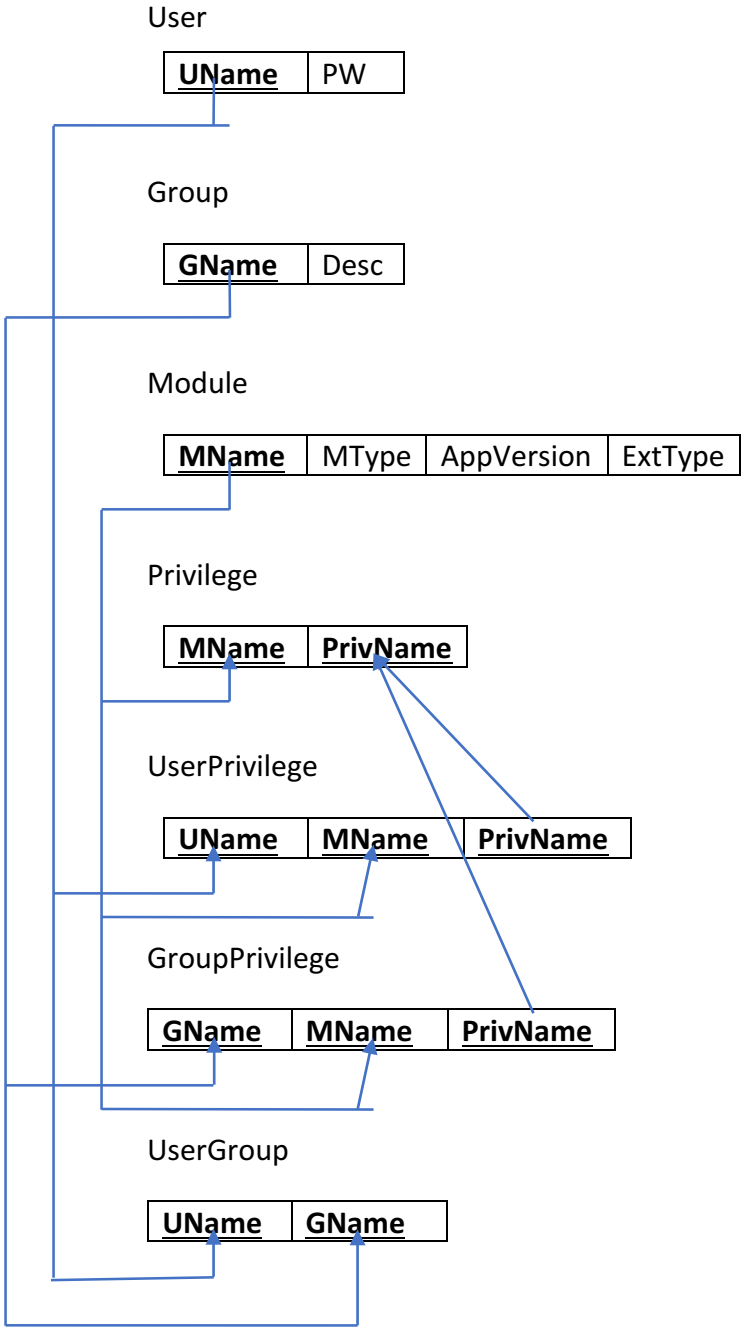
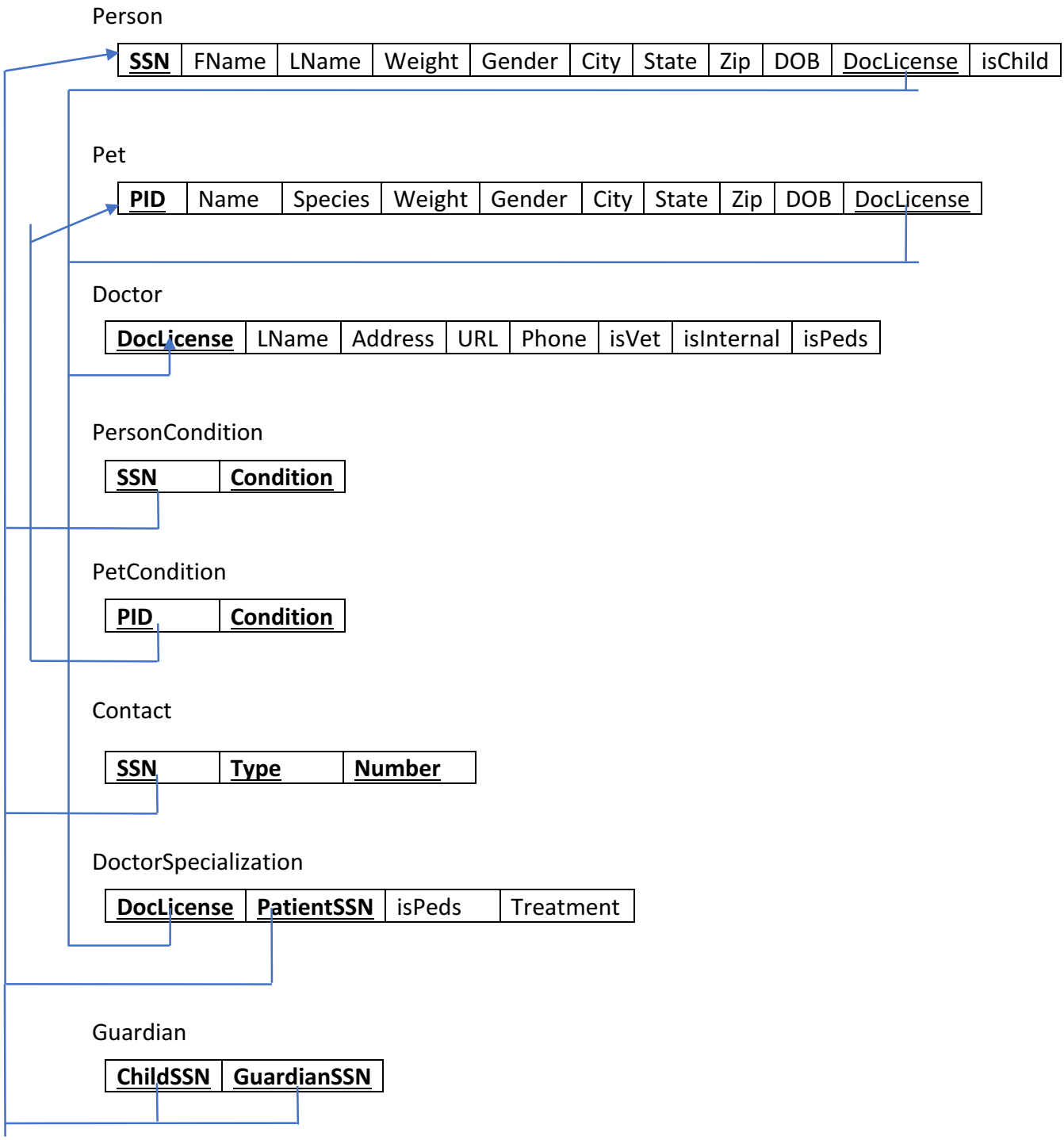
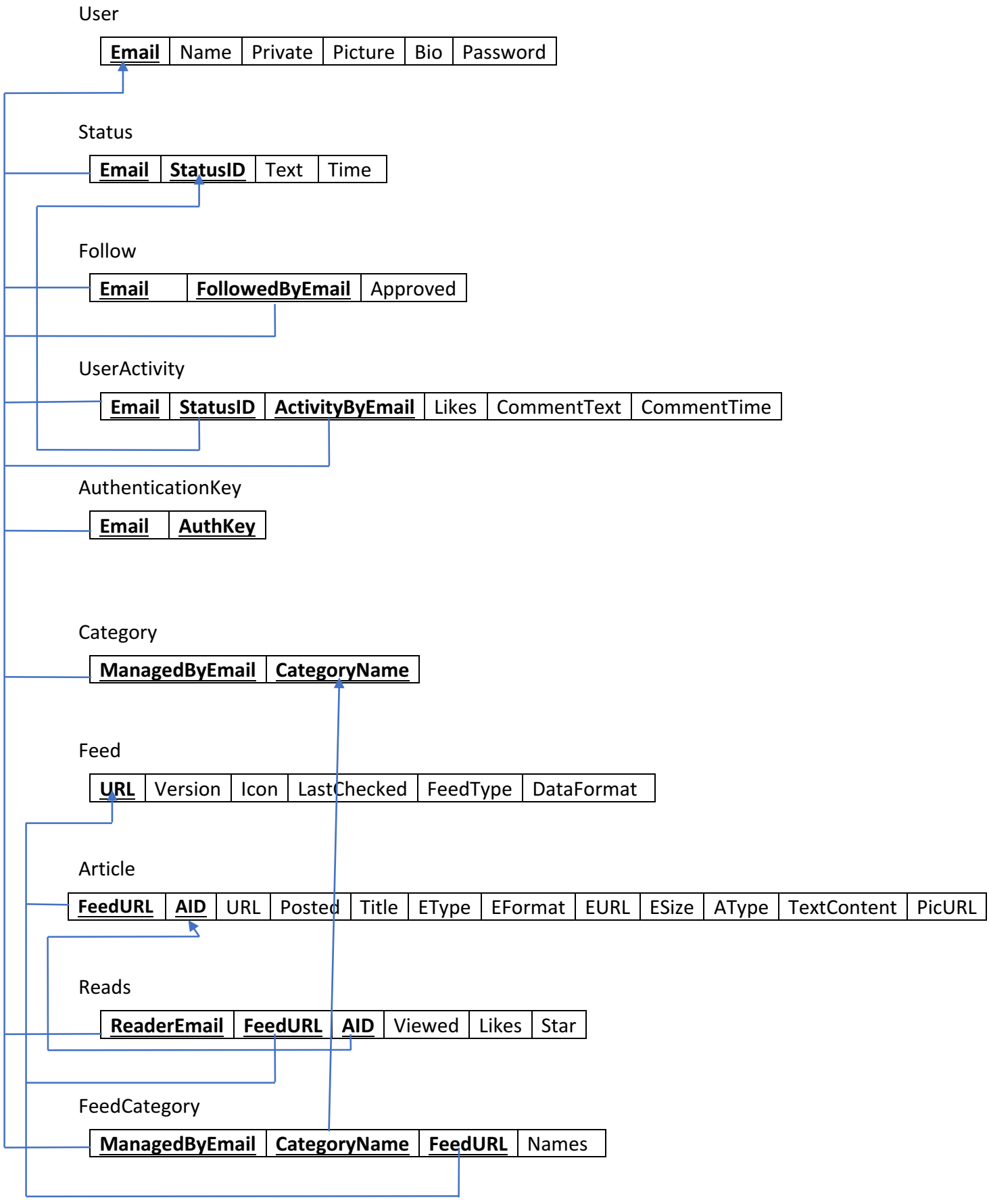
1. Answer


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 isChild
Pet
PID Name Species Weight Gender City State Zip DOB DocLicense
Doctor
DocLicense LName Address URL Phone isVet isInternal isPeds
PersonCondition
SSN Condition
PetCondition
PID Condition
Contact
SSN Type Number
DoctorSpecialization
DocLicense PatientSSN isPeds Treatment
Guardian
ChildSSN GuardianSSN

3. Answer


User
Email
Name
Private
Picture
Bio
Password
Status
Email
StatusID
Text
Time
Follow
Email
FollowedByEmail
Approved
UserActivity
Email
StatusID
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.

i) Only attribute ‘N’ does not have any pre-requisite dependency. Thus, we can say that ‘N’ is key of given schema

ii) The schema satisfies the 2-NF as all non-prime attributes are dependent on the key ‘N’

iii) The schema violates 3-NF as attributes M and P, are transitively FD on key N via O

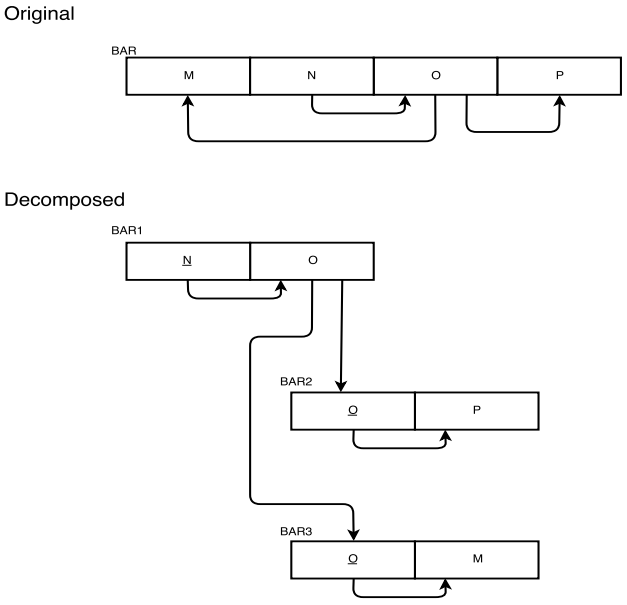
To bring BAR in 3-NF will decompose it such a way that there is no transitive FD in any decomposed schema. Below is the new structure of the schema –

i) BAR1 (N, O)

ii) BAR2 (O, P)

iii) 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.

i) Attribute ‘R’ and ‘T’ does not have any pre-requisite dependency. Thus, we can say that key of given schema is {R, T}

ii) 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

iii) The schema satisfies 3-NF as none of the non-prime attributes Q and S, are transitively FD on another key attribute

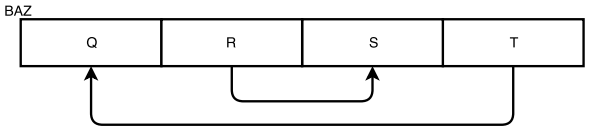
To satisfy 2-NF will decompose schema BAZ in such a way that every non-prime attribute is fully FD on key attribute. Below is the new structure of the schema –

i) BAZ1 (R, S)

ii) BAZ2 (T, Q)

Please refer below diagram for further details.

Original



Decomposed