NORMALIZATION

1NF:

```
mysql> DESC STUDENT;
+-------+------+------+-----+---------+-------+
| Field | Type | Null | Key | Default | Extra |
+-------+------+------+-----+---------+-------+
| S_ID  | int  | NO   | PRI | NULL    |       |
| MBO   | int  | NO   | PRI | NULL    |       |
+-------+------+------+-----+---------+-------+
2 rows in set (0.00 sec)
```

```
mysql> DESC STUDENT1;
+--------+-------------+------+-----+---------+-------+
| Field  | Type        | Null | Key | Default | Extra |
+--------+-------------+------+-----+---------+-------+
| S_ID   | int         | NO   | PRI | NULL    |       |
| F_NAME | varchar(20) | YES  |     | NULL    |       |
| L_NAME | varchar(20) | YES  |     | NULL    |       |
| MBO    | int         | YES  |     | NULL    |       |
+--------+-------------+------+-----+---------+-------+
4 rows in set (0.00 sec)
```

2NF:

```
mysql> CREATE TABLE TEACHERS(TEACHER_ID INT NOT NULL, SUBJECT VARCHAR(20), TEACHER_AGE INT,PRIMARY KEY(TEACHER_ID,SUBJECT));
Query OK, 0 rows affected (0.10 sec)

mysql> DESC TEACHERS;
+-------------+-------------+------+-----+---------+-------+
| Field       | Type        | Null | Key | Default | Extra |
+-------------+-------------+------+-----+---------+-------+
| TEACHER_ID  | int         | NO   | PRI | NULL    |       |
| SUBJECT     | varchar(20) | NO   | PRI | NULL    |       |
| TEACHER_AGE | int         | YES  |     | NULL    |       |
+-------------+-------------+------+-----+---------+-------+
3 rows in set (0.01 sec)
```

Splitting the table into 2NF

```
mysql> CREATE TABLE TEACHER_DETAILS(TEACHER_ID INT PRIMARY KEY, TEACHER_AGE VARCHAR(20));
Query OK, 0 rows affected (0.18 sec)

mysql> DESC TEACHER_DETAILS;
+-------------+-------------+------+-----+---------+-------+
| Field       | Type        | Null | Key | Default | Extra |
+-------------+-------------+------+-----+---------+-------+
| TEACHER_ID  | int         | NO   | PRI | NULL    |       |
| TEACHER_AGE | varchar(20) | YES  |     | NULL    |       |
+-------------+-------------+------+-----+---------+-------+
2 rows in set (0.00 sec)

mysql> CREATE TABLE TEACHER_SUBJECT(TEACHER_ID INT NOT NULL, SUBJECT VARCHAR(20),FOREIGN KEY(TEACHER_ID) REFERENCES TEACHER_DETAILS(TEACHER_ID));
Query OK, 0 rows affected (0.08 sec)

mysql> DESC TEACHER_SUBJECT;
+-------------+-------------+------+-----+---------+-------+
| Field       | Type        | Null | Key | Default | Extra |
+-------------+-------------+------+-----+---------+-------+
| TEACHER_ID  | int         | NO   | MUL | NULL    |       |
| SUBJECT     | varchar(20) | YES  |     | NULL    |       |
+-------------+-------------+------+-----+---------+-------+
2 rows in set (0.01 sec)
```

3NF:

```
mysql> CREATE TABLE EMPLOYEE_DETAILS(EMP_ID INT NOT NULL,EMP_NAME VARCHAR(20),EMP_ZIP INT NOT NULL,EMP_STATE VARCHAR(20),EMP_CITY VARCHAR(20),EMP_DISTRICT VA
RCHAR(20),PRIMARY KEY(EMP_ID));
Query OK, 0 rows affected (0.08 sec)

mysql> DESC EMPLOYEE_DETAILS;
+--------------+-------------+------+-----+---------+-------+
| Field        | Type        | Null | Key | Default | Extra |
+--------------+-------------+------+-----+---------+-------+
| EMP_ID       | int         | NO   | PRI | NULL    |       |
| EMP_NAME     | varchar(20) | YES  |     | NULL    |       |
| EMP_ZIP      | int         | NO   |     | NULL    |       |
| EMP_STATE    | varchar(20) | YES  |     | NULL    |       |
| EMP_CITY     | varchar(20) | YES  |     | NULL    |       |
| EMP_DISTRICT | varchar(20) | YES  |     | NULL    |       |
+--------------+-------------+------+-----+---------+-------+
6 rows in set (0.01 sec)
```

Splitting into 3NF

```
mysql> CREATE TABLE EMPLOYEE1(EMP_ID INT NOT NULL UNIQUE,EMP_NAME VARCHAR(20),EMP_ZIP INT PRIMARY KEY);
Query OK, 0 rows affected (0.09 sec)

mysql> DESC EMPLOYEE1;
+----------+-------------+------+-----+---------+-------+
| Field    | Type        | Null | Key | Default | Extra |
+----------+-------------+------+-----+---------+-------+
| EMP_ID   | int         | NO   | UNI | NULL    |       |
| EMP_NAME | varchar(20) | YES  |     | NULL    |       |
| EMP_ZIP  | int         | NO   | PRI | NULL    |       |
+----------+-------------+------+-----+---------+-------+
3 rows in set (0.00 sec)
```

```
mysql> CREATE TABLE EMPLOYEE2(EMP_ZIP INT NOT NULL PRIMARY KEY,EMP_STATE VARCHAR(20),EMP_CITY VARCHAR(20),EMP_DISTRICT VARCHAR(20),FOREIGN KEY(EMP_ZIP) REFER
ENCES EMPLOYEE1(EMP_ZIP));
Query OK, 0 rows affected (0.10 sec)

mysql> DESC EMPLOYEE2;
+--------------+-------------+------+-----+---------+-------+
| Field        | Type        | Null | Key | Default | Extra |
+--------------+-------------+------+-----+---------+-------+
| EMP_ZIP      | int         | NO   | PRI | NULL    |       |
| EMP_STATE    | varchar(20) | YES  |     | NULL    |       |
| EMP_CITY     | varchar(20) | YES  |     | NULL    |       |
| EMP_DISTRICT | varchar(20) | YES  |     | NULL    |       |
+--------------+-------------+------+-----+---------+-------+
4 rows in set (0.14 sec)

mysql>
```