

International Islamic University Chittagong
 Department of Computer Science and Engineering
 B. Sc. in CSE
 Final Exam, Autumn 2021

Course Code: **CSE4845**

Course Title: **Distributed Database**

Time: 2 hours 30 minutes

Full Marks: 50

- (i) The figures in the right-hand margin indicate full marks
 (ii) Course Outcomes and Bloom's Levels are mentioned in additional Columns

Course Outcomes (COs) of the Questions	
CO1	Write allocation during the distributed database design process
CO2	Explore the techniques used for data fragmentation, replication
CO3	Demonstrate how the two-phase commit protocol issued to deal with committing a transaction that accesses databases stored on multiple nodes.
CO4	Apply simple strategies for executing a distributed query to select the strategy that minimizes the amount of data transfer
CO5	Synthesize the basic concepts of parallel databases, object distributed databases, and multi databases

Bloom's Levels of the Questions						
Letter Symbols	R	U	App	An	E	C
Meaning	Remember	Understand	Apply	Analyze	Evaluate	Create

Part A

1. a) Briefly describe the Distributed Query Processing Steps. CO1 R 5
1. b) Write down the steps of transform the query to a normalized form in a query decomposition process. CO2 U 5
2. a) Indicate whether the following schedules can produce anomalies; the symbols **ci** and **ai** indicate the result (commit or abort) of the transaction: CO4 App 5
- a. $r1(x); w1(x); r2(x); w2(y); a1; c2$
 - b. $r1(x); w1(x); r2(y); w2(y); a1; c2$
 - c. $r1(x); r2(x); r2(y); w2(y); r1(z); a1; c2$
 - d. $r1(x); r2(x); w2(x); w1(x); c1; c2$
 - e. $r1(x); w1(x); r2(x); w2(x); c1; c2$
2. b) Consider the Relations: **EMP(ENO, ENAME, TITLE), ASG(ENO,PNO,RESP,DUR)** CO2 E 5
 The Query is: "Find the names of employees who are managing a project?"
 And the High level query is:-
SELECT ENAME
FROM EMP,ASG
WHERE EMP.ENO = ASG.ENO AND DUR > 37

Now, write the possible Transformation of an SQL-query into a Relational Algebra-query.

OR

2. a) Write down the properties of Transactions? Briefly discuss it. CO4 App 5
2. b) Why need the data localization and Mention the issues also. CO2 E 5

Part-B

3. a) Write down the steps of Two Phase Locking Protocol. CO5 C 5
3. b) Classify the following schedule as Non-VSR, VSR or CSR:- CO2 E 5

a. r1(x); r2(y); w3(y); r5(x); w5(u); w3(s); w2(u); w3(x); w1(u); r4(y); w5(z); r5(z)

b. r2(u); w2(s); r1(x); r2(y); w3(y); r5(x); w5(u); w3(s); w2(u); w3(x); w1(u); r4(y); w5(z); r5(z)

c. r1(x); r2(y); w3(y); r5(x); w5(u); w3(s); w2(u); w3(x); w1(u); r4(y); w5(z); r5(z); r2(u); w2(s)

4. a) What do you mean by Local Recovery Management (LRM) in DDBMS? How many ways for the LRM to deal with update/ write operations? Describe it. CO5 App 5
4. b) Write down the Taxonomy of Concurrency control algorithm? Which tool is useful to identify the Deadlocks? CO2 U 5

5. Let us consider the case of a real estate agency whose database is composed by the following tables: CO3 An 10

OWNER (IDOwner, Name, Surname, Address, City, Phone)

ESTATE (IDestate, IDOwner, Category, Area, City, Province, Rooms, Bedrooms, Garage, Meters)

CUSTOMER (IDCust, Name, Surname, Budget, Address, City, Phone)

AGENT (IDAgent, Name, Surname, Office, Address, City, Phone)

AGENDA (IDAgent, Data, Hour, IDEstate, ClientName)

VISIT (IDestate, IDAgent, IDCust, Date, Duration)

SALE (IDestate, IDAgent, IDCust, Date, AgreedPrice, Status)

RENT (IDestate, IDAgent, IDCust, Date, Price, Status, Time)

Goal: Provide a supervisor with an overview of the situation. The supervisor must have a global view of the business, in terms of the estates the agency deals with and of the agents' work.

Questions:-

- a. Design a conceptual schema for the DW.
- b. What facts and dimensions do you consider?
- c. Design a Star Schema or Snowflake Schema for the DW.

OR

5. a) What do you know about the **site failures** in 2PC protocol? CO3 An 5
- b) What is Reliability and Out-of-place Update? Is there a difference between Two-Phase "Locking" and Two-Phase "Commit"? CO4 App 5