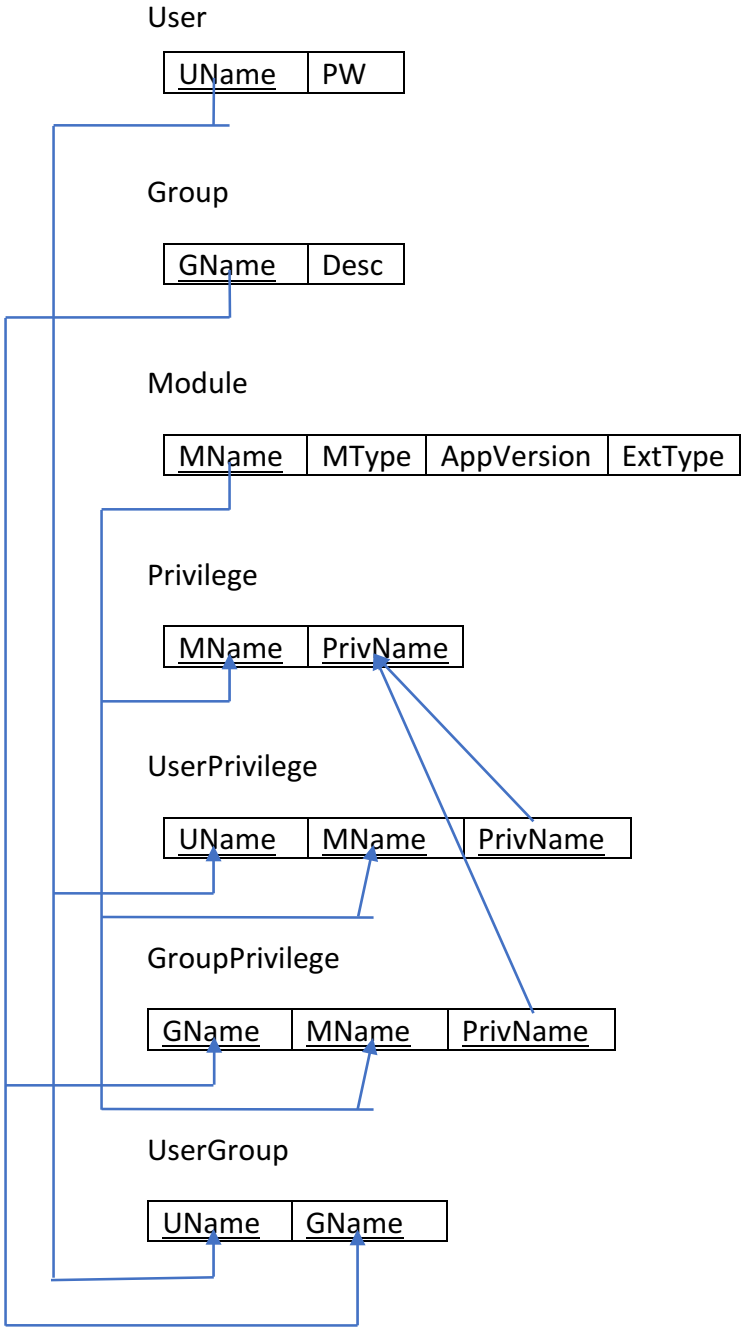
1. Answer


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

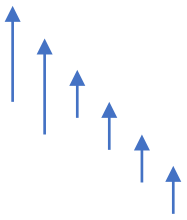
PID	Condition

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.

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 –

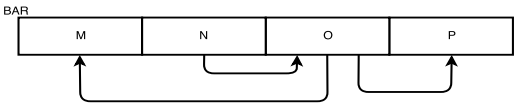
i) BAR1 (N, O)

ii) BAR2 (O, P)

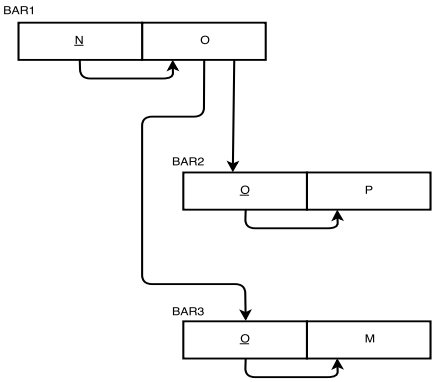
iii) BAR3 (O, M)

Please refer below diagram for further details.

Original



Decomposed



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

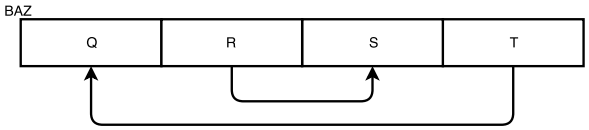
To satisfy 2-NF will decompose schema BAZ in such a way that every non-prime attribute is fully FD on key attribute. Below is the new structure of the schema –

i) BAZ1 (R, S)

ii) BAZ2 (T, Q)

Please refer below diagram for further details.

Original



Decomposed