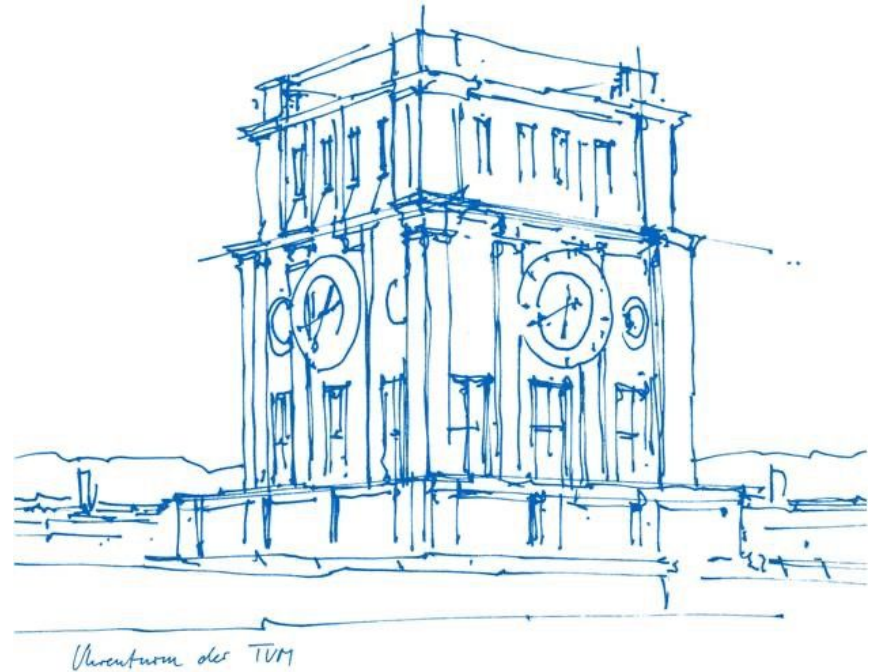


Database Systems on Modern CPU Architectures

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Chair for Database Systems



Lecture Overview

Database Systems on Modern CPU Architectures

Lecture Overview

Database Systems on Modern CPU Architectures

Database Systems **and** Modern CPU Architectures

Lecture Overview

Implementation of Database Systems

Lecture Overview

Implementation of Database Systems

(on Modern CPU Architectures)

Lecture Overview

Implementation of Database Systems

1. The Classical

Architecture

- 1.1. Storage
- 1.2. Access paths
- 1.3. Transactions &
recovery

Lecture Overview

Implementation of Database Systems

1. The Classical Architecture

- 1.1. Storage
- 1.2. Access paths
- 1.3. Transactions &
recovery

2. Efficient Query Processing

- 2.1. Set oriented query
processing
- 2.2. Algebraic operators
- 2.3. Code generation

Lecture Overview

Implementation of Database Systems

1. The Classical Architecture
 - 1.1. Storage
 - 1.2. Access paths
 - 1.3. Transactions & recovery
2. Efficient Query Processing
 - 2.1. Set oriented query processing
 - 2.2. Algebraic operators
 - 2.3. Code generation
3. Designing a DBMS for Modern Hardware
 - 3.1. Re-designing storage
 - 3.2. Optimizing cache locality
 - 3.3. Main memory databases

Lecture Overview

Implementation of Database Systems

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recovery



External
Sorting

Lecture Overview

Implementation of Database Systems

1. The Classical Architecture

- 1.1. Storage
- 1.2. Access paths
- 1.3. Transactions &
recovery

External
Sorting

The diagram consists of two blue speech bubbles. The top bubble is connected to the 'Storage' item in the list above. The bottom bubble is also connected to the 'Storage' item. The bubbles contain the text 'External Sorting' and 'Buffer Manager' respectively.

Buffer
Manager

Lecture Overview

Implementation of Database Systems

1. The Classical Architecture

1.1. Storage

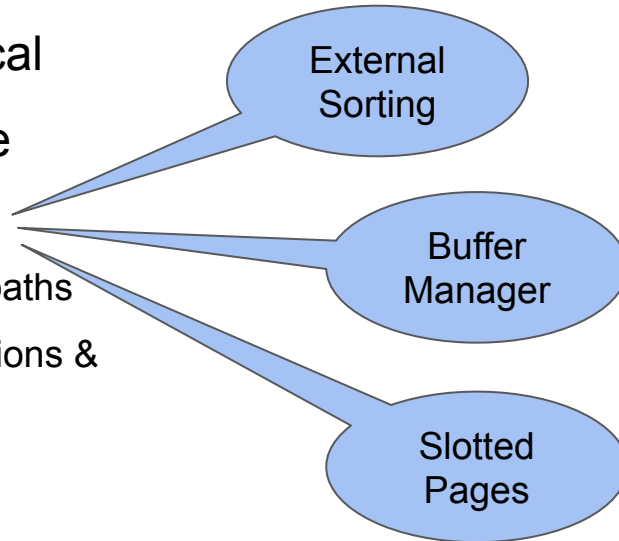
1.2. Access paths

1.3. Transactions &
recovery

External
Sorting

Buffer
Manager

Slotted
Pages

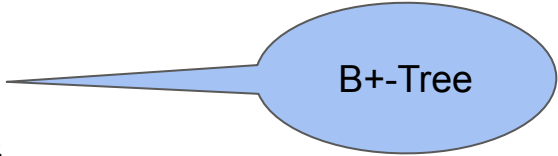


Lecture Overview

Implementation of Database Systems

1. The Classical Architecture

- 1.1. Storage
- 1.2. Access paths
- 1.3. Transactions &
recovery



B+-Tree

Lecture Overview

Implementation of Database Systems

1. The Classical Architecture

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Lecture Overview

Implementation of Database Systems

1. The Classical Architecture

- 1.1. Storage
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recovery

2. Efficient Query Processing

- 2.1. Set oriented query
processing
- 2.2. Algebraic operators
- 2.3. Code generation

3. Designing a DBMS for Modern Hardware

- 3.1. Re-designing storage
- 3.2. Optimizing cache
locality
- 3.3. Main memory
databases

Exercises

- Sessions: Tuesdays 15:30 – 17:00
- Programming assignments every 2 weeks, starting today
- Announcements on website & **Mattermost**
- Implementation assignment tasks on **GitLab**
 - Submit via git
 - Due two weeks later, Tuesdays @15:30
- No Teams. We will check for copied code!
- Bonus System:
 - .3/.4 grade bonus on final exam ($\geq 5\%$ exercises passed)
 - Passed: Green GitLab **CI** (build, lint, test)
 - Fail: CI pipeline failed, skipped/disabled tests

GitLab & Mattermost

- Register: <https://gitlab.db.in.tum.de/>
- Join Group: <https://gitlab.db.in.tum.de/moderndbs-2024>
- Fork first task External Sort
- Clone & Push your solution
- Announcements / Questions:
<https://mattermost.db.in.tum.de/moderndbs24>