MINOR PROJECT

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Branch: MCA   **Section/Group:** 3/A

Subject Name: Business Analytics   **Subject Code:** 23CAH-701

AIM: To analyze pizza sales data using SQL to uncover insights that drive informed business decisions and optimize operations.

TASK TO BE DONE:

- **Data Import:** Import pizza sales data from Excel into SQL, ensuring data types and formatting are correct.

- **Data Cleaning:** Use SQL to clean and preprocess the data (e.g., handle missing values, correct inconsistencies, format dates).

- **Exploratory Analysis:** Write SQL queries to explore the dataset, including counts, unique values, and distribution checks.

- **Key Query Development:**

    - Identify top-selling pizzas or toppings.

    - Analyze sales trends by day, time, or season.

    - Calculate revenue by category.

    - Identify most common pizza ordered.

    - Calculate the total revenue earned and identify the distribution of the order by category.

- **Result Validation:** Verify that each query output is accurate and makes sense with the dataset. Adjust any queries if needed.

- **Insight Documentation:** Record observations and insights based on query results to inform business recommendations.

PBL Implementation

1. **Define the Problem**

   - **Objective**: Analyze pizza sales data to uncover actionable insights for improving business decisions.

2. **Set Learning Goals**

   - **SQL Proficiency**: Develop skills in writing and optimizing SQL queries for data analysis.
   - **Data Analysis**: Understand data cleaning, exploration, and interpretation within SQL.
   - **Insight Generation**: Learn to derive actionable insights from data that could impact real business decisions.
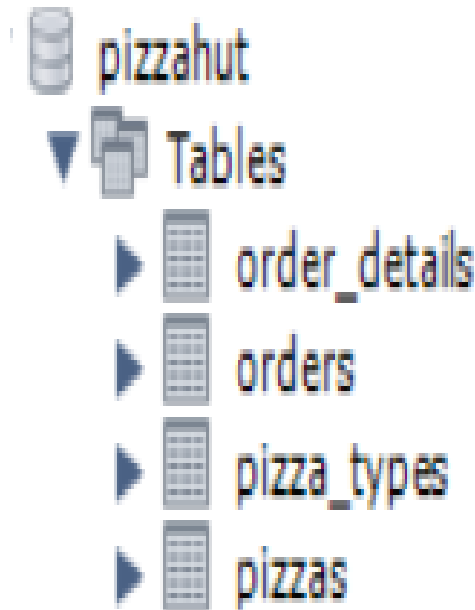
3. **Plan and Research**

   - **Dataset Familiarization**: Begin with exploring the dataset to understand available tables, fields, and data relationships.
   - **SQL Query Development**: Research and write SQL queries that will provide meaningful insights (e.g., sales trends, customer preferences).

4. **Execute the Project**
   - **Data Import**: Import Excel data into SQL, ensuring consistency and data cleanliness.
   - **Analytical Query Development**: Write and run SQL queries to answer specific questions related to sales performance, product popularity, peak hours, and revenue.
   - **Iterative Testing**: Test and validate query outputs, adjusting any logic or conditions as needed for accuracy.

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DESIGN AND IMPLEMENTATION

pizzahut

▼ Tables

▶ order_details

▶ orders

▶ pizza_types

▶ pizzas

1. Retrieve the total number of orders placed.

```
12      -- retrieve the total number of orders placed
13 •    select count(order_id) as total_orders from orders;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

total_orders
21350

2. Calculate the total revenue generated from pizza sales.

```
7       -- Calculate the total revenue generated from pizza sales
8
9 •     select sum(order_details.quantity * pizzas.price) as total_revenue
10      from order_details
11      join pizzas
12      on order_details.pizza_id= pizzas.pizza_id ;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

total_revenue
817860.049999993

5. List the top 5 most ordered pizza types along with their quantities.

```
29      -- List the top 5 most ordered pizza types along with their quantities.
30 •    select pizza_types.name ,sum( order_details.quantity ) as quantity
31      from order_details
32      join pizzas
33      on order_details.pizza_id=pizzas.pizza_id
34      join pizza_types
35      on pizzas.pizza_type_id= pizza_types.pizza_type_id
36      group by pizza_types.name
37      order by quantity desc limit 5;
38
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

name	quantity
The Classic Deluxe Pizza	2453
The Barbecue Chicken Pizza	2432
The Hawaiian Pizza	2422
The Pepperoni Pizza	2418
The Thai Chicken Pizza	2371

6. Join the necessary tables to find the total quantity of each pizza category ordered

```
39      -- Join the necessary tables to find the total quantity of each pizza category ordered.
40 •    select pizza_types.category , sum(order_details.quantity) as quantity
41      from pizza_types
42      join pizzas
43      on pizza_types.pizza_type_id=pizzas.pizza_type_id
44      join order_details
45      on order_details.pizza_id=pizzas.pizza_id
46      group by pizza_types.category
47      order by quantity desc
48
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

category	quantity
Classic	14888
Supreme	11987
Veggie	11649
Chicken	11050

3. Identify the highest-priced pizza

```
15      -- Identify the highest-priced pizza.
16 •    select  pizza_types.name as highest_priced_pizza , pizzas.price
17      from pizza_types
18      join pizzas
19      on pizzas.pizza_type_id = pizza_types.pizza_type_id
20      order by pizzas.price desc limit 1;
21
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

highest_priced_pizza	price
The Greek Pizza	35.95

4. Identify the most common pizza size ordered.

```
22      -- Identify the most common pizza size ordered.
23 •    select  pizzas.size,count(order_details.order_details_id) from order_details
24      join pizzas
25      on order_details.pizza_id= pizzas.pizza_id
26      group by pizzas.size
27      order by count(order_details.order_details_id) desc limit 1;
28
29
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

size	count(order_details.order_details_id)
L	18526

9. Group the orders by date and calculate the average number of pizzas ordered per day.

```sql
59    -- Group the orders by date and calculate the average number of pizzas ordered per day.
60 •  select round(avg(quantity),0) from
61 ⊟ (select  orders.order_date , sum(order_details.quantity) as quantity
62    from orders
63    join order_details
64    on order_details.order_id= orders.order_id
65    group by orders.order_date) as order_quantity ;
66
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

round(avg(quantity),0)
138

10. Determine the top 3 most ordered pizza types based on revenue.

```sql
67    -- Determine the top 3 most ordered pizza types based on revenue.
68 •  select pizza_types.name , sum(pizzas.price * order_details.quantity ) as revenue
69    from pizza_types
70    join pizzas
71    on pizzas.pizza_type_id = pizza_types.pizza_type_id
72    join order_details
73    on pizzas.pizza_id = order_details.pizza_id
74    group by pizza_types.name
75    order by revenue desc  limit 3;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

name	revenue
The Thai Chicken Pizza	43434.25
The Barbecue Chicken Pizza	42768
The California Chicken Pizza	41409.5

7. Determine the distribution of orders by hour of the day.

```sql
49    -- Determine the distribution of orders by hour of the day.
50 •  select hour(orders.order_time)as hour, count(orders.order_id) as order_count
51    from orders
52    group by hour(orders.order_time);
53
```
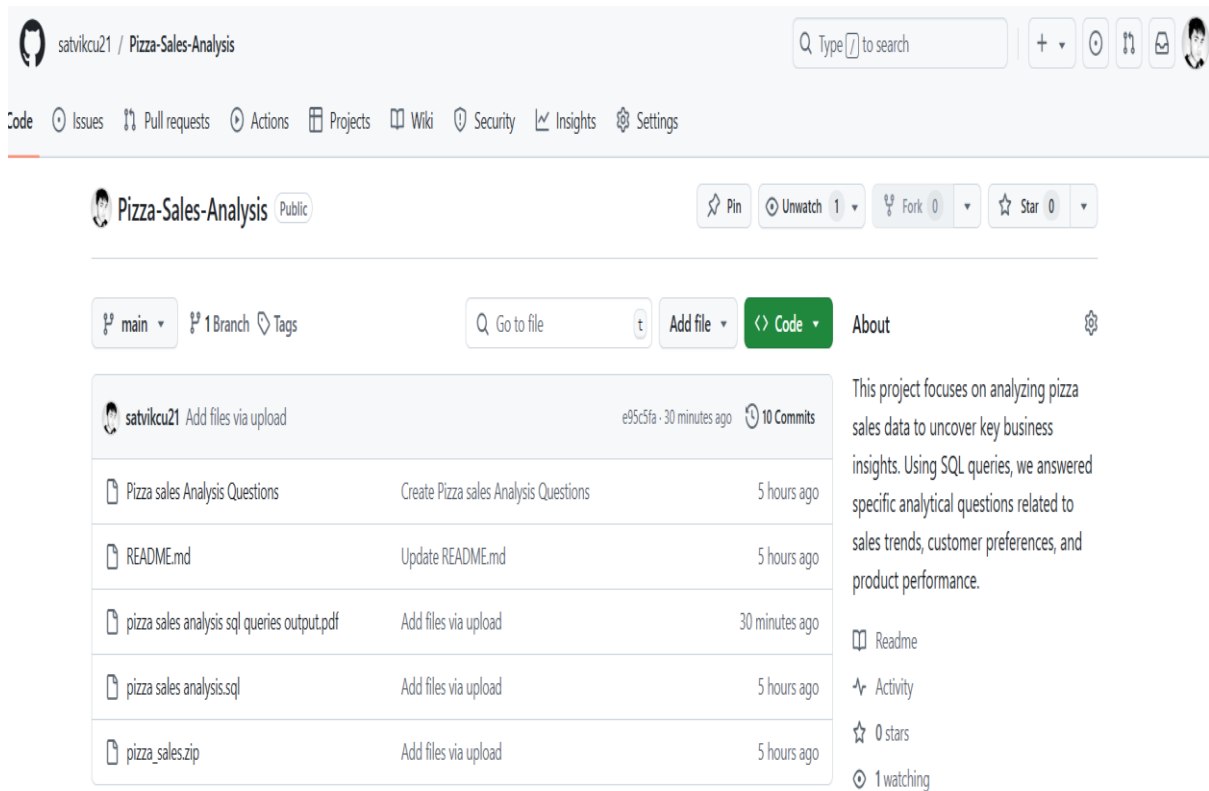
Result Grid | Filter Rows: | Export: | Wrap Cell Content:

hour	order_count
11	1231
12	2520
13	2455
14	1472
15	1468
16	1920
17	2336
18	2399
19	2009
20	1642
21	1198
22	663
23	28
10	8

8. Join relevant tables to find the category-wise distribution of pizzas.

```sql
54    -- Join relevant tables to find the category-wise distribution of pizzas.
55 •  select category , count(name)
56    from pizza_types
57    group by category
58
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

category	count(name)
Chicken	6
Classic	8
Supreme	9
Veggie	9

GIT HUB REPOSITORY

GitHub Link: https://github.com/satvikcu21/Pizza-Sales-Analysis

PORTFOLIO

Project Overview

This project analyses pizza sales data using SQL to uncover insights for strategic decision-making. The goal is to provide valuable business intelligence on sales trends, customer preferences, and product performance, which can inform better operational, marketing, and inventory decisions.

Key Questions Answered

1. **Total Orders**: Retrieve the total number of orders placed.

2. **Revenue Calculation**: Calculate the total revenue generated from pizza sales.

3. **Product Insights**:

   o Identify the highest-priced pizza.

   o Find the most common pizza size ordered.

   o List the top 5 most-ordered pizza types along with their quantities.

4. **Category Analysis**:

   o Determine the total quantity of each pizza category ordered.

   o Identify the category-wise distribution of pizzas.

5. **Sales Patterns**:

   o Determine the distribution of orders by hour of the day.

   o Group orders by date and calculate the average number of pizzas ordered per day.

6. **Revenue Breakdown**: Identify the top 3 most-ordered pizza types based on revenue.

Tools & Technologies

- **SQL**: Used for querying and analysing the pizza sales data.

- **Excel**: Imported sales data from Excel to SQL for analysis.

- **Database Management**: Worked with relational databases to join tables, group data, and calculate aggregates for deeper insights.

Results & Insights

- **Popular Pizza Types**: Discovered which pizzas and sizes are most popular with customers.

- **Sales Peaks**: Analysed order distribution by time of day, helping to identify peak sales periods.

- **Revenue Insights**: Found which pizzas contributed the most to total revenue, guiding menu optimization.

- **Operational Recommendations**: Insights derived from the analysis can help with inventory stocking, staff planning, and targeted promotions.

Challenges & Learning

- **Data Cleaning**: Ensured data consistency and resolved formatting issues during the import process.

- **SQL Optimization**: Developed efficient queries to handle large datasets, improving processing time and accuracy.

- **Business Relevance**: Focused on interpreting data insights in a way that could be actionable for business stakeholders.

Future Enhancements

- **Data Visualization**: Adding visualizations for insights on sales trends and customer preferences.

- **Advanced Analysis**: Incorporating customer segmentation and predictive sales analysis for proactive decision-making.

BLOG

Introduction

The food industry, particularly quick-service sectors like pizza shops, thrives on understanding customer preferences, optimizing inventory, and identifying peak times to drive sales. In my latest project, I tackled these challenges by analysing pizza sales data using SQL, aiming to transform raw sales data into actionable insights that could support better decision-making.

Project Goal

The primary aim of this project was to dive into pizza sales data, identify trends and patterns, and answer key business questions. The insights gained would help guide business strategies related to menu offerings, staffing, and inventory management.

Tools & Technologies Used

- **SQL**: The primary tool for querying, analysing, and transforming the data.

- **Excel**: Used for the initial data import.

- **Database Management**: Worked with relational databases, performing joins, grouping, and aggregation operations.

Step 1: Data Import and Preparation

To start, I imported the raw sales data from Excel into SQL. This included tables with details on orders, pizzas, and categories. Data preparation involved cleaning for consistency—ensuring dates, order quantities, and pricing data were in the correct formats. This step was crucial to make sure that the queries would run efficiently and accurately.

Step 2: Key Questions and SQL Queries

To structure my analysis, I defined several business-oriented questions and used SQL queries to answer them:

1. **Total Orders**: Understanding the total volume of orders gives insight into overall business performance.

2. **Total Revenue**: Calculated the total revenue from pizza sales to gauge financial performance.

3. **Product Insights**:

   o Highest-Priced Pizza: Identified which pizza carried the highest price.

   o Most Common Pizza Size: Determined the preferred size among customers.

   o Top 5 Pizza Types: Listed the top 5 pizzas by quantity ordered, helping to identify customer favourites.

4. **Category and Distribution Analysis**:

   o Total Quantity by Category: Analysed total sales per category to understand the popularity of various pizza types.

   o Orders by Hour: Mapped orders across hours of the day, which helped reveal peak times.

5. **Revenue Breakdown**:

   o Top 3 Pizza Types by Revenue: Focused on pizzas with the highest contribution to total revenue to inform menu prioritization.

Key Insights

With the queries completed, here's what the data revealed:

- **Top-Ordered Pizzas**: A small subset of pizza types accounted for the majority of orders, highlighting the value of customer favourites in driving sales.

- **Peak Hours**: Most orders clustered around specific times, like lunch and dinner hours, which can be critical for staffing and operational planning.

- **Revenue Drivers**: A handful of pizzas generated the highest revenue, offering insight into which items are essential to the menu.

- **Size Preferences**: Certain pizza sizes were consistently more popular, informing inventory and pricing strategies.

Challenges Faced

Every data project comes with its own set of challenges, and this one was no different:

- **Data Cleaning**: Ensuring consistency in data types and formats was essential, as it impacted query accuracy.

- **SQL Optimization**: Working with larger datasets meant optimizing queries for better performance, which I achieved by indexing tables and refining joins.

- **Interpreting Business Impact**: Translating raw numbers into actionable business insights was crucial to make the analysis practical and relevant.

Future Enhancements

While SQL analysis provided solid insights, there are several ways to build upon this project:

1. **Data Visualization**: Visualizations would make the data insights more accessible and impactful, such as charts for sales trends or peak hours.

2. **Customer Segmentation**: Segmenting customers by order frequency or preferences could uncover new opportunities for targeted marketing.

3. **Predictive Analysis**: Using historical data to forecast future demand could improve inventory planning and reduce waste.

Conclusion

This pizza sales analysis project was an exciting opportunity to use SQL for real-world business insights. By answering specific questions through SQL queries, I was able to identify trends, optimize operations, and uncover potential strategies for increased revenue and customer satisfaction. This project highlights how data can drive meaningful change in even the smallest business areas.