ASSIGNMENT 3

BANKING SYSTEM

AKILESH K

1)

```
mysql> create database hmbank;
Query OK, 1 row affected (0.03 sec)

mysql> use hmbank;
Database changed
```

2)

```
mysql> CREATE TABLE customers(
    ->    customerid INT,
    ->    firstname varchar(25),
    ->    lastname varchar(25),
    ->    date date,
    ->    email text,
    ->    phone text,
    ->    PRIMARY KEY (customerid)
    -> ) ;
Query OK, 0 rows affected (0.05 sec)
```
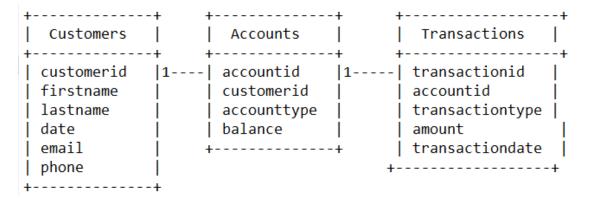
```
mysql> CREATE TABLE accounts (
    -> accountid INT,
    -> customerid INT,
    -> accounttype VARCHAR(30),
    -> balance DOUBLE,
    -> PRIMARY KEY (accountid),
    -> FOREIGN KEY (customerid) REFERENCES customers(customerid)
    ->
    -> );
```

```
mysql> CREATE TABLE transactions (
    -> transactionid INT,
    -> accountid INT,
    -> transactiontype INT,
    -> amount DOUBLE,
    -> transactiondate DATE,
    -> PRIMARY KEY (transactionid),
    -> FOREIGN KEY (accountid) REFERENCES accounts(accountid)
    ->
    -> );
Query OK, 0 rows affected (0.07 sec)
```

3)

```
mysql> INSERT INTO customers(customerid,firstname,lastname,date,email,phone)
    -> VALUES
    ->   ("8","Slade","Boone","1999-03-28","slade@aol.couk","1-377-644-1576"),
    ->   ("3","Macy","Travis","1990-01-29","macy@outlook.com","(157) 375-9678"),
    ->   ("1","Gretchen","Bird","1995-04-22","bird@icloud.com","(552) 253-2923"),
    ->   ("7","Jamal","Walls","1989-11-16","jamal@yahoo.ca","1-344-653-4977"),
    -> ("5","Jael","Mcfarland","1987-06-08","jael@aol.couk","(403) 558-6094");
Query OK, 5 rows affected (0.01 sec)
Records: 5  Duplicates: 0  Warnings: 0
```

```
mysql> INSERT INTO accounts (accountid, customerid, accounttype, balance)
    ->    VALUES
    -> ("42", "8", "savings", "7000"),
    ->  ("63", "3", "current", "20000"),
    -> ("97", "1", "savings", "72000"),
    ->  ("72", "7", "zero balance", "30000"),
    -> ("21", "5", "savings", "40000");
Query OK, 5 rows affected (0.01 sec)
Records: 5  Duplicates: 0  Warnings: 0
```

```
mysql> INSERT INTO transactions (transactionid, accountid, transactiontype, amount, transactiondate)
    ->    VALUES  ("4412", "42", "deposit", "1000", "2023-05-22"),
    -> ("5242", "63", "deposit", "500", "2023-05-22"),
    -> ("7731", "97", "withdrawal", "2500", "2023-05-22"),
    -> ("8471", "72", "transfer", "750", "2023-05-22"),
    -> ("6931", "21", "deposit", "3000", "2023-05-22") ;
Query OK, 5 rows affected (0.01 sec)
Records: 5  Duplicates: 0  Warnings: 0
```

4)

```
+---------------+          +---------------+          +-------------------+
|   Customers   |          |   Accounts    |          |   Transactions    |
+---------------+          +---------------+          +-------------------+
| customerid    |1----| accountid     |1-----| transactionid     |
| firstname     |          | customerid    |          | accountid         |
| lastname      |          | accounttype   |          | transactiontype   |
| date          |          | balance       |          | amount            |
| email         |          +---------------+          | transactiondate   |
| phone         |                                     +-------------------+
+---------------+
```

5)

```
mysql> show tables;
+------------------+
| Tables_in_hmbank |
+------------------+
| accounts         |
| customers        |
| transactions     |
+------------------+
3 rows in set (0.02 sec)
```

6)

```
mysql> desc customers;
+------------+-------------+------+-----+---------+-------+
| Field      | Type        | Null | Key | Default | Extra |
+------------+-------------+------+-----+---------+-------+
| customerid | int         | NO   | PRI | NULL    |       |
| firstname  | varchar(25) | YES  |     | NULL    |       |
| lastname   | varchar(25) | YES  |     | NULL    |       |
| date       | date        | YES  |     | NULL    |       |
| email      | text        | YES  |     | NULL    |       |
| phone      | text        | YES  |     | NULL    |       |
+------------+-------------+------+-----+---------+-------+
6 rows in set (0.01 sec)
```

```
mysql> desc accounts;
+-------------+-------------+------+-----+---------+-------+
| Field       | Type        | Null | Key | Default | Extra |
+-------------+-------------+------+-----+---------+-------+
| accountid   | int         | NO   | PRI | NULL    |       |
| customerid  | int         | YES  | MUL | NULL    |       |
| accounttype | varchar(30) | YES  |     | NULL    |       |
| balance     | double      | YES  |     | NULL    |       |
+-------------+-------------+------+-----+---------+-------+
4 rows in set (0.01 sec)
```

```
mysql> desc transactions;
+-----------------+--------+------+-----+---------+-------+
| Field           | Type   | Null | Key | Default | Extra |
+-----------------+--------+------+-----+---------+-------+
| transactionid   | int    | NO   | PRI | NULL    |       |
| accountid       | int    | YES  | MUL | NULL    |       |
| transactiontype | text   | YES  |     | NULL    |       |
| amount          | double | YES  |     | NULL    |       |
| transactiondate | date   | YES  |     | NULL    |       |
+-----------------+--------+------+-----+---------+-------+
5 rows in set (0.01 sec)
```

Task 2

1)

```
mysql> select customers.firstname,accounts.accounttype,customers.email from customers,accounts where customer
.customerid=accounts.customerid;
+-----------+--------------+------------------+
| firstname | accounttype  | email            |
+-----------+--------------+------------------+
| Gretchen  | savings      | bird@icloud.com  |
| Macy      | current      | macy@outlook.com |
| Jael      | savings      | jael@aol.couk    |
| Jamal     | zero balance | jamal@yahoo.ca   |
| Slade     | savings      | slade@aol.couk   |
+-----------+--------------+------------------+
5 rows in set (0.00 sec)
```

2)

```
mysql> select transactions.transactionid,transactions.amount,transactions.transactiondate,customers.firstname
from transactions,customers,accounts where customers.customerid=accounts.customerid and accounts.accountid=tra
nsactions.accountid;
+---------------+--------+-----------------+-----------+
| transactionid | amount | transactiondate | firstname |
+---------------+--------+-----------------+-----------+
|          4412 |   1000 | 2023-05-22      | Slade     |
|          5242 |    500 | 2023-05-22      | Macy      |
|          6931 |   3000 | 2023-05-22      | Jael      |
|          7731 |   2500 | 2023-05-22      | Gretchen  |
|          8471 |    750 | 2023-05-22      | Jamal     |
+---------------+--------+-----------------+-----------+
5 rows in set (0.00 sec)
```

3)

```
mysql> update accounts set balance=balance+100 where customerid=5;
Query OK, 1 row affected (0.01 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> select * from accounts
    -> ;
+-----------+------------+--------------+----------+
| accountid | customerid | accounttype  | balance  |
+-----------+------------+--------------+----------+
|        21 |          5 | savings      |    40100 |
|        42 |          8 | savings      |     7000 |
|        63 |          3 | current      |    20000 |
|        72 |          7 | zero balance |    30000 |
|        97 |          1 | savings      |    72000 |
+-----------+------------+--------------+----------+
5 rows in set (0.00 sec)
```

4)

```
mysql> select concat(firstname,lastname) from customers;
+----------------------------+
| concat(firstname,lastname) |
+----------------------------+
| GretchenBird               |
| MacyTravis                 |
| JaelMcfarland              |
| JamalWalls                 |
| SladeBoone                 |
+----------------------------+
5 rows in set (0.00 sec)
```

5)

```
mysql> delete from accounts where balance=0 and accounttype="savings";
Query OK, 0 rows affected (0.01 sec)

mysql>
```

6)

```
mysql> select firstname ,lastname from customers where phone="1-377-644-1576";
+-----------+----------+
| firstname | lastname |
+-----------+----------+
| Slade     | Boone    |
+-----------+----------+
1 row in set (0.00 sec)
```

7)

```
mysql> select * from accounts where accounttype="current" and balance>1000;
+-----------+------------+-------------+---------+
| accountid | customerid | accounttype | balance |
+-----------+------------+-------------+---------+
|        63 |          3 | current     |   20000 |
+-----------+------------+-------------+---------+
1 row in set (0.00 sec)
```

8)

```
mysql> select * from transactions where accountid=97;
+---------------+-----------+-----------------+--------+-----------------+
| transactionid | accountid | transactiontype | amount | transactiondate |
+---------------+-----------+-----------------+--------+-----------------+
|          7731 |        97 | withdrawal      |   2500 | 2023-05-22      |
+---------------+-----------+-----------------+--------+-----------------+
1 row in set (0.00 sec)

mysql>
```

9)

```
mysql> SELECT t.transactionid,t.accountid,t.amount,t.transactiondate FROM transactions t WHERE t.
accountid = '63';
+---------------+-----------+--------+-----------------+
| transactionid | accountid | amount | transactiondate |
+---------------+-----------+--------+-----------------+
|          5242 |        63 |    500 | 2023-05-22      |
+---------------+-----------+--------+-----------------+
1 row in set (0.03 sec)
```

10)

```
mysql> SELECT
    ->      a.accountid,
    ->      a.balance AS principal,
    ->      10 AS interest_rate,
    ->      a.balance * 10 * DATEDIFF(NOW(), t.transactiondate) / 365 AS interest_accrued
    -> FROM
    ->      accounts a
    -> JOIN
    ->      transactions t ON a.accountid = t.accountid
    -> WHERE
    ->      a.accounttype = 'Savings';
+-----------+-----------+---------------+--------------------+
| accountid | principal | interest_rate | interest_accrued   |
+-----------+-----------+---------------+--------------------+
|        21 |     40100 |            10 |  225219.1780821918 |
|        42 |      7000 |            10 | 39315.068493150684 |
|        97 |     72000 |            10 |  404383.5616438356 |
+-----------+-----------+---------------+--------------------+
3 rows in set (0.01 sec)
```

11)

```
mysql> SELECT accountid,accounttype,balance FROM accounts WHERE balance < 10000;
+-----------+-------------+---------+
| accountid | accounttype | balance |
+-----------+-------------+---------+
|        42 | savings     |    7000 |
+-----------+-------------+---------+
1 row in set (0.00 sec)

mysql>
```

12)

```
mysql> SELECT customerid,firstname,lastname FROM customers WHERE phone != "1-377-644-1576";
+------------+-----------+-----------+
| customerid | firstname | lastname  |
+------------+-----------+-----------+
|          1 | Gretchen  | Bird      |
|          3 | Macy      | Travis    |
|          5 | Jael      | Mcfarland |
|          7 | Jamal     | Walls     |
+------------+-----------+-----------+
4 rows in set (0.02 sec)

mysql>
```

Task 3

1)

```
mysql> SELECT customerid,AVG(balance) AS average_balance FROM accounts GROUP BY customerid;
+------------+-----------------+
| customerid | average_balance |
+------------+-----------------+
|          1 |           72000 |
|          3 |           20000 |
|          5 |           40100 |
|          7 |           30000 |
|          8 |            7000 |
+------------+-----------------+
5 rows in set (0.01 sec)

mysql>
```

2)

```
mysql> SELECT accountid,customerid,balance FROM accounts ORDER BY balance DESC LIMIT 5;
+-----------+------------+---------+
| accountid | customerid | balance |
+-----------+------------+---------+
|        97 |          1 |   72000 |
|        21 |          5 |   40100 |
|        72 |          7 |   30000 |
|        63 |          3 |   20000 |
|        42 |          8 |    7000 |
+-----------+------------+---------+
5 rows in set (0.01 sec)

mysql>
```

3)

```
mysql> SELECT c.customerid,c.firstname,c.lastname,SUM(t.amount) FROM customers c
    -> JOIN accounts a ON c.customerid = a.customerid JOIN transactions t ON a.accountid = t.accountid
    -> WHERE  t.transactiontype = 'Deposit' AND t.transactiondate = '2023-05-22' GROUP BY c.customerid;
+------------+-----------+-----------+---------------+
| customerid | firstname | lastname  | SUM(t.amount) |
+------------+-----------+-----------+---------------+
|          8 | Slade     | Boone     |          1000 |
|          3 | Macy      | Travis    |           500 |
|          5 | Jael      | Mcfarland |          3000 |
+------------+-----------+-----------+---------------+
3 rows in set (0.01 sec)

mysql>
```

4)

```
mysql> SELECT customerid,firstname,lastname, date FROM customers ORDER BY date ASC LIMIT 1;
+------------+-----------+-----------+------------+
| customerid | firstname | lastname  | date       |
+------------+-----------+-----------+------------+
|          5 | Jael      | Mcfarland | 1987-06-08 |
+------------+-----------+-----------+------------+
1 row in set (0.01 sec)

mysql>
```

```
mysql> SELECT customerid,firstname,lastname, date FROM customers ORDER BY date DESC LIMIT 1;
+------------+-----------+-----------+------------+
| customerid | firstname | lastname  | date       |
+------------+-----------+-----------+------------+
|          8 | Slade     | Boone     | 1999-03-28 |
+------------+-----------+-----------+------------+
1 row in set (0.00 sec)

mysql>
```

5)

```
mysql> SELECT t.transactionid,t.accountid,t.transactiontype,t.amount,t.transactiondate,a.accounttype FROM tra
nsactions t JOIN accounts a ON t.accountid = a.accountid;
+---------------+-----------+-----------------+--------+-----------------+--------------+
| transactionid | accountid | transactiontype | amount | transactiondate | accounttype  |
+---------------+-----------+-----------------+--------+-----------------+--------------+
|          4412 |        42 | deposit         |   1000 | 2023-05-22      | savings      |
|          5242 |        63 | deposit         |    500 | 2023-05-22      | current      |
|          6931 |        21 | deposit         |   3000 | 2023-05-22      | savings      |
|          7731 |        97 | withdrawal      |   2500 | 2023-05-22      | savings      |
|          8471 |        72 | transfer        |    750 | 2023-05-22      | zero balance |
+---------------+-----------+-----------------+--------+-----------------+--------------+
5 rows in set (0.00 sec)

mysql>
```

6)

```
mysql> SELECT c.customerid,c.firstname,c.lastname,a.accountid,a.accounttype,a.balance FROM customers c LEFT J
OIN accounts a ON c.customerid = a.customerid;
+------------+-----------+-----------+-----------+--------------+---------+
| customerid | firstname | lastname  | accountid | accounttype  | balance |
+------------+-----------+-----------+-----------+--------------+---------+
|          1 | Gretchen  | Bird      |        97 | savings      |   72000 |
|          3 | Macy      | Travis    |        63 | current      |   20000 |
|          5 | Jael      | Mcfarland |        21 | savings      |   40100 |
|          7 | Jamal     | Walls     |        72 | zero balance |   30000 |
|          8 | Slade     | Boone     |        42 | savings      |    7000 |
+------------+-----------+-----------+-----------+--------------+---------+
5 rows in set (0.00 sec)

mysql>
```

7)

```
mysql> SELECT c.customerid,c.firstname,c.lastname,t.transactionid,t.transactiontype,t.amount,t.transactiondat
e FROM customers c JOIN accounts a ON c.customerid = a.customerid JOIN transactions t ON a.accountid = t.acco
untid WHERE a.accountid = '97';
+------------+-----------+----------+---------------+-----------------+--------+-----------------+
| customerid | firstname | lastname | transactionid | transactiontype | amount | transactiondate |
+------------+-----------+----------+---------------+-----------------+--------+-----------------+
|          1 | Gretchen  | Bird     |          7731 | withdrawal      |   2500 | 2023-05-22      |
+------------+-----------+----------+---------------+-----------------+--------+-----------------+
1 row in set (0.00 sec)

mysql>
```

8)

```
mysql> SELECT      c.customerid,      c.firstname,      c.lastname,      COUNT(a.accountid) AS account_count FROM
     customers c JOIN     accounts a ON c.customerid = a.customerid GROUP BY      c.customerid, c.firstname, c
.lastname HAVING      COUNT(a.accountid) > 1;
Empty set (0.01 sec)

mysql>
```

9)

```
mysql> SELECT
    ->      a.accountid,
    ->      a.balance,
    ->      SUM(CASE WHEN t.transactiontype = 'Deposit' THEN t.amount ELSE 0 END) AS total_deposits,
    ->      SUM(CASE WHEN t.transactiontype = 'Withdrawal' THEN t.amount ELSE 0 END) AS total_withdrawals,
    ->      SUM(CASE WHEN t.transactiontype = 'Deposit' THEN t.amount ELSE -t.amount END) AS difference
    -> FROM
    ->      accounts a
    -> JOIN
    ->      transactions t ON a.accountid = t.accountid
    -> GROUP BY
    ->      a.accountid, a.balance;
+-----------+---------+----------------+-------------------+------------+
| accountid | balance | total_deposits | total_withdrawals | difference |
+-----------+---------+----------------+-------------------+------------+
|        21 |   40100 |           3000 |                 0 |       3000 |
|        42 |    7000 |           1000 |                 0 |       1000 |
|        63 |   20000 |            500 |                 0 |        500 |
|        72 |   30000 |              0 |                 0 |       -750 |
|        97 |   72000 |              0 |              2500 |      -2500 |
+-----------+---------+----------------+-------------------+------------+
5 rows in set (0.02 sec)
```

10)

```
mysql> SELECT
    ->     t.accountid,
    ->     AVG(balance)
    -> FROM (
    ->     SELECT
    ->         accountid,
    ->         transactiondate,
    ->         SUM(CASE WHEN transactiontype = 'Deposit' THEN amount ELSE -amount END) AS balance
    ->     FROM
    ->         transactions
    ->     WHERE
    ->         transactiondate BETWEEN '2023-04-22' AND '2023-07-12'
    ->     GROUP BY
    ->         accountid, transactiondate
    -> ) t
    -> GROUP BY
    ->     t.accountid;
+-----------+--------------+
| accountid | AVG(balance) |
+-----------+--------------+
|        42 |         1000 |
|        63 |          500 |
|        21 |         3000 |
|        97 |        -2500 |
|        72 |         -750 |
+-----------+--------------+
5 rows in set (0.01 sec)
```

11)

```
mysql> SELECT        accounttype,        SUM(balance) AS total_balance  FROM        accounts  GROUP BY        account
type;
+--------------+---------------+
| accounttype  | total_balance |
+--------------+---------------+
| savings      |        119100 |
| current      |         20000 |
| zero balance |         30000 |
+--------------+---------------+
3 rows in set (0.00 sec)

mysql>
```

12)

```
mysql> SELECT        accountid,        COUNT(transactionid) AS transaction_count FROM        transactions GROUP BY
 accountid ORDER BY        transaction_count DESC;
+-----------+-------------------+
| accountid | transaction_count |
+-----------+-------------------+
|        21 |                 1 |
|        42 |                 1 |
|        63 |                 1 |
|        72 |                 1 |
|        97 |                 1 |
+-----------+-------------------+
5 rows in set (0.00 sec)
```

13)

```
mysql> SELECT        c.customerid,        c.firstname,        c.lastname,        COUNT(a.accountid) AS account_count FROM
     customers c JOIN        accounts a ON c.customerid = a.customerid GROUP BY        c.customerid, c.firstname, c
.lastname HAVING        COUNT(a.accountid) > 1;
Empty set (0.00 sec)

mysql>
```

14)

```
mysql> SELECT    transactionid,    amount,    transactiondate,    accountid,    COUNT(*) AS duplicate_co
unt FROM    transactions GROUP BY    transactionid HAVING    COUNT(*) > 1;
Empty set (0.01 sec)

mysql>
```

Task 4

1)

```
mysql> SELECT c.customerid,c.firstname,c.lastname,a.balance AS highest_balance FROM customers c JOIN accounts
 a ON c.customerid = a.customerid WHERE a.balance = (SELECT MAX(balance) FROM accounts);
+------------+-----------+----------+-----------------+
| customerid | firstname | lastname | highest_balance |
+------------+-----------+----------+-----------------+
|          1 | Gretchen  | Bird     |           72000 |
+------------+-----------+----------+-----------------+
1 row in set (0.00 sec)
```

2)

```
mysql> SELECT c.customerid,c.firstname,c.lastname,AVG(a.balance) AS average_balance FROM customers c JOIN acc
ounts a ON c.customerid = a.customerid WHERE c.customerid IN (SELECT customerid  FROM  accounts GROUP BY cust
omerid HAVING COUNT(accountid) > 1 ) GROUP BY c.customerid, c.firstname, c.lastname;
Empty set (0.01 sec)

mysql>
```

3)

```
mysql> SELECT    a.accountid,    a.customerid,    t.transactionid,    t.amount,    subquery.avg_transact
ion_amount FROM    accounts a JOIN    transactions t ON a.accountid = t.accountid JOIN (    SELECT
 accountid,    AVG(amount) AS avg_transaction_amount    FROM    transactions    GROUP BY
accountid ) AS subquery ON a.accountid = subquery.accountid WHERE    t.amount > subquery.avg_transaction_amo
unt;
Empty set (0.00 sec)

mysql>
```

4)

```
mysql> SELECT    customerid, firstname, lastname FROM customers WHERE  customerid NOT IN (    SELECT DI
STINCT c.customerid    FROM  customers c  JOIN accounts a ON c.customerid = a.customerid  JOIN transact
ions t ON a.accountid = t.accountid);
Empty set (0.01 sec)

mysql>
```

5)

```
mysql> SELECT      SUM(balance) AS total_balance_no_transactions FROM      accounts WHERE accountid NOT IN (SEL
ECT DISTINCT    a.accountid  FROM accounts a JOIN  transactions t ON a.accountid = t.accountid);
+-------------------------------+
| total_balance_no_transactions |
+-------------------------------+
|                          NULL |
+-------------------------------+
1 row in set (0.00 sec)
```

6)

```
mysql> SELECT      transactionid,  accountid, amount,  transactiondate FROM transactions WHERE accountid = (SE
LECT accountid FROM  accounts ORDER BY   balance  LIMIT 1);
+---------------+-----------+--------+-----------------+
| transactionid | accountid | amount | transactiondate |
+---------------+-----------+--------+-----------------+
|          4412 |        42 |   1000 | 2023-05-22      |
+---------------+-----------+--------+-----------------+
1 row in set (0.01 sec)
```

7)

```
mysql> SELECT      customerid, firstname,      lastname FROM customers WHERE      customerid IN (SELECT DISTINCT
 c.customerid  FROM    customers c JOIN accounts a ON c.customerid = a.customerid GROUP BY   c.customerid HAVI
NG COUNT(DISTINCT a.accounttype) > 1);
Empty set (0.01 sec)

mysql>
```

8)

```
mysql> SELECT accounttype,COUNT(*) AS account_count,(COUNT(*) * 100.0 / (SELECT COUNT(*) FROM accounts)) AS p
ercentage
    -> FROM accounts GROUP BY accounttype;
+--------------+---------------+------------+
| accounttype  | account_count | percentage |
+--------------+---------------+------------+
| savings      |             3 |   60.00000 |
| current      |             1 |   20.00000 |
| zero balance |             1 |   20.00000 |
+--------------+---------------+------------+
3 rows in set (0.01 sec)

mysql>
```

9)

```
mysql> SELECT transactionid,accountid,amount,transactiondate FROM transactions
    -> WHERE accountid IN (SELECT accountid FROM accounts WHERE customerid = 7);
+---------------+-----------+--------+-----------------+
| transactionid | accountid | amount | transactiondate |
+---------------+-----------+--------+-----------------+
|          8471 |        72 |    750 | 2023-05-22      |
+---------------+-----------+--------+-----------------+
1 row in set (0.00 sec)

mysql>
```

10)

```
mysql> SELECT accounttype,(SELECT SUM(balance) FROM accounts a2 WHERE a2.accounttype = a1.accounttype) AS tot
al_balance FROM accounts a1 GROUP BY accounttype;
+--------------+---------------+
| accounttype  | total_balance |
+--------------+---------------+
| savings      |        119100 |
| current      |         20000 |
| zero balance |         30000 |
+--------------+---------------+
3 rows in set (0.00 sec)

mysql>
```