BIT2008A/ITEC2000A: Multimedia Data Management
Fall 2022

Assignment 2

Entity Relationship Model & Normalization

Question 1. Please explain what a weak entity is, and how we should identify its records. (5 points)

Question 2. Please explain how we can implement a trinary relationship using multiple binary relationships. (5 points)

Question 3. We have a relation $R = (A, B, C, D, E, F, G)$ and its functional dependency set as below.

$$F = \{A \to B,\ BC \to DE,\ AEF \to G,\ E \to C,\ A \to E\}$$

Please write down 4 members of F^+ mentioning which Armstrong's axioms you used to conclude each of them. (10 points)

Question 4. Consider the relation scheme $R = (E, F, G, H, I, J, K, L, M, N)$ and the set of functional dependencies as below.

$$F = \{EF \to G,\ F \to IJ,\ EH \to KL,\ K \to M,\ L \to N\}$$

Please write down $(EFH)^+$ and explain whether EFH is a candidate key. (10 points)

Question 5. Please find the canonical cover of $F = \{A \to BC, B \to AC, C \to AB\}$ explaining the steps of your process. (5 points)

Question 6. Having the relation $R = (A, B, C, D, E)$ and functional dependency set $F = \{AB \to CD, D \to E, A \to C, B \to D\}$, please find the BCNF decomposition of R, and determine if the decomposition is dependency-preserving. (10 points)

Question 7. Having the relation $R = (A, B, C, D, E, F, G, H)$ and the functional dependency set $F = \{A \to CD, ACF \to G, AD \to BEF, BCG \to D, CF \to AH, CH \to G, D \to B, H \to DEG\}$, please find the 3NF decomposition of R. (10 points)

Implementation

In this part, please design a schema corresponding to the ER Diagram that we drew in Lab 4. Then, write the code to create that schema in PostgreSQL. Place the code in your submission using the name *table.sql*. (45 points)

Description

1) The due date of this assignment is October 23rd, 11:55 PM. Late submission policy can be found on the course outline.
2) You are expected to submit your solution for all of the assignments, then the maximum three scores will be calculated.
3) Please include your answer to the first part of the assignment (Q1 to Q7) in a PDF file. It can be handwritten, but make sure it is easily readable.
4) Please upload your submission as Lastname_Firstname_StudentID.zip on Brightspace.