Question 28

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1. Write a short essay talking about your understanding of transactions, locks and isolation levels.

In my understanding, a transaction is one or multiple operations performed, usually changing or extracting from data, on a database which is treated as an independent logical work unit. It should follow the ACID rules, which are atomicity, consistency, isolation, and durability. There are two outcomes of a transaction: committed or rolled back.

Locks and isolation levels are used to avoid concurrency issues such as dirty read and phantom reads. There are two kinds of concurrency control: optimistic and pessimistic concurrency control. Optimistic concurrency has higher risk of roll back but has low waiting times, while pessimistic control use system automatic locks, which has lower risk of roll back but may result in longer waiting times.

There are many types of locks. In case of deadlock, it is resolved automatically by committing the more expensive transaction and rolling back the other one.

There are five levels of isolations:

* + - Snapshot: optimistic concurrency control
    - Read uncommitted: the first level of isolation; pessimistic concurrency control; allows dirty read problem
    - Read committed: the first level of isolation; pessimistic concurrency control
    - Repeatable read: third level of isolation; may lead to phantom read problem
    - Serializable: highest level of isolation