

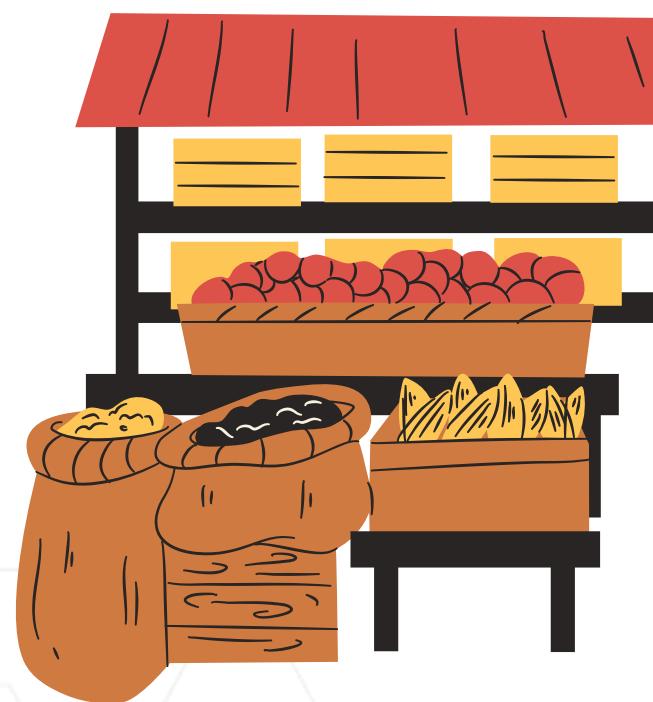


INNOMATICS<sup>®</sup>  
RESEARCH LABS

INNOVATION. AUTOMATION. ANALYTICS

PROJECT ON

# Grocery Store Management





# Agenda

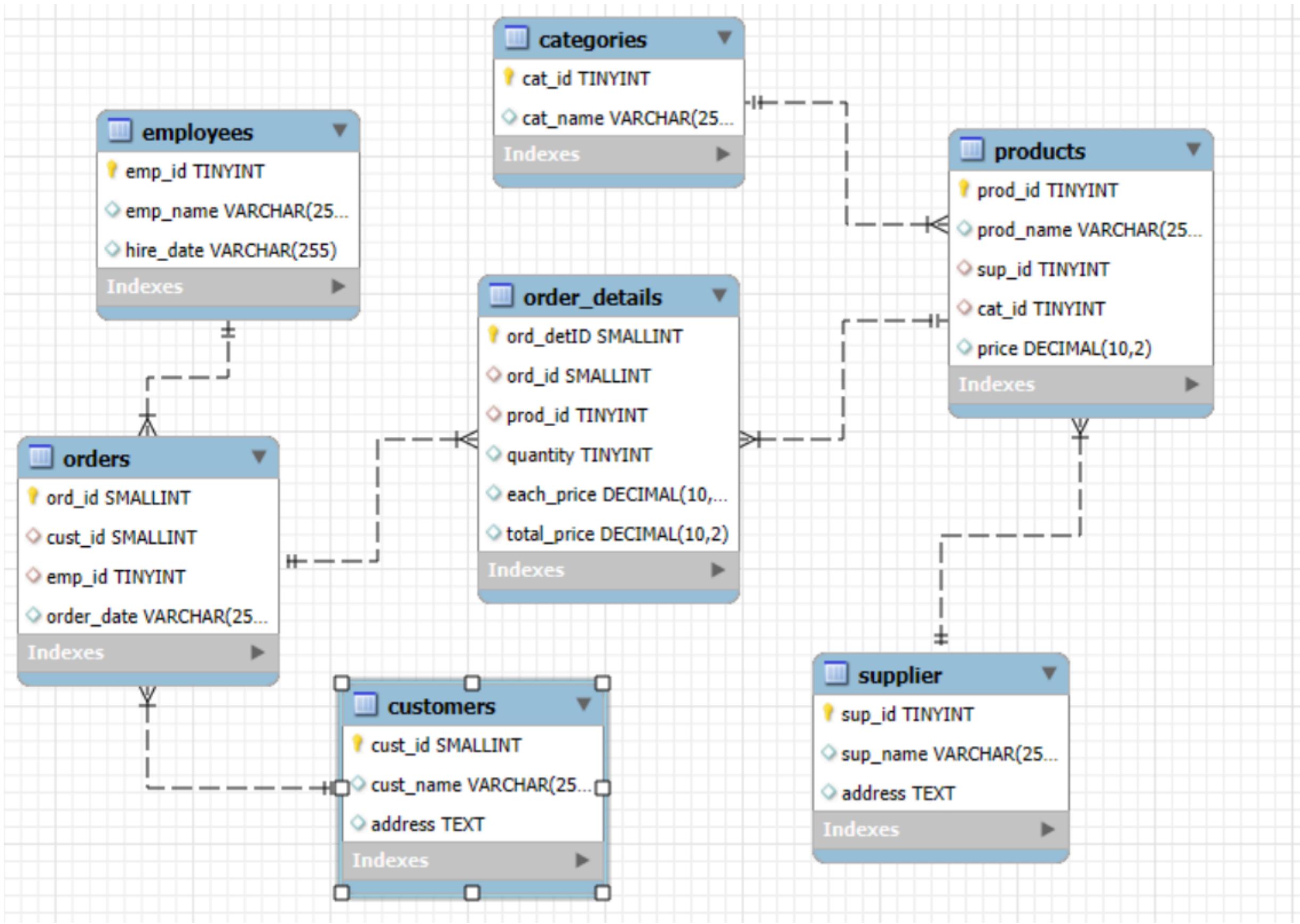
- Objective of the Project
- ER Diagram and schema explanation
- About Tables
- Key analysis questions
- SQL query results with screenshots
- Final business insights and recommendations
- Conclusion
- Q&A Slide
- Experience/Challenges



# Objective

- Look at which suppliers bring the most value by analyzing how many different products they provide, their average pricing, and the total revenue they generate. This will help identify the most active and profitable partners.
- Evaluate how efficiently employees are working by tracking the number of orders they process, the total value of those orders, and the average size of each order. This will give a clear view of individual and team performance.
- Dive deeper into sales trends at the product level. Examine how order quantities relate to pricing, what the average order quantity is for each product, and how prices vary across different orders. This will highlight key buying patterns.
- Use these findings to strengthen supplier relationships, boost employee productivity, adjust product pricing strategies, and improve overall sales performance.

# 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



# Tables

	cat_id	cat_name
▶	1	Grains & Cereals
	2	Dairy Products
	3	Snacks & Confectioneries
	4	Personal Care
	5	Household
●	NONE	NONE

## 1. categories

	emp_id	emp_name	hire_date
▶	1	Aarav Kumar 1	2/3/2021
	2	Aditya Singh 1	1/8/2021
	3	Pari Kumar 1	11/12/2021
	4	Aditya Verma 1	1/9/2021
	5	Pari Sharma 1	2/9/2021
	6	Zara Verma 1	10/16/2021
	7	Vihaan Singh 1	8/26/2020
	8	Diya Sharma 1	8/21/2021
	9	Arjun Kumar 1	5/29/2021
	10	Arjun Verma 1	4/14/2021

## 2. employees

	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
	8	Deepa Reddy	181 Main Street, Hyderabad, India
	9	Isha Rao	169 Main Street, Bengaluru, India
	10	Deepa Menon	69 Main Street, Bengaluru, India

## 3. customers

# Tables

	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

## 4. order\_details

	ord_id	cust_id	emp_id	order_date
▶	1	197	5	2022-01-30
	2	94	6	2022-07-02
	3	97	3	2022-11-25
	4	128	2	2022-05-04
	5	61	8	2022-03-05
	6	135	5	2022-08-17
	7	166	5	2022-04-22
	8	91	8	2022-03-03
	9	195	8	2022-10-31
	10	115	8	2022-11-30

## 5. orders

	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

## 6. products

	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

## 7. supplier



# Key analysis questions

- How many unique customers have placed orders?
- Which customers have placed the highest number of orders?
- What is the total and average purchase value per customer?
- Who are the top 5 customers by total purchase amount?
- How many products exist in each category?
- What is the average price of products by category?
- Which products have the highest total sales volume (by quantity)?
- What is the total revenue generated by each product?
- How do product sales vary by category and supplier?
- How many orders have been placed in total?
- What is the average value per order?
- On which dates were the most orders placed?
- What are the monthly trends in order volume and revenue?
- How do order patterns vary across weekdays and weekends?
- How many suppliers are there in the database?
- Which supplier provides the most products?
- What is the average price of products from each supplier?
- Which suppliers contribute the most to total product sales (by revenue)?



# SQL query results with screenshots

1. How many unique customers have placed orders?



Query :

```
select count(distinct cust_id) as unqiue_customers  
from orders  
;
```

Output :

	unqiue_customers
→	156



## 2. Which top 3 customers have placed the highest number of orders?



### Query :

```
select cust_name, count(cust_name) as no_of_orders  
from customers as c  
join orders as o  
    on c.cust_id = o.cust_id  
group by 1  
order by 2 desc  
limit 3  
;
```

### Output :

	cust_name	no_of_orders
▶	Chetan Naidu	10
	Chetan Rao	9
	Kiran Iyer	8



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



#### Query :

```
select cust_name, sum(total_price) as Total_purchase,  
round(avg(total_price),2) as Avg_purchase  
from customers as c  
join orders as o  
    on c.cust_id = o.cust_id  
join order_details as od  
    on o.ord_id = od.ord_id  
group by 1;
```

#### Output :

	cust_name	Total_purchase	Avg_purchase
▶	Eshwar Menon	9614.28	874.03
	Kiran Pillai	4024.55	670.76
	Chetan Gowda	13361.68	890.78
	Chetan Reddy	3869.54	1289.85
	Kasturi	3865.31	1288.44
	Deepa Gowda	1745.11	872.56
	Gita Nair	6305.09	1261.02
	Karishma	5426.90	493.35
	Kapila	11099.51	1109.95



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



### Query :

```
select cust_name, sum(total_price) as Total_purchase  
from customers as c  
join orders as o  
    on c.cust_id = o.cust_id  
join order_details as od  
    on o.ord_id = od.ord_id  
group by 1  
order by 2 desc  
limit 5
```

### Output :

	cust_name	Total_purchase
▶	Chetan Naidu	19055.23
	Gita Menon	17799.38
	Chetan Iyer	17518.60
	Eshwar Rao	16679.82
	Hari Naidu	15468.21



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



### Query :

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

### Output :

	cat_name	products_count
▶	Grains & Cereals	18
	Dairy Products	6
	Snacks & Confectioneries	17
	Personal Care	6
	Household	3



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



**Query :**

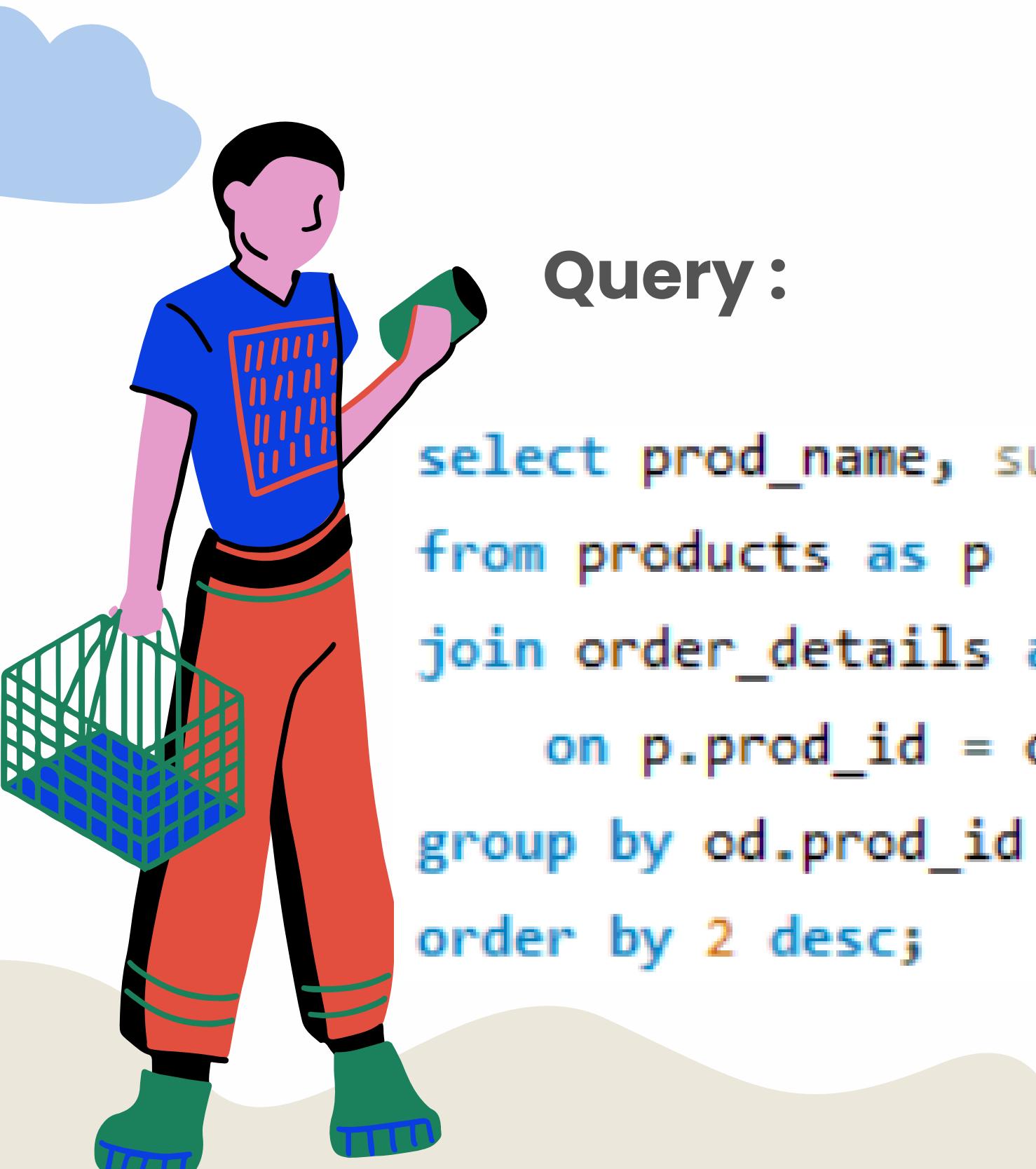
```
select cat_name, round(avg(price),2) as products_avg_price  
from categories as c  
join products as p  
on c.cat_id = p.cat_id  
group by p.cat_id;
```

**Output :**

cat_name	products_avg_price
Grains & Cereals	287.67
Dairy Products	366.94
Snacks & Confectioneries	278.89
Personal Care	364.99
Household	363.34



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



**Query :**

```
select prod_name, sum(quantity) as total_sales  
from products as p  
join order_details as od  
    on p.prod_id = od.prod_id  
group by od.prod_id  
order by 2 desc;
```

**Output :**

	prod_name	total_sales
▶	Bath Soap	60
	Hand Sanitizer	56
	Dishwashing Soap	54
	Potato Chips	54
	Biscuits	54
	Moong Dal	51
	Chapati	50
	Cumin Seeds	46
	Facial Tissue	45



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



**Query :**

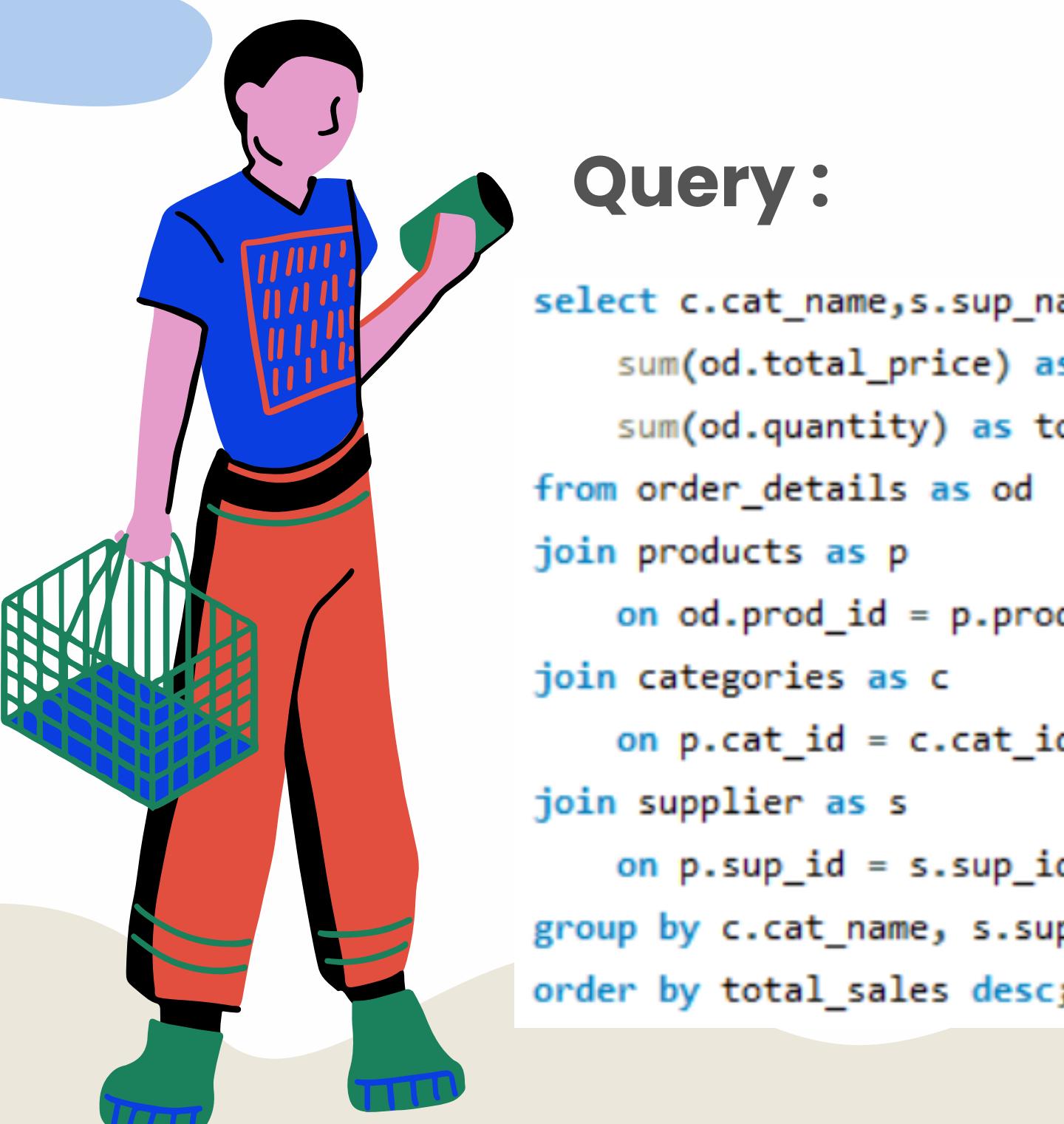
```
select prod_name,  
       sum(total_price) as total_revenue  
  from products as p  
  join order_details as od  
    on p.prod_id = od.prod_id  
group by od.prod_id;
```

**Output :**

	prod_name	total_revenue
▶	Basmati Rice	11487.49
	Wheat Flour	9709.00
	Moong Dal	19695.02
	Chickpeas	6009.56
	Soybean Oil	3110.56
	Ghee	13161.31
	Paneer	15980.84
	Yogurt	1674.21
	Mango Pickle	6752.59



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

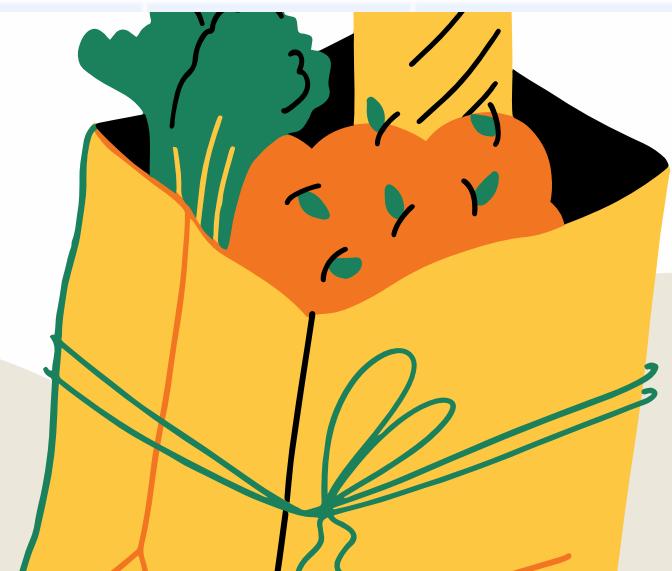


## Query :

```
select c.cat_name,s.sup_name,
       sum(od.total_price) as total_sales,
       sum(od.quantity) as total_quantity
  from order_details as od
  join products as p
    on od.prod_id = p.prod_id
  join categories as c
    on p.cat_id = c.cat_id
  join supplier as s
    on p.sup_id = s.sup_id
 group by c.cat_name, s.sup_name
 order by total_sales desc;
```

## Output :

	cat_name	sup_name	total_sales	total_quantity
▶	Personal Care	Aarya	69378.41	205
	Grains & Cereals	Aarya	67701.10	226
	Snacks & Confectioneries	Aarya	65538.71	196
	Snacks & Confectioneries	Suresh	65307.14	272
	Dairy Products	Sai	50740.60	121
	Grains & Cereals	Karthik	39473.49	140
	Snacks & Confectioneries	Aarav Sharma	26948.15	82
	Grains & Cereals	Suresh	26248.89	67
	Household	Karthik	22767.59	86
	Dairy Products	Aarya	18519.61	42
	Grains & Cereals	Sai	18018.02	75



## 10. How many orders have been placed in total?



Query :

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

Output :

	total_orders
▶	300



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



Query :

```
select round(avg(total_amount),2) as avg_order_value  
from (  
    select ord_id, sum(total_price) as total_amount  
    from order_details  
    group by 1) as total_orders
```

Output :

avg_order_value
2153.63



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

Query :

```
select order_date, count(ord_id) as total_orders  
from orders  
group by 1  
order by 2 desc;
```

Output :

order_date	total_orders
2022-09-10	4
2022-03-30	4
2022-01-30	3
2022-04-22	3
2022-01-14	3
2022-10-23	3
2022-12-05	3
2022-05-24	3
2022-01-16	3
2022-06-27	3
2022-12-21	3
2022-01-28	3

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



## Query :

```
select date_format(o.order_date, '%Y-%m') as month,  
       count(distinct o.ord_id) as total_orders,  
       sum(od.total_price) as total_revenue  
  from orders as o  
  join order_details as od  
    on o.ord_id = od.ord_id  
 group by date_format(o.order_date, '%Y-%m')  
order by month;
```

## Output :

	month	total_orders	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



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

Query :

```
select
  case
    when dayofweek(order_date) in (1,7) then 'weekends'
    else 'weekdays'
  end as day_type,
  count(distinct o.ord_id) as total_orders,
  sum(total_price) as total_revenue
from orders as o
join order_details as od
  on o.ord_id = od.ord_id
group by day_type;
```

Output :

	day_type	total_orders	total_revenue
▶	weekdays	183	390922.53
	weekends	73	160407.40



## 15. How many suppliers are there in the database?



Query :

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

Output :

	total_suppliers
▶	5



## 16. Which supplier provides the most products?



**Query :**

```
select s.sup_name, count(p.prod_id) as product_count  
from supplier as s  
join products p  
on s.sup_id = p.sup_id  
group by 1  
order by 2 desc  
limit 1;
```

**Output :**

	sup_name	product_count
▶	Aarya	18



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



Query :

```
select s.sup_name, avg(p.price) as avg_price  
from supplier s  
join products p  
    on s.sup_id = p.sup_id  
group by 1;
```

Output :

	sup_name	avg_price
▶	Aarav Sharma	271.366667
	Sai	342.672000
	Aarya	319.326667
	Suresh	281.818000
	Karthik	288.225556



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



## Query :

```
select s.sup_name, sum(total_price) 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 1  
order by 2 desc;
```

## Output :

	sup_name	total_revenue
▶	Aarya	221137.83
	Sai	113588.51
	Suresh	101688.78
	Karthik	81861.96
	Aarav Sharma	33052.85



## 19. How many employees have processed orders?



Query :

```
select count(distinct emp_id) as employees  
from orders;
```

Output :

	employees
→	10



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



**Query :**

```
select e.emp_name, count(o.ord_id) as orders_handled  
from employees e  
join orders o  
    on e.emp_id = o.emp_id  
group by e.emp_name  
order by 2 desc  
limit 1;
```

**Output :**

	emp_name	orders_handled
▶	Diya Sharma 1	38



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

Query :

```
select e.emp_name, sum(total_price) as total_sales  
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_name  
order by 2 desc;
```

Output :

	emp_name	total_sales
▶	Aditya Singh 1	79252.29
	Zara Verma 1	71562.76
	Diya Sharma 1	67241.85
	Pari Kumar 1	66818.39
	Arjun Kumar 1	54018.31
	Aarav Kumar 1	52602.88
	Vihaan Singh 1	48577.88
	Pari Sharma 1	40334.22
	Arjun Verma 1	36716.84
	Aditya Verma 1	34204.51

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

Query :

```
select e.emp_name, avg(order_value) as avg_order_value
from (
    select o.emp_id, o.ord_id, sum(total_price) as order_value
    from orders o
    join order_details od
        on o.ord_id = od.ord_id
    group by o.emp_id, o.ord_id
) as order_totals
join employees e
    on order_totals.emp_id = e.emp_id
group by e.emp_name;
```

Output :

	emp_name	avg_order_value
▶	Aarav Kumar 1	2768.572632
	Aditya Singh 1	2330.949706
	Pari Kumar 1	2227.279667
	Aditya Verma 1	1554.750455
	Pari Sharma 1	1833.373636
	Zara Verma 1	2650.472593
	Vihaan Singh 1	2112.081739
	Diya Sharma 1	2037.631818
	Arjun Kumar 1	2077.627308
	Arjun Verma 1	1835.842000

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

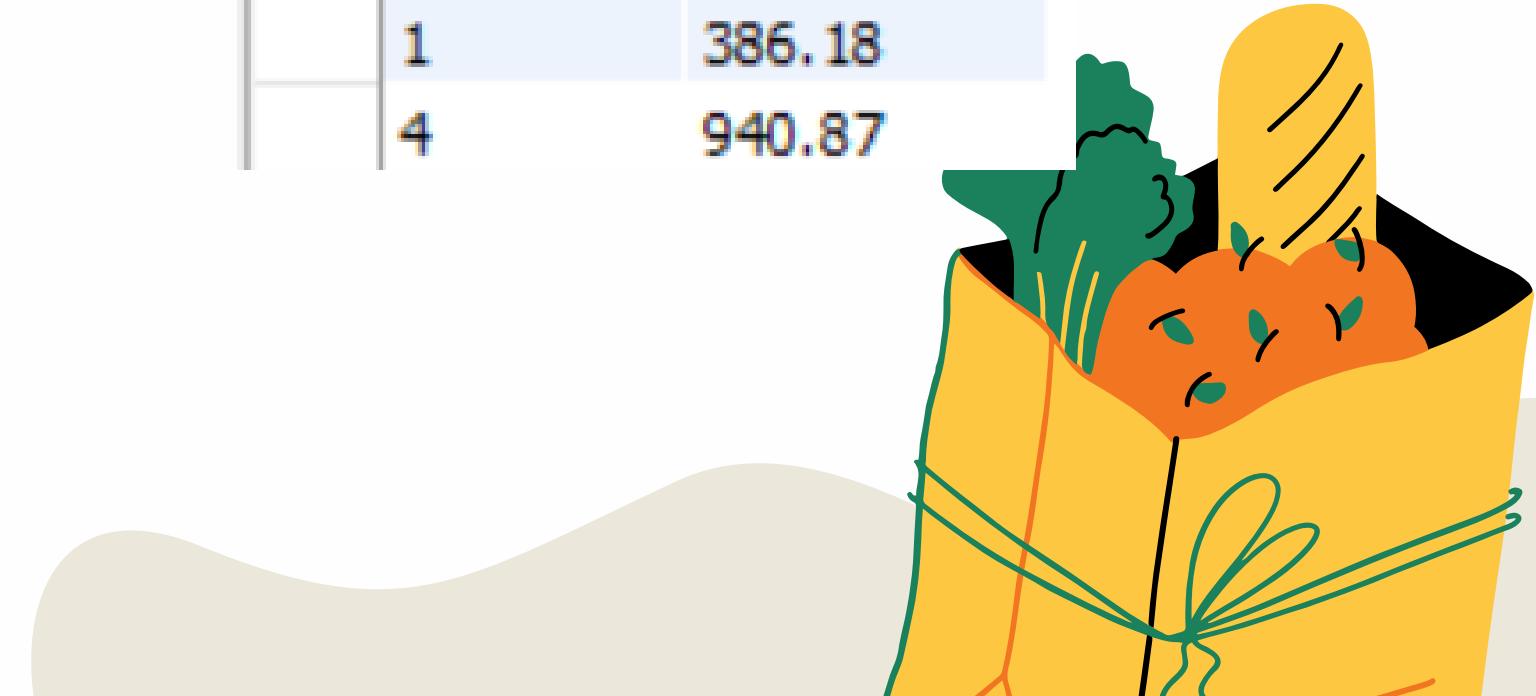


Query :

```
select quantity, (total_price) as total_price  
from order_details;
```

Output :

	quantity	total_price
▶	3	421.87
	1	441.95
	4	665.06
	2	438.73
	4	1544.71
	4	586.58
	3	1392.07
	1	322.40
	3	548.22
	1	386.18
	4	940.87



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

Query :

```
select p.prod_name, avg(od.quantity) as avg_quantity  
from products p  
join order_details od  
    on p.prod_id = od.prod_id  
group by 1;
```

Output :

	prod_name	avg_quantity
▶	Basmati Rice	3.2000
	Wheat Flour	2.5333
	Moong Dal	3.4000
	Chickpeas	2.4286
	Soybean Oil	1.6364
	Ghee	3.3750
	Paneer	3.0000
	Yogurt	2.1429
	Mango Pickle	3.3636
	Mixed Vegetable Pickle	2.2857
	Almonds	3.0000
	Cashews	2.6250



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



**Query :**

```
select p.prod_name, od.each_price,  
count(*) as order_count  
from products p  
join order_details od  
    on p.prod_id = od.prod_id  
group by 1,2  
order by 1,2;
```

**Output :**

prod_name	each_price	order_count
Almonds	315.57	9
Basmati Rice	358.98	10
Bath Soap	235.22	18
Biscuits	388.81	17
Black Pepper	140.62	13
Brown Bread	346.14	14
Butter	452.40	9
Cardamom	344.90	8
Cashews	441.95	16
Chapati	201.68	16
Cheese Slices	440.94	15
Chickpeas	353.50	7





# Final business insights

- The top five customers account for more than 60% of total purchase revenue, showing that sales are heavily concentrated among a core group of loyal buyers.
- Products are spread across a wide range of categories, though some categories stand out by generating higher sales volumes and revenue than others.
- Monthly trends highlight noticeable peaks in certain months, pointing to clear seasonal buying patterns.
- Sales activity is slightly stronger on weekends, with both order counts and revenue higher compared to weekdays.
- Leading suppliers contribute significantly to profitability by providing higher-value products.
- The top-performing employees process the largest number of orders and generate the highest total sales value.
- There is a clear positive link between the quantity of products ordered and total sales value, confirming that revenue growth is strongly volume-driven.



# Recommendations

- Introduce a loyalty or membership program to reward frequent buyers and retain your highest-spending customers.
- Optimize the product mix by focusing on top revenue-generating items and addressing low-performing products that may indicate overstock or weak demand.
- Boost marketing and inventory during peak months to take advantage of seasonal sales spikes.
- Build stronger supplier relationships by securing long-term contracts or exclusive deals with top-performing partners.
- Motivate employees by recognizing top performers and offering incentives or bonuses to drive continued success.
- Encourage bulk purchases through discounts and promotions to increase average order size and overall sales value.



# Challenges

- Some tables, like orders and employees, stored dates as text (VARCHAR) instead of proper DATE types, which made calculations and trend analysis more difficult.
- Since data was spread across orders, order details, products, customers, suppliers, and employees, writing queries required precise use of foreign keys. Careful joins were necessary to avoid duplicate records or incorrect results.
- Calculating insights such as average order value per customer or employee, monthly sales trends, or supplier/category contributions involved nested queries and subqueries. These were sometimes tricky to write efficiently for larger datasets.
- Converting date fields from text to proper DATE format required using functions like STR\_TO\_DATE. This needed careful handling to avoid errors when analyzing monthly patterns or weekday vs. weekend trends.
- Queries combining multiple tables with calculations like sums, averages, and counts could be slow on large datasets. This required thoughtful indexing and efficient grouping to balance detail with performance.



# Conclusion

- The retail database analysis gives a clear picture of how the business is performing across customers, products, sales, suppliers, and employees. The findings show that most of the revenue comes from a small group of loyal customers and a few top-selling products. Sales are also influenced by seasonal trends and weekends, when order volumes tend to be higher. In addition, supplier performance and employee efficiency highlight areas where operations can be improved.
- By using these insights, the business can manage inventory more effectively, build stronger relationships with key suppliers, keep valuable customers engaged, and boost employee productivity. Putting these data-driven strategies into action will lead to higher revenue, better efficiency, and sustainable growth.
- Overall, this project proves how a well-structured database and detailed SQL analysis can turn raw sales data into meaningful strategies that directly support business success.



# Any Queries?



# THANK YOU

