Technische Hochschule Rosenheim

Chapter 0 – Organisational info

Databases lectures

Dr Kai Höfig

Organisational info

- Structure:
  - 4 hours of lectures plus
  - 2 hours of exercises per week
- Examination:
  - Written examination, 90 minutes
  - Permitted resources or aids: NONE
- The slides are not a complete script
  Additional personal notes and literature studies (including MS SQL Server online documentation) as well as participation in the exercises are required for the examination
- Lecture materials and exercises in the Learning Campus (LC) and/or Git

Content/learning objectives of the lectures

- Specialist knowledge
  - Knowledge of the key concepts of database systems
  - Data models, especially the relational model
  - Basics of relational databases: relational algebra and relational calculus
  - Database design: technical requirements, ER models, relational design
  - Query languages, especially the language SQL
    - interactively in the database system and in applications
  - Further advanced concepts of database management systems
    - Transactions
    - Views
    - Triggers
    - Indexes
- Methodical skills
  - Understand and implement technical requirements in a database design
  - Problem definition and solution by means of a formally correct approach

Exercises on Thursdays

- Group INF 1 (DE) on Wednesdays from 11:45-13:15 in B0.11
  (can be from 11:30-13:00)
- Group INF 2 (DE) on Wednesdays from 13:45-15:15 in B0.11
- Group INF 3 (DE) on Wednesdays from 15:30-17:00 in B0.11
- Group AAI (ENG) on Tuesdays from 13:45-15:15 in A0.03
  (can be from 13:30-15:00)
- Selection of the exercise group in the Learning Campus from Monday 05.10.2022 from 13:20 for a week
- Don't let any exercise group die off!
- Participation in two exercise groups is possible (e.g. 2nd and 3rd)

Practice exercises and preparation for the written examination

- You need an **operational SQL environment** - further information on this can be found in the LC.
- To successfully participate in the exercises, you must **prepare for them**. If you only start the exercise sheet in the exercise session, you will never get beyond the simple tasks at the beginning and will be badly prepared for the challenging written examination.
- The written examination is based on the exercises. If you can solve all types of tasks from the exercises **by yourself** without difficulty after discussing the model solution, you will be well prepared to achieve a very good grade.

Do not learn this subject for the written examination

- Databases and especially relational databases are the cornerstones of computer science including all the key concepts involved (relational data, object-relational mapping, transactions, locking protocols, ER models, the language SQL…)
- Cooking recipes are a good way to master complete types of tasks successfully. But you must also understand what's behind it: master whole groups of cooking recipes.

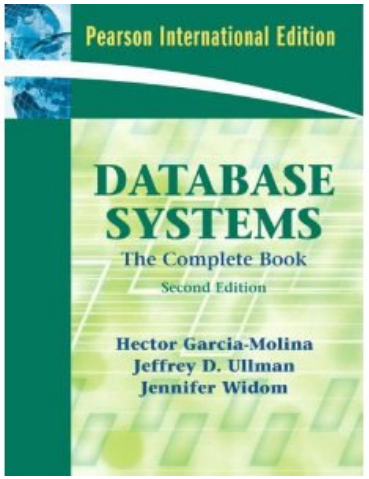
Structure of the lectures

1) What are databases?
2) Relational databases
3) Database design process
4) Relational database design
5) Conceptual design
6) Advanced SQL
7) Relational algebra and tuple relational calculus
8) Domain relational calculus and QBE
9) Transactions, integrity and triggers
10) Views and access control
11) SQL/PSM
12) Application programming
13) File organisation and indexes
14) Outlook

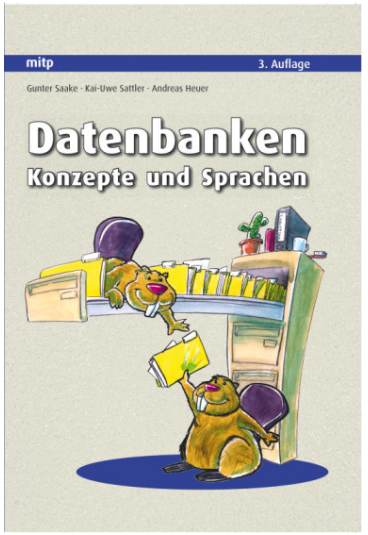
Literature

Book for the lectures

- Hector Garcia-Molina, Jeffrey D. Ullmann, Jennifer Widom:
  Database Systems – The Complete Book
  2nd edition, 2008, ISBN 0131354280



- G. Saake, K.-U. Sattler, A. Heuer
  Datenbanken: Konzepte und Sprachen
  (the “beaver book”)
  3rd edition, 2007, ISBN 3826616642
  4th edition, 2010, ISBN 3826690575
  (Comment: editions almost identical)



Further literature

- In German
  - Alfons Kemper, André Eickler:
    Datenbanksysteme – Eine Einführung (7th edition, 2009)
- In English
  - Abraham Silberschatz, Henry Korth:
    Database System Concepts (6th edition, 2010)
- Theory in German
  - P.Kandzia, H.-J. Klein
    Theoretische Grundlagen relationaler Datenbanksysteme
    BI Wissenschaftsverlag 1993, Computer Science Series, Volume 79
- … and many more.

Acknowledgements

- Some of the slides are based on documents developed by the authors Heuer, Saake & Sattler for their book as well as Prof. M. Breunig's lecture materials.
- Also, slides and exercises by D. Petkovic, S. Conrad and H.-P. Kriegel were used.