42 Lecture - CS403

Important Subjective

1. **What is a transaction in a database, and why is it important?**
   Answer: A transaction in a database is a sequence of operations that are executed as a single unit of work. It is important for ensuring data consistency and integrity, especially in multi-user environments where multiple transactions may be executed simultaneously.

   What are the ACID properties of a transaction?
   Answer: The ACID properties of a transaction are Atomicity, Consistency, Isolation, and Durability. Atomicity ensures that a transaction must be all-or-nothing, leaving the database in a consistent state. Consistency ensures that the transaction must leave the database in a consistent state. Isolation ensures that the transaction must be isolated from other transactions. Durability ensures that the transaction must be durable even in the event of system failures.

   Why is atomicity an important property of a transaction?
   Answer: Atomicity is an important property of a transaction because it ensures that the transaction must complete successfully or be rolled back completely. This prevents incomplete transactions from leaving the database in an inconsistent state.

   What does isolation mean in the context of transactions?
   Answer: Isolation in the context of transactions means that the transaction must be isolated from other transactions to prevent interference and maintain data integrity.

   How can a transaction ensure data consistency?
   Answer: A transaction can ensure data consistency by making sure that all changes are made together as a single unit of work. This ensures that the database remains in a consistent state even if the transaction is interrupted or fails.

   Why is durability an important property of a transaction?
   Answer: Durability is an important property of a transaction because it ensures that the changes made by the transaction are permanently saved and can survive system failures.

   What is a rollback in a transaction, and when is it used?
   Answer: A rollback in a transaction is used when the transaction cannot be completed successfully. It means that all changes made by the transaction are undone, and the database is returned to its previous state.

   What is a commit in a transaction, and when is it used?
   Answer: A commit in a transaction is used when the transaction has been successfully completed. It means that all changes made by the transaction are permanently saved to the database.

   How can transactions be used to maintain data integrity?
   Answer: Transactions can be used to maintain data integrity by ensuring that changes to the database are made in a consistent and reliable way. This prevents incomplete transactions or

conflicting changes from leaving the database in an inconsistent state.

What are some best practices for using transactions in a database?
Answer: Best practices for using transactions in a database include ensuring that each transaction is small and focused, using the appropriate isolation level, minimizing the time that a transaction holds locks, and properly handling errors and exceptions.