

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:

Mon 08 Apr, 10:00 am

Question 1 (8 marks)

Consider a relation $R(A, B, C, D, E, G, H, I, J)$ and its FD set $F = \{AB \rightarrow CE, D \rightarrow GH, E \rightarrow BCD, C \rightarrow DI, H \rightarrow G, EH \rightarrow I\}$.

- 1) Check if $C \rightarrow J \in F^+$. (1 mark)
- 2) List all the candidate keys for R . (2 marks)
- 3) Find a minimal cover F_m for F . (2 marks)
- 4) Decompose into a set of 3NF relations if it is not in 3NF. Make sure your decomposition is dependency-preserving and lossless-join. Justify your answers. (3 marks)

Question 2 (12 marks)

Consider a relation $R(A, B, C, D, E, G, H, I, J)$ and its FD set $F = \{AB \rightarrow CE, D \rightarrow GH, E \rightarrow BCD, C \rightarrow DI, H \rightarrow G, EH \rightarrow I\}$.

- 1) How many super keys can be found for R ? Compute the total number of super keys and list 5 of them. (2 marks)
- 2) Determine the highest normal form of R with respect to F . Justify your answer. (2 marks)
- 3) Regarding F , is the decomposition $R_1 = \{ABCDE\}$, $R_2 = \{EGH\}$, $R_3 = \{EIJ\}$ of R dependency-preserving? Please justify your answer. (2 marks)
- 4) Regarding F , is the decomposition $R_1 = \{ABCDE\}$, $R_2 = \{EGH\}$, $R_3 = \{EIJ\}$ of R lossless-join? Please justify your answer. (3 marks)
- 5) Decompose it into a collection of BCNF relations if it is not in BCNF. Make sure your decomposition is lossless-join and briefly justify your answers. (3 marks)

Assignment Submission

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

- The file name should be **ass2.pdf**.
- 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.
- **Please keep a screen capture** (including **timestamp** and the **size** of the submitted file) for your submissions as proof in case that the system is not working properly. If you are not sure how, please have a look at the [FAQ](#).

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, and the submission system will be immediately closed after the deadline.

Late Submission Penalty

Zero mark