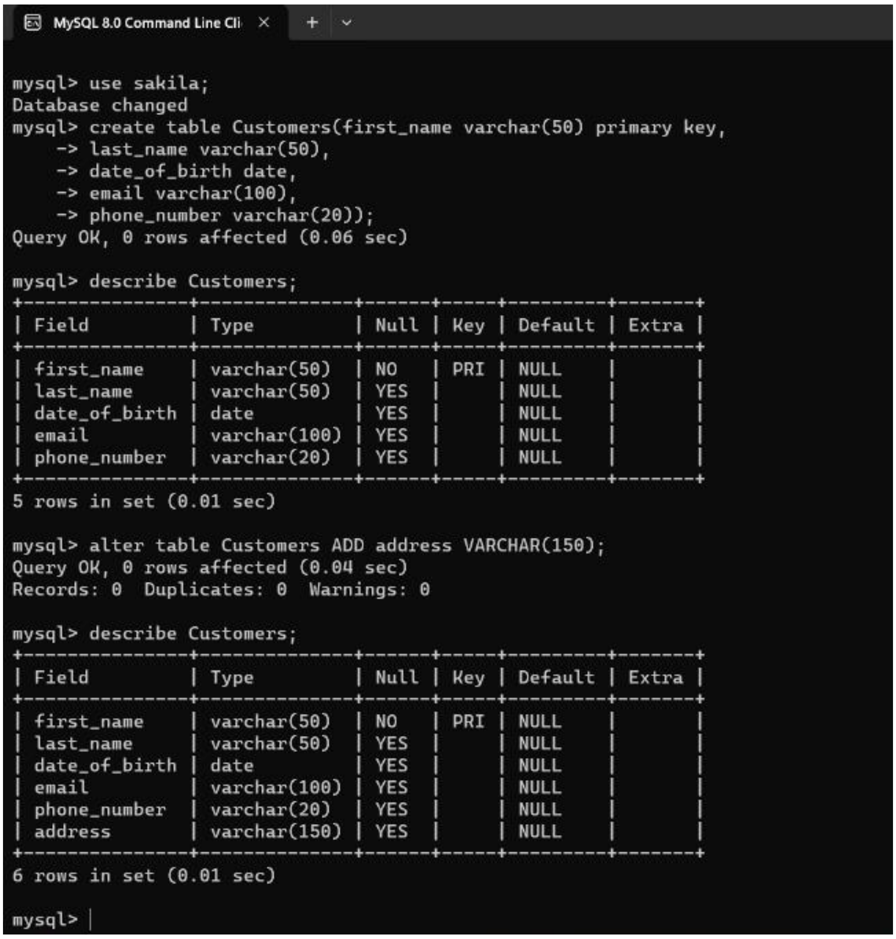
Assignment – 3

Madiha Aimon Tappal

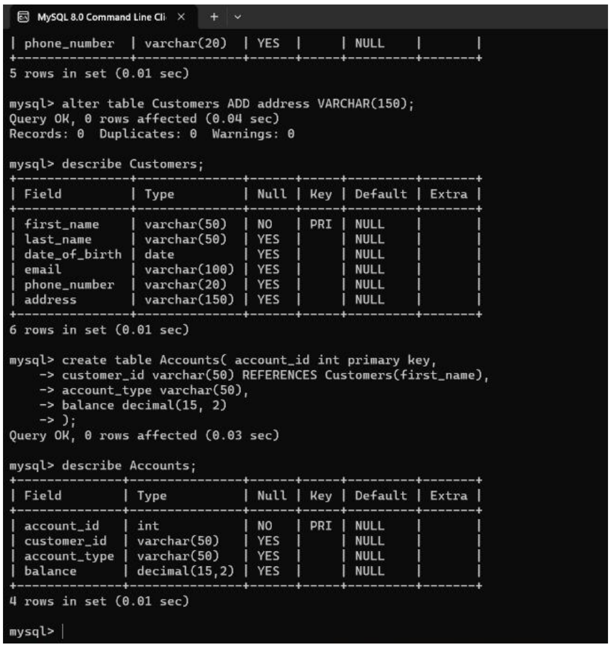
Database Tables:

1. **Customers:**
   - Customer_id(Primary key)
   - First_name
   - Last_name
   - DOB(Date of birth)
   - Email
   - Phone_number
   - Address



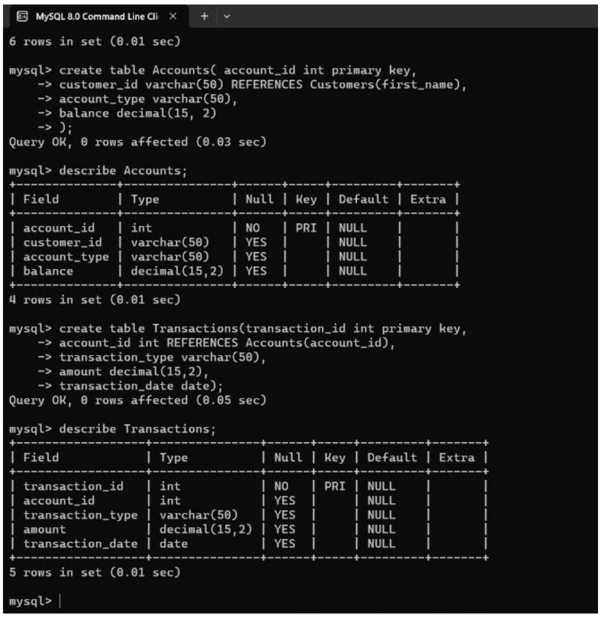
```
mysql> use sakila;
Database changed
mysql> create table Customers(first_name varchar(50) primary key,
    -> last_name varchar(50),
    -> date_of_birth date,
    -> email varchar(100),
    -> phone_number varchar(20));
Query OK, 0 rows affected (0.06 sec)

mysql> describe Customers;
+---------------+--------------+------+-----+---------+-------+
| Field         | Type         | Null | Key | Default | Extra |
+---------------+--------------+------+-----+---------+-------+
| first_name    | varchar(50)  | NO   | PRI | NULL    |       |
| last_name     | varchar(50)  | YES  |     | NULL    |       |
| date_of_birth | date         | YES  |     | NULL    |       |
| email         | varchar(100) | YES  |     | NULL    |       |
| phone_number  | varchar(20)  | YES  |     | NULL    |       |
+---------------+--------------+------+-----+---------+-------+
5 rows in set (0.01 sec)

mysql> alter table Customers ADD address VARCHAR(150);
Query OK, 0 rows affected (0.04 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> describe Customers;
+---------------+--------------+------+-----+---------+-------+
| Field         | Type         | Null | Key | Default | Extra |
+---------------+--------------+------+-----+---------+-------+
| first_name    | varchar(50)  | NO   | PRI | NULL    |       |
| last_name     | varchar(50)  | YES  |     | NULL    |       |
| date_of_birth | date         | YES  |     | NULL    |       |
| email         | varchar(100) | YES  |     | NULL    |       |
| phone_number  | varchar(20)  | YES  |     | NULL    |       |
| address       | varchar(150) | YES  |     | NULL    |       |
+---------------+--------------+------+-----+---------+-------+
6 rows in set (0.01 sec)

mysql>
```

2. **Accounts:**
    - Account_id(Primary Key)
    - Customer_id(Foreign key)
    - Account_type(e.g., saving, current, zero_balance)
    - Balance



```
| phone_number  | varchar(20)  | YES  |     | NULL    |       |
+---------------+--------------+------+-----+---------+-------+
5 rows in set (0.01 sec)

mysql> alter table Customers ADD address VARCHAR(150);
Query OK, 0 rows affected (0.04 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> describe Customers;
+---------------+--------------+------+-----+---------+-------+
| Field         | Type         | Null | Key | Default | Extra |
+---------------+--------------+------+-----+---------+-------+
| first_name    | varchar(50)  | NO   | PRI | NULL    |       |
| last_name     | varchar(50)  | YES  |     | NULL    |       |
| date_of_birth | date         | YES  |     | NULL    |       |
| email         | varchar(100) | YES  |     | NULL    |       |
| phone_number  | varchar(20)  | YES  |     | NULL    |       |
| address       | varchar(150) | YES  |     | NULL    |       |
+---------------+--------------+------+-----+---------+-------+
6 rows in set (0.01 sec)

mysql> create table Accounts( account_id int primary key,
    -> customer_id varchar(50) REFERENCES Customers(first_name),
    -> account_type varchar(50),
    -> balance decimal(15, 2)
    -> );
Query OK, 0 rows affected (0.03 sec)

mysql> describe Accounts;
+--------------+---------------+------+-----+---------+-------+
| Field        | Type          | Null | Key | Default | Extra |
+--------------+---------------+------+-----+---------+-------+
| account_id   | int           | NO   | PRI | NULL    |       |
| customer_id  | varchar(50)   | YES  |     | NULL    |       |
| account_type | varchar(50)   | YES  |     | NULL    |       |
| balance      | decimal(15,2) | YES  |     | NULL    |       |
+--------------+---------------+------+-----+---------+-------+
4 rows in set (0.01 sec)

mysql>
```

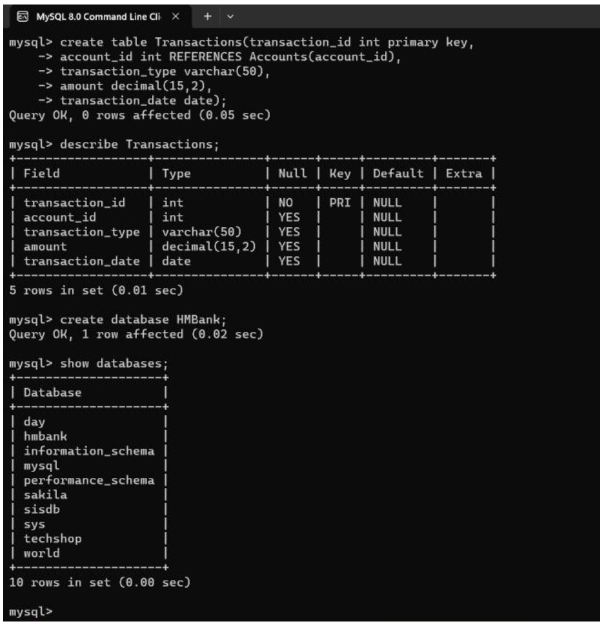
3. **Transactions:**
    - Transaction_id(Primary Key)
    - Account_id (Foreign key)
    - Transaction_type (e.g.,deposit, withdrawal, transfer)
    - Amount
    - Transaction_date



```
6 rows in set (0.01 sec)

mysql> create table Accounts( account_id int primary key,
    -> customer_id varchar(50) REFERENCES Customers(first_name),
    -> account_type varchar(50),
    -> balance decimal(15, 2)
    -> );
Query OK, 0 rows affected (0.03 sec)

mysql> describe Accounts;
+--------------+---------------+------+-----+---------+-------+
| Field        | Type          | Null | Key | Default | Extra |
+--------------+---------------+------+-----+---------+-------+
| account_id   | int           | NO   | PRI | NULL    |       |
| customer_id  | varchar(50)   | YES  |     | NULL    |       |
| account_type | varchar(50)   | YES  |     | NULL    |       |
| balance      | decimal(15,2) | YES  |     | NULL    |       |
+--------------+---------------+------+-----+---------+-------+
4 rows in set (0.01 sec)

mysql> create table Transactions(transaction_id int primary key,
    -> account_id int REFERENCES Accounts(account_id),
    -> transaction_type varchar(50),
    -> amount decimal(15,2),
    -> transaction_date date);
Query OK, 0 rows affected (0.05 sec)

mysql> describe Transactions;
+------------------+---------------+------+-----+---------+-------+
| Field            | Type          | Null | Key | Default | Extra |
+------------------+---------------+------+-----+---------+-------+
| transaction_id   | int           | NO   | PRI | NULL    |       |
| account_id       | int           | YES  |     | NULL    |       |
| transaction_type | varchar(50)   | YES  |     | NULL    |       |
| amount           | decimal(15,2) | YES  |     | NULL    |       |
| transaction_date | date          | YES  |     | NULL    |       |
+------------------+---------------+------+-----+---------+-------+
5 rows in set (0.01 sec)

mysql>
```

Task 1: <u>Database Design:</u>

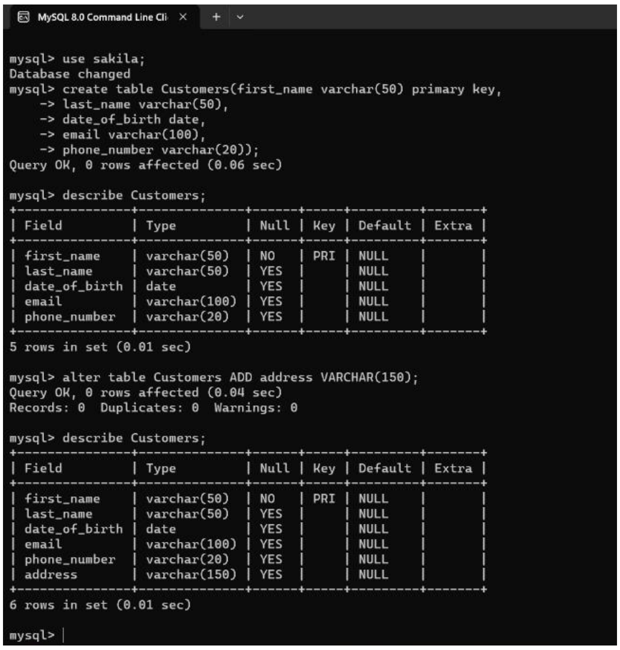
1. Create the database named “HMBank”.?



```
mysql> create table Transactions(transaction_id int primary key,
    -> account_id int REFERENCES Accounts(account_id),
    -> transaction_type varchar(50),
    -> amount decimal(15,2),
    -> transaction_date date);
Query OK, 0 rows affected (0.05 sec)

mysql> describe Transactions;
+------------------+---------------+------+-----+---------+-------+
| Field            | Type          | Null | Key | Default | Extra |
+------------------+---------------+------+-----+---------+-------+
| transaction_id   | int           | NO   | PRI | NULL    |       |
| account_id       | int           | YES  |     | NULL    |       |
| transaction_type | varchar(50)   | YES  |     | NULL    |       |
| amount           | decimal(15,2) | YES  |     | NULL    |       |
| transaction_date | date          | YES  |     | NULL    |       |
+------------------+---------------+------+-----+---------+-------+
5 rows in set (0.01 sec)

mysql> create database HMBank;
Query OK, 1 row affected (0.02 sec)

mysql> show databases;
+--------------------+
| Database           |
+--------------------+
| day                |
| hmbank             |
| information_schema |
| mysql              |
| performance_schema |
| sakila             |
| sisdb              |
| sys                |
| techshop           |
| world              |
+--------------------+
10 rows in set (0.00 sec)

mysql>
```

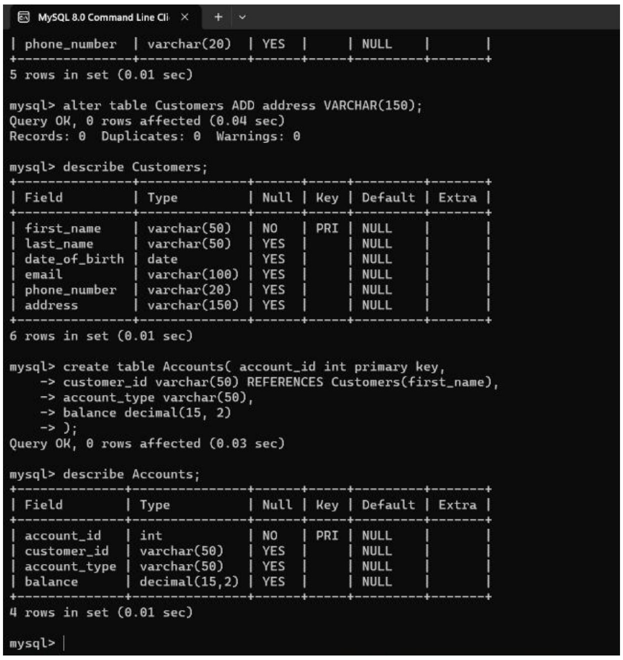
2. Define the schema for the Customers, Accounts, and Transactions tables based on the provided schema.
    - Customers
    - Accounts
    - Transactions

1. Customers:



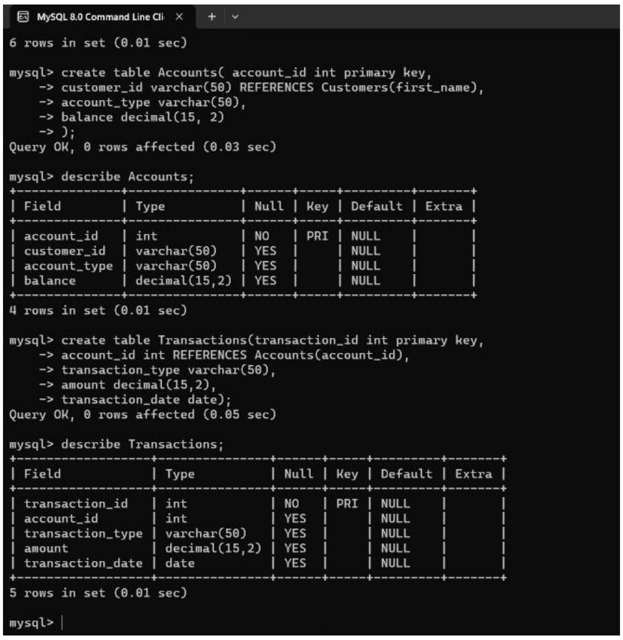
```
mysql> use sakila;
Database changed
mysql> create table Customers(first_name varchar(50) primary key,
    -> last_name varchar(50),
    -> date_of_birth date,
    -> email varchar(100),
    -> phone_number varchar(20));
Query OK, 0 rows affected (0.06 sec)

mysql> describe Customers;
+---------------+--------------+------+-----+---------+-------+
| Field         | Type         | Null | Key | Default | Extra |
+---------------+--------------+------+-----+---------+-------+
| first_name    | varchar(50)  | NO   | PRI | NULL    |       |
| last_name     | varchar(50)  | YES  |     | NULL    |       |
| date_of_birth | date         | YES  |     | NULL    |       |
| email         | varchar(100) | YES  |     | NULL    |       |
| phone_number  | varchar(20)  | YES  |     | NULL    |       |
+---------------+--------------+------+-----+---------+-------+
5 rows in set (0.01 sec)

mysql> alter table Customers ADD address VARCHAR(150);
Query OK, 0 rows affected (0.04 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> describe Customers;
+---------------+--------------+------+-----+---------+-------+
| Field         | Type         | Null | Key | Default | Extra |
+---------------+--------------+------+-----+---------+-------+
| first_name    | varchar(50)  | NO   | PRI | NULL    |       |
| last_name     | varchar(50)  | YES  |     | NULL    |       |
| date_of_birth | date         | YES  |     | NULL    |       |
| email         | varchar(100) | YES  |     | NULL    |       |
| phone_number  | varchar(20)  | YES  |     | NULL    |       |
| address       | varchar(150) | YES  |     | NULL    |       |
+---------------+--------------+------+-----+---------+-------+
6 rows in set (0.01 sec)

mysql>
```

2. Accounts:



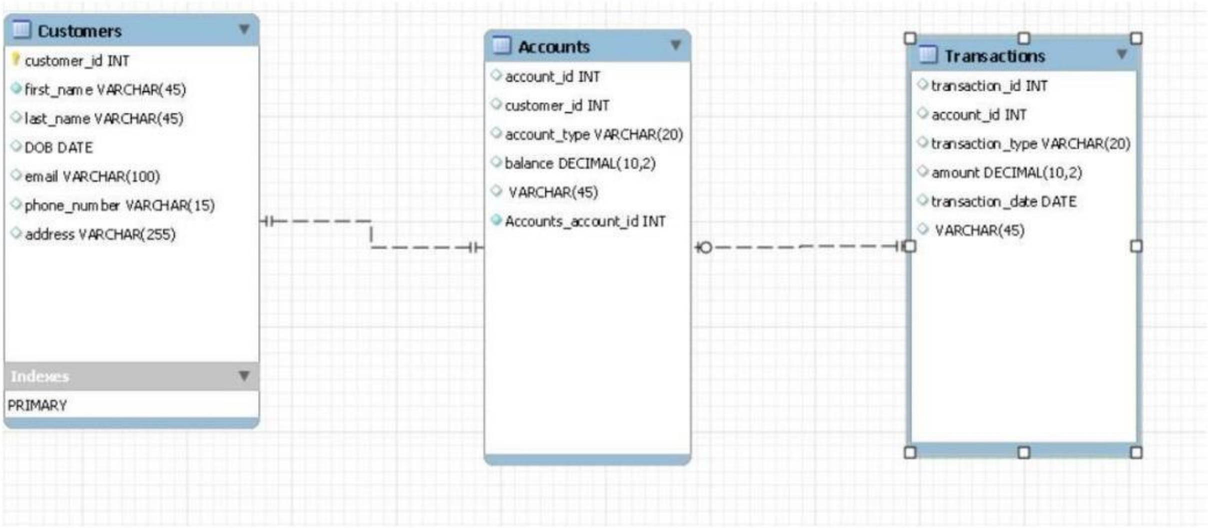
```
| phone_number  | varchar(20)  | YES  |     | NULL    |       |
+---------------+--------------+------+-----+---------+-------+
5 rows in set (0.01 sec)

mysql> alter table Customers ADD address VARCHAR(150);
Query OK, 0 rows affected (0.04 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> describe Customers;
+---------------+--------------+------+-----+---------+-------+
| Field         | Type         | Null | Key | Default | Extra |
+---------------+--------------+------+-----+---------+-------+
| first_name    | varchar(50)  | NO   | PRI | NULL    |       |
| last_name     | varchar(50)  | YES  |     | NULL    |       |
| date_of_birth | date         | YES  |     | NULL    |       |
| email         | varchar(100) | YES  |     | NULL    |       |
| phone_number  | varchar(20)  | YES  |     | NULL    |       |
| address       | varchar(150) | YES  |     | NULL    |       |
+---------------+--------------+------+-----+---------+-------+
6 rows in set (0.01 sec)

mysql> create table Accounts( account_id int primary key,
    -> customer_id varchar(50) REFERENCES Customers(first_name),
    -> account_type varchar(50),
    -> balance decimal(15, 2)
    -> );
Query OK, 0 rows affected (0.03 sec)

mysql> describe Accounts;
+--------------+---------------+------+-----+---------+-------+
| Field        | Type          | Null | Key | Default | Extra |
+--------------+---------------+------+-----+---------+-------+
| account_id   | int           | NO   | PRI | NULL    |       |
| customer_id  | varchar(50)   | YES  |     | NULL    |       |
| account_type | varchar(50)   | YES  |     | NULL    |       |
| balance      | decimal(15,2) | YES  |     | NULL    |       |
+--------------+---------------+------+-----+---------+-------+
4 rows in set (0.01 sec)

mysql> |
```

3. Transactions:



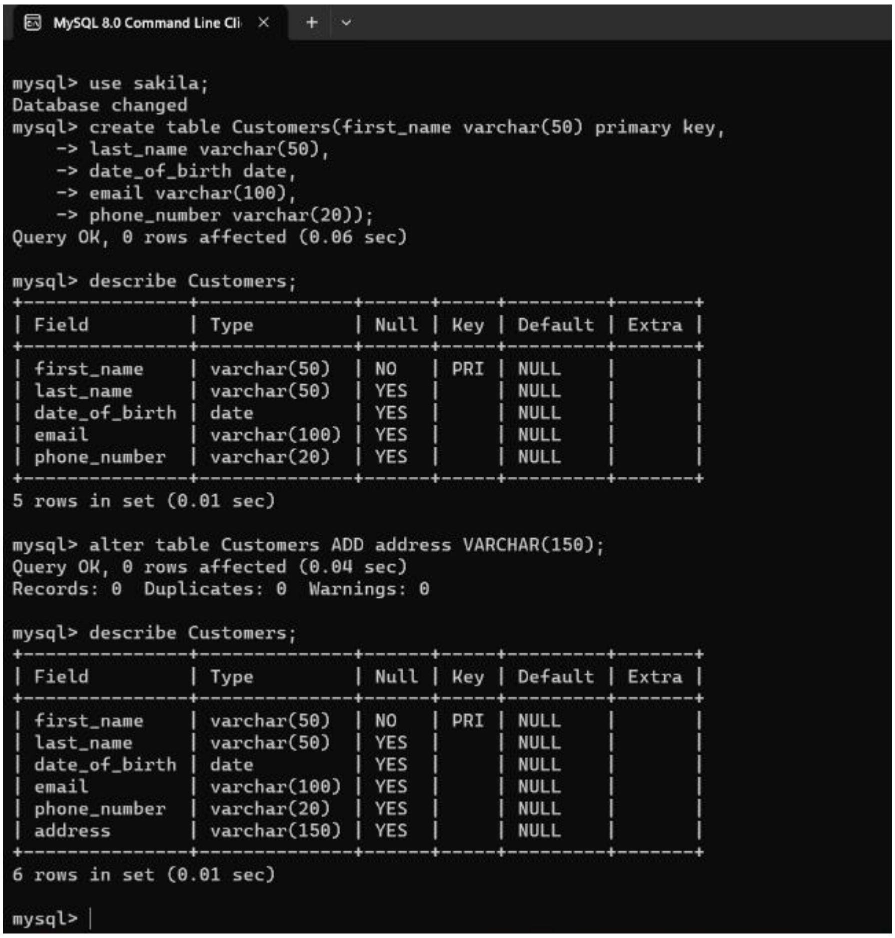
```
6 rows in set (0.01 sec)

mysql> create table Accounts( account_id int primary key,
    -> customer_id varchar(50) REFERENCES Customers(first_name),
    -> account_type varchar(50),
    -> balance decimal(15, 2)
    -> );
Query OK, 0 rows affected (0.03 sec)

mysql> describe Accounts;
+--------------+---------------+------+-----+---------+-------+
| Field        | Type          | Null | Key | Default | Extra |
+--------------+---------------+------+-----+---------+-------+
| account_id   | int           | NO   | PRI | NULL    |       |
| customer_id  | varchar(50)   | YES  |     | NULL    |       |
| account_type | varchar(50)   | YES  |     | NULL    |       |
| balance      | decimal(15,2) | YES  |     | NULL    |       |
+--------------+---------------+------+-----+---------+-------+
4 rows in set (0.01 sec)

mysql> create table Transactions(transaction_id int primary key,
    -> account_id int REFERENCES Accounts(account_id),
    -> transaction_type varchar(50),
    -> amount decimal(15,2),
    -> transaction_date date);
Query OK, 0 rows affected (0.05 sec)

mysql> describe Transactions;
+------------------+---------------+------+-----+---------+-------+
| Field            | Type          | Null | Key | Default | Extra |
+------------------+---------------+------+-----+---------+-------+
| transaction_id   | int           | NO   | PRI | NULL    |       |
| account_id       | int           | YES  |     | NULL    |       |
| transaction_type | varchar(50)   | YES  |     | NULL    |       |
| amount           | decimal(15,2) | YES  |     | NULL    |       |
| transaction_date | date          | YES  |     | NULL    |       |
+------------------+---------------+------+-----+---------+-------+
5 rows in set (0.01 sec)

mysql> |
```

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



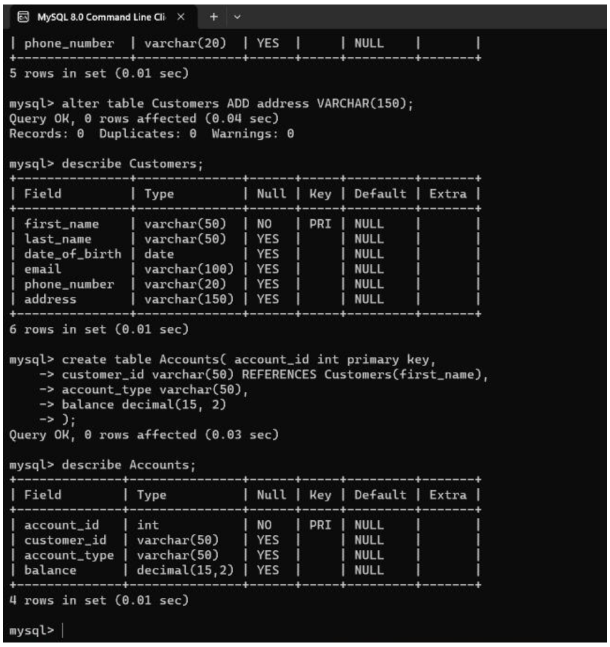
5. Create appropriate Primary Key and Forign Key Constrains for referential integrity.

1. **Customers:**



```
mysql> use sakila;
Database changed
mysql> create table Customers(first_name varchar(50) primary key,
    -> last_name varchar(50),
    -> date_of_birth date,
    -> email varchar(100),
    -> phone_number varchar(20));
Query OK, 0 rows affected (0.06 sec)

mysql> describe Customers;
+---------------+--------------+------+-----+---------+-------+
| Field         | Type         | Null | Key | Default | Extra |
+---------------+--------------+------+-----+---------+-------+
| first_name    | varchar(50)  | NO   | PRI | NULL    |       |
| last_name     | varchar(50)  | YES  |     | NULL    |       |
| date_of_birth | date         | YES  |     | NULL    |       |
| email         | varchar(100) | YES  |     | NULL    |       |
| phone_number  | varchar(20)  | YES  |     | NULL    |       |
+---------------+--------------+------+-----+---------+-------+
5 rows in set (0.01 sec)

mysql> alter table Customers ADD address VARCHAR(150);
Query OK, 0 rows affected (0.04 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> describe Customers;
+---------------+--------------+------+-----+---------+-------+
| Field         | Type         | Null | Key | Default | Extra |
+---------------+--------------+------+-----+---------+-------+
| first_name    | varchar(50)  | NO   | PRI | NULL    |       |
| last_name     | varchar(50)  | YES  |     | NULL    |       |
| date_of_birth | date         | YES  |     | NULL    |       |
| email         | varchar(100) | YES  |     | NULL    |       |
| phone_number  | varchar(20)  | YES  |     | NULL    |       |
| address       | varchar(150) | YES  |     | NULL    |       |
+---------------+--------------+------+-----+---------+-------+
6 rows in set (0.01 sec)

mysql> |
```

2. Accounts:



```
| phone_number  | varchar(20)  | YES  |     | NULL    |       |
+---------------+--------------+------+-----+---------+-------+
5 rows in set (0.01 sec)

mysql> alter table Customers ADD address VARCHAR(150);
Query OK, 0 rows affected (0.04 sec)
Records: 0  Duplicates: 0  Warnings: 0

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+---------------+--------------+------+-----+---------+-------+
| Field         | Type         | Null | Key | Default | Extra |
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| first_name    | varchar(50)  | NO   | PRI | NULL    |       |
| last_name     | varchar(50)  | YES  |     | NULL    |       |
| date_of_birth | date         | YES  |     | NULL    |       |
| email         | varchar(100) | YES  |     | NULL    |       |
| phone_number  | varchar(20)  | YES  |     | NULL    |       |
| address       | varchar(150) | YES  |     | NULL    |       |
+---------------+--------------+------+-----+---------+-------+
6 rows in set (0.01 sec)

mysql> create table Accounts( account_id int primary key,
    -> customer_id varchar(50) REFERENCES Customers(first_name),
    -> account_type varchar(50),
    -> balance decimal(15, 2)
    -> );
Query OK, 0 rows affected (0.03 sec)

mysql> describe Accounts;
+--------------+---------------+------+-----+---------+-------+
| Field        | Type          | Null | Key | Default | Extra |
+--------------+---------------+------+-----+---------+-------+
| account_id   | int           | NO   | PRI | NULL    |       |
| customer_id  | varchar(50)   | YES  |     | NULL    |       |
| account_type | varchar(50)   | YES  |     | NULL    |       |
| balance      | decimal(15,2) | YES  |     | NULL    |       |
+--------------+---------------+------+-----+---------+-------+
4 rows in set (0.01 sec)

mysql>
```
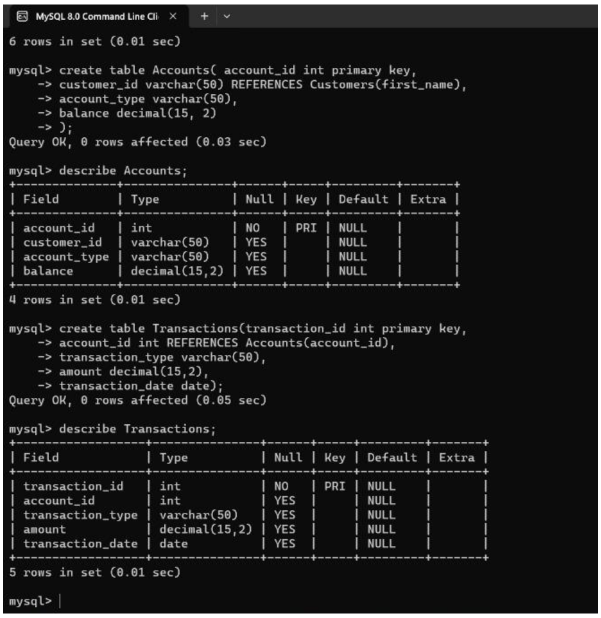

3. Transactions:



```
6 rows in set (0.01 sec)

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+--------------+---------------+------+-----+---------+-------+
| Field        | Type          | Null | Key | Default | Extra |
+--------------+---------------+------+-----+---------+-------+
| account_id   | int           | NO   | PRI | NULL    |       |
| customer_id  | varchar(50)   | YES  |     | NULL    |       |
| account_type | varchar(50)   | YES  |     | NULL    |       |
| balance      | decimal(15,2) | YES  |     | NULL    |       |
+--------------+---------------+------+-----+---------+-------+
4 rows in set (0.01 sec)

mysql> create table Transactions(transaction_id int primary key,
    -> account_id int REFERENCES Accounts(account_id),
    -> transaction_type varchar(50),
    -> amount decimal(15,2),
    -> transaction_date date);
Query OK, 0 rows affected (0.05 sec)

mysql> describe Transactions;
+------------------+---------------+------+-----+---------+-------+
| Field            | Type          | Null | Key | Default | Extra |
+------------------+---------------+------+-----+---------+-------+
| transaction_id   | int           | NO   | PRI | NULL    |       |
| account_id       | int           | YES  |     | NULL    |       |
| transaction_type | varchar(50)   | YES  |     | NULL    |       |
| amount           | decimal(15,2) | YES  |     | NULL    |       |
| transaction_date | date          | YES  |     | NULL    |       |
+------------------+---------------+------+-----+---------+-------+
5 rows in set (0.01 sec)

mysql>
```
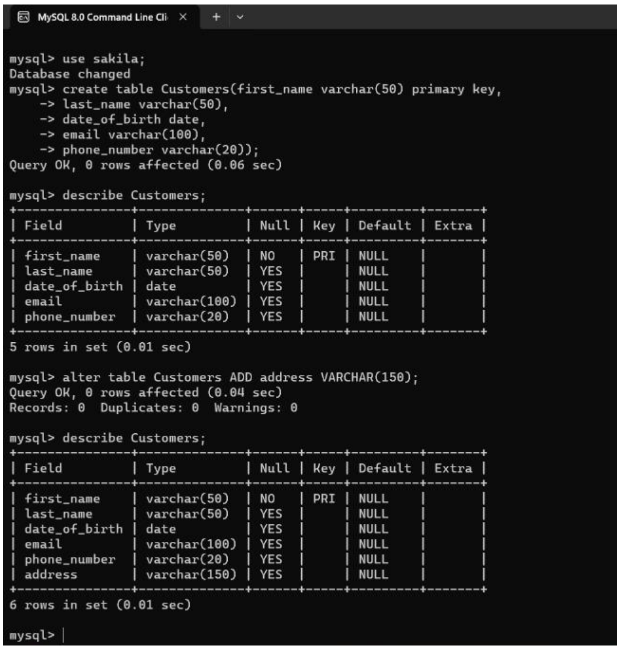

6. Write SQL scripts to create the mentioned tables with appropriate data types, constraints, and relationships.

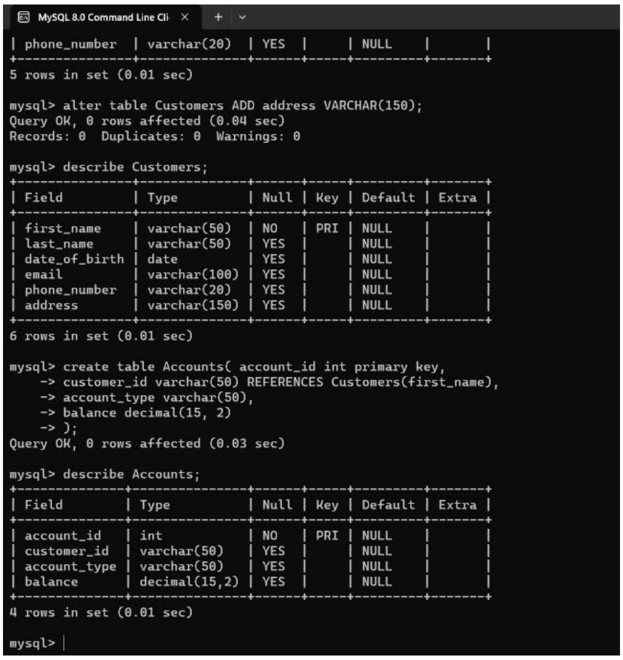
- Customers
- Accounts
- Transactions

1. Customers:



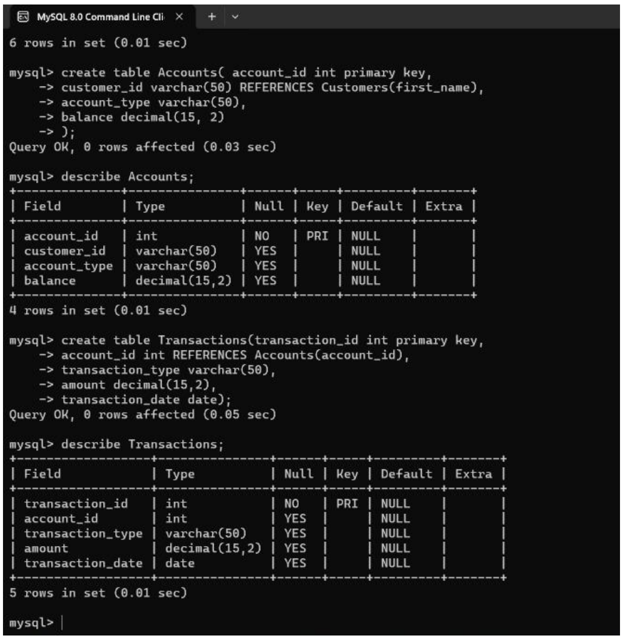
```
mysql> use sakila;
Database changed
mysql> create table Customers(first_name varchar(50) primary key,
    -> last_name varchar(50),
    -> date_of_birth date,
    -> email varchar(100),
    -> phone_number varchar(20));
Query OK, 0 rows affected (0.06 sec)

mysql> describe Customers;
+---------------+--------------+------+-----+---------+-------+
| Field         | Type         | Null | Key | Default | Extra |
+---------------+--------------+------+-----+---------+-------+
| first_name    | varchar(50)  | NO   | PRI | NULL    |       |
| last_name     | varchar(50)  | YES  |     | NULL    |       |
| date_of_birth | date         | YES  |     | NULL    |       |
| email         | varchar(100) | YES  |     | NULL    |       |
| phone_number  | varchar(20)  | YES  |     | NULL    |       |
+---------------+--------------+------+-----+---------+-------+
5 rows in set (0.01 sec)

mysql> alter table Customers ADD address VARCHAR(150);
Query OK, 0 rows affected (0.04 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> describe Customers;
+---------------+--------------+------+-----+---------+-------+
| Field         | Type         | Null | Key | Default | Extra |
+---------------+--------------+------+-----+---------+-------+
| first_name    | varchar(50)  | NO   | PRI | NULL    |       |
| last_name     | varchar(50)  | YES  |     | NULL    |       |
| date_of_birth | date         | YES  |     | NULL    |       |
| email         | varchar(100) | YES  |     | NULL    |       |
| phone_number  | varchar(20)  | YES  |     | NULL    |       |
| address       | varchar(150) | YES  |     | NULL    |       |
+---------------+--------------+------+-----+---------+-------+
6 rows in set (0.01 sec)

mysql> |
```

2. Accounts



```
| phone_number  | varchar(20)  | YES  |     | NULL    |       |
+---------------+--------------+------+-----+---------+-------+
5 rows in set (0.01 sec)

mysql> alter table Customers ADD address VARCHAR(150);
Query OK, 0 rows affected (0.04 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> describe Customers;
+---------------+--------------+------+-----+---------+-------+
| Field         | Type         | Null | Key | Default | Extra |
+---------------+--------------+------+-----+---------+-------+
| first_name    | varchar(50)  | NO   | PRI | NULL    |       |
| last_name     | varchar(50)  | YES  |     | NULL    |       |
| date_of_birth | date         | YES  |     | NULL    |       |
| email         | varchar(100) | YES  |     | NULL    |       |
| phone_number  | varchar(20)  | YES  |     | NULL    |       |
| address       | varchar(150) | YES  |     | NULL    |       |
+---------------+--------------+------+-----+---------+-------+
6 rows in set (0.01 sec)

mysql> create table Accounts( account_id int primary key,
    -> customer_id varchar(50) REFERENCES Customers(first_name),
    -> account_type varchar(50),
    -> balance decimal(15, 2)
    -> );
Query OK, 0 rows affected (0.03 sec)

mysql> describe Accounts;
+--------------+---------------+------+-----+---------+-------+
| Field        | Type          | Null | Key | Default | Extra |
+--------------+---------------+------+-----+---------+-------+
| account_id   | int           | NO   | PRI | NULL    |       |
| customer_id  | varchar(50)   | YES  |     | NULL    |       |
| account_type | varchar(50)   | YES  |     | NULL    |       |
| balance      | decimal(15,2) | YES  |     | NULL    |       |
+--------------+---------------+------+-----+---------+-------+
4 rows in set (0.01 sec)

mysql> |
```

3. Transactions:



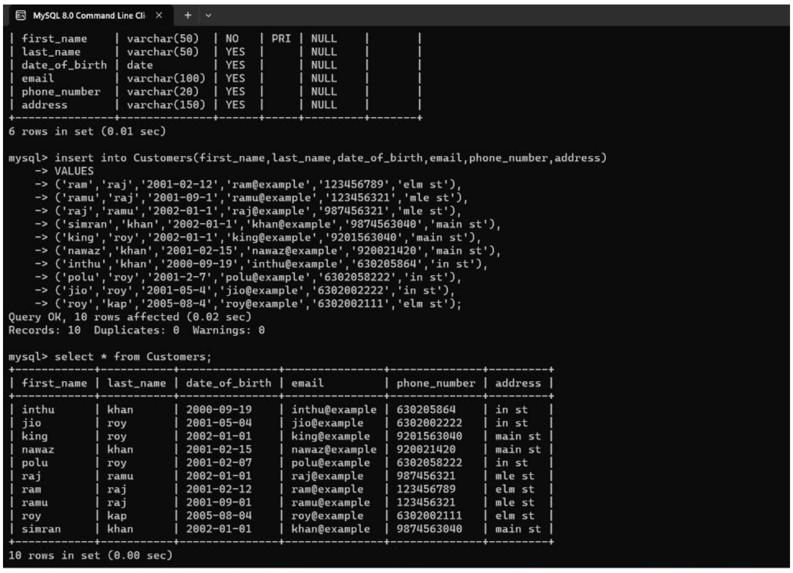
```
6 rows in set (0.01 sec)

mysql> create table Accounts( account_id int primary key,
    -> customer_id varchar(50) REFERENCES Customers(first_name),
    -> account_type varchar(50),
    -> balance decimal(15, 2)
    -> );
Query OK, 0 rows affected (0.03 sec)

mysql> describe Accounts;
+--------------+---------------+------+-----+---------+-------+
| Field        | Type          | Null | Key | Default | Extra |
+--------------+---------------+------+-----+---------+-------+
| account_id   | int           | NO   | PRI | NULL    |       |
| customer_id  | varchar(50)   | YES  |     | NULL    |       |
| account_type | varchar(50)   | YES  |     | NULL    |       |
| balance      | decimal(15,2) | YES  |     | NULL    |       |
+--------------+---------------+------+-----+---------+-------+
4 rows in set (0.01 sec)

mysql> create table Transactions(transaction_id int primary key,
    -> account_id int REFERENCES Accounts(account_id),
    -> transaction_type varchar(50),
    -> amount decimal(15,2),
    -> transaction_date date);
Query OK, 0 rows affected (0.05 sec)

mysql> describe Transactions;
+------------------+---------------+------+-----+---------+-------+
| Field            | Type          | Null | Key | Default | Extra |
+------------------+---------------+------+-----+---------+-------+
| transaction_id   | int           | NO   | PRI | NULL    |       |
| account_id       | int           | YES  |     | NULL    |       |
| transaction_type | varchar(50)   | YES  |     | NULL    |       |
| amount           | decimal(15,2) | YES  |     | NULL    |       |
| transaction_date | date          | YES  |     | NULL    |       |
+------------------+---------------+------+-----+---------+-------+
5 rows in set (0.01 sec)

mysql> |
```

Task 2:

Select, Where, Between, And, Like:

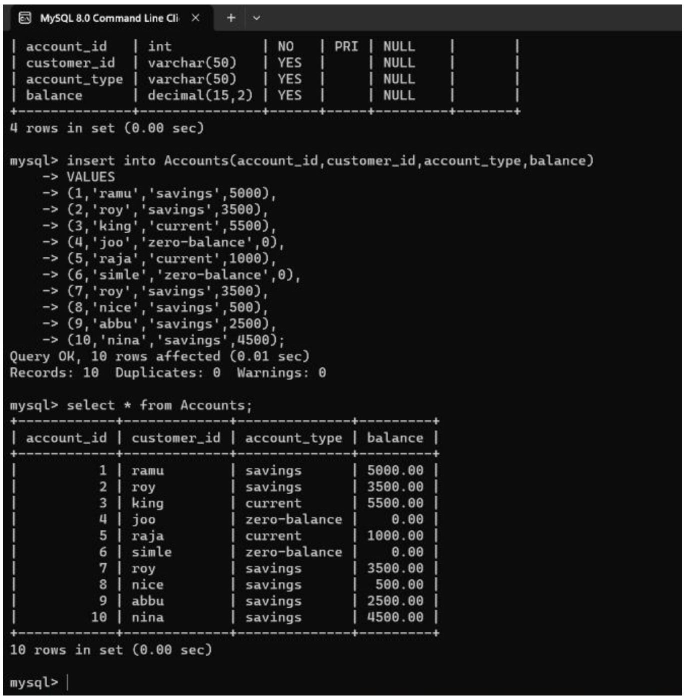
1. Insert at least 10 sample records into each of the following tables.
    - Customers
    - Accounts
    - Transactions

1. Customers



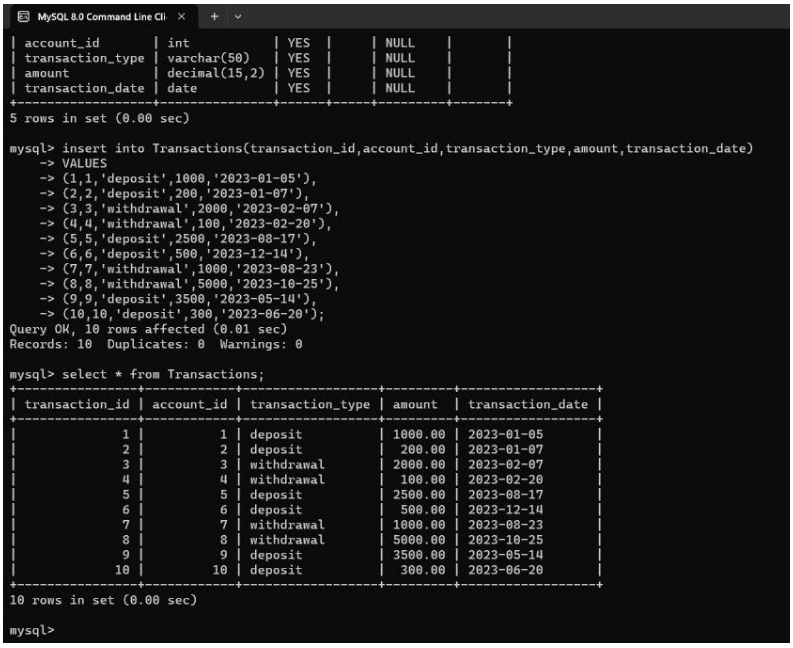
```
| first_name    | varchar(50)  | NO   | PRI | NULL    |       |
| last_name     | varchar(50)  | YES  |     | NULL    |       |
| date_of_birth | date         | YES  |     | NULL    |       |
| email         | varchar(100) | YES  |     | NULL    |       |
| phone_number  | varchar(20)  | YES  |     | NULL    |       |
| address       | varchar(150) | YES  |     | NULL    |       |
+---------------+--------------+------+-----+---------+-------+
6 rows in set (0.01 sec)

mysql> insert into Customers(first_name,last_name,date_of_birth,email,phone_number,address)
    -> VALUES
    -> ('ram','raj','2001-02-12','ram@example','123456789','elm st'),
    -> ('ramu','raj','2001-09-1','ramu@example','123456321','mle st'),
    -> ('raj','ramu','2002-01-1','raj@example','987456321','mle st'),
    -> ('simran','khan','2002-01-1','khan@example','9874563040','main st'),
    -> ('king','roy','2002-01-1','king@example','9201563040','main st'),
    -> ('nawaz','khan','2001-02-15','nawaz@example','920021420','main st'),
    -> ('inthu','khan','2000-09-19','inthu@example','630205864','in st'),
    -> ('polu','roy','2001-2-7','polu@example','6302058222','in st'),
    -> ('jio','roy','2001-05-4','jio@example','6302002222','in st'),
    -> ('roy','kap','2005-08-4','roy@example','6302002111','elm st');
Query OK, 10 rows affected (0.02 sec)
Records: 10  Duplicates: 0  Warnings: 0

mysql> select * from Customers;
+------------+-----------+---------------+---------------+--------------+---------+
| first_name | last_name | date_of_birth | email         | phone_number | address |
+------------+-----------+---------------+---------------+--------------+---------+
| inthu      | khan      | 2000-09-19    | inthu@example | 630205864    | in st   |
| jio        | roy       | 2001-05-04    | jio@example   | 6302002222   | in st   |
| king       | roy       | 2002-01-01    | king@example  | 9201563040   | main st |
| nawaz      | khan      | 2001-02-15    | nawaz@example | 920021420    | main st |
| polu       | roy       | 2001-02-07    | polu@example  | 6302058222   | in st   |
| raj        | ramu      | 2002-01-01    | raj@example   | 987456321    | mle st  |
| ram        | raj       | 2001-02-12    | ram@example   | 123456789    | elm st  |
| ramu       | raj       | 2001-09-01    | ramu@example  | 123456321    | mle st  |
| roy        | kap       | 2005-08-04    | roy@example   | 6302002111   | elm st  |
| simran     | khan      | 2002-01-01    | khan@example  | 9874563040   | main st |
+------------+-----------+---------------+---------------+--------------+---------+
10 rows in set (0.00 sec)
```

2. Accounts:



```
| account_id   | int           | NO   | PRI | NULL    |       |
| customer_id  | varchar(50)   | YES  |     | NULL    |       |
| account_type | varchar(50)   | YES  |     | NULL    |       |
| balance      | decimal(15,2) | YES  |     | NULL    |       |
+--------------+---------------+------+-----+---------+-------+
4 rows in set (0.00 sec)

mysql> insert into Accounts(account_id,customer_id,account_type,balance)
    -> VALUES
    -> (1,'ramu','savings',5000),
    -> (2,'roy','savings',3500),
    -> (3,'king','current',5500),
    -> (4,'joo','zero-balance',0),
    -> (5,'raja','current',1000),
    -> (6,'simle','zero-balance',0),
    -> (7,'roy','savings',3500),
    -> (8,'nice','savings',500),
    -> (9,'abbu','savings',2500),
    -> (10,'nina','savings',4500);
Query OK, 10 rows affected (0.01 sec)
Records: 10  Duplicates: 0  Warnings: 0

mysql> select * from Accounts;
+------------+-------------+--------------+---------+
| account_id | customer_id | account_type | balance |
+------------+-------------+--------------+---------+
|          1 | ramu        | savings      | 5000.00 |
|          2 | roy         | savings      | 3500.00 |
|          3 | king        | current      | 5500.00 |
|          4 | joo         | zero-balance |    0.00 |
|          5 | raja        | current      | 1000.00 |
|          6 | simle       | zero-balance |    0.00 |
|          7 | roy         | savings      | 3500.00 |
|          8 | nice        | savings      |  500.00 |
|          9 | abbu        | savings      | 2500.00 |
|         10 | nina        | savings      | 4500.00 |
+------------+-------------+--------------+---------+
10 rows in set (0.00 sec)

mysql>
```

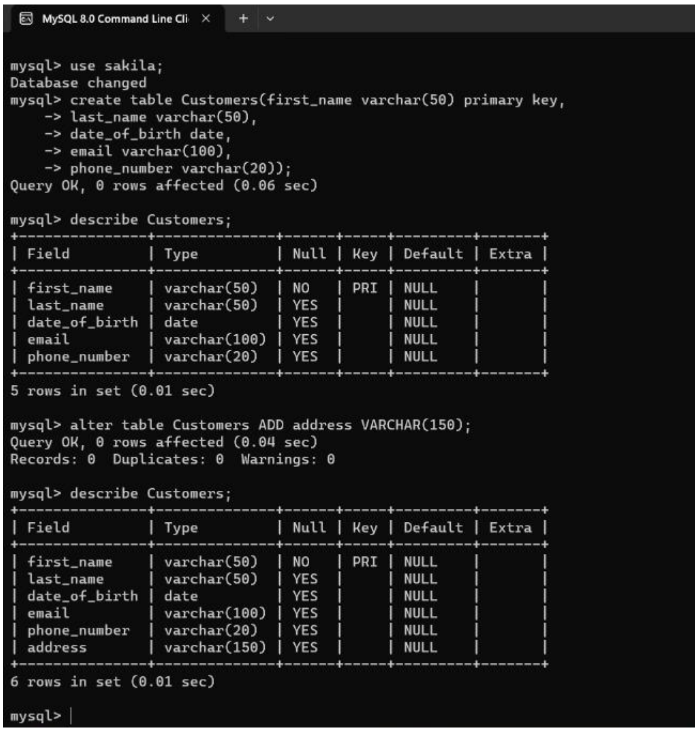
3. Transactions:



```
| account_id       | int           | YES  |     | NULL    |       |
| transaction_type | varchar(50)   | YES  |     | NULL    |       |
| amount           | decimal(15,2) | YES  |     | NULL    |       |
| transaction_date | date          | YES  |     | NULL    |       |
+------------------+---------------+------+-----+---------+-------+
5 rows in set (0.00 sec)

mysql> insert into Transactions(transaction_id,account_id,transaction_type,amount,transaction_date)
    -> VALUES
    -> (1,1,'deposit',1000,'2023-01-05'),
    -> (2,2,'deposit',200,'2023-01-07'),
    -> (3,3,'withdrawal',2000,'2023-02-07'),
    -> (4,4,'withdrawal',100,'2023-02-20'),
    -> (5,5,'deposit',2500,'2023-08-17'),
    -> (6,6,'deposit',500,'2023-12-14'),
    -> (7,7,'withdrawal',1000,'2023-08-23'),
    -> (8,8,'withdrawal',5000,'2023-10-25'),
    -> (9,9,'deposit',3500,'2023-05-14'),
    -> (10,10,'deposit',300,'2023-06-20');
Query OK, 10 rows affected (0.01 sec)
Records: 10  Duplicates: 0  Warnings: 0

mysql> select * from Transactions;
+----------------+------------+------------------+---------+------------------+
| transaction_id | account_id | transaction_type | amount  | transaction_date |
+----------------+------------+------------------+---------+------------------+
|              1 |          1 | deposit          | 1000.00 | 2023-01-05       |
|              2 |          2 | deposit          |  200.00 | 2023-01-07       |
|              3 |          3 | withdrawal       | 2000.00 | 2023-02-07       |
|              4 |          4 | withdrawal       |  100.00 | 2023-02-20       |
|              5 |          5 | deposit          | 2500.00 | 2023-08-17       |
|              6 |          6 | deposit          |  500.00 | 2023-12-14       |
|              7 |          7 | withdrawal       | 1000.00 | 2023-08-23       |
|              8 |          8 | withdrawal       | 5000.00 | 2023-10-25       |
|              9 |          9 | deposit          | 3500.00 | 2023-05-14       |
|             10 |         10 | deposit          |  300.00 | 2023-06-20       |
+----------------+------------+------------------+---------+------------------+
10 rows in set (0.00 sec)

mysql>
```

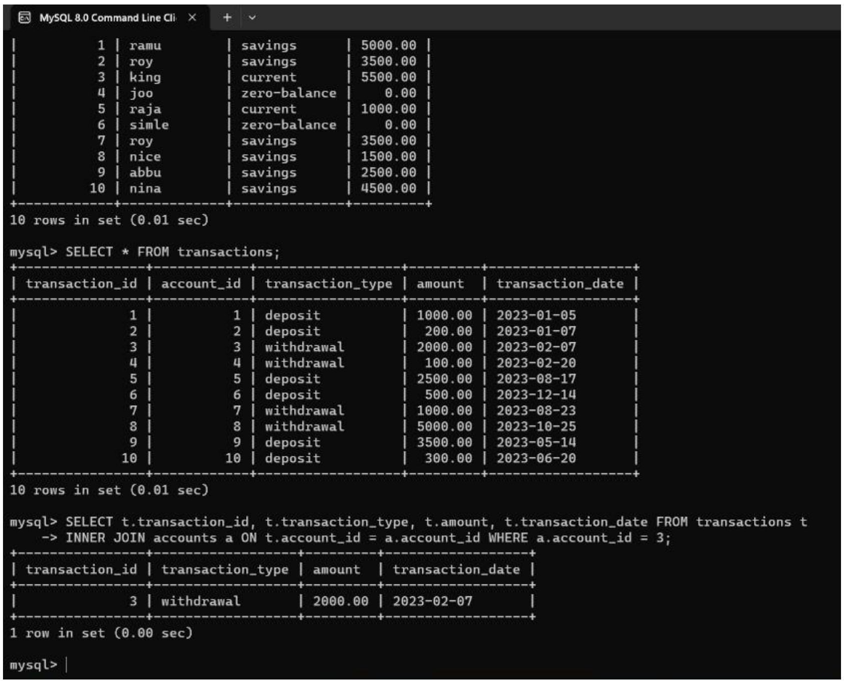
2. Write SQL queries for the following tasks:

   1. Write a SQL query to retrieve the name,account type and email of all customers.



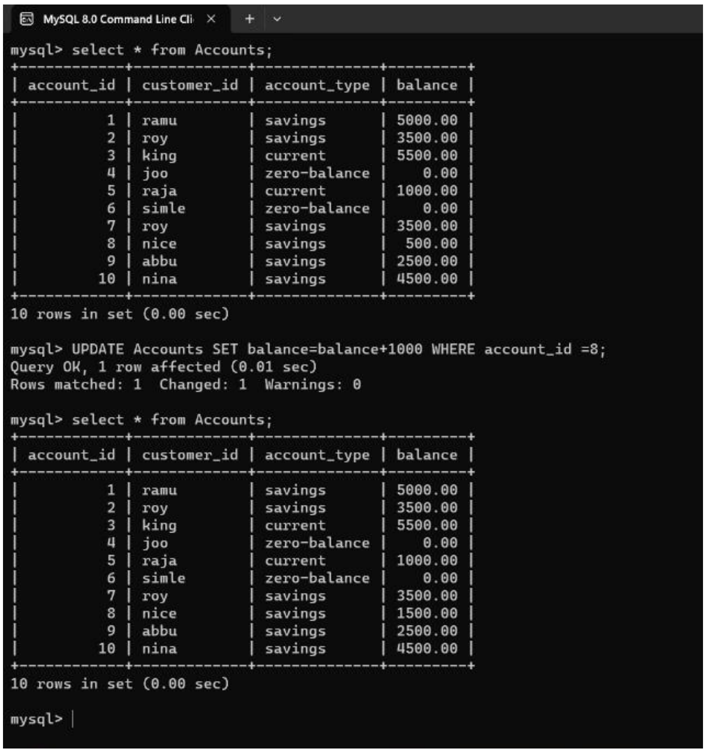
```
mysql> use sakila;
Database changed
mysql> create table Customers(first_name varchar(50) primary key,
    -> last_name varchar(50),
    -> date_of_birth date,
    -> email varchar(100),
    -> phone_number varchar(20));
Query OK, 0 rows affected (0.06 sec)

mysql> describe Customers;
+---------------+--------------+------+-----+---------+-------+
| Field         | Type         | Null | Key | Default | Extra |
+---------------+--------------+------+-----+---------+-------+
| first_name    | varchar(50)  | NO   | PRI | NULL    |       |
| last_name     | varchar(50)  | YES  |     | NULL    |       |
| date_of_birth | date         | YES  |     | NULL    |       |
| email         | varchar(100) | YES  |     | NULL    |       |
| phone_number  | varchar(20)  | YES  |     | NULL    |       |
+---------------+--------------+------+-----+---------+-------+
5 rows in set (0.01 sec)

mysql> alter table Customers ADD address VARCHAR(150);
Query OK, 0 rows affected (0.04 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> describe Customers;
+---------------+--------------+------+-----+---------+-------+
| Field         | Type         | Null | Key | Default | Extra |
+---------------+--------------+------+-----+---------+-------+
| first_name    | varchar(50)  | NO   | PRI | NULL    |       |
| last_name     | varchar(50)  | YES  |     | NULL    |       |
| date_of_birth | date         | YES  |     | NULL    |       |
| email         | varchar(100) | YES  |     | NULL    |       |
| phone_number  | varchar(20)  | YES  |     | NULL    |       |
| address       | varchar(150) | YES  |     | NULL    |       |
+---------------+--------------+------+-----+---------+-------+
6 rows in set (0.01 sec)

mysql> |
```

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



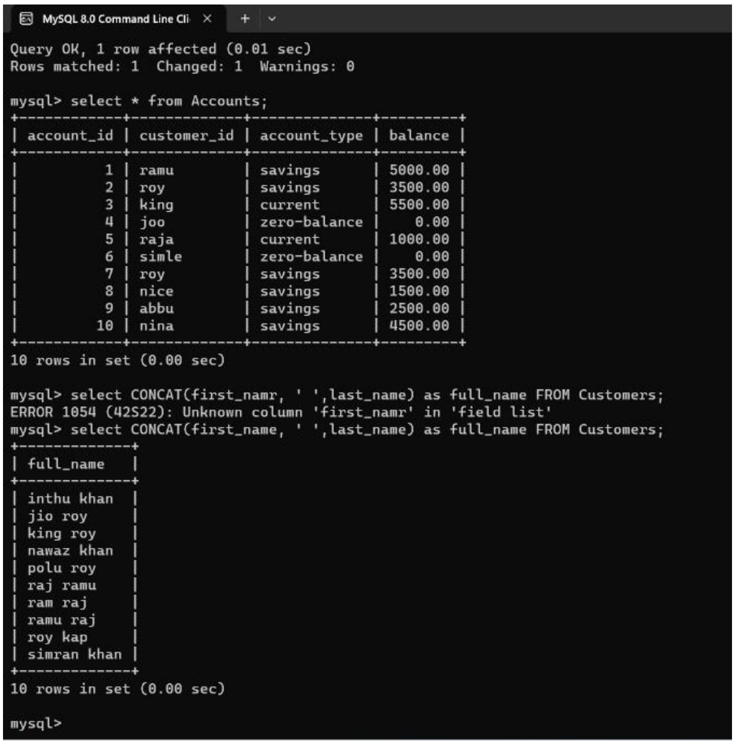
```
|          1 | ramu        | savings      | 5000.00 |
|          2 | roy         | savings      | 3500.00 |
|          3 | king        | current      | 5500.00 |
|          4 | joo         | zero-balance |    0.00 |
|          5 | raja        | current      | 1000.00 |
|          6 | simle       | zero-balance |    0.00 |
|          7 | roy         | savings      | 3500.00 |
|          8 | nice        | savings      | 1500.00 |
|          9 | abbu        | savings      | 2500.00 |
|         10 | nina        | savings      | 4500.00 |
+------------+-------------+--------------+---------+
10 rows in set (0.01 sec)

mysql> SELECT * FROM transactions;
+----------------+------------+------------------+---------+------------------+
| transaction_id | account_id | transaction_type | amount  | transaction_date |
+----------------+------------+------------------+---------+------------------+
|              1 |          1 | deposit          | 1000.00 | 2023-01-05       |
|              2 |          2 | deposit          |  200.00 | 2023-01-07       |
|              3 |          3 | withdrawal       | 2000.00 | 2023-02-07       |
|              4 |          4 | withdrawal       |  100.00 | 2023-02-20       |
|              5 |          5 | deposit          | 2500.00 | 2023-08-17       |
|              6 |          6 | deposit          |  500.00 | 2023-12-14       |
|              7 |          7 | withdrawal       | 1000.00 | 2023-08-23       |
|              8 |          8 | withdrawal       | 5000.00 | 2023-10-25       |
|              9 |          9 | deposit          | 3500.00 | 2023-05-14       |
|             10 |         10 | deposit          |  300.00 | 2023-06-20       |
+----------------+------------+------------------+---------+------------------+
10 rows in set (0.01 sec)

mysql> SELECT t.transaction_id, t.transaction_type, t.amount, t.transaction_date FROM transactions t
    -> INNER JOIN accounts a ON t.account_id = a.account_id WHERE a.account_id = 3;
+----------------+------------------+---------+------------------+
| transaction_id | transaction_type | amount  | transaction_date |
+----------------+------------------+---------+------------------+
|              3 | withdrawal       | 2000.00 | 2023-02-07       |
+----------------+------------------+---------+------------------+
1 row in set (0.00 sec)

mysql> |
```

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



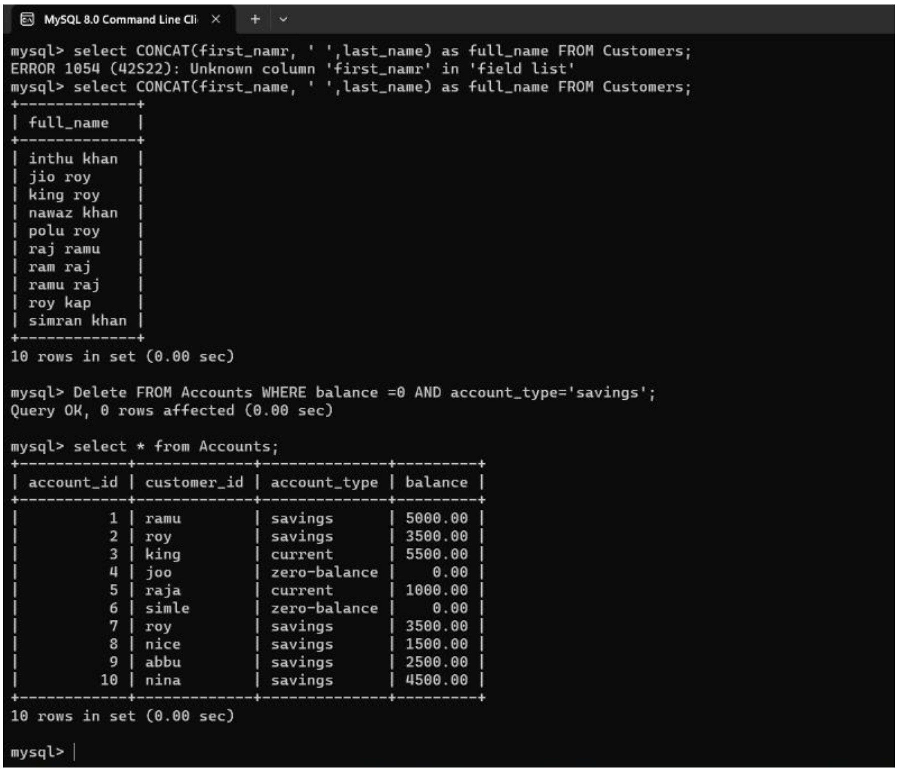
```
mysql> select * from Accounts;
+------------+-------------+--------------+---------+
| account_id | customer_id | account_type | balance |
+------------+-------------+--------------+---------+
|          1 | ramu        | savings      | 5000.00 |
|          2 | roy         | savings      | 3500.00 |
|          3 | king        | current      | 5500.00 |
|          4 | joo         | zero-balance |    0.00 |
|          5 | raja        | current      | 1000.00 |
|          6 | simle       | zero-balance |    0.00 |
|          7 | roy         | savings      | 3500.00 |
|          8 | nice        | savings      |  500.00 |
|          9 | abbu        | savings      | 2500.00 |
|         10 | nina        | savings      | 4500.00 |
+------------+-------------+--------------+---------+
10 rows in set (0.00 sec)

mysql> UPDATE Accounts SET balance=balance+1000 WHERE account_id =8;
Query OK, 1 row affected (0.01 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> select * from Accounts;
+------------+-------------+--------------+---------+
| account_id | customer_id | account_type | balance |
+------------+-------------+--------------+---------+
|          1 | ramu        | savings      | 5000.00 |
|          2 | roy         | savings      | 3500.00 |
|          3 | king        | current      | 5500.00 |
|          4 | joo         | zero-balance |    0.00 |
|          5 | raja        | current      | 1000.00 |
|          6 | simle       | zero-balance |    0.00 |
|          7 | roy         | savings      | 3500.00 |
|          8 | nice        | savings      | 1500.00 |
|          9 | abbu        | savings      | 2500.00 |
|         10 | nina        | savings      | 4500.00 |
+------------+-------------+--------------+---------+
10 rows in set (0.00 sec)

mysql>
```

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



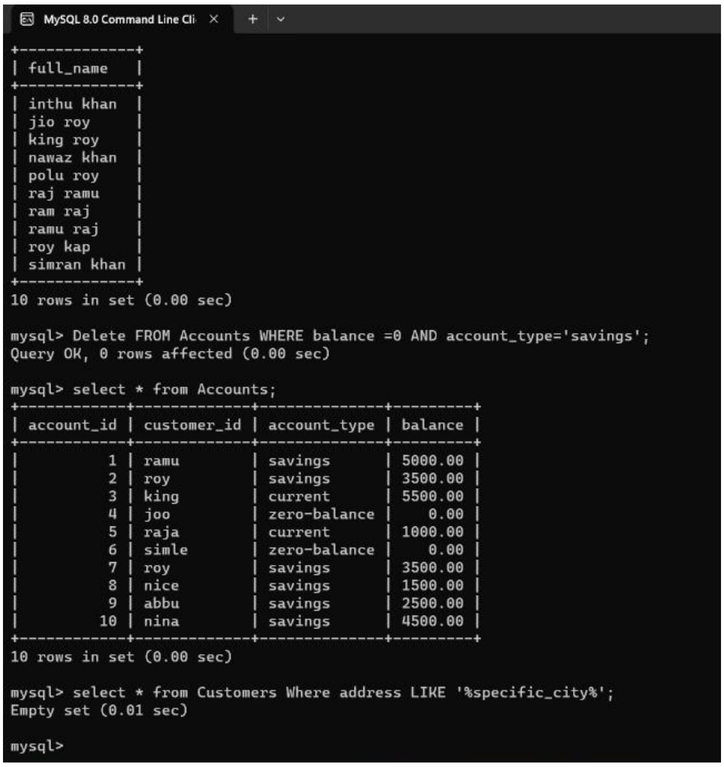
```
Query OK, 1 row affected (0.01 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> select * from Accounts;
+------------+-------------+--------------+---------+
| account_id | customer_id | account_type | balance |
+------------+-------------+--------------+---------+
|          1 | ramu        | savings      | 5000.00 |
|          2 | roy         | savings      | 3500.00 |
|          3 | king        | current      | 5500.00 |
|          4 | joo         | zero-balance |    0.00 |
|          5 | raja        | current      | 1000.00 |
|          6 | simle       | zero-balance |    0.00 |
|          7 | roy         | savings      | 3500.00 |
|          8 | nice        | savings      | 1500.00 |
|          9 | abbu        | savings      | 2500.00 |
|         10 | nina        | savings      | 4500.00 |
+------------+-------------+--------------+---------+
10 rows in set (0.00 sec)

mysql> select CONCAT(first_namr, ' ',last_name) as full_name FROM Customers;
ERROR 1054 (42S22): Unknown column 'first_namr' in 'field list'
mysql> select CONCAT(first_name, ' ',last_name) as full_name FROM Customers;
+-------------+
| full_name   |
+-------------+
| inthu khan  |
| jio roy     |
| king roy    |
| nawaz khan  |
| polu roy    |
| raj ramu    |
| ram raj     |
| ramu raj    |
| roy kap     |
| simran khan |
+-------------+
10 rows in set (0.00 sec)

mysql>
```

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



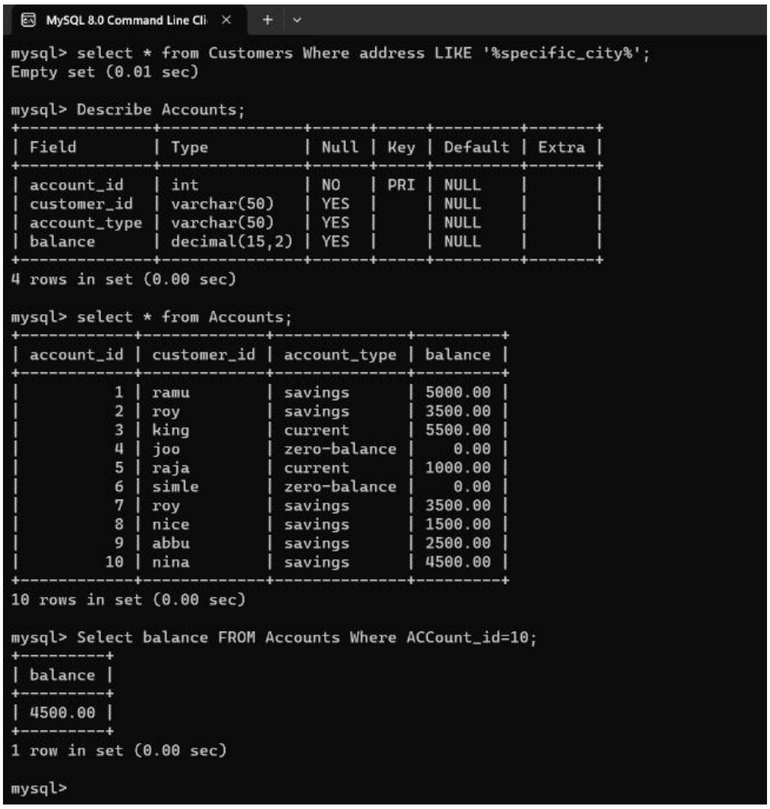
```
mysql> select CONCAT(first_namr, ' ',last_name) as full_name FROM Customers;
ERROR 1054 (42S22): Unknown column 'first_namr' in 'field list'
mysql> select CONCAT(first_name, ' ',last_name) as full_name FROM Customers;
+-------------+
| full_name   |
+-------------+
| inthu khan  |
| jio roy     |
| king roy    |
| nawaz khan  |
| polu roy    |
| raj ramu    |
| ram raj     |
| ramu raj    |
| roy kap     |
| simran khan |
+-------------+
10 rows in set (0.00 sec)

mysql> Delete FROM Accounts WHERE balance =0 AND account_type='savings';
Query OK, 0 rows affected (0.00 sec)

mysql> select * from Accounts;
+------------+-------------+--------------+---------+
| account_id | customer_id | account_type | balance |
+------------+-------------+--------------+---------+
|          1 | ramu        | savings      | 5000.00 |
|          2 | roy         | savings      | 3500.00 |
|          3 | king        | current      | 5500.00 |
|          4 | joo         | zero-balance |    0.00 |
|          5 | raja        | current      | 1000.00 |
|          6 | simle       | zero-balance |    0.00 |
|          7 | roy         | savings      | 3500.00 |
|          8 | nice        | savings      | 1500.00 |
|          9 | abbu        | savings      | 2500.00 |
|         10 | nina        | savings      | 4500.00 |
+------------+-------------+--------------+---------+
10 rows in set (0.00 sec)

mysql>
```

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



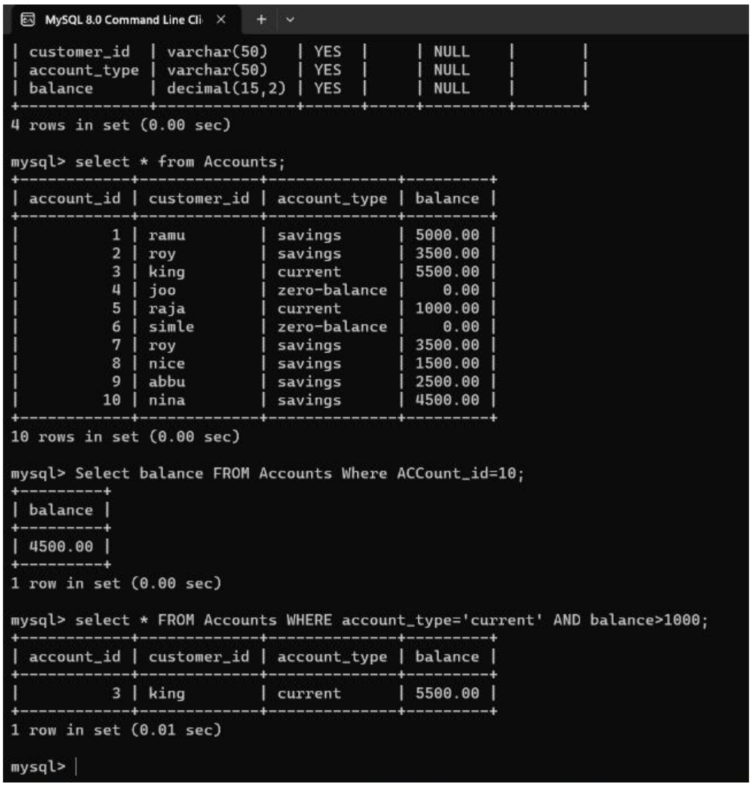
```
+-------------+
| full_name   |
+-------------+
| inthu khan  |
| jio roy     |
| king roy    |
| nawaz khan  |
| polu roy    |
| raj ramu    |
| ram raj     |
| ramu raj    |
| roy kap     |
| simran khan |
+-------------+
10 rows in set (0.00 sec)

mysql> Delete FROM Accounts WHERE balance =0 AND account_type='savings';
Query OK, 0 rows affected (0.00 sec)

mysql> select * from Accounts;
+------------+-------------+--------------+---------+
| account_id | customer_id | account_type | balance |
+------------+-------------+--------------+---------+
|          1 | ramu        | savings      | 5000.00 |
|          2 | roy         | savings      | 3500.00 |
|          3 | king        | current      | 5500.00 |
|          4 | joo         | zero-balance |    0.00 |
|          5 | raja        | current      | 1000.00 |
|          6 | simle       | zero-balance |    0.00 |
|          7 | roy         | savings      | 3500.00 |
|          8 | nice        | savings      | 1500.00 |
|          9 | abbu        | savings      | 2500.00 |
|         10 | nina        | savings      | 4500.00 |
+------------+-------------+--------------+---------+
10 rows in set (0.00 sec)

mysql> select * from Customers Where address LIKE '%specific_city%';
Empty set (0.01 sec)

mysql>
```

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



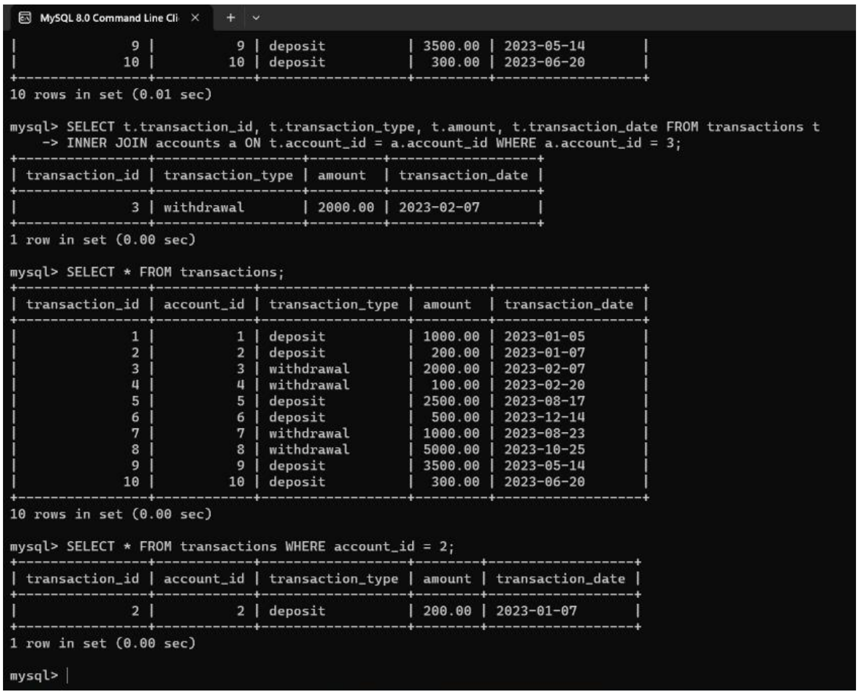
```
mysql> select * from Customers Where address LIKE '%specific_city%';
Empty set (0.01 sec)

mysql> Describe Accounts;
+--------------+---------------+------+-----+---------+-------+
| Field        | Type          | Null | Key | Default | Extra |
+--------------+---------------+------+-----+---------+-------+
| account_id   | int           | NO   | PRI | NULL    |       |
| customer_id  | varchar(50)   | YES  |     | NULL    |       |
| account_type | varchar(50)   | YES  |     | NULL    |       |
| balance      | decimal(15,2) | YES  |     | NULL    |       |
+--------------+---------------+------+-----+---------+-------+
4 rows in set (0.00 sec)

mysql> select * from Accounts;
+------------+-------------+--------------+---------+
| account_id | customer_id | account_type | balance |
+------------+-------------+--------------+---------+
|          1 | ramu        | savings      | 5000.00 |
|          2 | roy         | savings      | 3500.00 |
|          3 | king        | current      | 5500.00 |
|          4 | joo         | zero-balance |    0.00 |
|          5 | raja        | current      | 1000.00 |
|          6 | simle       | zero-balance |    0.00 |
|          7 | roy         | savings      | 3500.00 |
|          8 | nice        | savings      | 1500.00 |
|          9 | abbu        | savings      | 2500.00 |
|         10 | nina        | savings      | 4500.00 |
+------------+-------------+--------------+---------+
10 rows in set (0.00 sec)

mysql> Select balance FROM Accounts Where ACCount_id=10;
+---------+
| balance |
+---------+
| 4500.00 |
+---------+
1 row in set (0.00 sec)

mysql>
```

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



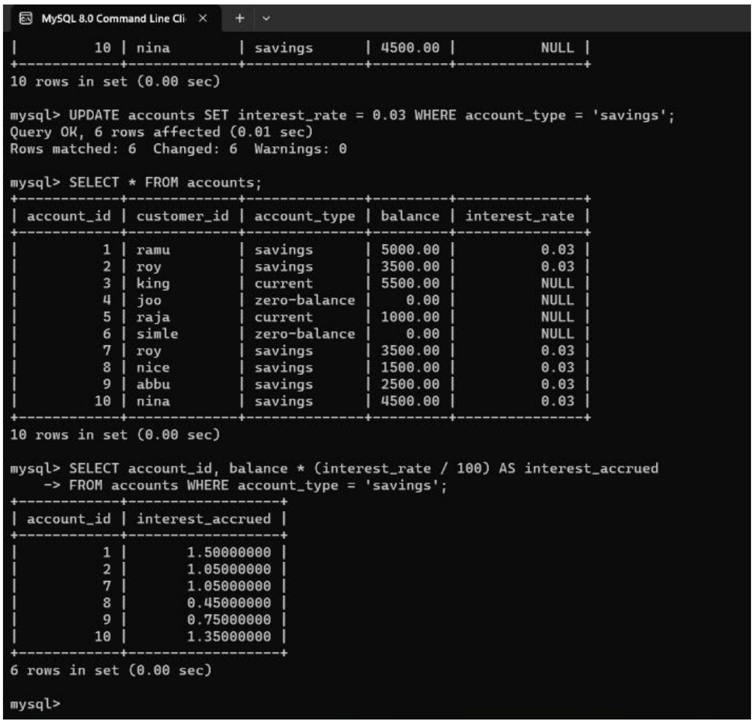
```
| customer_id  | varchar(50)   | YES  |     | NULL    |       |
| account_type | varchar(50)   | YES  |     | NULL    |       |
| balance      | decimal(15,2) | YES  |     | NULL    |       |
+--------------+---------------+------+-----+---------+-------+
4 rows in set (0.00 sec)

mysql> select * from Accounts;
+------------+-------------+--------------+---------+
| account_id | customer_id | account_type | balance |
+------------+-------------+--------------+---------+
|          1 | ramu        | savings      | 5000.00 |
|          2 | roy         | savings      | 3500.00 |
|          3 | king        | current      | 5500.00 |
|          4 | joo         | zero-balance |    0.00 |
|          5 | raja        | current      | 1000.00 |
|          6 | simle       | zero-balance |    0.00 |
|          7 | roy         | savings      | 3500.00 |
|          8 | nice        | savings      | 1500.00 |
|          9 | abbu        | savings      | 2500.00 |
|         10 | nina        | savings      | 4500.00 |
+------------+-------------+--------------+---------+
10 rows in set (0.00 sec)

mysql> Select balance FROM Accounts Where ACCount_id=10;
+---------+
| balance |
+---------+
| 4500.00 |
+---------+
1 row in set (0.00 sec)

mysql> select * FROM Accounts WHERE account_type='current' AND balance>1000;
+------------+-------------+--------------+---------+
| account_id | customer_id | account_type | balance |
+------------+-------------+--------------+---------+
|          3 | king        | current      | 5500.00 |
+------------+-------------+--------------+---------+
1 row in set (0.01 sec)

mysql> 
```

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



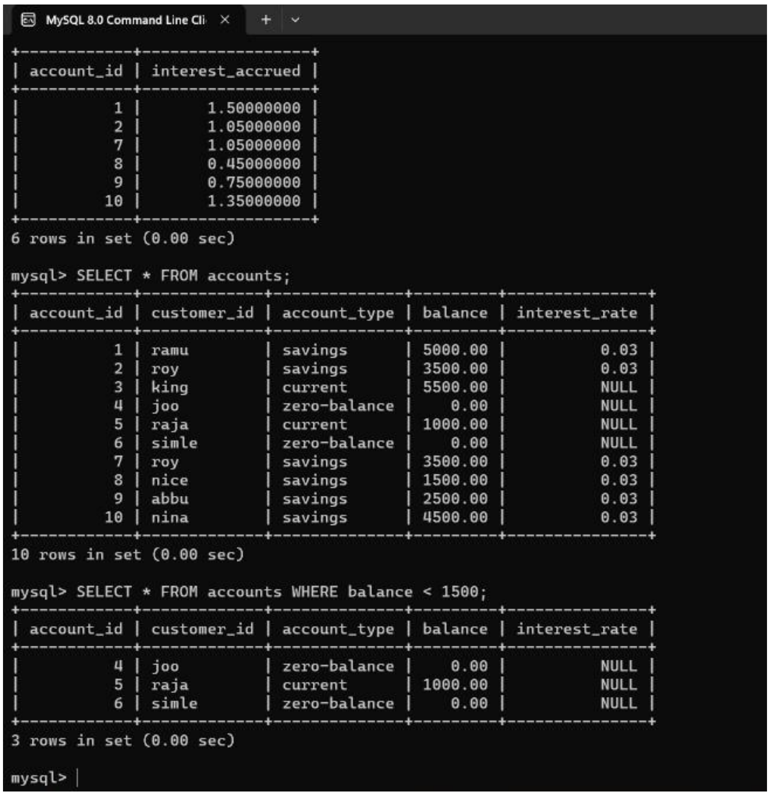
```
|              9 |          9 | deposit          | 3500.00 | 2023-05-14       |
|             10 |         10 | deposit          |  300.00 | 2023-06-20       |
+----------------+------------+------------------+---------+------------------+
10 rows in set (0.01 sec)

mysql> SELECT t.transaction_id, t.transaction_type, t.amount, t.transaction_date FROM transactions t
    -> INNER JOIN accounts a ON t.account_id = a.account_id WHERE a.account_id = 3;
+----------------+------------------+---------+------------------+
| transaction_id | transaction_type | amount  | transaction_date |
+----------------+------------------+---------+------------------+
|              3 | withdrawal       | 2000.00 | 2023-02-07       |
+----------------+------------------+---------+------------------+
1 row in set (0.00 sec)

mysql> SELECT * FROM transactions;
+----------------+------------+------------------+---------+------------------+
| transaction_id | account_id | transaction_type | amount  | transaction_date |
+----------------+------------+------------------+---------+------------------+
|              1 |          1 | deposit          | 1000.00 | 2023-01-05       |
|              2 |          2 | deposit          |  200.00 | 2023-01-07       |
|              3 |          3 | withdrawal       | 2000.00 | 2023-02-07       |
|              4 |          4 | withdrawal       |  100.00 | 2023-02-20       |
|              5 |          5 | deposit          | 2500.00 | 2023-08-17       |
|              6 |          6 | deposit          |  500.00 | 2023-12-14       |
|              7 |          7 | withdrawal       | 1000.00 | 2023-08-23       |
|              8 |          8 | withdrawal       | 5000.00 | 2023-10-25       |
|              9 |          9 | deposit          | 3500.00 | 2023-05-14       |
|             10 |         10 | deposit          |  300.00 | 2023-06-20       |
+----------------+------------+------------------+---------+------------------+
10 rows in set (0.00 sec)

mysql> SELECT * FROM transactions WHERE account_id = 2;
+----------------+------------+------------------+--------+------------------+
| transaction_id | account_id | transaction_type | amount | transaction_date |
+----------------+------------+------------------+--------+------------------+
|              2 |          2 | deposit          | 200.00 | 2023-01-07       |
+----------------+------------+------------------+--------+------------------+
1 row in set (0.00 sec)

mysql> 
```

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



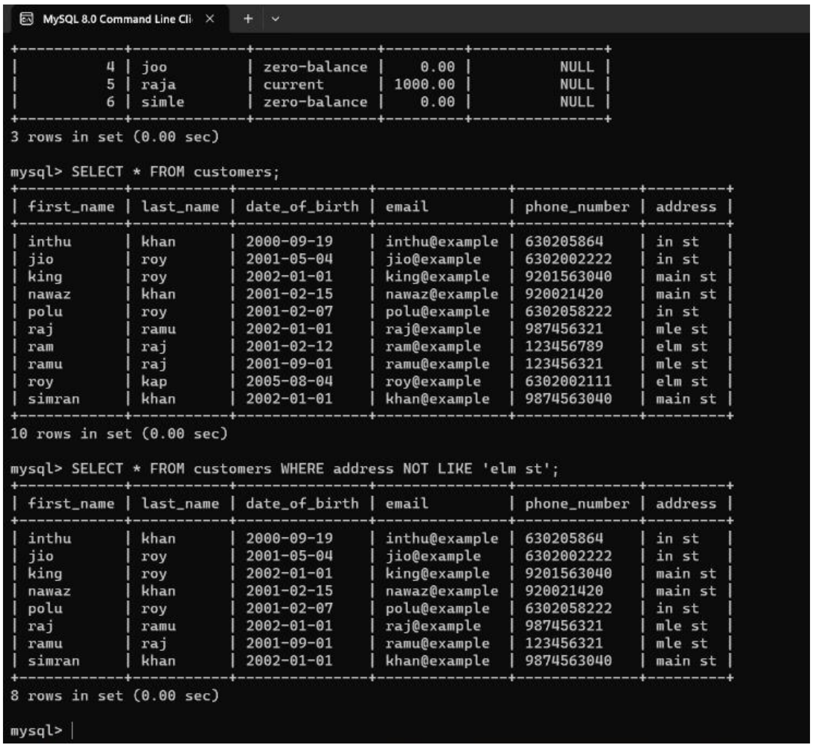
```
|         10 | nina        | savings      | 4500.00 |          NULL |
+------------+-------------+--------------+---------+---------------+
10 rows in set (0.00 sec)

mysql> UPDATE accounts SET interest_rate = 0.03 WHERE account_type = 'savings';
Query OK, 6 rows affected (0.01 sec)
Rows matched: 6  Changed: 6  Warnings: 0

mysql> SELECT * FROM accounts;
+------------+-------------+--------------+---------+---------------+
| account_id | customer_id | account_type | balance | interest_rate |
+------------+-------------+--------------+---------+---------------+
|          1 | ramu        | savings      | 5000.00 |          0.03 |
|          2 | roy         | savings      | 3500.00 |          0.03 |
|          3 | king        | current      | 5500.00 |          NULL |
|          4 | joo         | zero-balance |    0.00 |          NULL |
|          5 | raja        | current      | 1000.00 |          NULL |
|          6 | simle       | zero-balance |    0.00 |          NULL |
|          7 | roy         | savings      | 3500.00 |          0.03 |
|          8 | nice        | savings      | 1500.00 |          0.03 |
|          9 | abbu        | savings      | 2500.00 |          0.03 |
|         10 | nina        | savings      | 4500.00 |          0.03 |
+------------+-------------+--------------+---------+---------------+
10 rows in set (0.00 sec)

mysql> SELECT account_id, balance * (interest_rate / 100) AS interest_accrued
    -> FROM accounts WHERE account_type = 'savings';
+------------+------------------+
| account_id | interest_accrued |
+------------+------------------+
|          1 |       1.50000000 |
|          2 |       1.05000000 |
|          7 |       1.05000000 |
|          8 |       0.45000000 |
|          9 |       0.75000000 |
|         10 |       1.35000000 |
+------------+------------------+
6 rows in set (0.00 sec)

mysql>
```

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



```
+------------+------------------+
| account_id | interest_accrued |
+------------+------------------+
|          1 |       1.50000000 |
|          2 |       1.05000000 |
|          7 |       1.05000000 |
|          8 |       0.45000000 |
|          9 |       0.75000000 |
|         10 |       1.35000000 |
+------------+------------------+
6 rows in set (0.00 sec)

mysql> SELECT * FROM accounts;
+------------+-------------+--------------+---------+---------------+
| account_id | customer_id | account_type | balance | interest_rate |
+------------+-------------+--------------+---------+---------------+
|          1 | ramu        | savings      | 5000.00 |          0.03 |
|          2 | roy         | savings      | 3500.00 |          0.03 |
|          3 | king        | current      | 5500.00 |          NULL |
|          4 | joo         | zero-balance |    0.00 |          NULL |
|          5 | raja        | current      | 1000.00 |          NULL |
|          6 | simle       | zero-balance |    0.00 |          NULL |
|          7 | roy         | savings      | 3500.00 |          0.03 |
|          8 | nice        | savings      | 1500.00 |          0.03 |
|          9 | abbu        | savings      | 2500.00 |          0.03 |
|         10 | nina        | savings      | 4500.00 |          0.03 |
+------------+-------------+--------------+---------+---------------+
10 rows in set (0.00 sec)

mysql> SELECT * FROM accounts WHERE balance < 1500;
+------------+-------------+--------------+---------+---------------+
| account_id | customer_id | account_type | balance | interest_rate |
+------------+-------------+--------------+---------+---------------+
|          4 | joo         | zero-balance |    0.00 |          NULL |
|          5 | raja        | current      | 1000.00 |          NULL |
|          6 | simle       | zero-balance |    0.00 |          NULL |
+------------+-------------+--------------+---------+---------------+
3 rows in set (0.00 sec)

mysql>
```

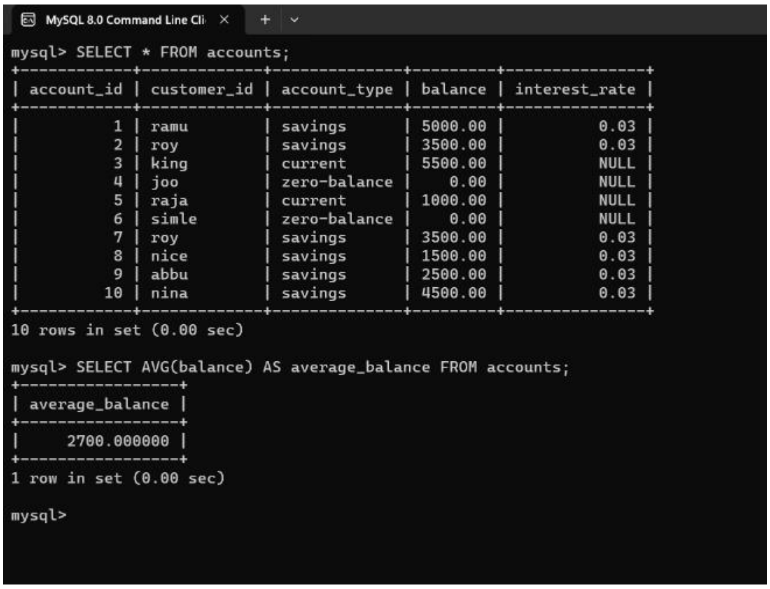
12. Write a SQL query to Find customers not living in a specific city.



```
+------------+-------------+--------------+---------+---------------+
|          4 | joo         | zero-balance |    0.00 |          NULL |
|          5 | raja        | current      | 1000.00 |          NULL |
|          6 | simle       | zero-balance |    0.00 |          NULL |
+------------+-------------+--------------+---------+---------------+
3 rows in set (0.00 sec)

mysql> SELECT * FROM customers;
+------------+-----------+---------------+-----------------+--------------+---------+
| first_name | last_name | date_of_birth | email           | phone_number | address |
+------------+-----------+---------------+-----------------+--------------+---------+
| inthu      | khan      | 2000-09-19    | inthu@example   | 630205864    | in st   |
| jio        | roy       | 2001-05-04    | jio@example     | 6302002222   | in st   |
| king       | roy       | 2002-01-01    | king@example    | 9201563040   | main st |
| nawaz      | khan      | 2001-02-15    | nawaz@example   | 920021420    | main st |
| polu       | roy       | 2001-02-07    | polu@example    | 6302058222   | in st   |
| raj        | ramu      | 2002-01-01    | raj@example     | 987456321    | mle st  |
| ram        | raj       | 2001-02-12    | ram@example     | 123456789    | elm st  |
| ramu       | raj       | 2001-09-01    | ramu@example    | 123456321    | mle st  |
| roy        | kap       | 2005-08-04    | roy@example     | 6302002111   | elm st  |
| simran     | khan      | 2002-01-01    | khan@example    | 9874563040   | main st |
+------------+-----------+---------------+-----------------+--------------+---------+
10 rows in set (0.00 sec)

mysql> SELECT * FROM customers WHERE address NOT LIKE 'elm st';
+------------+-----------+---------------+-----------------+--------------+---------+
| first_name | last_name | date_of_birth | email           | phone_number | address |
+------------+-----------+---------------+-----------------+--------------+---------+
| inthu      | khan      | 2000-09-19    | inthu@example   | 630205864    | in st   |
| jio        | roy       | 2001-05-04    | jio@example     | 6302002222   | in st   |
| king       | roy       | 2002-01-01    | king@example    | 9201563040   | main st |
| nawaz      | khan      | 2001-02-15    | nawaz@example   | 920021420    | main st |
| polu       | roy       | 2001-02-07    | polu@example    | 6302058222   | in st   |
| raj        | ramu      | 2002-01-01    | raj@example     | 987456321    | mle st  |
| ramu       | raj       | 2001-09-01    | ramu@example    | 123456321    | mle st  |
| simran     | khan      | 2002-01-01    | khan@example    | 9874563040   | main st |
+------------+-----------+---------------+-----------------+--------------+---------+
8 rows in set (0.00 sec)

mysql>
```

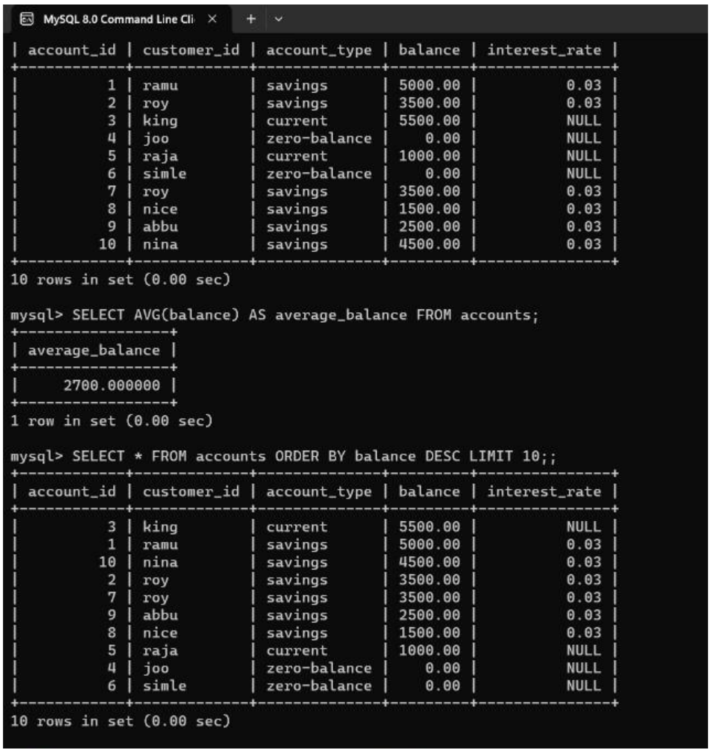
Task-3

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



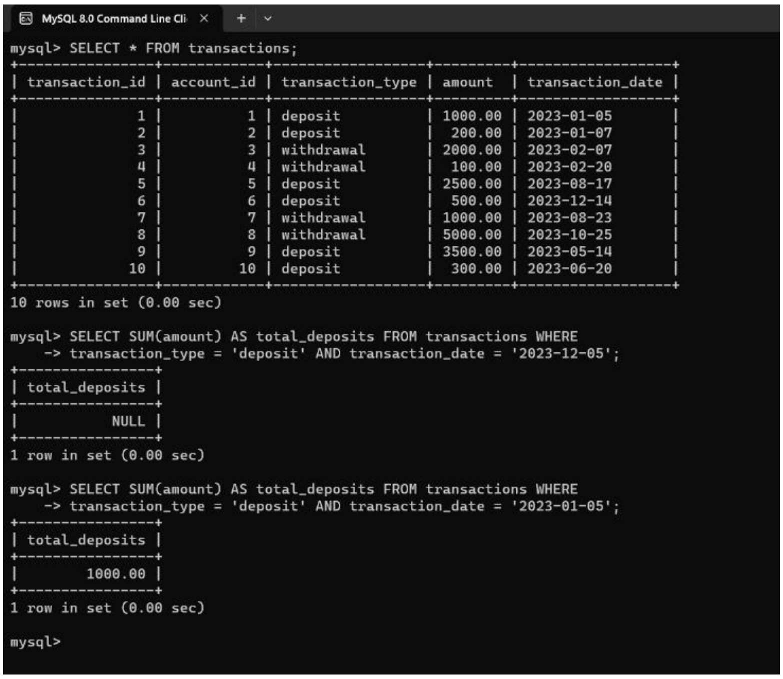
```
mysql> SELECT * FROM accounts;
+------------+-------------+--------------+---------+---------------+
| account_id | customer_id | account_type | balance | interest_rate |
+------------+-------------+--------------+---------+---------------+
|          1 | ramu        | savings      | 5000.00 |          0.03 |
|          2 | roy         | savings      | 3500.00 |          0.03 |
|          3 | king        | current      | 5500.00 |          NULL |
|          4 | joo         | zero-balance |    0.00 |          NULL |
|          5 | raja        | current      | 1000.00 |          NULL |
|          6 | simle       | zero-balance |    0.00 |          NULL |
|          7 | roy         | savings      | 3500.00 |          0.03 |
|          8 | nice        | savings      | 1500.00 |          0.03 |
|          9 | abbu        | savings      | 2500.00 |          0.03 |
|         10 | nina        | savings      | 4500.00 |          0.03 |
+------------+-------------+--------------+---------+---------------+
10 rows in set (0.00 sec)

mysql> SELECT AVG(balance) AS average_balance FROM accounts;
+-----------------+
| average_balance |
+-----------------+
|     2700.000000 |
+-----------------+
1 row in set (0.00 sec)

mysql>
```

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



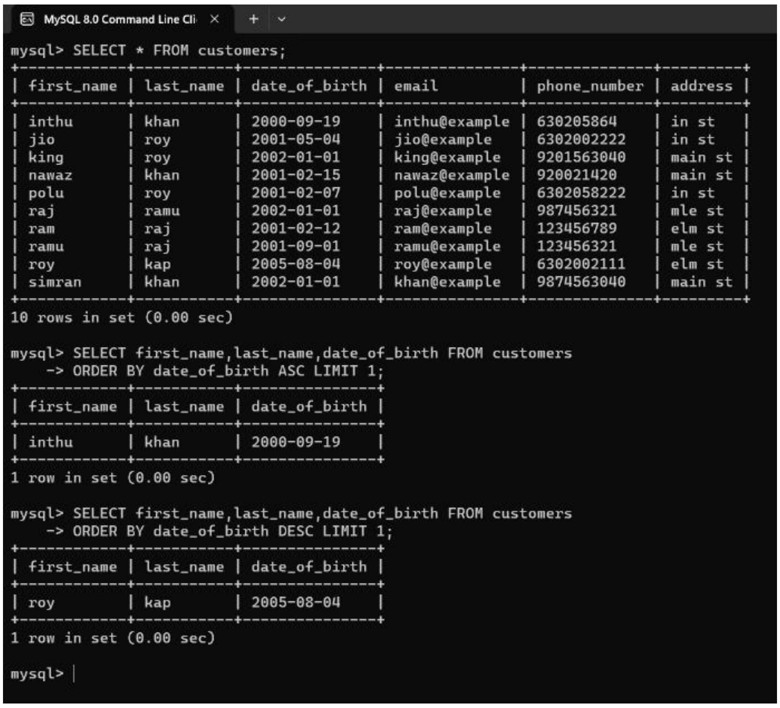
```
| account_id | customer_id | account_type | balance | interest_rate |
+------------+-------------+--------------+---------+---------------+
|          1 | ramu        | savings      | 5000.00 |          0.03 |
|          2 | roy         | savings      | 3500.00 |          0.03 |
|          3 | king        | current      | 5500.00 |          NULL |
|          4 | joo         | zero-balance |    0.00 |          NULL |
|          5 | raja        | current      | 1000.00 |          NULL |
|          6 | simle       | zero-balance |    0.00 |          NULL |
|          7 | roy         | savings      | 3500.00 |          0.03 |
|          8 | nice        | savings      | 1500.00 |          0.03 |
|          9 | abbu        | savings      | 2500.00 |          0.03 |
|         10 | nina        | savings      | 4500.00 |          0.03 |
+------------+-------------+--------------+---------+---------------+
10 rows in set (0.00 sec)

mysql> SELECT AVG(balance) AS average_balance FROM accounts;
+-----------------+
| average_balance |
+-----------------+
|     2700.000000 |
+-----------------+
1 row in set (0.00 sec)

mysql> SELECT * FROM accounts ORDER BY balance DESC LIMIT 10;;
+------------+-------------+--------------+---------+---------------+
| account_id | customer_id | account_type | balance | interest_rate |
+------------+-------------+--------------+---------+---------------+
|          3 | king        | current      | 5500.00 |          NULL |
|          1 | ramu        | savings      | 5000.00 |          0.03 |
|         10 | nina        | savings      | 4500.00 |          0.03 |
|          2 | roy         | savings      | 3500.00 |          0.03 |
|          7 | roy         | savings      | 3500.00 |          0.03 |
|          9 | abbu        | savings      | 2500.00 |          0.03 |
|          8 | nice        | savings      | 1500.00 |          0.03 |
|          5 | raja        | current      | 1000.00 |          NULL |
|          4 | joo         | zero-balance |    0.00 |          NULL |
|          6 | simle       | zero-balance |    0.00 |          NULL |
+------------+-------------+--------------+---------+---------------+
10 rows in set (0.00 sec)
```

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



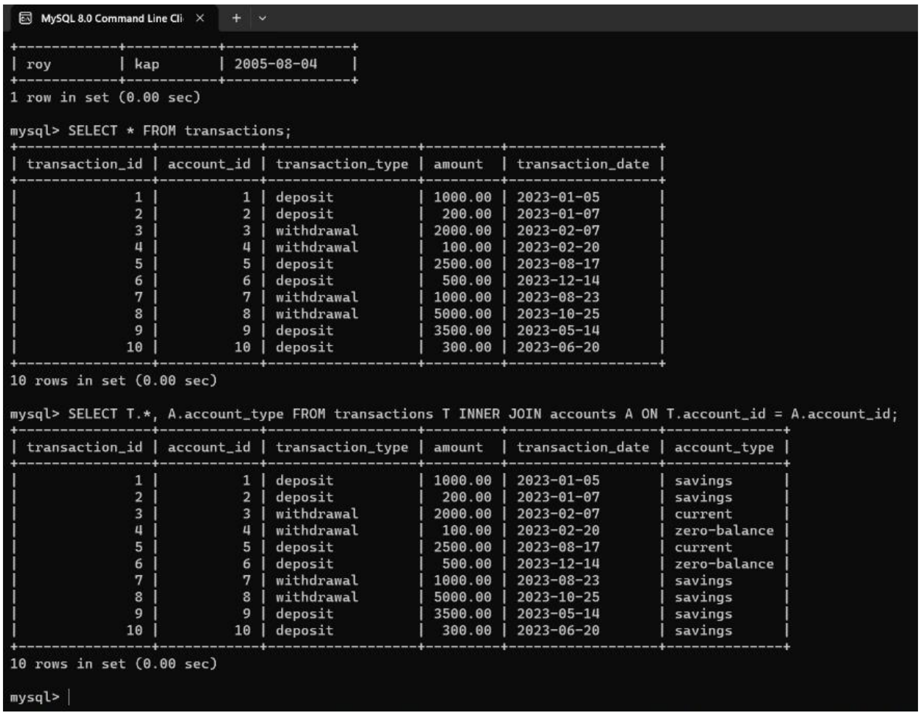
```
mysql> SELECT * FROM transactions;
+----------------+------------+------------------+---------+------------------+
| transaction_id | account_id | transaction_type | amount  | transaction_date |
+----------------+------------+------------------+---------+------------------+
|              1 |          1 | deposit          | 1000.00 | 2023-01-05       |
|              2 |          2 | deposit          |  200.00 | 2023-01-07       |
|              3 |          3 | withdrawal       | 2000.00 | 2023-02-07       |
|              4 |          4 | withdrawal       |  100.00 | 2023-02-20       |
|              5 |          5 | deposit          | 2500.00 | 2023-08-17       |
|              6 |          6 | deposit          |  500.00 | 2023-12-14       |
|              7 |          7 | withdrawal       | 1000.00 | 2023-08-23       |
|              8 |          8 | withdrawal       | 5000.00 | 2023-10-25       |
|              9 |          9 | deposit          | 3500.00 | 2023-05-14       |
|             10 |         10 | deposit          |  300.00 | 2023-06-20       |
+----------------+------------+------------------+---------+------------------+
10 rows in set (0.00 sec)

mysql> SELECT SUM(amount) AS total_deposits FROM transactions WHERE
    -> transaction_type = 'deposit' AND transaction_date = '2023-12-05';
+----------------+
| total_deposits |
+----------------+
|           NULL |
+----------------+
1 row in set (0.00 sec)

mysql> SELECT SUM(amount) AS total_deposits FROM transactions WHERE
    -> transaction_type = 'deposit' AND transaction_date = '2023-01-05';
+----------------+
| total_deposits |
+----------------+
|        1000.00 |
+----------------+
1 row in set (0.00 sec)

mysql>
```

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



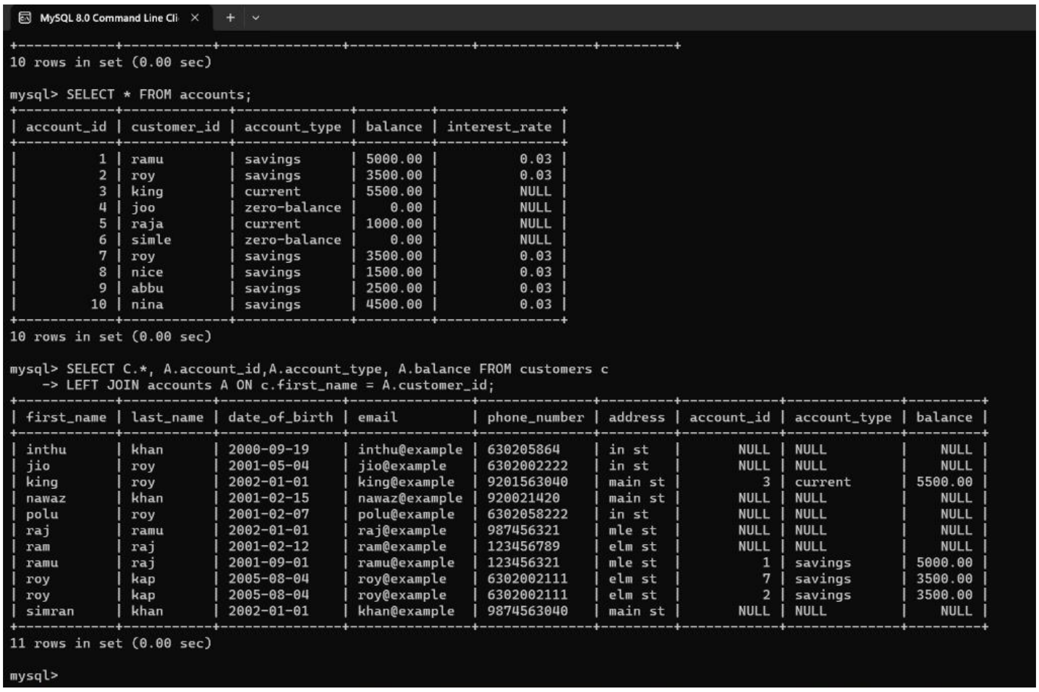
```
mysql> SELECT * FROM customers;
+------------+-----------+---------------+---------------+--------------+---------+
| first_name | last_name | date_of_birth | email         | phone_number | address |
+------------+-----------+---------------+---------------+--------------+---------+
| inthu      | khan      | 2000-09-19    | inthu@example | 630205864    | in st   |
| jio        | roy       | 2001-05-04    | jio@example   | 6302002222   | in st   |
| king       | roy       | 2002-01-01    | king@example  | 9201563040   | main st |
| nawaz      | khan      | 2001-02-15    | nawaz@example | 920021420    | main st |
| polu       | roy       | 2001-02-07    | polu@example  | 6302058222   | in st   |
| raj        | ramu      | 2002-01-01    | raj@example   | 987456321    | mle st  |
| ram        | raj       | 2001-02-12    | ram@example   | 123456789    | elm st  |
| ramu       | raj       | 2001-09-01    | ramu@example  | 123456321    | mle st  |
| roy        | kap       | 2005-08-04    | roy@example   | 6302002111   | elm st  |
| simran     | khan      | 2002-01-01    | khan@example  | 9874563040   | main st |
+------------+-----------+---------------+---------------+--------------+---------+
10 rows in set (0.00 sec)

mysql> SELECT first_name,last_name,date_of_birth FROM customers
    -> ORDER BY date_of_birth ASC LIMIT 1;
+------------+-----------+---------------+
| first_name | last_name | date_of_birth |
+------------+-----------+---------------+
| inthu      | khan      | 2000-09-19    |
+------------+-----------+---------------+
1 row in set (0.00 sec)

mysql> SELECT first_name,last_name,date_of_birth FROM customers
    -> ORDER BY date_of_birth DESC LIMIT 1;
+------------+-----------+---------------+
| first_name | last_name | date_of_birth |
+------------+-----------+---------------+
| roy        | kap       | 2005-08-04    |
+------------+-----------+---------------+
1 row in set (0.00 sec)

mysql> |
```

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



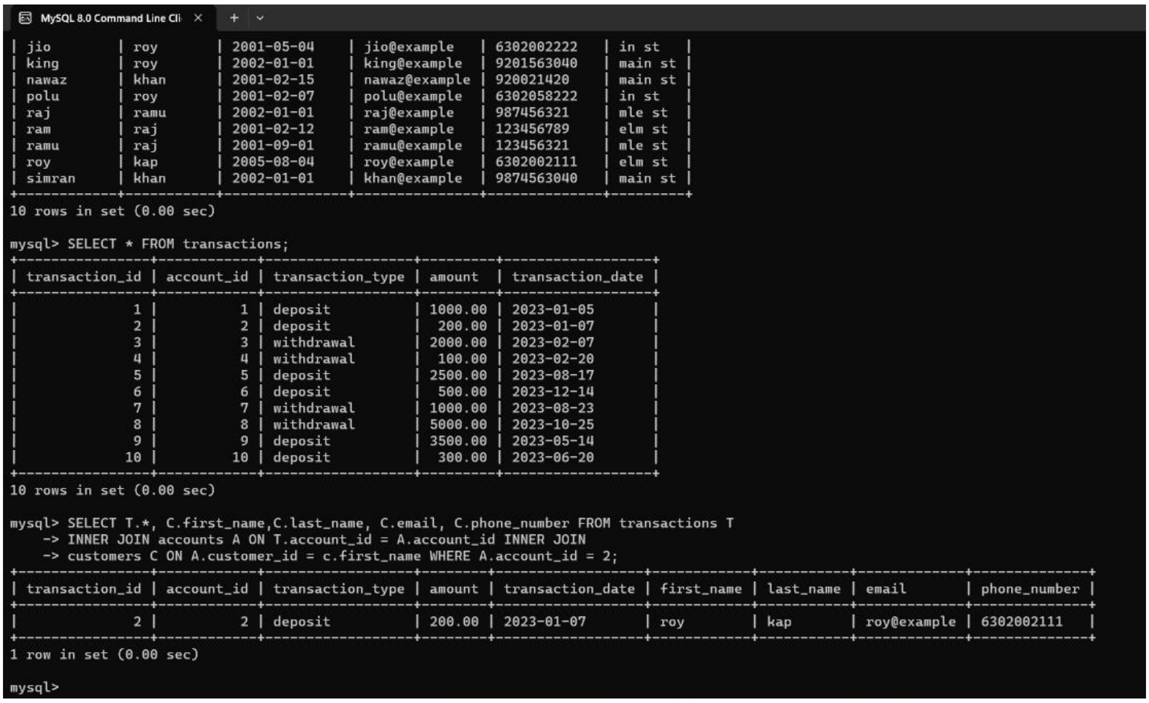
```
+------------+-----------+----------------+
| roy        | kap       | 2005-08-04     |
+------------+-----------+----------------+
1 row in set (0.00 sec)

mysql> SELECT * FROM transactions;
+----------------+------------+------------------+---------+------------------+
| transaction_id | account_id | transaction_type | amount  | transaction_date |
+----------------+------------+------------------+---------+------------------+
|              1 |          1 | deposit          | 1000.00 | 2023-01-05       |
|              2 |          2 | deposit          |  200.00 | 2023-01-07       |
|              3 |          3 | withdrawal       | 2000.00 | 2023-02-07       |
|              4 |          4 | withdrawal       |  100.00 | 2023-02-20       |
|              5 |          5 | deposit          | 2500.00 | 2023-08-17       |
|              6 |          6 | deposit          |  500.00 | 2023-12-14       |
|              7 |          7 | withdrawal       | 1000.00 | 2023-08-23       |
|              8 |          8 | withdrawal       | 5000.00 | 2023-10-25       |
|              9 |          9 | deposit          | 3500.00 | 2023-05-14       |
|             10 |         10 | deposit          |  300.00 | 2023-06-20       |
+----------------+------------+------------------+---------+------------------+
10 rows in set (0.00 sec)

mysql> SELECT T.*, A.account_type FROM transactions T INNER JOIN accounts A ON T.account_id = A.account_id;
+----------------+------------+------------------+---------+------------------+--------------+
| transaction_id | account_id | transaction_type | amount  | transaction_date | account_type |
+----------------+------------+------------------+---------+------------------+--------------+
|              1 |          1 | deposit          | 1000.00 | 2023-01-05       | savings      |
|              2 |          2 | deposit          |  200.00 | 2023-01-07       | savings      |
|              3 |          3 | withdrawal       | 2000.00 | 2023-02-07       | current      |
|              4 |          4 | withdrawal       |  100.00 | 2023-02-20       | zero-balance |
|              5 |          5 | deposit          | 2500.00 | 2023-08-17       | current      |
|              6 |          6 | deposit          |  500.00 | 2023-12-14       | zero-balance |
|              7 |          7 | withdrawal       | 1000.00 | 2023-08-23       | savings      |
|              8 |          8 | withdrawal       | 5000.00 | 2023-10-25       | savings      |
|              9 |          9 | deposit          | 3500.00 | 2023-05-14       | savings      |
|             10 |         10 | deposit          |  300.00 | 2023-06-20       | savings      |
+----------------+------------+------------------+---------+------------------+--------------+
10 rows in set (0.00 sec)

mysql> |
```

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



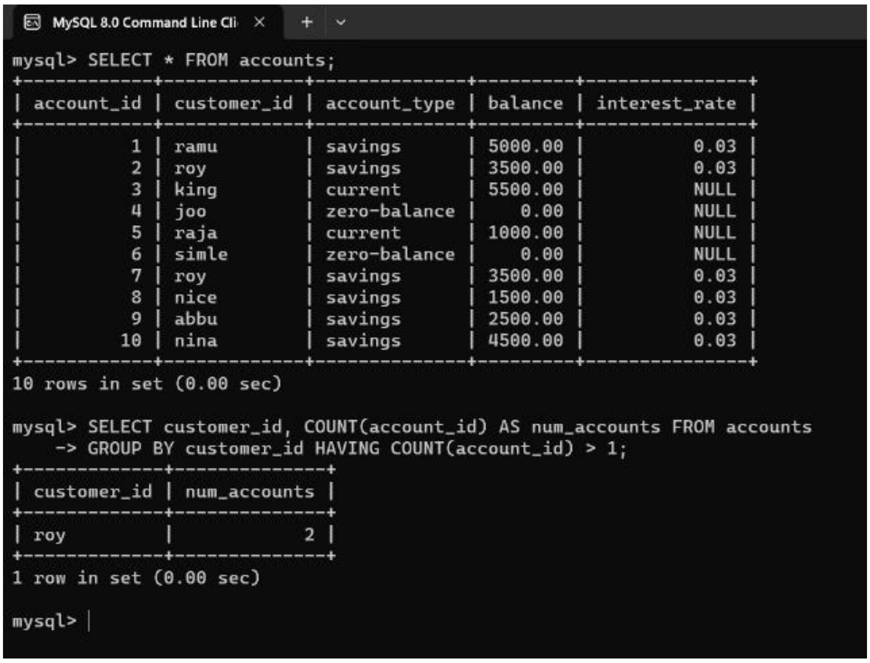
```
+------------+-----------+---------------+-----------------+--------------+---------+
10 rows in set (0.00 sec)

mysql> SELECT * FROM accounts;
+------------+-------------+--------------+---------+---------------+
| account_id | customer_id | account_type | balance | interest_rate |
+------------+-------------+--------------+---------+---------------+
|          1 | ramu        | savings      | 5000.00 |          0.03 |
|          2 | roy         | savings      | 3500.00 |          0.03 |
|          3 | king        | current      | 5500.00 |          NULL |
|          4 | joo         | zero-balance |    0.00 |          NULL |
|          5 | raja        | current      | 1000.00 |          NULL |
|          6 | simle       | zero-balance |    0.00 |          NULL |
|          7 | roy         | savings      | 3500.00 |          0.03 |
|          8 | nice        | savings      | 1500.00 |          0.03 |
|          9 | abbu        | savings      | 2500.00 |          0.03 |
|         10 | nina        | savings      | 4500.00 |          0.03 |
+------------+-------------+--------------+---------+---------------+
10 rows in set (0.00 sec)

mysql> SELECT C.*, A.account_id,A.account_type, A.balance FROM customers c
    -> LEFT JOIN accounts A ON c.first_name = A.customer_id;
+------------+-----------+---------------+-----------------+--------------+---------+------------+--------------+---------+
| first_name | last_name | date_of_birth | email           | phone_number | address | account_id | account_type | balance |
+------------+-----------+---------------+-----------------+--------------+---------+------------+--------------+---------+
| inthu      | khan      | 2000-09-19    | inthu@example   | 630205864    | in st   |       NULL | NULL         |    NULL |
| jio        | roy       | 2001-05-04    | jio@example     | 6302002222   | in st   |       NULL | NULL         |    NULL |
| king       | roy       | 2002-01-01    | king@example    | 9201563040   | main st |          3 | current      | 5500.00 |
| nawaz      | khan      | 2001-02-15    | nawaz@example   | 920021420    | main st |       NULL | NULL         |    NULL |
| polu       | roy       | 2001-02-07    | polu@example    | 6302058222   | in st   |       NULL | NULL         |    NULL |
| raj        | ramu      | 2002-01-01    | raj@example     | 987456321    | mle st  |       NULL | NULL         |    NULL |
| ram        | raj       | 2001-02-12    | ram@example     | 123456789    | elm st  |       NULL | NULL         |    NULL |
| ramu       | raj       | 2001-09-01    | ramu@example    | 123456321    | mle st  |          1 | savings      | 5000.00 |
| roy        | kap       | 2005-08-04    | roy@example     | 6302002111   | elm st  |          7 | savings      | 3500.00 |
| roy        | kap       | 2005-08-04    | roy@example     | 6302002111   | elm st  |          2 | savings      | 3500.00 |
| simran     | khan      | 2002-01-01    | khan@example    | 9874563040   | main st |       NULL | NULL         |    NULL |
+------------+-----------+---------------+-----------------+--------------+---------+------------+--------------+---------+
11 rows in set (0.00 sec)

mysql>
```

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



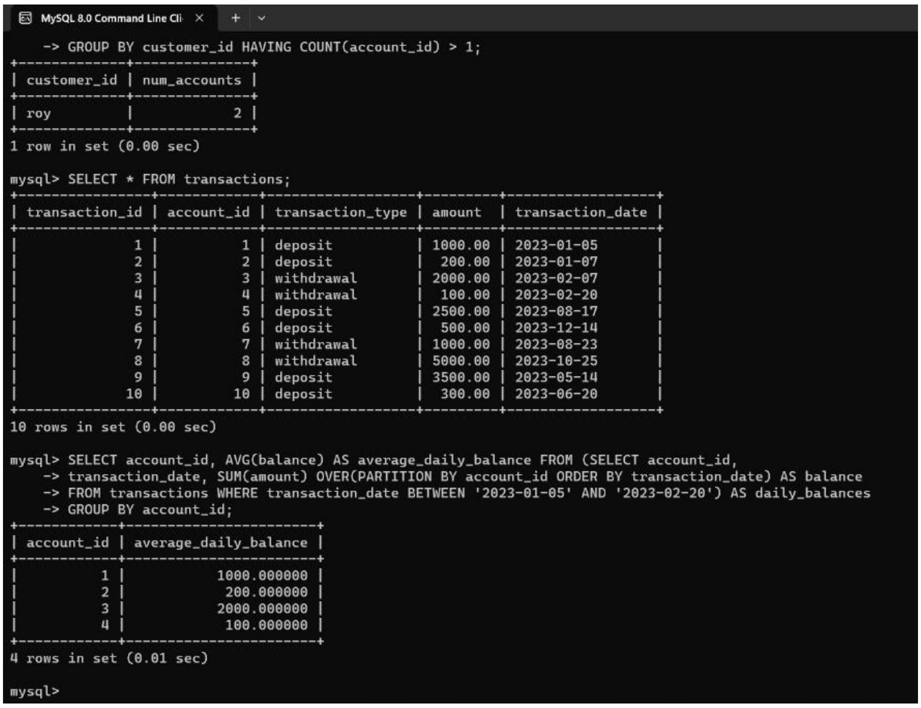
```
| jio        | roy      | 2001-05-04    | jio@example   | 6302002222   | in st   |
| king       | roy      | 2002-01-01    | king@example  | 9201563040   | main st |
| nawaz      | khan     | 2001-02-15    | nawaz@example | 920021420    | main st |
| polu       | roy      | 2001-02-07    | polu@example  | 6302058222   | in st   |
| raj        | ramu     | 2002-01-01    | raj@example   | 987456321    | mle st  |
| ram        | raj      | 2001-02-12    | ram@example   | 123456789    | elm st  |
| ramu       | raj      | 2001-09-01    | ramu@example  | 123456321    | mle st  |
| roy        | kap      | 2005-08-04    | roy@example   | 6302002111   | elm st  |
| simran     | khan     | 2002-01-01    | khan@example  | 9874563040   | main st |
+------------+----------+---------------+---------------+--------------+---------+
10 rows in set (0.00 sec)

mysql> SELECT * FROM transactions;
+----------------+------------+------------------+---------+------------------+
| transaction_id | account_id | transaction_type | amount  | transaction_date |
+----------------+------------+------------------+---------+------------------+
|              1 |          1 | deposit          | 1000.00 | 2023-01-05       |
|              2 |          2 | deposit          |  200.00 | 2023-01-07       |
|              3 |          3 | withdrawal       | 2000.00 | 2023-02-07       |
|              4 |          4 | withdrawal       |  100.00 | 2023-02-20       |
|              5 |          5 | deposit          | 2500.00 | 2023-08-17       |
|              6 |          6 | deposit          |  500.00 | 2023-12-14       |
|              7 |          7 | withdrawal       | 1000.00 | 2023-08-23       |
|              8 |          8 | withdrawal       | 5000.00 | 2023-10-25       |
|              9 |          9 | deposit          | 3500.00 | 2023-05-14       |
|             10 |         10 | deposit          |  300.00 | 2023-06-20       |
+----------------+------------+------------------+---------+------------------+
10 rows in set (0.00 sec)

mysql> SELECT T.*, C.first_name,C.last_name, C.email, C.phone_number FROM transactions T
    -> INNER JOIN accounts A ON T.account_id = A.account_id INNER JOIN
    -> customers C ON A.customer_id = c.first_name WHERE A.account_id = 2;
+----------------+------------+------------------+--------+------------------+------------+-----------+-------------+--------------+
| transaction_id | account_id | transaction_type | amount | transaction_date | first_name | last_name | email       | phone_number |
+----------------+------------+------------------+--------+------------------+------------+-----------+-------------+--------------+
|              2 |          2 | deposit          | 200.00 | 2023-01-07       | roy        | kap       | roy@example | 6302002111   |
+----------------+------------+------------------+--------+------------------+------------+-----------+-------------+--------------+
1 row in set (0.00 sec)

mysql>
```

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



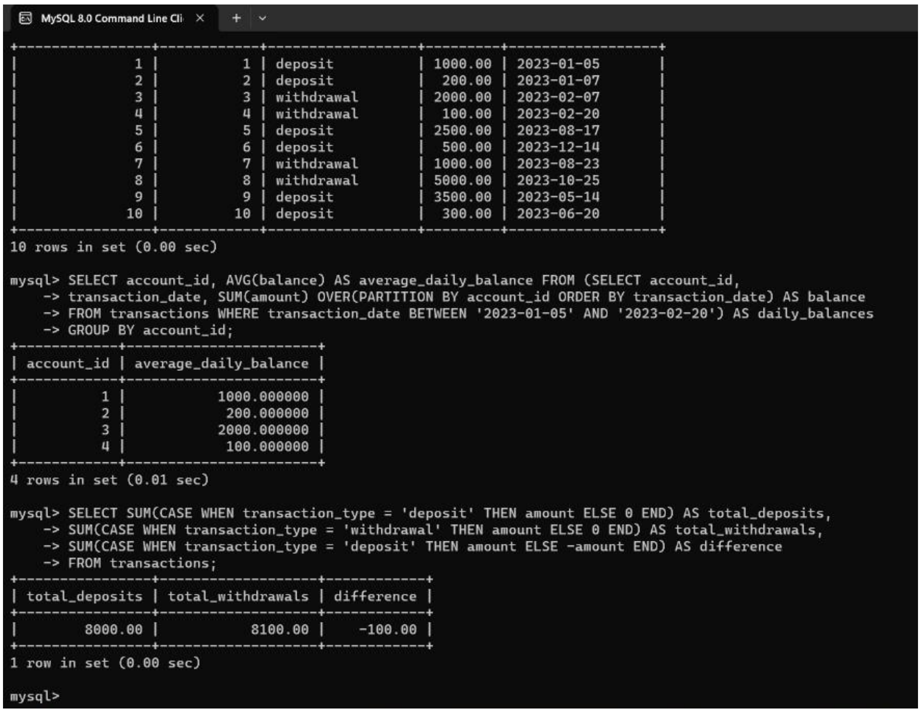
```
mysql> SELECT * FROM accounts;
+------------+-------------+--------------+---------+---------------+
| account_id | customer_id | account_type | balance | interest_rate |
+------------+-------------+--------------+---------+---------------+
|          1 | ramu        | savings      | 5000.00 |          0.03 |
|          2 | roy         | savings      | 3500.00 |          0.03 |
|          3 | king        | current      | 5500.00 |          NULL |
|          4 | joo         | zero-balance |    0.00 |          NULL |
|          5 | raja        | current      | 1000.00 |          NULL |
|          6 | simle       | zero-balance |    0.00 |          NULL |
|          7 | roy         | savings      | 3500.00 |          0.03 |
|          8 | nice        | savings      | 1500.00 |          0.03 |
|          9 | abbu        | savings      | 2500.00 |          0.03 |
|         10 | nina        | savings      | 4500.00 |          0.03 |
+------------+-------------+--------------+---------+---------------+
10 rows in set (0.00 sec)

mysql> SELECT customer_id, COUNT(account_id) AS num_accounts FROM accounts
    -> GROUP BY customer_id HAVING COUNT(account_id) > 1;
+-------------+--------------+
| customer_id | num_accounts |
+-------------+--------------+
| roy         |            2 |
+-------------+--------------+
1 row in set (0.00 sec)

mysql>
```

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



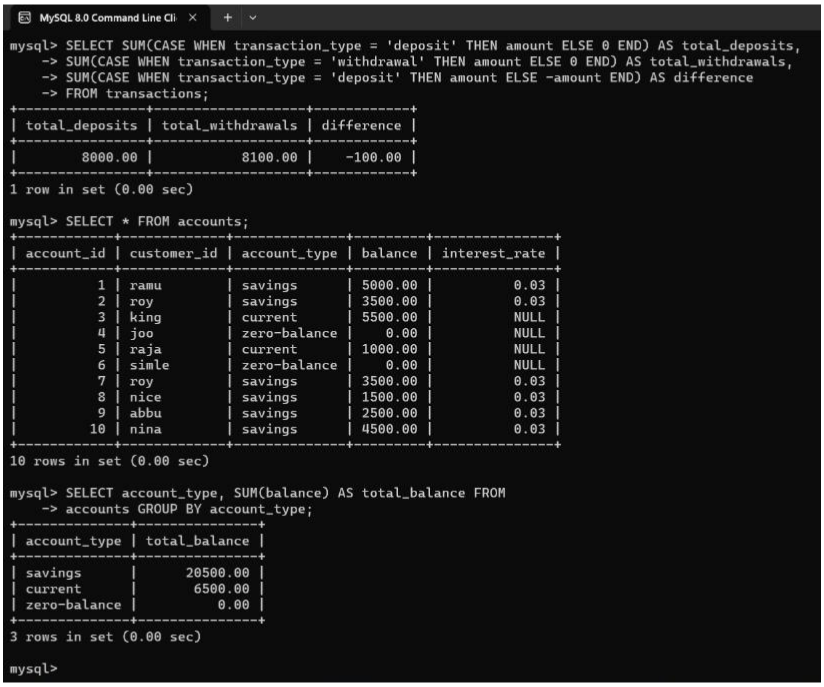
```
    -> GROUP BY customer_id HAVING COUNT(account_id) > 1;
+-------------+--------------+
| customer_id | num_accounts |
+-------------+--------------+
| roy         |            2 |
+-------------+--------------+
1 row in set (0.00 sec)

mysql> SELECT * FROM transactions;
+----------------+------------+------------------+---------+------------------+
| transaction_id | account_id | transaction_type | amount  | transaction_date |
+----------------+------------+------------------+---------+------------------+
|              1 |          1 | deposit          | 1000.00 | 2023-01-05       |
|              2 |          2 | deposit          |  200.00 | 2023-01-07       |
|              3 |          3 | withdrawal       | 2000.00 | 2023-02-07       |
|              4 |          4 | withdrawal       |  100.00 | 2023-02-20       |
|              5 |          5 | deposit          | 2500.00 | 2023-08-17       |
|              6 |          6 | deposit          |  500.00 | 2023-12-14       |
|              7 |          7 | withdrawal       | 1000.00 | 2023-08-23       |
|              8 |          8 | withdrawal       | 5000.00 | 2023-10-25       |
|              9 |          9 | deposit          | 3500.00 | 2023-05-14       |
|             10 |         10 | deposit          |  300.00 | 2023-06-20       |
+----------------+------------+------------------+---------+------------------+
10 rows in set (0.00 sec)

mysql> SELECT account_id, AVG(balance) AS average_daily_balance FROM (SELECT account_id,
    -> transaction_date, SUM(amount) OVER(PARTITION BY account_id ORDER BY transaction_date) AS balance
    -> FROM transactions WHERE transaction_date BETWEEN '2023-01-05' AND '2023-02-20') AS daily_balances
    -> GROUP BY account_id;
+------------+-----------------------+
| account_id | average_daily_balance |
+------------+-----------------------+
|          1 |           1000.000000 |
|          2 |            200.000000 |
|          3 |           2000.000000 |
|          4 |            100.000000 |
+------------+-----------------------+
4 rows in set (0.01 sec)

mysql>
```

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



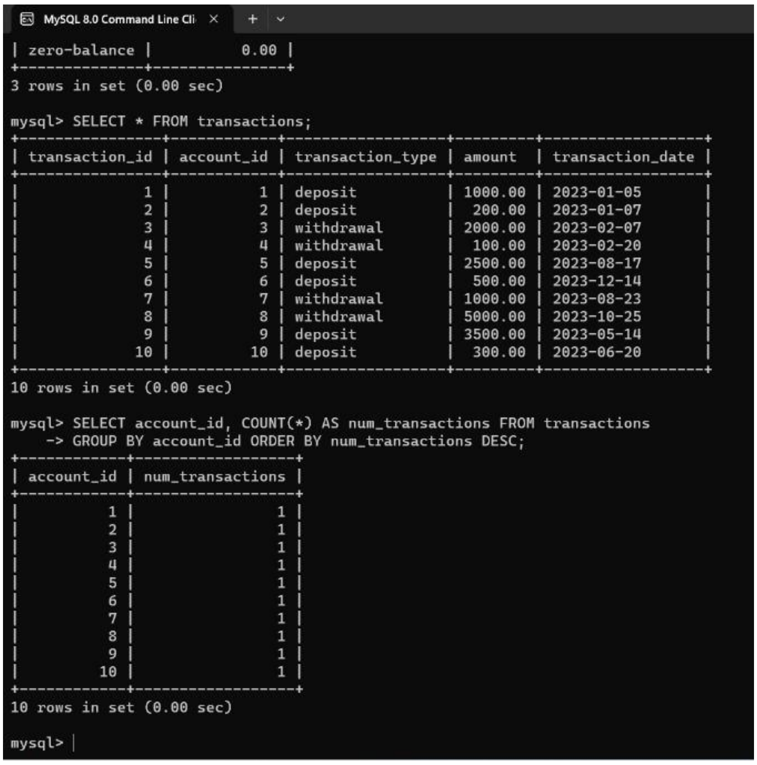
```
+----------------+------------+------------------+---------+------------------+
|              1 |          1 | deposit          | 1000.00 | 2023-01-05       |
|              2 |          2 | deposit          |  200.00 | 2023-01-07       |
|              3 |          3 | withdrawal       | 2000.00 | 2023-02-07       |
|              4 |          4 | withdrawal       |  100.00 | 2023-02-20       |
|              5 |          5 | deposit          | 2500.00 | 2023-08-17       |
|              6 |          6 | deposit          |  500.00 | 2023-12-14       |
|              7 |          7 | withdrawal       | 1000.00 | 2023-08-23       |
|              8 |          8 | withdrawal       | 5000.00 | 2023-10-25       |
|              9 |          9 | deposit          | 3500.00 | 2023-05-14       |
|             10 |         10 | deposit          |  300.00 | 2023-06-20       |
+----------------+------------+------------------+---------+------------------+
10 rows in set (0.00 sec)

mysql> SELECT account_id, AVG(balance) AS average_daily_balance FROM (SELECT account_id,
    -> transaction_date, SUM(amount) OVER(PARTITION BY account_id ORDER BY transaction_date) AS balance
    -> FROM transactions WHERE transaction_date BETWEEN '2023-01-05' AND '2023-02-20') AS daily_balances
    -> GROUP BY account_id;
+------------+-----------------------+
| account_id | average_daily_balance |
+------------+-----------------------+
|          1 |           1000.000000 |
|          2 |            200.000000 |
|          3 |           2000.000000 |
|          4 |            100.000000 |
+------------+-----------------------+
4 rows in set (0.01 sec)

mysql> SELECT SUM(CASE WHEN transaction_type = 'deposit' THEN amount ELSE 0 END) AS total_deposits,
    -> SUM(CASE WHEN transaction_type = 'withdrawal' THEN amount ELSE 0 END) AS total_withdrawals,
    -> SUM(CASE WHEN transaction_type = 'deposit' THEN amount ELSE -amount END) AS difference
    -> FROM transactions;
+----------------+-------------------+------------+
| total_deposits | total_withdrawals | difference |
+----------------+-------------------+------------+
|        8000.00 |           8100.00 |    -100.00 |
+----------------+-------------------+------------+
1 row in set (0.00 sec)

mysql>
```

11. Calculate the total balance for each account type.



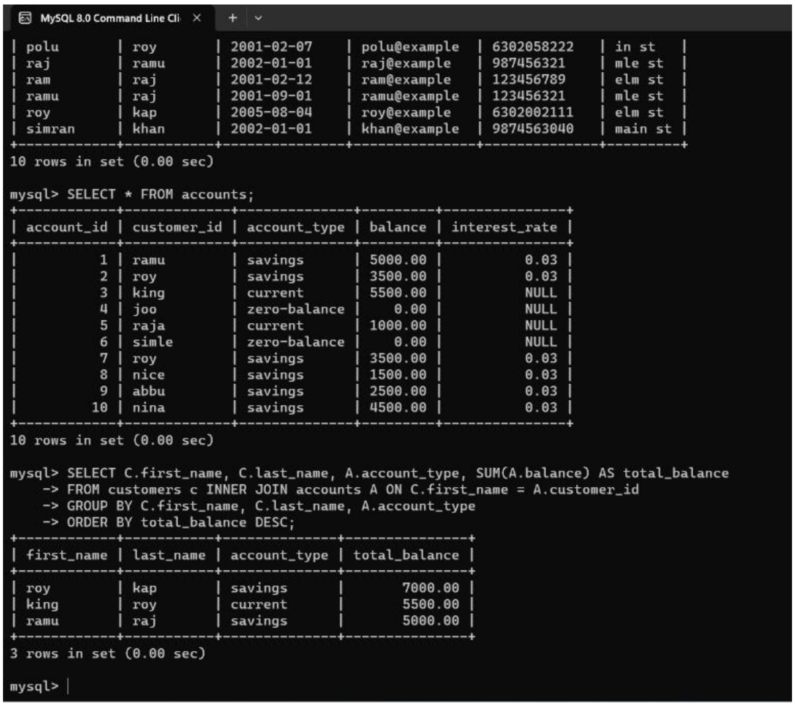
```
mysql> SELECT SUM(CASE WHEN transaction_type = 'deposit' THEN amount ELSE 0 END) AS total_deposits,
    -> SUM(CASE WHEN transaction_type = 'withdrawal' THEN amount ELSE 0 END) AS total_withdrawals,
    -> SUM(CASE WHEN transaction_type = 'deposit' THEN amount ELSE -amount END) AS difference
    -> FROM transactions;
+----------------+-------------------+------------+
| total_deposits | total_withdrawals | difference |
+----------------+-------------------+------------+
|        8000.00 |           8100.00 |    -100.00 |
+----------------+-------------------+------------+
1 row in set (0.00 sec)

mysql> SELECT * FROM accounts;
+------------+-------------+--------------+---------+---------------+
| account_id | customer_id | account_type | balance | interest_rate |
+------------+-------------+--------------+---------+---------------+
|          1 | ramu        | savings      | 5000.00 |          0.03 |
|          2 | roy         | savings      | 3500.00 |          0.03 |
|          3 | king        | current      | 5500.00 |          NULL |
|          4 | joo         | zero-balance |    0.00 |          NULL |
|          5 | raja        | current      | 1000.00 |          NULL |
|          6 | simle       | zero-balance |    0.00 |          NULL |
|          7 | roy         | savings      | 3500.00 |          0.03 |
|          8 | nice        | savings      | 1500.00 |          0.03 |
|          9 | abbu        | savings      | 2500.00 |          0.03 |
|         10 | nina        | savings      | 4500.00 |          0.03 |
+------------+-------------+--------------+---------+---------------+
10 rows in set (0.00 sec)

mysql> SELECT account_type, SUM(balance) AS total_balance FROM
    -> accounts GROUP BY account_type;
+--------------+---------------+
| account_type | total_balance |
+--------------+---------------+
| savings      |      20500.00 |
| current      |       6500.00 |
| zero-balance |          0.00 |
+--------------+---------------+
3 rows in set (0.00 sec)

mysql>
```

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



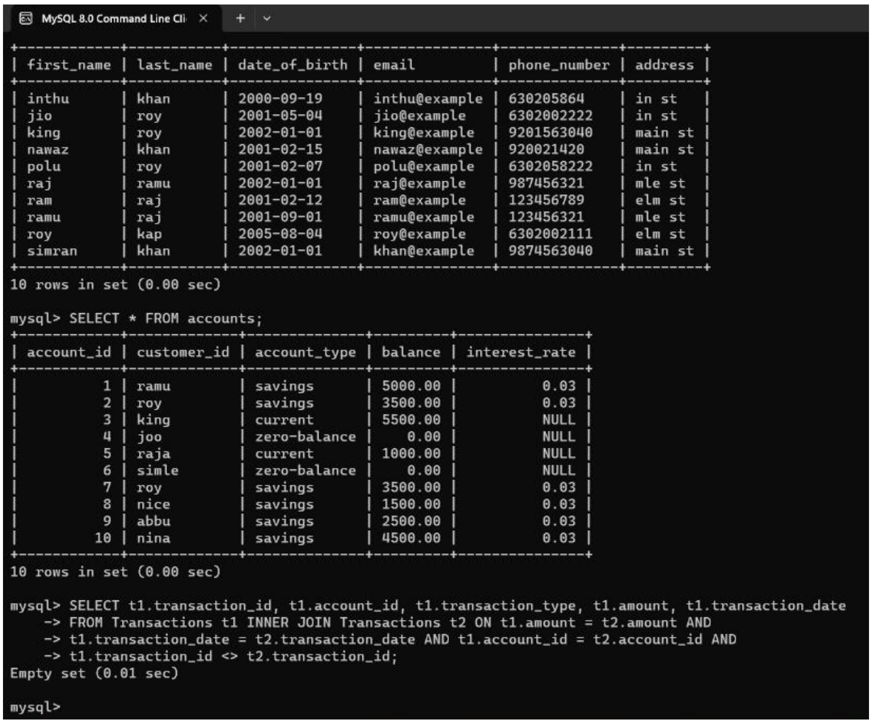
```
| zero-balance |          0.00 |
+--------------+---------------+
3 rows in set (0.00 sec)

mysql> SELECT * FROM transactions;
+----------------+------------+------------------+---------+------------------+
| transaction_id | account_id | transaction_type | amount  | transaction_date |
+----------------+------------+------------------+---------+------------------+
|              1 |          1 | deposit          | 1000.00 | 2023-01-05       |
|              2 |          2 | deposit          |  200.00 | 2023-01-07       |
|              3 |          3 | withdrawal       | 2000.00 | 2023-02-07       |
|              4 |          4 | withdrawal       |  100.00 | 2023-02-20       |
|              5 |          5 | deposit          | 2500.00 | 2023-08-17       |
|              6 |          6 | deposit          |  500.00 | 2023-12-14       |
|              7 |          7 | withdrawal       | 1000.00 | 2023-08-23       |
|              8 |          8 | withdrawal       | 5000.00 | 2023-10-25       |
|              9 |          9 | deposit          | 3500.00 | 2023-05-14       |
|             10 |         10 | deposit          |  300.00 | 2023-06-20       |
+----------------+------------+------------------+---------+------------------+
10 rows in set (0.00 sec)

mysql> SELECT account_id, COUNT(*) AS num_transactions FROM transactions
    -> GROUP BY account_id ORDER BY num_transactions DESC;
+------------+------------------+
| account_id | num_transactions |
+------------+------------------+
|          1 |                1 |
|          2 |                1 |
|          3 |                1 |
|          4 |                1 |
|          5 |                1 |
|          6 |                1 |
|          7 |                1 |
|          8 |                1 |
|          9 |                1 |
|         10 |                1 |
+------------+------------------+
10 rows in set (0.00 sec)

mysql>
```

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



```
| polu       | roy       | 2001-02-07    | polu@example  | 6302058222   | in st   |
| raj        | ramu      | 2002-01-01    | raj@example   | 987456321    | mle st  |
| ram        | raj       | 2001-02-12    | ram@example   | 123456789    | elm st  |
| ramu       | raj       | 2001-09-01    | ramu@example  | 123456321    | mle st  |
| roy        | kap       | 2005-08-04    | roy@example   | 6302002111   | elm st  |
| simran     | khan      | 2002-01-01    | khan@example  | 9874563040   | main st |
+------------+-----------+---------------+---------------+--------------+---------+
10 rows in set (0.00 sec)

mysql> SELECT * FROM accounts;
+------------+-------------+--------------+---------+---------------+
| account_id | customer_id | account_type | balance | interest_rate |
+------------+-------------+--------------+---------+---------------+
|          1 | ramu        | savings      | 5000.00 |          0.03 |
|          2 | roy         | savings      | 3500.00 |          0.03 |
|          3 | king        | current      | 5500.00 |          NULL |
|          4 | joo         | zero-balance |    0.00 |          NULL |
|          5 | raja        | current      | 1000.00 |          NULL |
|          6 | simle       | zero-balance |    0.00 |          NULL |
|          7 | roy         | savings      | 3500.00 |          0.03 |
|          8 | nice        | savings      | 1500.00 |          0.03 |
|          9 | abbu        | savings      | 2500.00 |          0.03 |
|         10 | nina        | savings      | 4500.00 |          0.03 |
+------------+-------------+--------------+---------+---------------+
10 rows in set (0.00 sec)

mysql> SELECT C.first_name, C.last_name, A.account_type, SUM(A.balance) AS total_balance
    -> FROM customers c INNER JOIN accounts A ON C.first_name = A.customer_id
    -> GROUP BY C.first_name, C.last_name, A.account_type
    -> ORDER BY total_balance DESC;
+------------+-----------+--------------+---------------+
| first_name | last_name | account_type | total_balance |
+------------+-----------+--------------+---------------+
| roy        | kap       | savings      |       7000.00 |
| king       | roy       | current      |       5500.00 |
| ramu       | raj       | savings      |       5000.00 |
+------------+-----------+--------------+---------------+
3 rows in set (0.00 sec)

mysql>
```

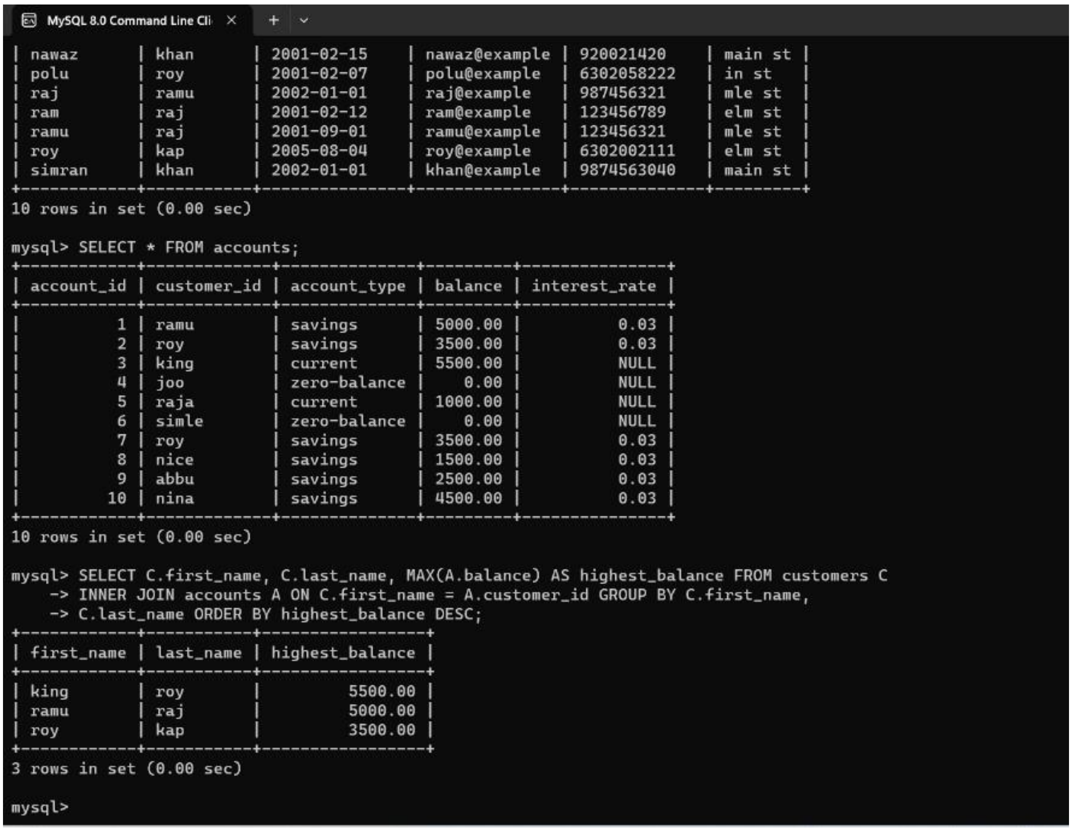
14. Identify and list duplicate transactions based on transaction amount, date, and account.



```
+------------+-----------+---------------+---------------+--------------+---------+
| first_name | last_name | date_of_birth | email         | phone_number | address |
+------------+-----------+---------------+---------------+--------------+---------+
| inthu      | khan      | 2000-09-19    | inthu@example | 630205864    | in st   |
| jio        | roy       | 2001-05-04    | jio@example   | 6302002222   | in st   |
| king       | roy       | 2002-01-01    | king@example  | 9201563040   | main st |
| nawaz      | khan      | 2001-02-15    | nawaz@example | 920021420    | main st |
| polu       | roy       | 2001-02-07    | polu@example  | 6302058222   | in st   |
| raj        | ramu      | 2002-01-01    | raj@example   | 987456321    | mle st  |
| ram        | raj       | 2001-02-12    | ram@example   | 123456789    | elm st  |
| ramu       | raj       | 2001-09-01    | ramu@example  | 123456321    | mle st  |
| roy        | kap       | 2005-08-04    | roy@example   | 6302002111   | elm st  |
| simran     | khan      | 2002-01-01    | khan@example  | 9874563040   | main st |
+------------+-----------+---------------+---------------+--------------+---------+
10 rows in set (0.00 sec)

mysql> SELECT * FROM accounts;
+------------+-------------+--------------+---------+---------------+
| account_id | customer_id | account_type | balance | interest_rate |
+------------+-------------+--------------+---------+---------------+
|          1 | ramu        | savings      | 5000.00 |          0.03 |
|          2 | roy         | savings      | 3500.00 |          0.03 |
|          3 | king        | current      | 5500.00 |          NULL |
|          4 | joo         | zero-balance |    0.00 |          NULL |
|          5 | raja        | current      | 1000.00 |          NULL |
|          6 | simle       | zero-balance |    0.00 |          NULL |
|          7 | roy         | savings      | 3500.00 |          0.03 |
|          8 | nice        | savings      | 1500.00 |          0.03 |
|          9 | abbu        | savings      | 2500.00 |          0.03 |
|         10 | nina        | savings      | 4500.00 |          0.03 |
+------------+-------------+--------------+---------+---------------+
10 rows in set (0.00 sec)

mysql> SELECT t1.transaction_id, t1.account_id, t1.transaction_type, t1.amount, t1.transaction_date
    -> FROM Transactions t1 INNER JOIN Transactions t2 ON t1.amount = t2.amount AND
    -> t1.transaction_date = t2.transaction_date AND t1.account_id = t2.account_id AND
    -> t1.transaction_id <> t2.transaction_id;
Empty set (0.01 sec)

mysql>
```

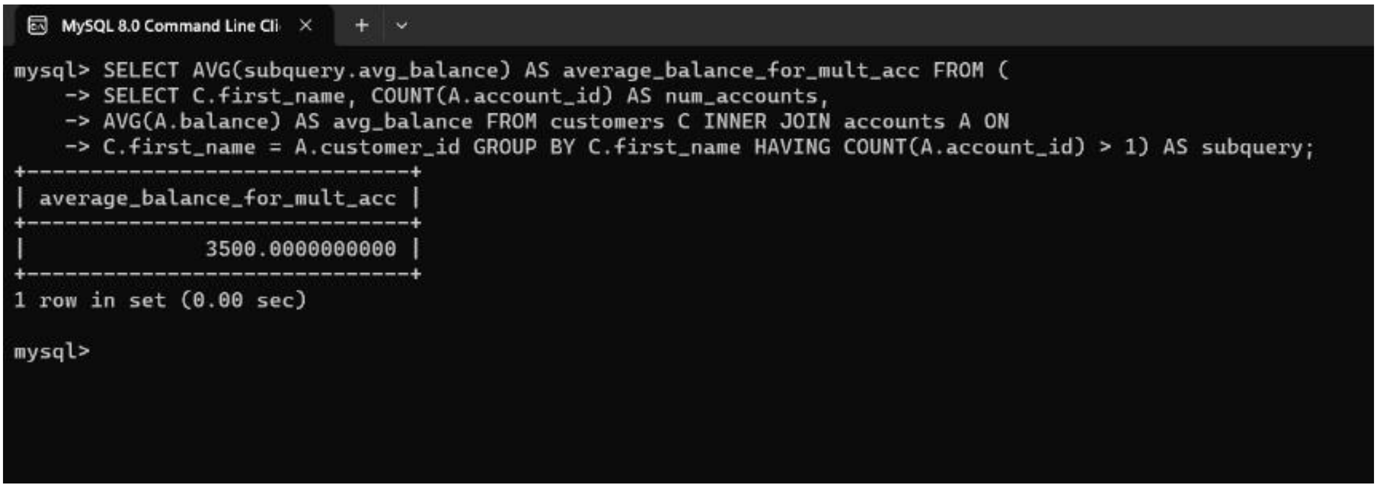
Task-4

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



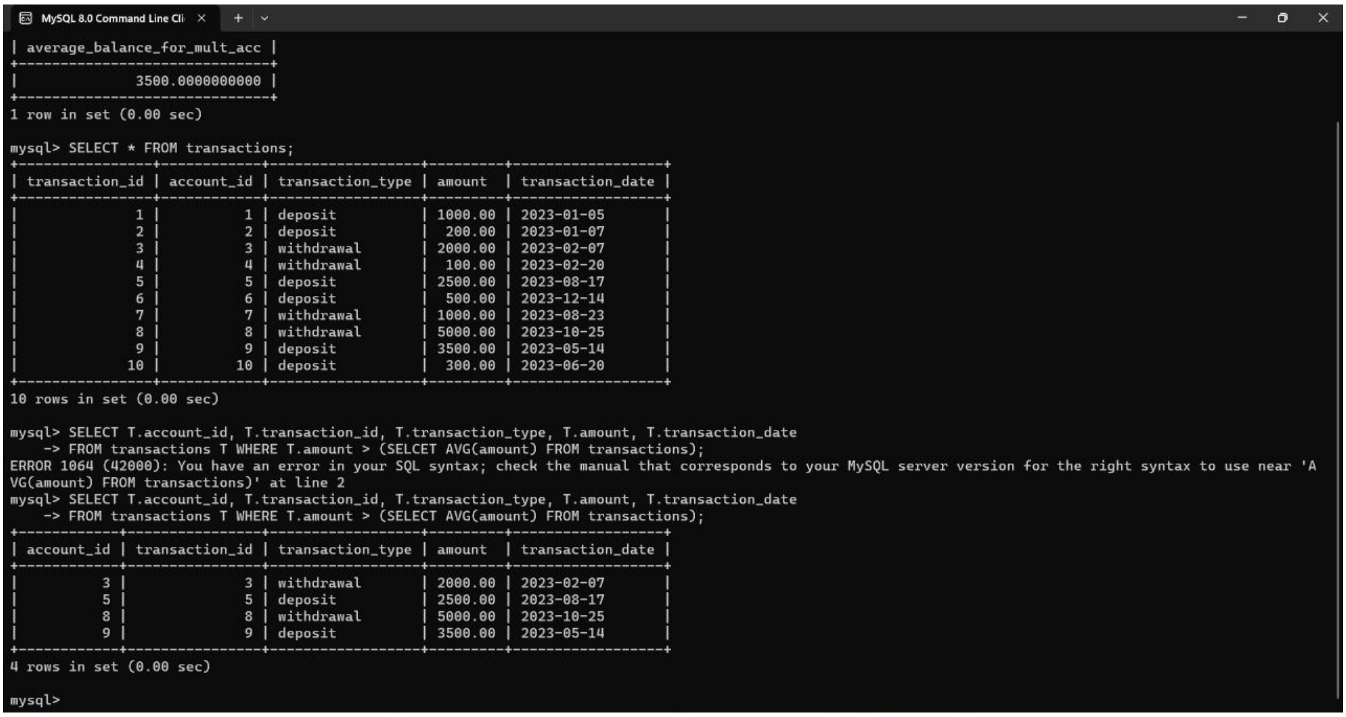
```
| nawaz      | khan      | 2001-02-15    | nawaz@example | 920021420    | main st |
| polu       | roy       | 2001-02-07    | polu@example  | 6302058222   | in st   |
| raj        | ramu      | 2002-01-01    | raj@example   | 987456321    | mle st  |
| ram        | raj       | 2001-02-12    | ram@example   | 123456789    | elm st  |
| ramu       | raj       | 2001-09-01    | ramu@example  | 123456321    | mle st  |
| roy        | kap       | 2005-08-04    | roy@example   | 6302002111   | elm st  |
| simran     | khan      | 2002-01-01    | khan@example  | 9874563040   | main st |
+------------+-----------+---------------+---------------+--------------+---------+
10 rows in set (0.00 sec)

mysql> SELECT * FROM accounts;
+------------+-------------+--------------+---------+---------------+
| account_id | customer_id | account_type | balance | interest_rate |
+------------+-------------+--------------+---------+---------------+
|          1 | ramu        | savings      | 5000.00 |          0.03 |
|          2 | roy         | savings      | 3500.00 |          0.03 |
|          3 | king        | current      | 5500.00 |          NULL |
|          4 | joo         | zero-balance |    0.00 |          NULL |
|          5 | raja        | current      | 1000.00 |          NULL |
|          6 | simle       | zero-balance |    0.00 |          NULL |
|          7 | roy         | savings      | 3500.00 |          0.03 |
|          8 | nice        | savings      | 1500.00 |          0.03 |
|          9 | abbu        | savings      | 2500.00 |          0.03 |
|         10 | nina        | savings      | 4500.00 |          0.03 |
+------------+-------------+--------------+---------+---------------+
10 rows in set (0.00 sec)

mysql> SELECT C.first_name, C.last_name, MAX(A.balance) AS highest_balance FROM customers C
    -> INNER JOIN accounts A ON C.first_name = A.customer_id GROUP BY C.first_name,
    -> C.last_name ORDER BY highest_balance DESC;
+------------+-----------+-----------------+
| first_name | last_name | highest_balance |
+------------+-----------+-----------------+
| king       | roy       |         5500.00 |
| ramu       | raj       |         5000.00 |
| roy        | kap       |         3500.00 |
+------------+-----------+-----------------+
3 rows in set (0.00 sec)

mysql>
```

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



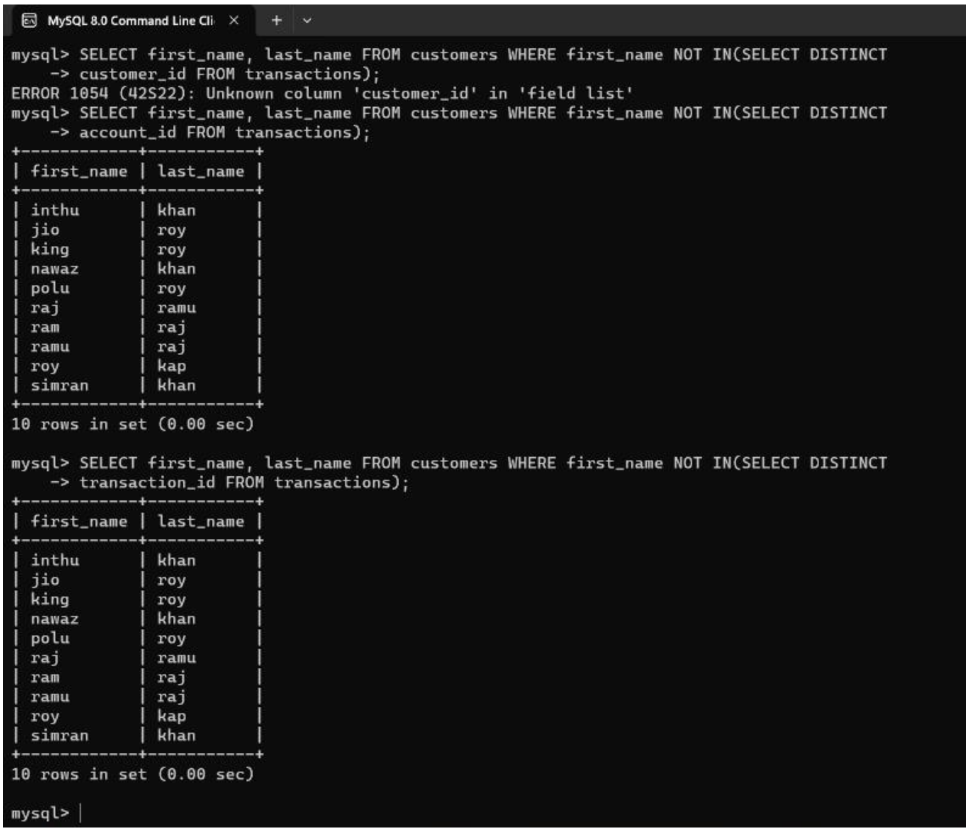
```
mysql> SELECT AVG(subquery.avg_balance) AS average_balance_for_mult_acc FROM (
    -> SELECT C.first_name, COUNT(A.account_id) AS num_accounts,
    -> AVG(A.balance) AS avg_balance FROM customers C INNER JOIN accounts A ON
    -> C.first_name = A.customer_id GROUP BY C.first_name HAVING COUNT(A.account_id) > 1) AS subquery;
+------------------------------+
| average_balance_for_mult_acc |
+------------------------------+
|              3500.0000000000 |
+------------------------------+
1 row in set (0.00 sec)

mysql>
```

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



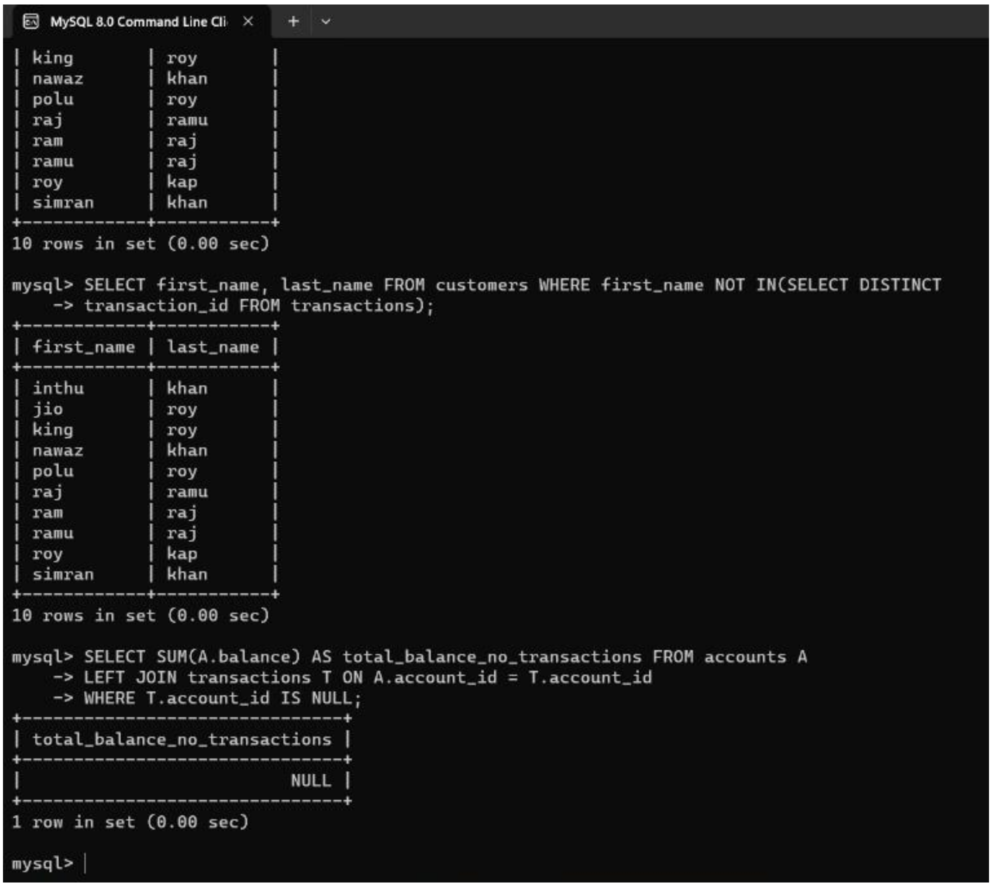
```
| average_balance_for_mult_acc |
+------------------------------+
|              3500.0000000000 |
+------------------------------+
1 row in set (0.00 sec)

mysql> SELECT * FROM transactions;
+----------------+------------+------------------+---------+------------------+
| transaction_id | account_id | transaction_type | amount  | transaction_date |
+----------------+------------+------------------+---------+------------------+
|              1 |          1 | deposit          | 1000.00 | 2023-01-05       |
|              2 |          2 | deposit          |  200.00 | 2023-01-07       |
|              3 |          3 | withdrawal       | 2000.00 | 2023-02-07       |
|              4 |          4 | withdrawal       |  100.00 | 2023-02-20       |
|              5 |          5 | deposit          | 2500.00 | 2023-08-17       |
|              6 |          6 | deposit          |  500.00 | 2023-12-14       |
|              7 |          7 | withdrawal       | 1000.00 | 2023-08-23       |
|              8 |          8 | withdrawal       | 5000.00 | 2023-10-25       |
|              9 |          9 | deposit          | 3500.00 | 2023-05-14       |
|             10 |         10 | deposit          |  300.00 | 2023-06-20       |
+----------------+------------+------------------+---------+------------------+
10 rows in set (0.00 sec)

mysql> SELECT T.account_id, T.transaction_id, T.transaction_type, T.amount, T.transaction_date
    -> FROM transactions T WHERE T.amount > (SELCET AVG(amount) FROM transactions);
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax to use near 'A
VG(amount) FROM transactions)' at line 2
mysql> SELECT T.account_id, T.transaction_id, T.transaction_type, T.amount, T.transaction_date
    -> FROM transactions T WHERE T.amount > (SELECT AVG(amount) FROM transactions);
+------------+----------------+------------------+---------+------------------+
| account_id | transaction_id | transaction_type | amount  | transaction_date |
+------------+----------------+------------------+---------+------------------+
|          3 |              3 | withdrawal       | 2000.00 | 2023-02-07       |
|          5 |              5 | deposit          | 2500.00 | 2023-08-17       |
|          8 |              8 | withdrawal       | 5000.00 | 2023-10-25       |
|          9 |              9 | deposit          | 3500.00 | 2023-05-14       |
+------------+----------------+------------------+---------+------------------+
4 rows in set (0.00 sec)

mysql>
```

4. Identify customers who have no recorded transactions.



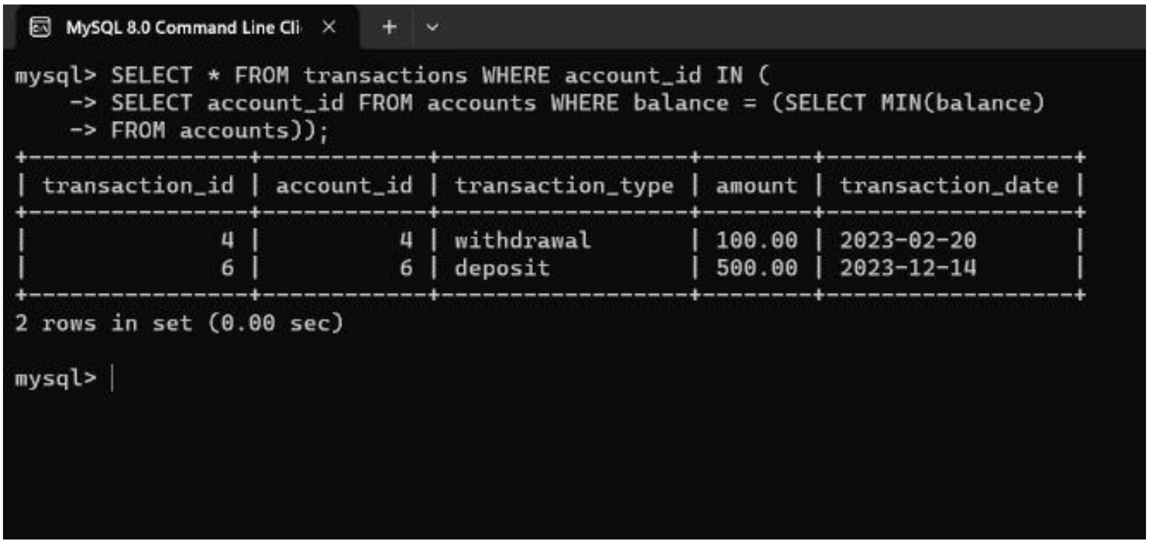
```
mysql> SELECT first_name, last_name FROM customers WHERE first_name NOT IN(SELECT DISTINCT
    -> customer_id FROM transactions);
ERROR 1054 (42S22): Unknown column 'customer_id' in 'field list'
mysql> SELECT first_name, last_name FROM customers WHERE first_name NOT IN(SELECT DISTINCT
    -> account_id FROM transactions);
+------------+-----------+
| first_name | last_name |
+------------+-----------+
| inthu      | khan      |
| jio        | roy       |
| king       | roy       |
| nawaz      | khan      |
| polu       | roy       |
| raj        | ramu      |
| ram        | raj       |
| ramu       | raj       |
| roy        | kap       |
| simran     | khan      |
+------------+-----------+
10 rows in set (0.00 sec)

mysql> SELECT first_name, last_name FROM customers WHERE first_name NOT IN(SELECT DISTINCT
    -> transaction_id FROM transactions);
+------------+-----------+
| first_name | last_name |
+------------+-----------+
| inthu      | khan      |
| jio        | roy       |
| king       | roy       |
| nawaz      | khan      |
| polu       | roy       |
| raj        | ramu      |
| ram        | raj       |
| ramu       | raj       |
| roy        | kap       |
| simran     | khan      |
+------------+-----------+
10 rows in set (0.00 sec)

mysql>
```

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



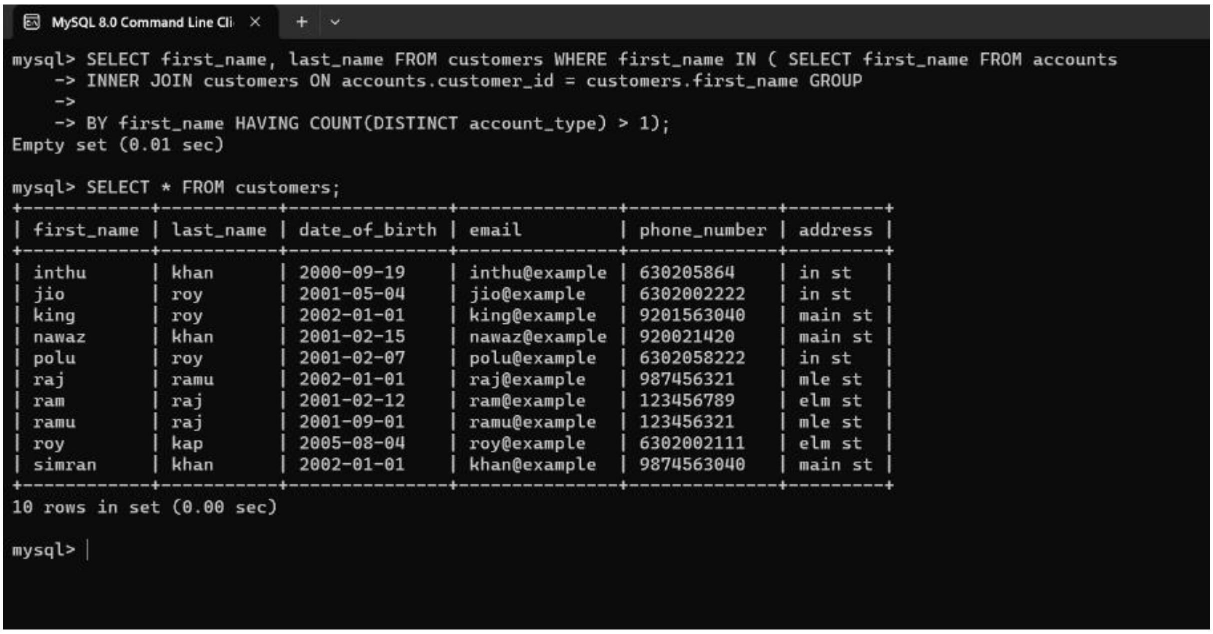
```
| king       | roy       |
| nawaz      | khan      |
| polu       | roy       |
| raj        | ramu      |
| ram        | raj       |
| ramu       | raj       |
| roy        | kap       |
| simran     | khan      |
+------------+-----------+
10 rows in set (0.00 sec)

mysql> SELECT first_name, last_name FROM customers WHERE first_name NOT IN(SELECT DISTINCT
    -> transaction_id FROM transactions);
+------------+-----------+
| first_name | last_name |
+------------+-----------+
| inthu      | khan      |
| jio        | roy       |
| king       | roy       |
| nawaz      | khan      |
| polu       | roy       |
| raj        | ramu      |
| ram        | raj       |
| ramu       | raj       |
| roy        | kap       |
| simran     | khan      |
+------------+-----------+
10 rows in set (0.00 sec)

mysql> SELECT SUM(A.balance) AS total_balance_no_transactions FROM accounts A
    -> LEFT JOIN transactions T ON A.account_id = T.account_id
    -> WHERE T.account_id IS NULL;
+-------------------------------+
| total_balance_no_transactions |
+-------------------------------+
|                          NULL |
+-------------------------------+
1 row in set (0.00 sec)

mysql> 
```

6. Retrieve transactions for accounts with the lowest balance.



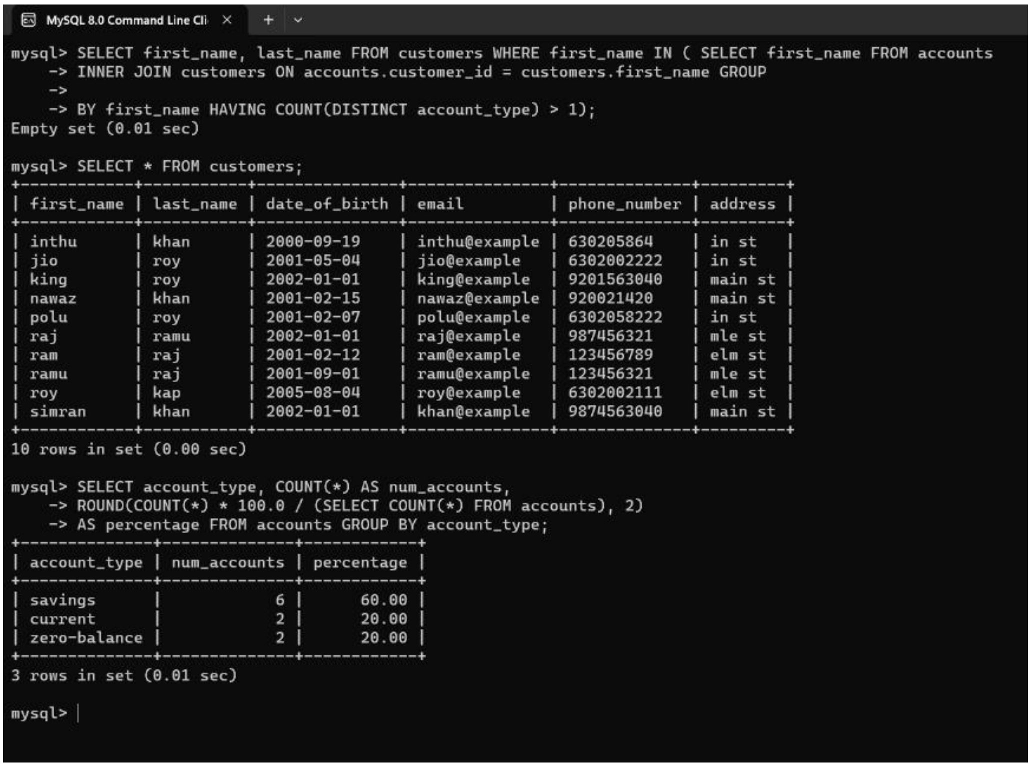
```
mysql> SELECT * FROM transactions WHERE account_id IN (
    -> SELECT account_id FROM accounts WHERE balance = (SELECT MIN(balance)
    -> FROM accounts));
+----------------+------------+------------------+--------+------------------+
| transaction_id | account_id | transaction_type | amount | transaction_date |
+----------------+------------+------------------+--------+------------------+
|              4 |          4 | withdrawal       | 100.00 | 2023-02-20       |
|              6 |          6 | deposit          | 500.00 | 2023-12-14       |
+----------------+------------+------------------+--------+------------------+
2 rows in set (0.00 sec)

mysql> 
```

7. Identify customers who have accounts of multiple types.



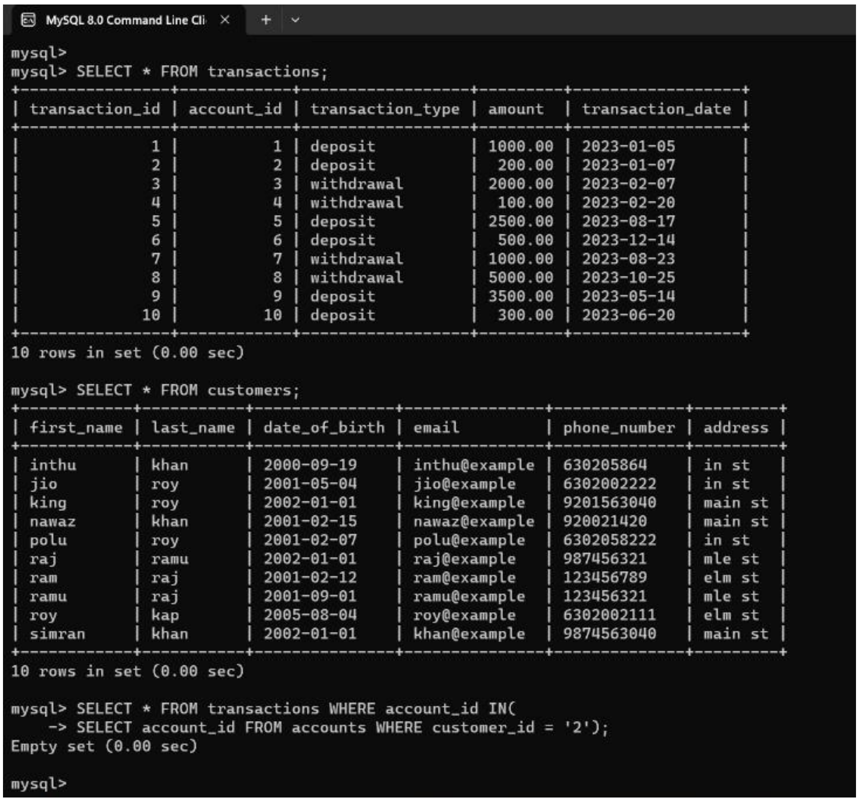
```
mysql> SELECT first_name, last_name FROM customers WHERE first_name IN ( SELECT first_name FROM accounts
    -> INNER JOIN customers ON accounts.customer_id = customers.first_name GROUP
    ->
    -> BY first_name HAVING COUNT(DISTINCT account_type) > 1);
Empty set (0.01 sec)

mysql> SELECT * FROM customers;
+------------+-----------+---------------+---------------+--------------+---------+
| first_name | last_name | date_of_birth | email         | phone_number | address |
+------------+-----------+---------------+---------------+--------------+---------+
| inthu      | khan      | 2000-09-19    | inthu@example | 630205864    | in st   |
| jio        | roy       | 2001-05-04    | jio@example   | 6302002222   | in st   |
| king       | roy       | 2002-01-01    | king@example  | 9201563040   | main st |
| nawaz      | khan      | 2001-02-15    | nawaz@example | 920021420    | main st |
| polu       | roy       | 2001-02-07    | polu@example  | 6302058222   | in st   |
| raj        | ramu      | 2002-01-01    | raj@example   | 987456321    | mle st  |
| ram        | raj       | 2001-02-12    | ram@example   | 123456789    | elm st  |
| ramu       | raj       | 2001-09-01    | ramu@example  | 123456321    | mle st  |
| roy        | kap       | 2005-08-04    | roy@example   | 6302002111   | elm st  |
| simran     | khan      | 2002-01-01    | khan@example  | 9874563040   | main st |
+------------+-----------+---------------+---------------+--------------+---------+
10 rows in set (0.00 sec)

mysql> |
```

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



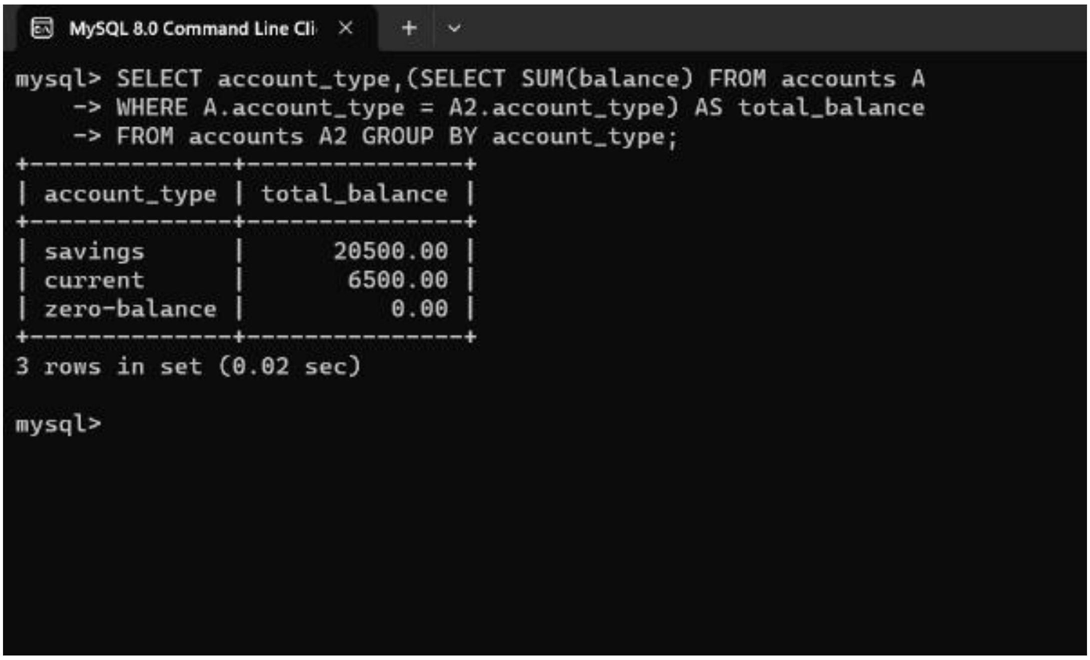
```
mysql> SELECT first_name, last_name FROM customers WHERE first_name IN ( SELECT first_name FROM accounts
    -> INNER JOIN customers ON accounts.customer_id = customers.first_name GROUP
    ->
    -> BY first_name HAVING COUNT(DISTINCT account_type) > 1);
Empty set (0.01 sec)

mysql> SELECT * FROM customers;
+------------+-----------+---------------+---------------+--------------+---------+
| first_name | last_name | date_of_birth | email         | phone_number | address |
+------------+-----------+---------------+---------------+--------------+---------+
| inthu      | khan      | 2000-09-19    | inthu@example | 630205864    | in st   |
| jio        | roy       | 2001-05-04    | jio@example   | 6302002222   | in st   |
| king       | roy       | 2002-01-01    | king@example  | 9201563040   | main st |
| nawaz      | khan      | 2001-02-15    | nawaz@example | 920021420    | main st |
| polu       | roy       | 2001-02-07    | polu@example  | 6302058222   | in st   |
| raj        | ramu      | 2002-01-01    | raj@example   | 987456321    | mle st  |
| ram        | raj       | 2001-02-12    | ram@example   | 123456789    | elm st  |
| ramu       | raj       | 2001-09-01    | ramu@example  | 123456321    | mle st  |
| roy        | kap       | 2005-08-04    | roy@example   | 6302002111   | elm st  |
| simran     | khan      | 2002-01-01    | khan@example  | 9874563040   | main st |
+------------+-----------+---------------+---------------+--------------+---------+
10 rows in set (0.00 sec)

mysql> SELECT account_type, COUNT(*) AS num_accounts,
    -> ROUND(COUNT(*) * 100.0 / (SELECT COUNT(*) FROM accounts), 2)
    -> AS percentage FROM accounts GROUP BY account_type;
+--------------+--------------+------------+
| account_type | num_accounts | percentage |
+--------------+--------------+------------+
| savings      |            6 |      60.00 |
| current      |            2 |      20.00 |
| zero-balance |            2 |      20.00 |
+--------------+--------------+------------+
3 rows in set (0.01 sec)

mysql> |
```

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



```
mysql>
mysql> SELECT * FROM transactions;
+----------------+------------+------------------+---------+------------------+
| transaction_id | account_id | transaction_type | amount  | transaction_date |
+----------------+------------+------------------+---------+------------------+
|              1 |          1 | deposit          | 1000.00 | 2023-01-05       |
|              2 |          2 | deposit          |  200.00 | 2023-01-07       |
|              3 |          3 | withdrawal       | 2000.00 | 2023-02-07       |
|              4 |          4 | withdrawal       |  100.00 | 2023-02-20       |
|              5 |          5 | deposit          | 2500.00 | 2023-08-17       |
|              6 |          6 | deposit          |  500.00 | 2023-12-14       |
|              7 |          7 | withdrawal       | 1000.00 | 2023-08-23       |
|              8 |          8 | withdrawal       | 5000.00 | 2023-10-25       |
|              9 |          9 | deposit          | 3500.00 | 2023-05-14       |
|             10 |         10 | deposit          |  300.00 | 2023-06-20       |
+----------------+------------+------------------+---------+------------------+
10 rows in set (0.00 sec)

mysql> SELECT * FROM customers;
+------------+-----------+---------------+---------------+--------------+---------+
| first_name | last_name | date_of_birth | email         | phone_number | address |
+------------+-----------+---------------+---------------+--------------+---------+
| inthu      | khan      | 2000-09-19    | inthu@example | 630205864    | in st   |
| jio        | roy       | 2001-05-04    | jio@example   | 6302002222   | in st   |
| king       | roy       | 2002-01-01    | king@example  | 9201563040   | main st |
| nawaz      | khan      | 2001-02-15    | nawaz@example | 920021420    | main st |
| polu       | roy       | 2001-02-07    | polu@example  | 6302058222   | in st   |
| raj        | ramu      | 2002-01-01    | raj@example   | 987456321    | mle st  |
| ram        | raj       | 2001-02-12    | ram@example   | 123456789    | elm st  |
| ramu       | raj       | 2001-09-01    | ramu@example  | 123456321    | mle st  |
| roy        | kap       | 2005-08-04    | roy@example   | 6302002111   | elm st  |
| simran     | khan      | 2002-01-01    | khan@example  | 9874563040   | main st |
+------------+-----------+---------------+---------------+--------------+---------+
10 rows in set (0.00 sec)

mysql> SELECT * FROM transactions WHERE account_id IN(
    -> SELECT account_id FROM accounts WHERE customer_id = '2');
Empty set (0.00 sec)

mysql>
```

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



```
mysql> SELECT account_type,(SELECT SUM(balance) FROM accounts A
    -> WHERE A.account_type = A2.account_type) AS total_balance
    -> FROM accounts A2 GROUP BY account_type;
+--------------+---------------+
| account_type | total_balance |
+--------------+---------------+
| savings      |      20500.00 |
| current      |       6500.00 |
| zero-balance |          0.00 |
+--------------+---------------+
3 rows in set (0.02 sec)

mysql>
```