

### Task 1.

It is not always possible to achieve both BCNF and dependency preservation.

Advantages to 3NF over BCNF. It is always possible to obtain a 3NF design without sacrificing losslessness or dependency preservation.

Disadvantages to 3NF. We may have to use null values to represent some of the possible meaningful relationships among data items. There is the problem of repetition of information

### Task 2.

| UnitID | StudentID | Tutor ID | Grade |
|--------|-----------|----------|-------|
| U1     | St1       | Tut1     | 4.7   |
| U2     | St1       | Tut3     | 5.1   |
| U1     | St4       | Tut1     | 4.3   |
| U5     | St2       | Tut3     | 4.9   |
| U4     | St2       | Tut5     | 5.0   |

| UnitID | Date     | Room | Topic | Book     |
|--------|----------|------|-------|----------|
| U1     | 23.02.03 | 629  | GMT   | Deumlich |
| U2     | 18.11.02 | 631  | Gln   | Zehnder  |
| U5     | 05.05.03 | 632  | PhF   | Dümmlers |
| U4     | 04.07.03 | 621  | AVQ   | SwissTop |

| Tutor ID | TutEmail     |
|----------|--------------|
| Tut1     | tut1@fhbb.ch |
| Tut3     | tut1@fhbb.ch |
| Tut1     | tut1@fhbb.ch |
| Tut3     | tut3@fhbb.ch |
| Tut5     | tut5@fhbb.ch |

### Task 3.

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

| ProjectName | Budget    | TeamSize |
|-------------|-----------|----------|
| Project1    | 1 kk \$   | 15       |
| Project2    | 1.5 kk \$ | 12       |

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

Task 4.

| Group | Speciality |
|-------|------------|
| g1    | s1         |
| g2    | s2         |

| Speciality | Faculty |
|------------|---------|
| s1         | f1      |
| s2         | f2      |

Task 5.

| ProjectID | Curator | TeamSize |
|-----------|---------|----------|
| p1        | e1      | 100      |
| p2        | e2      | 120      |

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

| Department | Curator |
|------------|---------|
| d1         | e1      |
| d2         | e2      |

Task 6.

The three design goals for relational databases:

1. BCNF
2. Losslessness
3. Dependency preservation

Desirable decompositions:

Lossless join, dependency preserving decompositions

Undesirable decompositions:

A lossy decomposition