

<b>Project Title</b>	Retail Sales & Inventory Intelligence System Using Excel, SQL, and Power BI
<b>Skills Take Away From This Project</b>	<ul style="list-style-type: none"> <li>• Data Cleaning and Preprocessing in Excel</li> <li>• Relational Database Design and Querying in SQL</li> <li>• Data Import/Export between Excel and SQL</li> <li>• Data Modeling and KPI Analysis</li> <li>• Interactive Dashboard Creation using Power BI</li> <li>• Optional: Data Manipulation using Python (Pandas, NumPy)</li> <li>• Optional: Machine Learning-based Segmentation (KMeans, Clustering)</li> </ul>
<b>Domain</b>	Retail, Sales & Inventory Analytics

### Problem Statement:

Design and implement a comprehensive data analysis solution for a retail company **that sells mobile phones and laptops**. The company operates multiple stores and wants to analyze its end-to-end operations—from order processing to inventory management and sales performance—across regions, stores, products, and staff. The company's management seeks to extract insights that can improve sales strategies, identify top-selling products, understand customer preferences, optimize inventory, and monitor staff performance.

### Business Use Cases:

1. Identify top-selling brands by region and store.
2. Evaluate staff performance based on total sales handled.
3. Track customer orders and their fulfillment status.
4. Identify the most profitable product categories.

5. Analyze stock levels across stores to optimize inventory.
6. Understand order trends across time (daily, weekly, monthly). Monitor delayed shipments vs. required delivery dates.
7. Discover customer concentration and demographics.
8. (Optional) Segment customers based on order volume and frequency.
10. (Optional) Predict high-demand products during upcoming months.

**Approach:****Phase 1: Excel – Data Preprocessing**

- Load raw data into Excel.
- Clean up inconsistencies (null values, date formats, duplicate entries).
- Normalize specific fields (e.g., product and category names).
- Conduct exploratory data summaries (pivot tables, filters).
- Save clean datasets for import into SQL.

**Phase 2: SQL – Database Management and Querying**

- Import clean data into SQL Workbench or a local database.
- Perform integrity checks (e.g., foreign key constraints).
- Write SQL queries for:
  - Store-wise and Region-wise sales analysis
  - Product-wise sales and inventory trends
  - Staff performance reports
  - Customer orders and order frequency
  - Revenue and discount analysis

- Create SQL Views for reusable insights.

### Phase 3: Python (Optional)

- Load SQL data using pymysql or sqlalchemy. Perform advanced aggregations using pandas, numpy.
- Generate time-series trend insights, customer-level metrics.
- Perform optional segmentation using clustering algorithms.
- Create final insights table to be written back into SQL.

### Phase 4: Power BI – Dashboard Creation

- Connect Power BI to SQL views or insight tables.
- Create visuals for:
  - KPIs: Total Sales, Total Orders, Customer Count
  - Bar Charts: Sales by Category, Staff, Store
  - Maps: Regional Sales Distribution
  - Line Charts: Sales Over Time
  - Matrix Tables: Orders by Staff and Customer
- Apply slicers for Date, Region, Store, Category.
- Enable drill-down features for detailed analysis.

### Results:

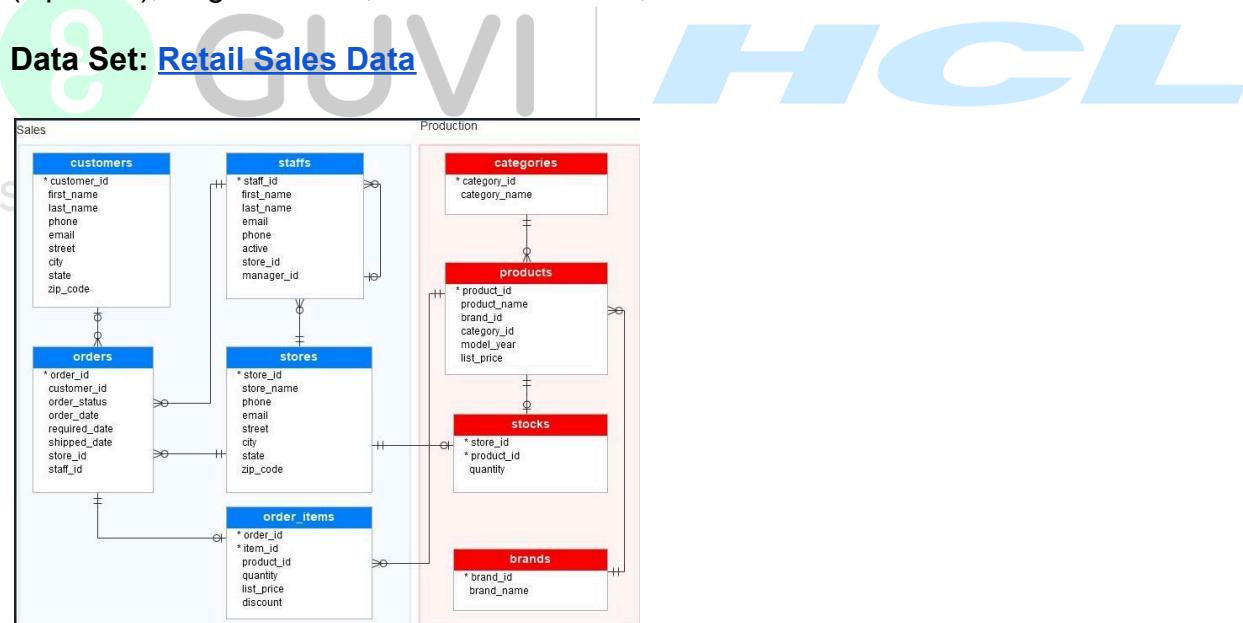
- Cleaned, structured database for analytics
- Interactive dashboard showing all KPIs and metrics
- Insights into sales trends, inventory, staff, and customer behavior
- Readiness for predictive analytics (if Python/ML applied)

## Project Evaluation Metrics:

- Accuracy of data cleaning and transformation steps
- Complexity and quality of SQL queries
- Relevance and clarity of Power BI visualizations
- Logical structure and flow of the analysis (Optional) Effectiveness of customer segmentation or clustering
- Quality and professionalism of final documentation

## Technical Tags:

Excel, SQL, Power BI, ETL, Retail Analytics, Sales Reporting, Inventory, Python (Optional), Segmentation, Data Visualization, KPI Dashboard



- Format: Relational schema with 9 tables (Sales & Production domains)
- Type: Structured CSV or SQL import
- Size: 5000+ transactions
- Content: Orders, Order Items, Customers, Stores, Staffs, Stocks, Products, Brands, Categories

## Data Set Explanation:

- **Sales Domain:**
  - orders, order\_items, customers, staffs, stores
- **Production Domain:**
  - products, stocks, brands, categories
- **Preprocessing Needed:**Join keys verified (e.g., foreign key integrity)
  - Date formatting (order dates, shipped dates)
  - Null handling in emails, discounts, etc.
  - Filter unneeded or test entries (if any)

## Project Deliverables:

- Excel workbook with cleaned dataset
- SQL script for schema and queries
- (Optional) Python notebook with insights or segmentation
- Power BI dashboard file (.pbix)
- Final report documenting steps, insights, and visuals

## Project Guidelines:

- Use proper naming conventions and comments in SQL/Python
- Keep backups of Excel and SQL stages
- Use GitHub or local versioning (if collaborative)
- Follow visualization best practices (label axes, use tooltips, limit clutter)
- Submit documentation in PDF or markdown format



## 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: Saturday (5:00PM to 7:00PM)**

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

## 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 on Saturday and Sunday Only on Every Week**

**Timing: Monday-Saturday (11:30PM to 12:30PM)**

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