

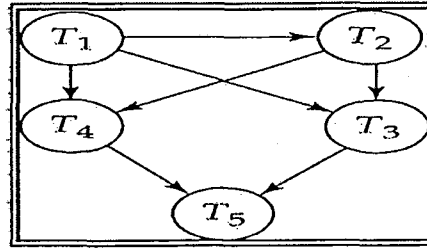
(OR)

- b) i. Consider the following relation
Car_sale (car#, salesman, date_sold, commission, discount_amount, color, manufacturing_location)
Assume that the car may be sold by multiple salesman and hence (car#, salesman) is the primary key. Additional functional dependencies are:
date_sold -> discount_amount,
salesman -> commission,
discount_amount -> commission
car#, salesman ->> color,
car#, salesman ->> manufacturing_location.
Based on the given primary key, is the relation in 1NF, 2NF, 3NF and BCNF, 4NF? Why and why not? How would you successfully normalize it completely? (10)
ii. Why 3NF is preferable than BCNF? Explain with a suitable example. (6)

13. a) i. Consider the following relations which keep track of airline flight information:
Flights(flno: integer, from: string, to: string, distance: integer, departs: time, arrives: time, price: real)
Aircraft(aid: integer, aname: string, cruisingrange: integer)
Certified(eid: integer, aid: integer)
Employees(eid: integer, ename: string, salary: integer)
Note that the Employees relation describes pilots and other kinds of employees as well; every pilot is certified for some aircraft, and only pilots are certified to fly.
Write each of the following queries in SQL.
- Find the names of aircraft such that all pilots certified to operate them have salaries more than \$80,000. (2)
 - Find the aids of all aircraft that can be used on routes from Los Angeles to Chicago. (2)
 - Compute the difference between the average salary of a pilot and the average salary of all employees (including pilots). (2)
 - Print the names of employees who are certified only on aircrafts with cruising range longer than 1000 miles. (3)
 - For each pilot who is certified for more than three aircraft, find the eid and the maximum cruising range of the aircraft for which she or he is certified. (3)
- ii. How is the security enforced in databases? (4)

(OR)

- b) i. Explain the significance of triggers with other integrity constraints supported by SQL. (8)
ii. Discuss about views in SQL and the problems that may arise when updating the views with a suitable example. (8)
14. a) i. Illustrate the locking protocols for concurrency control. (12)
ii. Consider the precedence graph given below. Is the corresponding schedule is conflict serializable? State the reasons. (4)



(OR)

- b) i. Illustrate the two Phase Commit protocol for recovery. (8)
 ii. Explain the deadlock prevention strategies. (8)
15. a) i. Describe the steps involved in Query processing. (6)
 ii. Let the relations $r_1(A,B,C)$ and $r_2(C,D,E)$ have the following properties : r_1 has 20,000 tuples, r_2 has 45,000 tuples, 25 tuples of r_1 fit on one block, and 30 tuples of r_2 fit on one block. Estimate the number of block accesses required, using each of the following join strategies for $r_1 \bowtie r_2$: (10)
- Nested-loop join
 - Block nested -loop join
 - Merge Join
 - Hash Join

(OR)

- b) i. Explain the architecture of a typical data warehouse and describe the various components of data warehouse. (10)
 ii. Illustrate the guidelines for tuning the database. (6)