E-Commerce Sales Data Analysis Using SQL

CONTENTS

INTRODUCTION

The project will involve the extraction and analysis of key metrics, such as total sales, customer demographics, and purchase patterns. We will explore data relationships and trends over time, employing SQL techniques to perform aggregations, joins, and subqueries. This analytical approach will enable us to identify opportunities for optimization, such as improving conversion rates and enhancing inventory management.

Ultimately, the project aims to provide actionable recommendations based on our SQL analysis, empowering e-commerce businesses to refine their strategies, boost sales, and enhance customer satisfaction in a dynamic online marketplace.

In the evolving landscape of e-commerce, data-driven decision-making is essential for achieving competitive advantage and enhancing customer experiences. This project focuses on utilizing SQL (Structured Query Language) to analyze e-commerce sales data, uncovering insights that can inform strategic business initiatives.

With the exponential growth of online shopping, businesses generate vast amounts of data—from transaction records and customer profiles to product inventories and website interactions. By harnessing SQL, we can efficiently query and manipulate this data to derive meaningful insights into sales performance, customer behavior, and market trends.

OBJECTIVES

The primary objectives of this E-Commerce Sales Data Analysis project using

SQL are as follows:

1. **Analyze Sales Trends:**

    - Investigate historical sales data to identify patterns and trends over various time periods, including seasonal fluctuations and peak sales times. This will help understand when sales are highest and why.

2. **Evaluate Customer Behavior:**

    - Examine customer demographics and purchasing habits to uncover insights about who the customers are and what they prefer. This analysis will assist in segmenting the customer base for targeted marketing efforts.

3. **Measure Key Performance Indicators (KPIs):**

    - Calculate critical metrics such as total sales, average order value, conversion rates, and customer acquisition costs. Comparing these metrics against industry benchmarks will provide context for performance evaluation.

4. **Identify Top-Selling Products:**

    - Determine which products are driving the most sales and analyze the factors influencing their success, such as promotions or seasonal demand. This insight can guide inventory and marketing decisions.

5. **Uncover Insights for Optimization:**

    - Generate actionable recommendations based on the analysis to enhance marketing strategies, optimize inventory management, and

improve overall customer engagement. The goal is to leverage data to drive business growth.

6. **Develop SQL Skills:**
    - Strengthen SQL proficiency through the creation and execution of complex queries for effective data extraction and manipulation. This hands-on experience will enhance technical skills relevant to data analysis.
7. **Visualize Data Insights:**
    - Create visual representations of key findings using data visualization tools. Effective visualizations will aid in communicating insights clearly to stakeholders, facilitating data-driven decision-making.

These objectives will guide the analysis and ensure that the project provides valuable insights for optimizing e-commerce sales strategies.

DATA DESCRIPTION

CREATE TABLE CUSTOMER

```
CREATE TABLE customers (
   customer_id INT PRIMARY KEY,
   name VARCHAR(50),
   email VARCHAR(100),
   signup_date DATE);
```

INSERT VALUES CUSTOMER

```
INSERT INTO customers (customer_id, name, email, signup_date)
VALUES
(1, 'Alice Smith', 'alice@example.com', '2023-01-01'),
(2, 'Bob Johnson', 'bob@example.com', '2023-01-02'),
(3, 'Charlie Brown', 'charlie@example.com', '2023-01-03'),
(4, 'Diana Prince', 'diana@example.com', '2023-01-04'),
(5, 'Ethan Hunt', 'ethan@example.com', '2023-01-05'),
(6, 'Fiona Gallagher', 'fiona@example.com', '2023-01-06'),
(7, 'George Lucas', 'george@example.com', '2023-01-07'),
```

(8, 'Hannah Baker', 'hannah@example.com', '2023-01-08'),

(9, 'Ian Malcolm', 'ian@example.com', '2023-01-09'),

(10, 'Jenna Ortega', 'jenna@example.com', '2023-01-10'),

(11, 'Kevin Hart', 'kevin@example.com', '2023-01-11'),

(12, 'Laura Croft', 'laura@example.com', '2023-01-12'),

(13, 'Mike Wazowski', 'mike@example.com', '2023-01-13'),

(14, 'Nina Dobrev', 'nina@example.com', '2023-01-14'),

(15, 'Oscar Isaac', 'oscar@example.com', '2023-01-15'),

(16, 'Paula Patton', 'paula@example.com', '2023-01-16'),

(17, 'Quinn Fabray', 'quinn@example.com', '2023-01-17'),

(18, 'Riley Keough', 'riley@example.com', '2023-01-18'),

(19, 'Steve Rogers', 'steve@example.com', '2023-01-19'),

(20, 'Tina Fey', 'tina@example.com', '2023-01-20'),

(21, 'Uma Thurman', 'uma@example.com', '2023-01-21'),

(22, 'Victor Frankenstein', 'victor@example.com', '2023-01-22'),

(23, 'Will Smith', 'will@example.com', '2023-01-23'),

(24, 'Xena Warrior', 'xena@example.com', '2023-01-24'),

(25, 'Yara Shahidi', 'yara@example.com', '2023-01-25'),

(26, 'Zara Lee', 'zara@example.com', '2023-01-26'),

(27, 'Aaron Paul', 'aaron@example.com', '2023-01-27'),

(28, 'Bella Thorne', 'bella@example.com', '2023-01-28'),

(29, 'Chris Evans', 'chris@example.com', '2023-01-29'),

(30, 'Daisy Ridley', 'daisy@example.com', '2023-01-30'),

(31, 'Eli Manning', 'eli@example.com', '2023-01-31'),

(32, 'Felicia Day', 'felicia@example.com', '2023-02-01'),

(33, 'Gina Rodriguez', 'gina@example.com', '2023-02-02'),

(34, 'Henry Cavill', 'henry@example.com', '2023-02-03'),

(35, 'Isla Fisher', 'isla@example.com', '2023-02-04'),

(36, 'Jack Black', 'jack@example.com', '2023-02-05'),

(37, 'Katherine Langford', 'katherine@example.com', '2023-02-06'),

(38, 'Liam Neeson', 'liam@example.com', '2023-02-07'),

(39, 'Mila Kunis', 'mila@example.com', '2023-02-08'),

(40, 'Nicolas Cage', 'nicolas@example.com', '2023-02-09'),

(41, 'Olivia Wilde', 'olivia@example.com', '2023-02-10'),

(42, 'Paul Rudd', 'paul@example.com', '2023-02-11'),

(43, 'Queen Latifah', 'queen@example.com', '2023-02-12'),

(44, 'Robert Pattinson', 'robert@example.com', '2023-02-13'),

(45, 'Sophie Turner', 'sophie@example.com', '2023-02-14'),

(46, 'Tom Holland', 'tom@example.com', '2023-02-15'),

(47, 'Uma Thurman', 'uma2@example.com', '2023-02-16'),

(48, 'Vince Vaughn', 'vince@example.com', '2023-02-17'),

(49, 'Wanda Sykes', 'wanda@example.com', '2023-02-18'),

(50, 'Xavier Dolan', 'xavier@example.com', '2023-02-19'),

(51, 'Yasmine Bleeth', 'yasmine@example.com', '2023-02-20'),

(52, 'Zach Galifianakis', 'zach@example.com', '2023-02-21'),

(53, 'Angela Bassett', 'angela@example.com', '2023-02-22'),

(54, 'Ben Stiller', 'ben@example.com', '2023-02-23'),

(55, 'Chadwick Boseman', 'chadwick@example.com', '2023-02-24'),

(56, 'Drew Barrymore', 'drew@example.com', '2023-02-25'),

(57, 'Elijah Wood', 'elijah@example.com', '2023-02-26'),

(58, 'Freida Pinto', 'freida@example.com', '2023-02-27'),

(59, 'Gordon Ramsay', 'gordon@example.com', '2023-02-28'),

(60, 'Hilary Duff', 'hilary@example.com', '2023-03-01'),

(61, 'Jared Leto', 'jared@example.com', '2023-03-02'),

(62, 'Kathy Bates', 'kathy@example.com', '2023-03-03'),

(63, 'Luke Hemsworth', 'luke@example.com', '2023-03-04'),

(64, 'Matthew McConaughey', 'matthew@example.com', '2023-03-05'),

(65, 'Natalie Portman', 'natalie@example.com', '2023-03-06'),

(66, 'Owen Wilson', 'owen@example.com', '2023-03-07'),

(67, 'Penelope Cruz', 'penelope@example.com', '2023-03-08'),

(68, 'Quentin Tarantino', 'quentin@example.com', '2023-03-09'),

(69, 'Reese Witherspoon', 'reese@example.com', '2023-03-10'),

(70, 'Steve Carell', 'steve2@example.com', '2023-03-11'),

(71, 'Taron Egerton', 'taron@example.com', '2023-03-12'),

(72, 'Uma Thurman', 'uma3@example.com', '2023-03-13'),

(73, 'Vera Farmiga', 'vera@example.com', '2023-03-14'),

(74, 'Will Ferrell', 'will2@example.com', '2023-03-15'),

(75, 'Xander Cage', 'xander@example.com', '2023-03-16'),

(76, 'Yvette Nicole Brown', 'yvette@example.com', '2023-03-17'),

(77, 'Zoe Saldana', 'zoe@example.com', '2023-03-18'),

(78, 'Aaron Eckhart', 'aaron2@example.com', '2023-03-19'),

(79, 'Blake Lively', 'blake@example.com', '2023-03-20'),

(80, 'Chris Hemsworth', 'chris2@example.com', '2023-03-21'),

(81, 'Dwayne Johnson', 'dwayne@example.com', '2023-03-22'),

(82, 'Emily Blunt', 'emily@example.com', '2023-03-23'),

(83, 'Finn Wolfhard', 'finn@example.com', '2023-03-24'),

(84, 'Gal Gadot', 'gal@example.com', '2023-03-25'),

(85, 'Henry Golding', 'henry2@example.com', '2023-03-26'),

(86, 'Isabelle Fuhrman', 'isabelle@example.com', '2023-03-27'),

(87, 'John Boyega', 'john@example.com', '2023-03-28'),

(88, 'Kerry Washington', 'kerry@example.com', '2023-03-29'),

(89, 'Lupita Nyong\'o', 'lupita@example.com', '2023-03-30'),

(90, 'Megan Fox', 'megan@example.com', '2023-03-31'),

(91, 'Nina Dobrev', 'nina2@example.com', '2023-04-01'),

(92, 'Oscar Isaac', 'oscar2@example.com', '2023-04-02'),

(93, 'Peyton List', 'peyton@example.com', '2023-04-03'),

(94, 'Quincy Brown', 'quincy@example.com', '2023-04-04'),

(95, 'Rami Malek', 'rami@example.com', '2023-04-05'),

(96, 'Sienna Miller', 'sienna@example.com', '2023-04-06'),

(97, 'Timothée Chalamet', 'timothee@example.com', '2023-04-07'),

(98, 'Uzo Aduba', 'uzo@example.com', '2023-04-08'),

(99, 'Vanessa Kirby', 'vanessa@example.com', '2023-04-09'),

(100, 'Zara Lee', 'zara@example.com', '2023-04-10');

CREATE TABLE PRODUCTS

```
CREATE TABLE products (
   product_id INT PRIMARY KEY,
   product_name VARCHAR(50),
   category VARCHAR(50),
   price DECIMAL(10, 2));
```

INSERT VALUES PRODUCT

```
INSERT INTO products (product_id, product_name, category, price)
VALUES
(1, 'Laptop', 'Electronics', 999.99),
(2, 'Smartphone', 'Electronics', 599.99),
(3, 'Desk Chair', 'Furniture', 149.99),
(4, 'Office Desk', 'Furniture', 299.99),
(5, 'Wireless Mouse', 'Accessories', 25.99),
(6, 'Keyboard', 'Accessories', 49.99),
(7, 'Monitor', 'Electronics', 199.99),
(8, 'Printer', 'Electronics', 89.99),
(9, 'Router', 'Electronics', 79.99),
(10, 'HDMI Cable', 'Accessories', 15.99),
(11, 'External Hard Drive', 'Storage', 119.99),
(12, 'USB Flash Drive', 'Storage', 29.99),
(13, 'Bluetooth Speaker', 'Audio', 59.99),
(14, 'Gaming Headset', 'Audio', 89.99),
(15, 'Webcam', 'Electronics', 69.99),
(16, 'Smartwatch', 'Wearables', 199.99),
```

(17, 'Action Camera', 'Electronics', 249.99),

(18, 'VR Headset', 'Electronics', 399.99),

(19, 'Fitness Tracker', 'Wearables', 49.99),

(20, 'Drone', 'Electronics', 499.99),

(21, 'Gaming Console', 'Gaming', 299.99),

(22, 'Video Game', 'Gaming', 59.99),

(23, 'Graphic Card', 'Computer Hardware', 499.99),

(24, 'Motherboard', 'Computer Hardware', 199.99),

(25, 'Power Supply', 'Computer Hardware', 79.99),

(26, 'CPU', 'Computer Hardware', 299.99),

(27, 'RAM', 'Computer Hardware', 129.99),

(28, 'SSD', 'Storage', 99.99),

(29, 'HDD', 'Storage', 59.99),

(30, 'Gaming Chair', 'Furniture', 249.99),

(31, 'Office Supplies', 'Office', 19.99),

(32, 'Notebook', 'Office Supplies', 4.99),

(33, 'Pen', 'Office Supplies', 1.99),

(34, 'Folder', 'Office Supplies', 2.99),

(35, 'Stapler', 'Office Supplies', 9.99),

(36, 'Paper Clips', 'Office Supplies', 3.99),

(37, 'Whiteboard', 'Office Equipment', 49.99),

(38, 'Marker Set', 'Office Supplies', 14.99),

(39, 'Printer Paper', 'Office Supplies', 6.99),

(40, 'Desk Organizer', 'Furniture', 19.99),

(41, 'Office Lamp', 'Furniture', 39.99),

(42, 'Wall Art', 'Home Decor', 29.99),

(43, 'Bookshelf', 'Furniture', 149.99),

(44, 'Coffee Maker', 'Kitchen Appliances', 89.99),

(45, 'Microwave Oven', 'Kitchen Appliances', 149.99),

(46, 'Blender', 'Kitchen Appliances', 39.99),

(47, 'Toaster', 'Kitchen Appliances', 29.99),

(48, 'Air Fryer', 'Kitchen Appliances', 119.99),

(49, 'Electric Kettle', 'Kitchen Appliances', 39.99),

(50, 'Rice Cooker', 'Kitchen Appliances', 49.99),

(51, 'Slow Cooker', 'Kitchen Appliances', 59.99),

(52, 'Dishwasher', 'Kitchen Appliances', 499.99),

(53, 'Refrigerator', 'Kitchen Appliances', 999.99),

(54, 'Washing Machine', 'Appliances', 699.99),

(55, 'Vacuum Cleaner', 'Appliances', 199.99),

(56, 'Air Purifier', 'Appliances', 149.99),

(57, 'Dehumidifier', 'Appliances', 129.99),

(58, 'Fan', 'Appliances', 49.99),

(59, 'Heater', 'Appliances', 69.99),

(60, 'Air Conditioner', 'Appliances', 499.99),

(61, 'LED Light Bulbs', 'Lighting', 14.99),

(62, 'Smart Light Bulb', 'Lighting', 24.99),

(63, 'Solar Garden Lights', 'Lighting', 39.99),

(64, 'Desk Fan', 'Appliances', 29.99),

(65, 'Smart Thermostat', 'Home Automation', 199.99),

(66, 'Security Camera', 'Home Security', 129.99),

(67, 'Smart Lock', 'Home Security', 89.99),

(68, 'Smoke Detector', 'Safety', 39.99),

(69, 'Carbon Monoxide Detector', 'Safety', 49.99),

(70, 'First Aid Kit', 'Safety', 29.99),

(71, 'Fire Extinguisher', 'Safety', 49.99),

(72, 'Home Safety Alarm', 'Safety', 59.99),

(73, 'Pet Camera', 'Home Security', 99.99),

(74, 'Robot Vacuum', 'Appliances', 299.99),

(75, 'Smart Speaker', 'Audio', 99.99),

(76, 'Streaming Device', 'Electronics', 49.99),

(77, 'Home Theater System', 'Audio', 299.99),

(78, 'Soundbar', 'Audio', 199.99),

(79, 'Wireless Earbuds', 'Audio', 79.99),

(80, 'Bluetooth Headphones', 'Audio', 59.99),

(81, 'Portable Charger', 'Accessories', 29.99),

(82, 'Car Charger', 'Accessories', 19.99),

(83, 'Screen Protector', 'Accessories', 9.99),

(84, 'Phone Case', 'Accessories', 14.99),

(85, 'Camera Tripod', 'Photography', 39.99),

(86, 'Camera Lens', 'Photography', 299.99),

(87, 'Photography Lighting Kit', 'Photography', 89.99),

(88, 'Camera Bag', 'Photography', 49.99),

(89, 'Drone Accessories', 'Electronics', 29.99),

(90, 'Smartphone Gimbal', 'Photography', 99.99),

(91, 'Photography Backdrops', 'Photography', 39.99),

(92, 'Tripod Stand', 'Photography', 29.99),

(93, 'Photography Reflector', 'Photography', 19.99),

(94, 'Digital Photo Frame', 'Photography', 49.99),

(95, 'Film Camera', 'Photography', 199.99),

(96, 'Instant Camera', 'Photography', 129.99),

(97, 'Action Camera Accessories', 'Photography', 39.99),

(98, 'Camera Stabilizer', 'Photography', 99.99),

(99, 'Camera Cleaning Kit', 'Photography', 19.99),

(100, 'Camera Lens Filters', 'Photography', 29.99);

CREATE TABLE ORDER

```
CREATE TABLE orders (
   order_id INT PRIMARY KEY,
   customer_id INT,
   order_date DATE,
   total_amount DECIMAL(10, 2),
   FOREIGN KEY (customer_id) REFERENCES customers(customer_id)
);
```

INSERT VALUES ORDERS

```
INSERT INTO orders (order_id, customer_id, order_date, total_amount)
VALUES
(1, 1, '2023-01-15', 1149.98),
(2, 2, '2023-01-16', 599.99),
(3, 3, '2023-01-17', 149.99),
(4, 4, '2023-01-18', 299.99),
(5, 5, '2023-01-19', 25.99),
(6, 6, '2023-01-20', 49.99),
(7, 7, '2023-01-21', 199.99),
(8, 8, '2023-01-22', 89.99),
(9, 9, '2023-01-23', 79.99),
(10, 10, '2023-01-24', 15.99),
```

(11, 11, '2023-01-25', 119.99),

(12, 12, '2023-01-26', 29.99),

(13, 13, '2023-01-27', 59.99),

(14, 14, '2023-01-28', 89.99),

(15, 15, '2023-01-29', 69.99),

(16, 16, '2023-01-30', 199.99),

(17, 17, '2023-01-31', 249.99),

(18, 18, '2023-02-01', 399.99),

(19, 19, '2023-02-02', 49.99),

(20, 20, '2023-02-03', 499.99),

(21, 21, '2023-02-04', 299.99),

(22, 22, '2023-02-05', 59.99),

(23, 23, '2023-02-06', 499.99),

(24, 24, '2023-02-07', 199.99),

(25, 25, '2023-02-08', 129.99),

(26, 26, '2023-02-09', 79.99),

(27, 27, '2023-02-10', 149.99),

(28, 28, '2023-02-11', 19.99),

(29, 29, '2023-02-12', 4.99),

(30, 30, '2023-02-13', 1.99),

(31, 31, '2023-02-14', 2.99),

(32, 32, '2023-02-15', 9.99),

(33, 33, '2023-02-16', 3.99),

(34, 34, '2023-02-17', 49.99),

(35, 35, '2023-02-18', 14.99),

(36, 36, '2023-02-19', 6.99),

(37, 37, '2023-02-20', 19.99),

(38, 38, '2023-02-21', 39.99),

(39, 39, '2023-02-22', 29.99),

(40, 40, '2023-02-23', 149.99),

(41, 41, '2023-02-24', 89.99),

(42, 42, '2023-02-25', 149.99),

(43, 43, '2023-02-26', 299.99),

(44, 44, '2023-02-27', 199.99),

(45, 45, '2023-02-28', 59.99),

(46, 46, '2023-03-01', 29.99),

(47, 47, '2023-03-02', 49.99),

(48, 48, '2023-03-03', 119.99),

(49, 49, '2023-03-04', 69.99),

(50, 50, '2023-03-05', 99.99),

(51, 51, '2023-03-06', 89.99),

(52, 52, '2023-03-07', 39.99),

(53, 53, '2023-03-08', 149.99),

(54, 54, '2023-03-09', 69.99),

(55, 55, '2023-03-10', 59.99),

(56, 56, '2023-03-11', 499.99),

(57, 57, '2023-03-12', 199.99),

(58, 58, '2023-03-13', 299.99),

(59, 59, '2023-03-14', 89.99),

(60, 60, '2023-03-15', 49.99),

(61, 61, '2023-03-16', 299.99),

(62, 62, '2023-03-17', 499.99),

(63, 63, '2023-03-18', 59.99),

(64, 64, '2023-03-19', 199.99),

(65, 65, '2023-03-20', 99.99),

(66, 66, '2023-03-21', 29.99),

(67, 67, '2023-03-22', 79.99),

(68, 68, '2023-03-23', 199.99),

(69, 69, '2023-03-24', 39.99),

(70, 70, '2023-03-25', 149.99),

(71, 71, '2023-03-26', 299.99),

(72, 72, '2023-03-27', 89.99),

(73, 73, '2023-03-28', 49.99),

(74, 74, '2023-03-29', 299.99),

(75, 75, '2023-03-30', 69.99),

(76, 76, '2023-03-31', 199.99),

(77, 77, '2023-04-01', 99.99),

(78, 78, '2023-04-02', 89.99),

(79, 79, '2023-04-03', 299.99),

(80, 80, '2023-04-04', 39.99),

(81, 81, '2023-04-05', 149.99),

(82, 82, '2023-04-06', 49.99),

(83, 83, '2023-04-07', 19.99),

(84, 84, '2023-04-08', 299.99),

(85, 85, '2023-04-09', 69.99),

(86, 86, '2023-04-10', 199.99),

(87, 87, '2023-04-11', 59.99),

(88, 88, '2023-04-12', 79.99),

(89, 89, '2023-04-13', 129.99),

(90, 90, '2023-04-14', 99.99),

(91, 91, '2023-04-15', 19.99),

(92, 92, '2023-04-16', 149.99),

(93, 93, '2023-04-17', 199.99),

(94, 94, '2023-04-18', 299.99),

(95, 95, '2023-04-19', 49.99),

(96, 96, '2023-04-20', 69.99),

(97, 97, '2023-04-21', 79.99),

(98, 98, '2023-04-22', 129.99),

(99, 99, '2023-04-23', 159.99),

(100, 100, '2023-04-24', 199.99);

CREATE TABLE ORDER_ITEMS

```
CREATE TABLE order_items (
   order_item_id INT PRIMARY KEY,
   order_id INT,
   product_id INT,
   quantity INT,
   FOREIGN KEY (order_id) REFERENCES orders(order_id),
   FOREIGN KEY (product_id) REFERENCES products(product_id)
);
```

INSERT VALUE ORDER_ITEMS

```
INSERT INTO order_items (order_item_id, order_id, product_id, quantity)
VALUES
(1, 1, 1, 1),
(2, 1, 5, 2),
(3, 2, 2, 1),
```

(4, 3, 3, 1),

(5, 4, 4, 1),

(6, 5, 5, 1),

(7, 6, 6, 1),

(8, 7, 7, 1),

(9, 8, 8, 1),

(10, 9, 9, 1),

(11, 10, 10, 1),

(12, 11, 11, 1),

(13, 12, 12, 1),

(14, 13, 13, 1),

(15, 14, 14, 1),

(16, 15, 15, 1),

(17, 16, 16, 1),

(18, 17, 17, 1),

(19, 18, 18, 1),

(20, 19, 19, 1),

(21, 20, 20, 1),

(22, 21, 21, 1),

(23, 22, 22, 1),

(24, 23, 23, 1),

(25, 24, 24, 1),

(26, 25, 25, 1),

(27, 26, 26, 1),

(28, 27, 27, 1),

(29, 28, 28, 1),

(30, 29, 29, 1),

(31, 30, 30, 1),

(32, 31, 31, 1),

(33, 32, 32, 1),

(34, 33, 33, 1),

(35, 34, 34, 1),

(36, 35, 35, 1),

(37, 36, 36, 1),

(38, 37, 37, 1),

(39, 38, 38, 1),

(40, 39, 39, 1),

(41, 40, 40, 1),

(42, 41, 41, 1),

(43, 42, 42, 1),

(44, 43, 43, 1),

(45, 44, 44, 1),

(46, 45, 45, 1),

(47, 46, 46, 1),

(48, 47, 47, 1),

(49, 48, 48, 1),

(50, 49, 49, 1),

(51, 50, 50, 1),

(52, 51, 51, 1),

(53, 52, 52, 1),

(54, 53, 53, 1),

(55, 54, 54, 1),

(56, 55, 55, 1),

(57, 56, 56, 1),

(58, 57, 57, 1),

(59, 58, 58, 1),

(60, 59, 59, 1),

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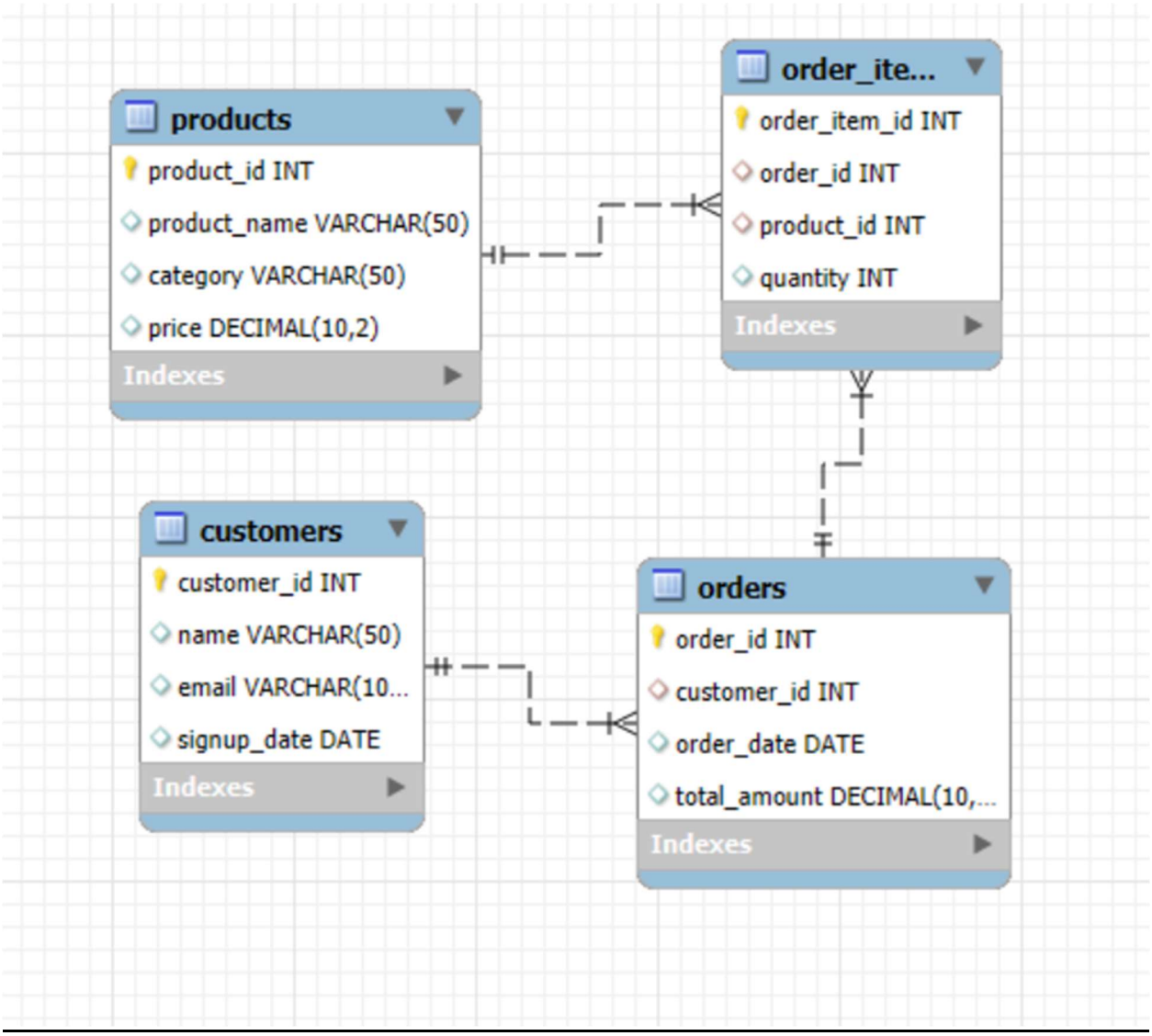
EER DIAGRAM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product_name VARCHAR(50)
category VARCHAR(50)
price DECIMAL(10,2)
Indexes
order_ite...
order_item_id INT
order_id INT
product_id INT
quantity INT
Indexes
customers
customer_id INT
name VARCHAR(50)
email VARCHAR(10...
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Indexes
orders
order_id INT
customer_id INT
order_date DATE
total_amount DECIMAL(10,...
Indexes

METHOTOLOGY

1. Data Preparation and Import: The initial step involves collecting relevant datasets, including sales transactions, customer details, and product information. Once gathered, the data is cleaned to remove inconsistencies, duplicates, and any missing values. After preparation, the cleaned datasets are imported into a relational database management system (RDBMS) such as MySQL or PostgreSQL, ensuring that the data is structured correctly for querying.

2. Database Schema Design: A well-defined database schema is essential for effective analysis. This involves creating tables that accurately represent the relationships between different entities, such as customers, products, and orders. Foreign keys are used to link tables, allowing for comprehensive queries that can pull information across multiple datasets.

3. SQL Query Development: With the database in place, the next step is to write SQL queries to extract insights. This involves using SELECT statements to retrieve specific data, along with aggregate functions (like SUM, AVG, COUNT) to compute key metrics such as total sales and average order value. Joins are employed to combine data from multiple tables, enabling a holistic view of customer behavior and product performance.

4. Data Analysis: Once the queries are executed, the resulting datasets are analyzed to identify trends, patterns, and anomalies. This includes segmenting data by time periods to assess seasonality, evaluating customer demographics to understand purchasing behavior, and identifying top-selling products to inform inventory decisions.

DATA ANALYSIS:

Total sales by Product

```
SELECT p.product_name, SUM(oi.quantity) AS total_sold, SUM(oi.quantity *

p.price) AS total_revenue

FROM order_items oi

JOIN products p ON oi.product_id = p.product_id

GROUP BY p.product_name

ORDER BY total_revenue DESC;
```

SALES TRENT OVER TIME

```
SELECT DATE(order_date) AS sales_date, SUM(total_amount) AS total_sales

FROM orders

GROUP BY sales_date

ORDER BY sales_date;
```

customer purchase behavior

```
SELECT c.name, COUNT(o.order_id) AS total_orders, SUM(o.total_amount) AS

total_spent

FROM customers c

JOIN orders o ON c.customer_id = o.customer_id

GROUP BY c.customer_id

ORDER BY total_spent DESC;
```

top selling product

```
SELECT p.product_name, SUM(oi.quantity) AS total_sold

FROM order_items oi

JOIN products p ON oi.product_id = p.product_id

GROUP BY p.product_name

ORDER BY total_sold DESC

LIMIT 1;
```

CONCLUSION

In this E-Commerce Sales Data Analysis project, we have leveraged SQL to extract and analyze valuable insights from sales data, enabling a deeper understanding of customer behavior and sales performance. Through a systematic methodology, we identified key trends, evaluated critical metrics, and uncovered actionable insights that can significantly impact strategic decision-making.

The analysis revealed important patterns in sales trends, including peak purchasing periods and the factors driving customer engagement. By examining customer demographics and purchasing habits, we successfully segmented the customer base, allowing for more targeted marketing strategies. Additionally, identifying top-selling products provided insights that can guide inventory management and promotional efforts.

Overall, this project underscores the critical role of data-driven decision-making in the e-commerce landscape. By harnessing the power of SQL for data analysis, businesses can optimize their strategies, improve customer experiences, and ultimately drive growth in a competitive market. The insights generated here can serve as a foundation for ongoing analysis and continuous improvement in e-commerce operations.