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RESEARCH LABS

INNOVATION. AUTOMATION. ANALYTICS

PROJECT ON

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Grocery Store Management

- **Introduction**

This project simulates a mini grocery store database. We will use SQL to manage data derive business insights.

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Problem Statement

Design and implement a relational database system for a grocery store to manage suppliers, products, customers, employees, and orders. Perform comprehensive data analysis using SQL to extract business insights related to customer behavior, product performance, sales trends, supplier contributions, and employee efficiency.

Domain Knowledge: Retail & Grocery

- Key Aspects
- Inventory management
- Supplier relations
- Customer orders
- Employee activity

- Benefits of Data Management
- Track sales and revenue
- Monitor product availability
- Inventory management system
- Make good decisions

Tables

sup_id	sup_name	address
1	Aarav Sharma	33 Main Street, Madhya Pradesh, India
2	Sai	108 Main Street, Telangana, India
3	Aarya	166 Main Street, Uttar Pradesh, India
4	Suresh	163 Main Street, Andhra Pradesh, India
5	Karthik	182 Main Street, West Bengal, India
NULL	NULL	NULL

prod_id	prod_name	sup_id	cat_id	price
1	Basmati Rice	3	1	358.98
2	Wheat Flour	2	1	255.50
3	Moong Dal	4	1	386.18
4	Chickpeas	5	1	353.50
5	Soybean Oil	3	1	172.81
6	Ghee	3	1	487.46
7	Paneer	2	2	484.27
8	Yogurt	2	2	111.61
9	Mango Pickle	5	1	182.50
10	Mixed Vegetable Pickle	3	1	133.51
11	Almonds	5	3	315.57
12	Cashews	4	3	441.95

ord_detID	ord_id	prod_id	quantity	each_price	total_price
1	109	23	3	140.62	421.87
2	144	12	1	441.95	441.95
3	82	13	4	166.26	665.06
4	224	18	2	219.36	438.73
5	256	3	4	386.18	1544.71
6	183	27	4	146.65	586.58
7	174	26	3	464.02	1392.07
8	164	42	1	322.40	322.40
9	68	21	3	182.74	548.22
10	129	3	1	386.18	386.18

ord_id	cust_id	emp_id	order_date
1	197	5	1/30/2022
2	94	6	7/2/2022
3	97	3	11/25/2022
4	128	2	5/4/2022
5	61	8	3/5/2022
6	135	5	8/17/2022
7	166	5	4/22/2022

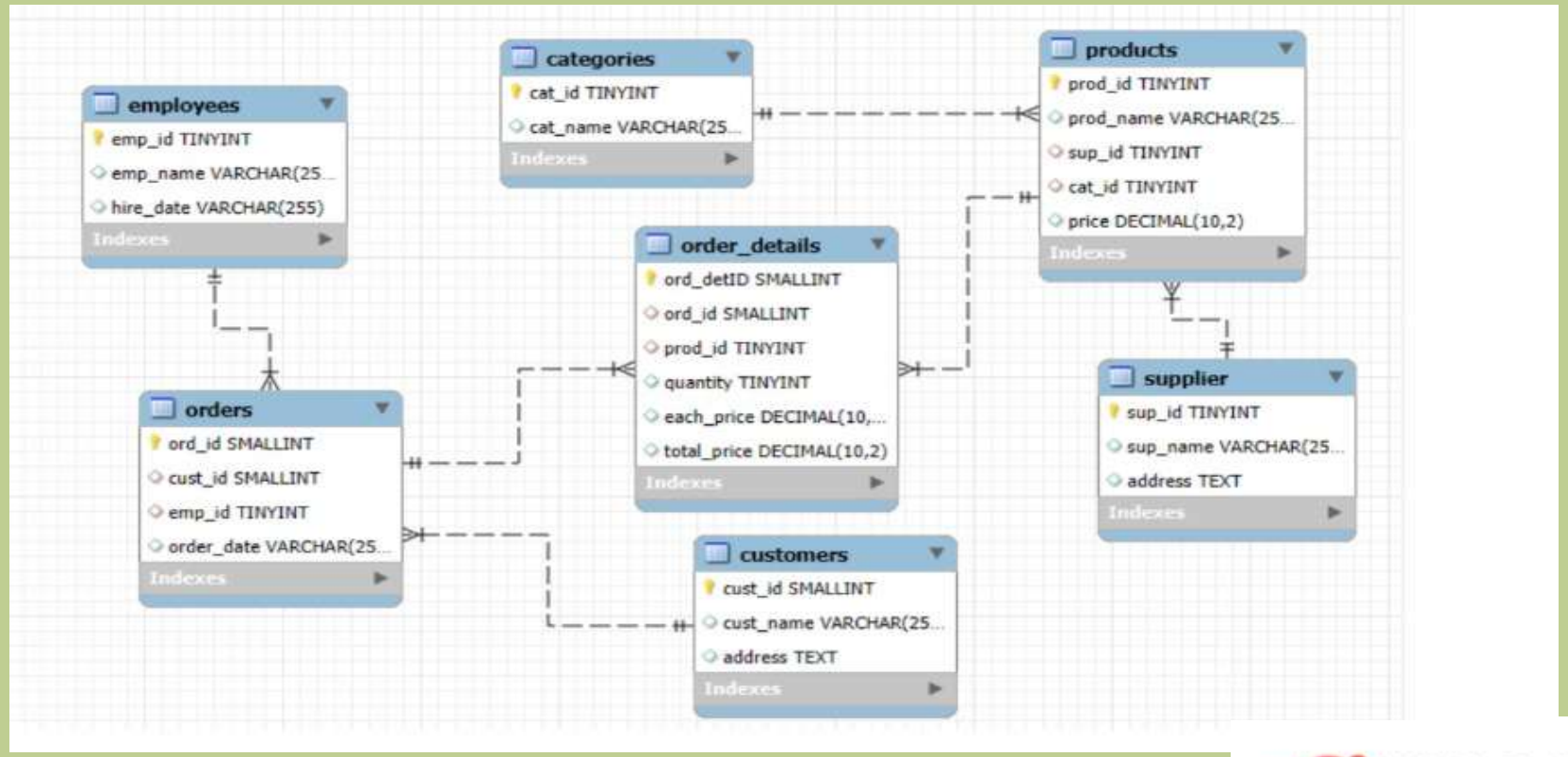
cust_id	cust_name	address
1	Aditi Shetty	37 Main Street, Bengaluru, India
2	Isha Reddy	27 Main Street, Hyderabad, India
3	Chetan Rao	168 Main Street, Hyderabad, India
4	Deepa Reddy	102 Main Street, Hyderabad, India
5	Isha Rao	135 Main Street, Hyderabad, India
6	Eshwar Reddy	140 Main Street, Bengaluru, India
7	Eshwar Iyer	156 Main Street, Hyderabad, India

cat_id	cat_name
1	Grains & Cereals
2	Dairy Products
3	Beverages
4	Personal Care
5	Snacks & Confectioneries
NULL	NULL

emp_id	emp_name	hire_date
1	Aarav Kumar 1	2021-02-03
2	Aditya Singh 1	2021-01-08
3	Pari Kumar 1	2021-11-12
4	Aditya Verma 1	2021-01-09
5	Pari Sharma 1	2021-02-09
6	Zara Verma 1	2021-10-16
7	Vihaan Singh 1	2020-08-26
8	Diya Sharma 1	2021-08-21
9	Arjun Kumar 1	2021-05-29
10	Arjun Verma 1	2021-04-14
NULL	NULL	NULL

ER Diagram

- An Entity Relationship (ER) diagram is a visual representation of entities and their relationships in a database
- It helps in database design by mapping out relationships constraints clearly



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Database Schema interrelated Tables

- **Core Entities**

  Supplier Categories Employees, Customers.

- **Product Information**

  Products table links suppliers and categories.

- **Order Details**

  Orders and Order_Details track customer purchases

Project Objectives

- **Design & Implement**

  Create a relational database for the Grocery store

- **Retrieve & Manipulate**

  Use SQL queries for data extraction And transformation

- **Analyze Data**

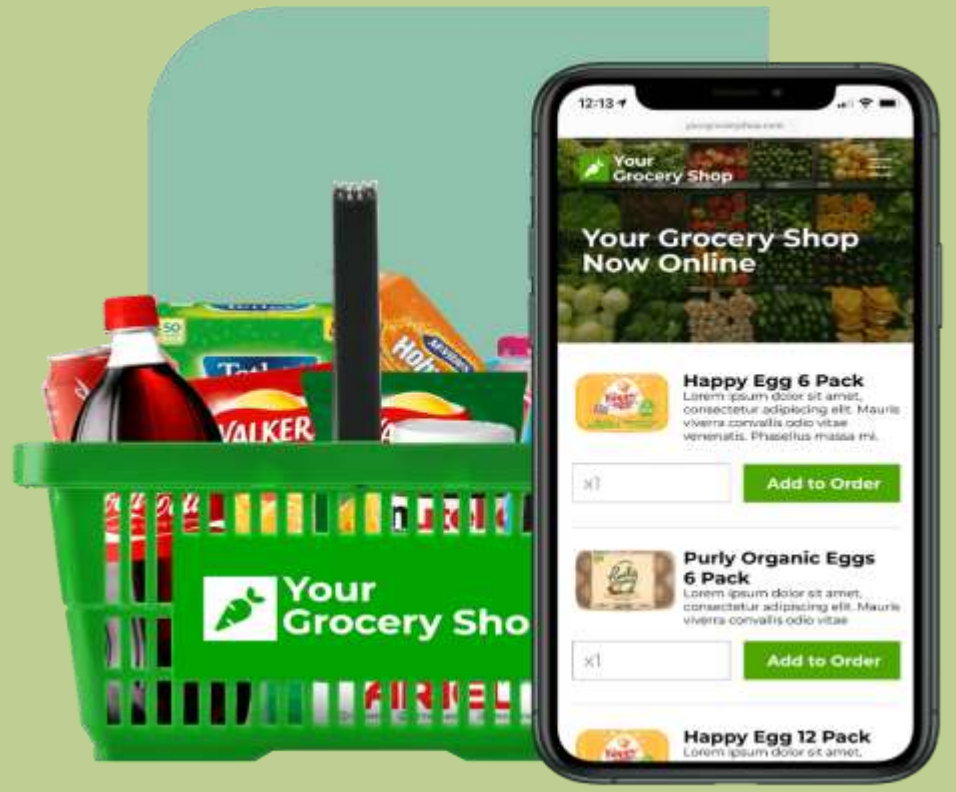
  use SQL queries for data extraction and transformation

Customer Insights

1. How many unique customers have placed orders ?

```
SELECT COUNT(DISTINCT Cust_ID) AS UniqueCustomers
FROM Orders;
```

	UniqueCustomers
▶	156



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2. Which customers have placed the highest number of orders

```sql
select c.cust_id, c.cust_name, count(o.ord_id) as total_orders
from customers c
join orders o on c.cust_id = o.cust_id
group by c.cust_id,c.cust_name
order by total_orders desc
limit 3;
```

cust_id	cust_name	total_orders
165	Jyotika	7
61	Aditi Rao	6
19	Chetan Naidu	5

3.What is the total average purchase value per customer

```
select c.cust_id,c.Cust_name,
sum(od.total_price) as total_purchase,
avg(od.total_price) as average_purchase
from customers c
join orders o on c.cust_id = o.cust_id
join order_details od on o.ord_id = od.ord_id
group by cust_id,cust_name;
```

cust_id	Cust_name	total_purchase	average_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

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

```sql
select c.cust_id, c.cust_name,
sum(od.total_price) as total_purchase_amount
from customers c
join orders o on c.cust_id = o.cust_id
join order_details od on o.ord_id = od.ord_id
group by c.cust_id,c.cust_name
order by total_purchase_amount desc
limit 5;
```

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

Product Performance

- 5.how many unique products exists in each category

```
select c.cat_id, c.cat_name,
count(p.prod_id) as total_products
from categories c
join products p on c.cat_id = p.cat_id
group by c.cat_id,c.cat_name;
```

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

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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
join products p on c.cat_id = p.cat_id
group by c.cat_id,c.cat_name;
```

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

7.What is the total revenue generated by each product

```
select p.prod_id, p.prod_name,
sum(od.total_price) as total_revenue
from products p
join order_details od on p.prod_id = od.prod_id
group by p.prod_id, p.prod_name
order by total_revenue desc;
```

prod_id	prod_name	total_revenue
33	Hand Sanitizer	27787.76
48	Biscuits	20995.92
3	Moong Dal	19695.02
31	Toothpaste	19688.95
22	Mustard Seeds	19516.68
12	Cashews	18561.92
40	Butter	18548.40

Sales and Order Trends

8.How many orders have been placed in total

```
select count(*) as total_orders
from orders;
```

	total_orders
▶	300

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9.On which dates were the most orders placed

```
select order_date, count(ord_id) as total_orders
from orders
group by order_date
order by total_orders desc;
```

order_date	total_orders
9/10/2022	4
3/30/2022	4
1/30/2022	3
4/22/2022	3
1/14/2022	3
10/23/2022	3
12/5/2022	3
5/24/2022	3

10.What are the monthly trends in order volume and revenue

```sql
select
date_format(str_to_date(o.order_date, '%c/%e/%Y'), '%Y-%m') AS month,
count(distinct o.ord_id) as order_count,
sum(od.total_price) as total_revenue
from orders o
join order_details od ON o.ord_id = od.ord_id
group by month
order by month;
```

month	order_count	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

Supplier Contribution

- 11.How many suppliers are there in the database

```
select count(*) from supplier ;
```

	count(*)
▶	5

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12.Which supplier provides the most products

```
select s.sup_name, count(p.prod_id) as product_count
from supplier s
join products p on s.sup_id = p.sup_id
group by s.sup_id, s.sup_name
order by product_count desc
limit 3;
```

sup_name	product_count
Aarya	18
Sai	10
Suresh	10

13.Which suppliers contribute the most to total product sales (by revenue)

```
select s.sup_name , SUM(p.price * od.quantity) as total_revenue
from supplier s
join products p ON s.sup_id = p.sup_id
JOIN order_details od ON p.prod_id = od.prod_id
group by s.sup_id,
Order by total_rev
limit 2;
```


sup_name	total_revenue
Aarya	221137.77
Sai	113588.67

Employee performance

- 14.How many employees have processed orders

```
Select COUNT(DISTINCT o.emp_id) AS number_of_employees_who_processed_orders
FROM orders o ;
```

number_of_employees_who_processed_orders
10

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15.Which employees have handled the most orders

```sql
select emp_name , count(o.ord_id) as total_orders_handled
from employees e
join orders o ON e.emp_id = o.emp_id
group by e.emp_id,e.emp_name
order by total_orders_handled desc
limit 5;
```

emp_name	total_orders_handled
Diya Sharma 1	38
Aditya Singh 1	37
Arjun Kumar 1	32
Pari Kumar 1	31
Pari Sharma 1	31

16.What is the total sales value processed by each employee

```
  select e.emp_id,e.emp_name,
SUM(od.total_price) as total_sales_value
FROM employees e
JOIN orders o ON e.emp_id = o.emp_id
JOIN order_details od ON o.ord_id = od.ord_id
GROUP BY e.emp_id, e.emp_name
ORDER BY total_sales_value DESC;
```

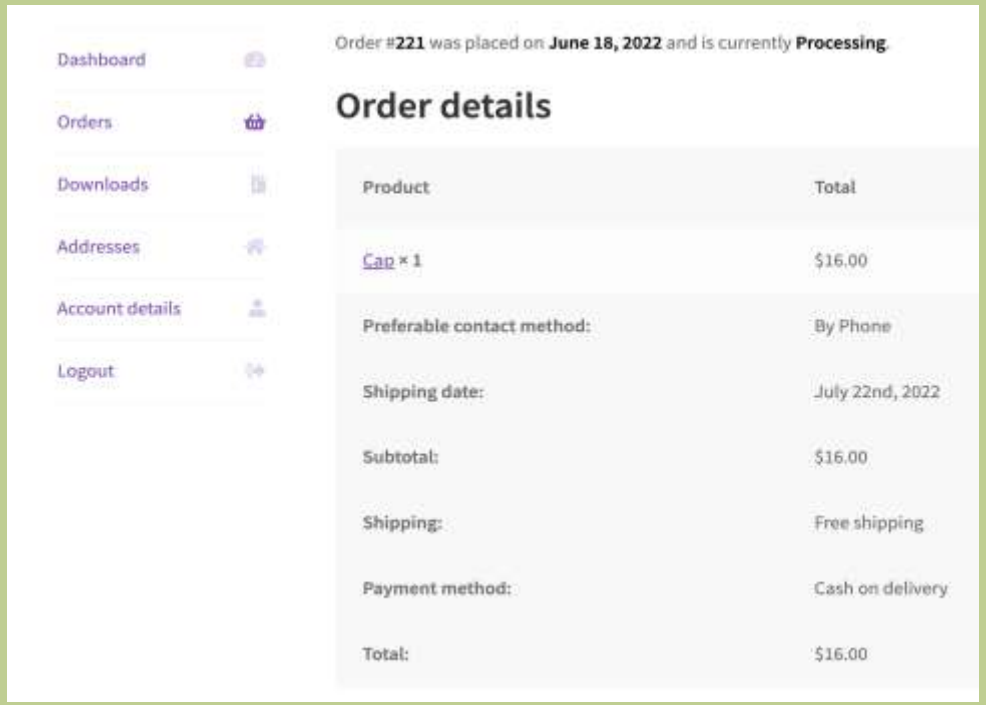
emp_id	emp_name	total_sales_value
2	Aditya Singh 1	79252.29
6	Zara Verma 1	71562.76
8	Diya Sharma 1	67241.85
3	Pari Kumar 1	66818.39
9	Arjun Kumar 1	54018.31
1	Aarav Kumar 1	52602.88
7	Vihaan Singh 1	48577.88
5	Pari Sharma 1	40334.22
10	Arjun Verma 1	36716.84
4	Aditya Verma 1	34204.51

Order Details Deep Dive

- 17.What is the relationship between quantity ordered and total price

```
  select e.emp_id,e.emp_name,
SUM(od.total_price) as total_sales_value
FROM employees e
JOIN orders o ON e.emp_id = o.emp_id
JOIN order_details od ON o.ord_id = od.ord_id
GROUP BY e.emp_id, e.emp_name
ORDER BY total_sales_value DESC;
```

emp_id	emp_name	total_sales_value
2	Aditya Singh 1	79252.29
6	Zara Verma 1	71562.76
8	Diya Sharma 1	67241.85
3	Pari Kumar 1	66818.39
9	Arjun Kumar 1	54018.31
1	Aarav Kumar 1	52602.88
7	Vihaan Singh 1	48577.88
5	Pari Sharma 1	40334.22
10	Arjun Verma 1	36716.84
4	Aditya Verma 1	34204.51



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18.What is the average quantity ordered per product

```sql
select p.prod_id, p.prod_name,
avg(od.quantity) as average_quantity_per_product
from products p
join order_details od on p.prod_id = od.prod_id
group by p.prod_id,p.prod_name
order by average_quantity_per_product desc;
```

prod_id	prod_name	average_quantity_per_product
40	Butter	4.5556
31	Toothpaste	3.6667
46	Potato Chips	3.6000
42	Tomato Ketchup	3.5000
22	Mustard Seeds	3.4615
3	Moong Dal	3.4000
6	Ghee	3.3750
9	Mango Pickle	3.3636
32	Bath Soap	3.3333

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