**Q1: Design a star schema to analyze sales data for a retail company. Include dimension tables for Time, Products, Customers, and Stores. Create a fact table to record sales transactions, including measures such as sales amount, quantity sold, and discount.**

**STAR**

-- Step 2: Create Dimension Tables

CREATE TABLE Dim\_Time (

Time\_ID INT PRIMARY KEY,

Date DATE,

Day VARCHAR(10),

Month VARCHAR(10),

Year INT,

Quarter VARCHAR(10)

);

CREATE TABLE Dim\_Products (

Product\_ID INT PRIMARY KEY,

Product\_Name VARCHAR(50),

Category VARCHAR(50),

Price DECIMAL(10, 2)

);

CREATE TABLE Dim\_Customers (

Customer\_ID INT PRIMARY KEY,

Customer\_Name VARCHAR(50),

Gender VARCHAR(10),

Age INT,

City VARCHAR(50)

);

CREATE TABLE Dim\_Stores (

Store\_ID INT PRIMARY KEY,

Store\_Name VARCHAR(50),

Location VARCHAR(50),

Manager\_Name VARCHAR(50)

);

-- Step 3: Create Fact Table

CREATE TABLE Fact\_Sales (

Transaction\_ID INT PRIMARY KEY,

Time\_ID INT,

Product\_ID INT,

Customer\_ID INT,

Store\_ID INT,

Sales\_Amount DECIMAL(10, 2),

Quantity\_Sold INT,

Discount DECIMAL(10, 2),

FOREIGN KEY (Time\_ID) REFERENCES Dim\_Time(Time\_ID),

FOREIGN KEY (Product\_ID) REFERENCES Dim\_Products(Product\_ID),

FOREIGN KEY (Customer\_ID) REFERENCES Dim\_Customers(Customer\_ID),

FOREIGN KEY (Store\_ID) REFERENCES Dim\_Stores(Store\_ID)

);

-- Step 4: Insert Data into Dimension Tables

INSERT INTO Dim\_Time VALUES (1, '2024-11-18', 'Monday', 'November', 2024, 'Q4');

INSERT INTO Dim\_Time VALUES (2, '2024-11-19', 'Tuesday', 'November', 2024, 'Q4');

INSERT INTO Dim\_Time VALUES (3, '2024-11-20', 'Wednesday', 'November', 2024, 'Q4');

INSERT INTO Dim\_Time VALUES (4, '2024-11-21', 'Thursday', 'November', 2024, 'Q4');

INSERT INTO Dim\_Time VALUES (5, '2024-11-22', 'Friday', 'November', 2024, 'Q4');

INSERT INTO Dim\_Products VALUES (1, 'Laptop', 'Electronics', 1000.00);

INSERT INTO Dim\_Products VALUES (2, 'Headphones', 'Electronics', 100.00);

INSERT INTO Dim\_Products VALUES (3, 'Chair', 'Furniture', 50.00);

INSERT INTO Dim\_Products VALUES (4, 'Table', 'Furniture', 150.00);

INSERT INTO Dim\_Products VALUES (5, 'Smartphone', 'Electronics', 700.00);

INSERT INTO Dim\_Customers VALUES (1, 'Alice', 'Female', 30, 'New York');

INSERT INTO Dim\_Customers VALUES (2, 'Bob', 'Male', 25, 'Los Angeles');

INSERT INTO Dim\_Customers VALUES (3, 'Charlie', 'Male', 35, 'Chicago');

INSERT INTO Dim\_Customers VALUES (4, 'Diana', 'Female', 40, 'Houston');

INSERT INTO Dim\_Customers VALUES (5, 'Eve', 'Female', 28, 'Seattle');

INSERT INTO Dim\_Stores VALUES (1, 'Downtown Store', 'New York', 'John Smith');

INSERT INTO Dim\_Stores VALUES (2, 'Mall Outlet', 'Los Angeles', 'Jane Doe');

INSERT INTO Dim\_Stores VALUES (3, 'Suburban Branch', 'Chicago', 'Mike Johnson');

INSERT INTO Dim\_Stores VALUES (4, 'City Center', 'Houston', 'Emma Brown');

INSERT INTO Dim\_Stores VALUES (5, 'Plaza Store', 'Seattle', 'Luke Wilson');

-- Step 5: Insert Data into Fact Table

INSERT INTO Fact\_Sales VALUES (1, 1, 1, 1, 1, 900.00, 1, 100.00);

INSERT INTO Fact\_Sales VALUES (2, 2, 2, 2, 2, 90.00, 1, 10.00);

INSERT INTO Fact\_Sales VALUES (3, 3, 3, 3, 3, 45.00, 1, 5.00);

INSERT INTO Fact\_Sales VALUES (4, 4, 4, 4, 4, 135.00, 1, 15.00);

INSERT INTO Fact\_Sales VALUES (5, 5, 5, 5, 5, 630.00, 1, 70.00);

INSERT INTO Fact\_Sales VALUES (6, 1, 2, 1, 1, 180.00, 2, 20.00);

INSERT INTO Fact\_Sales VALUES (7, 2, 3, 2, 2, 90.00, 2, 10.00);

INSERT INTO Fact\_Sales VALUES (8, 3, 5, 3, 3, 1400.00, 2, 100.00);

-- Step 6: Queries

-- Query 1: Total sales amount for each product

SELECT

P.Product\_Name,

SUM(F.Sales\_Amount) AS Total\_Sales

FROM

Fact\_Sales F

JOIN

Dim\_Products P ON F.Product\_ID = P.Product\_ID

GROUP BY

P.Product\_Name;

-- Query 2: Total quantity sold by store

SELECT

S.Store\_Name,

SUM(F.Quantity\_Sold) AS Total\_Quantity

FROM

Fact\_Sales F

JOIN

Dim\_Stores S ON F.Store\_ID = S.Store\_ID

GROUP BY

S.Store\_Name;

-- Query 3: Total discount given per customer

SELECT

C.Customer\_Name,

SUM(F.Discount) AS Total\_Discount

FROM

Fact\_Sales F

JOIN

Dim\_Customers C ON F.Customer\_ID = C.Customer\_ID

GROUP BY

C.Customer\_Name;

-- Query 4: Sales amount by date

SELECT

T.Date,

SUM(F.Sales\_Amount) AS Total\_Sales

FROM

Fact\_Sales F

JOIN

Dim\_Time T ON F.Time\_ID = T.Time\_ID

GROUP BY

T.Date;

-- Query 5: Total sales by product category

SELECT

P.Category,

SUM(F.Sales\_Amount) AS Total\_Sales

FROM

Fact\_Sales F

JOIN

Dim\_Products P ON F.Product\_ID = P.Product\_ID

GROUP BY

P.Category;

**GALAXY**

-- Create Dimension Tables

CREATE TABLE Time\_Dimension (

TimeID INTEGER PRIMARY KEY,

Date DATE NOT NULL,

Year INT NOT NULL,

Month INT NOT NULL,

Day INT NOT NULL

);

CREATE TABLE Product\_Dimension (

ProductID INTEGER PRIMARY KEY,

ProductName VARCHAR(50),

Category VARCHAR(50),

Price DECIMAL

);

CREATE TABLE Customer\_Dimension (

CustomerID INTEGER PRIMARY KEY,

CustomerName VARCHAR(50),

Gender VARCHAR(10),

City VARCHAR(50)

);

CREATE TABLE Store\_Dimension (

StoreID INTEGER PRIMARY KEY,

StoreName VARCHAR(50),

Location VARCHAR(50)

);

-- Create Fact Tables

CREATE TABLE Sales\_Fact (

SalesID INTEGER PRIMARY KEY,

TimeID INT REFERENCES Time\_Dimension(TimeID),

ProductID INT REFERENCES Product\_Dimension(ProductID),

CustomerID INT REFERENCES Customer\_Dimension(CustomerID),

StoreID INT REFERENCES Store\_Dimension(StoreID),

SalesAmount DECIMAL,

QuantitySold INT,

Discount DECIMAL

);

CREATE TABLE Inventory\_Fact (

InventoryID INTEGER PRIMARY KEY,

ProductID INT REFERENCES Product\_Dimension(ProductID),

StoreID INT REFERENCES Store\_Dimension(StoreID),

QuantityInStock INT,

RestockDate DATE

);

-- Insert Data into Dimension Tables

INSERT INTO Time\_Dimension (TimeID, Date, Year, Month, Day) VALUES

(1, '2024-11-01', 2024, 11, 1),

(2, '2024-11-02', 2024, 11, 2),

(3, '2024-11-03', 2024, 11, 3),

(4, '2024-11-04', 2024, 11, 4),

(5, '2024-11-05', 2024, 11, 5);

INSERT INTO Product\_Dimension (ProductID, ProductName, Category, Price) VALUES

(1, 'Laptop', 'Electronics', 1500),

(2, 'Smartphone', 'Electronics', 800),

(3, 'Shoes', 'Apparel', 120),

(4, 'Bag', 'Accessories', 60),

(5, 'Watch', 'Accessories', 200);

INSERT INTO Customer\_Dimension (CustomerID, CustomerName, Gender, City) VALUES

(1, 'John Doe', 'Male', 'New York'),

(2, 'Jane Smith', 'Female', 'Los Angeles'),

(3, 'Bob Brown', 'Male', 'Chicago'),

(4, 'Alice White', 'Female', 'Houston'),

(5, 'Chris Black', 'Male', 'Phoenix');

INSERT INTO Store\_Dimension (StoreID, StoreName, Location) VALUES

(1, 'Store A', 'Downtown'),

(2, 'Store B', 'Uptown'),

(3, 'Store C', 'Suburb'),

(4, 'Store D', 'Mall'),

(5, 'Store E', 'City Center');

-- Insert Data into Fact Tables

INSERT INTO Sales\_Fact (SalesID, TimeID, ProductID, CustomerID, StoreID, SalesAmount, QuantitySold, Discount) VALUES

(1, 1, 1, 1, 1, 1500, 1, 50),

(2, 2, 2, 2, 2, 800, 1, 30),

(3, 3, 3, 3, 3, 240, 2, 10),

(4, 4, 4, 4, 4, 120, 2, 5),

(5, 5, 5, 5, 5, 200, 1, 20);

INSERT INTO Inventory\_Fact (InventoryID, ProductID, StoreID, QuantityInStock, RestockDate) VALUES

(1, 1, 1, 50, '2024-11-01'),

(2, 2, 2, 100, '2024-11-02'),

(3, 3, 3, 200, '2024-11-03'),

(4, 4, 4, 150, '2024-11-04'),

(5, 5, 5, 300, '2024-11-05');

-- Queries

-- 1. Total Sales by Product

SELECT ProductName, SUM(SalesAmount) AS TotalSales

FROM Sales\_Fact

JOIN Product\_Dimension ON Sales\_Fact.ProductID = Product\_Dimension.ProductID

GROUP BY ProductName;

-- 2. Inventory Levels for Products

SELECT ProductName, StoreName, QuantityInStock

FROM Inventory\_Fact

JOIN Product\_Dimension ON Inventory\_Fact.ProductID = Product\_Dimension.ProductID

JOIN Store\_Dimension ON Inventory\_Fact.StoreID = Store\_Dimension.StoreID;

-- 3. Total Quantity Sold by Store

SELECT StoreName, SUM(QuantitySold) AS TotalQuantity

FROM Sales\_Fact

JOIN Store\_Dimension ON Sales\_Fact.StoreID = Store\_Dimension.StoreID

GROUP BY StoreName;

-- 4. Top Customer by Sales

SELECT CustomerName, SUM(SalesAmount) AS TotalSpent

FROM Sales\_Fact

JOIN Customer\_Dimension ON Sales\_Fact.CustomerID = Customer\_Dimension.CustomerID

GROUP BY CustomerName

ORDER BY TotalSpent DESC

LIMIT 1;

-- 5. Total Discount Given

SELECT SUM(Discount) AS TotalDiscount

FROM Sales\_Fact;

**SNOWFLAKE**-- Drop tables if they exist for a fresh start

DROP TABLE IF EXISTS Sales\_Fact;

DROP TABLE IF EXISTS Time\_Dimension;

DROP TABLE IF EXISTS Products\_Dimension;

DROP TABLE IF EXISTS Customers\_Dimension;

DROP TABLE IF EXISTS Stores\_Dimension;

-- Create Dimension Tables

CREATE TABLE Time\_Dimension (

Time\_ID INT PRIMARY KEY,

Year INT,

Quarter VARCHAR(10),

Month VARCHAR(20),

Day INT

);

CREATE TABLE Products\_Dimension (

Product\_ID INT PRIMARY KEY,

Product\_Name VARCHAR(100),

Category VARCHAR(50),

Subcategory VARCHAR(50),

Brand VARCHAR(50)

);

CREATE TABLE Customers\_Dimension (

Customer\_ID INT PRIMARY KEY,

Customer\_Name VARCHAR(100),

Gender VARCHAR(10),

Age\_Group VARCHAR(20),

Location VARCHAR(100)

);

CREATE TABLE Stores\_Dimension (

Store\_ID INT PRIMARY KEY,

Store\_Name VARCHAR(100),

Region VARCHAR(50),

Store\_Type VARCHAR(50)

);

-- Create Fact Table

CREATE TABLE Sales\_Fact (

Sales\_ID INT PRIMARY KEY,

Time\_ID INT,

Product\_ID INT,

Customer\_ID INT,

Store\_ID INT,

Sales\_Amount DECIMAL(10, 2),

Quantity\_Sold INT,

Discount DECIMAL(10, 2),

FOREIGN KEY (Time\_ID) REFERENCES Time\_Dimension(Time\_ID),

FOREIGN KEY (Product\_ID) REFERENCES Products\_Dimension(Product\_ID),

FOREIGN KEY (Customer\_ID) REFERENCES Customers\_Dimension(Customer\_ID),

FOREIGN KEY (Store\_ID) REFERENCES Stores\_Dimension(Store\_ID)

);

-- Insert Data into Dimension Tables

INSERT INTO Time\_Dimension VALUES

(1, 2024, 'Q1', 'January', 15),

(2, 2024, 'Q1', 'February', 20),

(3, 2024, 'Q1', 'March', 5),

(4, 2024, 'Q2', 'April', 10),

(5, 2024, 'Q2', 'May', 18);

INSERT INTO Products\_Dimension VALUES

(1, 'Laptop', 'Electronics', 'Computers', 'Brand A'),

(2, 'Smartphone', 'Electronics', 'Phones', 'Brand B'),

(3, 'Shoes', 'Apparel', 'Footwear', 'Brand C'),

(4, 'Bag', 'Apparel', 'Accessories', 'Brand D'),

(5, 'Watch', 'Accessories', 'Wristwear', 'Brand E');

INSERT INTO Customers\_Dimension VALUES

(1, 'Alice', 'Female', '25-34', 'New York'),

(2, 'Bob', 'Male', '35-44', 'Los Angeles'),

(3, 'Charlie', 'Male', '18-24', 'Chicago'),

(4, 'Diana', 'Female', '45-54', 'Houston'),

(5, 'Eva', 'Female', '25-34', 'Miami');

INSERT INTO Stores\_Dimension VALUES

(1, 'Downtown Store', 'East', 'Retail'),

(2, 'Suburban Store', 'West', 'Retail'),

(3, 'Mall Outlet', 'North', 'Retail'),

(4, 'Airport Store', 'South', 'Specialty'),

(5, 'Online Store', 'Global', 'Online');

-- Insert Data into Fact Table

INSERT INTO Sales\_Fact VALUES

(1, 1, 1, 1, 1, 1500.00, 1, 50.00),

(2, 2, 2, 2, 2, 799.99, 1, 30.00),

(3, 3, 3, 3, 3, 59.99, 2, 10.00),

(4, 4, 4, 4, 4, 120.00, 1, 20.00),

(5, 5, 5, 5, 5, 300.00, 1, 25.00);

-- Example Queries

-- Query 1: Total sales amount by product category

SELECT

p.Category,

SUM(s.Sales\_Amount) AS Total\_Sales

FROM Sales\_Fact s

JOIN Products\_Dimension p ON s.Product\_ID = p.Product\_ID

GROUP BY p.Category;

-- Query 2: Total sales by region

SELECT

st.Region,

SUM(s.Sales\_Amount) AS Total\_Sales

FROM Sales\_Fact s

JOIN Stores\_Dimension st ON s.Store\_ID = st.Store\_ID

GROUP BY st.Region;

-- Query 3: Total quantity sold for each product

SELECT

p.Product\_Name,

SUM(s.Quantity\_Sold) AS Total\_Quantity

FROM Sales\_Fact s

JOIN Products\_Dimension p ON s.Product\_ID = p.Product\_ID

GROUP BY p.Product\_Name;

-- Query 4: Sales amount for each store type

SELECT

st.Store\_Type,

SUM(s.Sales\_Amount) AS Total\_Sales

FROM Sales\_Fact s

JOIN Stores\_Dimension st ON s.Store\_ID = st.Store\_ID

GROUP BY st.Store\_Type;

-- Query 5: Average discount given to customers in different age groups

SELECT

c.Age\_Group,

AVG(s.Discount) AS Average\_Discount

FROM Sales\_Fact s

JOIN Customers\_Dimension c ON s.Customer\_ID = c.Customer\_ID

GROUP BY c.Age\_Group;

**Q2:Consider an order management operational database that tracks order numbers, dates, the requested ship dates, customers and their shipping and billing addresses, products and their quantity and gross dollar amount, sales representatives that take and process orders, the deals (promotions) and discounts proposed/offered to customers.**

**You have to design a data warehouse that will be updated from the above operational database and should support decision making by helping to answer analytical questions about the net order dollar amounts per customer, products, promotions or deals, and the performance of their sales representatives or agents.**

**Analysis of requested ship dates is important for analysis as well. It is also important to allow for performing order amount analysis in various currencies: dollars, dirhams, euros.**

**1) Draw the star schema(s) showing the main attributes, including primary keys, foreign keys. and facts.**

**2) Insert appropriate values in the database. Write one SQL statement that runs on your schema and returns the net order dollar amount per customer, products, promotions, and performance of sales representatives.**

**3) Make necessary assumptions to compute an approximate size (in MB) of your DW over a period of 5 years.**

**STAR:**

-- Customers Dimension Table

CREATE TABLE Dim\_Customers (

Customer\_ID INT PRIMARY KEY,

Customer\_Name VARCHAR(100),

Billing\_Address VARCHAR(255),

Shipping\_Address VARCHAR(255)

);

-- Products Dimension Table

CREATE TABLE Dim\_Products (

Product\_ID INT PRIMARY KEY,

Product\_Name VARCHAR(100),

Product\_Category VARCHAR(50)

);

-- Sales Representatives Dimension Table

CREATE TABLE Dim\_Sales\_Representatives (

Sales\_Rep\_ID INT PRIMARY KEY,

Sales\_Rep\_Name VARCHAR(100)

);

-- Promotions Dimension Table

CREATE TABLE Dim\_Promotions (

Promotion\_ID INT PRIMARY KEY,

Promotion\_Name VARCHAR(100),

Discount\_Percentage DECIMAL(5, 2)

);

-- Time Dimension Table

CREATE TABLE Dim\_Time (

Time\_ID INT PRIMARY KEY,

Date DATE,

Day VARCHAR(10),

Month VARCHAR(10),

Year INT,

Quarter VARCHAR(10)

);

-- Step 3: Create Fact Table

CREATE TABLE Fact\_Orders (

Order\_ID INT PRIMARY KEY,

Customer\_ID INT,

Product\_ID INT,

Sales\_Rep\_ID INT,

Promotion\_ID INT,

Order\_Date\_ID INT,

Ship\_Date\_ID INT,

Order\_Amount DECIMAL(10, 2),

Quantity INT,

Currency VARCHAR(3),

Discount DECIMAL(10, 2),

FOREIGN KEY (Customer\_ID) REFERENCES Dim\_Customers(Customer\_ID),

FOREIGN KEY (Product\_ID) REFERENCES Dim\_Products(Product\_ID),

FOREIGN KEY (Sales\_Rep\_ID) REFERENCES Dim\_Sales\_Representatives(Sales\_Rep\_ID),

FOREIGN KEY (Promotion\_ID) REFERENCES Dim\_Promotions(Promotion\_ID),

FOREIGN KEY (Order\_Date\_ID) REFERENCES Dim\_Time(Time\_ID),

FOREIGN KEY (Ship\_Date\_ID) REFERENCES Dim\_Time(Time\_ID)

);

-- Step 4: Insert Data into Dimension Tables

-- Dim\_Customers

INSERT INTO Dim\_Customers VALUES (1, 'John Doe', '123 Main St, NY', '456 Oak Rd, NY');

INSERT INTO Dim\_Customers VALUES (2, 'Jane Smith', '789 Elm St, LA', '101 Pine St, LA');

INSERT INTO Dim\_Customers VALUES (3, 'Alice Johnson', '202 Maple St, SF', '303 Birch Rd, SF');

INSERT INTO Dim\_Customers VALUES (4, 'Bob Brown', '404 Cedar St, Miami', '505 Pine Ave, Miami');

INSERT INTO Dim\_Customers VALUES (5, 'Charlie White', '606 Willow St, Chicago', '707 Ash St, Chicago');

-- Dim\_Products

INSERT INTO Dim\_Products VALUES (1, 'Laptop', 'Electronics');

INSERT INTO Dim\_Products VALUES (2, 'Smartphone', 'Electronics');

INSERT INTO Dim\_Products VALUES (3, 'Tablet', 'Electronics');

INSERT INTO Dim\_Products VALUES (4, 'Desk', 'Furniture');

INSERT INTO Dim\_Products VALUES (5, 'Chair', 'Furniture');

-- Dim\_Sales\_Representatives

INSERT INTO Dim\_Sales\_Representatives VALUES (1, 'Sarah Lee');

INSERT INTO Dim\_Sales\_Representatives VALUES (2, 'Michael Scott');

INSERT INTO Dim\_Sales\_Representatives VALUES (3, 'David Kim');

INSERT INTO Dim\_Sales\_Representatives VALUES (4, 'Emma Watson');

INSERT INTO Dim\_Sales\_Representatives VALUES (5, 'Luke Turner');

-- Dim\_Promotions

INSERT INTO Dim\_Promotions VALUES (1, 'Summer Sale', 10.00);

INSERT INTO Dim\_Promotions VALUES (2, 'Black Friday Deal', 20.00);

INSERT INTO Dim\_Promotions VALUES (3, 'Clearance Discount', 15.00);

INSERT INTO Dim\_Promotions VALUES (4, 'Holiday Special', 25.00);

INSERT INTO Dim\_Promotions VALUES (5, 'Flash Sale', 5.00);

-- Dim\_Time (using example dates)

INSERT INTO Dim\_Time VALUES (1, '2024-01-01', 'Monday', 'January', 2024, 'Q1');

INSERT INTO Dim\_Time VALUES (2, '2024-02-01', 'Thursday', 'February', 2024, 'Q1');

INSERT INTO Dim\_Time VALUES (3, '2024-03-01', 'Friday', 'March', 2024, 'Q1');

INSERT INTO Dim\_Time VALUES (4, '2024-04-01', 'Monday', 'April', 2024, 'Q2');

INSERT INTO Dim\_Time VALUES (5, '2024-05-01', 'Tuesday', 'May', 2024, 'Q2');

-- Step 5: Insert Data into Fact Table

INSERT INTO Fact\_Orders VALUES (1, 1, 1, 1, 1, 1, 1, 900.00, 1, 'USD', 50.00);

INSERT INTO Fact\_Orders VALUES (2, 2, 2, 2, 2, 2, 2, 400.00, 2, 'USD', 40.00);

INSERT INTO Fact\_Orders VALUES (3, 3, 3, 3, 3, 3, 3, 500.00, 1, 'EUR', 30.00);

INSERT INTO Fact\_Orders VALUES (4, 4, 4, 4, 4, 4, 4, 300.00, 1, 'AED', 20.00);

INSERT INTO Fact\_Orders VALUES (5, 5, 5, 5, 5, 5, 5, 600.00, 3, 'USD', 25.00);

INSERT INTO Fact\_Orders VALUES (6, 1, 2, 1, 2, 1, 2, 350.00, 2, 'EUR', 15.00);

INSERT INTO Fact\_Orders VALUES (7, 2, 1, 2, 3, 2, 3, 450.00, 1, 'USD', 5.00);

INSERT INTO Fact\_Orders VALUES (8, 3, 4, 3, 4, 3, 4, 200.00, 1, 'AED', 10.00);

-- Step 6: Perform Queries

-- Query 1: Net Order Dollar Amount per Customer

SELECT

C.Customer\_Name,

SUM(F.Order\_Amount - F.Discount) AS Net\_Order\_Amount

FROM

Fact\_Orders F

JOIN

Dim\_Customers C ON F.Customer\_ID = C.Customer\_ID

GROUP BY

C.Customer\_Name;

-- Query 2: Net Order Dollar Amount per Product

SELECT

P.Product\_Name,

SUM(F.Order\_Amount - F.Discount) AS Net\_Order\_Amount

FROM

Fact\_Orders F

JOIN

Dim\_Products P ON F.Product\_ID = P.Product\_ID

GROUP BY

P.Product\_Name;

-- Query 3: Net Order Dollar Amount per Promotion

SELECT

PR.Promotion\_Name,

SUM(F.Order\_Amount - F.Discount) AS Net\_Order\_Amount

FROM

Fact\_Orders F

JOIN

Dim\_Promotions PR ON F.Promotion\_ID = PR.Promotion\_ID

GROUP BY

PR.Promotion\_Name;

-- Query 4: Net Order Dollar Amount per Sales Representative

SELECT

SR.Sales\_Rep\_Name,

SUM(F.Order\_Amount - F.Discount) AS Net\_Order\_Amount

FROM

Fact\_Orders F

JOIN

Dim\_Sales\_Representatives SR ON F.Sales\_Rep\_ID = SR.Sales\_Rep\_ID

GROUP BY

SR.Sales\_Rep\_Name;

-- Query 5: Net Order Dollar Amount per Currency (USD, EUR, AED)

SELECT

F.Currency,

SUM(F.Order\_Amount - F.Discount) AS Net\_Order\_Amount

FROM

Fact\_Orders F

GROUP BY

F.Currency;  
  
  
  
**SNOWFLAKE**-- Snowflake Model: Table Creation

CREATE TABLE DimCustomer (

customer\_id INT PRIMARY KEY,

customer\_name VARCHAR(100),

shipping\_address VARCHAR(255),

billing\_address VARCHAR(255)

);

CREATE TABLE DimProduct (

product\_id INT PRIMARY KEY,

product\_name VARCHAR(100),

category VARCHAR(100),

price DECIMAL(10, 2)

);

CREATE TABLE DimPromotion (

promo\_id INT PRIMARY KEY,

promo\_name VARCHAR(100),

discount\_percentage DECIMAL(5, 2)

);

CREATE TABLE DimSalesRep (

sales\_rep\_id INT PRIMARY KEY,

sales\_rep\_name VARCHAR(100),

region VARCHAR(100)

);

CREATE TABLE FactOrder (

order\_id INT PRIMARY KEY,

customer\_id INT,

product\_id INT,

promo\_id INT,

sales\_rep\_id INT,

gross\_amount DECIMAL(10, 2),

discount\_amount DECIMAL(10, 2),

net\_amount DECIMAL(10, 2),

currency VARCHAR(10),

requested\_ship\_date DATE,

FOREIGN KEY (customer\_id) REFERENCES DimCustomer(customer\_id),

FOREIGN KEY (product\_id) REFERENCES DimProduct(product\_id),

FOREIGN KEY (promo\_id) REFERENCES DimPromotion(promo\_id),

FOREIGN KEY (sales\_rep\_id) REFERENCES DimSalesRep(sales\_rep\_id)

);

-- Snowflake Model: Data Insertion

INSERT INTO DimCustomer VALUES

(1, 'Alice', '123 Elm St, NY', '789 Oak St, NY'),

(2, 'Bob', '456 Maple St, CA', '321 Pine St, CA'),

(3, 'Charlie', '789 Birch St, TX', '654 Cedar St, TX');

INSERT INTO DimProduct VALUES

(1, 'Laptop', 'Electronics', 1000.00),

(2, 'Smartphone', 'Electronics', 800.00),

(3, 'Tablet', 'Electronics', 600.00);

INSERT INTO DimPromotion VALUES

(1, 'Holiday Sale', 10.00),

(2, 'Clearance Sale', 20.00),

(3, 'Weekend Deal', 15.00);

INSERT INTO DimSalesRep VALUES

(1, 'John', 'East'),

(2, 'Jane', 'West'),

(3, 'Jack', 'South');

INSERT INTO FactOrder VALUES

(1, 1, 1, 1, 1, 1000.00, 100.00, 900.00, 'USD', '2024-11-15'),

(2, 2, 2, 2, 2, 800.00, 160.00, 640.00, 'USD', '2024-11-16'),

(3, 3, 3, 3, 3, 600.00, 90.00, 510.00, 'USD', '2024-11-17'),

(4, 1, 2, 1, 2, 800.00, 80.00, 720.00, 'USD', '2024-11-18'),

(5, 2, 1, 3, 1, 1000.00, 150.00, 850.00, 'USD', '2024-11-19');

-- Snowflake Model: Queries

-- Query 1: Total Net Order Amount per Customer

SELECT

c.customer\_name,

SUM(f.net\_amount) AS total\_net\_amount

FROM FactOrder f

JOIN DimCustomer c ON f.customer\_id = c.customer\_id

GROUP BY c.customer\_name;

-- Query 2: Total Gross and Discount Amounts per Promotion

SELECT

promo.promo\_name,

SUM(f.gross\_amount) AS total\_gross\_amount,

SUM(f.discount\_amount) AS total\_discount\_amount

FROM FactOrder f

JOIN DimPromotion promo ON f.promo\_id = promo.promo\_id

GROUP BY promo.promo\_name;

-- Query 3: Performance of Sales Representatives

SELECT

sr.sales\_rep\_name,

COUNT(f.order\_id) AS total\_orders\_handled,

SUM(f.net\_amount) AS total\_sales

FROM FactOrder f

JOIN DimSalesRep sr ON f.sales\_rep\_id = sr.sales\_rep\_id

GROUP BY sr.sales\_rep\_name;

-- Query 4: Sales by Product Category

SELECT

p.category,

SUM(f.net\_amount) AS total\_net\_sales

FROM FactOrder f

JOIN DimProduct p ON f.product\_id = p.product\_id

GROUP BY p.category;

-- Query 5: Total Sales Amount by Currency

SELECT

f.currency,

SUM(f.net\_amount) AS total\_net\_sales

FROM FactOrder f

GROUP BY f.currency;  
  
  
**GALAXY**

-- Galaxy Model: Table Creation

CREATE TABLE FactOrder (

order\_id INT PRIMARY KEY,

customer\_id INT,

product\_id INT,

promo\_id INT,

sales\_rep\_id INT,

gross\_amount DECIMAL(10, 2),

discount\_amount DECIMAL(10, 2),

net\_amount DECIMAL(10, 2),

currency VARCHAR(10),

requested\_ship\_date DATE

);

CREATE TABLE DimCustomer (

customer\_id INT PRIMARY KEY,

customer\_name VARCHAR(100),

shipping\_address VARCHAR(255),

billing\_address VARCHAR(255)

);

CREATE TABLE DimProduct (

product\_id INT PRIMARY KEY,

product\_name VARCHAR(100),

category VARCHAR(100),

price DECIMAL(10, 2)

);

CREATE TABLE DimPromotion (

promo\_id INT PRIMARY KEY,

promo\_name VARCHAR(100),

discount\_percentage DECIMAL(5, 2)

);

CREATE TABLE DimSalesRep (

sales\_rep\_id INT PRIMARY KEY,

sales\_rep\_name VARCHAR(100),

region VARCHAR(100)

);

-- Galaxy Model: Data Insertion

INSERT INTO DimCustomer VALUES

(1, 'Alice', '123 Elm St, NY', '789 Oak St, NY'),

(2, 'Bob', '456 Maple St, CA', '321 Pine St, CA'),

(3, 'Charlie', '789 Birch St, TX', '654 Cedar St, TX');

INSERT INTO DimProduct VALUES

(1, 'Laptop', 'Electronics', 1000.00),

(2, 'Smartphone', 'Electronics', 800.00),

(3, 'Tablet', 'Electronics', 600.00);

INSERT INTO DimPromotion VALUES

(1, 'Holiday Sale', 10.00),

(2, 'Clearance Sale', 20.00),

(3, 'Weekend Deal', 15.00);

INSERT INTO DimSalesRep VALUES

(1, 'John', 'East'),

(2, 'Jane', 'West'),

(3, 'Jack', 'South');

INSERT INTO FactOrder VALUES

(1, 1, 1, 1, 1, 1000.00, 100.00, 900.00, 'USD', '2024-11-15'),

(2, 2, 2, 2, 2, 800.00, 160.00, 640.00, 'USD', '2024-11-16'),

(3, 3, 3, 3, 3, 600.00, 90.00, 510.00, 'USD', '2024-11-17'),

(4, 1, 2, 1, 2, 800.00, 80.00, 720.00, 'USD', '2024-11-18'),

(5, 2, 1, 3, 1, 1000.00, 150.00, 850.00, 'USD', '2024-11-19');

-- Galaxy Model: Queries

-- Query 1: Total Orders and Net Sales per Customer

SELECT

c.customer\_name,

COUNT(f.order\_id) AS total\_orders,

SUM(f.net\_amount) AS total\_net\_sales

FROM FactOrder f

JOIN DimCustomer c ON f.customer\_id = c.customer\_id

GROUP BY c.customer\_name;

-- Query 2: Gross Sales by Product

SELECT

p.product\_name,

SUM(f.gross\_amount) AS total\_gross\_sales

FROM FactOrder f

JOIN DimProduct p ON f.product\_id = p.product\_id

GROUP BY p.product\_name;

-- Query 3: Discount Utilization by Promotion

SELECT

promo.promo\_name,

COUNT(f.order\_id) AS total\_orders\_with\_promo,

SUM(f.discount\_amount) AS total\_discounts\_given

FROM FactOrder f

JOIN DimPromotion promo ON f.promo\_id = promo.promo\_id

GROUP BY promo.promo\_name;

-- Query 4: Total Orders by Requested Ship Date

SELECT

f.requested\_ship\_date,

COUNT(f.order\_id) AS total\_orders

FROM FactOrder f

GROUP BY f.requested\_ship\_date

ORDER BY f.requested\_ship\_date;

-- Query 5: Sales Performance of Sales Representatives by Region

SELECT

sr.region,

sr.sales\_rep\_name,

SUM(f.net\_amount) AS total\_sales

FROM FactOrder f

JOIN DimSalesRep sr ON f.sales\_rep\_id = sr.sales\_rep\_id

GROUP BY sr.region, sr.sales\_rep\_name

ORDER BY sr.region, total\_sales DESC;

**Q3:Consider a book management operational database that tracks different book types, cost, quantity, profit, location, authors and their age and country, publication name and their country and year. You have to design a data warehouse that will be updated from the above operational database and should support decision making by helping to answer analytical questions about the quantity and profit made per book type, location, author, and publication.**

**1) Draw the star schema(s) showing the main attributes, including primary keys, foreign keys, and facts.**

**2) Insert appropriate values in the database. Write SQL statements that runs on your schema and returns the quantity and profit made per book type, location, author, and publication.**

***STAR USED cause a Star Schema is designed to handle analytical queries effectively by organizing facts (measurements) around central fact tables, with surrounding dimension tables. In this case, we have entities like book types, cost, quantity, profit, location, authors, and publication that can be categorized as dimensions. The fact is related to sales or performance (profit, quantity), which is connected to the dimensions.***

-- Book Types Dimension Table

CREATE TABLE Dim\_Book\_Types (

Book\_Type\_ID INT PRIMARY KEY,

Book\_Type\_Name VARCHAR(100)

);

-- Locations Dimension Table

CREATE TABLE Dim\_Locations (

Location\_ID INT PRIMARY KEY,

Location\_Name VARCHAR(100)

);

-- Authors Dimension Table

CREATE TABLE Dim\_Authors (

Author\_ID INT PRIMARY KEY,

Author\_Name VARCHAR(100),

Author\_Age INT,

Author\_Country VARCHAR(100)

);

-- Publications Dimension Table

CREATE TABLE Dim\_Publications (

Publication\_ID INT PRIMARY KEY,

Publication\_Name VARCHAR(100),

Publication\_Country VARCHAR(100),

Publication\_Year INT

);

-- Step 3: Create Fact Table

CREATE TABLE Fact\_Books (

Fact\_ID INT PRIMARY KEY,

Book\_Type\_ID INT,

Location\_ID INT,

Author\_ID INT,

Publication\_ID INT,

Quantity\_Sold INT,

Profit DECIMAL(10, 2),

Book\_Cost DECIMAL(10, 2),

FOREIGN KEY (Book\_Type\_ID) REFERENCES Dim\_Book\_Types(Book\_Type\_ID),

FOREIGN KEY (Location\_ID) REFERENCES Dim\_Locations(Location\_ID),

FOREIGN KEY (Author\_ID) REFERENCES Dim\_Authors(Author\_ID),

FOREIGN KEY (Publication\_ID) REFERENCES Dim\_Publications(Publication\_ID)

);

-- Step 4: Insert Data into Dimension Tables

-- Dim\_Book\_Types

INSERT INTO Dim\_Book\_Types VALUES (1, 'Fiction');

INSERT INTO Dim\_Book\_Types VALUES (2, 'Non-Fiction');

INSERT INTO Dim\_Book\_Types VALUES (3, 'Science');

INSERT INTO Dim\_Book\_Types VALUES (4, 'History');

INSERT INTO Dim\_Book\_Types VALUES (5, 'Fantasy');

-- Dim\_Locations

INSERT INTO Dim\_Locations VALUES (1, 'New York');

INSERT INTO Dim\_Locations VALUES (2, 'London');

INSERT INTO Dim\_Locations VALUES (3, 'Paris');

INSERT INTO Dim\_Locations VALUES (4, 'Berlin');

INSERT INTO Dim\_Locations VALUES (5, 'Tokyo');

-- Dim\_Authors

INSERT INTO Dim\_Authors VALUES (1, 'J.K. Rowling', 58, 'United Kingdom');

INSERT INTO Dim\_Authors VALUES (2, 'George Orwell', 46, 'United Kingdom');

INSERT INTO Dim\_Authors VALUES (3, 'Albert Einstein', 76, 'Germany');

INSERT INTO Dim\_Authors VALUES (4, 'Isaac Newton', 84, 'United Kingdom');

INSERT INTO Dim\_Authors VALUES (5, 'Stephen Hawking', 76, 'United Kingdom');

-- Dim\_Publications

INSERT INTO Dim\_Publications VALUES (1, 'Bloomsbury', 'United Kingdom', 1997);

INSERT INTO Dim\_Publications VALUES (2, 'Penguin Books', 'United Kingdom', 1949);

INSERT INTO Dim\_Publications VALUES (3, 'Princeton University Press', 'USA', 1921);

INSERT INTO Dim\_Publications VALUES (4, 'Cambridge University Press', 'UK', 1687);

INSERT INTO Dim\_Publications VALUES (5, 'HarperCollins', 'USA', 1988);

-- Step 5: Insert Data into Fact Table

INSERT INTO Fact\_Books VALUES (1, 1, 1, 1, 1, 1500, 20000.00, 10.00);

INSERT INTO Fact\_Books VALUES (2, 2, 2, 2, 2, 1000, 12000.00, 8.00);

INSERT INTO Fact\_Books VALUES (3, 3, 3, 3, 3, 500, 5000.00, 15.00);

INSERT INTO Fact\_Books VALUES (4, 4, 4, 4, 4, 700, 7000.00, 12.00);

INSERT INTO Fact\_Books VALUES (5, 5, 5, 5, 5, 800, 8000.00, 18.00);

INSERT INTO Fact\_Books VALUES (6, 1, 2, 1, 2, 1200, 18000.00, 9.00);

INSERT INTO Fact\_Books VALUES (7, 2, 3, 2, 3, 950, 11000.00, 7.50);

INSERT INTO Fact\_Books VALUES (8, 3, 4, 3, 4, 300, 4000.00, 14.00);

-- Step 6: Perform Queries

-- Query 1: Quantity Sold and Profit per Book Type

SELECT

B.Book\_Type\_Name,

SUM(F.Quantity\_Sold) AS Total\_Quantity\_Sold,

SUM(F.Profit) AS Total\_Profit

FROM

Fact\_Books F

JOIN

Dim\_Book\_Types B ON F.Book\_Type\_ID = B.Book\_Type\_ID

GROUP BY

B.Book\_Type\_Name;

-- Query 2: Quantity Sold and Profit per Location

SELECT

L.Location\_Name,

SUM(F.Quantity\_Sold) AS Total\_Quantity\_Sold,

SUM(F.Profit) AS Total\_Profit

FROM

Fact\_Books F

JOIN

Dim\_Locations L ON F.Location\_ID = L.Location\_ID

GROUP BY

L.Location\_Name;

-- Query 3: Quantity Sold and Profit per Author

SELECT

A.Author\_Name,

SUM(F.Quantity\_Sold) AS Total\_Quantity\_Sold,

SUM(F.Profit) AS Total\_Profit

FROM

Fact\_Books F

JOIN

Dim\_Authors A ON F.Author\_ID = A.Author\_ID

GROUP BY

A.Author\_Name;

-- Query 4: Quantity Sold and Profit per Publication

SELECT

P.Publication\_Name,

SUM(F.Quantity\_Sold) AS Total\_Quantity\_Sold,

SUM(F.Profit) AS Total\_Profit

FROM

Fact\_Books F

JOIN

Dim\_Publications P ON F.Publication\_ID = P.Publication\_ID

GROUP BY

P.Publication\_Name;

-- Query 5: Quantity Sold and Profit per Book Type and Location

SELECT

B.Book\_Type\_Name,

L.Location\_Name,

SUM(F.Quantity\_Sold) AS Total\_Quantity\_Sold,

SUM(F.Profit) AS Total\_Profit

FROM

Fact\_Books F

JOIN

Dim\_Book\_Types B ON F.Book\_Type\_ID = B.Book\_Type\_ID

JOIN

Dim\_Locations L ON F.Location\_ID = L.Location\_ID

GROUP BY

B.Book\_Type\_Name, L.Location\_Name;

**SNOWLAKE:**

-- Dim\_Book\_Type\_Category (Normalized Book Category)

CREATE TABLE Dim\_Book\_Type\_Category (

Category\_ID INT PRIMARY KEY,

Category\_Name VARCHAR(50)

);

-- Dim\_Book\_Type (Book Types normalized into Category)

CREATE TABLE Dim\_Book\_Type (

Book\_Type\_ID INT PRIMARY KEY,

Category\_ID INT,

Book\_Type\_Name VARCHAR(50),

FOREIGN KEY (Category\_ID) REFERENCES Dim\_Book\_Type\_Category(Category\_ID)

);

-- Dim\_Location (Location details)

CREATE TABLE Dim\_Location (

Location\_ID INT PRIMARY KEY,

Location\_Name VARCHAR(100)

);

-- Dim\_Author\_Country (Country of Author)

CREATE TABLE Dim\_Author\_Country (

Author\_Country\_ID INT PRIMARY KEY,

Author\_Country VARCHAR(50)

);

-- Dim\_Author\_Age (Age of Author)

CREATE TABLE Dim\_Author\_Age (

Author\_Age\_ID INT PRIMARY KEY,

Author\_Age INT

);

-- Dim\_Author (Author details, references country and age)

CREATE TABLE Dim\_Author (

Author\_ID INT PRIMARY KEY,

Author\_Name VARCHAR(100),

Author\_Country\_ID INT,

Author\_Age\_ID INT,

FOREIGN KEY (Author\_Country\_ID) REFERENCES Dim\_Author\_Country(Author\_Country\_ID),

FOREIGN KEY (Author\_Age\_ID) REFERENCES Dim\_Author\_Age(Author\_Age\_ID)

);

-- Dim\_Publication\_Country (Country of Publication)

CREATE TABLE Dim\_Publication\_Country (

Publication\_Country\_ID INT PRIMARY KEY,

Publication\_Country VARCHAR(50)

);

-- Dim\_Publication\_Year (Year of Publication)

CREATE TABLE Dim\_Publication\_Year (

Publication\_Year\_ID INT PRIMARY KEY,

Publication\_Year INT

);

-- Dim\_Publication (Publication details, references country and year)

CREATE TABLE Dim\_Publication (

Publication\_ID INT PRIMARY KEY,

Publication\_Name VARCHAR(100),

Publication\_Country\_ID INT,

Publication\_Year\_ID INT,

FOREIGN KEY (Publication\_Country\_ID) REFERENCES Dim\_Publication\_Country(Publication\_Country\_ID),

FOREIGN KEY (Publication\_Year\_ID) REFERENCES Dim\_Publication\_Year(Publication\_Year\_ID)

);

-- Step 3: Create Fact Table (Sales Data)

CREATE TABLE Fact\_Book\_Sales (

Fact\_Sales\_ID INT PRIMARY KEY,

Book\_Type\_ID INT,

Location\_ID INT,

Author\_ID INT,

Publication\_ID INT,

Quantity\_Sold INT,

Profit DECIMAL(15, 2),

FOREIGN KEY (Book\_Type\_ID) REFERENCES Dim\_Book\_Type(Book\_Type\_ID),

FOREIGN KEY (Location\_ID) REFERENCES Dim\_Location(Location\_ID),

FOREIGN KEY (Author\_ID) REFERENCES Dim\_Author(Author\_ID),

FOREIGN KEY (Publication\_ID) REFERENCES Dim\_Publication(Publication\_ID)

);

-- Step 4: Insert Sample Data

-- Dim\_Book\_Type\_Category (Book Categories)

INSERT INTO Dim\_Book\_Type\_Category VALUES (1, 'Fiction');

INSERT INTO Dim\_Book\_Type\_Category VALUES (2, 'Non-Fiction');

INSERT INTO Dim\_Book\_Type\_Category VALUES (3, 'Educational');

INSERT INTO Dim\_Book\_Type\_Category VALUES (4, 'Science');

INSERT INTO Dim\_Book\_Type\_Category VALUES (5, 'Biography');

-- Dim\_Book\_Type (Books under each Category)

INSERT INTO Dim\_Book\_Type VALUES (1, 1, 'Novel');

INSERT INTO Dim\_Book\_Type VALUES (2, 1, 'Short Story');

INSERT INTO Dim\_Book\_Type VALUES (3, 2, 'Self Help');

INSERT INTO Dim\_Book\_Type VALUES (4, 3, 'Mathematics');

INSERT INTO Dim\_Book\_Type VALUES (5, 4, 'Physics');

-- Dim\_Location (Bookstore Locations)

INSERT INTO Dim\_Location VALUES (1, 'New York');

INSERT INTO Dim\_Location VALUES (2, 'Los Angeles');

INSERT INTO Dim\_Location VALUES (3, 'Chicago');

INSERT INTO Dim\_Location VALUES (4, 'Houston');

INSERT INTO Dim\_Location VALUES (5, 'San Francisco');

-- Dim\_Author\_Country (Countries of Authors)

INSERT INTO Dim\_Author\_Country VALUES (1, 'United Kingdom');

INSERT INTO Dim\_Author\_Country VALUES (2, 'United States');

INSERT INTO Dim\_Author\_Country VALUES (3, 'Germany');

INSERT INTO Dim\_Author\_Country VALUES (4, 'France');

INSERT INTO Dim\_Author\_Country VALUES (5, 'India');

-- Dim\_Author\_Age (Age of Authors)

INSERT INTO Dim\_Author\_Age VALUES (1, 55);

INSERT INTO Dim\_Author\_Age VALUES (2, 60);

INSERT INTO Dim\_Author\_Age VALUES (3, 80);

INSERT INTO Dim\_Author\_Age VALUES (4, 45);

INSERT INTO Dim\_Author\_Age VALUES (5, 50);

-- Dim\_Author (Authors details)

INSERT INTO Dim\_Author VALUES (1, 'J.K. Rowling', 1, 1);

INSERT INTO Dim\_Author VALUES (2, 'George R.R. Martin', 2, 2);

INSERT INTO Dim\_Author VALUES (3, 'Isaac Newton', 3, 3);

INSERT INTO Dim\_Author VALUES (4, 'Albert Einstein', 4, 4);

INSERT INTO Dim\_Author VALUES (5, 'Stephen Hawking', 5, 5);

-- Dim\_Publication\_Country (Countries of Publications)

INSERT INTO Dim\_Publication\_Country VALUES (1, 'United Kingdom');

INSERT INTO Dim\_Publication\_Country VALUES (2, 'United States');

INSERT INTO Dim\_Publication\_Country VALUES (3, 'Germany');

INSERT INTO Dim\_Publication\_Country VALUES (4, 'France');

INSERT INTO Dim\_Publication\_Country VALUES (5, 'India');

-- Dim\_Publication\_Year (Publication Year)

INSERT INTO Dim\_Publication\_Year VALUES (1, 1995);

INSERT INTO Dim\_Publication\_Year VALUES (2, 2000);

INSERT INTO Dim\_Publication\_Year VALUES (3, 2010);

INSERT INTO Dim\_Publication\_Year VALUES (4, 2015);

INSERT INTO Dim\_Publication\_Year VALUES (5, 2020);

-- Dim\_Publication (Publication details)

INSERT INTO Dim\_Publication VALUES (1, 'Penguin Books', 1, 1);

INSERT INTO Dim\_Publication VALUES (2, 'HarperCollins', 2, 2);

INSERT INTO Dim\_Publication VALUES (3, 'Oxford University Press', 3, 3);

INSERT INTO Dim\_Publication VALUES (4, 'Springer', 4, 4);

INSERT INTO Dim\_Publication VALUES (5, 'Macmillan', 5, 5);

-- Fact\_Book\_Sales (Sales Data)

INSERT INTO Fact\_Book\_Sales VALUES (1, 1, 1, 1, 1, 500, 2500.00);

INSERT INTO Fact\_Book\_Sales VALUES (2, 2, 2, 2, 2, 300, 1500.00);

INSERT INTO Fact\_Book\_Sales VALUES (3, 3, 3, 3, 3, 400, 2000.00);

INSERT INTO Fact\_Book\_Sales VALUES (4, 4, 4, 4, 4, 600, 3500.00);

INSERT INTO Fact\_Book\_Sales VALUES (5, 5, 5, 5, 5, 200, 1200.00);

-- Step 5: Execute Queries

-- Query 1: Quantity and Profit per Book Type

SELECT BT.Book\_Type\_Name, SUM(FBS.Quantity\_Sold) AS Total\_Quantity\_Sold, SUM(FBS.Profit) AS Total\_Profit

FROM Fact\_Book\_Sales FBS

JOIN Dim\_Book\_Type BT ON FBS.Book\_Type\_ID = BT.Book\_Type\_ID

GROUP BY BT.Book\_Type\_Name;

-- Query 2: Quantity and Profit per Location

SELECT L.Location\_Name, SUM(FBS.Quantity\_Sold) AS Total\_Quantity\_Sold, SUM(FBS.Profit) AS Total\_Profit

FROM Fact\_Book\_Sales FBS

JOIN Dim\_Location L ON FBS.Location\_ID = L.Location\_ID

GROUP BY L.Location\_Name;

-- Query 3: Quantity and Profit per Author

SELECT A.Author\_Name, SUM(FBS.Quantity\_Sold) AS Total\_Quantity\_Sold, SUM(FBS.Profit) AS Total\_Profit

FROM Fact\_Book\_Sales FBS

JOIN Dim\_Author A ON FBS.Author\_ID = A.Author\_ID

GROUP BY A.Author\_Name;

-- Query 4: Quantity and Profit per Publication

SELECT P.Publication\_Name, SUM(FBS.Quantity\_Sold) AS Total\_Quantity\_Sold, SUM(FBS.Profit) AS Total\_Profit

FROM Fact\_Book\_Sales FBS

JOIN Dim\_Publication P ON FBS.Publication\_ID = P.Publication\_ID

GROUP BY P.Publication\_Name;

-- Query 5: Quantity and Profit by Book Type and Author

SELECT BT.Book\_Type\_Name, A.Author\_Name, SUM(FBS.Quantity\_Sold) AS Total\_Quantity\_Sold, SUM(FBS.Profit) AS Total\_Profit

FROM Fact\_Book\_Sales FBS

JOIN Dim\_Book\_Type BT ON FBS.Book\_Type\_ID = BT.Book\_Type\_ID

JOIN Dim\_Author A ON FBS.Author\_ID = A.Author\_ID

GROUP BY BT.Book\_Type\_Name, A.Author\_Name;

**GALAXY**

-- Dim\_Book\_Type (Book Type details)

CREATE TABLE Dim\_Book\_Type (

Book\_Type\_ID INT PRIMARY KEY,

Book\_Type\_Name VARCHAR(50)

);

-- Dim\_Location (Bookstore Locations)

CREATE TABLE Dim\_Location (

Location\_ID INT PRIMARY KEY,

Location\_Name VARCHAR(100)

);

-- Dim\_Author (Author details)

CREATE TABLE Dim\_Author (

Author\_ID INT PRIMARY KEY,

Author\_Name VARCHAR(100)

);

-- Dim\_Publication (Publication details)

CREATE TABLE Dim\_Publication (

Publication\_ID INT PRIMARY KEY,

Publication\_Name VARCHAR(100)

);

-- Step 3: Create Fact Tables

-- Fact\_Book\_Sales (Sales data)

CREATE TABLE Fact\_Book\_Sales (

Fact\_Sales\_ID INT PRIMARY KEY,

Book\_Type\_ID INT,

Location\_ID INT,

Author\_ID INT,

Publication\_ID INT,

Quantity\_Sold INT,

Profit DECIMAL(15, 2),

FOREIGN KEY (Book\_Type\_ID) REFERENCES Dim\_Book\_Type(Book\_Type\_ID),

FOREIGN KEY (Location\_ID) REFERENCES Dim\_Location(Location\_ID),

FOREIGN KEY (Author\_ID) REFERENCES Dim\_Author(Author\_ID),

FOREIGN KEY (Publication\_ID) REFERENCES Dim\_Publication(Publication\_ID)

);

-- Fact\_Book\_Inventory (Inventory data)

CREATE TABLE Fact\_Book\_Inventory (

Fact\_Inventory\_ID INT PRIMARY KEY,

Book\_Type\_ID INT,

Location\_ID INT,

Quantity\_In\_Stock INT,

FOREIGN KEY (Book\_Type\_ID) REFERENCES Dim\_Book\_Type(Book\_Type\_ID),

FOREIGN KEY (Location\_ID) REFERENCES Dim\_Location(Location\_ID)

);

-- Fact\_Author\_Profit (Profit data for authors)

CREATE TABLE Fact\_Author\_Profit (

Fact\_Author\_Profit\_ID INT PRIMARY KEY,

Author\_ID INT,

Profit DECIMAL(15, 2),

FOREIGN KEY (Author\_ID) REFERENCES Dim\_Author(Author\_ID)

);

-- Step 4: Insert Sample Data

-- Dim\_Book\_Type (Book Types)

INSERT INTO Dim\_Book\_Type VALUES (1, 'Fiction');

INSERT INTO Dim\_Book\_Type VALUES (2, 'Non-Fiction');

INSERT INTO Dim\_Book\_Type VALUES (3, 'Educational');

INSERT INTO Dim\_Book\_Type VALUES (4, 'Science');

INSERT INTO Dim\_Book\_Type VALUES (5, 'Biography');

-- Dim\_Location (Bookstore Locations)

INSERT INTO Dim\_Location VALUES (1, 'New York');

INSERT INTO Dim\_Location VALUES (2, 'Los Angeles');

INSERT INTO Dim\_Location VALUES (3, 'Chicago');

INSERT INTO Dim\_Location VALUES (4, 'Houston');

INSERT INTO Dim\_Location VALUES (5, 'San Francisco');

-- Dim\_Author (Authors details)

INSERT INTO Dim\_Author VALUES (1, 'J.K. Rowling');

INSERT INTO Dim\_Author VALUES (2, 'George R.R. Martin');

INSERT INTO Dim\_Author VALUES (3, 'Isaac Newton');

INSERT INTO Dim\_Author VALUES (4, 'Albert Einstein');

INSERT INTO Dim\_Author VALUES (5, 'Stephen Hawking');

-- Dim\_Publication (Publication details)

INSERT INTO Dim\_Publication VALUES (1, 'Penguin Books');

INSERT INTO Dim\_Publication VALUES (2, 'HarperCollins');

INSERT INTO Dim\_Publication VALUES (3, 'Oxford University Press');

INSERT INTO Dim\_Publication VALUES (4, 'Springer');

INSERT INTO Dim\_Publication VALUES (5, 'Macmillan');

-- Fact\_Book\_Sales (Sales Data)

INSERT INTO Fact\_Book\_Sales VALUES (1, 1, 1, 1, 1, 500, 2500.00);

INSERT INTO Fact\_Book\_Sales VALUES (2, 2, 2, 2, 2, 300, 1500.00);

INSERT INTO Fact\_Book\_Sales VALUES (3, 3, 3, 3, 3, 400, 2000.00);

INSERT INTO Fact\_Book\_Sales VALUES (4, 4, 4, 4, 4, 600, 3500.00);

INSERT INTO Fact\_Book\_Sales VALUES (5, 5, 5, 5, 5, 200, 1200.00);

-- Fact\_Book\_Inventory (Inventory Data)

INSERT INTO Fact\_Book\_Inventory VALUES (1, 1, 1, 100);

INSERT INTO Fact\_Book\_Inventory VALUES (2, 2, 2, 200);

INSERT INTO Fact\_Book\_Inventory VALUES (3, 3, 3, 150);

INSERT INTO Fact\_Book\_Inventory VALUES (4, 4, 4, 50);

INSERT INTO Fact\_Book\_Inventory VALUES (5, 5, 5, 120);

-- Fact\_Author\_Profit (Author Profit Data)

INSERT INTO Fact\_Author\_Profit VALUES (1, 1, 2500.00);

INSERT INTO Fact\_Author\_Profit VALUES (2, 2, 3000.00);

INSERT INTO Fact\_Author\_Profit VALUES (3, 3, 2000.00);

INSERT INTO Fact\_Author\_Profit VALUES (4, 4, 3500.00);

INSERT INTO Fact\_Author\_Profit VALUES (5, 5, 1500.00);

-- Step 5: Execute Queries

-- Query 1: Sales and profit per Book Type

SELECT BT.Book\_Type\_Name, SUM(FBS.Quantity\_Sold) AS Total\_Quantity\_Sold, SUM(FBS.Profit) AS Total\_Profit

FROM Fact\_Book\_Sales FBS

JOIN Dim\_Book\_Type BT ON FBS.Book\_Type\_ID = BT.Book\_Type\_ID

GROUP BY BT.Book\_Type\_Name;

-- Query 2: Sales and Profit per Location

SELECT L.Location\_Name, SUM(FBS.Quantity\_Sold) AS Total\_Quantity\_Sold, SUM(FBS.Profit) AS Total\_Profit

FROM Fact\_Book\_Sales FBS

JOIN Dim\_Location L ON FBS.Location\_ID = L.Location\_ID

GROUP BY L.Location\_Name;

-- Query 3: Sales and Profit per Author

SELECT A.Author\_Name, SUM(FBS.Quantity\_Sold) AS Total\_Quantity\_Sold, SUM(FBS.Profit) AS Total\_Profit

FROM Fact\_Book\_Sales FBS

JOIN Dim\_Author A ON FBS.Author\_ID = A.Author\_ID

GROUP BY A.Author\_Name;

-- Query 4: Inventory per Book Type and Location

SELECT BT.Book\_Type\_Name, L.Location\_Name, SUM(FBI.Quantity\_In\_Stock) AS Total\_Inventory

FROM Fact\_Book\_Inventory FBI

JOIN Dim\_Book\_Type BT ON FBI.Book\_Type\_ID = BT.Book\_Type\_ID

JOIN Dim\_Location L ON FBI.Location\_ID = L.Location\_ID

GROUP BY BT.Book\_Type\_Name, L.Location\_Name;

-- Query 5: Author's Profit

SELECT A.Author\_Name, SUM(FAP.Profit) AS Total\_Author\_Profit

FROM Fact\_Author\_Profit FAP

JOIN Dim\_Author A ON FAP.Author\_ID = A.Author\_ID

GROUP BY A.Author\_Name;

**Q4:Gather Business Requirements for Banking enterprise and design it using any multi-dimensional data model namely Star, Snowflake, or Galaxy schema.**

**STAR SCHEMA:**-- Step 1: Drop existing tables to avoid errors

DROP TABLE IF EXISTS Fact\_Transactions;

DROP TABLE IF EXISTS Dim\_Customers;

DROP TABLE IF EXISTS Dim\_Accounts;

DROP TABLE IF EXISTS Dim\_Transactions;

DROP TABLE IF EXISTS Dim\_Branches;

DROP TABLE IF EXISTS Dim\_Date;

-- Step 2: Create Dimension Tables

-- Customers Dimension Table

CREATE TABLE Dim\_Customers (

Customer\_ID INT PRIMARY KEY,

Customer\_Name VARCHAR(100),

Address VARCHAR(255),

City VARCHAR(50),

Country VARCHAR(50)

);

-- Accounts Dimension Table

CREATE TABLE Dim\_Accounts (

Account\_ID INT PRIMARY KEY,

Account\_Type VARCHAR(50), -- Savings, Checking, etc.

Balance DECIMAL(15, 2),

Account\_Status VARCHAR(50) -- Active, Closed, Dormant

);

-- Transactions Dimension Table

CREATE TABLE Dim\_Transactions (

Transaction\_Type\_ID INT PRIMARY KEY,

Transaction\_Type VARCHAR(50) -- Deposit, Withdrawal, Transfer, etc.

);

-- Branches Dimension Table

CREATE TABLE Dim\_Branches (

Branch\_ID INT PRIMARY KEY,

Branch\_Name VARCHAR(100),

Branch\_Location VARCHAR(100)

);

-- Date Dimension Table

CREATE TABLE Dim\_Date (

Date\_ID INT PRIMARY KEY,

Date DATE,

Year INT,

Month INT,

Day INT,

Quarter INT

);

-- Step 3: Create Fact Table

CREATE TABLE Fact\_Transactions (

Fact\_ID INT PRIMARY KEY,

Customer\_ID INT,

Account\_ID INT,

Transaction\_Type\_ID INT,

Branch\_ID INT,

Date\_ID INT,

Transaction\_Amount DECIMAL(15, 2),

FOREIGN KEY (Customer\_ID) REFERENCES Dim\_Customers(Customer\_ID),

FOREIGN KEY (Account\_ID) REFERENCES Dim\_Accounts(Account\_ID),

FOREIGN KEY (Transaction\_Type\_ID) REFERENCES Dim\_Transactions(Transaction\_Type\_ID),

FOREIGN KEY (Branch\_ID) REFERENCES Dim\_Branches(Branch\_ID),

FOREIGN KEY (Date\_ID) REFERENCES Dim\_Date(Date\_ID)

);

-- Step 4: Insert Data into Dimension Tables

-- Dim\_Customers

INSERT INTO Dim\_Customers VALUES (1, 'John Doe', '123 Elm St', 'New York', 'USA');

INSERT INTO Dim\_Customers VALUES (2, 'Jane Smith', '456 Oak Rd', 'Los Angeles', 'USA');

INSERT INTO Dim\_Customers VALUES (3, 'Mike Johnson', '789 Pine Ave', 'Chicago', 'USA');

INSERT INTO Dim\_Customers VALUES (4, 'Emily Davis', '101 Maple Dr', 'Houston', 'USA');

INSERT INTO Dim\_Customers VALUES (5, 'Chris Lee', '202 Birch Blvd', 'San Francisco', 'USA');

-- Dim\_Accounts

INSERT INTO Dim\_Accounts VALUES (1, 'Savings', 10000.00, 'Active');

INSERT INTO Dim\_Accounts VALUES (2, 'Checking', 5000.00, 'Active');

INSERT INTO Dim\_Accounts VALUES (3, 'Savings', 20000.00, 'Closed');

INSERT INTO Dim\_Accounts VALUES (4, 'Checking', 3000.00, 'Active');

INSERT INTO Dim\_Accounts VALUES (5, 'Savings', 15000.00, 'Dormant');

-- Dim\_Transactions

INSERT INTO Dim\_Transactions VALUES (1, 'Deposit');

INSERT INTO Dim\_Transactions VALUES (2, 'Withdrawal');

INSERT INTO Dim\_Transactions VALUES (3, 'Transfer');

INSERT INTO Dim\_Transactions VALUES (4, 'Loan Repayment');

INSERT INTO Dim\_Transactions VALUES (5, 'Interest Payment');

-- Dim\_Branches

INSERT INTO Dim\_Branches VALUES (1, 'Downtown Branch', 'New York');

INSERT INTO Dim\_Branches VALUES (2, 'West End Branch', 'Los Angeles');

INSERT INTO Dim\_Branches VALUES (3, 'Midtown Branch', 'Chicago');

INSERT INTO Dim\_Branches VALUES (4, 'East Side Branch', 'Houston');

INSERT INTO Dim\_Branches VALUES (5, 'South Bay Branch', 'San Francisco');

-- Dim\_Date

INSERT INTO Dim\_Date VALUES (1, '2024-01-01', 2024, 1, 1, 1);

INSERT INTO Dim\_Date VALUES (2, '2024-01-02', 2024, 1, 2, 1);

INSERT INTO Dim\_Date VALUES (3, '2024-02-15', 2024, 2, 15, 1);

INSERT INTO Dim\_Date VALUES (4, '2024-03-10', 2024, 3, 10, 1);

INSERT INTO Dim\_Date VALUES (5, '2024-04-20', 2024, 4, 20, 2);

-- Step 5: Insert Data into Fact Table

INSERT INTO Fact\_Transactions VALUES (1, 1, 1, 1, 1, 1, 5000.00);

INSERT INTO Fact\_Transactions VALUES (2, 2, 2, 2, 2, 2, 2000.00);

INSERT INTO Fact\_Transactions VALUES (3, 3, 3, 3, 3, 3, 3000.00);

INSERT INTO Fact\_Transactions VALUES (4, 4, 4, 4, 4, 4, 1500.00);

INSERT INTO Fact\_Transactions VALUES (5, 5, 5, 5, 5, 5, 1000.00);

-- Step 6: Perform Queries

-- Query 1: Total Transactions and Amount per Customer

SELECT

C.Customer\_Name,

SUM(F.Transaction\_Amount) AS Total\_Transaction\_Amount

FROM

Fact\_Transactions F

JOIN

Dim\_Customers C ON F.Customer\_ID = C.Customer\_ID

GROUP BY

C.Customer\_Name;

-- Query 2: Total Transactions and Amount per Account

SELECT

A.Account\_Type,

SUM(F.Transaction\_Amount) AS Total\_Transaction\_Amount

FROM

Fact\_Transactions F

JOIN

Dim\_Accounts A ON F.Account\_ID = A.Account\_ID

GROUP BY

A.Account\_Type;

-- Query 3: Total Transactions and Amount per Branch

SELECT

B.Branch\_Name,

SUM(F.Transaction\_Amount) AS Total\_Transaction\_Amount

FROM

Fact\_Transactions F

JOIN

Dim\_Branches B ON F.Branch\_ID = B.Branch\_ID

GROUP BY

B.Branch\_Name;

-- Query 4: Total Transactions and Amount per Transaction Type

SELECT

T.Transaction\_Type,

SUM(F.Transaction\_Amount) AS Total\_Transaction\_Amount

FROM

Fact\_Transactions F

JOIN

Dim\_Transactions T ON F.Transaction\_Type\_ID = T.Transaction\_Type\_ID

GROUP BY

T.Transaction\_Type;

-- Query 5: Total Transactions and Amount per Month

SELECT

D.Month,

SUM(F.Transaction\_Amount) AS Total\_Transaction\_Amount

FROM

Fact\_Transactions F

JOIN

Dim\_Date D ON F.Date\_ID = D.Date\_ID

GROUP BY

D.Month;

**SNOWFLAKE:**

-- Customers Dimension Table

CREATE TABLE Dim\_Customers (

Customer\_ID INT PRIMARY KEY,

Customer\_Name VARCHAR(100)

);

-- Customer Address Table

CREATE TABLE Dim\_Customer\_Address (

Address\_ID INT PRIMARY KEY,

Customer\_ID INT,

Address VARCHAR(255),

City VARCHAR(50),

Country VARCHAR(50),

FOREIGN KEY (Customer\_ID) REFERENCES Dim\_Customers(Customer\_ID)

);

-- Account Types Dimension Table

CREATE TABLE Dim\_Account\_Types (

Account\_Type\_ID INT PRIMARY KEY,

Account\_Type VARCHAR(50) -- Savings, Checking, etc.

);

-- Transactions Dimension Table

CREATE TABLE Dim\_Transactions (

Transaction\_Type\_ID INT PRIMARY KEY,

Transaction\_Type VARCHAR(50) -- Deposit, Withdrawal, etc.

);

-- Branches Dimension Table

CREATE TABLE Dim\_Branches (

Branch\_ID INT PRIMARY KEY,

Branch\_Name VARCHAR(100),

Branch\_Location VARCHAR(100)

);

-- Date Dimension Table

CREATE TABLE Dim\_Date (

Date\_ID INT PRIMARY KEY,

Date DATE,

Year INT,

Month INT,

Day INT,

Quarter INT

);

-- Step 3: Create Fact Table

CREATE TABLE Fact\_Transactions (

Fact\_ID INT PRIMARY KEY,

Customer\_ID INT,

Account\_Type\_ID INT,

Transaction\_Type\_ID INT,

Branch\_ID INT,

Date\_ID INT,

Transaction\_Amount DECIMAL(15, 2),

FOREIGN KEY (Customer\_ID) REFERENCES Dim\_Customers(Customer\_ID),

FOREIGN KEY (Account\_Type\_ID) REFERENCES Dim\_Account\_Types(Account\_Type\_ID),

FOREIGN KEY (Transaction\_Type\_ID) REFERENCES Dim\_Transactions(Transaction\_Type\_ID),

FOREIGN KEY (Branch\_ID) REFERENCES Dim\_Branches(Branch\_ID),

FOREIGN KEY (Date\_ID) REFERENCES Dim\_Date(Date\_ID)

);

-- Step 4: Insert Data into Dimension Tables

-- Dim\_Customers

INSERT INTO Dim\_Customers VALUES (1, 'John Doe');

INSERT INTO Dim\_Customers VALUES (2, 'Jane Smith');

INSERT INTO Dim\_Customers VALUES (3, 'Mike Johnson');

INSERT INTO Dim\_Customers VALUES (4, 'Emily Davis');

INSERT INTO Dim\_Customers VALUES (5, 'Chris Lee');

-- Dim\_Customer\_Address

INSERT INTO Dim\_Customer\_Address VALUES (1, 1, '123 Elm St', 'New York', 'USA');

INSERT INTO Dim\_Customer\_Address VALUES (2, 2, '456 Oak Rd', 'Los Angeles', 'USA');

INSERT INTO Dim\_Customer\_Address VALUES (3, 3, '789 Pine Ave', 'Chicago', 'USA');

INSERT INTO Dim\_Customer\_Address VALUES (4, 4, '101 Maple Dr', 'Houston', 'USA');

INSERT INTO Dim\_Customer\_Address VALUES (5, 5, '202 Birch Blvd', 'San Francisco', 'USA');

-- Dim\_Account\_Types

INSERT INTO Dim\_Account\_Types VALUES (1, 'Savings');

INSERT INTO Dim\_Account\_Types VALUES (2, 'Checking');

INSERT INTO Dim\_Account\_Types VALUES (3, 'Loan');

INSERT INTO Dim\_Account\_Types VALUES (4, 'Credit');

INSERT INTO Dim\_Account\_Types VALUES (5, 'Investment');

-- Dim\_Transactions

INSERT INTO Dim\_Transactions VALUES (1, 'Deposit');

INSERT INTO Dim\_Transactions VALUES (2, 'Withdrawal');

INSERT INTO Dim\_Transactions VALUES (3, 'Transfer');

INSERT INTO Dim\_Transactions VALUES (4, 'Loan Repayment');

INSERT INTO Dim\_Transactions VALUES (5, 'Interest Payment');

-- Dim\_Branches

INSERT INTO Dim\_Branches VALUES (1, 'Downtown Branch', 'New York');

INSERT INTO Dim\_Branches VALUES (2, 'West End Branch', 'Los Angeles');

INSERT INTO Dim\_Branches VALUES (3, 'Midtown Branch', 'Chicago');

INSERT INTO Dim\_Branches VALUES (4, 'East Side Branch', 'Houston');

INSERT INTO Dim\_Branches VALUES (5, 'South Bay Branch', 'San Francisco');

-- Dim\_Date

INSERT INTO Dim\_Date VALUES (1, '2024-01-01', 2024, 1, 1, 1);

INSERT INTO Dim\_Date VALUES (2, '2024-01-02', 2024, 1, 2, 1);

INSERT INTO Dim\_Date VALUES (3, '2024-02-15', 2024, 2, 15, 1);

INSERT INTO Dim\_Date VALUES (4, '2024-03-10', 2024, 3, 10, 1);

INSERT INTO Dim\_Date VALUES (5, '2024-04-20', 2024, 4, 20, 2);

-- Step 5: Insert Data into Fact Table

INSERT INTO Fact\_Transactions VALUES (1, 1, 1, 1, 1, 1, 5000.00);

INSERT INTO Fact\_Transactions VALUES (2, 2, 2, 2, 2, 2, 2000.00);

INSERT INTO Fact\_Transactions VALUES (3, 3, 3, 3, 3, 3, 3000.00);

INSERT INTO Fact\_Transactions VALUES (4, 4, 4, 4, 4, 4, 1500.00);

INSERT INTO Fact\_Transactions VALUES (5, 5, 5, 5, 5, 5, 1000.00);

-- Step 6: Perform Queries

-- Query 1: Total Transactions and Amount per Customer

SELECT

C.Customer\_Name,

SUM(F.Transaction\_Amount) AS Total\_Transaction\_Amount

FROM

Fact\_Transactions F

JOIN

Dim\_Customers C ON F.Customer\_ID = C.Customer\_ID

GROUP BY

C.Customer\_Name;

-- Query 2: Total Transactions and Amount per Account Type

SELECT

A.Account\_Type,

SUM(F.Transaction\_Amount) AS Total\_Transaction\_Amount

FROM

Fact\_Transactions F

JOIN

Dim\_Account\_Types A ON F.Account\_Type\_ID = A.Account\_Type\_ID

GROUP BY

A.Account\_Type;

-- Query 3: Total Transactions and Amount per Branch

SELECT

B.Branch\_Name,

SUM(F.Transaction\_Amount) AS Total\_Transaction\_Amount

FROM

Fact\_Transactions F

JOIN

Dim\_Branches B ON F.Branch\_ID = B.Branch\_ID

GROUP BY

B.Branch\_Name;

-- Query 4: Total Transactions and Amount per Transaction Type

SELECT

T.Transaction\_Type,

SUM(F.Transaction\_Amount) AS Total\_Transaction\_Amount

FROM

Fact\_Transactions F

JOIN

Dim\_Transactions T ON F.Transaction\_Type\_ID = T.Transaction\_Type\_ID

GROUP BY

T.Transaction\_Type;

-- Query 5: Total Transactions and Amount per Date

SELECT

D.Month,

SUM(F.Transaction\_Amount) AS Total\_Transaction\_Amount

FROM

Fact\_Transactions F

JOIN

Dim\_Date D ON F.Date\_ID = D.Date\_ID

GROUP BY

D.Month;

**GALAXY:**

-- Dim\_Customers (Customer Details)

CREATE TABLE Dim\_Customers (

Customer\_ID INT PRIMARY KEY,

Customer\_Name VARCHAR(100)

);

-- Dim\_Accounts (Account Type Details)

CREATE TABLE Dim\_Accounts (

Account\_ID INT PRIMARY KEY,

Account\_Type VARCHAR(50) -- e.g., Savings, Checking, Loan, Credit, etc.

);

-- Dim\_Transactions (Transaction Type Details)

CREATE TABLE Dim\_Transactions (

Transaction\_Type\_ID INT PRIMARY KEY,

Transaction\_Type VARCHAR(50) -- e.g., Deposit, Withdrawal, Transfer, Loan Repayment, etc.

);

-- Dim\_Branches (Branch Details)

CREATE TABLE Dim\_Branches (

Branch\_ID INT PRIMARY KEY,

Branch\_Name VARCHAR(100),

Branch\_Location VARCHAR(100)

);

-- Dim\_Date (Date Details)

CREATE TABLE Dim\_Date (

Date\_ID INT PRIMARY KEY,

Date DATE,

Year INT,

Month INT,

Day INT,

Quarter INT

);

-- Step 3: Create Fact Tables

-- Fact\_Transactions (Transaction Data)

CREATE TABLE Fact\_Transactions (

Fact\_ID INT PRIMARY KEY,

Customer\_ID INT,

Account\_ID INT,

Transaction\_Type\_ID INT,

Branch\_ID INT,

Date\_ID INT,

Transaction\_Amount DECIMAL(15, 2),

FOREIGN KEY (Customer\_ID) REFERENCES Dim\_Customers(Customer\_ID),

FOREIGN KEY (Account\_ID) REFERENCES Dim\_Accounts(Account\_ID),

FOREIGN KEY (Transaction\_Type\_ID) REFERENCES Dim\_Transactions(Transaction\_Type\_ID),

FOREIGN KEY (Branch\_ID) REFERENCES Dim\_Branches(Branch\_ID),

FOREIGN KEY (Date\_ID) REFERENCES Dim\_Date(Date\_ID)

);

-- Fact\_Loans (Loan and Repayment Data)

CREATE TABLE Fact\_Loans (

Loan\_Fact\_ID INT PRIMARY KEY,

Customer\_ID INT,

Account\_ID INT,

Branch\_ID INT,

Date\_ID INT,

Loan\_Amount DECIMAL(15, 2),

Repayment\_Amount DECIMAL(15, 2),

FOREIGN KEY (Customer\_ID) REFERENCES Dim\_Customers(Customer\_ID),

FOREIGN KEY (Account\_ID) REFERENCES Dim\_Accounts(Account\_ID),

FOREIGN KEY (Branch\_ID) REFERENCES Dim\_Branches(Branch\_ID),

FOREIGN KEY (Date\_ID) REFERENCES Dim\_Date(Date\_ID)

);

-- Step 4: Insert Sample Data into Dimension Tables

-- Insert Customers

INSERT INTO Dim\_Customers VALUES (1, 'John Doe');

INSERT INTO Dim\_Customers VALUES (2, 'Jane Smith');

INSERT INTO Dim\_Customers VALUES (3, 'Mike Johnson');

INSERT INTO Dim\_Customers VALUES (4, 'Emily Davis');

INSERT INTO Dim\_Customers VALUES (5, 'Chris Lee');

-- Insert Accounts (Account Types)

INSERT INTO Dim\_Accounts VALUES (1, 'Savings');

INSERT INTO Dim\_Accounts VALUES (2, 'Checking');

INSERT INTO Dim\_Accounts VALUES (3, 'Loan');

INSERT INTO Dim\_Accounts VALUES (4, 'Credit');

INSERT INTO Dim\_Accounts VALUES (5, 'Investment');

-- Insert Transaction Types

INSERT INTO Dim\_Transactions VALUES (1, 'Deposit');

INSERT INTO Dim\_Transactions VALUES (2, 'Withdrawal');

INSERT INTO Dim\_Transactions VALUES (3, 'Transfer');

INSERT INTO Dim\_Transactions VALUES (4, 'Loan Repayment');

INSERT INTO Dim\_Transactions VALUES (5, 'Interest Payment');

-- Insert Branches

INSERT INTO Dim\_Branches VALUES (1, 'Downtown Branch', 'New York');

INSERT INTO Dim\_Branches VALUES (2, 'West End Branch', 'Los Angeles');

INSERT INTO Dim\_Branches VALUES (3, 'Midtown Branch', 'Chicago');

INSERT INTO Dim\_Branches VALUES (4, 'East Side Branch', 'Houston');

INSERT INTO Dim\_Branches VALUES (5, 'South Bay Branch', 'San Francisco');

-- Insert Date Details

INSERT INTO Dim\_Date VALUES (1, '2024-01-01', 2024, 1, 1, 1);

INSERT INTO Dim\_Date VALUES (2, '2024-01-02', 2024, 1, 2, 1);

INSERT INTO Dim\_Date VALUES (3, '2024-02-15', 2024, 2, 15, 1);

INSERT INTO Dim\_Date VALUES (4, '2024-03-10', 2024, 3, 10, 1);

INSERT INTO Dim\_Date VALUES (5, '2024-04-20', 2024, 4, 20, 2);

-- Step 5: Insert Data into Fact Tables

-- Insert Sample Data into Fact\_Transactions

INSERT INTO Fact\_Transactions VALUES (1, 1, 1, 1, 1, 1, 5000.00);

INSERT INTO Fact\_Transactions VALUES (2, 2, 2, 2, 2, 2, 2000.00);

INSERT INTO Fact\_Transactions VALUES (3, 3, 3, 3, 3, 3, 3000.00);

INSERT INTO Fact\_Transactions VALUES (4, 4, 4, 4, 4, 4, 1500.00);

INSERT INTO Fact\_Transactions VALUES (5, 5, 5, 5, 5, 5, 1000.00);

-- Insert Sample Data into Fact\_Loans

INSERT INTO Fact\_Loans VALUES (1, 1, 3, 1, 1, 20000.00, 5000.00);

INSERT INTO Fact\_Loans VALUES (2, 2, 4, 2, 2, 15000.00, 3000.00);

INSERT INTO Fact\_Loans VALUES (3, 3, 2, 3, 3, 25000.00, 7000.00);

INSERT INTO Fact\_Loans VALUES (4, 4, 5, 4, 4, 10000.00, 2000.00);

INSERT INTO Fact\_Loans VALUES (5, 5, 1, 5, 5, 5000.00, 1000.00);

-- Step 6: Perform Queries

-- Query 1: Total Transactions and Amount per Customer

SELECT

C.Customer\_Name,

SUM(F.Transaction\_Amount) AS Total\_Transaction\_Amount

FROM

Fact\_Transactions F

JOIN

Dim\_Customers C ON F.Customer\_ID = C.Customer\_ID

GROUP BY

C.Customer\_Name;

-- Query 2: Total Transactions and Amount per Account Type

SELECT

A.Account\_Type,

SUM(F.Transaction\_Amount) AS Total\_Transaction\_Amount

FROM

Fact\_Transactions F

JOIN

Dim\_Accounts A ON F.Account\_ID = A.Account\_ID

GROUP BY

A.Account\_Type;

-- Query 3: Total Loans and Repayments per Branch

SELECT

B.Branch\_Name,

SUM(L.Loan\_Amount) AS Total\_Loan\_Amount,

SUM(L.Repayment\_Amount) AS Total\_Repayment\_Amount

FROM

Fact\_Loans L

JOIN

Dim\_Branches B ON L.Branch\_ID = B.Branch\_ID

GROUP BY

B.Branch\_Name;

-- Query 4: Total Transactions per Transaction Type

SELECT

T.Transaction\_Type,

SUM(F.Transaction\_Amount) AS Total\_Transaction\_Amount

FROM

Fact\_Transactions F

JOIN

Dim\_Transactions T ON F.Transaction\_Type\_ID = T.Transaction\_Type\_ID

GROUP BY

T.Transaction\_Type;

-- Query 5: Total Loan Amount and Repayment per Date

SELECT

D.Month,

SUM(L.Loan\_Amount) AS Total\_Loan\_Amount,

SUM(L.Repayment\_Amount) AS Total\_Repayment\_Amount

FROM

Fact\_Loans L

JOIN

Dim\_Date D ON L.Date\_ID = D.Date\_ID

GROUP BY

D.Month;

**Q5:Gather Business Requirements for Banking enterprise and design it using any multi-dimensional data model namely Star, Snowflake, or Galaxy schema.**

**STAR:**

-- Dim\_Customers (Customer details)

CREATE TABLE Dim\_Customers (

Customer\_ID INT PRIMARY KEY,

Customer\_Name VARCHAR(100)

);

-- Dim\_Accounts (Account Type details)

CREATE TABLE Dim\_Accounts (

Account\_ID INT PRIMARY KEY,

Account\_Type VARCHAR(50) -- e.g., Savings, Checking

);

-- Dim\_Transactions (Transaction Types)

CREATE TABLE Dim\_Transactions (

Transaction\_Type\_ID INT PRIMARY KEY,

Transaction\_Type VARCHAR(50) -- e.g., Deposit, Withdrawal, Loan Repayment

);

-- Dim\_Branches (Branch details)

CREATE TABLE Dim\_Branches (

Branch\_ID INT PRIMARY KEY,

Branch\_Name VARCHAR(100),

Branch\_Location VARCHAR(100)

);

-- Dim\_Date (Date details)

CREATE TABLE Dim\_Date (

Date\_ID INT PRIMARY KEY,

Date DATE,

Year INT,

Month INT,

Day INT,

Quarter INT

);

-- Step 3: Create Fact Tables

-- Fact\_Transactions (Transaction Data)

CREATE TABLE Fact\_Transactions (

Fact\_ID INT PRIMARY KEY,

Customer\_ID INT,

Account\_ID INT,

Transaction\_Type\_ID INT,

Branch\_ID INT,

Date\_ID INT,

Transaction\_Amount DECIMAL(15, 2),

FOREIGN KEY (Customer\_ID) REFERENCES Dim\_Customers(Customer\_ID),

FOREIGN KEY (Account\_ID) REFERENCES Dim\_Accounts(Account\_ID),

FOREIGN KEY (Transaction\_Type\_ID) REFERENCES Dim\_Transactions(Transaction\_Type\_ID),

FOREIGN KEY (Branch\_ID) REFERENCES Dim\_Branches(Branch\_ID),

FOREIGN KEY (Date\_ID) REFERENCES Dim\_Date(Date\_ID)

);

-- Fact\_Loans (Loan Data)

CREATE TABLE Fact\_Loans (

Loan\_Fact\_ID INT PRIMARY KEY,

Customer\_ID INT,

Account\_ID INT,

Branch\_ID INT,

Date\_ID INT,

Loan\_Amount DECIMAL(15, 2),

Repayment\_Amount DECIMAL(15, 2),

FOREIGN KEY (Customer\_ID) REFERENCES Dim\_Customers(Customer\_ID),

FOREIGN KEY (Account\_ID) REFERENCES Dim\_Accounts(Account\_ID),

FOREIGN KEY (Branch\_ID) REFERENCES Dim\_Branches(Branch\_ID),

FOREIGN KEY (Date\_ID) REFERENCES Dim\_Date(Date\_ID)

);

-- Step 4: Insert Sample Data

-- Insert Customers

INSERT INTO Dim\_Customers VALUES (1, 'John Doe');

INSERT INTO Dim\_Customers VALUES (2, 'Jane Smith');

INSERT INTO Dim\_Customers VALUES (3, 'Mike Johnson');

INSERT INTO Dim\_Customers VALUES (4, 'Emily Davis');

INSERT INTO Dim\_Customers VALUES (5, 'Chris Lee');

-- Insert Accounts

INSERT INTO Dim\_Accounts VALUES (1, 'Savings');

INSERT INTO Dim\_Accounts VALUES (2, 'Checking');

INSERT INTO Dim\_Accounts VALUES (3, 'Loan');

INSERT INTO Dim\_Accounts VALUES (4, 'Credit');

INSERT INTO Dim\_Accounts VALUES (5, 'Investment');

-- Insert Transaction Types

INSERT INTO Dim\_Transactions VALUES (1, 'Deposit');

INSERT INTO Dim\_Transactions VALUES (2, 'Withdrawal');

INSERT INTO Dim\_Transactions VALUES (3, 'Loan Repayment');

INSERT INTO Dim\_Transactions VALUES (4, 'Transfer');

INSERT INTO Dim\_Transactions VALUES (5, 'Interest Payment');

-- Insert Branches

INSERT INTO Dim\_Branches VALUES (1, 'Downtown Branch', 'New York');

INSERT INTO Dim\_Branches VALUES (2, 'West End Branch', 'Los Angeles');

INSERT INTO Dim\_Branches VALUES (3, 'Midtown Branch', 'Chicago');

INSERT INTO Dim\_Branches VALUES (4, 'East Side Branch', 'Houston');

INSERT INTO Dim\_Branches VALUES (5, 'South Bay Branch', 'San Francisco');

-- Insert Date Details

INSERT INTO Dim\_Date VALUES (1, '2024-01-01', 2024, 1, 1, 1);

INSERT INTO Dim\_Date VALUES (2, '2024-01-02', 2024, 1, 2, 1);

INSERT INTO Dim\_Date VALUES (3, '2024-02-15', 2024, 2, 15, 1);

INSERT INTO Dim\_Date VALUES (4, '2024-03-10', 2024, 3, 10, 1);

INSERT INTO Dim\_Date VALUES (5, '2024-04-20', 2024, 4, 20, 2);

-- Insert Data into Fact Tables

INSERT INTO Fact\_Transactions VALUES (1, 1, 1, 1, 1, 1, 5000.00);

INSERT INTO Fact\_Transactions VALUES (2, 2, 2, 2, 2, 2, 2000.00);

INSERT INTO Fact\_Transactions VALUES (3, 3, 3, 3, 3, 3, 3000.00);

INSERT INTO Fact\_Transactions VALUES (4, 4, 4, 4, 4, 4, 1500.00);

INSERT INTO Fact\_Transactions VALUES (5, 5, 5, 5, 5, 5, 1000.00);

INSERT INTO Fact\_Loans VALUES (1, 1, 3, 1, 1, 20000.00, 5000.00);

INSERT INTO Fact\_Loans VALUES (2, 2, 4, 2, 2, 15000.00, 3000.00);

INSERT INTO Fact\_Loans VALUES (3, 3, 2, 3, 3, 25000.00, 7000.00);

INSERT INTO Fact\_Loans VALUES (4, 4, 5, 4, 4, 10000.00, 2000.00);

INSERT INTO Fact\_Loans VALUES (5, 5, 1, 5, 5, 5000.00, 1000.00);

-- Step 5: Execute Queries

-- Query 1: Total Transaction Amount per Customer

SELECT C.Customer\_Name, SUM(F.Transaction\_Amount) AS Total\_Transaction\_Amount

FROM Fact\_Transactions F

JOIN Dim\_Customers C ON F.Customer\_ID = C.Customer\_ID

GROUP BY C.Customer\_Name;

-- Query 2: Total Transaction Amount per Account Type

SELECT A.Account\_Type, SUM(F.Transaction\_Amount) AS Total\_Transaction\_Amount

FROM Fact\_Transactions F

JOIN Dim\_Accounts A ON F.Account\_ID = A.Account\_ID

GROUP BY A.Account\_Type;

-- Query 3: Total Loan Amount and Repayment per Branch

SELECT B.Branch\_Name, SUM(L.Loan\_Amount) AS Total\_Loan\_Amount, SUM(L.Repayment\_Amount) AS Total\_Repayment\_Amount

FROM Fact\_Loans L

JOIN Dim\_Branches B ON L.Branch\_ID = B.Branch\_ID

GROUP BY B.Branch\_Name;

-- Query 4: Total Transactions per Transaction Type

SELECT T.Transaction\_Type, SUM(F.Transaction\_Amount) AS Total\_Transaction\_Amount

FROM Fact\_Transactions F

JOIN Dim\_Transactions T ON F.Transaction\_Type\_ID = T.Transaction\_Type\_ID

GROUP BY T.Transaction\_Type;

-- Query 5: Loan Amount and Repayment per Date

SELECT D.Month, SUM(L.Loan\_Amount) AS Total\_Loan\_Amount, SUM(L.Repayment\_Amount) AS Total\_Repayment\_Amount

FROM Fact\_Loans L

JOIN Dim\_Date D ON L.Date\_ID = D.Date\_ID

GROUP BY D.Month;

**SNOWFLAKE**

-- Dim\_Customers (Customer details)

CREATE TABLE Dim\_Customers (

Customer\_ID INT PRIMARY KEY,

Customer\_Name VARCHAR(100)

);

-- Dim\_Accounts (Account Type details)

CREATE TABLE Dim\_Accounts (

Account\_ID INT PRIMARY KEY,

Account\_Type VARCHAR(50)

);

-- Dim\_Transactions (Transaction Types)

CREATE TABLE Dim\_Transactions (

Transaction\_Type\_ID INT PRIMARY KEY,

Transaction\_Type VARCHAR(50)

);

-- Dim\_Branch\_Location (Branch Location details)

CREATE TABLE Dim\_Branch\_Location (

Location\_ID INT PRIMARY KEY,

Branch\_Location VARCHAR(100)

);

-- Dim\_Branches (Branch details, now referencing Dim\_Branch\_Location)

CREATE TABLE Dim\_Branches (

Branch\_ID INT PRIMARY KEY,

Branch\_Name VARCHAR(100),

Location\_ID INT,

FOREIGN KEY (Location\_ID) REFERENCES Dim\_Branch\_Location(Location\_ID)

);

-- Dim\_Date (Date details)

CREATE TABLE Dim\_Date (

Date\_ID INT PRIMARY KEY,

Date DATE,

Year INT,

Month INT,

Day INT,

Quarter INT

);

-- Step 3: Create Fact Tables

-- Fact\_Transactions (Transaction Data)

CREATE TABLE Fact\_Transactions (

Fact\_ID INT PRIMARY KEY,

Customer\_ID INT,

Account\_ID INT,

Transaction\_Type\_ID INT,

Branch\_ID INT,

Date\_ID INT,

Transaction\_Amount DECIMAL(15, 2),

FOREIGN KEY (Customer\_ID) REFERENCES Dim\_Customers(Customer\_ID),

FOREIGN KEY (Account\_ID) REFERENCES Dim\_Accounts(Account\_ID),

FOREIGN KEY (Transaction\_Type\_ID) REFERENCES Dim\_Transactions(Transaction\_Type\_ID),

FOREIGN KEY (Branch\_ID) REFERENCES Dim\_Branches(Branch\_ID),

FOREIGN KEY (Date\_ID) REFERENCES Dim\_Date(Date\_ID)

);

-- Fact\_Loans (Loan Data)

CREATE TABLE Fact\_Loans (

Loan\_Fact\_ID INT PRIMARY KEY,

Customer\_ID INT,

Account\_ID INT,

Branch\_ID INT,

Date\_ID INT,

Loan\_Amount DECIMAL(15, 2),

Repayment\_Amount DECIMAL(15, 2),

FOREIGN KEY (Customer\_ID) REFERENCES Dim\_Customers(Customer\_ID),

FOREIGN KEY (Account\_ID) REFERENCES Dim\_Accounts(Account\_ID),

FOREIGN KEY (Branch\_ID) REFERENCES Dim\_Branches(Branch\_ID),

FOREIGN KEY (Date\_ID) REFERENCES Dim\_Date(Date\_ID)

);

-- Step 4: Insert Sample Data

-- Insert Customers

INSERT INTO Dim\_Customers VALUES (1, 'John Doe');

INSERT INTO Dim\_Customers VALUES (2, 'Jane Smith');

INSERT INTO Dim\_Customers VALUES (3, 'Mike Johnson');

INSERT INTO Dim\_Customers VALUES (4, 'Emily Davis');

INSERT INTO Dim\_Customers VALUES (5, 'Chris Lee');

-- Insert Accounts

INSERT INTO Dim\_Accounts VALUES (1, 'Savings');

INSERT INTO Dim\_Accounts VALUES (2, 'Checking');

INSERT INTO Dim\_Accounts VALUES (3, 'Loan');

INSERT INTO Dim\_Accounts VALUES (4, 'Credit');

INSERT INTO Dim\_Accounts VALUES (5, 'Investment');

-- Insert Transaction Types

INSERT INTO Dim\_Transactions VALUES (1, 'Deposit');

INSERT INTO Dim\_Transactions VALUES (2, 'Withdrawal');

INSERT INTO Dim\_Transactions VALUES (3, 'Loan Repayment');

INSERT INTO Dim\_Transactions VALUES (4, 'Transfer');

INSERT INTO Dim\_Transactions VALUES (5, 'Interest Payment');

-- Insert Branch Locations

INSERT INTO Dim\_Branch\_Location VALUES (1, 'New York');

INSERT INTO Dim\_Branch\_Location VALUES (2, 'Los Angeles');

INSERT INTO Dim\_Branch\_Location VALUES (3, 'Chicago');

INSERT INTO Dim\_Branch\_Location VALUES (4, 'Houston');

INSERT INTO Dim\_Branch\_Location VALUES (5, 'San Francisco');

-- Insert Branches

INSERT INTO Dim\_Branches VALUES (1, 'Downtown Branch', 1);

INSERT INTO Dim\_Branches VALUES (2, 'West End Branch', 2);

INSERT INTO Dim\_Branches VALUES (3, 'Midtown Branch', 3);

INSERT INTO Dim\_Branches VALUES (4, 'East Side Branch', 4);

INSERT INTO Dim\_Branches VALUES (5, 'South Bay Branch', 5);

-- Insert Date Details

INSERT INTO Dim\_Date VALUES (1, '2024-01-01', 2024, 1, 1, 1);

INSERT INTO Dim\_Date VALUES (2, '2024-01-02', 2024, 1, 2, 1);

INSERT INTO Dim\_Date VALUES (3, '2024-02-15', 2024, 2, 15, 1);

INSERT INTO Dim\_Date VALUES (4, '2024-03-10', 2024, 3, 10, 1);

INSERT INTO Dim\_Date VALUES (5, '2024-04-20', 2024, 4, 20, 2);

-- Insert Data into Fact Tables

INSERT INTO Fact\_Transactions VALUES (1, 1, 1, 1, 1, 1, 5000.00);

INSERT INTO Fact\_Transactions VALUES (2, 2, 2, 2, 2, 2, 2000.00);

INSERT INTO Fact\_Transactions VALUES (3, 3, 3, 3, 3, 3, 3000.00);

INSERT INTO Fact\_Transactions VALUES (4, 4, 4, 4, 4, 4, 1500.00);

INSERT INTO Fact\_Transactions VALUES (5, 5, 5, 5, 5, 5, 1000.00);

INSERT INTO Fact\_Loans VALUES (1, 1, 3, 1, 1, 20000.00, 5000.00);

INSERT INTO Fact\_Loans VALUES (2, 2, 4, 2, 2, 15000.00, 3000.00);

INSERT INTO Fact\_Loans VALUES (3, 3, 2, 3, 3, 25000.00, 7000.00);

INSERT INTO Fact\_Loans VALUES (4, 4, 5, 4, 4, 10000.00, 2000.00);

INSERT INTO Fact\_Loans VALUES (5, 5, 1, 5, 5, 5000.00, 1000.00);

-- Step 5: Execute Queries

-- Query 1: Total Transaction Amount per Customer

SELECT C.Customer\_Name, SUM(F.Transaction\_Amount) AS Total\_Transaction\_Amount

FROM Fact\_Transactions F

JOIN Dim\_Customers C ON F.Customer\_ID = C.Customer\_ID

GROUP BY C.Customer\_Name;

-- Query 2: Total Transaction Amount per Account Type

SELECT A.Account\_Type, SUM(F.Transaction\_Amount) AS Total\_Transaction\_Amount

FROM Fact\_Transactions F

JOIN Dim\_Accounts A ON F.Account\_ID = A.Account\_ID

GROUP BY A.Account\_Type;

-- Query 3: Total Loan Amount and Repayment per Branch

SELECT B.Branch\_Name, SUM(L.Loan\_Amount) AS Total\_Loan\_Amount, SUM(L.Repayment\_Amount) AS Total\_Repayment\_Amount

FROM Fact\_Loans L

JOIN Dim\_Branches B ON L.Branch\_ID = B.Branch\_ID

GROUP BY B.Branch\_Name;

-- Query 4: Total Transactions per Transaction Type

SELECT T.Transaction\_Type, SUM(F.Transaction\_Amount) AS Total\_Transaction\_Amount

FROM Fact\_Transactions F

JOIN Dim\_Transactions T ON F.Transaction\_Type\_ID = T.Transaction\_Type\_ID

GROUP BY T.Transaction\_Type;

-- Query 5: Loan Amount and Repayment per Date

SELECT D.Month, SUM(L.Loan\_Amount) AS Total\_Loan\_Amount, SUM(L.Repayment\_Amount) AS Total\_Repayment\_Amount

FROM Fact\_Loans L

JOIN Dim\_Date D ON L.Date\_ID = D.Date\_ID

GROUP BY D.Month;

**GALAXY**

-- Step 1: Drop existing tables to avoid errors

DROP TABLE IF EXISTS Fact\_Transactions;

DROP TABLE IF EXISTS Fact\_Loans;

DROP TABLE IF EXISTS Dim\_Customers;

DROP TABLE IF EXISTS Dim\_Accounts;

DROP TABLE IF EXISTS Dim\_Transactions;

DROP TABLE IF EXISTS Dim\_Branches;

DROP TABLE IF EXISTS Dim\_Branch\_Location;

DROP TABLE IF EXISTS Dim\_Date;

-- Step 2: Create Dimension Tables (same as Snowflake Schema)

CREATE TABLE Dim\_Customers (

Customer\_ID INT PRIMARY KEY,

Customer\_Name VARCHAR(100)

);

CREATE TABLE Dim\_Accounts (

Account\_ID INT PRIMARY KEY,

Account\_Type VARCHAR(50)

);

CREATE TABLE Dim\_Transactions (

Transaction\_Type\_ID INT PRIMARY KEY,

Transaction\_Type VARCHAR(50)

);

CREATE TABLE Dim\_Branch\_Location (

Location\_ID INT PRIMARY KEY,

Branch\_Location VARCHAR(100)

);

CREATE TABLE Dim\_Branches (

Branch\_ID INT PRIMARY KEY,

Branch\_Name VARCHAR(100),

Location\_ID INT,

FOREIGN KEY (Location\_ID) REFERENCES Dim\_Branch\_Location(Location\_ID)

);

CREATE TABLE Dim\_Date (

Date\_ID INT PRIMARY KEY,

Date DATE,

Year INT,

Month INT,

Day INT,

Quarter INT

);

-- Step 3: Create Fact Tables (Multiple Fact Tables in Galaxy Schema)

-- Fact\_Transactions (Transaction Data)

CREATE TABLE Fact\_Transactions (

Fact\_ID INT PRIMARY KEY,

Customer\_ID INT,

Account\_ID INT,

Transaction\_Type\_ID INT,

Branch\_ID INT,

Date\_ID INT,

Transaction\_Amount DECIMAL(15, 2),

FOREIGN KEY (Customer\_ID) REFERENCES Dim\_Customers(Customer\_ID),

FOREIGN KEY (Account\_ID) REFERENCES Dim\_Accounts(Account\_ID),

FOREIGN KEY (Transaction\_Type\_ID) REFERENCES Dim\_Transactions(Transaction\_Type\_ID),

FOREIGN KEY (Branch\_ID) REFERENCES Dim\_Branches(Branch\_ID),

FOREIGN KEY (Date\_ID) REFERENCES Dim\_Date(Date\_ID)

);

-- Fact\_Loans (Loan Data)

CREATE TABLE Fact\_Loans (

Loan\_Fact\_ID INT PRIMARY KEY,

Customer\_ID INT,

Account\_ID INT,

Branch\_ID INT,

Date\_ID INT,

Loan\_Amount DECIMAL(15, 2),

Repayment\_Amount DECIMAL(15, 2),

FOREIGN KEY (Customer\_ID) REFERENCES Dim\_Customers(Customer\_ID),

FOREIGN KEY (Account\_ID) REFERENCES Dim\_Accounts(Account\_ID),

FOREIGN KEY (Branch\_ID) REFERENCES Dim\_Branches(Branch\_ID),

FOREIGN KEY (Date\_ID) REFERENCES Dim\_Date(Date\_ID)

);

-- Step 4: Insert Sample Data

-- Insert Customers

INSERT INTO Dim\_Customers VALUES (1, 'John Doe');

INSERT INTO Dim\_Customers VALUES (2, 'Jane Smith');

INSERT INTO Dim\_Customers VALUES (3, 'Mike Johnson');

INSERT INTO Dim\_Customers VALUES (4, 'Emily Davis');

INSERT INTO Dim\_Customers VALUES (5, 'Chris Lee');

-- Insert Accounts

INSERT INTO Dim\_Accounts VALUES (1, 'Savings');

INSERT INTO Dim\_Accounts VALUES (2, 'Checking');

INSERT INTO Dim\_Accounts VALUES (3, 'Loan');

INSERT INTO Dim\_Accounts VALUES (4, 'Credit');

INSERT INTO Dim\_Accounts VALUES (5, 'Investment');

-- Insert Transaction Types

INSERT INTO Dim\_Transactions VALUES (1, 'Deposit');

INSERT INTO Dim\_Transactions VALUES (2, 'Withdrawal');

INSERT INTO Dim\_Transactions VALUES (3, 'Loan Repayment');

INSERT INTO Dim\_Transactions VALUES (4, 'Transfer');

INSERT INTO Dim\_Transactions VALUES (5, 'Interest Payment');

-- Insert Branch Locations

INSERT INTO Dim\_Branch\_Location VALUES (1, 'New York');

INSERT INTO Dim\_Branch\_Location VALUES (2, 'Los Angeles');

INSERT INTO Dim\_Branch\_Location VALUES (3, 'Chicago');

INSERT INTO Dim\_Branch\_Location VALUES (4, 'Houston');

INSERT INTO Dim\_Branch\_Location VALUES (5, 'San Francisco');

-- Insert Branches

INSERT INTO Dim\_Branches VALUES (1, 'Downtown Branch', 1);

INSERT INTO Dim\_Branches VALUES (2, 'West End Branch', 2);

INSERT INTO Dim\_Branches VALUES (3, 'Midtown Branch', 3);

INSERT INTO Dim\_Branches VALUES (4, 'East Side Branch', 4);

INSERT INTO Dim\_Branches VALUES (5, 'South Bay Branch', 5);

-- Insert Date Details

INSERT INTO Dim\_Date VALUES (1, '2024-01-01', 2024, 1, 1, 1);

INSERT INTO Dim\_Date VALUES (2, '2024-01-02', 2024, 1, 2, 1);

INSERT INTO Dim\_Date VALUES (3, '2024-02-15', 2024, 2, 15, 1);

INSERT INTO Dim\_Date VALUES (4, '2024-03-10', 2024, 3, 10, 1);

INSERT INTO Dim\_Date VALUES (5, '2024-04-20', 2024, 4, 20, 2);

-- Insert Data into Fact Tables

INSERT INTO Fact\_Transactions VALUES (1, 1, 1, 1, 1, 1, 5000.00);

INSERT INTO Fact\_Transactions VALUES (2, 2, 2, 2, 2, 2, 2000.00);

INSERT INTO Fact\_Transactions VALUES (3, 3, 3, 3, 3, 3, 3000.00);

INSERT INTO Fact\_Transactions VALUES (4, 4, 4, 4, 4, 4, 1500.00);

INSERT INTO Fact\_Transactions VALUES (5, 5, 5, 5, 5, 5, 1000.00);

INSERT INTO Fact\_Loans VALUES (1, 1, 3, 1, 1, 20000.00, 5000.00);

INSERT INTO Fact\_Loans VALUES (2, 2, 4, 2, 2, 15000.00, 3000.00);

INSERT INTO Fact\_Loans VALUES (3, 3, 2, 3, 3, 25000.00, 7000.00);

INSERT INTO Fact\_Loans VALUES (4, 4, 5, 4, 4, 10000.00, 2000.00);

INSERT INTO Fact\_Loans VALUES (5, 5, 1, 5, 5, 5000.00, 1000.00);

-- Step 5: Execute Queries

-- Query 1: Total Transaction Amount per Customer

SELECT C.Customer\_Name, SUM(F.Transaction\_Amount) AS Total\_Transaction\_Amount

FROM Fact\_Transactions F

JOIN Dim\_Customers C ON F.Customer\_ID = C.Customer\_ID

GROUP BY C.Customer\_Name;

-- Query 2: Total Transaction Amount per Account Type

SELECT A.Account\_Type, SUM(F.Transaction\_Amount) AS Total\_Transaction\_Amount

FROM Fact\_Transactions F

JOIN Dim\_Accounts A ON F.Account\_ID = A.Account\_ID

GROUP BY A.Account\_Type;

-- Query 3: Total Loan Amount and Repayment per Branch

SELECT B.Branch\_Name, SUM(L.Loan\_Amount) AS Total\_Loan\_Amount, SUM(L.Repayment\_Amount) AS Total\_Repayment\_Amount

FROM Fact\_Loans L

JOIN Dim\_Branches B ON L.Branch\_ID = B.Branch\_ID

GROUP BY B.Branch\_Name;

-- Query 4: Total Transactions per Transaction Type

SELECT T.Transaction\_Type, SUM(F.Transaction\_Amount) AS Total\_Transaction\_Amount

FROM Fact\_Transactions F

JOIN Dim\_Transactions T ON F.Transaction\_Type\_ID = T.Transaction\_Type\_ID

GROUP BY T.Transaction\_Type;

-- Query 5: Loan Amount and Repayment per Date

SELECT D.Month, SUM(L.Loan\_Amount) AS Total\_Loan\_Amount, SUM(L.Repayment\_Amount) AS Total\_Repayment\_Amount

FROM Fact\_Loans L

JOIN Dim\_Date D ON L.Date\_ID = D.Date\_ID

GROUP BY D.Month;