

Ministry of Higher Education **Subject**: Advanced Database System

Salahaddin University- Erbil **Time**: 2 Hours

College of Science **Date**: 14/5/2023

Computer Science& IT Department Final Exam 2nd Semester **Trial: 1st**

 **3rd CS and IT** 2022-2023 **Marks: %50**

**Q1: Answer the Following Questions: (10 Marks)**

 **A: Complete the following: (6 Marks)**

**1- A -------------is a collection of multiple, logically interrelated databases distributed over a computer network.**

**2- ------------- is types of access of data, read/write, etc.**

1. **Represent the user view as a collection of tables use the ------------------ to do this.**
2. **Understanding ------------------------------------- are key to understanding SQL and query processing.**
3. **If the system should match to existing systems or some modules are yet ready, the ----------------method is usually used.**
4. **---------- Consists of a single DB and DBMS stored at one site with users distributed across the network.**

**B: From the relation PROJ below: (4 marks)**

1. **Write information to find Horizontal Fragmentation ( with output)**
2. **Write information to find vertical Fragmentation (with output)**

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**Q2: From the relation below by using relation algebra. (10 Marks**)



 A: Find the output of:

1. S2×AllR (2 Marks)
2. ρ(sid−>sid1) (S1) × ρ(sid−>sid2) (R1) (2 Marks)
3. π Sname(σ S2.rating<AllR.rating(S2×AllR)) (3 Marks)

 B: Write the query in relation algebra to find Natural join between S1and R1 (3 Marks)

**Q3: Answer the Following Questions: (15 Marks)**

1. What is the Network transparency of distributed DBMS architecture
2. What is the disadvantages of DDBMS?
3. Draw the architecture models for Distributed DBMS (DBMS implementation alternatives)

**Q4: Compare between the followings: (15 Marks)**

1. Centralized and distributed databases
2. Centralized allocation And Partitioned allocation
3. Reference architecture for a DDBMS and Reference Architecture for a Federated MDBS (Explain by graph only)

**Answer the Question**

Answer: Q1: (10 Marks )

A: (6 Marks)

1-Distributed database (DDB)

1. Qualitative information.
2. EAR method.
3. Relation Algebra & Calculus
4. down-top
5. Centralized

 B: (4 Marks)





Answer Q2: (10 Marks)

1. **S2×AllR (2 Marks)**



1. ρ(sid−>sid1) (S1) × ρ(sid−>sid2) (R1) (3 Marks)

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1. π Sname(σ S2.rating<AllR.rating(S2×AllR)) (3 Marks)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| sid sname |  | S2.rating | age | AllR.rating |
| 28 | yuppy | 9 | 35.0 | 10 |
| 31 | lubber | 8 | 55.5 | 9 |
| 44 | guppy | 5 | 35.0 | 9 |
| 44 | guppy | 5 | 35.0 | 8 |
| 44 | guppy | 5 | 35.0 | 10 |

B: Write the query in relation algebra to find Natural join between S1and R1 (3 Marks)

Psid , sname, rating,age,bid,day(σ Sid.s1=Sid.R1**(S1 x ρ** sid , sname, rating,age,bid,day **(R1))**

Q3: Answer the Following Questions: (15 Marks)

1- What is the Network transparency of distributed DBMS architecture

– Location transparency: an operation on data is independent of both the location and the system where it is executed

– Naming transparency: unique name is provided for each object in the DB

2- What is the disadvantages of DDBMS?

The disadvantages of a DDBMS are that it

1. Complexity
2. Cost
3. Security
4. Integrity control more difficult
5. Lack of standards
6. Lack of experience
7. Database design more complex

3-Draw the architecture models for Distributed DBMS (DBMS implementation alternatives)



Q4 : Answer (15 marks)

**1-The main differences between centralized and distributed databases :**

1. Centralized databases store data on a single CPU bound to a single physical/geographical location. Distributed databases which manages all its different storage devices remotely, as it is not necessary for them to be kept in the same physical and/or geographical location.
2. Centralized databases are easier to maintain up to date than distributed databases, because distributed databases require additional (often manual) work to keep the data to stored .
3. If data is lost in a centralized system, retrieving it would be much harder. If, however, data is lost in a distributed system, retrieving it would be very easy, because there is always a copy of the data in a different location of the database.
4. Designing a centralized database is generally much less complex than designing a distributed database, as distributed database systems are based on a hierarchical structure.

**2- Centralized allocation And Partitioned allocation**

– Centralized allocation

∗ Consists of a single DB and DBMS stored at one site with users distributed across the network

– Partitioned allocation

∗ Database is partitioned into disjoint fragments, each fragment assigned to one site

3- Reference architecture for a DDBMS and Reference Architecture for a Federated MDBS (Explain by graph only)

Reference architecture for a DDBMS



Reference Architecture for a Federated MDBS

