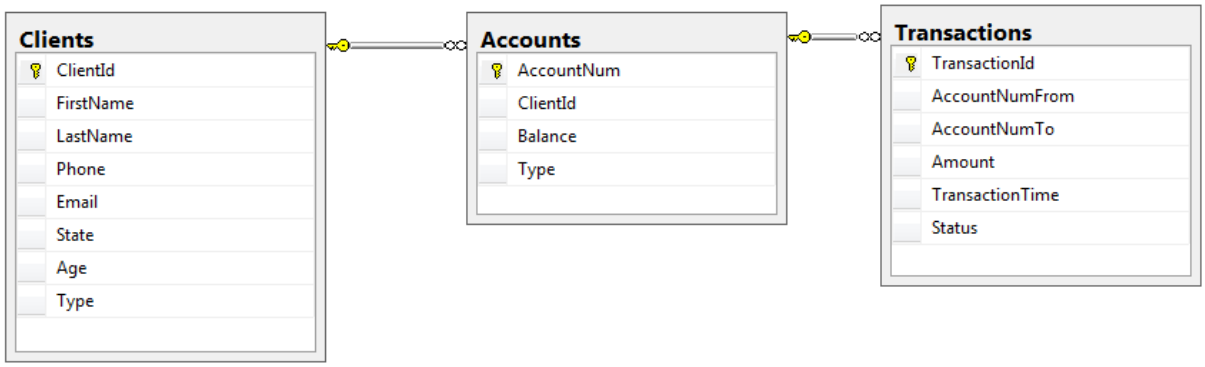
# Database Bank.

## Entity Relationship Diagram

An entity relationship diagram (ERD) shows the relationships of entity sets stored in a database. An entity in this context is a component of data. In other words, ER diagrams illustrate the logical or physical structure of databases.

Schema: **Bank**



## Data Sample.

Table **Bank.Clients**

| | ClientId | FirstName | LastName | Phone | Email | State | Age | Type |
|---|---|---|---|---|---|---|---|---|
| 1 | 1 | John | Smith | 703-543-3302 | John@gmail.com | VA | 33 | Private |
| 2 | 2 | Jereny | Smith | 723-543-3302 | Jeremy@gmail.com | WA | 19 | Private |
| 3 | 3 | Long | Mark | 722-366-5588 | MarkLong@Yahoo.com | TN | 41 | Private |
| 4 | 4 | Bob | James | 703-366-9632 | bob@microsoft.com | VA | 28 | Business |
| 5 | 5 | Adam | Marcos | 703-566-0000 | adam@Marcos.com | CA | 38 | Business |
| 6 | 6 | Jason | Boley | 345-234-9784 | json@blabla.com | NY | 31 | Business |
| 7 | 7 | Tom | Soyer | 572-223-5392 | stom@hotmail.com | NJ | 49 | Private |

Table **Bank.Accounts**

| | AccountNum | ClientId | Balance | Type |
|---|---|---|---|---|
| 1 | 1 | 1 | 10200.00 | CHECKING |
| 2 | 2 | 1 | 3550.00 | CREDIT |
| 3 | 3 | 2 | 1001.00 | CHECKING |
| 4 | 4 | 2 | 150.00 | CREDIT |
| 5 | 5 | 3 | 1303.00 | CHECKING |
| 6 | 6 | 3 | 25000.00 | SAVING |
| 7 | 7 | 4 | 15731.00 | CHECKING |
| 8 | 8 | 4 | 31014.00 | SAVING |
| 9 | 9 | 5 | 1724.00 | CHECKING |
| 10 | 10 | 5 | 3043.00 | CREDIT |
| 11 | 11 | 5 | 79320.00 | SAVING |

Table **Bank.Transactions**

| | TransactionId | AccountNumFrom | AccountNumTo | Amount | TransactionTime | Status |
|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 2 | 150.00 | 2015-01-10 00:00:00.000 | Pending |
| 2 | 2 | 1 | 4 | 1000.00 | 2016-02-11 00:00:00.000 | Commited |
| 3 | 3 | 1 | 8 | 100.00 | 2016-04-01 00:00:00.000 | Rejected |
| 4 | 4 | 1 | 9 | 343.55 | 2017-01-18 00:00:00.000 | Pending |
| 5 | 5 | 2 | 9 | 36.70 | 2016-12-10 00:00:00.000 | Commited |
| 6 | 6 | 3 | 9 | 100.00 | 2016-12-12 00:00:00.000 | Commited |
| 7 | 7 | 5 | 9 | 1500.00 | 2015-01-10 00:00:00.000 | Commited |
| 8 | 8 | 5 | 10 | 1500.00 | 2016-06-13 00:00:00.000 | Rejected |
| 9 | 9 | 9 | 10 | 2300.00 | 2016-11-30 00:00:00.000 | Commited |
| 10 | 10 | 9 | 11 | 15000.00 | 2017-01-01 00:00:00.000 | Commited |

## SQL Table definition (DDL).

Data Definition Language (DDL) is a standard for commands that define the structures in a database. DDL statements create, modify, and remove database objects such as tables, indexes, and users. Common DDL statements are CREATE, ALTER, and DROP

```
CREATE TABLE Bank.Clients
(
    ClientId int not null IDENTITY(1,1) PRIMARY KEY,
    FirstName varchar(100),
    LastName varchar(100),
    Phone varchar(20),
    Email varchar(20),
    State CHAR(2),
    Age INT,
    Type varchar(10)
);
```

```
CREATE TABLE Bank.Accounts
(
    AccountNum int not null PRIMARY KEY,
    ClientId INT NOT NULL,
    Balance numeric(10,2),
    Type CHAR(10)
);
ALTER TABLE Accounts ADD FOREIGN KEY (ClientId) REFERENCES Bank.Clients(ClientId);
```

```
CREATE TABLE Bank.Transactions
(
   TransactionId int not null IDENTITY(1,1) PRIMARY KEY,
   AccountNumFrom int,
   AccountNumTo int,
   Amount numeric(10,2),
   TransactionTime DateTime not null default GETDATE(),
   Status VARCHAR(10)
 );

ALTER TABLE Transactions ADD FOREIGN KEY (AccountNumFrom) REFERENCES Bank.Accounts(AccountNum);

ALTER TABLE Transactions ADD FOREIGN KEY (AccountNumTo) REFERENCES Bank.Accounts(AccountNum);
```

## SQL Query tasks (DML)

**Clients**

1. Get all a data from Table Clients
2. Find all Clients with LastName ='Smith'
3. Get the **FirstName,LastName,Phone,State** for all clients from Virginia.
4. Get the **FirstName,LastName,Phone,Email** of all clients who have an Gmail account.
5. Get all data of client whose LastName starts from letter 'M'
6. Get all data of client whose LastName starts from letter 'M' and has the last letter 'S'
7. Get names and phones of all Business clients.
8. Get information about clients younger than 20.
9. Get information about clients whose age between 20 and 40.
10. (Agg) Find the age of the youngest client and average age of our clients.
11. (Agg) Find average age and number of our Private clients.
12. (Agg) Find the age of oldest client who lives not in New Jersey.

**Accounts**

1. Show balances of all 'CREDIT' accounts.
2. Find all 'checking' accounts with Balance bigger than $2000.
3. (Agg) Find the biggest balance.
4. (Agg) Calculate the average balance by each client.
5. (Agg) Calculate the average balance and number of Accounts by each Client.

**Transactions**

1. Find all 'Pending' transactions.
2. Find all 'commited' transactions made since '1-jan-2016'
3. Find all transactions made in 2016 year.
4. (Agg) Find average amount of transactions
5. (Agg) Find average amount and number of transactions paid by each Account.

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Send your homework to email Andrew.a4100@gmail.com for validation