Clinic Database Design

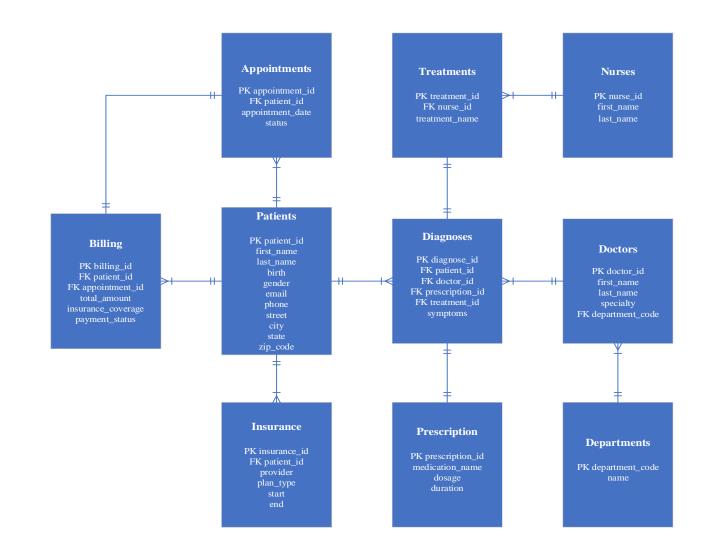**Group 5:**

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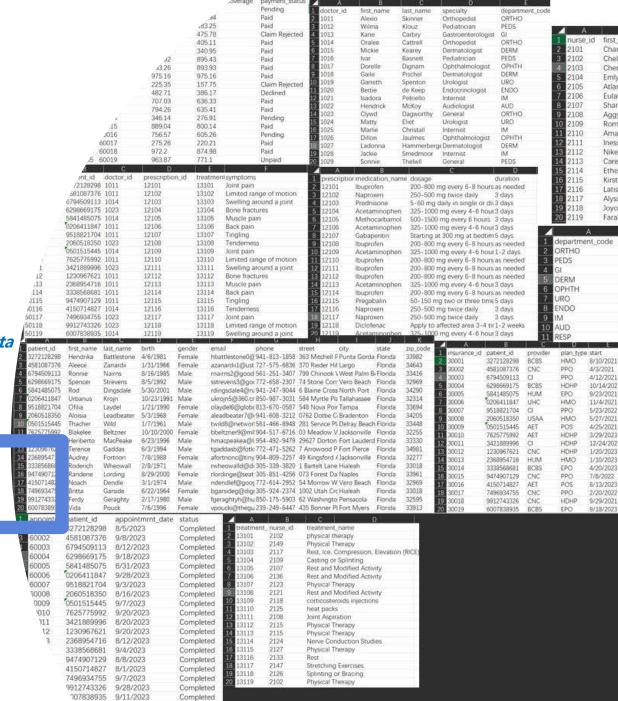
The Database Structure

- **Design for Clinic**

- **Including general procedure**

- **Representative**

Data Loading

Utilized MocKaroo to generate sample Data

- 1500 rows: Patients, Appointments
- 1000 rows: Diagnoses, Prescriptions, Treatments, Billing, Insurance
- 51 Nurses; 32 Doctors; 10 Departments

Develop Queries

```
-- Creating the stored procedure
CREATE OR REPLACE PROCEDURE RescheduleAppointment (
    p_appointment_id NUMBER,
    p_new_date DATE
) AS
BEGIN
    -- Update the appointments table to set the new date
    UPDATE appointments
    SET appointment_date = p_new_date
    WHERE appointment_id = p_appointment_id;
END;
/
CALL RescheduleAppointment (60628,'2023-08-28');
```

Other Queries:

Example: Monthly Revenue Insights

```
---Retrieve Net revenue of each month
SELECT TO_CHAR (a.appointment_date, 'Month YYYY') AS billing_month,
       SUM (b.total_amount - b.insurance_coverage) AS net_revenue
FROM billing b
INNER JOIN appointments a ON b.appointment_id = a.appointment_id
WHERE EXTRACT (YEAR FROM a.appointment_date) = EXTRACT(YEAR FROM SYSDATE)
GROUP BY TO_CHAR (a.appointment_date, 'Month YYYY')
ORDER BY MIN (a.appointment_date);
```

BILLING_MONTH	NET_REVENUE
1 August 2023	40692.68
2 September 2023	39868.36

Performance Tunning

Indexing strategies

```
CREATE INDEX idx_doctors_specialty_lastname ON doctors(specialty, last_name);
CREATE INDEX idx_patients_phone ON patients(phone);
CREATE INDEX idx_patients_city_birth ON patients(city, birth);
CREATE INDEX idx_diagnoses_symptoms ON diagnoses(symptoms);
CREATE INDEX idx_doctors_covering ON doctors(doctor_id, first_name, last_name);
CREATE INDEX idx_diagnoses_doctor_id ON diagnoses(doctor_id);
CREATE INDEX idx_patients_covering ON patients(patient_id, first_name, last_name);
CREATE INDEX idx_diagnoses_covering ON diagnoses(patient_id, symptoms, treatment_id, prescription_id);
CREATE INDEX idx_treatments_covering ON treatments(treatment_id, treatment_name);
CREATE INDEX idx_prescriptions_covering ON prescriptions(prescription_id, medication_name);
```
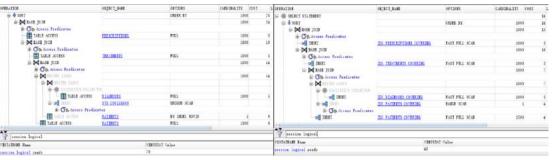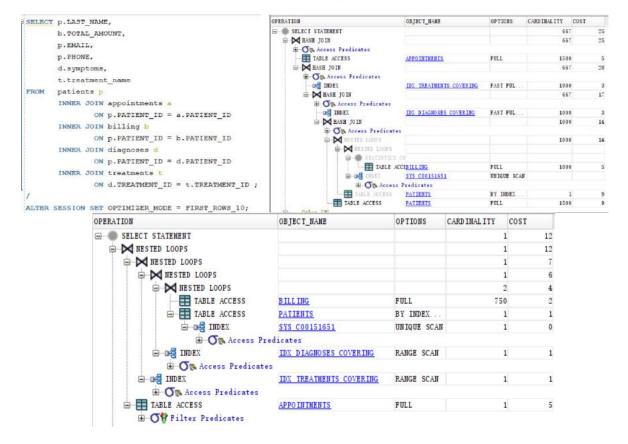
Optimizer changes

```
SELECT p.LAST_NAME,
       b.TOTAL_AMOUNT,
       p.EMAIL,
       p.PHONE,
       d.symptoms,
       t.treatment_name
FROM   patients p
   INNER JOIN appointments a
        ON p.PATIENT_ID = a.PATIENT_ID
   INNER JOIN billing b
        ON p.PATIENT_ID = b.PATIENT_ID
   INNER JOIN diagnoses d
        ON p.PATIENT_ID = d.PATIENT_ID
   INNER JOIN treatments t
        ON d.TREATMENT_ID = t.TREATMENT_ID ;
/
ALTER SESSION SET OPTIMIZER_MODE = FIRST_ROWS_10;
```

Increasing Performance:

Performance Tunning

Table partitioning

Patients table

1	NUM ROWS	1500
2	BLOCKS	28
3	AVG_ROW_LEN	115
4	SAMPLE_SIZE	1500
5	LAST_ANALYZED	23-10-28
6	LAST_ANALYZED_SINCE	23-10-28

Partition table

	PARTITION_	LAST_ANALYZED	NUM_ROWS	BLOCKS	SAMPLE_SIZE	HIGH_VALUE
1	P00S	23-10-28	189	124	189	2010
2	P10S	23-10-28	55	124	55	2020
3	P20S	23-10-28	21	124	21	MAXVALUE
4	P60S	23-10-28	316	124	316	1970
5	P70S	23-10-28	286	250	286	1980
6	P80S	23-10-28	314	250	314	1990
7	P90S	23-10-28	319	124	319	2000

Parallel Execution

```
SELECT * FROM appointments
WHERE appointment_date
BETWEEN TO_DATE('2023-08-01', 'YYYY-MM-DD')
AND TO_DATE('2023-08-10', 'YYYY-MM-DD');

ALTER TABLE appointments PARALLEL (DEGREE 4);
```
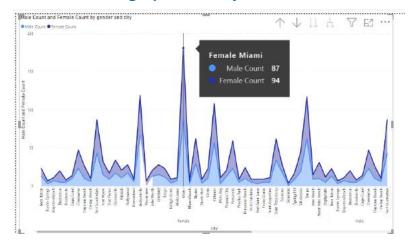
Before:

OPERATION	OBJECT_NAME	OPTIONS	CARDINALITY	COST
SELECT STATEMENT				5
TABLE ACCESS	APPOINTMENTS	FULL	522	5
Filter Predicates				
Other XML				
{info}				
info type="db_version"				
12.1.0.2				
info type="parse_schema"				
"SQL188"				

After:

OPERATION	OBJECT_NAME	OPTIONS	CARDINALITY	COST	L
SELECT STATEMENT				2	
PX COORDINATOR					
PX SEND	SYS :TQ10000	QC (RANDOM)	522	2	
PX BLOCK		ITERATOR	522	2	
TABLE ACCESS	APPOINTMENTS	FULL	522	2	
Access Predicates					
Filter Predicates					
Other XML					
{info}					
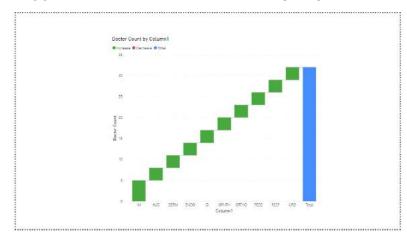
Data Visualization
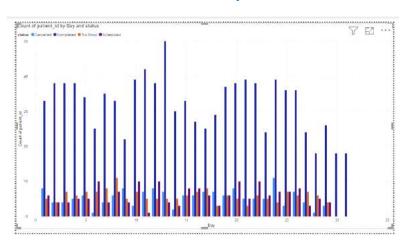
Gender Demographics Analysis in Florida Cities

Doctor Distribution Across Specialties

Appointment Status Distribution by Day

Insurance Coverage vs. Total Bill Amount