**DOCUMENTATION**

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**DETAILS:**

1.User Account is an entity with a primary key user\_account\_id ,Name is considered as a composite attribute as it is composed of lname and fname and Phone is considered to be a composite attribute as it consists of area\_code, state\_code, number which is in the form of a String(“\_ \_ \_-\_ \_ \_-\_ \_ \_”).

2.Privilege Entity is considered as super class with subclasses Account Privilege and Relation Privilege. The Account and Relation Privilege has Disjoint Relationship with the Privilege Entity.

The Account Privilege Entity has attributes acc\_priv\_name , ap\_uid and ap\_role\_id.

The Relation Privilege Entity has attributes rel\_priv\_name, rp\_role\_id and rp\_table\_name.

3. Userrole has a primary key role\_id , a unique attribute role\_name ,foreign key attribute uid and non primary key attribute description.

4.Table entity has a unique key attribute called table\_name, foreign keys table\_uid, table\_role\_id and table\_rp\_name.

**Table Entity:**

The following are the names of the 10 tables that are considered in the Table Relation.

|  |
| --- |
| **Tables** |
| 1. Patient |
| 2.Treatement |
| 3.Medicine |
| 4.Room |
| 5.Employee |
| 6.Doctor |
| 7.Receptionist |
| 8.Nurse |
| 9.Record |
| 10.Visiting Doctor |
| 11.Permanent Doctor |

**Relationships:**

**1.**The binary relationship “Assigned with” is between the Useraccount entity and Userrole entity where Useraccount has total participation in the relation whereas Userrole has partial participation.

N:M relationship between Useraccount and Userrole created a new table “Assigned\_with” which has attributes aw\_role\_id and aw\_uid.

**2.**The binary relationship “Owns” is between the Useraccount entity and Table entity where Useraccount has total participation in the relation whereas Table has partial participation.

1:N relationship between Useraccount and Table.

**3**.The binary relationship “Consists of” is between the Useraccount entity and Privilege entity where Useraccount has total participation in the relation whereas Userrole has partial participation.

1:N relationship between Useraccount and Privilege.

**4**.The binary relationship “Have” is between the Userrole entity and Account Privilege entity where Userrole has total participation in the relation whereas Account Privilege has partial participation.

1:N relationship between Userrole and Account Privilege.

**5**.The ternary relationship “Part of ” is between the Table entity and Relation Privilege entity and Userrole entity.

N:M relationship betweeen Table and Relation Privilege.

N:N relationship between Userrole and Table.

N:M realtionship between Userrole and Relation Privilege.

Due to the M:N relationship we created new table “Part\_of” which has attributes role\_id, po\_table\_name and po\_rp\_name.

**Missing Requirements:**

1.The Account Privilege and Relation Privilege entities have no attributes specified. So we have added acc\_priv\_name (PK), ap\_uid which references to user\_account\_id of user account entity and ap\_role\_id which references to role\_id of user\_role entity.

2. Since there is no PK specified in User role entity we have added role\_id as PK and role\_name as unique.

3. The table has no extra attributes other than name. So we added table\_role\_id which references role\_id of user\_role entity , table\_uid which references to user\_account\_id of user\_account entity and table\_rp\_name which is refencing to rel\_priv\_name of relation privilege entity.

**Application of normalization on security database:**

Normalization is the process of decomposing unsatisfactory relations by breaking up their attributes into smaller relations. Normal form is the condition using keys and functional dependencies of a relation to certify whether a relation schema is in a normalization form. Normalization helps reduce data redundancy and possible data inconsistency and improve data integrity.

First normal form (1NF):

First normal form disallows composite attributes, multivalued attributes and nested relations.

In all our tables, we have not violated first normal form (1NF) since all our attributes have atomic values.

Second normal form (2NF):

Table that is already in 1NF, is said to be in 2NF, if no non-prime attribute is dependent on the proper subset of any candidate key of the table.

In all our tables, we have not violated second normal form (2NF) since there are no non-prime attribute that is dependent on the proper subset of any candidate key of the table.

Third normal form (3NF):

In all the tables there is no transitive dependency between any of the attributes within the tables

and it also satisfies 2NF. So, all our tables satisfy 3NF.

Boyce – Codd normal form (BCNF):

In any table the non-prime attribute is not determining the value of any prime attribute.

That is in all our tables every determinant is a candidate key.