1. Answer

User

|  |  |
| --- | --- |
| UName | PW |

Group

|  |  |
| --- | --- |
| GName | Desc |

Module

|  |  |  |  |
| --- | --- | --- | --- |
| MName | MType | AppVersion | ExtType |

Privilege

|  |  |
| --- | --- |
| MName | PrivName |

UserPrivilege

|  |  |  |
| --- | --- | --- |
| UName | MName | PrivName |

GroupPrivilege

|  |  |  |
| --- | --- | --- |
| GName | MName | PrivName |

UserGroup

|  |  |
| --- | --- |
| UName | GName |

2. Answer

Person

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| SSN | FName | LName | Weight | Gender | City | State | Zip | DOB | DocLicense | GuardianSSN |

Pet

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PID | Name | Species | Weight | Gender | City | State | Zip | DOB | DocLicense |

Doctor

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| DocLicense | LName | Address | URL | Phone | DocType | HumanDocType |

PersonCondition

|  |  |
| --- | --- |
| SSN | Condition |

PetCondition

|  |  |
| --- | --- |
| PID | Condition |

Contact

|  |  |  |
| --- | --- | --- |
| SSN | Type | Number |

DoctorSpecialization

|  |  |  |  |
| --- | --- | --- | --- |
| DocLicense | SSN | HumanDocType | Treatment |

3. Answer

User

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Email | Name | Private | Picture | Bio | Password |

Status

|  |  |  |  |
| --- | --- | --- | --- |
| Email | SID | Text | Time |

Follow

|  |  |  |
| --- | --- | --- |
| Email | FollowedByEmail | Approved |

UserActivity

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Email | SID | ActivityByEmail | Likes | CommentText | CommentTime |

AuthenticationKey

|  |  |
| --- | --- |
| Email | AuthKey |

Category

|  |  |
| --- | --- |
| ManagedByEmail | CategoryName |

Feed

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| URL | Version | Icon | LastChecked | FeedType | DataFormat |

Article

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| FeedURL | AID | URL | Posted | Title | EType | EFormat | EURL | ESize | AType | TextContent | PicURL |

Reads

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ReaderEmail | FeedURL | AID | Viewed | Likes | Star |

FeedCategory

|  |  |  |  |
| --- | --- | --- | --- |
| ManagedByEmail | CategoryName | FeedURL | Names |

4. Answer

{A1} 🡪 {A2}

{A3} 🡪 {A2}

{A1, A3} 🡪 {A2}

5. Answer

Because of tuple t1 and t2 following three dependencies do not hold

{A5} -/--> {A4}

{A6} -/--> {A4}

{A5, A6} -/--> {A4}

Because of tuple t1 and t3 following three dependencies do not hold

{A6} -/--> {A5}

6. Answer

For a relational schema to be in 2-NF, it should satisfy all properties of 1-NF and all non-prime

attributes should fully functionally depend on primary key.

For the given schema, FOO (W, X, Y, Z), suppose we have following FD in the given schema

{X} 🡪 {Y}

{X} 🡪 {Z}

{W} 🡪 {Y}

{W} 🡪 {Z}

Then the schema will violate 2-NF as in any of the case non-prime attributes (Y, Z) will not be fully FD

on the primary key (W, X).

7. Answer

For a relational schema to be in -3NF, it should satisfy all properties of 2-NF and any non-prime

attributes should not be transitively dependent on another key.

For the given schema, FOO (W, X, Y, Z) the primary key attributes are W, X and non-prime attributes

are Y and Z.

Suppose we have following FD in the given schema

i) {WX} 🡪 {Y} & {Y} 🡪 {Z}

ii) {WX} 🡪 {Z} & {Z} 🡪 {Y}

Then the schema will violate 3-NF as in any of the case one of the non-prime attribute will be

transitively FD on the primary key (W, X). Note that the set will satisfy 2-NF as the non-prime attributes

are dependent on the primary key.

8. Answer

Given Schema –

BAR (M, N, O, P)

Following are the observations that can be made about given relational schema.

1. Only attribute ‘N’ does not have any pre-requisite dependency. Thus, we can say that ‘N’ is key of given schema
2. The schema satisfies the 2-NF as all non-prime attributes are dependent on the key ‘N’
3. The schema violates 3-NF as attributes M and P, are transitively FD on key N via O

To bring BAR in 3-NF will decompose it such a way that there is no transitive FD in any decomposed schema. Below is the new structure of the schema –

1. BAR1 (N, O)
2. BAR2 (O, P)
3. BAR3 (O, M)

Please refer below diagram for further details.



9. Answer

Given Schema –

BAZ (Q, R, S, T)

Following are the observations that can be made about given relational schema.

1. Attribute ‘R’ and ‘T’ does not have any pre-requisite dependency. Thus, we can say that key of given schema is {R, T}
2. Given schema satisfies the 1-NF but violates 2-NF as all the non-prime attributes {Q, S} are not fully FD on the key attributes
3. The schema satisfies 3-NF as none of the non-prime attributes Q and S, are transitively FD on another key attribute

To satisfy 2-NF will decompose schema BAZ in such a way that every non-prime attribute is fully FD on key attribute. Below is the new structure of the schema –

1. BAZ1 (R, S)
2. BAZ2 (T, Q)

Please refer below diagram for further details.

