

ALCCS – (OLD SCHEME)

Time: 3 Hours

AUGUST 2012

Max. Marks: 100

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE:

- Question 1 is compulsory and carries 28 marks. Answer any FOUR questions from the rest. Marks are indicated against each question.
- Parts of a question should be answered at the same place.

- Q.1**
- Discuss the activities performed by different database end users.
 - Define the terms: homogeneous and heterogeneous distributed database management systems.
 - With respect to the relational data model, define the concept of primary and foreign key constraints. Why are primary and foreign keys used? Illustrate your answer with example.
 - What do you understand by lock granularity? Explain.
 - Define a transaction and its desirable ACID properties.
 - Distinguish between RDBMS and DBMS.
 - What are DML and DDL statements? (7×4)

- Q.2** In the following airline database schema: (any **NINE**)

Flights(flno, from, to, distance, departs)

Aircraft(aid, aname, range)

Certified(eid, aid)

Employees(eid, ename, salary)

By definition, pilots are those employees who are certified on at least one aircraft. An aircraft can be used for any flight provided it has sufficient range. Pilots can pilot any flight provided they are certified on an aircraft with sufficient range.

Problems

- Find eid's of pilots who are certified on some Boeing.
- Find names of pilots who are certified on some Boeing.
- Find aid's of aircraft that can fly non-stop from LA to NY. Assume you don't already know the distance.

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- (iv) Find flno of flights that can be piloted by every pilot whose salary is over \$100,000.
- (v) Solve problem 4 without using the division operator.
- (vi) Find names of pilots who can operate planes with a range greater than 3,000 miles, but are not certified on any Boeing.
- (vii) Find eid of employee(s) with the highest salary.
- (viii) Find eid of employee(s) with the second highest salary.
- (ix) Find eid of employee(s) certified on the most aircraft.
- (x) Find eid's of employees certified on exactly three aircraft. (18)
- Q.3** a. How would the following ER constructs be mapped to the relational model?
(i) Aggregation.
(ii) Generalization / Specialization. (9)
- b. What is referential integrity? What is the need for triggers and how are they implemented in SQL? Give example. (4+5)
- Q.4** a. What are cardinality ratios? What are the possible cardinality ratios for a binary relationship? Explain with examples. (9)
- b. What is the primary goal of normalization? How are the concepts of functional dependency and multi valued dependency associated with normalization? Give an example for the same. (9)
- Q.5** a. What are check points and why are they important? List the actions taken by the recovery manager during check points. (2+2+5)
- b. What are the key properties of long duration transactions? How does the concurrency protocol affect long duration transactions? (9)
- Q.6** a. What are different types of joins in SQL? (9)
- b. What is "Two-Phase locking protocol"? Explain with the help of example of a schedule, how the protocol ensures a schedule to be conflict-serializable, but not cascade-less? (9)
- Q.7** Write short notes on the following:
- (i) Data Mining.
(ii) Distributed Transactions.
(iii) OLTP and OLAP (3×6)