All quires

```sql
CREATE TABLE IF NOT EXISTS ecommerce_data (

    order_id VARCHAR(50),

    order_date DATE,

    city VARCHAR(100),

    category VARCHAR(100),

    payment_method VARCHAR(50),

    amount DECIMAL(10, 2),

    customer_id VARCHAR(50),

    product_id VARCHAR(50)

);

DESCRIBE ecommerce_data;

INSERT INTO ecommerce_data (order_id, order_date, city, category, payment_method, amount, customer_id, product_id)

VALUES

('ORD001', '2025-04-01', 'New York', 'Electronics', 'Card', 250.75, 'CUST001', 'PROD001'),

('ORD002', '2025-04-02', 'Los Angeles', 'Furniture', 'COD', 400.00, 'CUST002', 'PROD002'),

('ORD003', '2025-04-03', 'Chicago', 'Clothing', 'Card', 150.50, 'CUST003', 'PROD003'),

('ORD004', '2025-04-04', 'Houston', 'Books', 'Card', 60.00, 'CUST004', 'PROD004'),

('ORD005', '2025-04-05', 'Phoenix', 'Home Appliances', 'COD', 120.45, 'CUST005', 'PROD005'),

('ORD006', '2025-04-06', 'Philadelphia', 'Toys', 'Card', 80.99, 'CUST006', 'PROD006'),

('ORD007', '2025-04-07', 'San Antonio', 'Sports', 'COD', 200.00, 'CUST007', 'PROD007'),

('ORD008', '2025-04-08', 'San Diego', 'Beauty', 'Card', 75.60, 'CUST008', 'PROD008'),

('ORD009', '2025-04-09', 'Dallas', 'Electronics', 'COD', 350.00, 'CUST009', 'PROD009'),

('ORD010', '2025-04-10', 'San Jose', 'Clothing', 'Card', 90.25, 'CUST010', 'PROD010'),

-- Repeat similar values for a total of 100 rows
```

('ORD100', '2025-06-09', 'Las Vegas', 'Books', 'COD', 35.00, 'CUST100', 'PROD100');

INSERT INTO ecommerce_data (order_id, order_date, city, category, payment_method, amount, customer_id, product_id)

VALUES

('ORD011', '2025-04-11', 'Austin', 'Electronics', 'Card', 280.99, 'CUST011', 'PROD011'),

('ORD012', '2025-04-12', 'Jacksonville', 'Clothing', 'COD', 145.50, 'CUST012', 'PROD012'),

('ORD013', '2025-04-13', 'Fort Worth', 'Books', 'Card', 65.00, 'CUST013', 'PROD013'),

('ORD014', '2025-04-14', 'Columbus', 'Furniture', 'COD', 380.00, 'CUST014', 'PROD014'),

('ORD015', '2025-04-15', 'San Francisco', 'Home Appliances', 'Card', 120.00, 'CUST015', 'PROD015'),

('ORD016', '2025-04-16', 'Charlotte', 'Toys', 'COD', 60.50, 'CUST016', 'PROD016'),

('ORD017', '2025-04-17', 'Indianapolis', 'Beauty', 'Card', 85.75, 'CUST017', 'PROD017'),

('ORD018', '2025-04-18', 'Seattle', 'Sports', 'COD', 195.20, 'CUST018', 'PROD018'),

('ORD019', '2025-04-19', 'Denver', 'Electronics', 'Card', 220.00, 'CUST019', 'PROD019'),

('ORD020', '2025-04-20', 'Washington D.C.', 'Clothing', 'COD', 110.80, 'CUST020', 'PROD020'),

('ORD021', '2025-04-21', 'Boston', 'Books', 'Card', 90.00, 'CUST021', 'PROD021'),

('ORD022', '2025-04-22', 'El Paso', 'Home Appliances', 'COD', 250.00, 'CUST022', 'PROD022'),

('ORD023', '2025-04-23', 'Nashville', 'Toys', 'Card', 78.90, 'CUST023', 'PROD023'),

('ORD024', '2025-04-24', 'Detroit', 'Electronics', 'COD', 500.00, 'CUST024', 'PROD024'),

('ORD025', '2025-04-25', 'Memphis', 'Clothing', 'Card', 120.30, 'CUST025', 'PROD025'),

('ORD026', '2025-04-26', 'Portland', 'Books', 'COD', 65.50, 'CUST026', 'PROD026'),

('ORD027', '2025-04-27', 'Oklahoma City', 'Furniture', 'Card', 310.00, 'CUST027', 'PROD027'),

('ORD028', '2025-04-28', 'Las Vegas', 'Home Appliances', 'COD', 180.00, 'CUST028', 'PROD028'),

('ORD029', '2025-04-29', 'Louisville', 'Sports', 'Card', 140.00, 'CUST029', 'PROD029'),

('ORD030', '2025-04-30', 'Baltimore', 'Toys', 'COD', 95.20, 'CUST030', 'PROD030'),

('ORD031', '2025-05-01', 'Milwaukee', 'Beauty', 'Card', 120.00, 'CUST031', 'PROD031'),

('ORD032', '2025-05-02', 'Albuquerque', 'Electronics', 'COD', 350.00, 'CUST032', 'PROD032'),

('ORD033', '2025-05-03', 'Tucson', 'Clothing', 'Card', 99.99, 'CUST033', 'PROD033'),

('ORD034', '2025-05-04', 'Fresno', 'Books', 'COD', 58.00, 'CUST034', 'PROD034'),

('ORD035', '2025-05-05', 'Sacramento', 'Home Appliances', 'Card', 210.00, 'CUST035', 'PROD035'),

('ORD036', '2025-05-06', 'Mesa', 'Toys', 'COD', 88.50, 'CUST036', 'PROD036'),

('ORD037', '2025-05-07', 'Kansas City', 'Beauty', 'Card', 77.00, 'CUST037', 'PROD037'),

('ORD038', '2025-05-08', 'Long Beach', 'Sports', 'COD', 150.00, 'CUST038', 'PROD038'),

('ORD039', '2025-05-09', 'Atlanta', 'Electronics', 'Card', 225.00, 'CUST039', 'PROD039'),

('ORD040', '2025-05-10', 'Miami', 'Clothing', 'COD', 112.50, 'CUST040', 'PROD040');

INSERT INTO ecommerce_data (order_id, order_date, city, category, payment_method, amount, customer_id, product_id)

VALUES

('ORD041', '2025-05-11', 'Raleigh', 'Furniture', 'Card', 400.00, 'CUST041', 'PROD041'),

('ORD042', '2025-05-12', 'Virginia Beach', 'Home Appliances', 'COD', 120.75, 'CUST042', 'PROD042'),

('ORD043', '2025-05-13', 'New Orleans', 'Toys', 'Card', 65.90, 'CUST043', 'PROD043'),

('ORD044', '2025-05-14', 'Chicago', 'Beauty', 'COD', 95.00, 'CUST044', 'PROD044'),

('ORD045', '2025-05-15', 'Houston', 'Sports', 'Card', 150.50, 'CUST045', 'PROD045'),

('ORD046', '2025-05-16', 'Phoenix', 'Electronics', 'COD', 500.00, 'CUST046', 'PROD046'),

('ORD047', '2025-05-17', 'San Antonio', 'Clothing', 'Card', 99.99, 'CUST047', 'PROD047'),

('ORD048', '2025-05-18', 'San Diego', 'Books', 'COD', 80.00, 'CUST048', 'PROD048'),

('ORD049', '2025-05-19', 'Dallas', 'Home Appliances', 'Card', 210.00, 'CUST049', 'PROD049'),

('ORD050', '2025-05-20', 'San Jose', 'Toys', 'COD', 120.40, 'CUST050', 'PROD050'),

('ORD051', '2025-05-21', 'Austin', 'Beauty', 'Card', 75.00, 'CUST051', 'PROD051'),

('ORD052', '2025-05-22', 'Jacksonville', 'Sports', 'COD', 125.25, 'CUST052', 'PROD052'),

('ORD053', '2025-05-23', 'Columbus', 'Electronics', 'Card', 250.00, 'CUST053', 'PROD053'),

('ORD054', '2025-05-24', 'Charlotte', 'Clothing', 'COD', 110.00, 'CUST054', 'PROD054'),

('ORD055', '2025-05-25', 'Indianapolis', 'Books', 'Card', 65.00, 'CUST055', 'PROD055'),

('ORD056', '2025-05-26', 'Seattle', 'Home Appliances', 'COD', 180.50, 'CUST056', 'PROD056'),

('ORD057', '2025-05-27', 'Denver', 'Toys', 'Card', 90.00, 'CUST057', 'PROD057'),

('ORD058', '2025-05-28', 'Washington D.C.', 'Beauty', 'COD', 60.75, 'CUST058', 'PROD058'),

('ORD059', '2025-05-29', 'Boston', 'Sports', 'Card', 145.00, 'CUST059', 'PROD059'),

('ORD060', '2025-05-30', 'El Paso', 'Electronics', 'COD', 350.00, 'CUST060', 'PROD060'),

('ORD061', '2025-06-01', 'Nashville', 'Clothing', 'Card', 85.50, 'CUST061', 'PROD061'),

('ORD062', '2025-06-02', 'Las Vegas', 'Books', 'COD', 50.25, 'CUST062', 'PROD062'),

('ORD063', '2025-06-03', 'Detroit', 'Home Appliances', 'Card', 320.00, 'CUST063', 'PROD063'),

('ORD064', '2025-06-04', 'Memphis', 'Toys', 'COD', 100.00, 'CUST064', 'PROD064'),

('ORD065', '2025-06-05', 'Portland', 'Beauty', 'Card', 90.75, 'CUST065', 'PROD065'),

('ORD066', '2025-06-06', 'Oklahoma City', 'Sports', 'COD', 115.50, 'CUST066', 'PROD066'),

('ORD067', '2025-06-07', 'Las Vegas', 'Electronics', 'Card', 250.00, 'CUST067', 'PROD067'),

('ORD068', '2025-06-08', 'Louisville', 'Clothing', 'COD', 130.25, 'CUST068', 'PROD068'),

('ORD069', '2025-06-09', 'Baltimore', 'Books', 'Card', 70.00, 'CUST069', 'PROD069'),

('ORD070', '2025-06-10', 'Milwaukee', 'Home Appliances', 'COD', 190.75, 'CUST070', 'PROD070');

INSERT INTO ecommerce_data (order_id, order_date, city, category, payment_method, amount, customer_id, product_id)

VALUES

('ORD071', '2025-06-11', 'Virginia Beach', 'Clothing', 'Card', 150.00, 'CUST071', 'PROD071'),

('ORD072', '2025-06-12', 'New Orleans', 'Books', 'COD', 60.00, 'CUST072', 'PROD072'),

('ORD073', '2025-06-13', 'Chicago', 'Home Appliances', 'Card', 275.50, 'CUST073', 'PROD073'),

('ORD074', '2025-06-14', 'Houston', 'Toys', 'COD', 55.00, 'CUST074', 'PROD074'),

('ORD075', '2025-06-15', 'Phoenix', 'Beauty', 'Card', 80.00, 'CUST075', 'PROD075'),

('ORD076', '2025-06-16', 'San Antonio', 'Sports', 'COD', 140.00, 'CUST076', 'PROD076'),

('ORD077', '2025-06-17', 'San Diego', 'Electronics', 'Card', 225.25, 'CUST077', 'PROD077'),

('ORD078', '2025-06-18', 'Dallas', 'Clothing', 'COD', 120.00, 'CUST078', 'PROD078'),

('ORD079', '2025-06-19', 'San Jose', 'Books', 'Card', 45.00, 'CUST079', 'PROD079'),

('ORD080', '2025-06-20', 'Austin', 'Home Appliances', 'COD', 180.00, 'CUST080', 'PROD080'),

('ORD081', '2025-06-21', 'Jacksonville', 'Toys', 'Card', 99.99, 'CUST081', 'PROD081'),

('ORD082', '2025-06-22', 'Columbus', 'Beauty', 'COD', 110.00, 'CUST082', 'PROD082'),

('ORD083', '2025-06-23', 'Charlotte', 'Sports', 'Card', 150.00, 'CUST083', 'PROD083'),

('ORD084', '2025-06-24', 'Indianapolis', 'Electronics', 'COD', 300.00, 'CUST084', 'PROD084'),

('ORD085', '2025-06-25', 'Seattle', 'Clothing', 'Card', 130.00, 'CUST085', 'PROD085'),

('ORD086', '2025-06-26', 'Denver', 'Books', 'COD', 70.00, 'CUST086', 'PROD086'),

('ORD087', '2025-06-27', 'Washington D.C.', 'Home Appliances', 'Card', 250.00, 'CUST087', 'PROD087'),

('ORD088', '2025-06-28', 'Boston', 'Toys', 'COD', 90.00, 'CUST088', 'PROD088'),

('ORD089', '2025-06-29', 'El Paso', 'Beauty', 'Card', 85.00, 'CUST089', 'PROD089'),

('ORD090', '2025-06-30', 'Nashville', 'Sports', 'COD', 135.50, 'CUST090', 'PROD090'),

('ORD091', '2025-07-01', 'Las Vegas', 'Electronics', 'Card', 220.00, 'CUST091', 'PROD091'),

('ORD092', '2025-07-02', 'Detroit', 'Clothing', 'COD', 100.00, 'CUST092', 'PROD092'),

('ORD093', '2025-07-03', 'Memphis', 'Books', 'Card', 55.75, 'CUST093', 'PROD093'),

('ORD094', '2025-07-04', 'Portland', 'Home Appliances', 'COD', 275.25, 'CUST094', 'PROD094'),

('ORD095', '2025-07-05', 'Oklahoma City', 'Toys', 'Card', 120.00, 'CUST095', 'PROD095'),

('ORD096', '2025-07-06', 'Las Vegas', 'Beauty', 'COD', 95.50, 'CUST096', 'PROD096'),

('ORD097', '2025-07-07', 'Louisville', 'Sports', 'Card', 150.00, 'CUST097', 'PROD097'),

('ORD098', '2025-07-08', 'Baltimore', 'Electronics', 'COD', 350.00, 'CUST098', 'PROD098'),

('ORD099', '2025-07-09', 'Milwaukee', 'Clothing', 'Card', 125.00, 'CUST099', 'PROD099'),

('ORD100', '2025-07-10', 'Virginia Beach', 'Books', 'COD', 60.00, 'CUST100', 'PROD100');

SELECT *

FROM ecommerce_data

WHERE city = 'New York';

	order_id	order_date	city	category	payment_method	amount	customer_id	product_id
	ORD001	2025-04-01	New York	Electronics	Card	250.75	CUST001	PROD001
	ORD001	2025-04-01	New York	Electronics	Card	250.75	CUST001	PROD001
	ORD001	2025-04-01	New York	Electronics	Card	250.75	CUST001	PROD001
▶	ORD001	2025-04-01	New York	Electronics	Card	250.75	CUST001	PROD001
	ORD001	2025-04-01	New York	Electronics	Card	250.75	CUST001	PROD001

SELECT category, COUNT(*) AS total_orders, SUM(amount) AS total_sales

FROM ecommerce_data

GROUP BY category

ORDER BY total_sales DESC;

	category	total_orders	total_sales
▶	Electronics	65	20170.20
	Home Appliances	58	11552.95
	Clothing	68	7967.91
	Sports	49	7497.50
	Furniture	20	7450.00
	Toys	54	4701.61
	Beauty	49	4264.85
	Books	63	3895.75

Use JOINS (INNER, LEFT, RIGHT)

Inner Join

SELECT ed.order_id, ed.order_date, c.customer_name, ed.amount

FROM ecommerce_data ed

INNER JOIN customers c ON ed.customer_id = c.customer_id;

category	total_orders	total_sales
Electronics	80	24792.19
Home Appliances	72	14436.15
Clothing	84	9848.49
Sports	61	9294.45
Furniture	24	8940.00
Toys	67	5846.99
Beauty	61	5315.20
Books	78	4825.25

Right Join

SELECT ed.order_id, ed.order_date, c.customer_name, ed.amount

FROM ecommerce_data ed

LEFT JOIN customers c ON ed.customer_id = c.customer_id;

category	total_orders	total_sales
Electronics	95	29414.18
Home Appliances	86	17319.35
Clothing	100	11729.07
Sports	73	11091.40
Furniture	28	10430.00
Toys	80	6992.37
Beauty	73	6365.55
Books	93	5754.75

SELECT ed.order_id, ed.order_date, c.customer_name, ed.amount

FROM ecommerce_data ed

LEFT JOIN customers c ON ed.customer_id = c.customer_id;

category	total_orders	total_sales
Electronics	110	34036.17
Home Appliances	100	20202.55
Clothing	116	13609.65
Sports	85	12888.35
Furniture	32	11920.00
Toys	93	8137.75
Beauty	85	7415.90
Books	108	6684.25

Write subqueries

SELECT *

FROM ecommerce_data

WHERE payment_method = (

   SELECT payment_method

   FROM ecommerce_data

   GROUP BY payment_method

   ORDER BY COUNT(*) DESC

   LIMIT 1

);

	category	total_orders	total_sales
▶	Electronics	140	43280.15
	Home Appliances	128	25968.95
	Clothing	148	17370.81
	Sports	109	16482.25
	Furniture	40	14900.00
	Toys	119	10428.51
	Beauty	109	9516.60
	Books	138	8543.25

Use aggregate functions (SUM, AVG)

SELECT category, SUM(amount) AS total_sales

FROM ecommerce_data

GROUP BY category

HAVING SUM(amount) > 2000;

	category	total_sales
▶	Electronics	47902.14
	Furniture	16390.00
	Clothing	19251.39
	Books	9472.75
	Home Appliances	28852.15
	Toys	11573.89
	Sports	18279.20
	Beauty	10566.95

```sql
SELECT
  city,
  total_sales
FROM (
  SELECT
    city,
    SUM(amount) AS total_sales
  FROM
    ecommerce_data
  GROUP BY
    city
) AS city_sales
WHERE
  total_sales > (
    SELECT
      AVG(total_city_sales)
    FROM (
      SELECT
        city,
        SUM(amount) AS total_city_sales
      FROM
        ecommerce_data
      GROUP BY
        city
    ) AS avg_city_sales
  );
```

'Los Angeles'	'4800.00'
'Chicago'	'5235.50'
'Phoenix'	'7165.40'
'San Antonio'	'4659.90'
'Dallas'	'7380.00'
'Las Vegas'	'8242.00'
'Austin'	'5460.89'
'Columbus'	'7670.00'
'Indianapolis'	'4293.25'
'Seattle'	'5122.20'
'Denver'	'3950.00'
'Washington D.C.'	'4076.30'
'El Paso'	'7015.00'
'Detroit'	'9600.00'
'Portland'	'4105.25'
'Oklahoma City'	'5645.00'
'Louisville'	'4192.50'
'Baltimore'	'4897.20'
'Milwaukee'	'4352.50'
'Albuquerque'	'3850.00'
'Raleigh'	'4000.00'

Create views for analysis

CREATE VIEW high_sales_cities AS

SELECT

  city,

  total_sales

FROM (

 SELECT

   city,

   SUM(amount) AS total_sales

 FROM

   ecommerce_data

 GROUP BY

   city

```
) AS city_sales
WHERE
    total_sales > (
        SELECT
            AVG(total_city_sales)
        FROM (
            SELECT
                city,
                SUM(amount) AS total_city_sales
            FROM
                ecommerce_data
            GROUP BY
                city
        ) AS avg_city_sales
    );
```

Optimize queries with indexes

```
USE ec;
CREATE INDEX idx_city ON ecommerce_data(city);
CREATE INDEX idx_city_amount ON ecommerce_data(city, amount);
```