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INNOVATION. AUTOMATION. ANALYTICS

PROJECT ON

Grocery Store Management System using SQL

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About me

- **Name**: Ch Naveen
- **Background:**Completed B Tech in Electronics and Communication Engineering from JNTUH College of Engineering Jagtial
- **Why Data Science:**Strong interest in mathematics, statistics, and problem-solving; Data Science allows me to apply these skills with Python and SQL to real-world problems.
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Objective of project:

The main goals of this SQL project are:

- To design and implement a relational database for a grocery store
- To retrieve and manipulate data using SQL queries.
- To perform data analysis for business insights such as top customers, best-selling products, and revenue trends.
- To practice using joins, aggregations, subqueries, and filtering techniques

ER Diagram and schema explanation

- One-to-Many from **supplier** to **products**
- One-to-Many from **categories** to **products**
- One-to-Many from **products** to **order_details**
- One-to-Many from **orders** to **order_details**
- One-to-Many from **customers** to **orders**
- One-to-Many from **employees** to **orders**

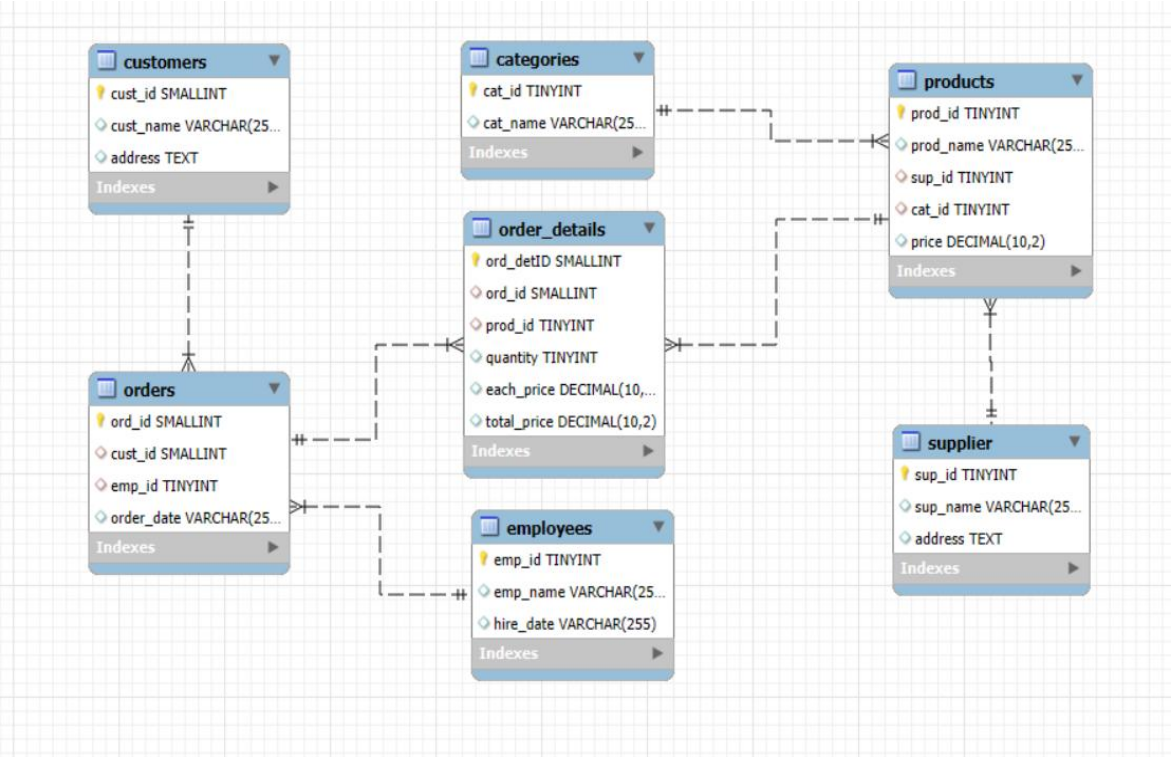


Fig 1:ER Diagram and Schema

- How many unique customers have placed orders?

```
select distinct cust_id,cust_name from customers c
join orders o
using(cust_id);
```


Result Grid | Filter Rows: | Expo

cust_id	cust_name
2	Isha Reddy
3	Chetan Rao
4	Deepa Reddy
5	Isha Rao
7	Eshwar Iyer
8	Deepa Reddy

- Which customers have placed the highest number of orders?

```
select cust_id,cust_name,count(*) as no_orders from customers c
join orders o
using(cust_id)
group by cust_id
order by no_orders desc
limit 3;
```

Result Grid | Filter Rows: | Export:

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

- What is the total and average purchase value per customer?

```
select c.cust_id,cust_name,sum(total_price) as total_perchase_value,
avg(total_price) as avg_value from customers c
join orders o
using (cust_id)
join order_details od
using (ord_id)
group by c.cust_id;
```

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

cust_id	cust_name	total_perchase_value	avg_value
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

- Who are the top 5 customers by total purchase amount?

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

cust_id	cust_name	total_value
19	Chetan Naidu	11256.82
166	Kapila	11099.51
67	Eshwar Rao	10819.96
61	Aditi Rao	10230.64

2. Product Performance

- How many products exist in each category?

```
select cat_name,count(*) from products
join categories
using (cat_id)
group by cat_id;
```

Result Grid | Filter Rows: | Export: | Wrap

cat_name	count(*)
Grains & Cereals	18
Dairy Products	6
Snacks & Confectioner...	17
Personal Care	6
Household	3

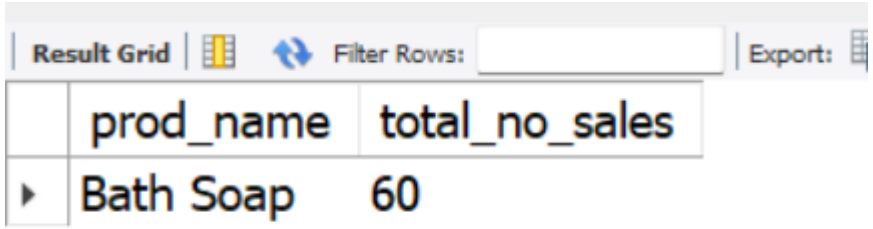
- What is the average price of products by category?

```
SELECT c.cat_name,prod_name,(sum(total_price)/sum(quantity)) as average
FROM products p
JOIN categories c
    ON p.cat_id = c.cat_id
JOIN order_details od
    ON od.prod_id = p.prod_id
group by c.cat_id,p.prod_id;
```

cust_id	cust_name	total_value
19	Chetan Naidu	11256.82
166	Kapila	11099.51
67	Eshwar Rao	10819.96
61	Aditi Rao	10230.64

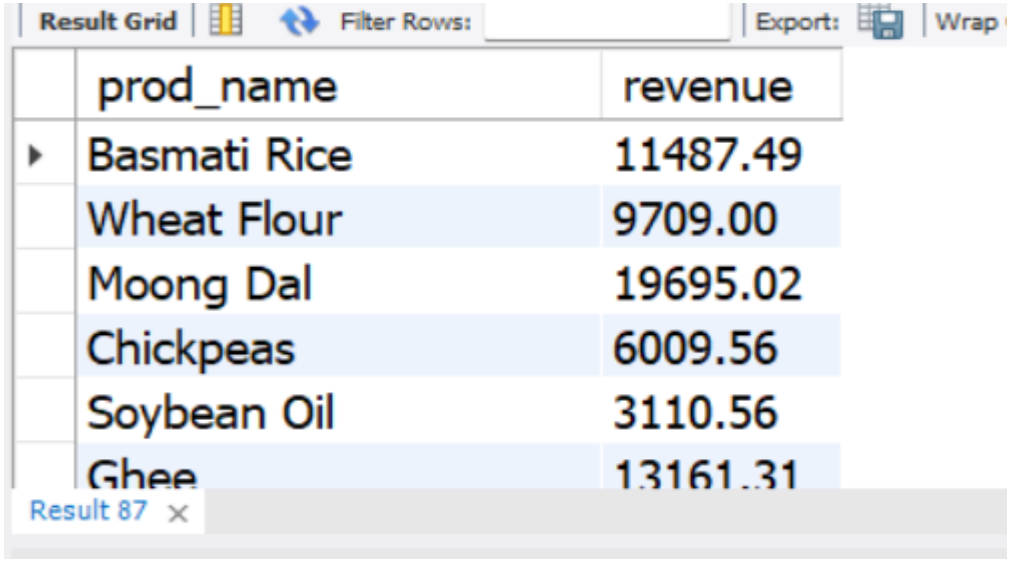
- Which products have the highest total sales volume (by quantity)?

```sql
select prod_name,sum(quantity) as total_no_sales
from products
join order_details
using(prod_id)
group by prod_id
order by total_no_sales desc
limit 1;
```



- What is the total revenue generated by each product?

```
select prod_name,sum(total_price) as revenue
 from products
join order_details
using (prod_id)
group by prod_name;
```



Result Grid | Filter Rows: | Export: | Wrap

prod_name	revenue
Basmati Rice	11487.49
Wheat Flour	9709.00
Moong Dal	19695.02
Chickpeas	6009.56
Soybean Oil	3110.56
Ghee	13161.31

Result 87

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- How do product sales vary by category and supplier?

```
select sup_name,cat_name,sum(quantity) from supplier
join products
using(sup_id)
join categories
using(cat_id)
join order_details
using (prod_id)
group by sup_id,cat_name;
```

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

sup_name	cat_name	sum(quantity)
Aarav Sharma	Grains & Cereals	34
Aarav Sharma	Snacks & Confectioner...	82
Sai	Grains & Cereals	75
Sai	Dairy Products	121
Sai	Snacks & Confectioner...	70
Sai	Household	35

- How many orders have been placed in total?

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

Result Grid | Filter Rows:

	no_of_orders
▸	300

- What is the average value per order?

```
select avg(total_price) from order_details;
```

	avg(total_price)
▸	918.883217

- On which dates were the most orders placed?

```sql
select order_date,count(*) as no_orders from orders o
group by order_date
order by no_orders desc
limit 2;
```

order_date	no_orders
3/30/2022	4
9/10/2022	4

What are the monthly trends in order volume and revenue?

```
166 • select monthname(dates),sum(total_price) as revenue,count(*) as no_orders fro
167   (select *,str_to_date(order_date,"%m/%d/%y") as dates from orders) t
168   join order_details using(ord_id)
169   group by monthname(dates)
170
171
```

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

monthname(dates)	revenue	no_orders
April	29118.54	32
September	52626.61	57
January	70312.45	79
July	48674.66	50
March	45977.16	57
August	36045.01	41
June	27378.69	31

- How do order patterns vary across weekdays and weekends?

```
with cte as (select *,(case when weekday(dates)<5 then "weekday"
          else "weekend" end) as days from
          (select *,str_to_date(order_date,"%m/%d/%y") as dates from orders) t)
select days,count(*) as no_of_orders from cte
join order_details
using(ord_id)
group by days;
```

days	no_of_orders
weekday	459
weekend	141

```sql
-- How many suppliers are there in the database?
select count(*) as no_of_suppliers from supplier;
```

no_of_suppliers
5

```sql
-- Which supplier provides the most products?
select sup_name,count(*) as no_of_products from supplier
join products
using(sup_id)
group by sup_id
order by no_of_products desc
limit 1
```

sup_name	no_of_products
Aarya	18

```sql
-- What is the average price of products from each supplier?
select sup_name,prod_name,avg(price) as average from supplier
join products
using(sup_id)
group by sup_id,prod_id
```

sup_name	prod_name	average
Aarav Sharma	Coffee Powder	179.550000
Aarav Sharma	Jaggery	200.850000
Aarav Sharma	Mustard Seeds	433.700000
Sai	Wheat Flour	255.500000
Sai	Paneer	484.270000

```sql
-- How many employees have processed orders?
select count(distinct emp_id) from employees
join orders
using(emp_id)
```

count(distinct emp_id)
10

```sql
-- Which suppliers contribute the most to total product sales (by revenue)?
select sup_name,sum(total_price) as revenue from supplier t1
join products t2
join order_details t3
using(prod_id)
group by t1.sup_id
order by revenue desc
limit 1
```

sup_name	revenue
Karthik	551329.93

```sql
-- Which employees have handled the most orders?
select emp_name,count(*) as no_of_orders from employees
join orders
using(emp_id)
group by emp_id
order by no_of_orders desc limit 1;
```

emp_name	no_of_orders
Diya Sharma 1	38

```sql
-- What is the total sales value processed by each employee?
select emp_name ,sum(total_price) as sales_value from employees t1
join orders t2
using(emp_id)
join order_details t3
using (ord_id)
group by emp_id;
```

emp_name	sales_value
Zara Verma 1	71562.76
Vihaan Singh 1	48577.88
Diya Sharma 1	67241.85
Arjun Kumar 1	54018.31
Arjun Verma 1	36716.84

```sql
-- What is the average order value handled per employee?
select emp_name,avg(total_price) as average from employees t1
join orders t2
using(emp_id)
join order_details t3
using (ord_id)
group by emp_id;
```

emp_name	average
Aarav Kumar 1	1073.528163
Aditya Singh 1	1003.193544
Pari Kumar 1	856.646026
Aditya Verma 1	760.100222
Pari Sharma 1	840.296250

```sql
-- What is the relationship between quantity ordered and total price?
select * from order_details
where quantity*each_price=total_price
-- quantity*each_price=total_price

-- What is the average quantity ordered per product?
select prod_name,avg(quantity) as average from products
join order_details
using(prod_id)
group by prod_id;
```

prod_name	average
Basmati Rice	3.2000
Wheat Flour	2.5333
Moong Dal	3.4000
Chickpeas	2.4286
Soybean Oil	1.6364

- How does the unit price vary across products and orders?

```
select prod_name,
AVG(each_price) AS avg_unit_price,
        MIN(each_price) AS min_unit_price,
        MAX(each_price) AS max_unit_price,
        COUNT(*) AS times_ordered from order_details
join products
using(prod_id)
group by prod_name
```

prod_name	avg_unit_price	min_unit_price	max_unit_price	times_ordered
Basmati Rice	358.980000	358.98	358.98	10
Wheat Flour	255.500000	255.50	255.50	15
Moong Dal	386.180000	386.18	386.18	15
Chickpeas	353.500000	353.50	353.50	7
Soybean Oil	172.810000	172.81	172.81	11

Challenges:

- 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).

Final business insights and recommendations

- Quantity and total price have a direct and predictable relationship is

  total_price = quantity × each_price
- products is Hand Sanitizer
- There are 5 suppliers in the data base
- September month has highest Revenue and Highest no of orders

THANK YOU

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