

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 20 Nov, 5:00 pm (Not Friday this time!)

Question 1 (15 marks)

Consider a relation $R(A, B, C, D, E, G, H, I, J)$ and its FD set $F = \{A \rightarrow DE, B \rightarrow GI, E \rightarrow CD, CE \rightarrow ADH, H \rightarrow G, AH \rightarrow I\}$.

- 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(B)					R(A)	W(B)				W(A)	
T_2								R(B)				W(B)
T_3			R(A)	W(A)								
T_4		R(A)			W(A)				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 serialisable? Give the precedence graph to justify your answer. (4 marks)
- 2) Give a serial schedule of these four transactions. (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

We accept electronic submissions only. Please submit your assignments as follows:

- The file name should be **ass2.pdf**.
- Log into the CSE server, ensure that you are in the directory containing the file to be submitted. (**note: we only accept files with .pdf extension**)
- Type “give cs9311 ass2 ass2.pdf” to submit.
- You can also use the web give system to submit.
- In case that the system is not working properly, you **must** take the following actions:
 - 1) Please keep a screen capture (including **timestamp** and the **size** of the submitted file) for your submissions as proof. If you are not sure how, please have a look at the guidelines.
 - 2) Please keep a copy of your submitted file on the CSE server. If you are not sure how, please have a look at taggi.

Note:

1. If the size of your pdf file is larger than **2MB**, the system will not accept the submission. If you face this problem, try converting to compress pdf.
2. If you have any problems in submissions, please email to comp9311unsw@gmail.com.
3. We do not accept e-mail submissions.

Late Submission Penalty

20% per day. In addition, you will receive **zero mark** if you submit after we release the solution.