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Vertiefungsarbeit in Informatik (3KP)
Datenbanktechnologie

Topic: A Database System's Storage Layer Implementation

Relational database systems are currently the most common systems for the management of structured data. One of the success factors of these systems is the declarative data management, i.e., a query is only a specification of how to modify data but not how to process it. This responsibility is left to the DBS. At the same time this poses major challenges to the database system itself, to find the most suitable and efficient way to store and process data.

This work focuses on the storage layer of a database system, in particular on the disk, buffer and storage managers, where the first manages the blocks on top of the operating system, the second buffers those blocks based on a specific strategy, such as most recently used and the third manages the storage of relations and indexes. The aim of the work is to implement these managers using the C-programming language.

The work is divided into the following steps:

1. Study of literature [1, 2, 3] about the internals of a database system.
2. Implementation and documentation of the file system.
3. Implementation and documentation of the buffer manager
4. Implementation and documentation of the storage manager.

The expected outcome is a report with a strong focus on the implementation aspects, small code examples might be used to illustrate the descriptions. The report should be structured as a scientific paper. At the end of the work the student should give a 10 min. presentation at one of the database technology group meetings.

The student is encouraged to develop the code and report in an incremental fashion during the working period. There will be weekly or biweekly meetings with the supervisor, where the student sends the current state of the report one day before the meeting to the supervisor.

References

[1] R. Elmasri and S. B. Navathe. *Fundamentals of Database Systems, 3rd Edition.* Addison-Wesley-Longman, 2000.

[2] H. Garcia-Molina, J. D. Ullman, and J. Widom. *Database systems - the complete book (2. ed.).* Pearson Education, 2009.

[3] J. M. Hellerstein and M. Stonebraker. *Readings in Database Systems, 4th Edition.* MIT Press, 2005.

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