Data and Applications **Due: 11:59PM, 18 November 2022**

Homework 4

Instructor: Ponnurangam Kumaraguru *Released:* 14 November 2022

1 Part One

Consider the attribute set $R = ABCDEGH$ and the FD set $F = \{AB \rightarrow C, AC \rightarrow B, AD \rightarrow E, B \rightarrow D, BC \rightarrow A, E \rightarrow G\}$.

1. For each of the following attribute sets, do the following: (i) Compute the set of dependencies that hold over the set and write down a minimal cover. (ii) Name the strongest normal form that is not violated by the relation containing these attributes. (iii) Decompose it into a collection of BCNF relations if it is not in BCNF.

   (a) ABC (b) $ABCD$ (c) $ABCEG$ (d) $DCEGH$ (e) $ACEH$

2. Which of the following decompositions of $R = ABCDEG$, with the same set of dependencies F, is (a) dependency-preserving? (b) lossless-join?

   (a) {AB, BC, $ABDE$, EG }

   (b) {ABC, $ACDE$, ADG }

2 Part Two

Table : PURCHASES

Customer_ID	Order_ID	Product_ID	Cust_Name	Product_Name	Phn_Nos	Day	Discount

Convert the relational table to a) 1NF b) 2NF c) 3NF

Information about the table :

1. Composite Key is Customer_ID + Order_ID + Product_ID
2. Phn_Nos is a multi-valued attribute.
3. Day → Discount
4. Customer_ID → Cust_Name
5. Product_ID → Product_Name
6. Order_ID → Day

3 Submission Instructions

Please submit a single PDF from the team named as <team_number>.pdf (without the < and >). Handwritten submissions are not allowed. Penality will be given for not following the submission criteria. All the best!