Project Title	Hospital Patient Flow & Medical Services Analytics
Skills to Take Away From This Project:	- Data Cleaning and Preprocessing using Excel - Aggregation and Summary Statistics - Complex Joins and Merging - Window Functions and Advanced SQL Queries - Date and Time Series Analysis in Healthcare Context - Ranking, Billing, and Cycle Efficiency Analysis - Advanced Data Visualization in Power BI - Healthcare Business Intelligence and Reporting
Domain	Healthcare Analytics , Data Analytics

Problem Statement

The objective of this project is to analyze operational efficiency and patient care metrics across hospital departments.
This includes tracking patient admissions, treatment outcomes, billing cycles, and doctor performance using multiple datasets.
The analysis will uncover bottlenecks, identify high-performing doctors, and help optimize hospital resources and revenue.

Business Use Cases

- Optimize Departmental Efficiency: Analyze average length of stay, treatment success rate, and readmission causes.
- Doctor Performance Evaluation: Identify top doctors by patient recovery time, volume handled, and satisfaction ratings.
- Billing and Resource Utilization: Assess billing cycle lags and resource usage across departments.
- Patient Segmentation: Understand treatment history, admission frequency, and demographics to enhance care quality.

Approach

A. Basic Aggregation

- Calculate the number of admissions per department per month.
- Find the average treatment cost per department.

B. Join Operations

- Join admissions with doctors to identify top performing doctors by department.
- Join treatments with patient data to evaluate recovery rate by age group.

C. Window Functions

- Calculate moving average of daily admissions (7-day MA).
- Rank doctors by number of successful treatments per month.

D. Percentiles and Median

- Calculate 25th, 50th, and 75th percentile of treatment costs per treatment type.
- Find the median length of stay per department.

E. Grouping and Case Statements

- Group patients into 'High-Risk', 'Moderate-Risk', 'Low-Risk' based on comorbidity count.
- Find admission trends by weekday and weekend.

F. Complex Joins and Subqueries

- Find doctors whose patients had recovery rate above the departmental average.
- Identify patients who visited more than 3 departments in a year.

G. Date Functions and YOY

- Calculate year-over-year change in total treatments administered.
- Find the month with the highest treatment cost.

H. Retention and Follow-up Analysis

- Find patients readmitted within 30 days of discharge.
- Calculate average interval between admissions for chronic patients.

I. Power BI Visualizations(dashboard)

- Doctor-wise recovery rate across departments (heatmap)
- Distribution of treatment types (donut chart)
- Treatment cost variation by department (boxplot)
- 30-day readmission rate KPI (card visual)
- Billing delay breakdown by department, doctor, and treatment (decomposition tree)
- Resource utilization cost by department or treatment type (treemap)
- Year-over-year treatment volume and growth trends (line & clustered column chart)

- Average length of stay per department (bar chart)
- Treatment success rate distribution (pie chart)
- Patient admission trends over time (line chart)
- Doctor rating vs. average treatment cost analysis (scatter plot)

Results:

- Gender distribution of admissions and treatments across patient profiles.
- Average treatment cost per department and recovery rate by patient age group.
- Year-over-year treatment volume trends and identification of top-performing doctors.
- Patient retention metrics including 30-day readmission and chronic care intervals
- Comprehensive Power BI dashboard summarizing efficiency, performance, and outcomes.

Project Evaluation Metrics:

- **Accuracy**: Precision in handling missing data and aggregations.
- **Completeness**: Ensuring all questions and analysis tasks are answered.
- **Insightfulness**: Actionable insights derived from the data.
- **Presentation**: Clear and effective data visualizations and insights.
- **Documentation**: Well-documented report detailing methodologies, findings, and recommendations.

Technical Tags:

- **Data Cleanin**
- **Outlier Detection**
- **SQL Queries and Aggregations**
- **Data Visualization**
- **Healthcare Analytics**

Data Set:

There are three datasets**(patient_admissions, doctor_profiles, treatment_records)**

Data Set Explanation

1. patient_admissions.csv – Contains patient IDs, admission/discharge dates, age, gender, diagnosis, and department info.

2. doctor_profiles.csv – Includes doctor ID, specialization, experience, performance rating, and assigned department.

3. treatment_records.csv – Tracks treatment ID, patient ID, doctor ID, treatment type, date, success flag, and cost.

Project Deliverables:

- **A comprehensive Excel workbook** containing all the analysis, calculations, and visualizations.
- All Sql queries in either mysql or Word document
- **A Power BI file** with interactive visualizations and a dashboard.
- **A detailed report (PDF/PPT)** summarizing the findings, insights, and recommendations.

Project Guidelines:

- **Reporting Standards**: Ensure that all submissions are well-organized
- **Best Practices**: Follow data analysis best practices and ensure the clarity of visualizations.
- **Report Writing**: Ensure the final report is professional, concise, and effectively communicates findings to stakeholders.

Timelines:

1.5 weeks for completing all the SQL, PowerBI and documentation

PROJECT DOUBT CLARIFICATION SESSION (PROJECT AND CLASS DOUBTS)

About Session: The Project Doubt Clarification Session is a helpful resource for resolving questions and concerns about projects and class topics. It provides support in understanding project requirements, addressing code issues, and clarifying class concepts. The session aims to enhance comprehension and provide guidance to overcome challenges effectively.
Note: Book the slot at least before 12:00 Pm on the same day

Timing: Monday-Saturday (4:00PM to 5:00PM)

Booking link : **https://forms.gle/XC553oSbMJ2Gcfug9**

For DE/BADM project/class topic doubt slot clarification session:

Booking link : **https://forms.gle/NtkQ4UV9cBV7Ac3C8**

Session timing:

For DE: 04:00 pm to 5:00 pm every saturday
For BADM 05:00 to 07:00 pm every saturday

LIVE EVALUATION SESSION (CAPSTONE AND FINAL PROJECT)

About Session: The Live Evaluation Session for Capstone and Final Projects allows participants to showcase their projects and receive real-time feedback for improvement. It assesses project quality and provides an opportunity for discussion and evaluation.
Note: This form will Open only on Saturday (after 2 PM) and Sunday on Every Week

Timing:

For BADM and DE
Monday-Saturday (11:30AM to 1:00PM)

For DS and AIML
Monday-Saturday (05:30PM to 07:00PM)

Booking link : **https://forms.gle/1m2Gsro41fLtZurRA**