Consider the un-normalized data presented in the below table having the following entity:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Customer ID** | **Name** | **DateOfBirth** | **Mobile** | **city** | **Account No** | **Balance** | **Account Type** |
| C0001 | Shiv Kumar | 1991-05-11 | 9876543210 | ATP | A0001, A0003 | 10000 ,  12000 | Savings |
| C0002 | Suresh Kumar | 1999-07-23 | 7982135687 | HDP | A0002 | 34050 | Savings |
| C0003 | Virat Kohli | 1990-06-15 | 6498732154 | TDP | A0004 | 21540 | Savings |

**Problem Statement 1:** Inspect the above un-normalized CUSTOMER table, what do we notice about the attributes and the data values?

In the table the name column consists of both first name and last name. So we need to break the above both columns into firstName, lastName .

**Problem Statement 2:** Identify the Non-Repeating group (Group in which there is only one row in the given scenario)

**Customer ID, Name, DateOfBirth, Mobile, City, Balance, Account Type**

**Problem Statement 3:** Identify the Repeating group (Group in which there are more than one row in the given scenario)

### Account no, Balance, Account Type, Customer Id. These four columns will create a new table called Staff where Account number will be the primary key and customerId will be the foreign key.

### **Problem Statement 4: Create the tables in First Normal Form 1NF by removing the repeating groups**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Customer ID** | **First Name** | **Last Name** | **DateOfBirth** | **Mobile** | **city** |
| C0001 | Shiv | Kumar | 1991-05-11 | 9876543210 | ATP |
| C0002 | Suresh | Kumar | 1999-07-23 | 7982135687 | HDP |
| C0003 | Virat | Kohli | 1990-06-15 | 6498732154 | TDP |

This table is in 1NF.

### **Problem Statement 5: Create the tables in Second Normal Form 2NF and remove the partial dependency**

In the 1NF table the Account No, Balance, Account Type is dependent on the primary key Customer Id.

So the above table is not in 2NF, since there exist partial dependency between non primary key attributes.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Customer ID** | **First Name** | **Last Name** | **DateOfBirth** | **Mobile** | **city** |
| C0001 | Shiv | Kumar | 1991-05-11 | 9876543210 | ATP |
| C0002 | Suresh | Kumar | 1999-07-23 | 7982135687 | HDP |
| C0003 | Virat | Kohli | 1990-06-15 | 6498732154 | TDP |

|  |  |  |  |
| --- | --- | --- | --- |
| **ACCOUNT** | | | |
| **Account No** | **Balance** | **Account Type** | **Customer Id** |
| A0001 | 10000 | Savings | C0001 |
| A0002 | 34050 | Savings | C0002 |
| A0003 | 12000 | Savings | C0001 |

### **Problem Statement 6: Create the tables in Third Normal Form 3NF and remove the transitive dependency**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Customer ID** | **First Name** | **Last Name** | **DateOfBirth** | **Mobile** | **city** |
| C0001 | Shiv | Kumar | 1991-05-11 | 9876543210 | ATP |
| C0002 | Suresh | Kumar | 1999-07-23 | 7982135687 | HDP |
| C0003 | Virat | Kohli | 1990-06-15 | 6498732154 | TDP |

|  |  |  |  |
| --- | --- | --- | --- |
| **ACCOUNT** | | | |
| **Account No** | **Balance** | **Account Type** | **Customer Id** |
| A0001 | 10000 | Savings | C0001 |
| A0002 | 34050 | Savings | C0002 |
| A0003 | 12000 | Savings | C0001 |

So the tables are in the 3NF, Since there exist no transitive dependency between non primary key attributes.