

C6-R3: ADVANCED DATABASE MANAGEMENT SYSTEMS

NOTE:

1. Answer question 1 and any FOUR questions from 2 to 7.
2. Parts of the same question should be answered together and in the same sequence.

Time: 3 Hours

Total Marks: 100

1.

- a) Give two advantages of RDBMS over DBMS and distributed database over centralized database.
- b) When a relation is said to be normalized? Explain the normal form(s) associated with multivalued dependency concept with example.
- c) Explain steps involved in query processing. List different measures of query cost.
- d) List out and explain the types of problems we face in distributed database management system.
- e) Give some reasons for allowing concurrency for transaction processing system.
- f) What is serializable schedule in transaction processing? Why is it considered such a crucial feature?
- g) How does RDBMS exploit encapsulations in implementing support for abstract data type?

(7x4)

2.

- a) What is functional dependency? List all functional dependencies satisfied by the relation given below:

| A1 | A2 | A3 | A4 |
|----|----|----|----|
| T1 | U2 | V1 | W2 |
| T1 | U2 | V2 | W2 |
| T2 | U2 | V1 | W1 |
| T2 | U2 | V3 | W1 |

- b) Why should the referential integrity be maintained? What kinds of problems may arise if it is not maintained? Explain with a suitable example.
- c) Distributed system may suffer from the same types of failure that a centralized system does. There are additional types of features with which we need to deal in distributed environment. Specify these features and describe them in detail.
- d) How to model and store image and multimedia data?

(5+5+4+4)

3.

- a) Draw a wait-for graph indicating a deadlock. Explain three actions that need to be taken for recovery from deadlock. Also explain any one method for dealing with deadlock in a distributed system.
- b) What form of parallelism (interquery, interoperation or intraoperation) is likely to be the most important for following task?
 - i) Increasing the throughput of a system with many small queries.
 - ii) Increasing the throughput of a system with a few large queries when the number of disks and processor is large.
- c) Explain the use of following terms: Scope of reference, Reference types, Instead of triggers.

(8+4+6)

- 4.
- a) What do you mean by a tier? For a Web, why a three tier client-server architecture is more suitable? Give a general structure of a client-server system.
 - b) Describe the terms homogeneous and heterogeneous distributed database management system.
 - c) Why there is a need of separate warehouse? What are the major components and steps in creating data mining system?
 - d) How does warehouse allow the precomputations and fast accessing of summarized data?

(5+5+4+4)

5.

- a) Explain what is meant by location, fragmentation and replication transparency and indicate how these are achieved in a distributed database.
- b) Consider the employee database. Give expressions in datalog for each of the following queries:
 - Employee(person-name, street, city)
 - Works(person-name, company-name, salary)
 - Company(company-name, city)
 - Managers(person-name, manager-name)
 - i) Find the names of all employees who work for First Bank Corporation.
 - ii) Find the names and cities of residence of all employees who work for First Bank Corporation.
- c) The strategy of query evaluation depends on the cost estimation of the strategy. Query optimiser makes use of the statistical information stored in the DBMS catalogue to estimate cost plan. What information is stored in database catalogue? List all the additional catalogue information on indices.
- d) How 3PC protocol responds to various types of failures?

(5+4+5+4)

6.

- a) Data items such as relations, replications and fragmentations must have unique names. Describe in brief two approaches that ensure this uniqueness in a distributed database.
- b) Explain how the concept of the object identity in the object-oriented model differs from the concept of tuple equality in a relational model?
- c) Is classification a kind of data mining? If yes, justify it and give an example. If no, write its utility and purpose.
- d) Explain all types of keys with NULL value concept.
- e) Explain the merits and demerits of shadow paging.

(5+4+3+3+3)

7.

- a) What do you mean by multithreaded server? What are the most important types of background process that can be used with Oracle 9i servers?
- b) Why 3NF decomposition is preferable over BCNF? Prove that BCNF decomposition is not a dependency preserving decomposition.
- c) What do you mean by atomicity of transaction? Explain nesting of transaction.
- d) Why concept hierarchies are useful in data mining? Describe in brief.
- e) How to organize, manipulate and Query the XML data?

(3+4+4+3+4)