HEXAWARE ASSIGNMEENT 1

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Banking System

Task 1

1. **Create the database named "HMBank".**

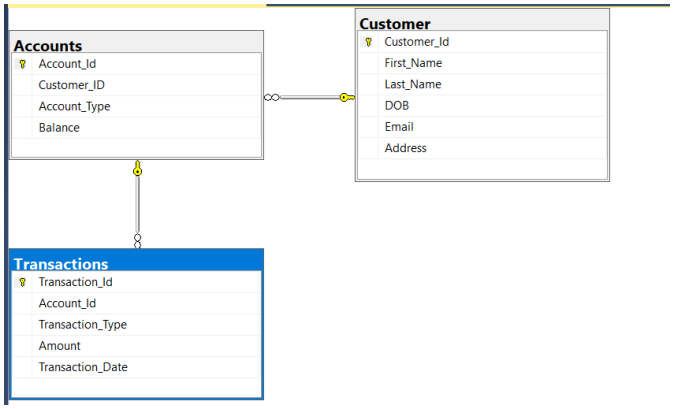
```
CREATE DATABASE HMBank;
```

2. **Define the schema for the Customers, Accounts, and Transactions tables based on the provided schema.**

```
CREATE TABLE HMBank.dbo.Customer(Customer_Id INT IDENTITY PRIMARY KEY, First_Name VARCHAR(65), Last_Name VARCHAR(65),
DOB DATE, Email VARCHAR(65), Address VARCHAR(65))
CREATE TABLE HMBank.dbo.Accounts(Account_Id INT IDENTITY PRIMARY KEY, Customer_ID INT FOREIGN KEY REFERENCES HMBank.dbo.Customer(Customer_Id));
ALTER TABLE HMBank.dbo.Accounts ADD
                                    Account_Type VARCHAR(65), Balance INT;

CREATE TABLE HMBank.dbo.Transactions(Transaction_Id INT IDENTITY PRIMARY KEY, Account_Id INT FOREIGN KEY REFERENCES HMBank.dbo.Accounts(Account_I
Transaction_Type VARCHAR(65), Amount INT, Transaction_Date DATE);
```

3. **Create an ERD (Entity Relationship Diagram) for the database.**



4. **Create appropriate Primary Key and Foreign Key constraints for referential integrity.**
5. **Write SQL scripts to create the mentioned tables with appropriate data types, constraints, and relationships.**
   - **Customers**
   - **Accounts**
   - **Transactions**

Task 2

1. **Insert at least 10 sample records into each of the following tables.**
   - **Customers**
   - **Accounts**
   - **Transactions**

```
----------------------------------------------------Inserting Data->
INSERT INTO HMBank.dbo.Customer (First_Name, Last_Name, DOB, Email, Address)
VALUES
('John', 'Doe', '1985-05-15', 'john.doe@example.com', '123 Elm Street'),
('Jane', 'Smith', '1990-07-23', 'jane.smith@example.com', '456 Oak Avenue'),
('Emily', 'Johnson', '1992-11-30', 'emily.johnson@example.com', '789 Pine Road'),
('Michael', 'Brown', '1988-03-10', 'michael.brown@example.com', '101 Maple Boulevard'),
('Emma', 'Jones', '1995-04-17', 'emma.jones@example.com', '202 Birch Lane'),
('David', 'Miller', '1993-09-19', 'david.miller@example.com', '303 Cedar Drive'),
('Sophia', 'Davis', '1987-08-22', 'sophia.davis@example.com', '404 Walnut Street'),
('William', 'Garcia', '1991-12-01', 'william.garcia@example.com', '505 Spruce Way'),
('Olivia', 'Martinez', '1994-02-14', 'olivia.martinez@example.com', '606 Redwood Place'),
('James', 'Wilson', '1989-06-07', 'james.wilson@example.com', '707 Chestnut Street');
```

2. **Write SQL queries for the following tasks:**
   1. **Write a SQL query to retrieve the name, account type and email of all customers.**

```
SELECT C.First_Name, C.Last_Name, C.Email, A.Account_Type
FROM HMBank.dbo.Customer C
JOIN HMBank.dbo.Accounts A ON C.Customer_Id = A.Customer_ID;
```

Results | Messages

	First_Name	Last_Name	Email	Account_Type
1	John	Doe	john.doe@example.com	Savings
2	Jane	Smith	jane.smith@example.com	Checking
3	Emily	Johnson	emily.johnson@example.com	Savings
4	Michael	Brown	michael.brown@example.com	Checking
5	Emma	Jones	emma.jones@example.com	Savings
6	David	Miller	david.miller@example.com	Checking
7	William	Garcia	william.garcia@example.com	Checking
8	Olivia	Martinez	olivia.martinez@example.com	Savings
9	James	Wilson	james.wilson@example.com	Checking

   2. **Write a SQL query to list all transaction corresponding customer.**

```
SELECT C.First_Name, C.Last_Name, T.Transaction_Id, T.Transaction_Type, T.Amount, T.Transaction
FROM HMBank.dbo.Customer C
JOIN HMBank.dbo.Accounts A ON C.Customer_Id = A.Customer_ID
JOIN HMBank.dbo.Transactions T ON A.Account_Id = T.Account_Id;
```

Results | Messages

	First_Name	Last_Name	Transaction_Id	Transaction_Type	Amount	Transaction_Date
1	John	Doe	1	Deposit	1000	2024-01-01
2	Jane	Smith	2	Withdrawal	2000	2024-02-15
3	Emily	Johnson	3	Deposit	500	2024-03-05
4	Michael	Brown	4	Withdrawal	1000	2024-04-22
5	Emma	Jones	5	Deposit	700	2024-05-30
6	David	Miller	6	Withdrawal	1500	2024-06-15
7	William	Garcia	8	Deposit	1200	2024-08-20
8	Olivia	Martinez	9	Withdrawal	300	2024-09-05
9	James	Wilson	10	Deposit	800	2024-09-18

   3. **Write a SQL query to increase the balance of a specific account by a certain amount.**

```
UPDATE HMBank.dbo.Accounts
SET Balance = Balance + 500
WHERE Account_Id = 1;
```

   4. **Write a SQL query to Combine first and last names of customers as a full_name.**

```
SELECT CONCAT(First_Name, ' ', Last_Name) AS full_name
FROM HMBank.dbo.Customer;
```

Results | Messages

	full_name
1	John Doe
2	Jane Smith
3	Emily Johnson
4	Michael Brown
5	Emma Jones
6	David Miller
7	Sophia Davis
8	William Garcia
9	Olivia Martinez
10	James Wilson

5. **Write a SQL query to remove accounts with a balance of zero where the account type is savings.**

```
DELETE FROM HMBank.dbo.Transactions
WHERE Account_Id IN (SELECT Account_Id FROM HMBank.dbo.Accounts WHERE Balance = 0 AND Account_Type = 'Savings');
```

Results | Messages

	Account_Id	Customer_ID	Account_Type	Balance
1	1	1	Savings	3000
2	2	2	Checking	5000
3	3	3	Savings	3000
4	4	4	Checking	2500
5	6	6	Checking	0
6	8	8	Checking	3200
7	9	9	Savings	500
8	10	10	Checking	800

6. **Write a SQL query to Find customers living in a specific city.**

```
SELECT * FROM HMBank.dbo.Customer
WHERE Address LIKE '%Oak%';
```

Results | Messages

	Customer_Id	First_Name	Last_Name	DOB	Email	Address
1	2	Jane	Smith	1990-07-23	jane.smith@example.com	456 Oak Avenue

7. **Write a SQL query to Get the account balance for a specific account.**

```
SELECT Balance
FROM HMBank.dbo.Accounts
WHERE Account_Id = 1;
```

Results | Messages

	Balance
1	3000

8. **Write a SQL query to List all current accounts with a balance greater than $1,000.**

```
SELECT * FROM HMBank.dbo.Accounts
WHERE Account_Type = 'Checking' AND Balance > 1000;
```

Results | Messages

	Account_Id	Customer_ID	Account_Type	Balance
1	2	2	Checking	5000
2	4	4	Checking	2500
3	8	8	Checking	3200

9. **Write a SQL query to Retrieve all transactions for a specific account.**

```
SELECT * FROM HMBank.dbo.Transactions
WHERE Account_Id = 1;
```

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Results | Messages

	Transaction_Id	Account_Id	Transaction_Type	Amount	Transaction_Date
1	1	1	Deposit	1000	2024-01-01

10. **Write a SQL query to Calculate the interest accrued on savings accounts based on a given interest rate.**

```
SELECT Account_Id, Balance, (Balance * 0.03) AS Interest_Accrued
FROM HMBank.dbo.Accounts
WHERE Account_Type = 'Savings';
```

Results | Messages

	Account_Id	Balance	Interest_Accrued
1	1	3000	90.00
2	3	3000	90.00
3	9	500	15.00

11. **Write a SQL query to Identify accounts where the balance is less than a specified overdraft limit.**

```
SELECT * FROM HMBank.dbo.Accounts
WHERE Balance < -500;
```

12. **Write a SQL query to Find customers not living in a specific city.**

```
SELECT * FROM HMBank.dbo.Customer
WHERE Address NOT LIKE '%oak%';
```

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Results | Messages

	Customer_Id	First_Name	Last_Name	DOB	Email	Address
1	1	John	Doe	1985-05-15	john.doe@example.com	123 Elm Street
2	3	Emily	Johnson	1992-11-30	emily.johnson@example.com	789 Pine Road
3	4	Michael	Brown	1988-03-10	michael.brown@example.com	101 Maple Boulevard
4	5	Emma	Jones	1995-04-17	emma.jones@example.com	202 Birch Lane
5	6	David	Miller	1993-09-19	david.miller@example.com	303 Cedar Drive
6	7	Sophia	Davis	1987-08-22	sophia.davis@example.com	404 Walnut Street
7	8	William	Garcia	1991-12-01	william.garcia@example.com	505 Spruce Way
8	9	Olivia	Martinez	1994-02-14	olivia.martinez@example.com	606 Redwood Place
9	10	James	Wilson	1989-06-07	james.wilson@example.com	707 Chestnut Street

Tasks 3: Aggregate functions, Having, Order By, GroupBy and Joins:

1. **Write a SQL query to Find the average account balance for all customers.**

```
SELECT AVG(Balance) AS Avg_Balance
FROM HMBank.dbo.Accounts;
```

Results | Messages

	Avg_Balance
1	2250

2. **Write a SQL query to Retrieve the top 10 highest account balances.**

```
SELECT TOP 10 *
FROM HMBank.dbo.Accounts
ORDER BY Balance DESC;
```

Results | Messages

	Account_Id	Customer_ID	Account_Type	Balance
1	2	2	Checking	5000
2	8	8	Checking	3200
3	1	1	Savings	3000
4	3	3	Savings	3000
5	4	4	Checking	2500
6	10	10	Checking	800
7	9	9	Savings	500
8	6	6	Checking	0

3. **Write a SQL query to Calculate Total Deposits for All Customers in specific date.**

```
SELECT SUM(Amount) AS Total_Deposits
FROM HMBank.dbo.Transactions
WHERE Transaction_Type = 'Deposit' AND Transaction_Date = '2024-03-05';
```

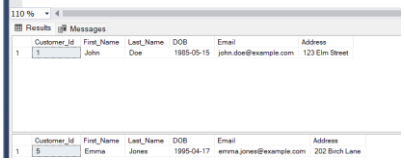
Results | Messages

	Total_Deposits
1	500

4. **Write a SQL query to Find the Oldest and Newest Customers.**

```
-- Oldest customer
SELECT TOP 1 *
FROM HMBank.dbo.Customer
ORDER BY DOB ASC;

-- Newest customer
SELECT TOP 1 *
FROM HMBank.dbo.Customer
ORDER BY DOB DESC;
```



5. Write a SQL query to Retrieve transaction details along with the account type.

```
SELECT T.Transaction_Id, T.Transaction_Type, T.Amount, A.Account_Type
FROM HMBank.dbo.Transactions T
JOIN HMBank.dbo.Accounts A ON T.Account_Id = A.Account_Id;
```

Results | Messages

	Transaction_Id	Transaction_Type	Amount	Account_Type
1	1	Deposit	1000	Savings
2	2	Withdrawal	2000	Checking
3	3	Deposit	500	Savings
4	4	Withdrawal	1000	Checking
5	6	Withdrawal	1500	Checking
6	8	Deposit	1200	Checking
7	9	Withdrawal	300	Savings
8	10	Deposit	800	Checking

6. **Write a SQL query to Get a list of customers along with their account details.**

```
SELECT C.First_Name, C.Last_Name, A.Account_Id, A.Account_Type, A.Balance
FROM HMBank.dbo.Customer C
JOIN HMBank.dbo.Accounts A ON C.Customer_Id = A.Customer_ID;
```

Results | Messages

	First_Name	Last_Name	Account_Id	Account_Type	Balance
1	John	Doe	1	Savings	3000
2	Jane	Smith	2	Checking	5000
3	Emily	Johnson	3	Savings	3000
4	Michael	Brown	4	Checking	2500
5	David	Miller	6	Checking	0
6	William	Garcia	8	Checking	3200
7	Olivia	Martinez	9	Savings	500
8	James	Wilson	10	Checking	800

7. **Write a SQL query to Retrieve transaction details along with customer information for a specific account.**

```
SELECT C.First_Name, C.Last_Name, T.Transaction_Id, T.Transaction_Type, T.Amount, T.Transaction_Date
FROM HMBank.dbo.Customer C
JOIN HMBank.dbo.Accounts A ON C.Customer_Id = A.Customer_ID
JOIN HMBank.dbo.Transactions T ON A.Account_Id = T.Account_Id
WHERE A.Account_Id = 1;
```

Results | Messages

	First_Name	Last_Name	Transaction_Id	Transaction_Type	Amount	Transaction_Date
1	John	Doe	1	Deposit	1000	2024-01-01

8. **Write a SQL query to Identify customers who have more than one account.**

```
SELECT C.First_Name, C.Last_Name, COUNT(A.Account_Id) AS Account_Count
FROM HMBank.dbo.Customer C
JOIN HMBank.dbo.Accounts A ON C.Customer_Id = A.Customer_ID
GROUP BY C.First_Name, C.Last_Name
HAVING COUNT(A.Account_Id) > 1;
```

9. **Write a SQL query to Calculate the difference in transaction amounts between deposits and withdrawals.**

```
SELECT Account_Id,
       SUM(CASE WHEN Transaction_Type = 'Deposit' THEN Amount ELSE 0 END) -
       SUM(CASE WHEN Transaction_Type = 'Withdrawal' THEN Amount ELSE 0 END) AS Transaction_Difference
FROM HMBank.dbo.Transactions
GROUP BY Account_Id;
```

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Results | Messages

	Account_Id	Transaction_Difference
1	1	1000
2	2	-2000
3	3	500
4	4	-1000
5	6	-1500
6	8	1200
7	9	-300
8	10	800

10. **Write a SQL query to Calculate the average daily balance for each account over a specified period.**

```
-- Calculate the average daily balance for each account over a specified period
SELECT A.Account_Id,
       AVG(Total_Daily_Amount) AS Avg_Daily_Balance
FROM (
    -- Subquery to calculate the total amount for each account per day
    SELECT T.Account_Id, T.Transaction_Date, SUM(T.Amount) AS Total_Daily_Amount
    FROM HMBank.dbo.Transactions T
    WHERE T.Transaction_Date BETWEEN '2024-01-01' AND '2024-12-31'
    GROUP BY T.Account_Id, T.Transaction_Date
) AS DailyTotals
JOIN HMBank.dbo.Accounts A ON A.Account_Id = DailyTotals.Account_Id
GROUP BY A.Account_Id;
```

110 %

Results | Messages

	Account_Id	Avg_Daily_Balance
1	1	1000
2	2	2000
3	3	500
4	4	1000
5	6	1500
6	8	1200
7	9	300
8	10	800

11. **Calculate the total balance for each account type.**

```
SELECT Account_Type, SUM(Balance) AS Total_Balance
FROM HMBank.dbo.Accounts
GROUP BY Account_Type;
```

110 %

Results | Messages

	Account_Type	Total_Balance
1	Checking	11500
2	Savings	6500

12. **Identify accounts with the highest number of transactions order by descending order.**

```
SELECT A.Account_Id, COUNT(T.Transaction_Id) AS Transaction_Count
FROM HMBank.dbo.Accounts A
JOIN HMBank.dbo.Transactions T ON A.Account_Id = T.Account_Id
GROUP BY A.Account_Id
ORDER BY Transaction_Count DESC;
```

110 %

Results | Messages

	Account_Id	Transaction_Count
1	1	1
2	2	1
3	3	1
4	4	1
5	6	1
6	8	1
7	9	1
8	10	1

13. **List customers with high aggregate account balances, along with their account types.**

```
SELECT C.First_Name, C.Last_Name, A.Account_Type, SUM(A.Balance) AS Total_Balance
FROM HMBank.dbo.Customer C
JOIN HMBank.dbo.Accounts A ON C.Customer_Id = A.Customer_ID
GROUP BY C.First_Name, C.Last_Name, A.Account_Type
HAVING SUM(A.Balance) >= 5000;
```

110 %

Results | Messages

	First_Name	Last_Name	Account_Type	Total_Balance
1	Jane	Smith	Checking	5000

14. **Identify and list duplicate transactions based on transaction amount, date, and account.**

```
SELECT Account_Id, Amount, Transaction_Date, COUNT(*) AS Duplicate_Count
FROM HMBank.dbo.Transactions
GROUP BY Account_Id, Amount, Transaction_Date
HAVING COUNT(*) > 1;
```

110 %

Results | Messages

Account_Id	Amount	Transaction_Date	Duplicate_Count

Tasks 4: Subquery and its type:

1. **Retrieve the customer(s) with the highest account balance.**

```
SELECT C.First_Name, C.Last_Name, A.Balance
FROM HMBank.dbo.Customer C
JOIN HMBank.dbo.Accounts A ON C.Customer_Id = A.Customer_ID
WHERE A.Balance = (SELECT MAX(Balance) FROM HMBank.dbo.Accounts);
```

110 %

Results | Messages

	First_Name	Last_Name	Balance
1	Jane	Smith	5000

2. **Calculate the average account balance for customers who have more than one account.**

```
SELECT AVG(A.Balance) AS Avg_Balance
FROM HMBank.dbo.Accounts A
WHERE A.Customer_ID IN (
   SELECT Customer_ID
   FROM HMBank.dbo.Accounts
   GROUP BY Customer_ID
   HAVING COUNT(Account_Id) > 1
);
```

110 %

Results | Messages

	Avg_Balance
1	NULL

3. **Retrieve accounts with transactions whose amounts exceed the average transaction amount.**

```
SELECT *
FROM HMBank.dbo.Transactions
WHERE Amount > (SELECT AVG(Amount) FROM HMBank.dbo.Transactions);
```

110 %

Results | Messages

	Transaction_Id	Account_Id	Transaction_Type	Amount	Transaction_Date
1	2	2	Withdrawal	2000	2024-02-15
2	6	6	Withdrawal	1500	2024-06-15
3	8	8	Deposit	1200	2024-08-20

4. **Identify customers who have no recorded transactions.**

```
SELECT C.First_Name, C.Last_Name
FROM HMBank.dbo.Customer C
WHERE NOT EXISTS (
   SELECT 1 FROM HMBank.dbo.Transactions T
   JOIN HMBank.dbo.Accounts A ON T.Account_Id = A.Account_Id
   WHERE C.Customer_Id = A.Customer_ID
);
```

110 %

Results | Messages

	First_Name	Last_Name
1	Emma	Jones
2	Sophia	Davis

5. **Calculate the total balance of accounts with no recorded transactions.**

```
SELECT SUM(Balance)
FROM HMBank.dbo.Accounts A
WHERE NOT EXISTS (
   SELECT 1 FROM HMBank.dbo.Transactions T
   WHERE T.Account_Id = A.Account_Id
);
```

110 %

Results | Messages

	(No column name)
1	2700

6. **Retrieve transactions for accounts with the lowest balance.**

```
SELECT TOP 10 *
FROM HMBank.dbo.Accounts
ORDER BY Balance DESC;
```

110 %

Results | Messages

	Account_Id	Customer_ID	Account_Type	Balance
1	2	2	Checking	5000
2	8	8	Checking	3200
3	1	1	Savings	3000
4	3	3	Savings	3000
5	4	4	Checking	2500
6	12	2	Checking	2000
7	10	10	Checking	800
8	11	1	Savings	700
9	9	9	Savings	500
10	6	6	Checking	0

7. **Identify customers who have accounts of multiple types.**

```
SELECT C.First_Name, C.Last_Name
FROM HMBank.dbo.Customer C
WHERE C.Customer_Id IN (
    SELECT Customer_ID
    FROM HMBank.dbo.Accounts
    GROUP BY Customer_ID
    HAVING COUNT(DISTINCT Account_Type) > 1
);
```

110 %

Results | Messages

	First_Name	Last_Name
1	John	Doe
2	Emily	Johnson

8. **Calculate the percentage of each account type out of the total number of accounts.**

```
SELECT Account_Type,
       COUNT(*) * 100.0 / (SELECT COUNT(*) FROM HMBank.dbo.Accounts) AS Percentage
FROM HMBank.dbo.Accounts
GROUP BY Account_Type;
```

10 %

Results | Messages

	Account_Type	Percentage
1	Checking	60.000000000000
2	Savings	40.000000000000

9. **Retrieve all transactions for a customer with a given customer_id.**

```
SELECT T.*
FROM HMBank.dbo.Transactions T
JOIN HMBank.dbo.Accounts A ON T.Account_Id = A.Account_Id
WHERE A.Customer_ID = 1;
```

110 %

Results | Messages

	Transaction_Id	Account_Id	Transaction_Type	Amount	Transaction_Date
1	1	1	Deposit	1000	2024-01-01

10. **Calculate the total balance for each account type, including a subquery within the SELECT clause.**

```
SELECT Account_Type,
       (SELECT SUM(Balance) FROM HMBank.dbo.Accounts A2 WHERE A2.Account_Type = A.Account_Type)
       AS Total_Balance
FROM HMBank.dbo.Accounts A
GROUP BY Account_Type;
```

110 %

Results | Messages

	Account_Type	Total_Balance
1	Checking	13500
2	Savings	7200