

22 Lecture - CS403

Important Subjective

1. **What is physical database design, and why is it important?**

Answer: Physical database design is the process of implementing the logical database design in a physical environment. It involves making decisions about storage structures, indexing methods, file organizations, partitioning, replication, backup, and recovery strategies. It is essential to optimize database performance, ensure data availability and reliability, and meet the organization's needs.

What is the difference between a heap file and a sorted file?

Answer: A heap file is an unsorted file that can be used for inserting and retrieving records in any order. A sorted file, on the other hand, is organized based on a particular sort order, typically the primary key. It is designed for fast retrieval of data in sorted order.

What is the purpose of indexing, and what are some common indexing methods?

Answer: Indexing is used to speed up query processing by providing a quick access path to the data. Common indexing methods include B-tree index, hash index, and bitmap index. B-tree index is designed for range queries, while hash index is used for exact match queries.

What is partitioning, and what are some partitioning techniques?

Answer: Partitioning is the process of dividing large tables into smaller, more manageable pieces called partitions. Partitioning techniques include list partitioning, range partitioning, hash partitioning, and round-robin partitioning. List partitioning divides data based on a specific column value, range partitioning divides data based on ranges of values in a column, hash partitioning divides data using a hash function, and round-robin partitioning distributes data evenly across partitions.

What is replication, and what are some replication techniques?

Answer: Replication is the process of creating and maintaining multiple copies of the database. Replication techniques include snapshot replication, merge replication, transactional replication, and peer-to-peer replication. Peer-to-peer replication involves writing to all copies of the database simultaneously.

What is backup, and what are some backup strategies?

Answer: Backup is the process of creating copies of the database to protect against data loss. Backup strategies include full backup, incremental backup, differential backup, and copy backup. Full backup involves taking a complete backup of the database, while incremental backup and differential backup only backup changes since the last backup.

What is recovery, and what are some recovery strategies?

Answer: Recovery is the process of restoring a database to a previous state in case of a system failure or data loss. Recovery strategies include rollback, restart, checkpoint, and restoring from backups.

How can you monitor database performance, and what tools are available?

Answer: Database performance can be monitored using various tools such as SQL Server

Profiler, Performance Monitor, and DMVs (Dynamic Management Views). These tools provide information on query performance, resource usage, and system performance metrics.

How does hardware impact database performance?

Answer: Hardware plays a critical role in database performance. Factors such as CPU, memory, disk I/O, and network bandwidth can impact database performance. A well-configured hardware environment can improve database performance significantly.

What are some best practices for physical database design?

Answer: Some best practices for physical database design include choosing appropriate storage structures, optimizing indexing and partitioning, implementing a backup and recovery strategy, monitoring database performance, and regularly tuning the system to optimize performance.