DBMS Lab Assignment - 5

Disk-Based Record Manager

Team: FooClub

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Abstract

This project aims to design an efficient way to store records on disk. We will explore different record storage protocols being used and design a record storage protocol for our system. We intend to use disk access optimization techniques such as buffering and defragmentation. We will also use different types of indexing and hashing, as required, to process the queries efficiently. Additionally, we will test the performance and efficiency of our designed system under various workloads. Ultimately, we hope to gain valuable insights into optimising how data is stored and retrieved on disk.

Week Wise Plan

- Week 1: Implementation of Record-Storing Protocols
- Project Planning and Literature Review
  - Study fixed-length, variable-length, sequential, and heap file organisations.
  - Understand database indexing concepts (clustered, non-clustered, primary, secondary).
- Implementation and Disk Access Tracking
  - Write code to handle different storage protocols (fixed-length, variable-length).
  - Develop a basic framework for tracking disk accesses.
- Week 2: Disk Access Optimizations
- File Organization and Buffering
  - Implement how records will be stored to minimize arm movement and avoid fragmentation.
  - Design and implement a protocol for buffering systems.
- Indexing and Hashing:
  - Explore different indexing and hashing techniques to speed up data access.
  - Test query performance with and without indexes.
- Week 3: Testing and Workload Analysis
- Testing:
  - Conduct initial testing on a small database and verify the correctness of insertion, deletion, and update under different conditions.
  - Test buffering and indexing for large files.
- Workload Analysis:
  - Simulate workloads (e.g., high read/write frequency, large data sets).
  - Analyse how storage protocols and indexing methods perform under these conditions.
- Week 4: Finalization and Presentation
- Compilation and Documentation
  - Complete detailed documentation of the project.
  - A structured presentation with a detailed walkthrough showcasing all the features.
  - Final demonstration of the project.