Task 1

There may not be a dependency preserving decomposition into BCNF. For example R = (J,K,L) with FDs: JK->L, L->K. Can’t decompose while preserving JK->L, but JKL is not in BCNF. If a relation is in BCNF, it is free of redundancies that can be detected using FDs. Thus, trying to ensure that all relations are in BCNF is a good heuristic. If a relation is not in BCNF, we can try to decompose it into a collection of BCNF relations. –  It is always possible to decompose a relation into a set of relations that are in BCNF such that: the decomposition is lossless , it may not be possible to preserve dependencies

Task 2

|  |  |
| --- | --- |
| TutorId | TutEmail |
| Tut1 | [Tut1@fhbb.ch](mailto:Tut1@fhbb.ch) |
| Tut3 | [Tut3@fhbb.ch](mailto:Tut3@fhbb.ch) |
| Tut5 | [Tut5@fhbb.ch](mailto:Tut5@fhbb.ch) |

|  |  |
| --- | --- |
| Topic | Book |
| GMT | Deumlich |
| Gln | Zehnder |
| PhF | Dummlers |
| AVQ | SwissTopo |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| UnitID | StudentID | Date | TutorID | Topic | Room | Grade |
| U1 | St1 | 23.02.03 | Tut1 | GMT | 629 | 4.7 |
| U2 | St1 | 18.11.02 | Tut3 | Gln | 631 | 5.1 |
| U1 | St4 | 23.02.03 | Tut1 | GMT | 629 | 4.3 |
| U5 | St2 | 05.05.03 | Tut3 | PhF | 632 | 4.9 |
| U4 | St2 | 04.07.03 | Tut5 | AVQ | 621 | 5.0 |

Task3

|  |  |
| --- | --- |
| ProjectName | ProjectManager |
| Project1 | Manager1 |
| Project2 | Manager2 |

|  |  |
| --- | --- |
| ProjectName | Budget |
| Project1 | 1 kk $ |
| Project2 | 1.5 kk $ |

|  |  |
| --- | --- |
| ProjectManager | Position |
| Manager1 | CTO |
| Manager2 | CTO2 |

|  |  |  |
| --- | --- | --- |
| ProjectName | ProjectManager | TeamSize |
| Project1 | Manager1 | 15 |
| Project2 | Manager2 | 12 |

Task 4

|  |  |
| --- | --- |
| Group | Speciality |
| G1 | S1 |
| G2 | S2 |

|  |  |
| --- | --- |
| Speciality | Faculty |
| S1 | F1 |
| S2 | F2 |

Task 5

|  |  |
| --- | --- |
| ProjectID | Department |
| P1 | D1 |
| P2 | D2 |

|  |  |  |
| --- | --- | --- |
| ProjectID | Curator | TeamSize |
| P1 | E1 | 100 |
| P2 | E2 | 120 |

|  |  |
| --- | --- |
| TeamSize | ProjectGroupsNumber |
| 100 | 5 |
| 120 | 6 |

Task 6

Three design goals: minimization of repetition of information, dependency preserving decomposition, lossless join decomposition. They are desirable so we can maintain an accurate database, check correctness of updates quickly, and use the smallest amount of space possible.