Final Assignment on CSE 207

Q1. Consider a relation R (A, B, C, D, E, F, G) with the functional dependencies-

$$A \rightarrow BC$$

$$BC \rightarrow DE$$

$$D \rightarrow F$$

$$CF \rightarrow G$$

Find closure set of A, BC, D, CF. Also, find the candidate and super key. Also find out the canonical cover.

Q2. Consider the relation scheme R (E, F, G, H, I, J, K, L, M, N) and the set of functional dependencies

{EF -> G,

F -> IJ,

EH -> KL,

K -> M,

L ->N}.

What are the candidate and super key for R? Also find out the canonical cover.

Q3. Consider a relation scheme R (A, B, C, D, E, H) on which the following functional dependencies hold: {A–>B, BC–> D, E–>C, D–>A}. What are the candidate keys of R?

Q4. Design a database for an airline. The database must keep track of customers and their reservations, flights and their status, seat assignments on individual flights, and the schedule and routing of future flights. Your design should include an E-R diagram, a set of relational schemas, and a list of constraints, including primary-key and foreign-key constraints.

Q5. Design a database for an automobile company to provide to its dealers to assist them in maintaining customer records and dealer inventory and to assist sales staff in ordering cars. Each vehicle is identified by a vehicle identification number (VIN). Each individual vehicle is a particular model of a particular brand offered by the company (e . g., the XF is a model of the car brand Jaguar of Tata Motors). Each model can be offered with a variety of options, but an individual car may have only some (or none) of the available options. The database needs to store information about models, brands, and options, as well as information about individual dealers, customers, and cars. Your design should include an E-R diagram, a set of relational schemas, and a list of constraints, including primary-key and foreign-key constraints.

Q6. Consider the following table:

EmpID	EmpName	DeptID	DeptName	DeptLocation
1	Alex	D01	HR	New York
2	Brian	D02	IT	Chicago
3	Clara	D01	HR	New York

I. Explain and illustrate the process of normalizing the data shown in this table to third normal form (3NF).
II. Identify the primary and foreign keys in your 3NF relations.

Q7. Consider the following set of key values: 4, 6, 8,17, 19,_ , , 45,51

i. **Construct** a B+-tree for order of n=4
ii. Insert 13.
iii. Insert 17.
iv. Delete 6.

[*N.B: fill up the blank position with numbers as you wish between a range of 20 to 40*]

Q8. Briefly explain the ACID properties of transaction.