

MySQL Transactions, Checkpoints, and Concurrency Control: Assignment

Question Paper

Section A: Short Answer Questions (40 Marks)

1. Transactions (10 marks)

Define a database transaction and explain the importance of the ACID properties in the context of a MySQL transaction.

2. Checkpoints (10 marks)

Describe what a checkpoint is in the context of database management and explain how MySQL handles checkpoints internally.

3. Concurrency Control (10 marks)

Explain what concurrency control is and why it is important in database systems. Provide an example of a concurrency issue that might arise without proper concurrency control.

4. Transaction States (10 marks)

Briefly describe the 'Committed' and 'Aborted' states in a transaction lifecycle.

Section B: Practical Application Questions (60 Marks)

5. Implementing Transactions in MySQL (15 marks)

Write a MySQL transaction block that updates two different tables while maintaining atomicity. Include error handling to demonstrate rollback in case of an error.

6. Checkpoint Understanding and Analysis (15 marks)

Given a scenario where a MySQL database server crashes, explain the role of checkpoints in the recovery process. How does MySQL determine what data needs to be redone or undone using checkpoints?

7. Concurrency Control Mechanisms (15 marks)

Discuss and compare two concurrency control mechanisms that MySQL uses to manage concurrent transactions.

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Provide SQL examples where possible.

8. Advanced Scenario: Concurrency and Isolation (15 marks)

Consider a scenario where two bank clerks are accessing and updating the balance of the same bank account simultaneously. Describe how MySQL would handle this situation to prevent data anomalies. Specify the isolation levels involved and their impact on transaction behavior.

Instructions:

Provide concise and clear answers to all questions.

Where applicable, support your answers with MySQL code snippets or pseudocode.

Ensure that your examples are relevant and demonstrate a clear understanding of the concepts.