

Assignment 2

Deadline: 16.05.2021

In this assignment you have to use the techniques mentioned in our lecture and slides. Any other technique will not be graded. You have to write down the answers to a paper and upload the photo of the paper to moodle.

1- Given $R = \{A_1, A_2, A_3, A_4, A_5, A_6, A_7, A_8\}$ and

$F = \{A_1 A_3 \rightarrow A_7,$

$A_4 \rightarrow A_5 A_7,$

$A_2 A_3 \rightarrow A_4,$

$A_3 A_7 \rightarrow A_2 A_4,$

$A_1 A_3 A_4 \rightarrow A_2,$

$A_3 A_5 \rightarrow A_1 A_7\}$.

After finding extraneous attributes and eliminating them and all redundant FDs, Find the canonical cover of F . You have to define all the steps to get the canonical cover. Just writing the canonical cover without the steps will not be graded.

2-a-Given $R(A_1, A_2, A_3, A_4, A_5, A_6)$ and

$A_1, A_2 \rightarrow A_3$

$A_1, A_4 \rightarrow A_5$

$A_2 \rightarrow A_4$

$A_1, A_6 \rightarrow A_2$

Find the $\{A_1, A_2\}^+$ and $\{A_1, A_6\}^+$

b-Why do we need closure? Explain giving examples if necessary.

3-Given $R(A_1, A_2, A_3, A_4)$ under $F = \{A_1 \rightarrow A_2, A_2 \rightarrow A_3\}$. A_1 and A_2 are superkeys.

a-Is R in BCNF? Give the proof.

b-Suppose that we decomposed R into $R_1(A_1 A_2)$, $R_2(A_1 A_3)$, and $R_3(A_1 A_4)$. Are each of the relations in BCNF? Give the proof.

c- Is the decomposition dependency preserving? Give the proof.