Assignment 2

Please make sure that you always use notations consistent with lecture notes. Different notations will not be accepted. The deadline for assignment 2 is:

Wed 18, Nov 5:00 pm

Question 1 (15 marks)

Consider a relation $R(A, B, C, D, E, G, H, I, J)$ and its FD set $F = \{A \rightarrow BC, CD \rightarrow AE, E \rightarrow CHI, H \rightarrow J\}$.

1) Check if $A \rightarrow I \in F^+$. (3 marks)

2) Find a candidate key for R. (3 marks)

3) Determine the highest normal form of R with respect to F. Justify your answer. (3 marks)

4) Find a minimal cover F_m for F. (3 marks)

5) Decompose into a set of 3NF relations if it is not in 3NF step by step. Make sure your decomposition is dependency-preserving and lossless-join. (3 marks)

Question 2 (10 marks)

Consider the schedule below. Here, R(*) and W(*) stand for 'Read' and 'Write', respectively. T_1, T_2, T_3 and T_4 represent four transactions and t_i represents a time slot.

Time	t_1	t_2	t_3	t_4	t_5	t_6	t_7	t_8	t_9	t_{10}	t_{11}	t_{12}
T_1				R(A)		R(C)	W(A)			W(C)		
T_2	R(A)	W(A)							R(B)	W(B)		
T_3	R(B)		R(C)		R(A)		W(C)	W(B)			W(A)	
T_4				R(C)	W(C)						R(B)	W(B)

Each transaction begins at the time slot of its first Read and commits right after its last Write (same time slot).

Regarding the following questions, give and justify your answers.

1) Is the transaction schedule conflict serializable? Give the precedence graph to justify your answer. (4 marks)

2) Give a serial schedule of these four transactions (there can be more than 12 time slots). (3 marks)

3) Lock the transactions T_1 and T_2 according to the simple locking scheme. You only need to consider the order of the operations, not the timestamps. (3 marks)

Assignment Submission

- Students must submit an electronic copy of their answers to the above questions to the course website in Moodle.
- Only **.doc** or **.pdf** file is accepted. The file name should be ass2_**studentID**.doc or ass2_**studentID**.pdf (e.g., **ass2_z5100000.doc** or **ass2_z5100000.pdf**).

Note:

1. For any problems in submissions, please email to comp9311unsw@gmail.com
2. All submissions will be checked for plagiarism.
3. We do not accept e-mail submissions.

The university regards plagiarism as a form of academic misconduct and has very strict rules regarding plagiarism. For UNSW policies, penalties, and information to help avoid plagiarism, please see: https://student.unsw.edu.au/plagiarism as well as the guidelines in the online ELISE tutorials for all new UNSW students: https://subjectguides.library.unsw.edu.au/elise

Late Submission Penalty

20% of the value of the submission will be deducted for each day (24 hours). Submissions with more than five days late will not be marked.