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Database Project

Banking System

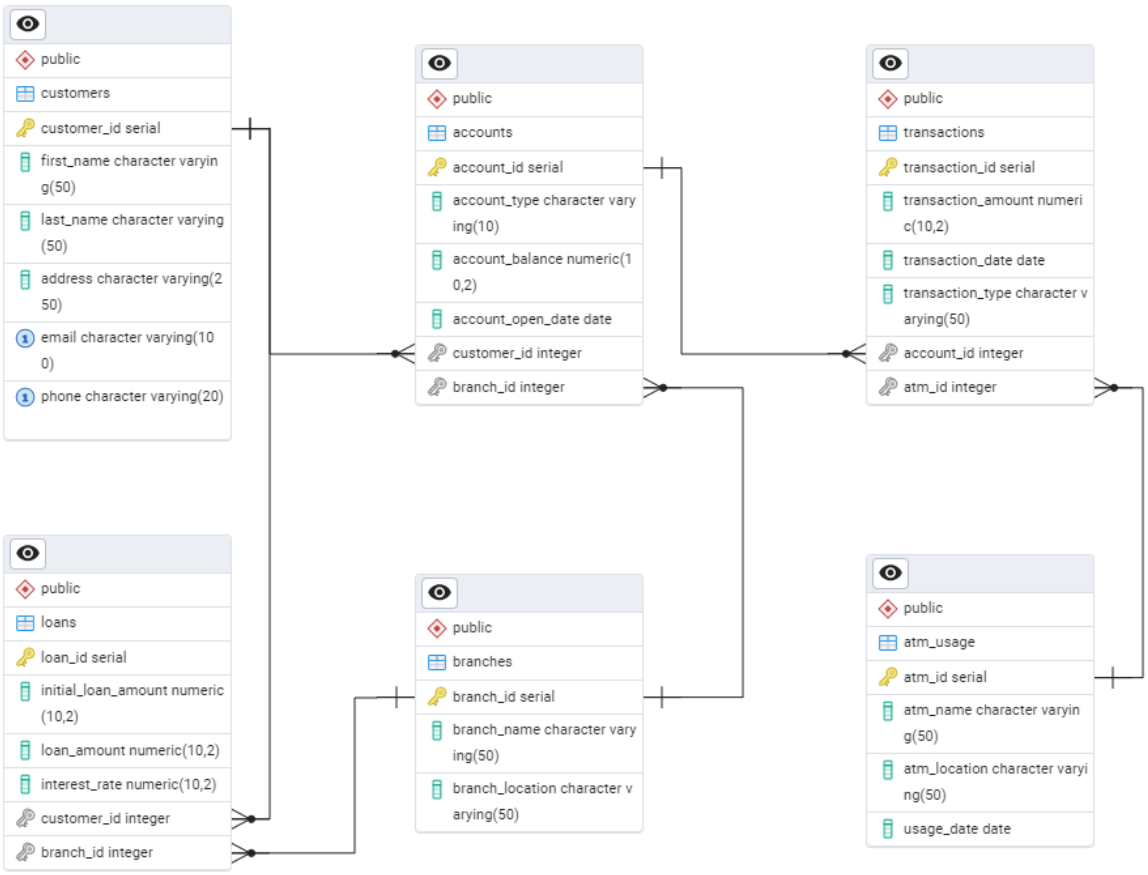

Diagram 1.1 pgAdmin ERD

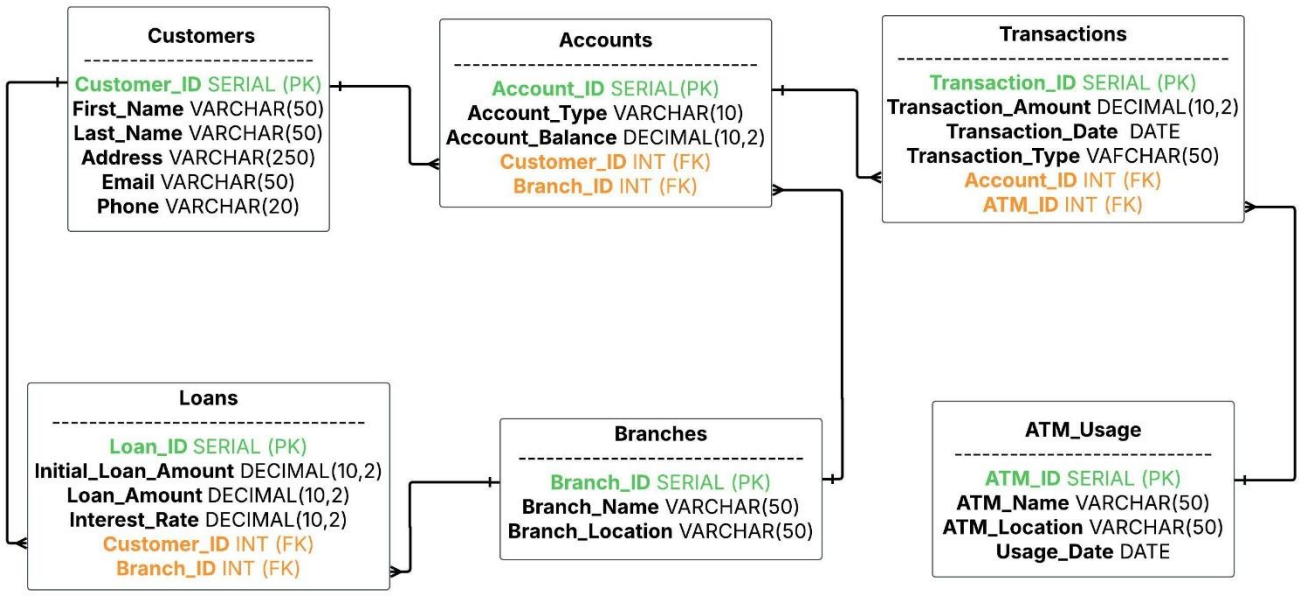

Diagram 1.2 Lucidchart ERD

Database Schema

-- TABLE CREATION

```
CREATE TABLE Customers (
Customer_ID SERIAL PRIMARY KEY,
First_Name VARCHAR(50) NOT NULL,
Last_Name VARCHAR(50) NOT NULL,
Address VARCHAR(250) NOT NULL,
Email VARCHAR (50) UNIQUE,
Phone VARCHAR(20) UNIQUE
);
```

```
CREATE TABLE Branches (
Branch_ID SERIAL PRIMARY KEY,
Branch_Name VARCHAR(50) NOT NULL,
Branch_Location VARCHAR(50) NOT NULL
);

CREATE TABLE Loans (
Loan_ID SERIAL PRIMARY KEY,
Initial_Loan_Amount DECIMAL(10, 2) NOT NULL CHECK(Initial_Loan_Amount >= 0),
Loan_Amount DECIMAL(10, 2) NOT NULL CHECK(Loan_Amount >= 0),
Interest_Rate DECIMAL (10, 2) NOT NULL CHECK(Interest_Rate BETWEEN 0 AND 100),
Customer_ID INT NOT NULL,
Branch_ID INT NOT NULL,
FOREIGN KEY (Customer_ID) REFERENCES Customers(Customer_ID) ON DELETE
CASCADE,
FOREIGN KEY (Branch_ID) REFERENCES Branches(Branch_ID)
);

CREATE TABLE Accounts(
Account_ID SERIAL PRIMARY KEY,
Account_Type VARCHAR(10) NOT NULL CHECK (Account_Type IN ('Chequing', 'Credit',
'Savings')),
Account_Balance DECIMAL(10, 2) DEFAULT 0 CHECK(Account_Balance >= 0),
Account_Open_Date DATE DEFAULT CURRENT_DATE,
Customer_ID INT NOT NULL,
Branch_ID INT NOT NULL,
```

```
FOREIGN KEY (Customer_ID) REFERENCES Customers(Customer_ID) ON DELETE CASCADE,
FOREIGN KEY (Branch_ID) REFERENCES Branches(Branch_ID) ON DELETE SET NULL
);

CREATE TABLE ATM_Usage(
ATM_ID SERIAL PRIMARY KEY,
ATM_Name VARCHAR(50) NOT NULL,
ATM_Location VARCHAR(50) NOT NULL,
Usage_Date DATE DEFAULT CURRENT_DATE
);

CREATE TABLE Transactions (
Transaction_ID SERIAL PRIMARY KEY,
Transaction_Amount DECIMAL(10, 2) NOT NULL CHECK(Transaction_Amount > 0),
Transaction_Date DATE DEFAULT CURRENT_DATE,
Transaction_Type VARCHAR(50) NOT NULL CHECK (Transaction_Type IN ('Deposit', 'Withdrawal')),
Account_ID INT NOT NULL,
ATM_ID INT NOT NULL,
FOREIGN KEY (Account_ID) REFERENCES Accounts(Account_ID) ON DELETE CASCADE,
FOREIGN KEY (ATM_ID) REFERENCES ATM_Usage(ATM_ID) ON DELETE CASCADE
);
```

--INSERT DATA INTO TABLES

```
INSERT INTO Customers (First_Name, Last_Name, Address, Email, Phone)
VALUES
('Anna', 'Kendrick', '1010 rue de Ruelle', 'aken@example.com', '8193310020'),
('Ian', 'Mion', '123 Rue de Sherbrooke', 'ianm9@example.com', '1122343445'),
('John', 'Doe', '456 Elm Street, Toronto', 'johndoe@example.com', '8192234455'),
('Sara', 'Miller', '789 Oak Avenue, Montreal', 'sara.miller@example.com', '5141234567'),
('Michael', 'Smith', '123 Maple Lane, Toronto', 'michael.smith@example.com',
'4167891234'),
('Emily', 'Davis', '333 Pine Crescent, Ottawa', 'emily.davis@example.com', '6139876543'),
('James', 'Brown', '987 Birch Road, Montreal', 'james.brown@example.com', '8194567890'),
('Olivia', 'Johnson', '555 Cedar Blvd, Toronto', 'olivia.johnson@example.com', '4164567890'),
('David', 'Wilson', '222 Birchwood St, Montreal', 'david.wilson@example.com',
'5142345678'),
('Sophia', 'Lee', '888 Spruce Lane, Ottawa', 'sophia.lee@example.com', '6138765432');

INSERT INTO Branches (Branch_Name, Branch_Location)
VALUES
('Branch01', 'Montreal'),
('Branch02', 'Toronto'),
('Branch03', 'Ottawa'),
('Branch04', 'Quebec'),
('Branch05', 'Vancouver'),
('Branch06', 'Calgary'),
('Branch07', 'Edmonton'),
('Branch08', 'Hamilton'),
('Branch09', 'London'),
```

('Branch10', 'Winnipeg');

INSERT INTO ATM_Usage (ATM_Name, ATM_Location, Usage_Date)

VALUES

('ATM01', 'Montreal', '2023-06-01'),

('ATM02', 'Toronto', '2023-06-02'),

('ATM03', 'Ottawa', '2023-06-03'),

('ATM04', 'Quebec', '2023-06-04'),

('ATM05', 'Vancouver', '2023-06-05'),

('ATM06', 'Calgary', '2023-06-06'),

('ATM07', 'Edmonton', '2023-06-07'),

('ATM08', 'Hamilton', '2023-06-08'),

('ATM09', 'London', '2023-06-09'),

('ATM10', 'Winnipeg', '2023-06-10');

INSERT INTO Accounts (Account_Type, Account_Balance, Customer_ID, Branch_ID)

VALUES

('Chequing', 1500, 1, 1),

('Savings', 2500, 2, 2),

('Credit', 3500, 3, 3),

('Chequing', 2200, 4, 4),

('Savings', 5000, 5, 5),

('Chequing', 700, 6, 6),

('Credit', 900, 7, 7),

('Savings', 1200, 8, 8),

('Chequing', 1600, 9, 9),

('Credit', 4000, 10, 10);

INSERT INTO Loans (Initial_Loan_Amount, Loan_Amount, Interest_Rate, Branch_ID, Customer_ID)

VALUES

(15000, 15000, 5.5, 1, 1),

(10000, 10000, 4.7, 2, 2),

(25000, 25000, 6.2, 3, 3),

(5000, 5000, 4.3, 4, 4),

(30000, 30000, 5.0, 5, 5),

(20000, 20000, 6.0, 6, 6),

(15000, 15000, 5.1, 7, 7),

(4000, 4000, 3.8, 8, 8),

(22000, 22000, 5.8, 9, 9),

(18000, 18000, 4.5, 10, 10);

INSERT INTO Transactions (Transaction_Amount, Transaction_Date, Transaction_Type, Account_ID, ATM_ID)

VALUES

(500, '2023-06-01', 'Deposit', 1, 1),

(200, '2023-06-02', 'Withdrawal', 2, 2),

(300, '2023-06-03', 'Deposit', 3, 3),

(150, '2023-06-04', 'Withdrawal', 4, 4),

(1000, '2023-06-05', 'Deposit', 5, 5),

(200, '2023-06-06', 'Withdrawal', 6, 6),

(450, '2023-06-07', 'Deposit', 7, 7),

(600, '2023-06-08', 'Withdrawal', 8, 8),

(250, '2023-06-09', 'Deposit', 9, 9),

(150, '2023-06-10', 'Withdrawal', 10, 10);

Functionalities

Some of the functionalities this database will be able to perform are:

1. List all the customer names and their contact information
2. List all the customer names and their account balance
3. List all the customers who live in Montreal
4. List all the customers and their loan amounts
5. List customer names and the branches they belong to
6. List customers that used an ATM in Montreal
7. Add a new customer into the system
8. Create a new account
9. Delete an account
10. Update the address
11. Generate a report showing a total amount of loans for each customer
12. Generate a report showing the average account balance for the customers in different cities
13. Generate a report showing average loan amount per city
14. Find an ATM with most transactions
15. Order cities by the ATM usage frequency
16. Find the customer that have an account at a Montreal branch
17. Find the customer with the biggest loan amount left to pay
18. Find the biggest account balance for each city
19. Find all the transactions that happened in 2024
20. Generate a report showing the number of transactions per city in 2024