Healthcare Data

Summary:

This project involved cleaning and normalizing a healthcare dataset for efficient storage and SQL querying. After addressing inconsistencies and duplicates, the data was reorganized into multiple related tables following 3NF principles, including **Patients, Doctors, Hospitals, Admissions, Admission-Medications, and Admission-Testes.**

Normalization Report

1st Normal Form (1NF):

- Ensured each cell contains atomic (single) values
- Split multivalued fields (e.g., medications, test results) into separate records

2nd Normal Form (2NF):

- Moved data into separate tables so that all non-key columns depend on the full primary key

3rd Normal Form (3NF):

- Removed transitive dependencies
- For example, doctors are linked to hospitals through hospital_id instead of repeating hospital names

1. Patients

Column	Description
patient_id	Primary Key
name	Patient's name
age	Patient's age
gender	Male / Female
blood_type	Blood group
insurance_provider	(Optional)

2. Doctors

Column	Description
doctor_id	Primary Key
name	Doctor's name
Hospital ID	Foreign Key → Hospitals

3. Hospitals

Column	Description
Hospital ID	Primary Key
hospital_name	Hospital's name

4. Admissions

Column	Description
Admisions ID	Primary Key
Patient-ID	Foreign Key → Patients
doctor_id	Foreign Key → Doctors
Hospital ID	Foreign Key → Hospitals
Room Number	Room assigned
Admission Type	e.g., Emergency, Urgent
Medical Condition	Diagnosis, if available
Date of Admission	Date of admission
Discharge Date	Date of discharge
Billing Amount	Total billing for the stay

5. Admission-Medications

Column	Description
admission_id	Foreign Key → Admissions
medication_name	Name of medication used

6.Admission-Testes.

Column	Description
test_id	Primary Key
admission_id	Foreign Key → Admissions
result	Result: Normal / Abnormal

🔗 Table Relationships Overview

- Patients → Admissions via patient_id
- Doctors → Admissions via doctor_id
- Hospitals → both Doctors and Admissions via hospital_id
- Admissions → Admission_Medications and Test_Results via admission_id

Data Modeling

Entity-Relationship Model

- **Entities and Attributes**

  1. **Patient :** PatientID (PK) - Name - Age - Gender - BloodType - Insurance Provider.

  2. **Hospital:** HospitalID (PK), HospitalName

  3. **Doctor:** DoctorID (PK), DoctorName, HospitalID (FK)

  4. **Admission:** AdmissionID (PK), PatientID (FK), HospitalID (FK), DoctorID (FK), DateOfAdmission, AdmissionType, DischargeDate, RoomNumber, BillingAmount

  5. **Admission-Medications:** Medication ID (PK), PatientID (FK), AdmissionID (FK), Medication

  6. **Admission-Testes**: PatientTestResultID (PK), PatientID (FK), MedicationID (FK), AdmissionID (FK).

- **Relationships**

  1. Patient → Admission (One-to-Many)

  2. Hospital→ Admission (One-to-Many)

  3. Doctor → Admission (One-to-Many)

  4. InsuranceProvider → Admission (One-to-Many)

  5. Patient ↔ Medication (Many-to-Many)
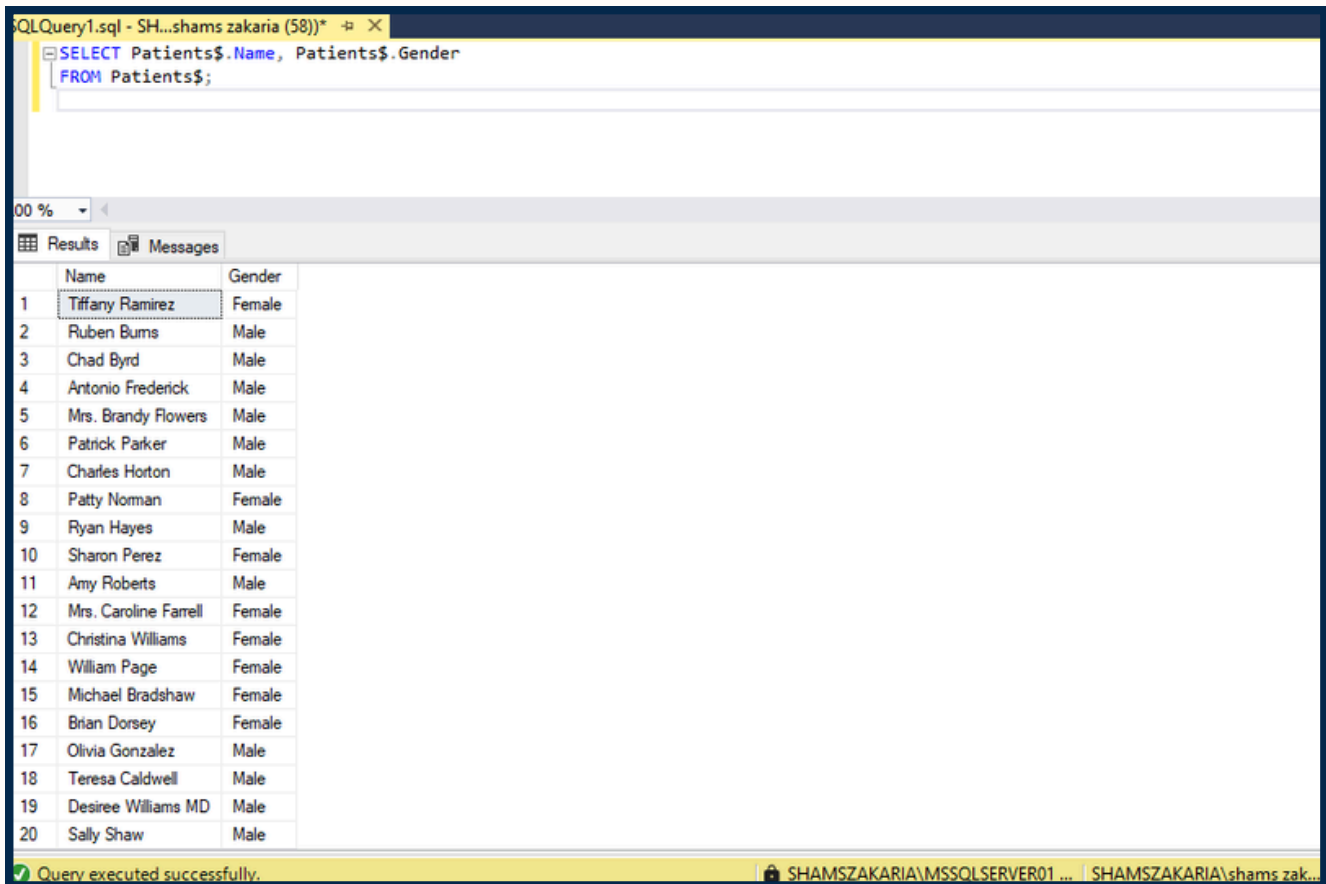
  6. Patient ↔ TestResult (Many-to-Many)

- **ERD**
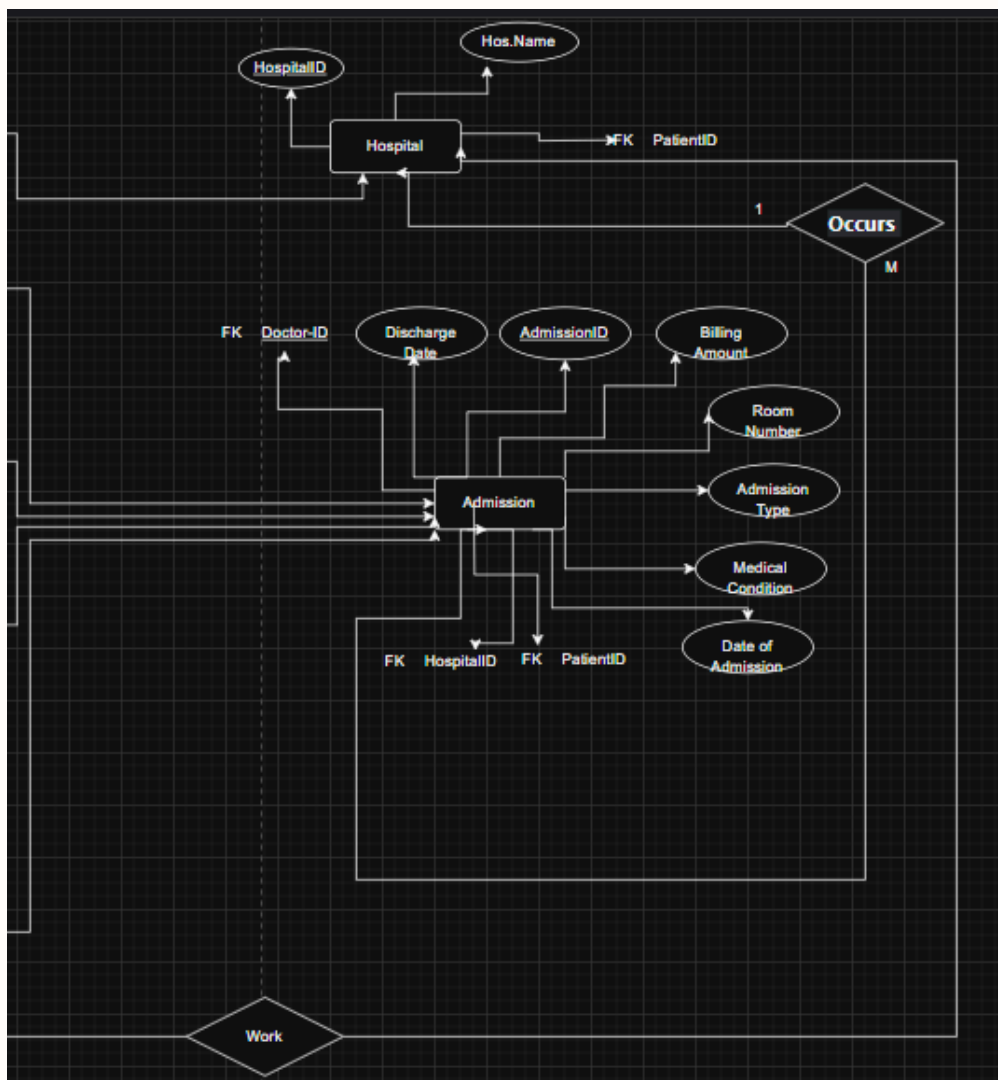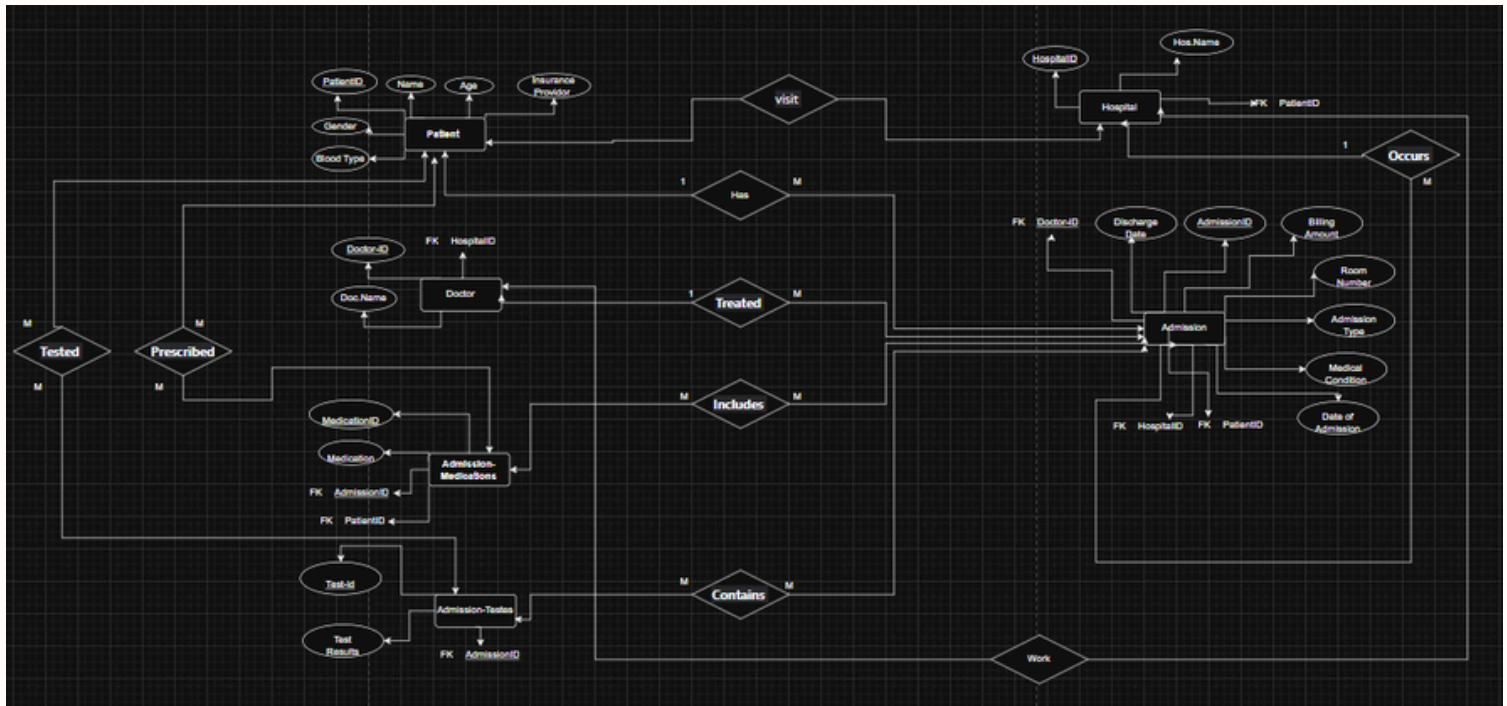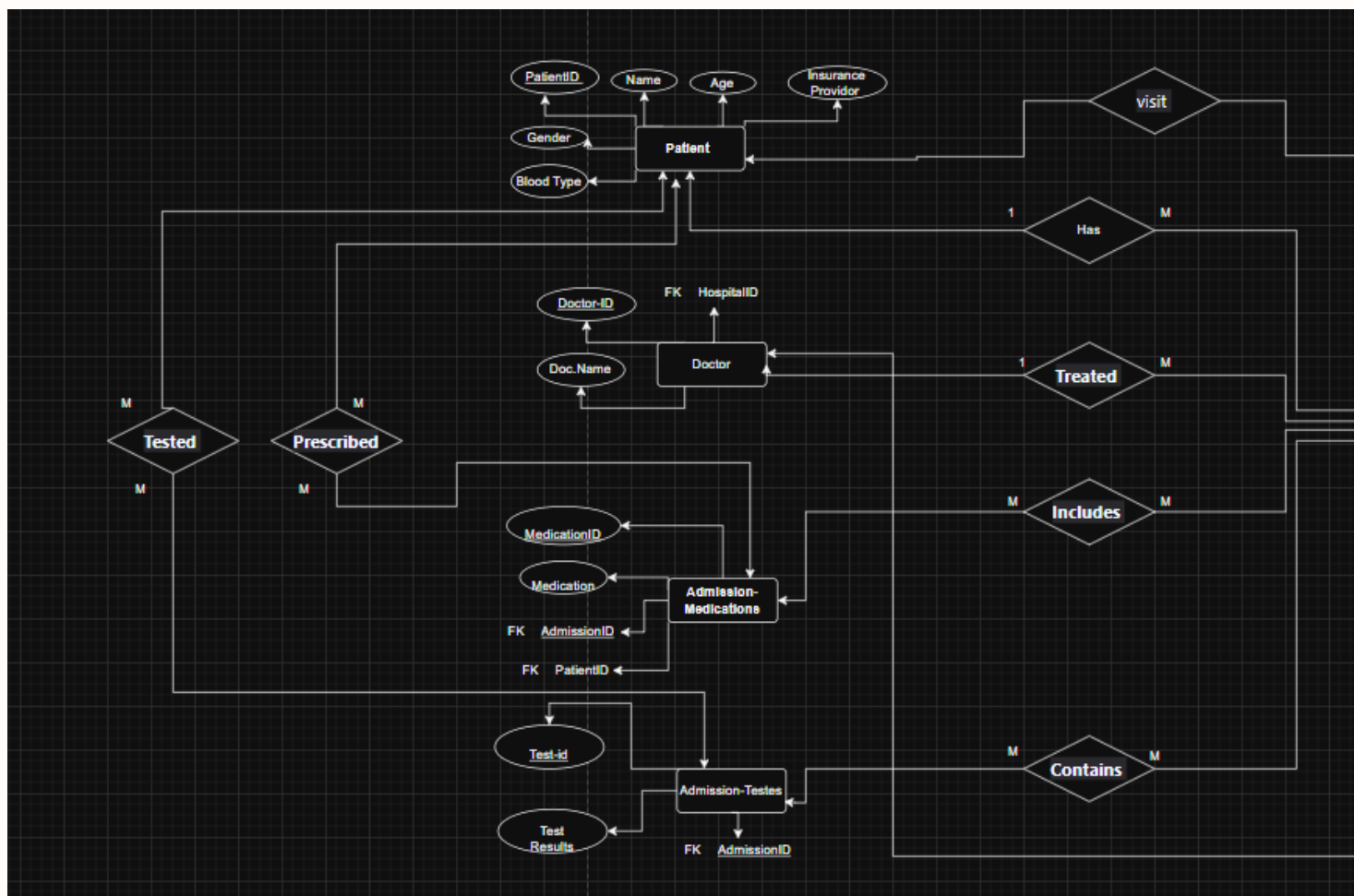
SQL Queries

1- Retrieve the names and genders of all patients.
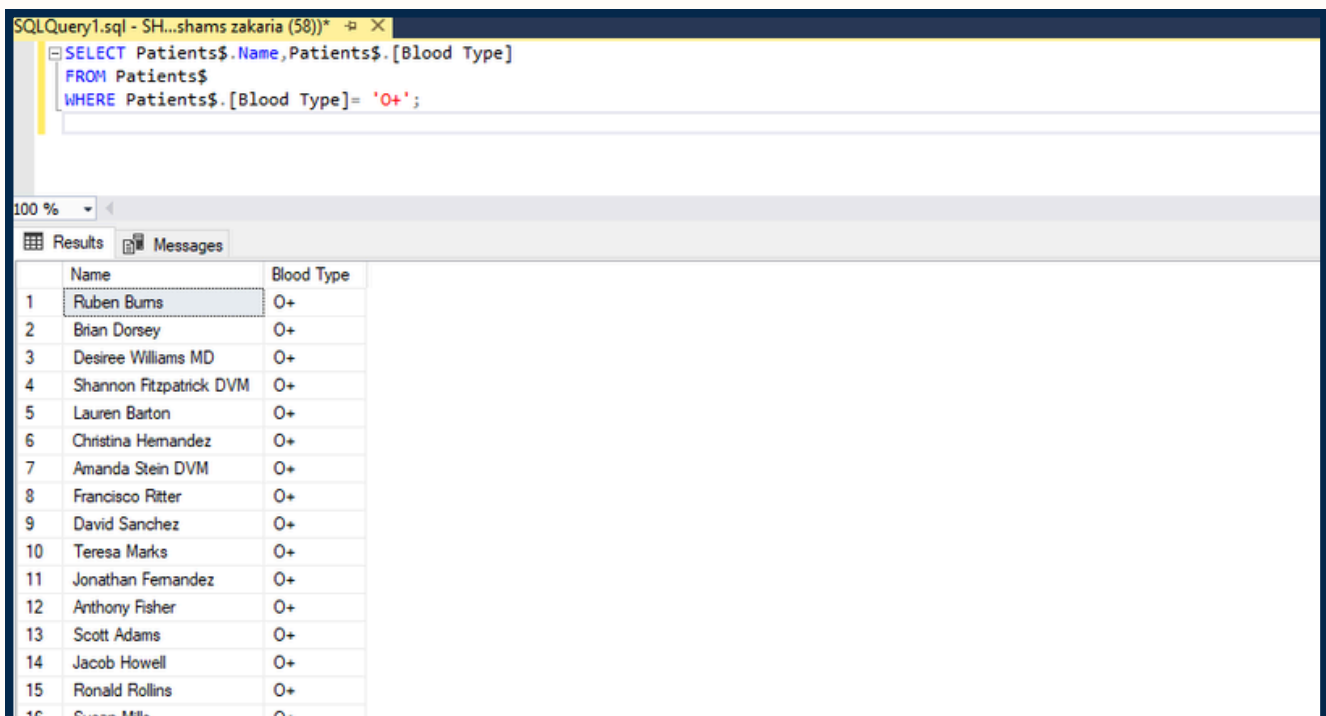
```sql
SELECT Patients$.Name, Patients$.Gender
FROM Patients$;
```

	Name	Gender
1	Tiffany Ramirez	Female
2	Ruben Burns	Male
3	Chad Byrd	Male
4	Antonio Frederick	Male
5	Mrs. Brandy Flowers	Male
6	Patrick Parker	Male
7	Charles Horton	Male
8	Patty Norman	Female
9	Ryan Hayes	Male
10	Sharon Perez	Female
11	Amy Roberts	Male
12	Mrs. Caroline Farrell	Female
13	Christina Williams	Female
14	William Page	Female
15	Michael Bradshaw	Female
16	Brian Dorsey	Female
17	Olivia Gonzalez	Male
18	Teresa Caldwell	Male
19	Desiree Williams MD	Male
20	Sally Shaw	Male

Query executed successfully.   SHAMSZAKARIA\MSSQLSERVER01 ... SHAMSZAKARIA\shams zak...

2- Display all patients with blood type O+.

```sql
SELECT Patients$.Name,Patients$.[Blood Type]
FROM Patients$
WHERE Patients$.[Blood Type]= 'O+';
```
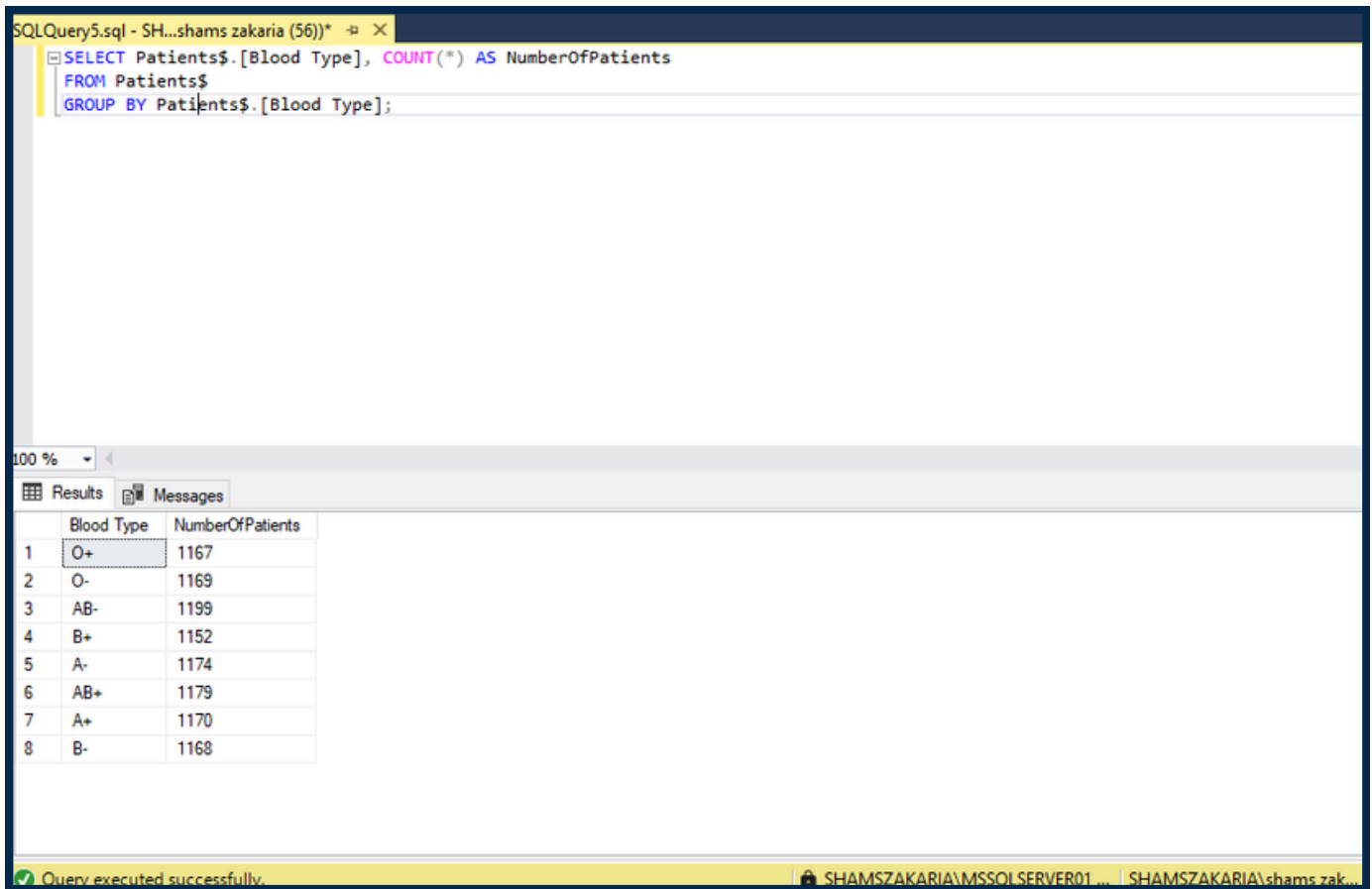
	Name	Blood Type
1	Ruben Burns	O+
2	Brian Dorsey	O+
3	Desiree Williams MD	O+
4	Shannon Fitzpatrick DVM	O+
5	Lauren Barton	O+
6	Christina Hernandez	O+
7	Amanda Stein DVM	O+
8	Francisco Ritter	O+
9	David Sanchez	O+
10	Teresa Marks	O+
11	Jonathan Fernandez	O+
12	Anthony Fisher	O+
13	Scott Adams	O+
14	Jacob Howell	O+
15	Ronald Rollins	O+
16	Susan Mills	O+

SQL Queries

3- Count the number of patients in each blood type.
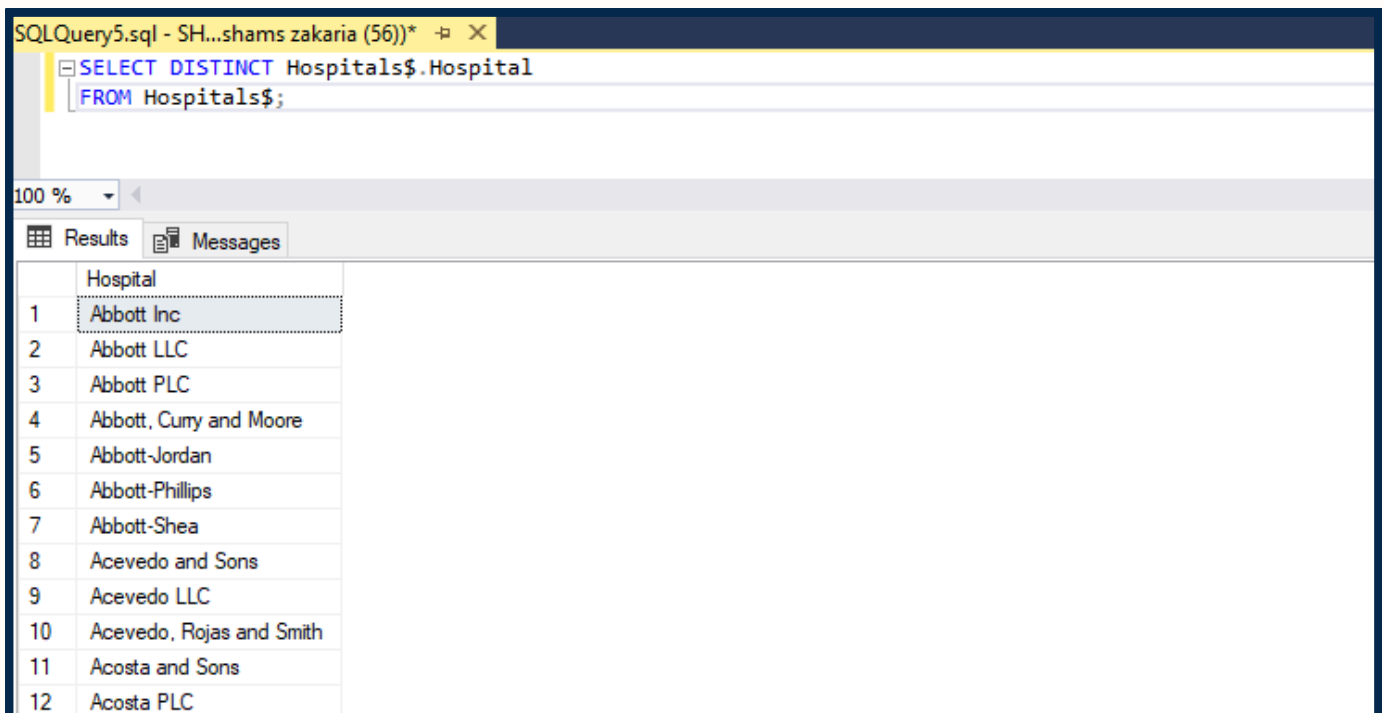
```
SELECT Patients$.[Blood Type], COUNT(*) AS NumberOfPatients
FROM Patients$
GROUP BY Patients$.[Blood Type];
```

	Blood Type	NumberOfPatients
1	O+	1167
2	O-	1169
3	AB-	1199
4	B+	1152
5	A-	1174
6	AB+	1179
7	A+	1170
8	B-	1168

Query executed successfully. SHAMSZAKARIA\MSSQLSERVER01 ... SHAMSZAKARIA\shams zak...

4-List all distinct hospital names.

```
SELECT DISTINCT Hospitals$.Hospital
FROM Hospitals$;
```

	Hospital
1	Abbott Inc
2	Abbott LLC
3	Abbott PLC
4	Abbott, Curry and Moore
5	Abbott-Jordan
6	Abbott-Phillips
7	Abbott-Shea
8	Acevedo and Sons
9	Acevedo LLC
10	Acevedo, Rojas and Smith
11	Acosta and Sons
12	Acosta PLC

5- Order patients by age from oldest to youngest.

```
SQLQuery5.sql - SH...shams zakaria (56))*  ⊡ ×
  SELECT Patients$.Name, Patients$.Age
  FROM Patients$
  ORDER BY Patients$.Age DESC;
```

100 % ▾ ◂

⊞ Results 📄 Messages

	Name	Age
1	Christina Williams	85
2	Amber Solomon	85
3	Sheila Castro	85
4	Raymond Cain	85
5	Steven Irwin	85
6	Michele Thompson	85
7	Christopher Cervantes	85
8	Rachel Marks	85
9	Stacey Wilson	85
10	Cynthia Garner DDS	85
11	Kayla James	85
12	Katelyn Thomas	85
13	Amy Johnson	85
14	Brian Gomez	85
15	Katelyn Daniel	85
16	Kenneth Yu	85
17	Christina George	85
18	Joel Young	85

✓ Query executed successfully.   🔒 SHAMSZAKARIA\MSSQLSERVER01 ...

6- Calculate the average billing amount for all admissions.

```
SQLQuery6.sql - SH...shams zakaria (68))*  ⊡ ×
  SELECT AVG(Admissions$.[Billing Amount]) AS AverageBilling
  FROM Admissions$;
```

100 % ▾ ◂

⊞ Results 📄 Messages

	AverageBilling
1	25504.2791294749

7- Display patients admitted through 'Emergency'.

Note: The query is correct and runs without errors, but it returns no results because there are no records in the database that match the condition

```
SELECT Patients$.Name , Admissions$.[Admission Type]
FROM Patients$
JOIN Admissions$ ON Patients$.[Patient-id]= Admissions$.[Admission-id]
WHERE Admissions$.[Admission Type] = 'Emergency';
```

Name	Admission Type

8- Count the number of cases handled by each doctor.

```
SELECT Doctors$.Doctor, COUNT(Admissions$.[Admission-id]) AS [Number of Cases]
FROM Doctors$
JOIN Admissions$ ON Doctors$.[Doctor-id] = Admissions$.[Doctor-id]
GROUP BY Doctors$.Doctor;
```

	Doctor	Number of Cases
1	Alvin Garcia DDS	3
2	Ann Mcdonald	3
3	Christian Carter	3
4	Christopher Bell	3
5	Craig Johnson II	3
6	Debbie Dillon DDS	3
7	Gabriel Gibson	3
8	Gregory Wilson	3
9	Jason Smith DVM	3

9- Show the doctor name and the hospital they work in.

```
SQLQuery6.sql - SH...shams zakaria (68))*  ⊣  ✕
⊟SELECT Doctors$.Doctor, Hospitals$.Hospital
  FROM Doctors$
  JOIN Hospitals$ ON Doctors$.[Hospital-id] = Hospitals$.[Hospital-id];
```

100 %

▦ Results ▤ Messages

	Doctor	Hospital
1	Patrick Parker	Wallace-Hamilton
2	Diane Jackson	Burke, Griffin and Cooper
3	Paul Baker	Walton LLC
4	Brian Chandler	Garcia Ltd
5	Dustin Griffin	Jones, Brown and Murray
6	Robin Green	Boyd PLC
7	Patricia Bishop	Wheeler, Bryant and Johns
8	Brian Kennedy	Brown Inc
9	Kristin Dunn	Smith, Edwards and Obrien
10	Jessica Bailey	Brown-Golden
11	Anthony Roberts	Little-Spencer

10- List patients whose test results are 'Abnormal'.

```
SQLQuery6.sql - SH...shams zakaria (68))*  ⊣  ✕
⊟SELECT *
  FROM ['Admission-Testes$']
  WHERE ['Admission-Testes$'].[Test Results]='Abnormal';
```

100 %

▦ Results ▤ Messages

	Test-id	Admission-id	Test Results
1	test-4	Ad-4	Abnormal
2	test-6	Ad-6	Abnormal
3	test-7	Ad-7	Abnormal
4	test-9	Ad-9	Abnormal
5	test-11	Ad-11	Abnormal
6	test-22	Ad-22	Abnormal
7	test-23	Ad-23	Abnormal
8	test-24	Ad-24	Abnormal
9	test-26	Ad-26	Abnormal
10	test-27	Ad-27	Abnormal
11	test-28	Ad-28	Abnormal
12	test-29	Ad-29	Abnormal
13	test-31	Ad-31	Abnormal
14	test-33	Ad-33	Abnormal

11- Display all patients treated in a hospital named 'Cairo Hospital' using JOIN.

Note: The query is correct and runs without errors, but it returns no results because there are no records in the database that match the condition

```
SELECT DISTINCT Patients$.[Name]
FROM Patients$
JOIN Admissions$ ON Patients$.[Patient-id] = Admissions$.[Patient-id]
JOIN Hospitals$ ON Admissions$.[Hospital-id] = Hospitals$.[Hospital-id]
WHERE Hospitals$.Hospital = 'Cairo Hospital';
```

Results:

Name

12- Calculate the total billing amount per hospital.

```
SELECT Hospitals$.Hospital, SUM(Admissions$.[Billing Amount]) AS [Total Billing]
FROM Hospitals$
JOIN Admissions$ ON Hospitals$.[Hospital-id] = Admissions$.[Hospital-id]
GROUP BY Hospitals$.Hospital;
```

Results:

	Hospital	Total Billing
1	Blanchard, Butler and Morris	49026.16704
2	Gates, Gutierrez and Sullivan	71366.1615
3	Morales-Mitchell	66801.57579
4	Lara-Barker	113754.65025
5	Blackwell, Schneider and Davis	72244.60851
6	Finley Ltd	83842.27326
7	Crawford, Mills and Foster	13515.832263
8	Quinn Ltd	13193.541225
9	Ryan, Werner and Harper	11831.641566
10	Young Group	131473.501104
11	White-Hahn	94430.16516
12	Brown-Green	7904.273589
13	Alvarez, Aguilar and Santiago	96039.25182
14	Hall, Torres and Turner	93855.47067
15	Sanchez, Phillips and Miller	118248.55947
16	Alvarez, Love and Cowan	116023.49886
17	Phillips, Fowler and Rodriguez	116672.83173

13- List the patients who stayed more than 5 days in the hospital.

```
SQLQuery6.sql - SH...shams zakaria (68))*  ⊣⋆  ✕
  SELECT Patients$.Name, DATEDIFF(DAY, Admissions$.[Date of Admission], Admissions$.[Discharge Date]) AS DaysStayed
  FROM Patients$
  JOIN Admissions$ ON Patients$.[Patient-id] = Admissions$.[Patient-id]
  WHERE DATEDIFF(DAY, Admissions$.[Date of Admission], Admissions$.[Discharge Date]) > 5;
```

100 %

Results | Messages

	Name	DaysStayed
1	Tiffany Ramirez	14
2	Tiffany Ramirez	14
3	Tiffany Ramirez	14
4	Tiffany Ramirez	14
5	Ruben Burns	14
6	Ruben Burns	14
7	Ruben Burns	14
8	Ruben Burns	14
9	Chad Byrd	30
10	Chad Byrd	30
11	Chad Byrd	30
12	Chad Byrd	30
13	Mrs. Brandy Flowers	24
14	Mrs. Brandy Flowers	24

14- Show all medications used per admission using JOIN.

```
SQLQuery6.sql - SH...shams zakaria (68))*  ⊣⋆  ✕
  SELECT Admissions$.[Admission-id], [' Admission-Medications$'].Medication
  FROM Admissions$
  JOIN [' Admission-Medications$'] ON Admissions$.[Admission-id] = [' Admission-Medications$'].[Admission-id];
```

100 %

Results | Messages

	Admission-id	Medication
1	Ad-1	Aspirin
2	Ad-1	Aspirin
3	Ad-1	Aspirin
4	Ad-1	Aspirin
5	Ad-2	Lipitor
6	Ad-2	Lipitor
7	Ad-2	Lipitor
8	Ad-2	Lipitor
9	Ad-3	Lipitor
10	Ad-3	Lipitor
11	Ad-3	Lipitor
12	Ad-3	Lipitor
13	Ad-4	Penicillin
14	Ad-4	Penicillin
15	Ad-4	Penicillin
16	Ad-4	Penicillin
17	Ad-5	Paracetamol
18	Ad-5	Paracetamol

15- Count the number of patients per medical condition.

```
SELECT Admissions$.[Medical Condition], COUNT(DISTINCT Admissions$.[Patient-id]) AS [Number of Patients]
FROM Admissions$
GROUP BY Admissions$.[Medical Condition];
```

	Medical Condition	Number of Patients
1	Arthritis	1545
2	Asthma	1595
3	Cancer	1607
4	Diabetes	1528
5	Hypertension	1586
6	Obesity	1517

16- Show each doctor and how many patients they treated.

```
SELECT Doctors$.Doctor, COUNT(DISTINCT Admissions$.[Patient-id]) AS [Number of Patients]
FROM Doctors$
JOIN Admissions$ ON Doctors$.[Doctor-id] = Admissions$.[Doctor-id]
GROUP BY Doctors$.Doctor;
```

	Doctor	Number of Patients
1	Alvin Garcia DDS	1
2	Ann Mcdonald	1
3	Christian Carter	1
4	Christopher Bell	1
5	Craig Johnson II	1
6	Debbie Dillon DDS	1
7	Gabriel Gibson	1
8	Gregory Wilson	1
9	Jason Smith DVM	1
10	Juan Lopez DDS	1
11	Keith Morrison	1
12	Kevin Rodriguez	1
13	Mary Gibson	1
14	Matthew Johnson MD	1
15	Michael Ross	1
16	Nicolas Bryant	1

17- List each hospital and the number of doctors working there.

```sql
SELECT Hospitals$.Hospital, COUNT(DISTINCT Doctors$.[Doctor-id]) AS [Number of Doctors]
FROM Hospitals$
JOIN Doctors$ ON Hospitals$.[Hospital-id] = Doctors$.[Hospital-id]
GROUP BY Hospitals$.Hospital;
```

100 %

Results | Messages

	Hospital	Number of Doctors
1	Abbott LLC	2
2	Abbott PLC	1
3	Abbott-Phillips	1
4	Acevedo and Sons	1
5	Acevedo LLC	1
6	Acosta-Holmes	1
7	Adams Inc	4
8	Adams, Coleman and Ross	1
9	Adams, Fritz and Smith	1
10	Adams, Martinez and Allen	1
11	Adams, Miller and Li	1
12	Adams-Thornton	1
13	Adkins, Larson and Collins	1

18- Display patients discharged before '2024-01-01'.

```sql
SELECT Patients$.[Name], Admissions$.[Discharge Date]
FROM Patients$
JOIN Admissions$ ON Patients$.[Patient-id] = Admissions$.[Patient-id]
WHERE Admissions$.[Discharge Date] < '2024-01-01';
```

100 %

Results | Messages

	Name	Discharge Date
1	Tiffany Ramirez	2022-12-01 00:00:00.000
2	Ruben Burns	2023-06-15 00:00:00.000
3	Chad Byrd	2019-02-08 00:00:00.000
4	Antonio Frederick	2020-05-03 00:00:00.000
5	Mrs. Brandy Flowers	2021-08-02 00:00:00.000
6	Patrick Parker	2020-08-23 00:00:00.000
7	Charles Horton	2021-04-15 00:00:00.000
8	Patty Norman	2019-06-02 00:00:00.000
9	Ryan Hayes	2020-12-22 00:00:00.000
10	Sharon Perez	2022-12-16 00:00:00.000
11	Amy Roberts	2021-05-11 00:00:00.000
12	Mrs. Caroline Farrell	2019-06-26 00:00:00.000
13	Christina Williams	2021-12-14 00:00:00.000
14	William Page	2021-08-14 00:00:00.000

19- Show patients with billing amounts above the average (use subquery).

```
SQLQuery7.sql - SH...shams zakaria (75))*  ⊞ ✕
SELECT Patients$.[Name], Admissions$.[Billing Amount]
FROM Patients$
JOIN Admissions$ ON Patients$.[Patient-id] = Admissions$.[Patient-id]
WHERE Admissions$.[Billing Amount] > (
    SELECT AVG([Billing Amount])
    FROM Admissions$
);
```

100 %

Results | Messages

	Name	Billing Amount
1	Tiffany Ramirez	37490.98336
2	Ruben Burns	47304.06485
3	Chad Byrd	36874.897
4	Charles Horton	39593.43576
5	Amy Roberts	40325.07139
6	Brian Dorsey	27174.94291
7	Teresa Caldwell	45213.53763
8	William Johnson	32263.62216
9	Steven Bennett	42610.70456
10	Beverly Miller	41319.50032
11	Daniel Dickson	37766.52124
12	Kimberly Mason	35834.3566

20- List patients who were given the medication 'Aspirin'.

```
SQLQuery7.sql - SH...shams zakaria (75))*  ⊞ ✕
SELECT Patients$.Name, [' Admission-Medications$'].Medication
FROM Patients$
JOIN [' Admission-Medications$'] ON Patients$.[Patient-id] = [' Admission-Medications$'].[Patient-i
WHERE [' Admission-Medications$'].Medication = 'Aspirin';
```

100 %

Results | Messages

	Name	Medication
1	Tiffany Ramirez	Aspirin
2	Patrick Parker	Aspirin
3	Patty Norman	Aspirin
4	Ryan Hayes	Aspirin
5	Sharon Perez	Aspirin
6	Christina Williams	Aspirin
7	William Page	Aspirin
8	Brian Dorsey	Aspirin
9	Olivia Gonzalez	Aspirin
10	Desiree Williams MD	Aspirin
11	Angela Brown	Aspirin
12	Christina Hernandez	Aspirin
13	Rachael Davidson	Aspirin

21- Show each patient's name, their doctor's name, and hospital name. If the medical condition is NULL, show 'No Diagnosis' (use COALESCE with JOINs across patients, doctors, and hospitals).

SQLQuery7.sql - SH...shams zakaria (75))* ⊣ ✕

```
SELECT
    Patients$.[Name] ,
    Doctors$.Doctor ,
    Hospitals$.Hospital ,
    COALESCE(Admissions$.[Medical Condition], 'No Diagnosis') AS [Medical Condition]
FROM Admissions$
JOIN Patients$ ON Admissions$.[Patient-id] = Patients$.[Patient-id]
JOIN Doctors$ ON Admissions$.[Doctor-id] = Doctors$.[Doctor-id]
JOIN Hospitals$ ON Admissions$.[Hospital-id] = Hospitals$.[Hospital-id];
```

100 %

Results | Messages

	Name	Doctor	Hospital	Medical Condition
1	Philip Hall	Brenda Moore	Brown, Weeks and Robbins	Diabetes
2	Philip Hall	Brenda Moore	Brown, Weeks and Robbins	Diabetes
3	Philip Hall	Brenda Moore	Brown, Weeks and Robbins	Diabetes
4	Philip Hall	Brenda Moore	Brown, Weeks and Robbins	Diabetes
5	Philip Hall	Brenda Moore	Brown, Weeks and Robbins	Diabetes
6	Philip Hall	Brenda Moore	Brown, Weeks and Robbins	Diabetes

22- List patients who were admitted more than once, showing their name and number of admissions (use GROUP BY and HAVING COUNT(*) > 1).

SQLQuery7.sql - SH...shams zakaria (75))* ⊣ ✕

```
SELECT Patients$.[Name], COUNT(*) AS [Number of Admissions]
FROM Patients$
JOIN Admissions$ ON Patients$.[Patient-id] = Admissions$.[Patient-id]
GROUP BY Patients$.[Name]
HAVING COUNT(*) > 1;
```
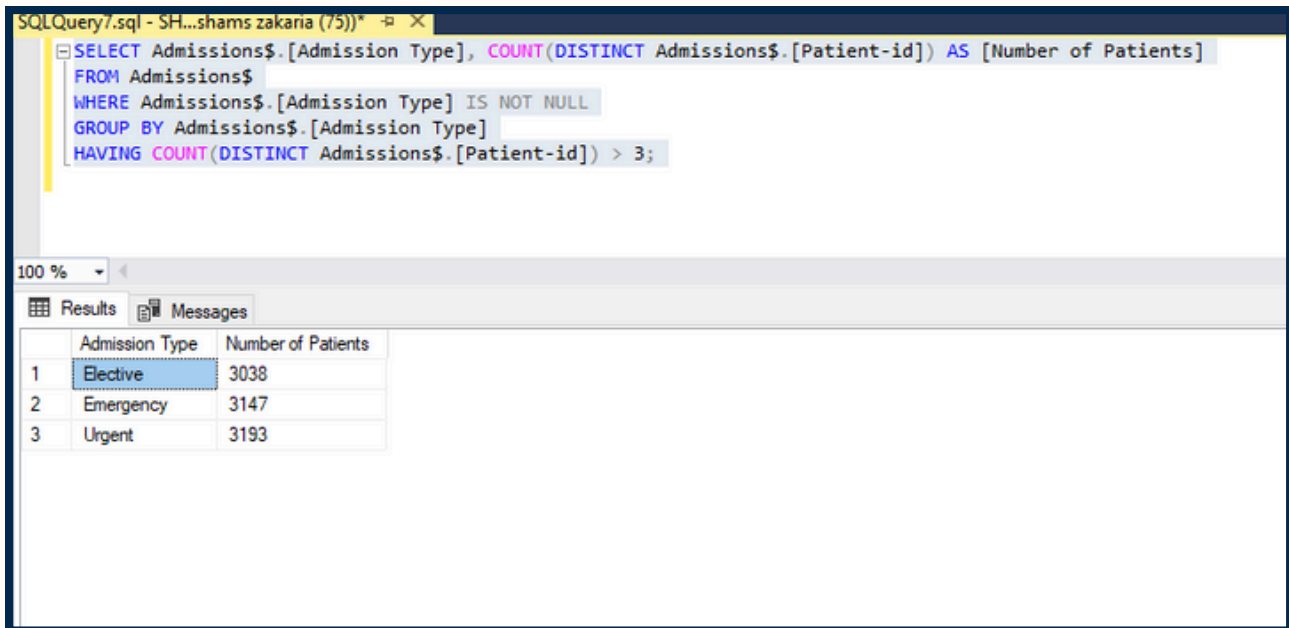
100 %

Results | Messages

	Name	Number of Admissions
1	Barbara Foster	3
2	Cassandra Austin	3
3	Christian Lee	3
4	Erica Williams	3
5	Hannah Cox	3
6	Jessica Edwards	3
7	Jillian Graves	3
8	Kimberly Khan	3
9	Melissa Johnson MD	3
10	Sherry Taylor	3

23- Count the number of patients per admission_type, only showing those with more than 3 and where admission_type is not NULL.
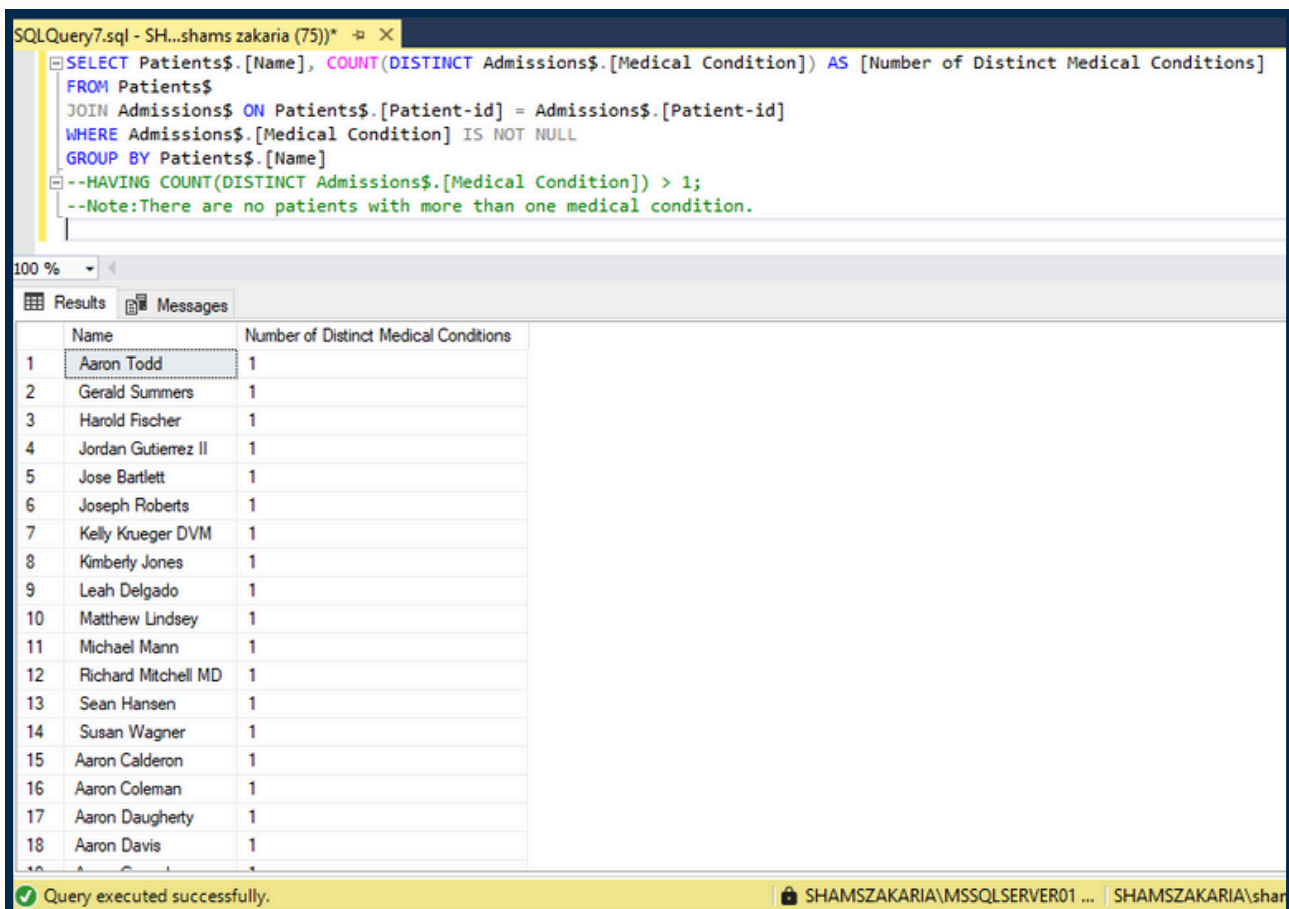
```sql
SELECT Admissions$.[Admission Type], COUNT(DISTINCT Admissions$.[Patient-id]) AS [Number of Patients]
FROM Admissions$
WHERE Admissions$.[Admission Type] IS NOT NULL
GROUP BY Admissions$.[Admission Type]
HAVING COUNT(DISTINCT Admissions$.[Patient-id]) > 3;
```

	Admission Type	Number of Patients
1	Elective	3038
2	Emergency	3147
3	Urgent	3193

24- List patients with more than one distinct medical condition using JOINs across patients, admissions, and medical conditions.

```sql
SELECT Patients$.[Name], COUNT(DISTINCT Admissions$.[Medical Condition]) AS [Number of Distinct Medical Conditions]
FROM Patients$
JOIN Admissions$ ON Patients$.[Patient-id] = Admissions$.[Patient-id]
WHERE Admissions$.[Medical Condition] IS NOT NULL
GROUP BY Patients$.[Name]
--HAVING COUNT(DISTINCT Admissions$.[Medical Condition]) > 1;
--Note:There are no patients with more than one medical condition.
```

	Name	Number of Distinct Medical Conditions
1	Aaron Todd	1
2	Gerald Summers	1
3	Harold Fischer	1
4	Jordan Gutierrez II	1
5	Jose Bartlett	1
6	Joseph Roberts	1
7	Kelly Krueger DVM	1
8	Kimberly Jones	1
9	Leah Delgado	1
10	Matthew Lindsey	1
11	Michael Mann	1
12	Richard Mitchell MD	1
13	Sean Hansen	1
14	Susan Wagner	1
15	Aaron Calderon	1
16	Aaron Coleman	1
17	Aaron Daugherty	1
18	Aaron Davis	1

Query executed successfully.   SHAMSZAKARIA\MSSQLSERVER01 ... SHAMSZAKARIA\shar

25- Show hospitals where the total billing is more than 50,000 EGP and display the total billing amount (use GROUP BY + SUM).

```sql
SELECT Hospitals$.Hospital, SUM(Admissions$.[Billing Amount]) AS [Total Billing]
FROM Hospitals$
JOIN Admissions$ ON Hospitals$.[Hospital-id] = Admissions$.[Hospital-id]
GROUP BY Hospitals$.Hospital
HAVING SUM(Admissions$.[Billing Amount]) > 50000;
```

100 %

Results | Messages

	Hospital	Total Billing
1	Silva, Adams and Price	60691.33653
2	Moreno PLC	93753.0642
3	Cochran-King	145987.9086
4	Weiss Inc	105501.92799
5	Brooks, Wright and Olson	57958.22283
6	Wheeler-Cowan	50316.21429
7	Burke, Mora and Shannon	135622.27347
8	Rivera-Knight	128686.93146

26- Using a CTE, show patients over age 40 who were admitted as 'Urgent', along with their doctor and hospital name.

```sql
WITH UrgentPatients AS (
    SELECT Patients$.[Patient-id], Patients$.[Name],
    Patients$.[Age], Admissions$.[Admission Type],
    Doctors$.Doctor, Hospitals$.Hospital
    FROM Patients$
    JOIN Admissions$ ON Patients$.[Patient-id] = Admissions$.[Patient-id]
    JOIN Doctors$ ON Admissions$.[Doctor-id] = Doctors$.[Doctor-id]
    JOIN Hospitals$ ON Admissions$.[Hospital-id] = Hospitals$.[Hospital-id]
    WHERE Admissions$.[Admission Type] = 'Urgent' AND Patients$.[Age] > 40
)
SELECT [Name], [Age], [Admission Type], [Doctor], [Hospital]
FROM UrgentPatients;
```

100 %

Results | Messages

	Name	Age	Admission Type	Doctor	Hospital
1	Christopher Juarez	81	Urgent	William Martinez	Short, Glass and Morgan
2	Christopher Juarez	81	Urgent	William Martinez	Short, Glass and Morgan
3	Christopher Juarez	81	Urgent	William Martinez	Short, Glass and Morgan
4	Christopher Juarez	81	Urgent	William Martinez	Short, Glass and Morgan
5	Christopher Juarez	81	Urgent	William Martinez	Short, Glass and Morgan
6	Christopher Juarez	81	Urgent	William Martinez	Short, Glass and Morgan
7	Christopher Juarez	81	Urgent	William Martinez	Short, Glass and Morgan
8	Christopher Juarez	81	Urgent	William Martinez	Short, Glass and Morgan
9	Christopher Juarez	81	Urgent	William Martinez	Short, Glass and Morgan
10	Christopher Juarez	81	Urgent	William Martinez	Short, Glass and Morgan
11	Christopher Juarez	81	Urgent	William Martinez	Short, Glass and Morgan

27- Use a subquery to find all patients treated by the same doctor who treated a patient named 'Ahmed'.

```sql
SELECT Patients$.[Name], Admissions$.[Doctor-id]
FROM Patients$
JOIN Admissions$ ON Patients$.[Patient-id] = Admissions$.[Patient-id]
WHERE Admissions$.[Doctor-id] = (
    SELECT Admissions$.[Doctor-id]
    FROM Patients$
    JOIN Admissions$ ON Patients$.[Patient-id] = Admissions$.[Patient-id]
    WHERE Patients$.[Name] = 'Ahmed'
)
```

28- Show all admissions at 'Alex Medical Center' with the medication names and quantities using joins across admissions, hospitals, and medications.

```sql
SELECT
    Admissions$.[Admission-id],
    Hospitals$.Hospital,
    [' Admission-Medications$'].Medication
FROM Admissions$
JOIN Hospitals$ ON Admissions$.[Hospital-id] = Hospitals$.[Hospital-id]
JOIN [' Admission-Medications$'] ON Admissions$.[Admission-id] = [' Admission-Medications$'].[Admission-id]
WHERE Hospitals$.Hospital = 'Alexander Ltd';
```

	Admission-id	Hospital	Medication
1	Ad-6976	Alexander Ltd	Lipitor
2	Ad-6976	Alexander Ltd	Lipitor
3	Ad-6976	Alexander Ltd	Lipitor
4	Ad-7180	Alexander Ltd	Penicillin
5	Ad-7180	Alexander Ltd	Penicillin
6	Ad-7180	Alexander Ltd	Penicillin
7	Ad-6976	Alexander Ltd	Lipitor
8	Ad-6976	Alexander Ltd	Lipitor
9	Ad-6976	Alexander Ltd	Lipitor
10	Ad-7180	Alexander Ltd	Penicillin
11	Ad-7180	Alexander Ltd	Penicillin
12	Ad-7180	Alexander Ltd	Penicillin
13	Ad-6976	Alexander Ltd	Lipitor
14	Ad-6976	Alexander Ltd	Lipitor
15	Ad-6976	Alexander Ltd	Lipitor
16	Ad-7180	Alexander Ltd	Penicillin

Query executed successfully.   SHAMSZAKARIA\MSSQLSERVER01 ...   SHAMSZAK

29- List patients who were discharged 10 or more days after admission (use DATEDIFF or date arithmetic).

```sql
SELECT
    Patients$.[Name],
    Admissions$.[Admission-id],
    Admissions$.[Date of Admission],
    Admissions$.[Discharge Date],
    DATEDIFF(DAY, Admissions$.[Date of Admission], Admissions$.[Discharge Date]) AS [DaysStayed]
FROM Admissions$
JOIN Patients$ ON Admissions$.[Patient-id] = Patients$.[Patient-id]
WHERE DATEDIFF(DAY, Admissions$.[Date of Admission], Admissions$.[Discharge Date]) >= 10;
```

	Name	Admission-id	Date of Admission	Discharge Date	DaysStayed
1	Tiffany Ramirez	Ad-1	2022-11-17 00:00:00.000	2022-12-01 00:00:00.000	14
2	Tiffany Ramirez	Ad-1	2022-11-17 00:00:00.000	2022-12-01 00:00:00.000	14
3	Tiffany Ramirez	Ad-1	2022-11-17 00:00:00.000	2022-12-01 00:00:00.000	14
4	Tiffany Ramirez	Ad-1	2022-11-17 00:00:00.000	2022-12-01 00:00:00.000	14
5	Mark Moss	Ad-1000	2022-06-14 00:00:00.000	2022-06-27 00:00:00.000	13
6	Mark Moss	Ad-1000	2022-06-14 00:00:00.000	2022-06-27 00:00:00.000	13
7	Mark Moss	Ad-1000	2022-06-14 00:00:00.000	2022-06-27 00:00:00.000	13
8	Philip Hall	Ad-1002	2021-03-01 00:00:00.000	2021-03-16 00:00:00.000	15

30- Show patients admitted to rooms between 100 and 200, treated by 'Dr. Mona', and include a column that displays 'Senior' if the patient is older than 50, else 'Adult' (use CASE, JOIN, and filtering).

```sql
SELECT
    Patients$.[Name],
    Admissions$.[Admission-id],
    Admissions$.[Room Number],
    Patients$.[Age],
    CASE
        WHEN Patients$.[Age] > 50 THEN 'Senior'
        ELSE 'Adult'
    END AS [AgeGroup]
FROM Admissions$
JOIN Patients$ ON Admissions$.[Patient-id] = Patients$.[Patient-id]
JOIN Doctors$ ON Admissions$.[Doctor-id] = Doctors$.[Doctor-id]
WHERE Admissions$.[Room Number] BETWEEN 100 AND 200
    AND Doctors$.Doctor = 'Patrick Parker';
```

	Name	Admission-id	Room Number	Age	AgeGroup
1	Tiffany Ramirez	Ad-1	146	81	Senior
2	Tiffany Ramirez	Ad-1	146	81	Senior
3	Tiffany Ramirez	Ad-1	146	81	Senior
4	Tiffany Ramirez	Ad-1	146	81	Senior
5	Tiffany Ramirez	Ad-1	146	81	Senior

31- Show the number of admissions per insurance provider.

```sql
SELECT
    Patients$.[Insurance Provider],
    COUNT(Admissions$.[Admission-id]) AS [NumberOfAdmissions]
FROM Admissions$
JOIN Patients$ ON Admissions$.[Patient-id] = Patients$.[Patient-id]
GROUP BY Patients$.[Insurance Provider];
```

100 %

Results | Messages

	Insurance Provider	NumberOfAdmissions
1	Cigna	5783
2	Medicare	5422
3	Blue Cross	5716
4	UnitedHealthcare	5524
5	Aetna	5789