A Few Words About Me

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1996–2001  Diploma in Physics, U Konstanz
2001–2005  Research assistant, DBIS Group, U Konstanz
2005–2007  Research assistant, Database Group, TU München
   Oct 2006  PhD in Computer Science (XML query processing)
2007–2008  Postdoc, IBM T. J. Watson Research Center, NY, USA
2008–2013  Senior Researcher, Systems Group, ETH Zurich
since 4/2013  Full Professor, DBIS Group, TU Dortmund University

Topic: Database systems on modern computing hardware
Example: Library of Congress (http://www.loc.gov/)

In 2018:

- **168.3 million items** held
  - 39.6 million books
    (and other print materials)
  - 72.5 million manuscripts
  - recordings, maps, sheet music, ...

- **15,000 items** received per day
  (≈ 10,000 are added to collection)

- 1.9 million on-site visitors

- website: 114 million visits,
  498 million page views
Example: Amadeus (https://amadeus.com/)

In 2019:

- 645+ million bookings
- 1.9+ billion passengers
- each booking preceded by many requests for connections and prices
In this course you’ll learn how to

model, store, and process data

data in an efficient and scalable manner.

We’ll look at

- good ways to model your data from an application perspective,
- the role of database systems,
- how you access and query them,
- how multiple users can access a database at the same time,
- how a database can guarantee consistency and durability, and
- what a database does to find your data quickly.
Course Organization

Lecture:

- Wednesdays, 16–18h, Room H.001, Seminarraumgebäude (SRG)
  Lecture videos will be provided through Moodle.

  Please visit this website regularly. We will frequently post new information during the semester.

- Please make sure you register for this course in Moodle.
Exercises / Support:

- Organizer: **Thomas Lindemann**  
  (thomas.lindemann@cs.tu-dortmund.de)

- Online exercise groups
  → See course website for information on how to register.

- Weekly assignments
  → Voluntary (no “Studienleistung”)
  → But you’ll get **feedback** if you **hand them in**.

- We’re there to help you
  → “HelpDesk” chat via https://riot.fachschaften.org/
  → Online forum via Moodle
  → Don’t be shy, **email your tutor**.
Surviving the Exam

There will be a **written exam** (60 min) at the end of the semester.
- dates: **July 22, 2020**; 2nd date: **September 23, 2020**
- **material allowed**: one sheet of A4 paper, **handwritten**

**Note:** The situation around Corona is still highly dynamic. So this information might change at any time.

Best preparation for the exam? Do the exercises!
- Do exercises **before** they are discussed in the group.
- **Hand in** your exercises to get feedback.

“I don’t understand this one thing. I need help!”
- Don’t hesitate to ask me or your TA.
- Use the communication channels on the previous slide.
I will post all lecture slides on the course web site;¹ videos will be available via Moodle.

Good text books:


... and many more (this is a standard course, taught world-wide).

¹Except parts that I mark with ☐ on the slide.
I strongly recommend you exercise the material of this course on a real database system.

Examples:

  - Used in the exercises for this course.
  - More details in the exercise groups.

  - Full-featured, industry-strength database
  - Available for free (Win/Linux)

- **PostgreSQL** ([http://www.postgresql.org/](http://www.postgresql.org/))
  - Very powerful and feature-rich open source database
1. Introduction (this part)
2. Overview of database systems
3. Database design (3-tier architecture, ER diagrams)
4. The relational model (relational algebra, relational calculus)
5. SQL (Structured Query Language)
6. Normal forms
7. Transaction management (ACID properties, serializability)
8. Semi-structured data (XML)
9. Database implementation (memory hierarchy, B-trees)