



INNOVATION. AUTOMATION. ANALYTICS

# SQL PROJECT ON GROCERY STORE MANAGEMENT

PRESENTED BY  
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# LET'S GO TO THE GROCERIEASE



# INTRODUCTION

In today's competitive retail environment, grocery stores must efficiently manage vast amounts of data related to products, suppliers, employees, customers, and transactions. This project focuses on designing and implementing a comprehensive relational database system for a grocery store using SQL (Structured Query Language) to enable streamlined operations and data-driven decision-making.



# LET'S SEE TABLES

## Category Table

	Field	Type	Null	Key	Default	Extra
▶	cat_id	tinyint	NO	PRI	HULL	
	cat_name	varchar(255)	YES		HULL	



## Customer Table

	Field	Type	Null	Key	Default
▶	cust_id	smallint	NO	PRI	HULL
	cust_name	varchar(255)	YES		HULL
	address	text	YES		HULL

# Employee Table

	Field	Type	Null	Key	Default
▶	emp_id	tinyint	NO	PRI	NULL
	emp_name	varchar(255)	YES		NULL
	hire_date	varchar(255)	YES		NULL

# Orders Table

	Field	Type	Null	Key	Default
▶	ord_id	smallint	NO	PRI	NULL
	cust_id	smallint	YES	MUL	NULL
	emp_id	tinyint	YES	MUL	NULL
	order_date	varchar(255)	YES		NULL
	dateConverted	date	YES		NULL

# Order Details Table

	Field	Type	Null	Key	Default	Extra
▶	ord_det_id	smallint	NO	PRI	NULL	auto_increment
	ord_id	smallint	YES	MUL	NULL	
	prod_id	tinyint	YES	MUL	NULL	
	quantity	tinyint	YES		NULL	
	each_price	decimal(10,2)	YES		NULL	
	total_price	decimal(10,2)	YES		NULL	



# Products Table

Field	Type	Null	Key	Default
prod_id	tinyint	NO	PRI	NULL
prod_name	varchar(255)	YES		NULL
sup_id	tinyint	YES	MUL	NULL
cat_id	tinyint	YES	MUL	NULL
price	decimal(10,2)	YES		NULL

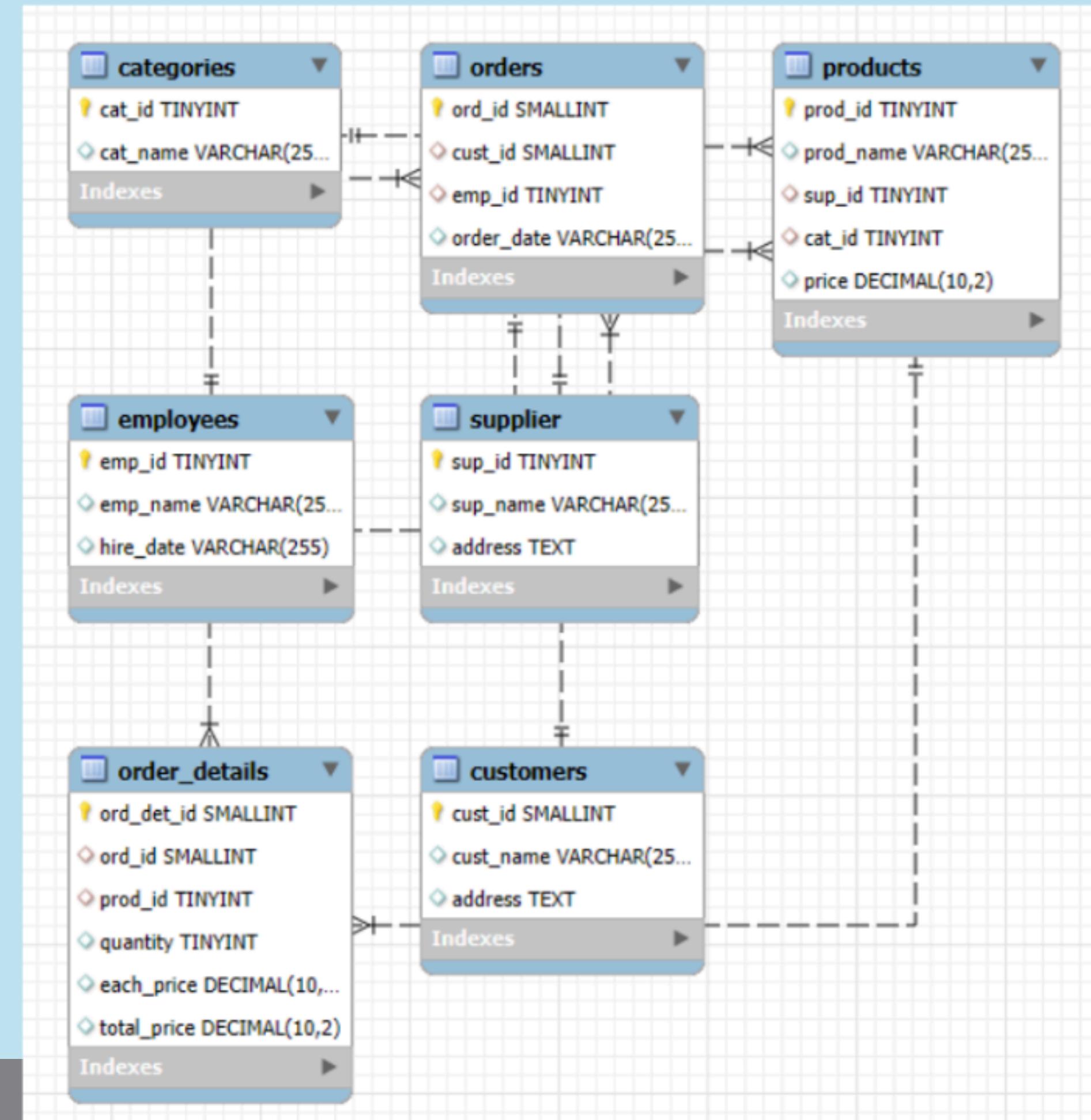
# Supplier Table

Field	Type	Null	Key	Default
sup_id	tinyint	NO	PRI	NULL
sup_name	varchar(255)	YES		NULL
address	text	YES		NULL





# ENTITY RELATIONSHIP DIAGRAM



# PROBLEM STATEMENT

This project simulates a grocery store database designed to manage products, customers, suppliers, and orders.

It enables tracking of sales, stock levels, and employee or customer activity.

SQL is used to analyze the data and extract meaningful business insights.

The aim is to enhance operational efficiency and support informed decision-making.



# CUSTOMER INSIGHTS

## 1. How many unique customers have placed orders?

```
SELECT  
COUNT(DISTINCT cust_id) AS unique_customers  
FROM orders;
```

Output:

	unique_customers
→	156



Insight:

Identifies your actual engaged customer base

## 2. Which customers have placed the highest number of orders?

```
SELECT c.cust_id, c.cust_name,  
       COUNT(o.ord_id) AS total_orders  
  FROM customers c  
INNER JOIN orders o  
    ON c.cust_id=o.cust_id  
 GROUP BY c.cust_id  
 ORDER BY total_orders DESC LIMIT 1;
```

### Output:

	cust_id	cust_name	total_orders
▶	165	Jyotika	7



### Insight:

Reveals your most loyal customer(s) by frequency

### 3.What is the total and average purchase value per customer?

```

SELECT o.cust_id, c.cust_name,
SUM(od.total_price) AS total_purchase,
AVG(od.total_price) AS avg_purchase
FROM orders o
INNER JOIN order_details od
ON o.ord_id= od.ord_id
INNER JOIN customers c
ON o.cust_id= c.cust_id
GROUP BY o.cust_id;
    
```

#### Output:

	cust_id	cust_name	total_purchase	avg_purchase
	158	Eshwar Menon	3061.90	765.475000
	129	Kiran Pillai	2625.93	656.482500
	27	Chetan Gowda	5750.59	821.512857
	122	Chetan Reddy	3869.54	1289.846667
	168	Kasturi	3865.31	1288.436667
	157	Deepa Gowda	1745.11	872.555000
	125	Gita Nair	6305.09	1261.018000
	167	Karishma	5426.90	493.354545
	166	Kapila	11099.51	1109.951000
	120	Kiran Iyer	5588.91	698.613750
	145	Chetan Rao	5351.18	668.897500
	141	Hari Nair	5722.71	817.530000
	182	Nikita	5595.89	932.648333
	163	Esha	2515.25	1257.625000
	94	Gita Menon	6581.93	731.325556

Insight:

Helps segment customers by spending behavior, guiding loyalty programs

## 4. Who are the top 5 customers by total purchase amount?

```

SELECT o.cust_id, c.cust_name,
SUM(od.total_price) AS total_purchase
FROM orders o
INNER JOIN order_details od
ON o.ord_id= od.ord_id
INNER JOIN customers c
ON o.cust_id= c.cust_id
GROUP BY o.cust_id
ORDER BY total_purchase DESC
LIMIT 5;
  
```

### Output:

cust_id	cust_name	total_purchase
19	Chetan Naidu	11256.82
166	Kapila	11099.51
67	Eshwar Rao	10819.96
61	Aditi Rao	10230.64
7	Eshwar Iyer	9188.45

Insight:

Spotlights high-value customers who contribute the most revenue

# PRODUCT PERFORMANCE

## 5. How many products exist in each category?

```

SELECT c.cat_id, c.cat_name,
       COUNT(p.prod_id) AS total_products
  FROM categories c
 LEFT JOIN products p
    ON c.cat_id= p.cat_id
 GROUP BY c.cat_id;
    
```



### Output:

cat_id	cat_name	total_products
1	Grains & Cereals	18
2	Dairy Products	6
3	Beverages	17
4	Personal Care	6
5	Snacks & Confectioneries	3

#### Insight:

Shows product diversity per category, helping identify over- or under-stocked categories.

## 6. What is the average price of products by category?

```
SELECT c.cat_id, c.cat_name,  
AVG(p.price) AS avg_price  
FROM categories c  
LEFT JOIN products p  
ON c.cat_id = p.cat_id  
GROUP BY c.cat_id;
```

**Output:**

cat_id	cat_name	avg_price
1	Grains & Cereals	287.673333
2	Dairy Products	366.943333
3	Beverages	278.892353
4	Personal Care	364.991667
5	Snacks & Confectioneries	363.336667



**Insight:**

Gives an idea of category pricing strategy—whether you're premium or budget in each segment.

## 7. Which products have the highest total sales volume (by quantity)?

```
SELECT p.prod_name,  
       SUM(quantity) AS high_sales  
  FROM order_details od  
  LEFT JOIN products p  
    ON od.prod_id= p.prod_id  
 GROUP BY prod_name  
 ORDER BY high_sales DESC  
 LIMIT 1;
```

**Output:**

prod_name	high_sales
Bath Soap	60

**Insight:**

Finds bestsellers by quantity



## 8. What is the total revenue generated by each product?

```

SELECT SUM(od.total_price) AS total_revenue,
p.prod_name
FROM order_details od
LEFT JOIN products p
ON od.prod_id= p.prod_id
GROUP BY prod_name;
    
```

**Output:**

total_revenue	prod_name
5062.45	Black Pepper
18561.92	Cashews
5819.23	Green Tea
5703.43	Salt
19695.02	Moong Dal
7918.87	Dishwashing Soap
14848.72	Detergent Powder
11283.92	Tomato Ketchup
8406.10	Cumin Seeds
14113.00	Bath Soap
11100.45	Mayonnaise
6104.70	Coffee Powder



**Insight:**

Uncovers the most revenue-generating products

## 9. How do product sales vary by category and supplier?

```

SELECT c.cat_name, s.sup_name,
SUM(od.total_price) AS total_sales
FROM order_details od
INNER JOIN products p
ON od.prod_id= p.prod_id
INNER JOIN categories c
ON p.cat_id= c.cat_id
INNER JOIN supplier s
ON p.sup_id= s.sup_id
GROUP BY c.cat_name, s.sup_name
ORDER BY c.cat_name, total_sales
DESC;
    
```

**Output:**

cat_name	sup_name	total_sales
Beverages	Aarya	65538.71
Beverages	Suresh	65307.14
Beverages	Aarav Sharma	26948.15
Beverages	Sai	17103.15
Beverages	Karthik	8520.43
Dairy Products	Sai	50740.60
Dairy Products	Aarya	18519.61
Dairy Products	Karthik	11100.45
Grains & Cereals	Aarya	67701.10
Grains & Cereals	Karthik	39473.49
Grains & Cereals	Suresh	26248.89

**Insight:**

Helps identify which category-supplier combinations drive revenue

# SALES AND ORDER TRENDS

10. How many orders have been placed in total?

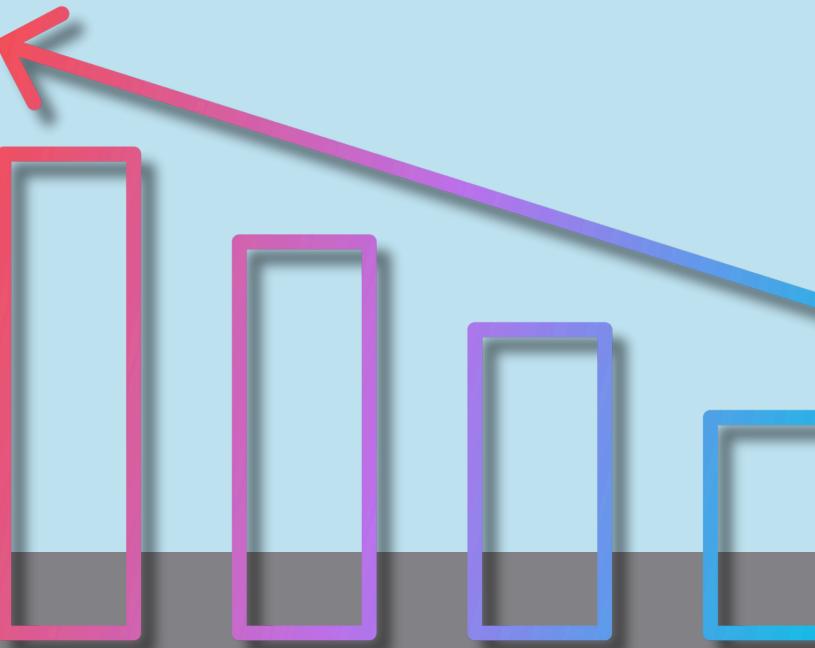
```
SELECT COUNT(*) AS total_orders  
FROM orders;
```

Output:

total_orders
300

Insight:

Total number of orders placed



## 11. What is the average value per order?

```
SELECT SUM(total_price)/COUNT(DISTINCT ord_id) AS avg_ord_value  
FROM order_details;
```

### Output:

avg_ord_value
2153.632539

### Insight:

Useful for gauging basket size or customer spend per transaction

## 12. On which dates were the most orders placed?

```
SELECT order_date, COUNT(ord_id) AS ord_count  
FROM orders  
GROUP BY order_date  
ORDER BY ord_count DESC  
LIMIT 1;
```

**Output:**

order_date	ord_count
9/10/2022	4

**Insight:**

Identifies peak sales days

## 13. What are the monthly trends in order volume and revenue?

```

ALTER TABLE orders ADD COLUMN date_converted DATE;
UPDATE orders
SET date_converted = STR_TO_DATE(order_date, '%m/%d/%Y');

SELECT
LEFT(o.date_converted, 7) AS ord_month,
COUNT(DISTINCT o.ord_id) AS ord_volume,
SUM(od.total_price) AS total_revenue
FROM orders o
INNER JOIN order_details od
ON o.ord_id= od.ord_id
GROUP BY ord_month
ORDER BY ord_month;
    
```

**Insight:**

Shows seasonal patterns or growth trends, helping in forecasting

**Output:**

ord_month	ord_volume	total_revenue
2022-01	30	70312.45
2022-02	28	66929.42
2022-03	27	45977.16
2022-04	11	29118.54
2022-05	19	41305.62
2022-06	14	27378.69
2022-07	21	48674.66
2022-08	20	36045.01
2022-09	23	52626.61
2022-10	12	25917.32
2022-11	19	46141.33
2022-12	32	60903.12

## 14. How do order patterns vary across weekdays and weekends?

```
SELECT  
    DayName (STR_TO_DATE(order_date, "%m/%d/%y")) AS weekday,  
    MonthName (STR_TO_DATE(order_date, "%m/%d/%y")) AS month_,  
    COUNT(ord_id) AS total_orders  
FROM orders  
GROUP BY weekday, month_  
ORDER BY weekday, month_;
```

### Output:

weekday	month_	total_orders
Friday	April	2
Friday	August	2
Friday	December	3
Friday	February	4
Friday	January	5
Friday	July	3
Friday	June	2
Friday	March	3
Friday	May	2
Friday	November	3
Friday	October	5

Insight:

Reveals customer behavior across the week

# SUPPLIER CONTRIBUTION

15. How many suppliers are there in the database?

```
SELECT COUNT(*)  
FROM Supplier;
```

Output:

COUNT(*)
5

Insight:

Measures your supplier network size



## 16. Which supplier provides the most products?

```
SELECT s.sup_id, s.sup_name,  
COUNT(p.prod_id) AS product_count  
FROM supplier s  
INNER JOIN products p  
ON s.sup_id= p.sup_id  
GROUP BY s.sup_id  
ORDER BY product_count DESC  
LIMIT 1;
```

**Output:**

sup_id	sup_name	product_count
3	Aarya	18

**Insight:**

Highlights your primary product provider

## 17. What is the average price of products from each supplier?

```
SELECT  
    s.sup_id, s.sup_name, AVG(p.price)  
FROM products p  
INNER JOIN  
    supplier s  
ON s.sup_id = p.sup_id  
GROUP BY s.sup_id;
```

### Output:

sup_id	sup_name	AVG(p.price)
1	Aarav Sharma	271.366667
2	Sai	342.672000
3	Aarya	319.326667
4	Suresh	281.818000
5	Karthik	288.225556

Insight:

Assesses supplier pricing strategy

## 18. Which suppliers contribute the most to total product sales (by revenue)?

```
SELECT s.sup_id, s.sup_name,  
SUM(od.total_price) AS total_revenue  
FROM supplier s  
INNER JOIN products p  
ON s.sup_id = p.sup_id  
INNER JOIN order_details od  
ON p.prod_id= od.prod_id  
GROUP BY s.sup_id  
ORDER BY total_revenue DESC  
LIMIT 1;
```

### Output:

sup_id	sup_name	total_revenue
3	Aarya	221137.83

Insight:

Pinpoints your most profitable supplier relationships

# EMPLOYEE PERFORMANCE

## 19. How many employees have processed orders?

```
SELECT COUNT(DISTINCT emp_id)  
FROM orders;
```

**Output:**

COUNT(DISTINCT emp_id)
10

**Insight:**

Shows how many employees are actively engaged in sales processing



## 20. Which employees have handled the most orders?

```
SELECT e.emp_id, e.emp_name ,  
COUNT(o.ord_id) AS ordered_most  
FROM orders o  
INNER JOIN employees e  
ON o.emp_id= e.emp_id  
GROUP BY e.emp_id  
ORDER BY ordered_most DESC  
LIMIT 1;
```



**Output:**

emp_id	emp_name	ordered_most
8	Diya Sharma	38

**Insight:**

Identifies top-performing staff in order volume

## 21. What is the total sales value processed by each employee?

```

SELECT e.emp_id, e.emp_name,
COUNT(od.total_price) AS total_sales
FROM employees e
INNER JOIN orders o
ON e.emp_id = o.emp_id
INNER JOIN order_details od
ON o.ord_id= od.ord_id
GROUP BY e.emp_id
ORDER BY total_sales DESC;
    
```

### Output:

emp_id	emp_name	total_sales
2	Aditya Singh 1	79
3	Pari Kumar 1	78
6	Zara Verma 1	76
8	Diya Sharma 1	68
9	Arjun Kumar 1	59
7	Vishaan Singh 1	53
1	Aarav Kumar 1	49
5	Pari Sharma 1	48
4	Aditya Verma 1	45
10	Arjun Verma 1	45

Insight:

Measures employee impact on revenue, not just activity

## 22. What is the average order value handled per employee?

```

SELECT e.emp_id, e.emp_name,
SUM(od.total_price)/COUNT(DISTINCT o.ord_id) AS avg_value
FROM employees e
INNER JOIN orders o
ON e.emp_id= o.emp_id
INNER JOIN order_details od
ON o.ord_id= od.ord_id
GROUP BY e.emp_id
ORDER BY avg_value DESC;
    
```

### Output:

emp_id	emp_name	avg_value
1	Aarav Kumar 1	2768.572632
6	Zara Verma 1	2650.472593
2	Aditya Singh 1	2330.949706
3	Pari Kumar 1	2227.279667
7	Vihaan Singh 1	2112.081739
9	Arjun Kumar 1	2077.627308
8	Diya Sharma 1	2037.631818
10	Arjun Verma 1	1835.842000
5	Pari Sharma 1	1833.373636
4	Aditya Verma 1	1554.750455

Insight:

Highlights staff who consistently handle higher-value transactions

# ORDER DETAILS DEEP DIVE

## 23. What is the relationship between quantity ordered and total price?

```
SELECT quantity,  
AVG(od.total_price) AS avg_total_price,  
COUNT(*) AS order_count  
FROM order_details od  
GROUP BY quantity  
ORDER BY quantity;
```

### Output:

quantity	avg_total_price	order_count
1	319.274516	124
2	595.716667	117
3	898.266377	138
4	1338.607143	105
5	1530.401121	116

Insight:

Analyzes how order size affects total cost

## 24. What is the average quantity ordered per product?

```

SELECT p.prod_id, p.prod_name,
COUNT(od.ord_id) AS total_orders,
AVG(od.quantity) AS avg_quantity_ordered
FROM products p
INNER JOIN order_details od
ON p.prod_id= od.prod_id
GROUP BY p.prod_id
ORDER BY avg_quantity_ordered;
    
```

### Output:

prod_id	prod_name	total_orders	avg_quantity_ordered
5	Soybean Oil	11	1.6364
8	Yogurt	7	2.1429
24	Cardamom	8	2.2500
10	Mixed Vegetable Pickle	7	2.2857
30	Conditioner	10	2.3000
28	Toilet Cleaner	15	2.3333
4	Chickpeas	7	2.4286
15	Coffee Powder	14	2.4286
44	Soya Sauce	14	2.4286
50	Pasta	4	2.5000
2	Wheat Flour	15	2.5333

Insight:

Reveals product popularity and purchase volume

## 25. How does the unit price vary across products and orders?

```

SELECT p.prod_id, p.prod_name,
od.each_price AS unit_price,
COUNT(od.ord_id) AS times_ordered
FROM products p
INNER JOIN order_details od
ON p.prod_id= od.prod_id
GROUP BY p.prod_id, od.each_price
ORDER BY p.prod_id, od.each_price;
    
```

### Output:

prod_id	prod_name	unit_price	times_ordered
1	Basmati Rice	358.98	10
2	Wheat Flour	255.50	15
3	Moong Dal	386.18	15
4	Chickpeas	353.50	7
5	Soybean Oil	172.81	11
6	Ghee	487.46	8
7	Paneer	484.27	11
8	Yogurt	111.61	7
9	Mango Pickle	182.50	11
10	Mixed Vegetable Pickle	133.51	7
11	Almonds	315.57	9

Insight:

Detects price inconsistencies (possibly discounts or errors)

# CONCLUSION

This project demonstrates how a relational database can efficiently manage and analyze grocery store operations. It provides structured data storage through linked tables for products, orders, suppliers, customers, and employees. SQL queries help uncover insights on sales, customer behavior, and supplier or employee performance. These insights support better decision-making, improving efficiency and overall store performance.

# CHALLENGES FACED BY ME

- Understanding table relationships and applying correct joins.
- Ensuring data consistency with foreign key constraints.
- Handling aggregation across joined tables.
- Extracting time-based trends from date data (especially if in VARCHAR format).

# THANK YOU FOR JOINING ME

