National University of Computer and Emerging Sciences, Lahore Campus

Assignment 2 Database System

Deadline: 6th April, 2025 (hand written scanned form)

Q1. Consider the relation R (A, B, C, D, E, I) and a set of FDs F = { A → C, AB → C, C → DI, CD → I, EC → AB, EI → C }. Compute the minimal cover for *F* (i.e. *Fc*). Also find all possible Keys **(minimal of super keys i.e. candidate keys)** of R.

Q2. Find out whether the following set of functional dependencies for the relation R (A, B, C, D, E, G) are equivalent or not. Show all the steps. F1 = {A→C, AB→C, C→DG, CD→G, EC→AB, EG→C} and F2 = {A→C, C→D, C→G, EC→A, EC→B, EG→C}

Q3. Consider the relation R (A, B, C, D, E, G) and a set of FDs F = {D→E, ABC→BDE, B→G, A→C, ABC→G}. Compute the minimal cover for *F* (i.e. *Fc*). Also find all possible Keys (i.e. minimal of super keys) of R.

Q4. Consider the relation R (A, B, C, D, E) and a set of FDs F = {C→AB, A→E, D→E, BD→C, CD→B}. Find all possible Keys of R.

Q5. Consider the relation R (A, B, C, D) and a set of FDs F = {AB→C, CD→B, AD→B, AC→D}. Find all possible Keys of R.

Q6. Consider the relation R (A, B, C, D, E) and a set of FDs F = {A→C, C→BD, D→A}. Find all possible Keys of R.

Q7. Consider the relation R (A, B, C, D, E, G) and a set of FDs F = {ABC→CDEG, C→E, A→B, D→G}. Compute the minimal cover for *F* (i.e. *Fc*). Also find all possible Keys (i.e. minimal of super keys) of R.

Q8. Consider two sets of FDs, F and G, F = {A→BC, B→D, C→E, D→E} and G = {A→BC, B→D, C→E, BD→E, A→D}. Are F and G equivalent? Prove it.

Q9. Consider the relation R (A, B. C, D, E), with FDs {AC→B, D→E}. State which of the following decomposions of R relaon are lossless decomposion. Prove it.
a. R1(A, C, D), R2(A, B, C), and R3(D, E).
b. R1(A, B, D), R2 (A, B, C), and R3(D, E).