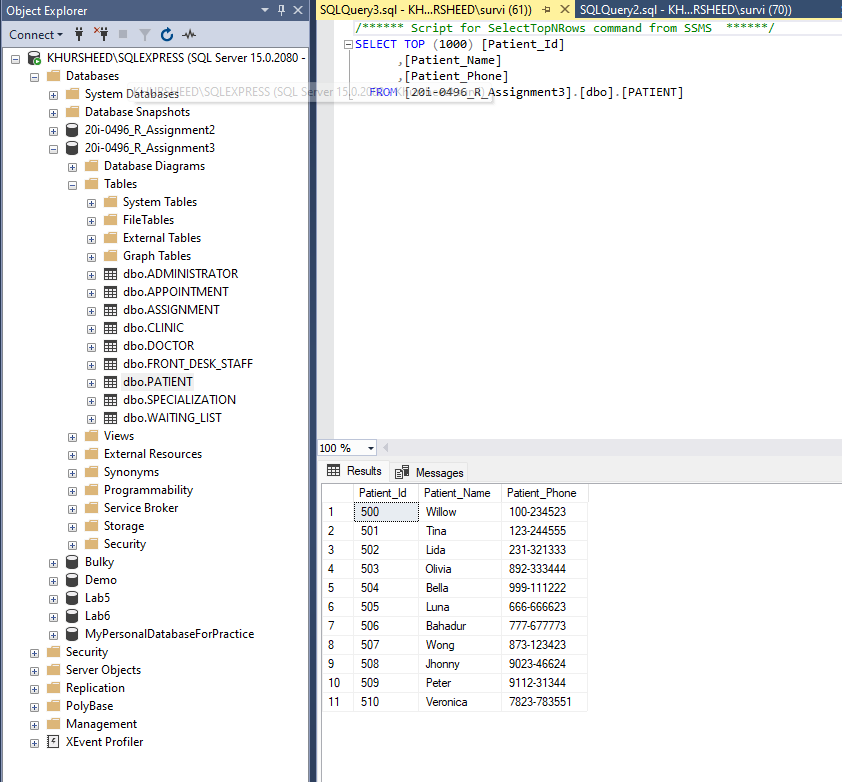
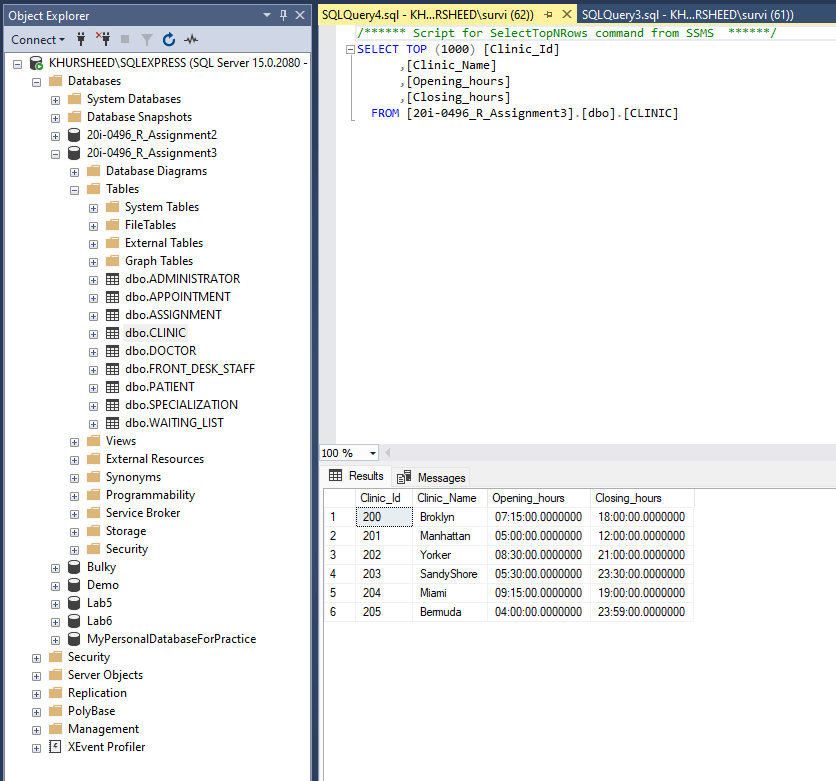
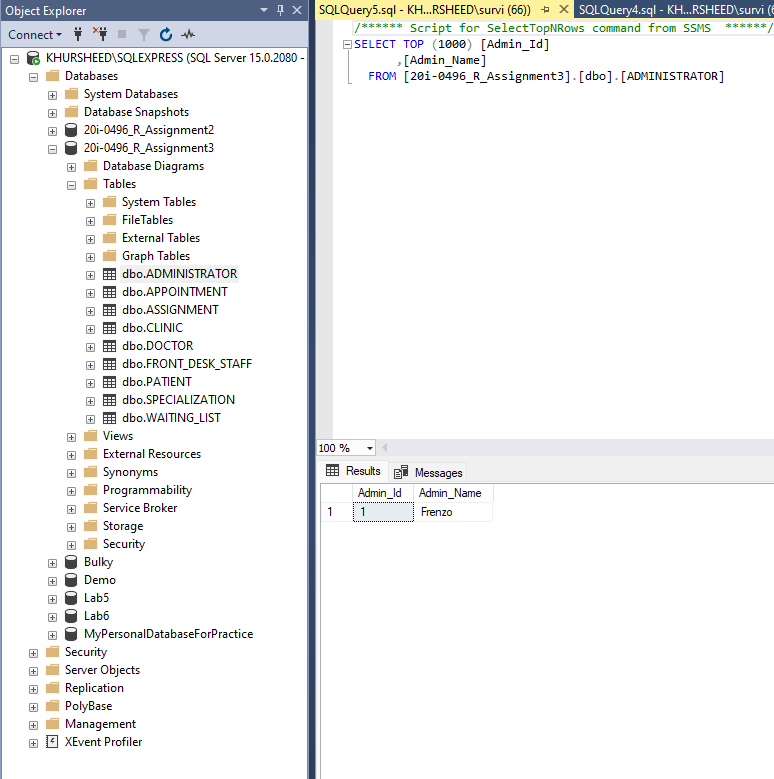
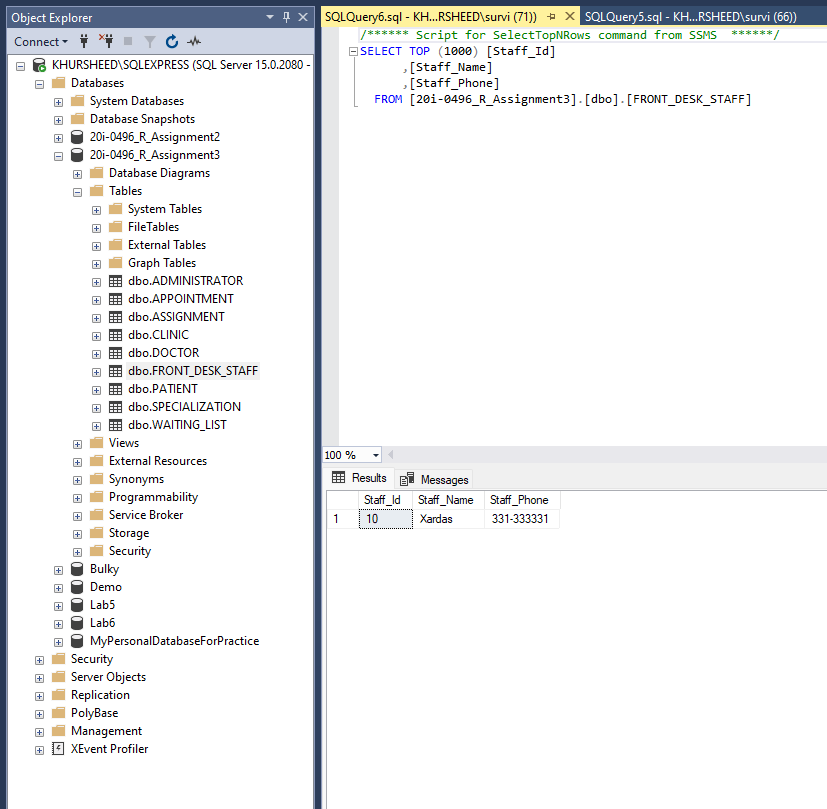
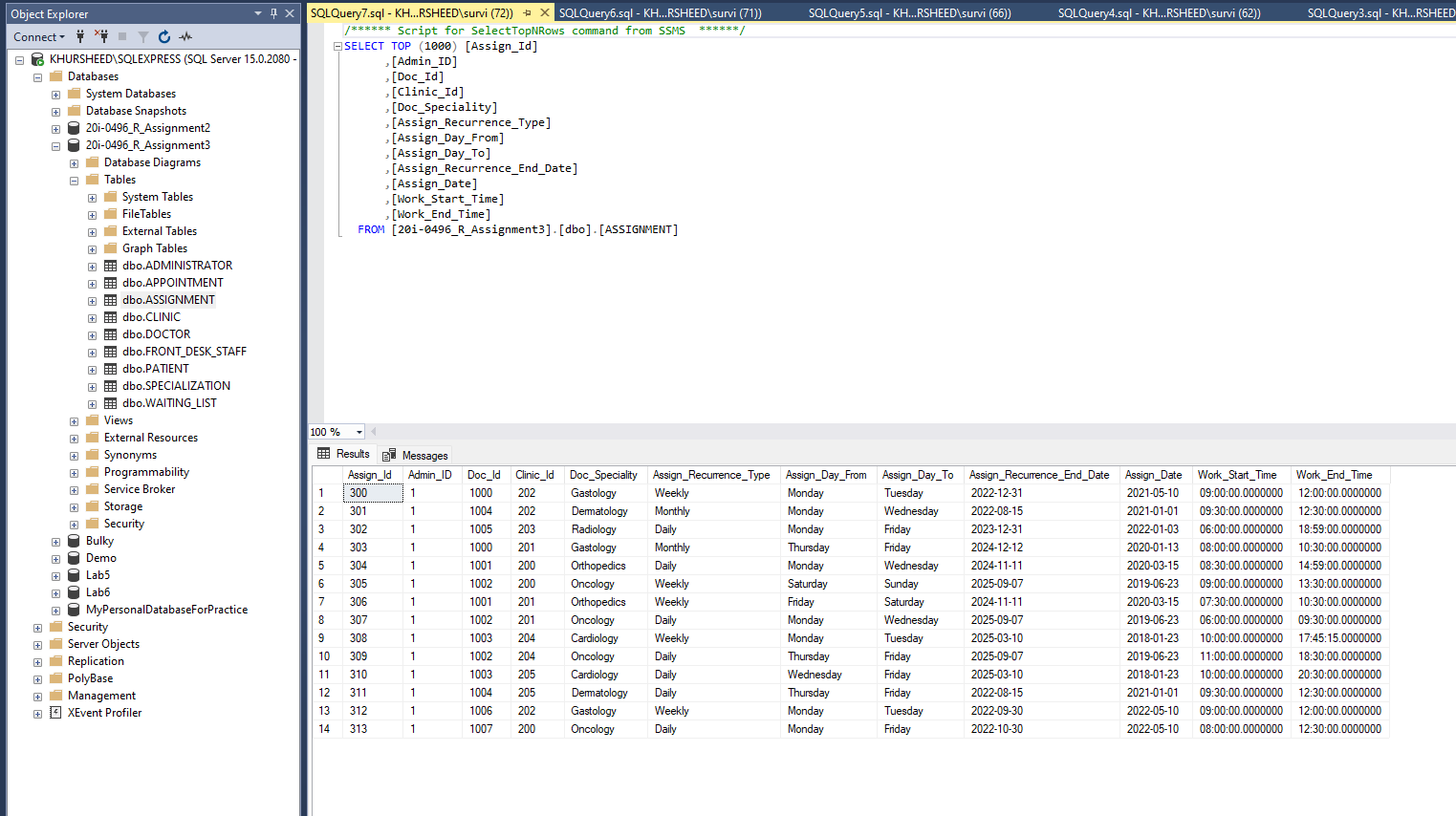
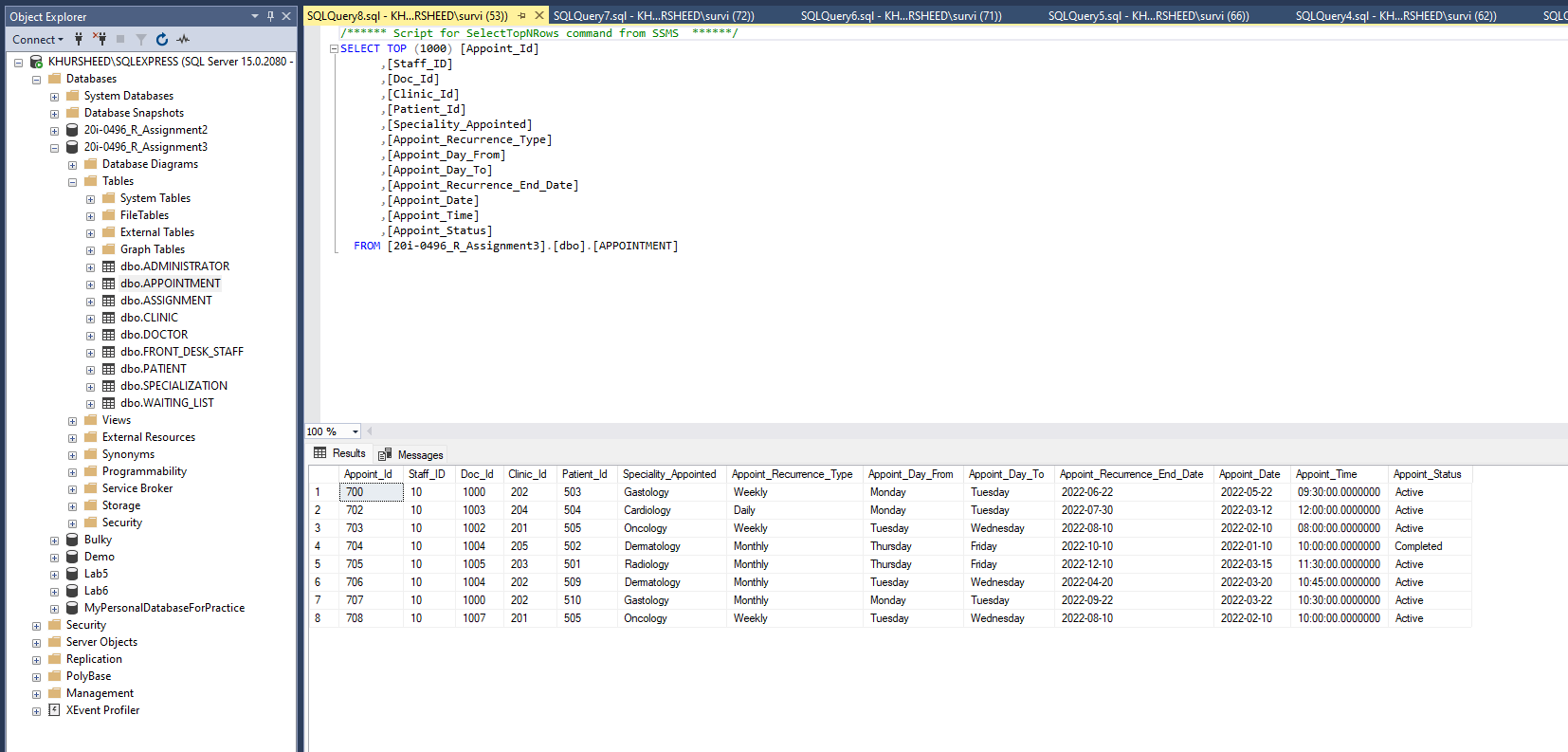
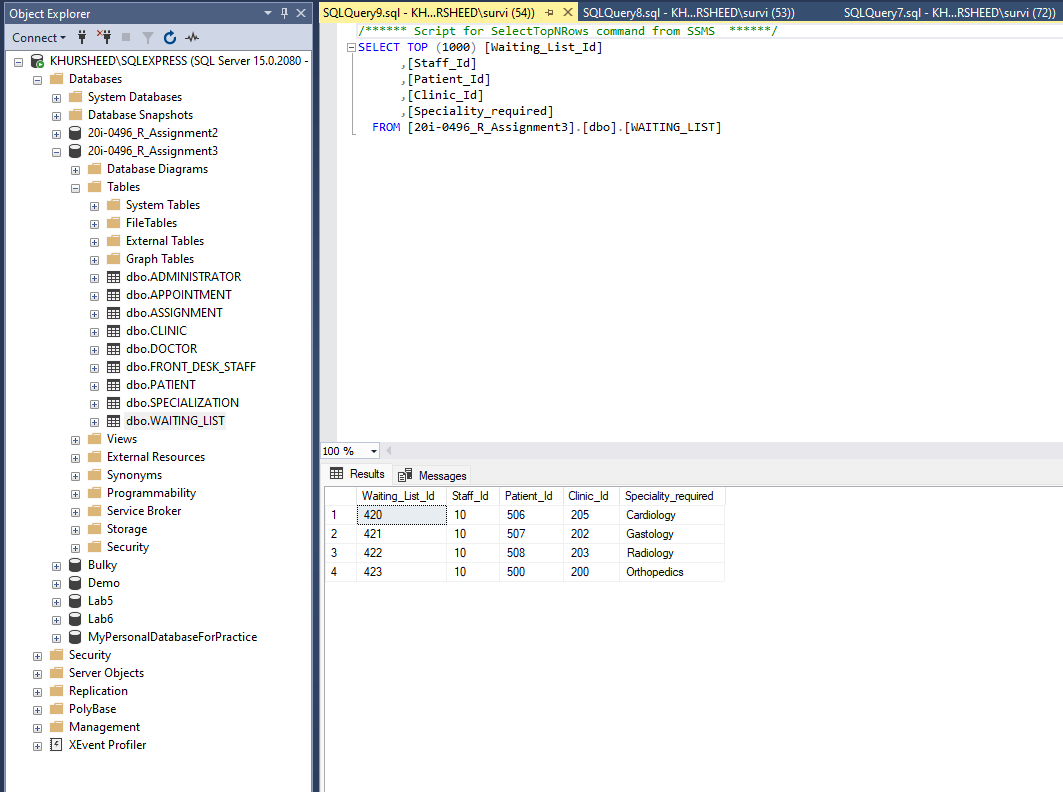
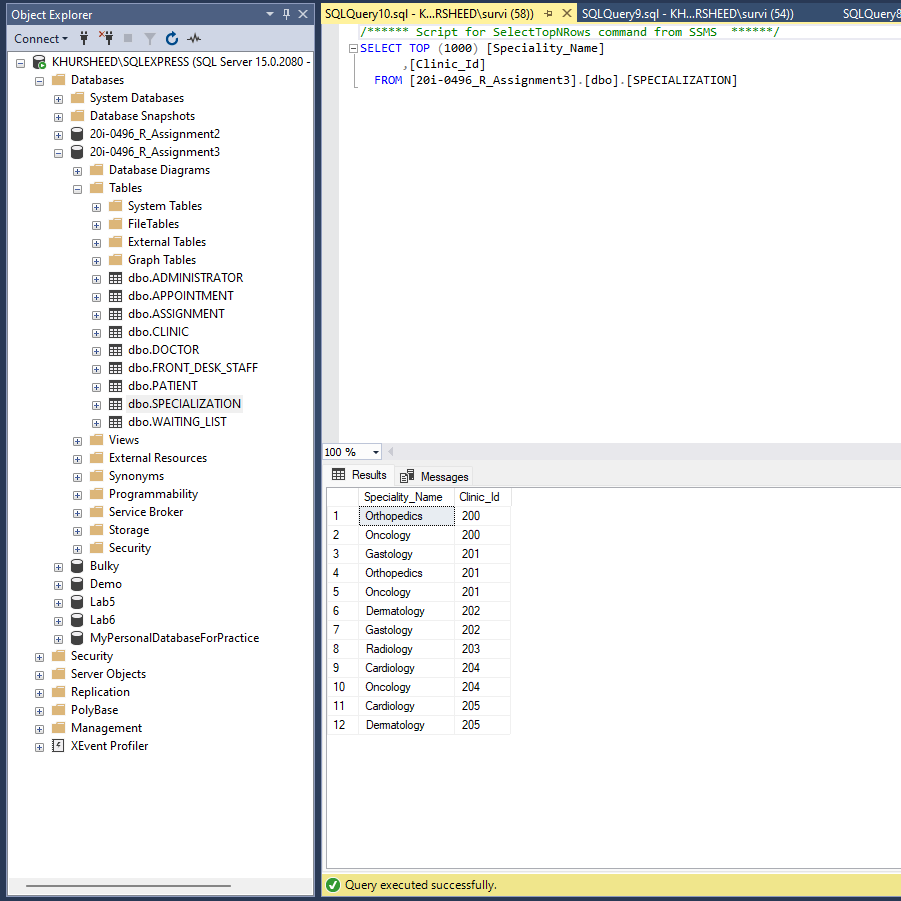


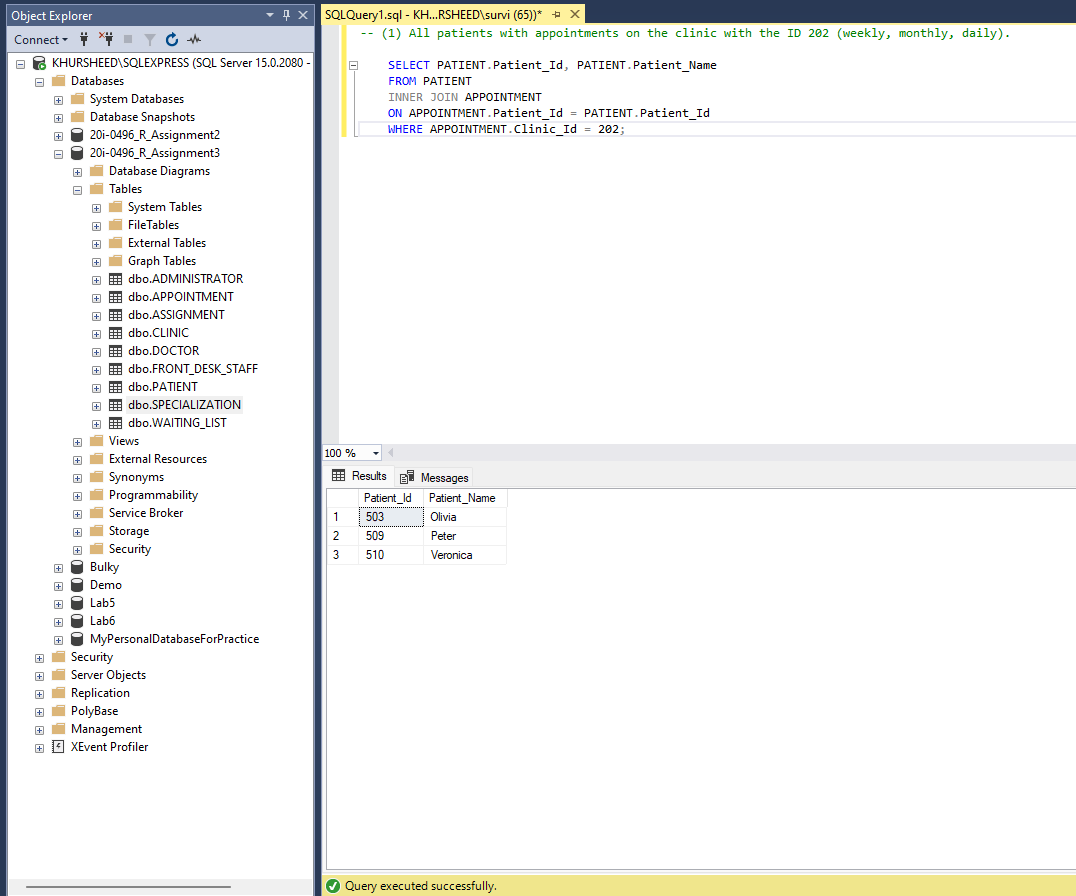


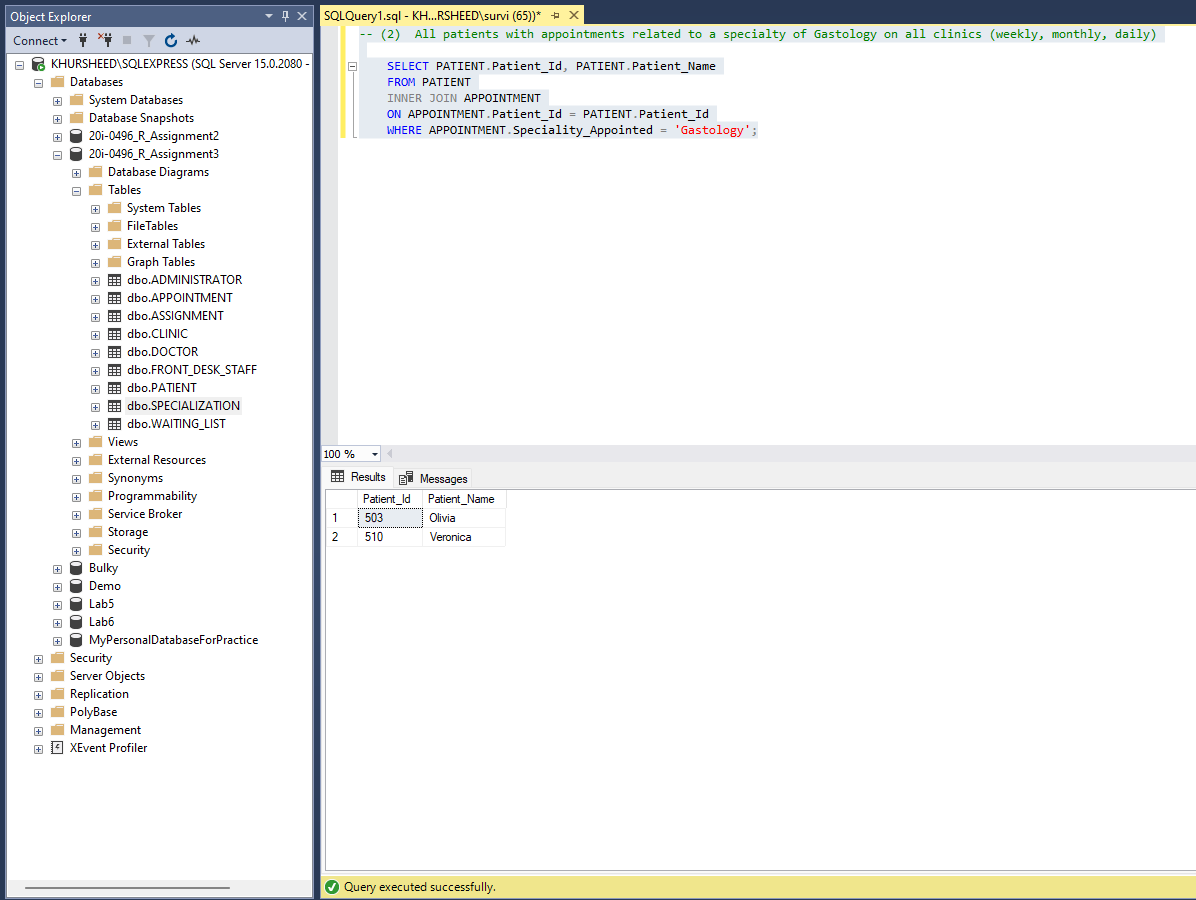


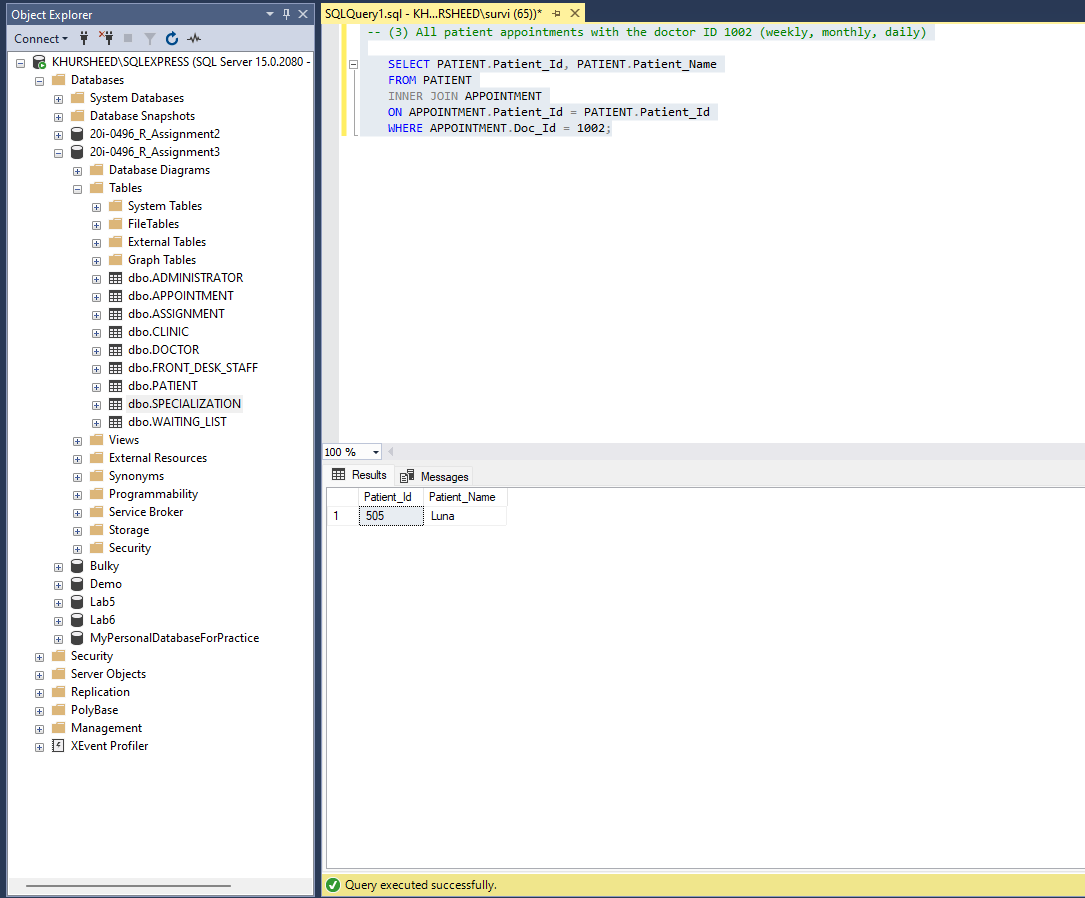
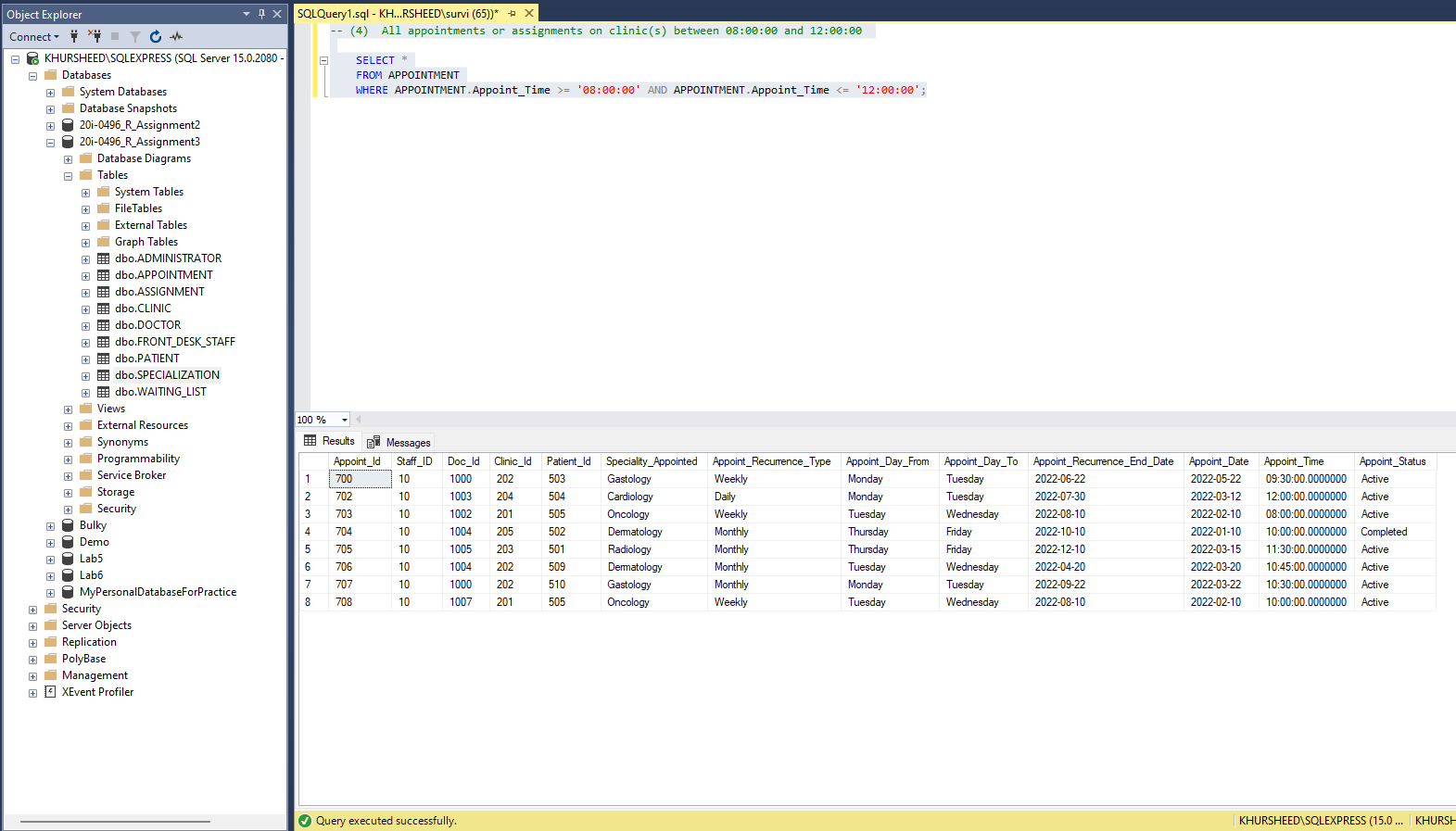
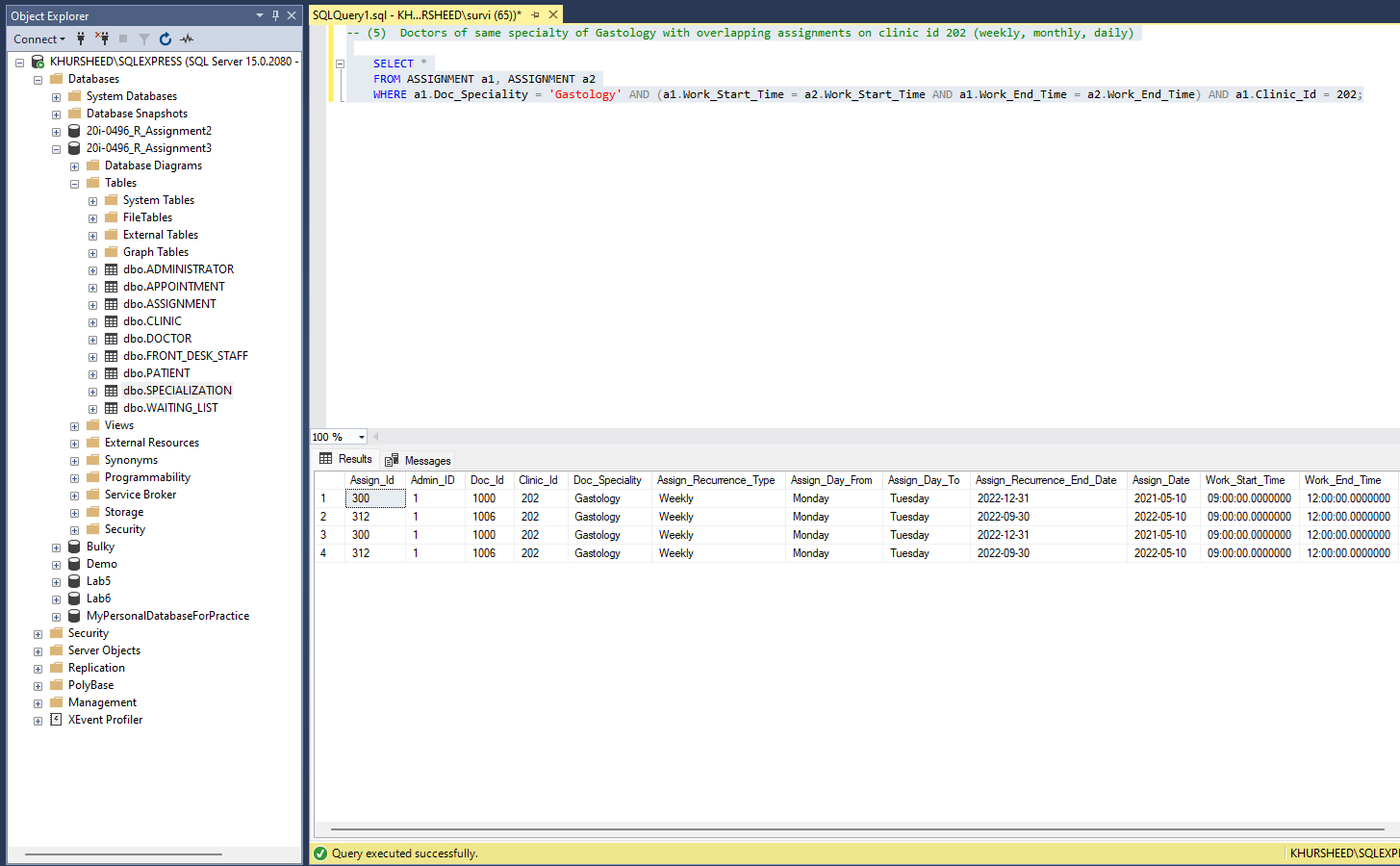
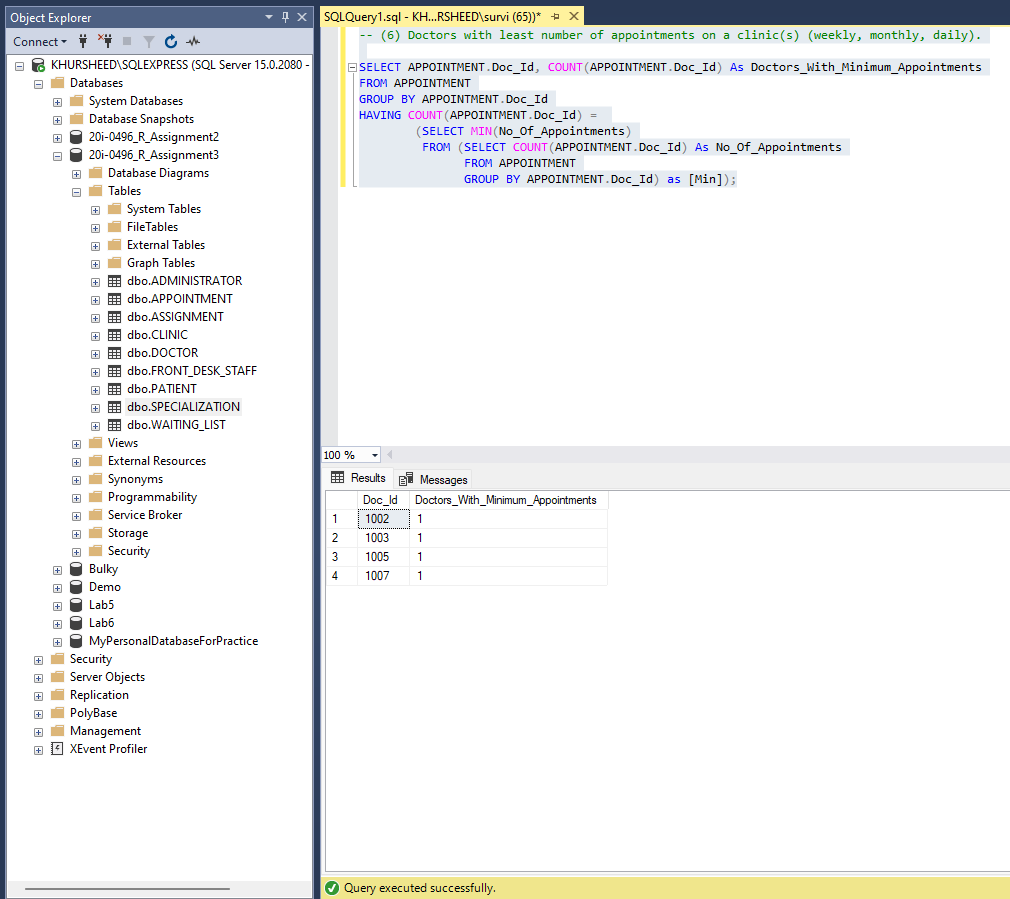
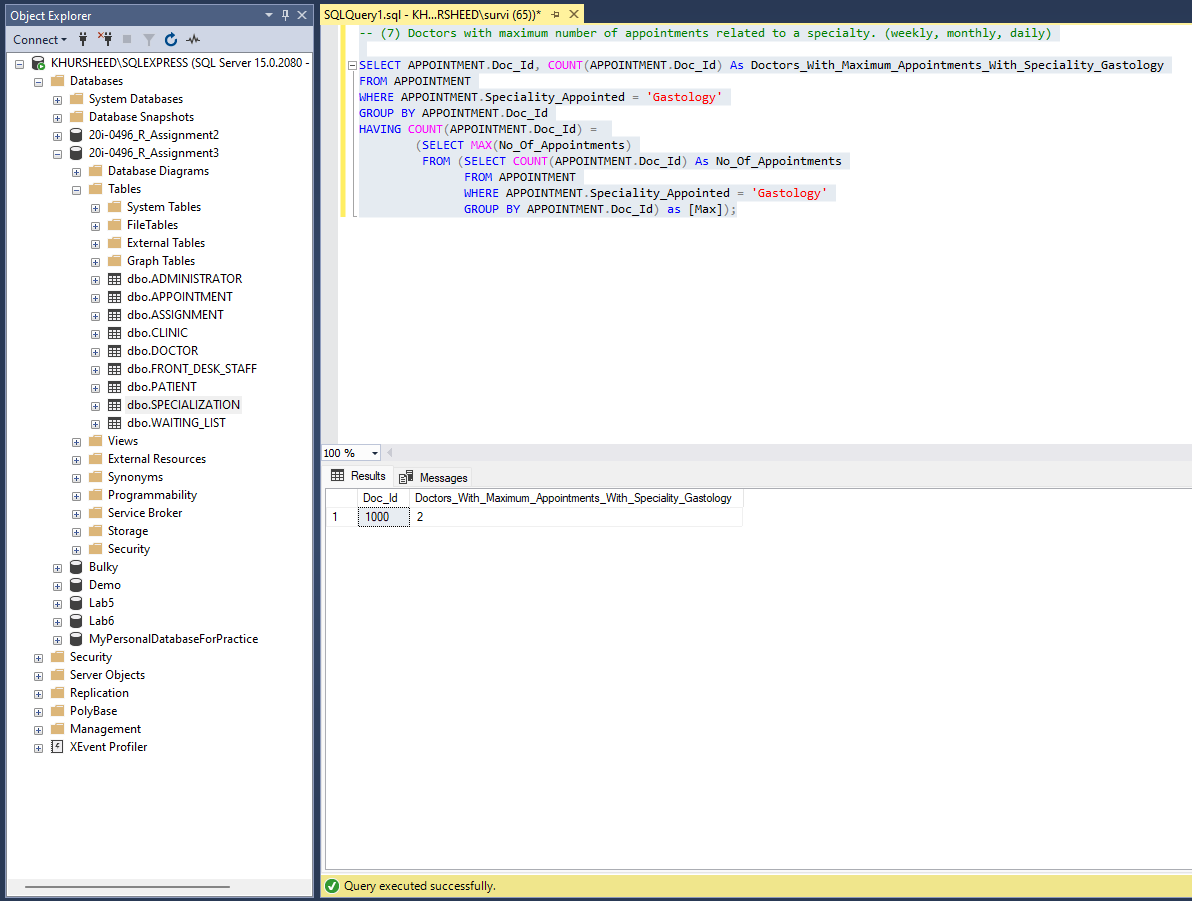
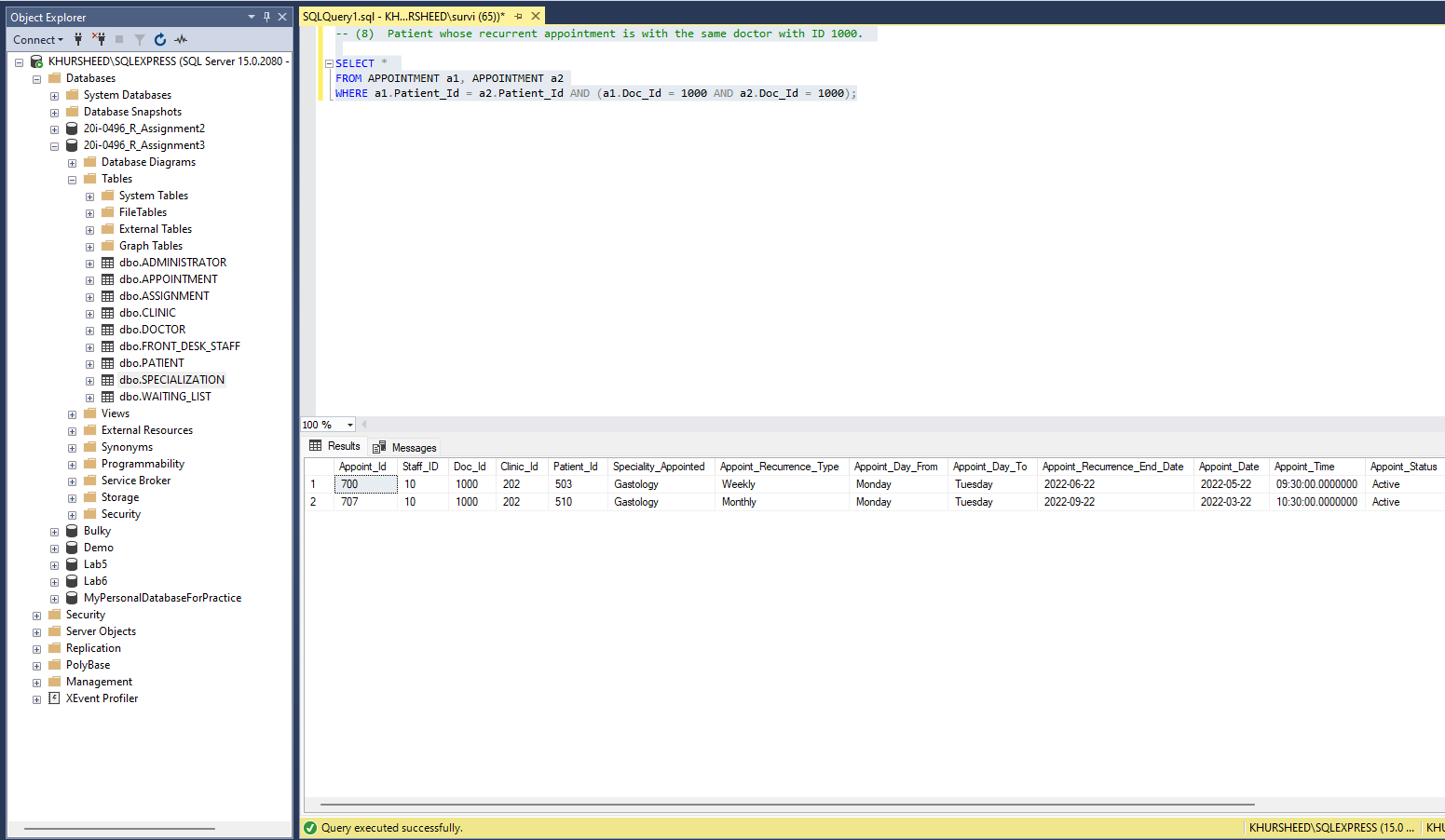
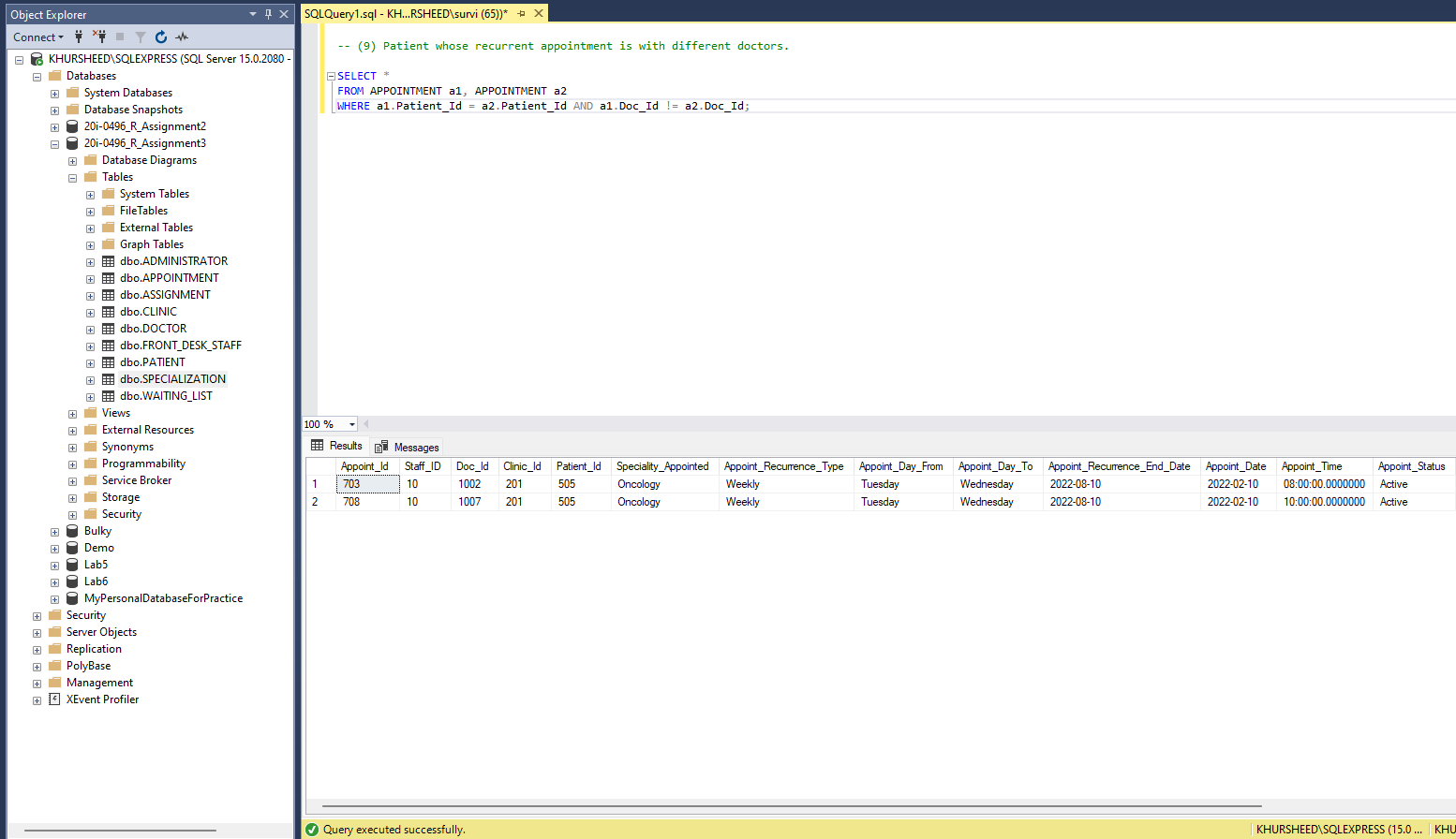
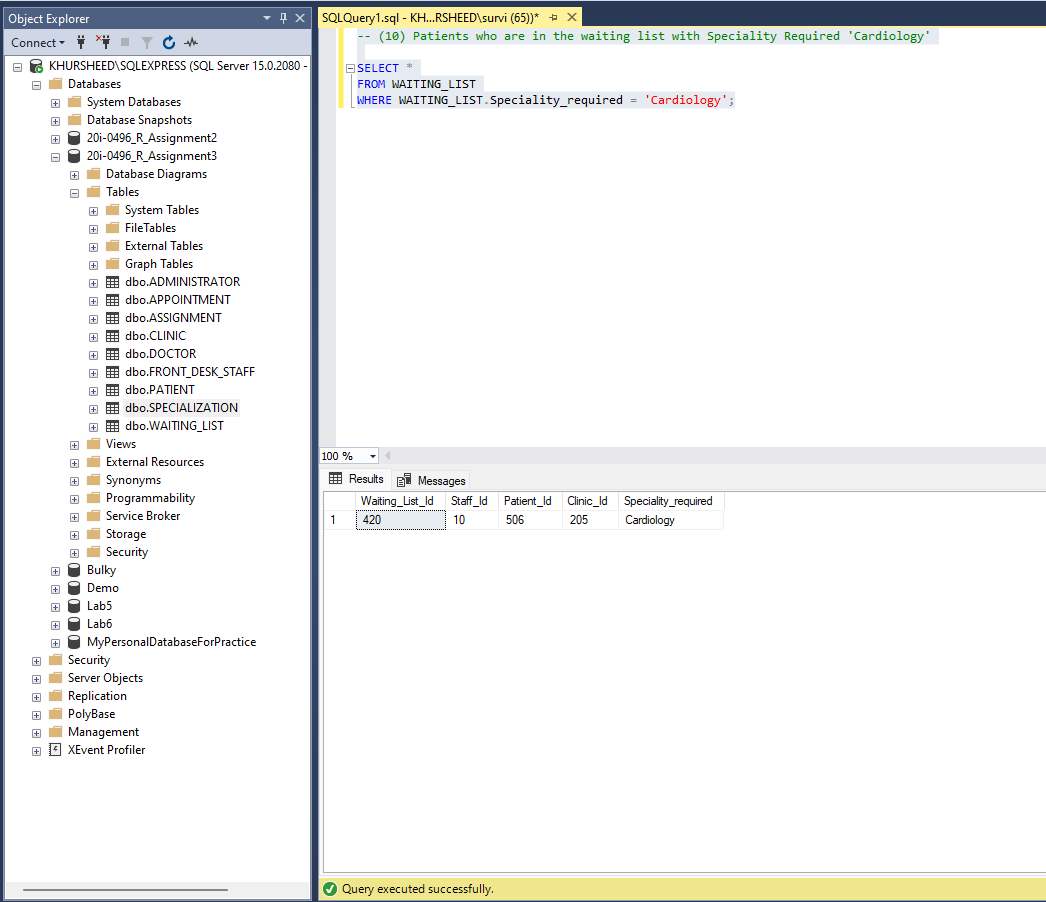
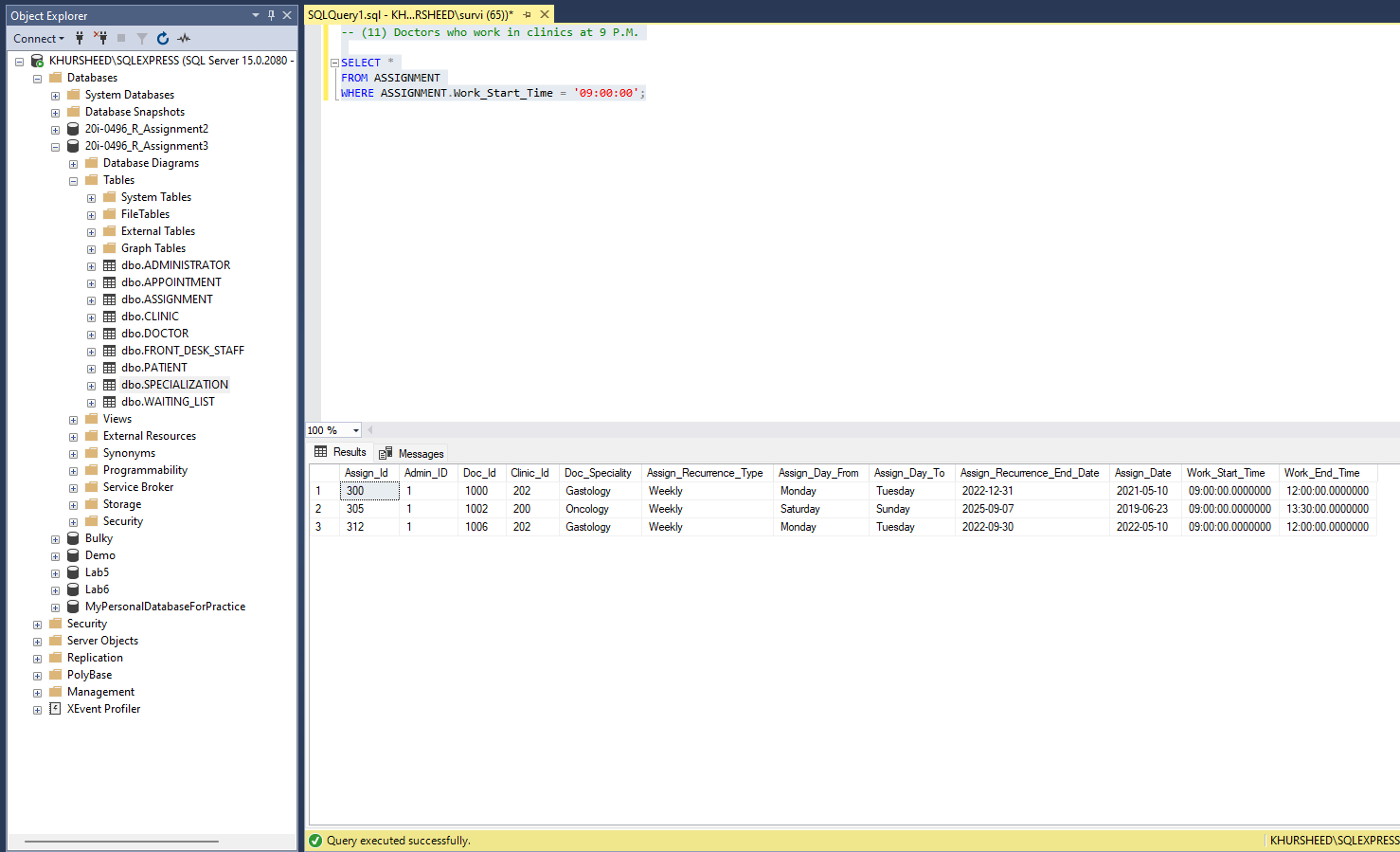
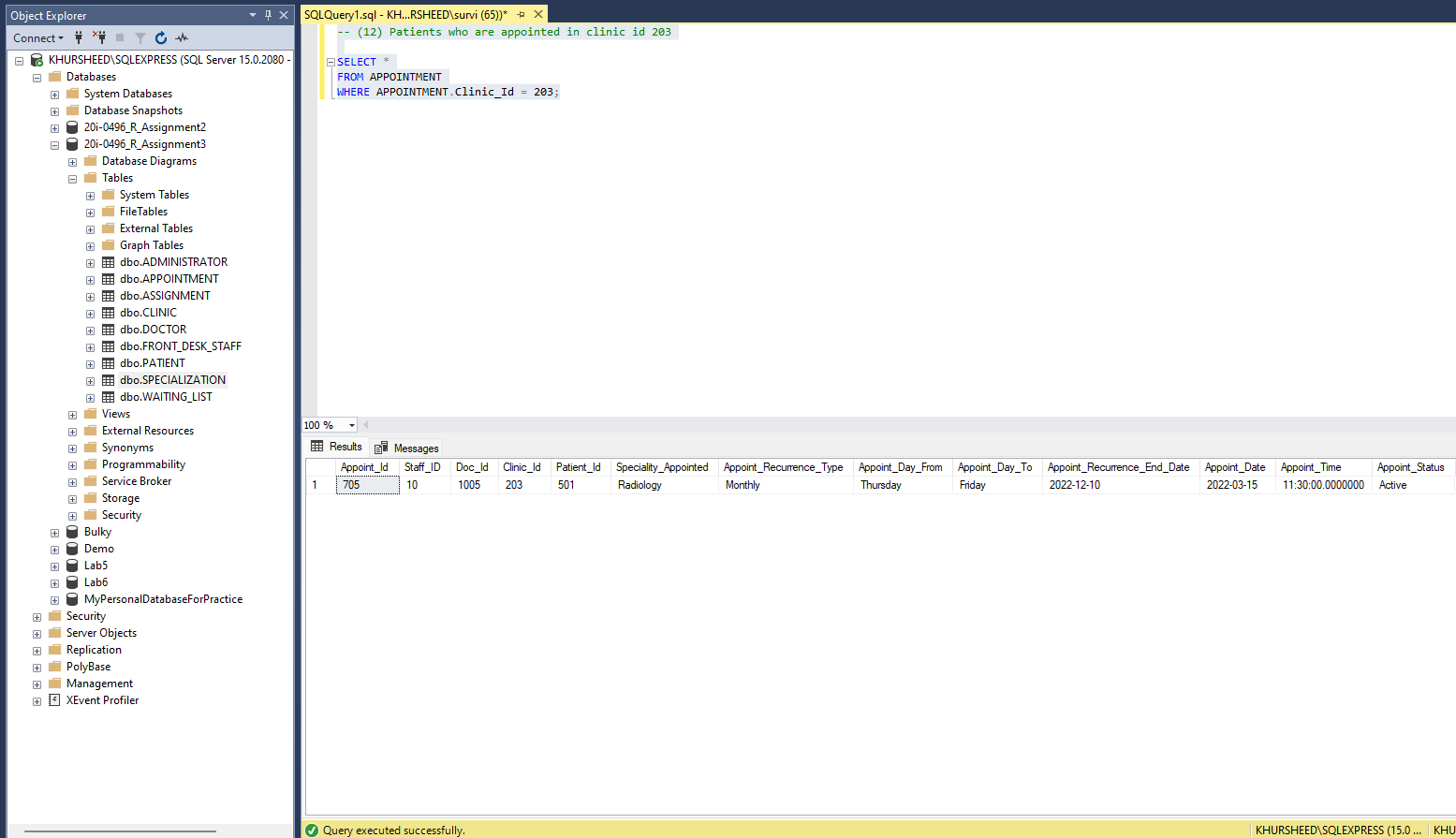
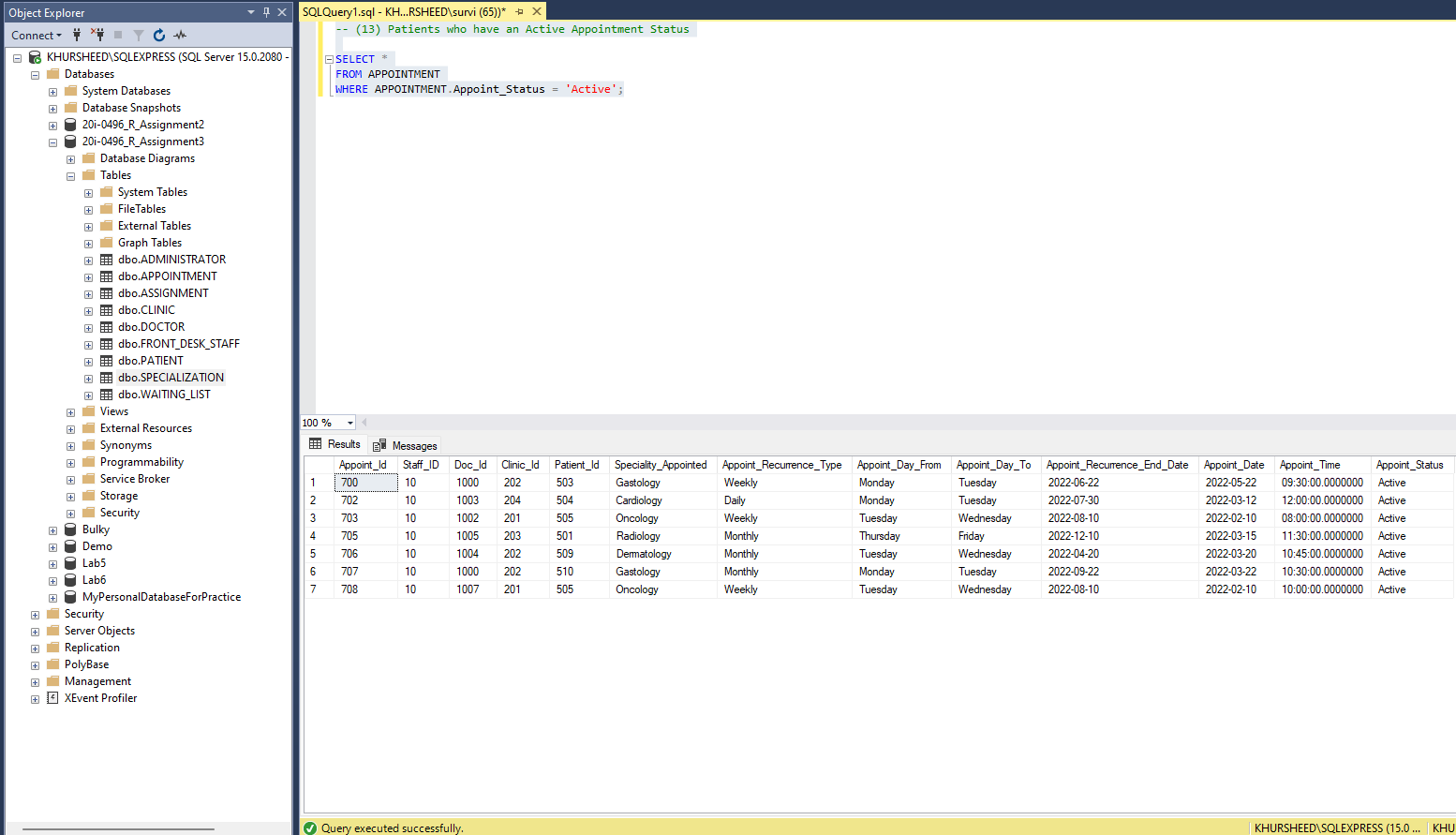
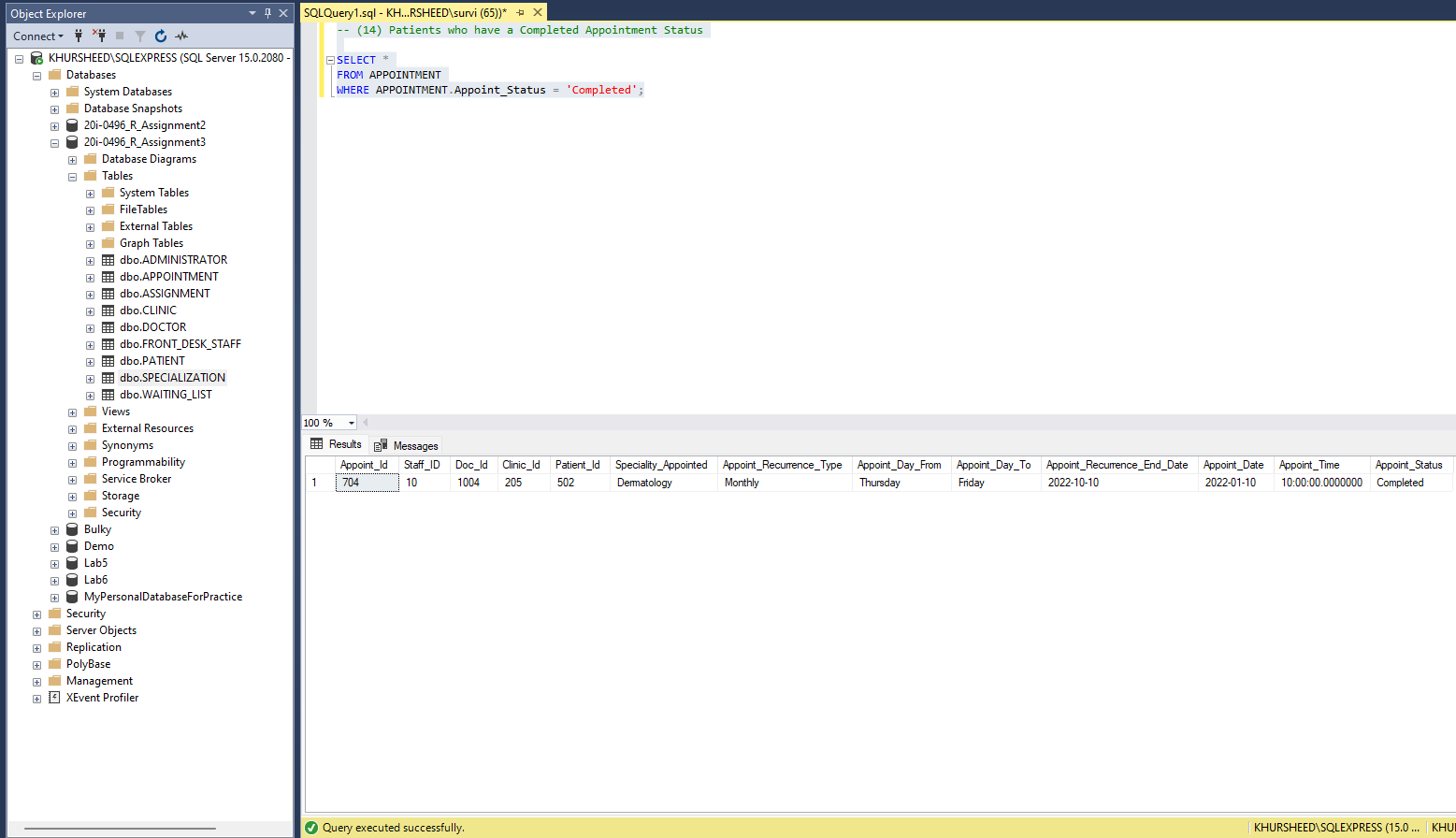
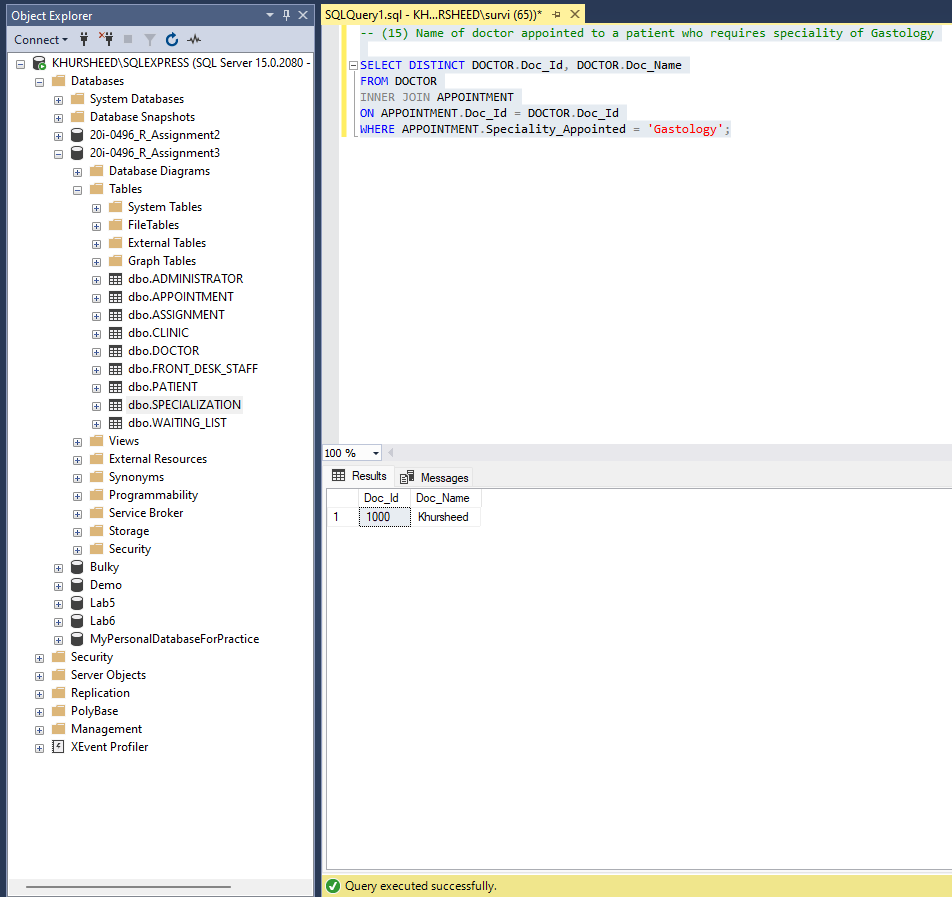
**Snapshot of the Tuples in the Tables and Results of the SQL Queries:** Healthcare Scheduling System

* The Following Images show the Tuples in the Tables for Each Entity Mentioned in my Relational Database Schema:

1. **Doctor:**
2. **Patient:**
3. **Clinic:**
4. **Administrator:**
5. **Front\_Desk\_Staff:**
6. **Assignment:**
7. **Appointment:**
8. **Waiting\_List:**
9. **Specialization:**

* The Following Images show the Results for the 15 SQL Queries:
* (1) All patients with appointments on the clinic with the ID 202 (weekly, monthly, daily).
* (2) All patients with appointments related to a specialty of Gastology on all clinics (weekly, monthly, daily)



* (3) All patient appointments with the doctor ID 1002 (weekly, monthly, daily)
* (4) All appointments or assignments on clinic(s) between 08:00:00 and 12:00:00
* (5) Doctors of same specialty of Gastology with overlapping assignments on clinic id 202 (weekly, monthly, daily)
* (6) Doctors with least number of appointments on a clinic(s) (weekly, monthly, daily).
* (7) Doctors with maximum number of appointments related to a specialty. (weekly, monthly, daily)
* (8) Patient whose recurrent appointment is with the same doctor with ID 1000.
* (9) Patient whose recurrent appointment is with different doctors.
* (10) Patients who are in the waiting list with Speciality Required 'Cardiology'
* (11) Doctors who work in clinics at 9 P.M.
* (12) Patients who are appointed in clinic id 203
* (13) Patients who have an Active Appointment Status
* (14) Patients who have a Completed Appointment Status
* (15) Name of doctor appointed to a patient who requires speciality of Gastology