COMP 1100 In-Class Assignment – 05 Functional Dependencies and Normalization

Name	Date

1. Consider the relation R1(A, B, C, D, E, F) with functional dependencies: A→{B,C,D,E}; D→F; {B,C}→{A,D}; B→E

   a. What are the possible *candidate keys* for relation R1?

   b. Is R1 in 3NF? If so why, and if not why not? Show a decomposition of R1 into 3NF

2. Consider the relation R2(A, B, C, D, E, F) with functional dependencies: {B,D}→{A,E}; C→F; {E,F}→{A}; E→C
   a. What are the possible *candidate keys* for relation R2?

   b. Is R2 in 3NF? If so why, and if not why not? Show a decomposition of R2 into 3NF

3. Consider the relation R3(A, B, C, D, E, F) with functional dependencies: {A}→{F}; {E}→{B,C}; {E,F}→{D}; {F}→{A,C}
    a. What are the possible *candidate keys* for relation R3?

    b. Is R3 in 3NF? If so why, and if not why not? Show a decomposition of R3 into 3NF

4. Multiple Choice (circle only one answer):

a. Given the relation schema R(A,B,C,D,E) and the dependencies: {A,B}→{C,D,E}; A→E We can infer the following:	a. A is a key for R b. {B,E} is a key for R c. {A,B} is a key for R d. None of the above
b. Given the relation schema R(A,B,C,D, E) and the functional dependencies: {A}→{C,D}; D→{C}; B→E; {C,E}→A which of the following could be the *primary key* of R?	a. {A} b. {A,B,E} c. {B,E} d. {B,D}
c. Given the relation schema R(A,B,C,D,E) and the functional dependencies: {E}→{C,D}; {A,E}→B; B→A, what is the highest normal form of R?	a. 1NF b. 2NF c. 3NF d. None of the above
d. Given the relation schema R(A,B,C,D,E,F) and the dependencies: {C,D}→{A,B,E}; A→{C,D,E} We can infer the following:	a. R is in 3NF b. {C,D} is a candidate key for R c. {A} is a candidate key for R d. E is a primary key attribute e. F is a primary key attribute f. None of the above