DATABASE DEVELOPMENT WITH PL/SQL

Sylvain NSENGA NDIZEYE

27569

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STEP 1 : Problem definition.

Business Context

A hospital created a Hospital Management System analyzing the number of patient visits, the type of medical services, and the hospital billing to enhance efficiency and patient care.

Industry: Healthcare

Department: Hospital Administration & Finance

Data Challenge

Information on patients, services, and billing are kept in different tables. And this becomes a challenge to find out the service utilization, the information on patients, and the income growth over time.

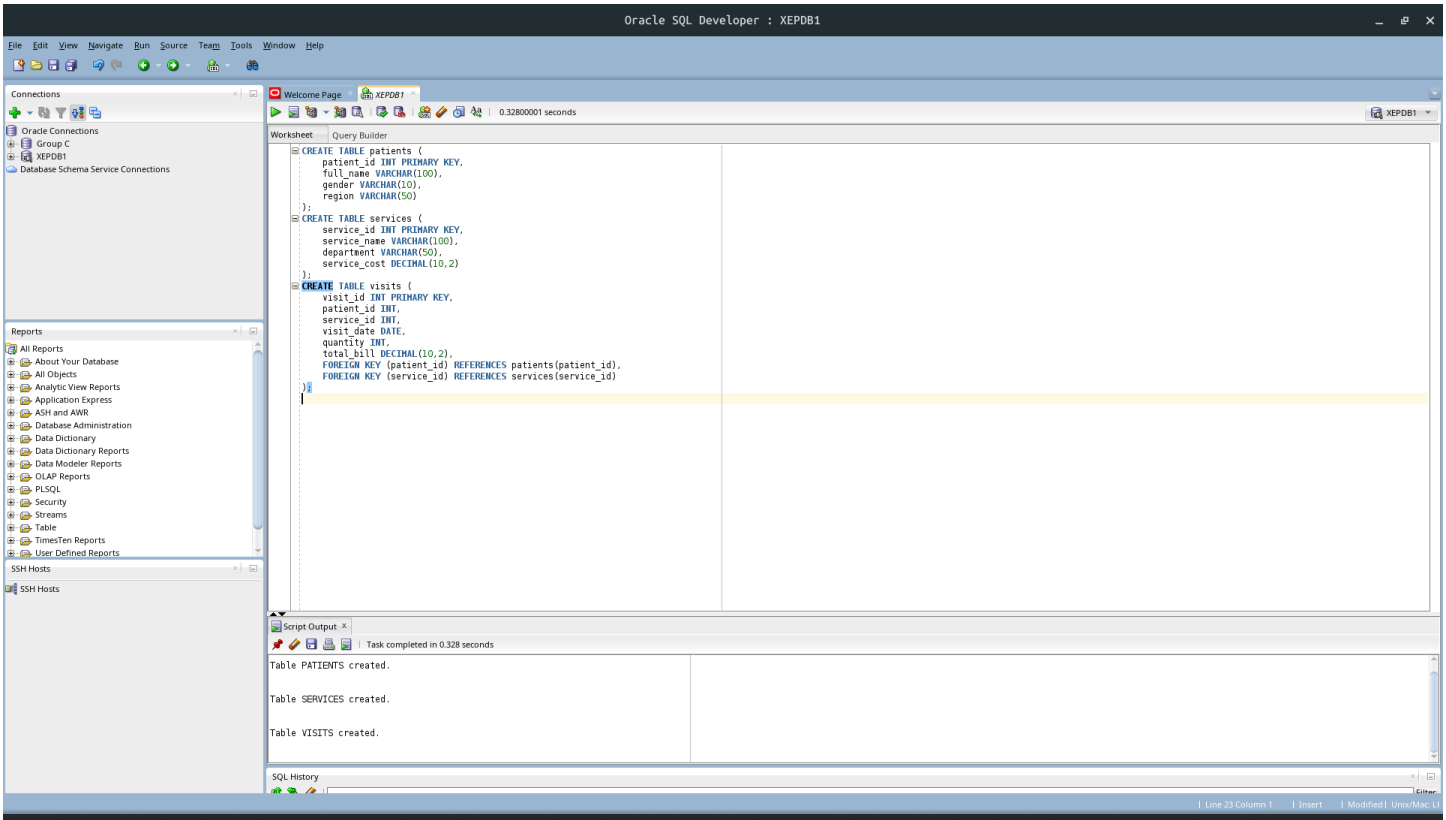
Expected Outcome

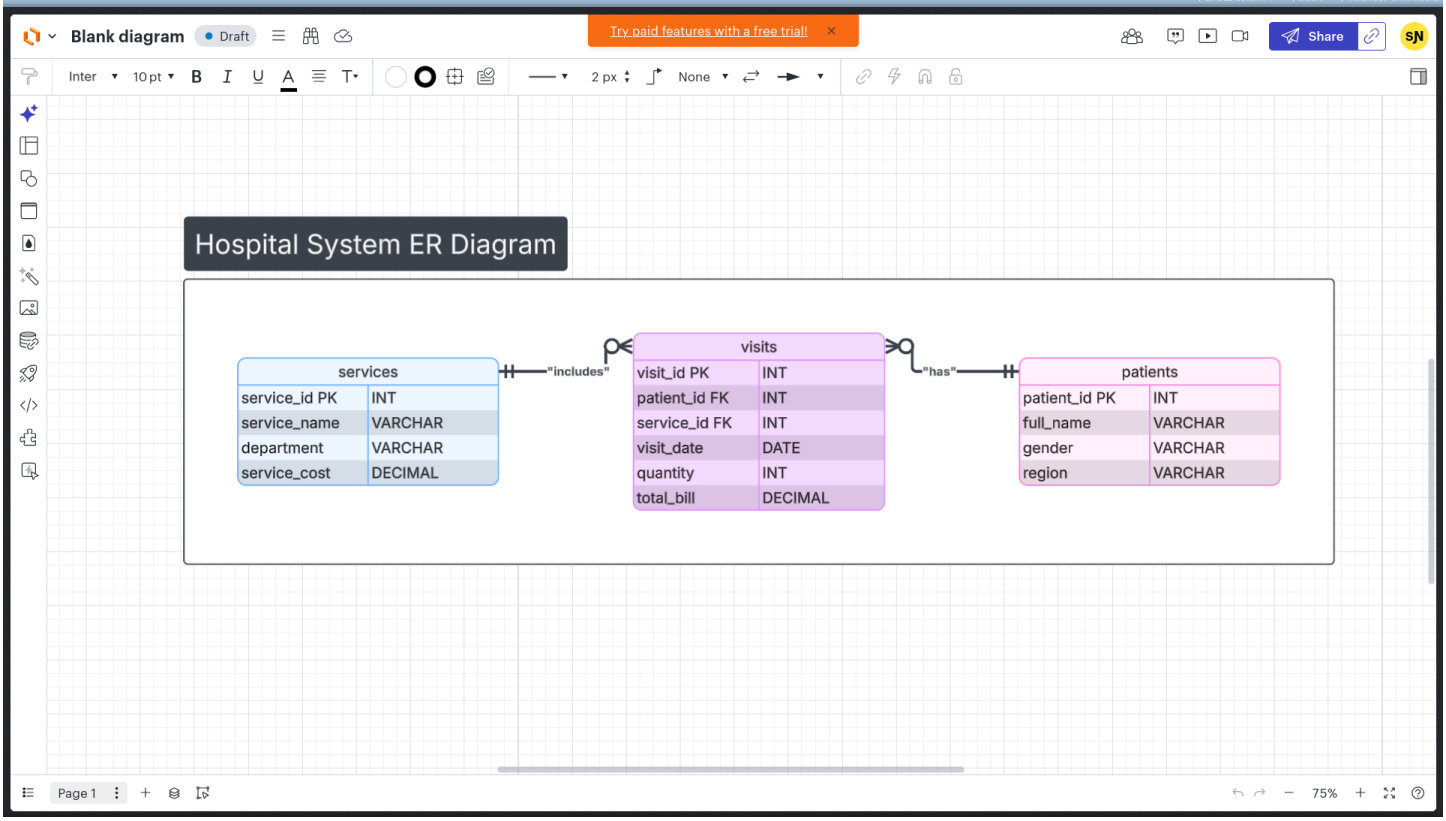
Determine easly the type and quality of a service that the patient received according to price he/she paid, keeping track of the hospital's revenues and incomes over time easly and effitiently, And helping in taking sttrategic and wised decisions in the allocation of recources.

Step 2: Success Criteria.

- Compute running monthly hospital revenue - SUM() OVER()
- Calculate 3-month moving average revenue - AVG().OVER()
- Measure month-over-month revenue growth - LAG()
- divide patients into spending groups - NTILE(4)
- Identify Top 5 medical services per department - RANK()

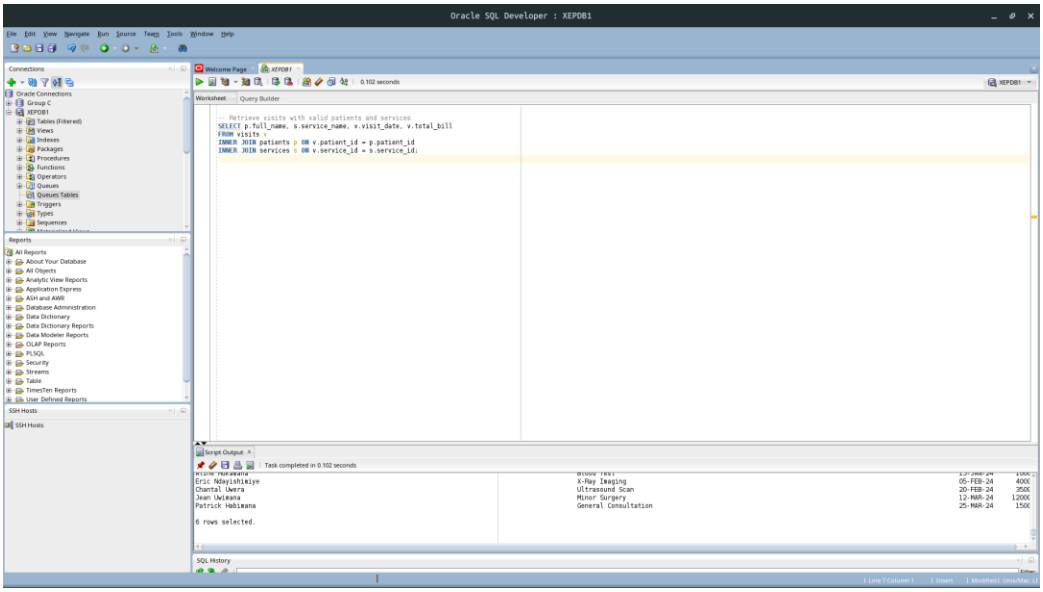
STEP 3: Database Schema Design





STEP 4: PART A — SQL JOINs Implementation

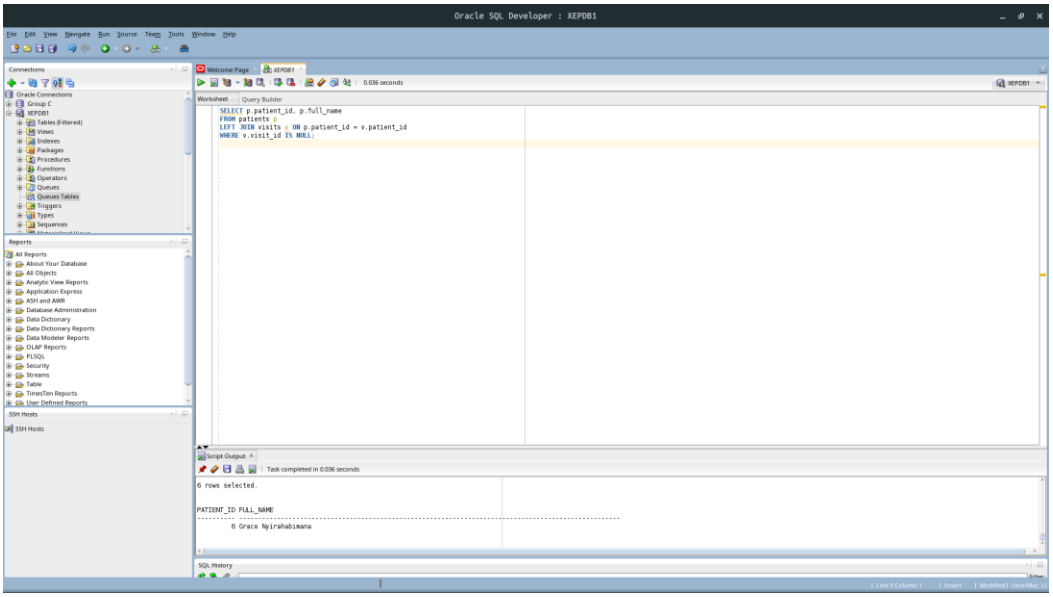
INNER JOIN — Valid Visits



Business Interpretation

Displays confirmed hospital visits linked to registered patients and services, ensuring reliable billing analysis.

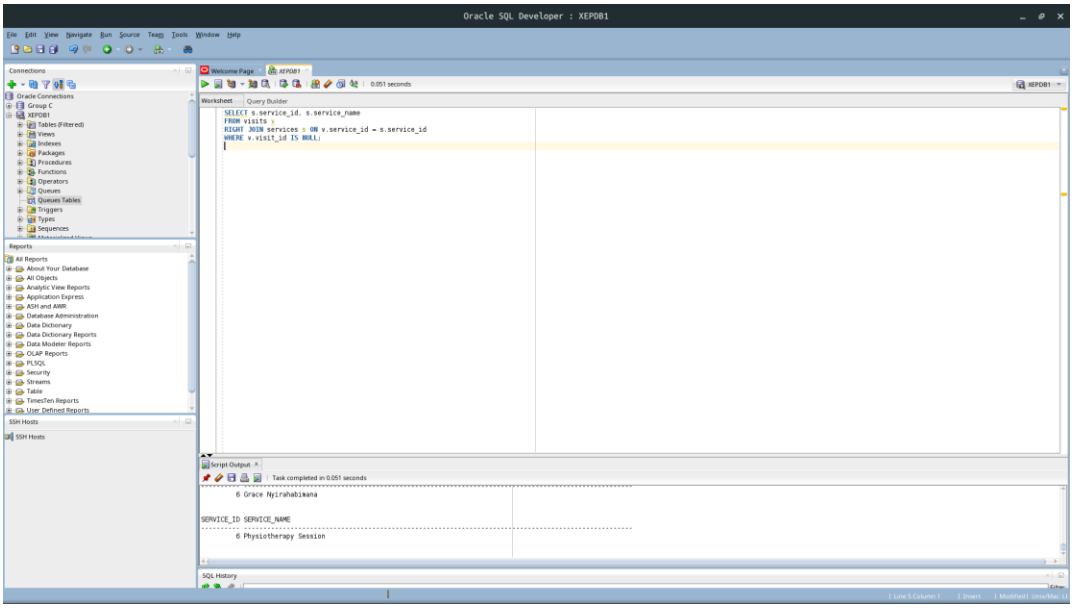
LEFT JOIN — Patients with No Visits



Interpretation:

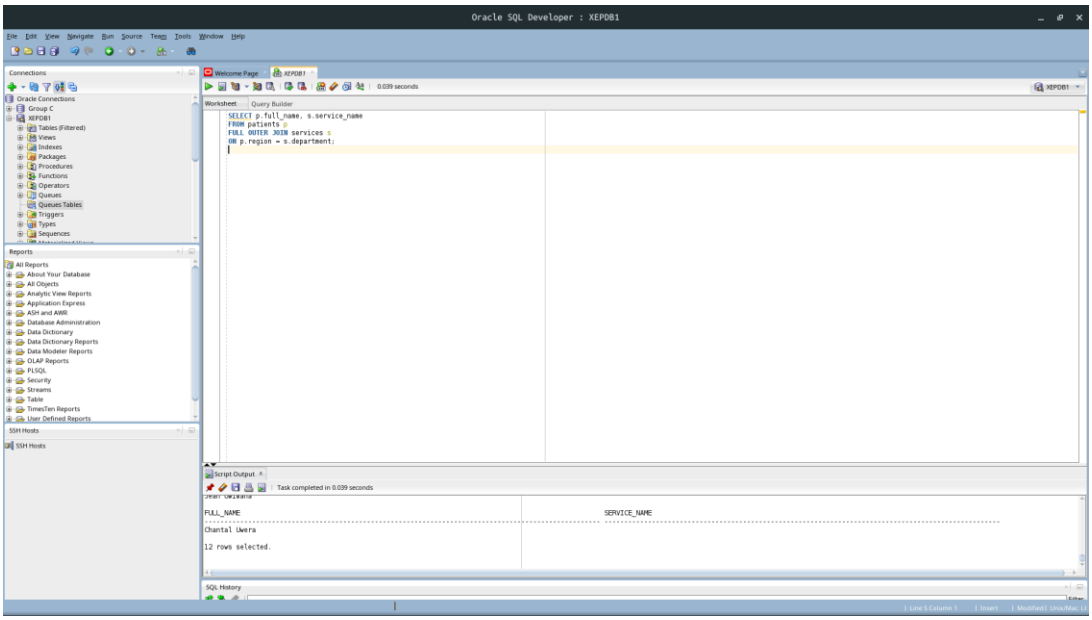
Identifies registered patients who have never visited the hospital.

RIGHT JOIN — Services Never Used



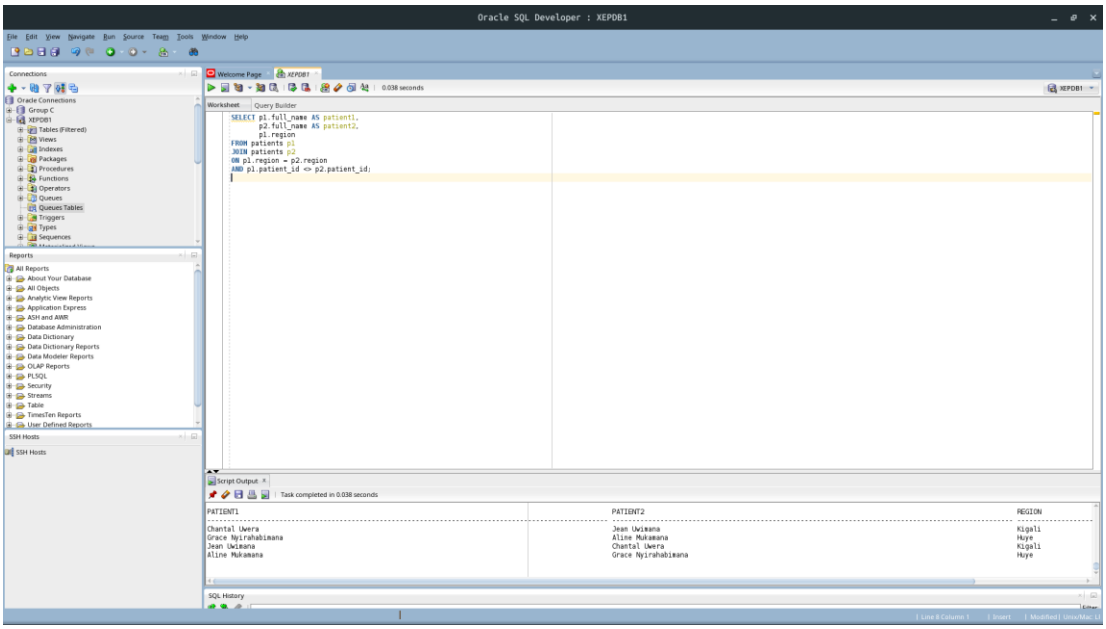
Interpretation:
Highlights medical services that have not been utilized.

FULL OUTER JOIN — Patients & Services



Interpretation:
Compares all patients and services, including unmatched records.

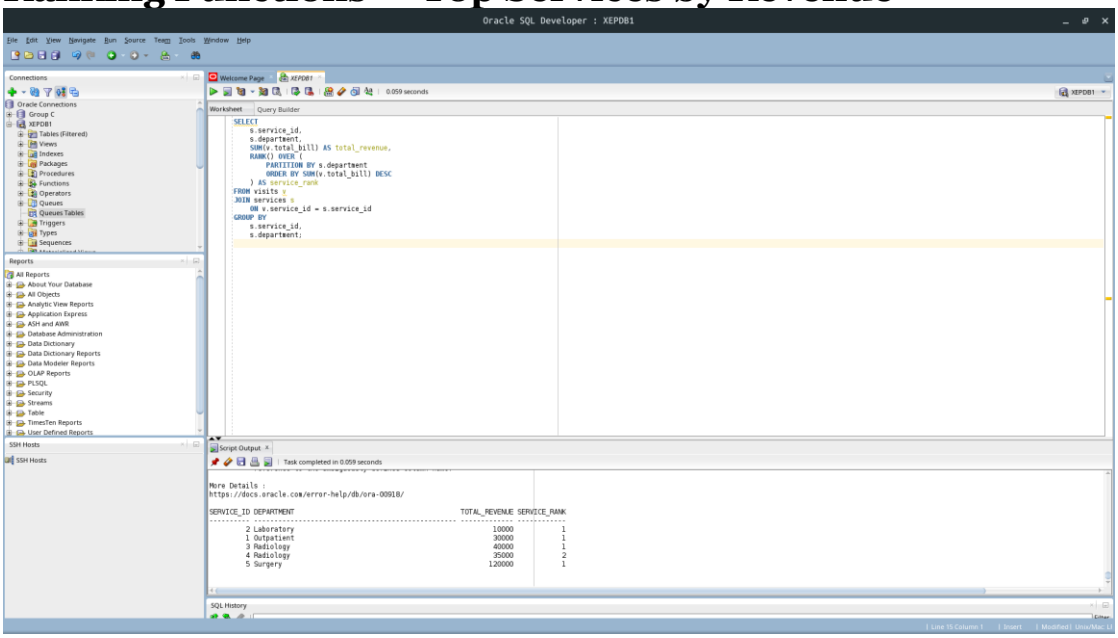
SELF JOIN — Patients from Same Region



Interpretation:
Helps analyze patient distribution within the same region.

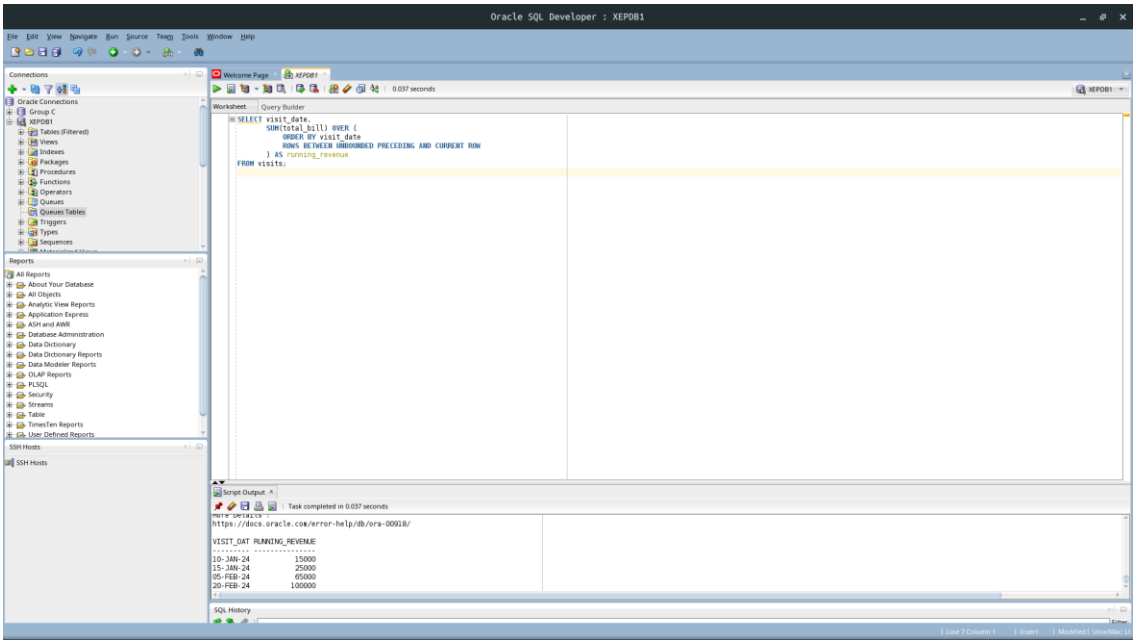
STEP 5: PART B — Window Functions

Ranking Functions — Top Services by Revenue



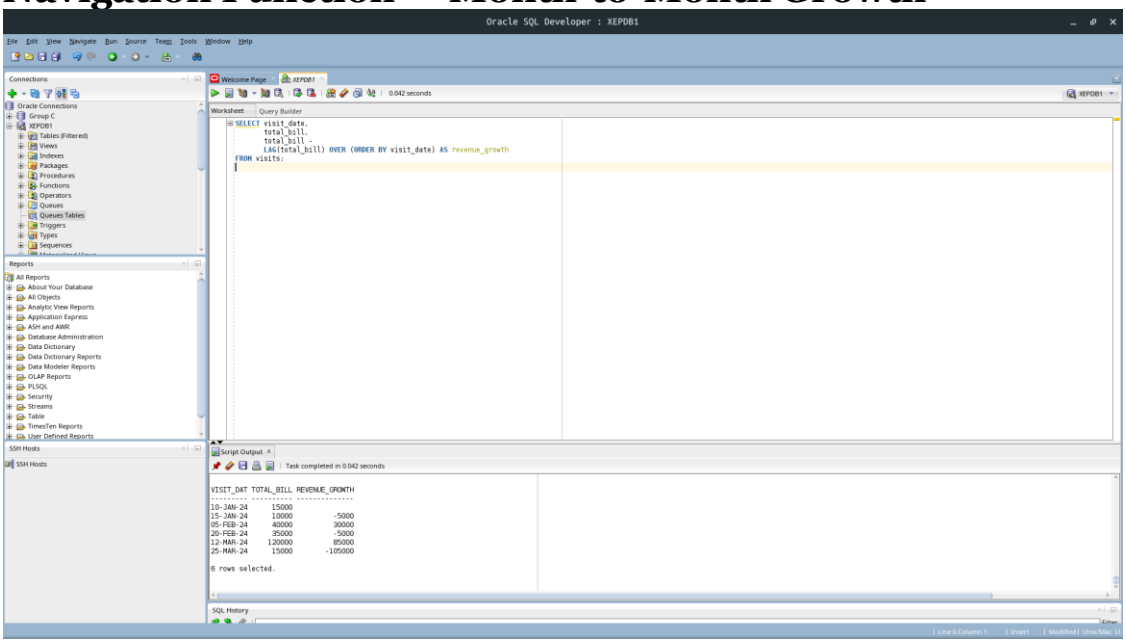
Interpretation:
Ranks medical services within each department based on revenue.

Aggregate Window — Running Revenue



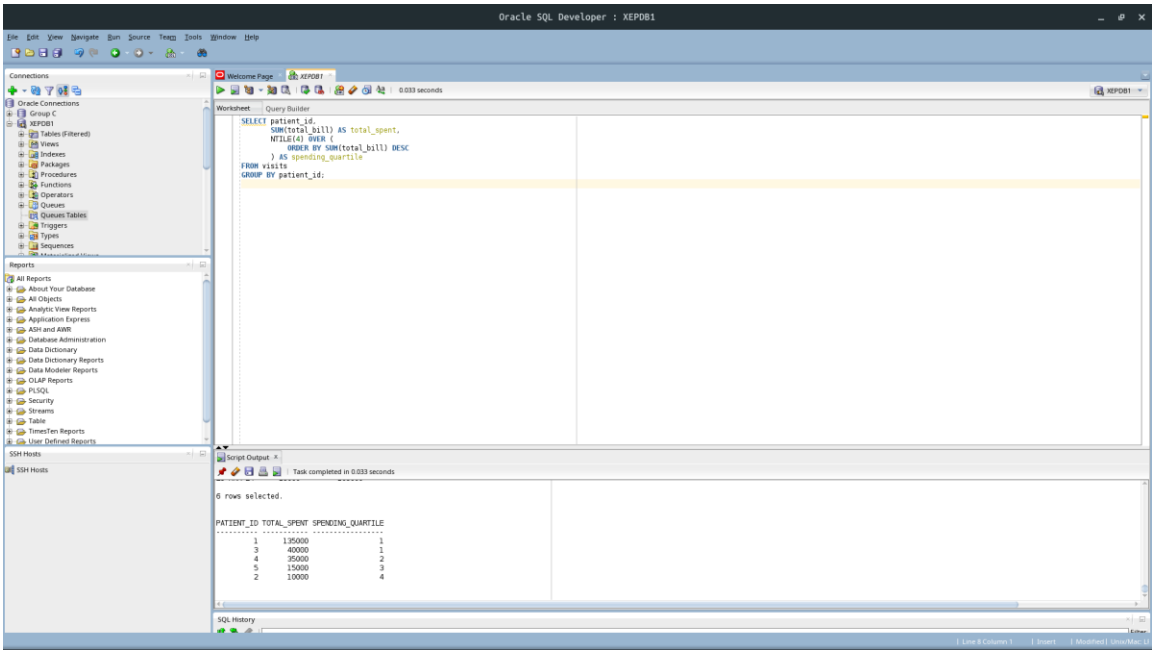
Interpretation:
Shows cumulative hospital revenue growth over time.

Navigation Function — Month-to-Month Growth



Interpretation:
Tracks changes in revenue between consecutive periods.

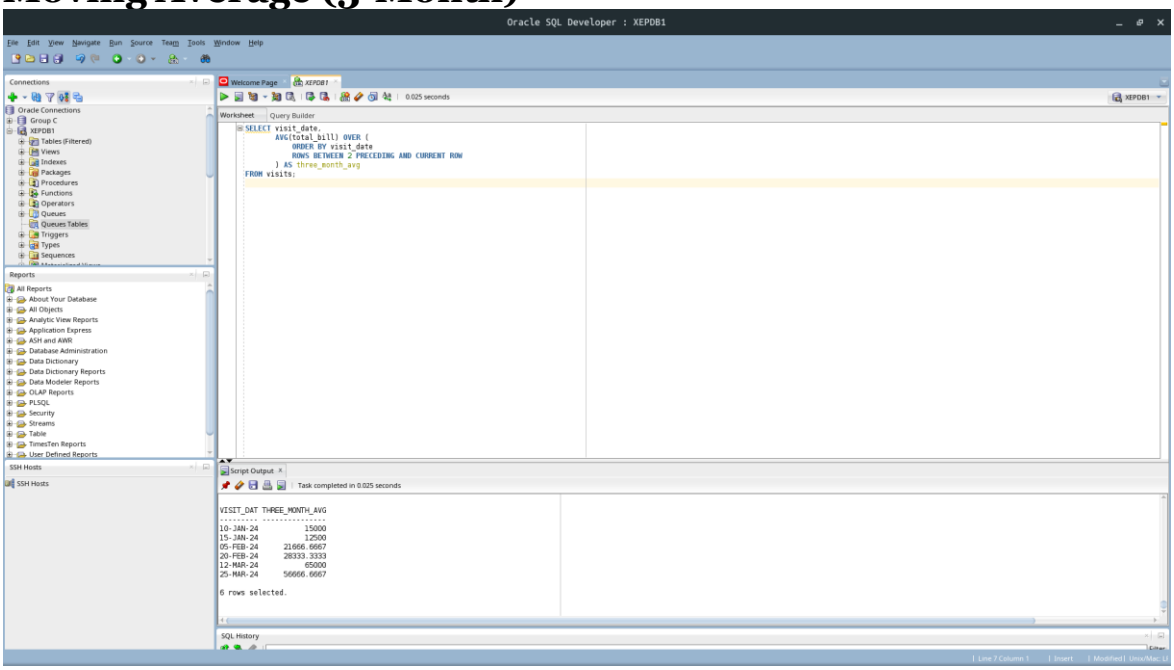
Distribution Functions — Patient Segmentation



Interpretation:

Segments patients into quartiles based on hospital spending.

Moving Average (3-Month)



Interpretation:

Smooths revenue trends to support forecasting.

STEP 7: Results Analysis

Descriptive

Hospital revenue increased steadily, with diagnostics and surgery services generating the highest income.

Diagnostic

A small group of patients contributes significantly to total revenue, while some services remain underutilized.

Prescriptive

Promote underused services, optimize staffing in high-demand departments, and introduce loyalty programs for high-value patients.

STEP 8: References

- Oracle SQL Window Functions Documentation
- PostgreSQL Analytical Functions Guide
- W3Schools SQL JOINs

All sources were properly cited. Implementations and analysis represent original work. No AI-generated content was copied without attribution or adaptation.