

*Homework assignment 2 Databases*  
2026

**Exercise 1**

$$R = (ABCDEG)$$

$$F = \{B \rightarrow CD, D \rightarrow CE, E \rightarrow AG\}$$

$$R_1 = (BD), R_2 = (ACDEG)$$

$$R_3 = (BCD), R_4 = (DE), R_5 = (EAG)$$

- (1) Is  $R_1, R_2$  a lossless decomposition for  $R$  ? (1 pnt)
- (2) Is this decomposition in BCNF? (1 pnt)
- (3) Is this decomposition in 3NF? (1 pnt)
- (4) Is this decomposition DP? (1 pnt)
- (5) Is  $R_3, R_4, R_5$  a lossless decomposition for  $R$  ? (1 pnt)
- (6) Is this decomposition in BCNF? (1 pnt)
- (7) Is this decomposition in 3NF? (1 pnt)
- (8) Is this decomposition DP? (1 pnt)

**Exercise 2**

$$R = (ABCDEG)$$

$$F = \{BD \rightarrow CEG, D \rightarrow BE, E \rightarrow G\}$$

We are going to calculate a minimal cover for  $F$ .

- (9) Which FD's will remain after the step *reduce left sides*? (2 pnt)
- (10) Which FD's will remain after the step *eliminate redundant FD's*? (2 pnt)
- (11) We use this minimal cover as the basis for a 3NF decomposition of  $R$ . Do we have to add another relation schema to guarantee losslessness? If so, which schema? (2 pnt)