COSC430—Advanced Database Topics—2020

Assignment 1: Relational Theory Due 20th March, 2020

Consider a database relation of student records as follows:

Student (SID, SNAME, GRADE, PCODE, PNAME, SEM, YEAR, ENROL, LECT, ROOM, RSIZE)
You can abbreviate this as **Student (I,N,G,P,M,S,Y,E,L,R,C)**

Attribute	Abbreviation	Description
SID	I	Student ID
SNAME	N	Student's name
GRADE	G	Student's grade for this paper
PCODE	P	Paper's 7-character code
PNAME	M	Paper's name
SEM	S	Semester in which the paper is taught
YEAR	Y	Year in which the paper was offered
ENROL	E	Number of students enrolled in the paper
LECT	L	Lecturer's name, for the lecturer that is the paper's coordinator
ROOM	R	The room in which lectures for this paper are held
RSIZE	C	The maximum capacity of the room in which lectures are held

Assume functional dependencies **F = {I→N,P→M, PMSY→LRCE, IPMSY→G, LSY→PME, R→C}**

(a) Show how to derive two candidate keys for **Student**, or justify why you cannot do so. (2)
(b) Find a minimal cover (i.e, an irreducible set of functional dependencies) for **Student**. (3)
(c) Find a dependency-preserving decomposition of the **Student** relation into third normal form (3NF), showing working that justifies how you reached your answer. (3)

Important points to note

- The total number of marks in this assignment is 8.
- This assignment makes up 8% of your COSC430 mark.
- You must provide clearly reasoned justifications to your answers in order to get full marks.
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