

Assignment 2

Deadline (12.06.2023 23:55)

Rules:

- You should base your solution on the definitions in the book till the end of CH7, slide 35. You can not use any technique after that slide. Other kind of definitions will be graded 0, even if they are correct.
 - Answers and sub steps in the answer without a proof will not be accepted and graded 0, even they are correct. You should also add the definition needed for that proof near your answer. Your definitions must be from the book. If not, you will be graded 0, even they are correct.
 - Solutions that are similar to the solutions extracted from chatGPT or a software similar to that will be graded -100.
 - You should answer your assignment by yourself. If some of the students have similar assignments that makes me suspicious that you cheat, you will be graded -100.
1. (60 pts) Suppose that you have a relation $R = \{A1, A2, A3, A4, A5\}$ and functional dependencies $A2 A3 \rightarrow A4$ and $A1 A3 \rightarrow A5$.

A1	A2	A3	A4	A5
1	2	3	7	6
1	1	3	6	6
2	5	1	7	6

- Is the relation in BCNF and 3NF? Give the proof of each step.
 - If not, decompose it so that each decomposed relation will be in 3NF or BCNF. Show how and why you decomposed it that way. Which formula you used. And show how you used that formula.
 - After the decomposition show if each decomposed relation are in BCNF and 3NF?
 - For each of the following sets of functional dependencies, determine if the dependencies are preserved by the decomposition.
2. (40 pts) This question is related to assignment 1.

Suppose that you decided to create a noSQL database for the same project in assignment 1. Give details about the steps designing the (your) database. Which database you are planning to use? Why you decided to use it? Give details about your reasons. Show, how you are going to create entities giving one example for one entity in the (your) database. Give one example for adding a single record to the (your) database. All examples should be for the database related to health sector mentioned in the question.