Nontrivial functional dependencies in entity sets:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1 | CREATE TABLE Course ( | | |  |
|  | Course ID |  | INT, |  |
|  | Title |  | VARCHAR(50), | |
|  | Credit |  | INT, |  |
|  | Date |  | DATE, |  |
|  | Time |  | TIME, |  |
|  | Location |  | VARCHAR(50), | |
|  | Department | | VARCHAR(10), | |
|  | ); |  |  |  |

In the Course table, the nontrivial FD is:

Department, Course ID🡪Title, Credit, Date, Time, Location

This relation is already in BCNF.

There is no MVD is this relation and is already in 4NF.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 2 | CREATE TABLE Department( | | |  |
|  | Abbreviation | | VARCHAR(10), | |
|  | Name |  | VARCHAR(50), | |
|  | Found date | | DATE, |  |
|  | Address |  | VARCHAR(50), | |
|  | Website |  | VARCHAR(50), | |
|  | ); |  |  |  |

In the Department table, the nontrivial FD is:

Abbreviation🡪Name, Found date, Address, Website

This relation is already in BCNF.

There is no MVD is this relation and is already in 4NF.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 3 | CREATE TABLE Professor( | | |  |
|  | UIN |  | INT, |  |
|  | Name |  | VARCHAR(20), | |
|  | Title |  | VARCHAR(20), | |
|  | Nationality | | VARCHAR(20), | |
|  | Interest |  | VARCHAR(50), | |
|  | Office# |  | VARCHAR(10), | |
|  | Phone |  | INT, |  |
|  | Webpage |  | VARCHAR(50), | |
|  | ); |  |  |  |

In the Professor table, the nontrivial FD is:

UIN🡪Name, Title, Nationality, Interest, Office#, Phone, Webpage

This relation is already in BCNF.

There is no MVD is this relation and is already in 4NF.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 4 | CREATE TABLE Student( | | |  |
|  | UIN |  | INT |  |
|  | Name |  | VARCHAR(20), | |
|  | Birthdate |  | DATE, |  |
|  | Nationality | | VARCHAR(20), | |
|  | Gender |  | CHAR(1), |  |
|  | Phone |  | INT, |  |
|  | Email |  | VARCHAR(20), | |
|  | Major |  | VARCHAR(20), | |
|  | Program |  | VARCHAR(10), | |
|  | ); |  |  |  |

In the Student table, the nontrivial FD is:

UIN🡪Name, Birthdate, Nationality, Gender, Phone, Email, Major, Program

This relation is already in BCNF.

There is no MVD is this relation and is already in 4NF.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 5 | CREATE TABLE Paper( | | |  |
|  | ISBN |  | INT |  |
|  | Title |  | VARCHAR(50), | |
|  | Publish Date | | DATE, |  |
|  | Genre |  | VARCHAR(10), | |
|  | Publisher |  | VARCHAR(20), | |
|  | Page# |  | INT, |  |
|  | Cited# |  | INT, |  |
|  | ); |  |  |  |

In the Paper table, the nontrivial FD is:

ISBN🡪Title, Publish Date, Genre, Publisher, Page#, Cited#

This relation is already in BCNF.

There is no MVD is this relation and is already in 4NF.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 6 | CREATE TABLE Club( | |  |  |
|  | Name |  | VARCHAR(20), | |
|  | ChairName | | VARCHAR(20), | |
|  | Found date | | DATE, |  |
|  | Website |  | VARCHAR(50), | |
|  | Capacity# |  | INT, |  |
|  | AnnualFee | | REAL, |  |
|  | ); |  |  |  |

In the Club table, the nontrivial FD is:

Name🡪ChairName, Found date, Website, Capacity#, AnnualFee

This relation is already in BCNF.

There is no MVD is this relation and is already in 4NF.

Nontrivial Functional Dependencies in the relation schema:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1 | CREATE TABLE teachof( | | |  |
|  | Course ID | | INT, |  |
|  | Department | | VARCHAR(10), | |
|  | ProfName | | VARCHAR(20), | |
|  | ); |  |  |  |

In the teachof table, the nontrivial FD is:

Course ID, Department🡪ProfName

This relation is already in BCNF.

There is no MVD is this relation and is already in 4NF.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 2 | CREATE TABLE studyof( | | |  |
|  | Course ID | | INT, |  |
|  | Department | | VARCHAR(10), | |
|  | UIN |  | INT, |  |
|  | Score |  | REAL |  |
|  | ); |  |  |  |

In the studyof table, the nontrivial FD is

Course ID, Department, UIN🡪Score

This relation is already in BCNF.

There is no MVD is this relation and is already in 4NF.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 3 | CREATE TABLE supervisor of( | | |  |
|  | Prof UIN |  | INT, |  |
|  | Student UIN | | INT, |  |
|  | Start Date | | DATE, |  |
|  | Fund Type | | VARCHAR(10), | |
|  | ); |  |  |  |

In the supervisor table, the nontrivial FD is:

Prof UIN, Student UIN🡪Start Date, Fund type

This relation is already in BCNF.

There is no MVD is this relation and is already in 4NF.

|  |  |  |  |
| --- | --- | --- | --- |
| 4 | CREATE TABLE committee of( | | |
|  | Student UIN | | INT, |
|  | Chair UIN | | INT, |
|  | Cochair UIN | | INT, |
|  | Defense Date | | DATE, |
|  | Passed |  | CHAR(1) |
|  | ); |  |  |

In the committee table, the nontrivial FD is:

Student UIN, Chair UIN, Cochair UIN🡪Defense Date, Passed

This relation is already in BCNF.

There is no MVD is this relation and is already in 4NF.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 5 | CREATE TABLE submitted by( | | |  |
|  | ISBN |  | INT |  |
|  | Student UIN | | INT, |  |
|  | Prof. name | | VARCHAR(20), | |
|  | ); |  |  |  |

In the submitted by table, the nontrivial FD is:

ISBN, Student UIN🡪Prof.name

This relation is already in BCNF.

There is no MVD is this relation and is already in 4NF.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 6 | CREATE TABLE faculty of( | | |  |
|  | Prof. Name | | VARCHAR(20), | |
|  | Prof. UIN |  | INT, |  |
|  | Department |  | VARCHAR(10), | |
|  | Start Date | | DATE, |  |
|  | End Date |  | DATE, |  |
|  | Salary |  | REAL |  |
|  | ); |  |  |  |

In the faculty of table, the nontrivial FD is:

Prof.UIN, Department🡪Prof.Name, Start Date, End Date, Salary

This relation is already in BCNF.

There is no MVD is this relation and is already in 4NF.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 7 | CREATE TABLE group leader( | | |  |
|  | Prof. UIN |  | INT, |  |
|  | Title |  | VARCHAR(20), | |
|  | Job summary | | VARCHAR(100), | |
|  | Start Date | | DATE, |  |
|  | ); |  |  |  |

In the group leader table, the nontrivial FD is:

Prof.UIN🡪Title, job summary, Start Date

This relation is already in BCNF.

There is no MVD is this relation and is already in 4NF.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 8 | CREATE TABLE register in( | | |  |
|  | ClubName | | VARCHAR(20), | |
|  | StudentUIN | | INT |  |
|  | ); |  |  |  |

In the register in table, there is no nontrivial FD.

This relation is already in BCNF.

There is no MVD is this relation and is already in 4NF.