ASSIGNMENT – 4

Question (A)

Develop DDL to implement the above schema specifying appropriate data types for each attribute enforcing primary key, check constraints and foreign key constraint.

Customer Table

```
mysql> CREATE TABLE Customer(Cid int(5),Cname varchar(20));
Query OK, 0 rows affected (0.07 sec)

mysql> ALTER TABLE Customer ADD PRIMARY KEY(Cid);
Query OK, 0 rows affected (0.07 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> Desc Customer;
+-------+-------------+------+-----+---------+-------+
| Field | Type        | Null | Key | Default | Extra |
+-------+-------------+------+-----+---------+-------+
| Cid   | int(5)      | NO   | PRI | NULL    |       |
| Cname | varchar(20) | YES  |     | NULL    |       |
+-------+-------------+------+-----+---------+-------+
2 rows in set (0.00 sec)
```

Branch Table

```
mysql> CREATE TABLE Branch(Bcode varchar(5),Bname varchar(20));
Query OK, 0 rows affected (0.03 sec)

mysql> ALTER TABLE Branch ADD PRIMARY KEY(Bcode);
Query OK, 0 rows affected (0.08 sec)
Records: 0  Duplicates: 0  Warnings: 0
mysql> ALTER TABLE Branch ADD CONSTRAINT chk2 check(Bcode LIKE('B%'))
;
Query OK, 0 rows affected (0.01 sec)
Records: 0  Duplicates: 0  Warnings: 0
mysql> Desc Branch;
+-------+-------------+------+-----+---------+-------+
| Field | Type        | Null | Key | Default | Extra |
+-------+-------------+------+-----+---------+-------+
| Bcode | varchar(5)  | NO   | PRI | NULL    |       |
| Bname | varchar(20) | YES  |     | NULL    |       |
+-------+-------------+------+-----+---------+-------+
2 rows in set (0.00 sec)
```

Account Table

```
mysql> CREATE TABLE Account(Ano varchar(10),Atype varchar(20),Balance int(50)
,Cid int(5),Bcode varchar(5));
Query OK, 0 rows affected (0.06 sec)
```

```
mysql> ALTER TABLE Account ADD PRIMARY KEY(Ano);
Query OK, 0 rows affected (0.07 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> ALTER TABLE Account ADD CONSTRAINT chk check(Atype IN('Saving'
,'Current'));
Query OK, 0 rows affected (0.01 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> ALTER TABLE Account ADD FOREIGN KEY(Cid) REFERENCES Customer(Cid);
Query OK, 0 rows affected (0.08 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> ALTER TABLE Account ADD FOREIGN KEY(Bcode) REFERENCES Branch(Bcode);
Query OK, 0 rows affected (0.09 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> ALTER TABLE Account ADD CONSTRAINT chk3 check(Ano LIKE('A%'));

Query OK, 0 rows affected (0.01 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> Desc Account;
+---------+-------------+------+-----+---------+-------+
| Field   | Type        | Null | Key | Default | Extra |
+---------+-------------+------+-----+---------+-------+
| Ano     | varchar(10) | NO   | PRI | NULL    |       |
| Atype   | varchar(20) | YES  |     | NULL    |       |
| Balance | int(50)     | YES  |     | NULL    |       |
| Cid     | int(5)      | YES  | MUL | NULL    |       |
| Bcode   | varchar(5)  | YES  | MUL | NULL    |       |
+---------+-------------+------+-----+---------+-------+
5 rows in set (0.00 sec)
```

Transaction Table

```
mysql> CREATE TABLE Transaction(Tid varchar(10),Ano varchar(10),Tttype char
(2),Tdate date,Tamount int(20));
Query OK, 0 rows affected (0.05 sec)

mysql> ALTER TABLE Transaction ADD PRIMARY KEY(Tid);
Query OK, 0 rows affected (0.08 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> ALTER TABLE Transaction ADD FOREIGN KEY(Ano) REFERENCES Account(Ano)
;
Query OK, 0 rows affected (0.09 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> ALTER TABLE Transaction ADD CONSTRAINT chk1 check(Tttype IN('D','W')
);
Query OK, 0 rows affected (0.01 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

```
mysql> ALTER TABLE Transaction ADD CONSTRAINT chk4 check(Tid LIKE('T%
'));
Query OK, 0 rows affected (0.01 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> Desc Transaction;
+---------+-------------+------+-----+---------+-------+
| Field   | Type        | Null | Key | Default | Extra |
+---------+-------------+------+-----+---------+-------+
| Tid     | varchar(10) | NO   | PRI | NULL    |       |
| Ano     | varchar(10) | YES  | MUL | NULL    |       |
| Tttype  | char(2)     | YES  |     | NULL    |       |
| Tdate   | date        | YES  |     | NULL    |       |
| Tamount | int(20)     | YES  |     | NULL    |       |
+---------+-------------+------+-----+---------+-------+
5 rows in set (0.00 sec)
```

Question (B)

Populate the database with a rich data set.

Customer Table

```
mysql> INSERT INTO Customer VALUES(00001,'Isha Khare');
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Customer VALUES(00002,'Rupali Sahu');
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Customer VALUES(00003,'Rohit Thakur');
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Customer VALUES(00004,'Gautam Parmar');
Query OK, 1 row affected (0.01 sec)

mysql> INSERT INTO Customer VALUES(00005,'Kanika Gupta');
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Customer VALUES(00006,'Nakul Mehta');
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Customer VALUES(00007,'Akhansha Purwar');
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Customer VALUES(00008,'Dev Dhakciya');
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Customer VALUES(00009,'Jenny Anthony');
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Customer VALUES(00010,'Priya Sethi');
Query OK, 1 row affected (0.01 sec)
```

```
mysql> SELECT * FROM Customer;
+-----+-----------------+
| Cid | Cname           |
+-----+-----------------+
|   1 | Isha Khare      |
|   2 | Rupali Sahu     |
|   3 | Rohit Thakur    |
|   4 | Gautam Parmar   |
|   5 | Kanika Gupta    |
|   6 | Nakul Mehta     |
|   7 | Akhansha Purwar |
|   8 | Dev Dhakciya    |
|   9 | Jenny Anthony   |
|  10 | Priya Sethi     |
+-----+-----------------+
10 rows in set (0.00 sec)
```

Branch Table

```
mysql> INSERT INTO Branch VALUES('B0001','MIG');
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Branch VALUES('B0002','MG Road');
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Branch VALUES('B0003','AB Road');
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Branch VALUES('B0004','Old Palasia');
Query OK, 1 row affected (0.01 sec)

mysql> INSERT INTO Branch VALUES('B0005','Sanyogita Ganj');
Query OK, 1 row affected (0.00 sec)

mysql> SELECT * FROM Branch;
+-------+---------------+
| Bcode | Bname         |
+-------+---------------+
| B0001 | MIG           |
| B0002 | MG Road       |
| B0003 | AB Road       |
| B0004 | Old Palasia   |
| B0005 | Sanyogita Ganj |
+-------+---------------+
5 rows in set (0.00 sec)
```

Account Table

```
mysql> INSERT INTO Account VALUES('A0001','Saving',50000,1,'B0001');
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Account VALUES('A0002','Current',10000,1,'B0001');
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Account VALUES('A0003','Current',25000,2,'B0002');
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Account VALUES('A0004','Saving',100000,3,'B0003');
Query OK, 1 row affected (0.00 sec)
```

```
mysql> INSERT INTO Account VALUES('A0005','Current',30000,3,'B0004');
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Account VALUES('A0006','Current',15000,4,'B0005');
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Account VALUES('A0007','Saving',150000,5,'B0003');
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Account VALUES('A0008','Current',10000,5,'B0001');
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Account VALUES('A0009','Saving',200000,6,'B0001');
Query OK, 1 row affected (0.01 sec)

mysql> INSERT INTO Account VALUES('A0010','Saving',30000,7,'B0002');
Query OK, 1 row affected (0.01 sec)

mysql> INSERT INTO Account VALUES('A0011','Current',75000,8,'B0003');
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Account VALUES('A0012','Current',8000,9,'B0005');
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Account VALUES('A0013','Saving',570000,10,'B0002');
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Account VALUES('A0014','Current',5000,10,'B0003');
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Account VALUES('A0015','Current',15000,7,'B0003');
Query OK, 1 row affected (0.00 sec)

mysql> SELECT * FROM Account;
+-------+---------+---------+------+-------+
| Ano   | Atype   | Balance | Cid  | Bcode |
+-------+---------+---------+------+-------+
| A0001 | Saving  |   50000 |    1 | B0001 |
| A0002 | Current |   10000 |    1 | B0001 |
| A0003 | Current |   25000 |    2 | B0002 |
| A0004 | Saving  |  100000 |    3 | B0003 |
| A0005 | Current |   30000 |    3 | B0004 |
| A0006 | Current |   15000 |    4 | B0005 |
| A0007 | Saving  |  150000 |    5 | B0003 |
| A0008 | Current |   10000 |    5 | B0001 |
| A0009 | Saving  |  200000 |    6 | B0001 |
| A0010 | Saving  |   30000 |    7 | B0002 |
| A0011 | Current |   75000 |    8 | B0003 |
| A0012 | Current |    8000 |    9 | B0005 |
| A0013 | Saving  |  570000 |   10 | B0002 |
| A0014 | Current |    5000 |   10 | B0003 |
| A0015 | Current |   15000 |    7 | B0003 |
+-------+---------+---------+------+-------+
15 rows in set (0.00 sec)
```

Transaction Table

```
mysql> INSERT INTO Transaction VALUES('T0001','A0001','D','2024-01-12',25000);
Query OK, 1 row affected (0.01 sec)

mysql> INSERT INTO Transaction VALUES('T0002','A0002','W','2024-02-1',1000);
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Transaction VALUES('T0003','A0002','D','2024-02-1',2000);
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Transaction VALUES('T0004','A0002','W','2024-02-1',2000);
Query OK, 1 row affected (0.00 sec)
```

```
mysql> INSERT INTO Transaction VALUES('T0005','A0003','D','2024-03-12',1500);
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Transaction VALUES('T0006','A0004','W','2024-01-15',5000);
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Transaction VALUES('T0007','A0005','W','2024-02-20',10000);
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Transaction VALUES('T0008','A0005','D','2024-02-20',5000);
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Transaction VALUES('T0009','A0005','D','2024-02-20',1000);
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Transaction VALUES('T0010','A0006','W','2024-03-2',500);
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Transaction VALUES('T0011','A0007','W','2024-01-25',10000);
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Transaction VALUES('T0012','A0008','W','2024-01-27',2000);
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Transaction VALUES('T0013','A0009','D','2024-02-25',50000);
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Transaction VALUES('T0014','A0010','W','2024-01-20',15000);
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Transaction VALUES('T0015','A0011','D','2024-02-21',2000);
Query OK, 1 row affected (0.00 sec)
mysql> INSERT INTO Transaction VALUES('T0016','A0012','D','2024-03-2',1000);
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Transaction VALUES('T0017','A0013','W','2024-01-20',20000);
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Transaction VALUES('T0018','A0014','W','2024-02-25',500);
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO Transaction VALUES('T0019','A0015','D','2024-02-23',5000);
Query OK, 1 row affected (0.00 sec)
mysql> SELECT * FROM Transaction;
+-------+-------+--------+------------+---------+
| Tid   | Ano   | Tttype | Tdate      | Tamount |
+-------+-------+--------+------------+---------+
| T0001 | A0001 | D      | 2024-01-12 |   25000 |
| T0002 | A0002 | W      | 2024-02-01 |    1000 |
| T0003 | A0002 | D      | 2024-02-01 |    2000 |
| T0004 | A0002 | W      | 2024-02-01 |    2000 |
| T0005 | A0003 | D      | 2024-03-12 |    1500 |
| T0006 | A0004 | W      | 2024-01-15 |    5000 |
| T0007 | A0005 | W      | 2024-02-20 |   10000 |
| T0008 | A0005 | D      | 2024-02-20 |    5000 |
| T0009 | A0005 | D      | 2024-02-20 |    1000 |
| T0010 | A0006 | W      | 2024-03-02 |     500 |
| T0011 | A0007 | W      | 2024-01-25 |   10000 |
| T0012 | A0008 | W      | 2024-01-27 |    2000 |
| T0013 | A0009 | D      | 2024-02-25 |   50000 |
| T0014 | A0010 | W      | 2024-01-20 |   15000 |
| T0015 | A0011 | D      | 2024-02-21 |    2000 |
| T0016 | A0012 | D      | 2024-03-02 |    1000 |
| T0017 | A0013 | W      | 2024-01-20 |   20000 |
| T0018 | A0014 | W      | 2024-02-25 |     500 |
| T0019 | A0015 | D      | 2024-02-23 |    5000 |
+-------+-------+--------+------------+---------+
19 rows in set (0.00 sec)
```

Question (C)

Develop a SQL query to list the details of customers who have a saving account and a current account.

```
mysql> SELECT C.Cid,C.Cname FROM Customer C
    -> INNER JOIN Account A ON C.Cid=A.Cid
    -> INNER JOIN Account A1 ON C.Cid=A1.Cid
    -> WHERE A.Atype='Saving' AND A1.Atype='Current';
```

```
mysql> SELECT * FROM Customer WHERE Cid IN(
    -> SELECT A1.Cid FROM Account A1, Account A2 WHERE
    -> A1.Atype='Saving' AND A2.Atype='Current' AND A1.Cid=A2.Cid);
+-----+-----------------+
| Cid | Cname           |
+-----+-----------------+
|   1 | Isha Khare      |
|   3 | Rohit Thakur    |
|   5 | Kanika Gupta    |
|   7 | Akhansha Purwar |
|  10 | Priya Sethi     |
+-----+-----------------+
5 rows in set (0.01 sec)
```

Question (D)

Develop a SQL query to list the details of branches and the number of accounts in each branch.

```
mysql> SELECT B.Bcode,B.Bname,COUNT(A.Ano) FROM BRANCH B,Account A
    -> WHERE B.Bcode=A.Bcode GROUP BY B.Bcode,B.Bname;
+-------+---------------+--------------+
| Bcode | Bname         | COUNT(A.Ano) |
+-------+---------------+--------------+
| B0001 | MIG           |            4 |
| B0002 | MG Road       |            3 |
| B0003 | AB Road       |            5 |
| B0004 | Old Palasia   |            1 |
| B0005 | Sanyogita Ganj |            2 |
+-------+---------------+--------------+
5 rows in set (0.00 sec)
```

```
mysql> SELECT B.Bcode,B.Bname,COUNT(A.Ano) AS Number_Of_Account
    -> FROM Branch B JOIN Account A ON B.Bcode=A.Bcode
    -> GROUP BY B.Bcode,B.Bname;
```

```
mysql> SELECT B.Bcode,B.Bname,COUNT(A.Ano) AS Number_of_Accounts FROM BRANCH B,Account A
    -> WHERE B.Bcode=A.Bcode GROUP BY A.Bcode;
+-------+----------------+--------------------+
| Bcode | Bname          | Number_of_Accounts |
+-------+----------------+--------------------+
| B0001 | MIG            |                  4 |
| B0002 | MG Road        |                  3 |
| B0003 | AB Road        |                  5 |
| B0004 | Old Palasia    |                  1 |
| B0005 | Sanyogita Ganj |                  2 |
+-------+----------------+--------------------+
5 rows in set (0.00 sec)
```

Question (E)

Develop a SQL query to list the details of branches where the number of accounts is less than the average number of accounts in all branches.

```
mysql> SELECT B.Bcode,B.Bname,COUNT(A.Ano) AS Number_of_Accounts
    -> FROM Branch B
    -> JOIN Account A ON B.Bcode=A.Bcode
    -> GROUP BY B.Bcode,B.Bname
    -> HAVING COUNT(A.Ano)<(SELECT COUNT(Ano) / (SELECT COUNT(Bcode) FROM Branch)
    -> FROM Account);
```

```
mysql> SELECT B.Bcode,B.Bname,COUNT(A.Ano) AS Number_of_Accounts FROM BRANCH B,Account A
    -> WHERE B.Bcode=A.Bcode GROUP BY A.Bcode HAVING COUNT(A.Ano)<(SELECT COUNT(Ano)/5 FROM Account);
+-------+----------------+--------------------+
| Bcode | Bname          | Number_of_Accounts |
+-------+----------------+--------------------+
| B0004 | Old Palasia    |                  1 |
| B0005 | Sanyogita Ganj |                  2 |
+-------+----------------+--------------------+
2 rows in set (0.00 sec)
```

Question (F)

Develop a SQL query to list the details of customers who have performed three transactions on a day.

```
mysql> SELECT C.Cid,C.Cname FROM Customer C
    -> JOIN Account A ON A.Cid=C.Cid
    -> JOIN Transaction T ON A.Ano=T.Ano
    -> GROUP BY C.Cid,C.Cname,T.Tdate
    -> HAVING COUNT(T.Tdate)=3;
```

```
mysql> SELECT * FROM Customer WHERE Cid IN(
    -> SELECT Cid FROM Account WHERE Ano IN(
    -> SELECT Ano FROM Transaction GROUP BY Ano HAVING COUNT(Tdate)=3));
```

```
+-----+--------------+
| Cid | Cname        |
+-----+--------------+
|   1 | Isha Khare   |
|   3 | Rohit Thakur |
+-----+--------------+
2 rows in set (0.00 sec)
```

Question (G)

Create a view that will keep track of branch details and the number of accounts in each branch.

```
mysql> CREATE VIEW Branch_Data AS SELECT B.Bcode,B.Bname,COUNT(A.Ano) AS TOTAL
    -> FROM Branch B,Account A WHERE B.Bcode=A.Bcode GROUP BY B.Bcode,B.Bname;
Query OK, 0 rows affected (0.00 sec)

mysql> SELECT * FROM Branch_Data;
+-------+---------------+-------+
| Bcode | Bname         | TOTAL |
+-------+---------------+-------+
| B0001 | MIG           |     4 |
| B0002 | MG Road       |     3 |
| B0003 | AB Road       |     5 |
| B0004 | Old Palasia   |     1 |
| B0005 | Sanyogita Ganj |     2 |
+-------+---------------+-------+
5 rows in set (0.00 sec)
```