**Task 1. Will the conversion to BCNF be dependency preserving in any case? Proof your statement and give a reasoning for choosing BCNF design.**

**Task 2. Given table in 1NF, convert to 3NF if PK is UnitID:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| UnitID | **StudentID** | **Date** | **Tutor ID** | **Topic** | **Room** | **Grade** | **Book** | **TutEmail** |
| U1 | St1 | 23.02.03 | Tut1 | GMT | 629 | 4.7 | Deumlich | tut1@fhbb.ch |
| U2 | St1 | 18.11.02 | Tut3 | GIn | 631 | 5.1 | Zehnder | tut3@fhbb.ch |
| U1 | St4 | 23.02.03 | Tut1 | GMT | 629 | 4.3 | Deumlich | tut1@fhbb.ch |
| U5 | St2 | 05.05.03 | Tut3 | PhF | 632 | 4.9 | Dümmlers | tut3@fhbb.ch |
| U4 | St2 | 04.07.03 | Tut5 | AVQ | 621 | 5.0 | SwissTopo | tut5@fhbb.ch |

**Task 3. Given table in 1NF, convert to 2NF if PK is {ProjectName, ProjectManager}, use decomposition:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ProjectName** | **ProjectManager** | Position | **Budget** | TeamSize |
| Project1 | Manager1 | CTO | 1 kk $ | 15 |
| Project2 | Manager2 | CTO2 | 1.5 kk $ | 12 |

**Task 4. Given table, convert to 3NF if PK is Group, use decomposition:**

***Faculties have a number of specialities, each speciality consists of a set of particular groups.***

|  |  |  |
| --- | --- | --- |
| **Group** | **Faculty** | **Speciality** |
| **g1** | **f1** | **s1** |
| **g2** | **f2** | **s2** |

**Task 5. Given table, convert to BCNF if PK is {ProjectID, Department}, use decomposition:**

***Curator depends on projectID and related departments, teamSize directly relates to project and related departments, ProjectGroupsNumber depends on TeamSize.***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ProjectID** | **Department** | **Curator** | **TeamSize** | **ProjectGroupsNumber** |
| **p1** | **d1** | **e1** | **100** | **5** |
| **p2** | **d2** | **e2** | **120** | **6** |

**Task 6. List the three design goals for relational databases, and explain why each is desirable. Give an example of both desirable and undesirable types of decompositions.**