***User Personal Details are given below:***

* USEREMAIL: (Table-01)

|  |  |
| --- | --- |
| User ID | EMAIL |
| MA12 | alex@ymail.com |
| PO45 | emma.john@gmail.com |
| LA33 | victoria@yahoo.com |
| CH99 | joe.1997@hotmail.com |
| DA74 | dlany@live.com |

* USERDETAILS2: (Table-02)

|  |  |  |  |
| --- | --- | --- | --- |
| User ID | Fname | Lname | ZIP |
| MA12 | Alex | Jones | 75001 |
| PO45 | Emma | Stone | 10008 |
| LA33 | Victoria | Aurora | 34000 |
| CH99 | Joe | Johnson | 90201 |
| DA74 | Dany | Williams | 32006 |

* USERADDRESS: (Table-03)

|  |  |  |
| --- | --- | --- |
| ZIP | STATE | CITY |
| 75001 | Texas | Houston |
| 10008 | New York | Albany |
| 34000 | Turkey | Istanbul |
| 90201 | California | Los Angeles |
| 32006 | Florida | Miami |

**Bonus Progressions: (a)**To check for **2NF**, first we need to find the candidate keys for **Movie\_Screened**.

Then find the functional dependencies of **Movie\_Screened**.

* **Thearter\_name** cannot determine any attributes as a theatre screens more than one movie, it screens on different days, different timings, and different certification movies.
* **Movie**, **Day**, **Time** and **Age\_restriction** determine the other attributes unique.

Functional dependency for this relation as follows:

**Movie 🡪Age\_restriction**,

(**Thearter\_name**, **Movie**, **Day**, **Time**) **🡪 Age\_restriction**

Composite key (may or may not be a part of the foreign key.) (**Thearter\_name**, **Movie**, **Day**, **Time**) is the candidate key (super key with no repeated attributes) for the relation **Movie\_Screened**. The Main condition in **2NF** is, a relation should not have partial functional dependency.

In our relation, a non-key attribute **Age\_restriction** is determined by **Movie**, which is part of a candidate key (**Thearter\_name**, **Movie**, **Day**, **Time**). So, the above relation is not in **2NF**. The relation **Movie\_Screened** violates second normal form*.*

**Bonus Progressions: (b)**

Relation violates **2NF**. To normalize to **2NF**, we decompose the relation using the violating functional dependency **Movie** 🡪 **Age\_restriction**.

It results in the following relations:

Movie\_Screens (**Thearter\_name**, **Movie**, **Day**, **Time**)

Movies (**Movie**, **Age\_restriction**).

Both relations are in **2NF** because no partial dependency exists.

Both relations are in **3NF** too because no transitive dependencies found.

Also, both are in **BCNF** because in the Movie\_Screens relation, no subset of the attributes determines any other attribute, and the only non-trivial dependency in **Movies** is from **Movies** to **Age\_restrictions**.