TTOW0110
Advanced Databases
(7 ECTS)

Course introduction

Jouni Huotari

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http://ttow0110.pages.labranet.jamk.fi/

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Objectives / Learning Outcomes

You

- understand **database design, data modeling, and database administration** and as parts of the development of information systems

- can make a **normalized relational database (=> logical and physical data model)** based on a **conceptual data model** with a **CASE** tool

- master the basic **database administration tasks**: you are able to

  – specify users and their access rights

  – monitor and optimize databases

  – document a plan for database management

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Items of Assessment

- Database project: 40 points

- Examination(s): 30 points

- Exercises and assignments: 20 points

- Learning report: 10 points

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Grading scale (0-5)

Points	Grade	Explanation
0 – 24.9	0	☹
25 – 39.9	S or 1	The student can design and implement a normalized database (comprising of approximately 10 tables) and perform the most typical database administrative tasks such as creating a database, importing data to it, giving access rights, and monitoring the performance.
40 – 54.9	2	😐
55 – 69.9	3	Database has been designed and documented rather comprehensively and nearly faultlessly, good knowledge of modeling and management
70 – 84.9	4	☺
85 –	5	The student 1) provides detailed, clear, error-free, and complete documentation about database design and database management; 2) carries out database assignments and exams without major flaws or errors in database design and management.

These, including the final presentation, show 1) ability to document and argument design decisions understandably, 2) knowledge and understanding of concepts, and 3) practical skills of database design and management. |

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Database project

- Recommended size of the group: 2-4 persons

- Choose a topic which solves a real problem

- Size of the database: ~ 10 concepts (and when normalized to 3rd normal form => ~ 20 tables)

- Prototype with the DBMS you have chosen containing GUI for SCRUD (search, create, read, update, and delete data)

- Database management plan for
  - backups
  - distribution and using different disks or cloud
  - optimization (database tuning)
  - user/group rights management
  - other tasks that belong to DBA

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Examination(s)

- 1st part is an applied modeling task: design a database according to a given requirements specification by using a CASE tool

- 2nd part test your skills of database management

- You can use all the learning material including your learning diary, but the exam(s) must be done independently

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Exercises and assignments

- 10 quizzes: 10 points
  - located in Moodle
  - you can also answer them by using your learning diary
  - Note: you can try to answer each quiz twice (but opening the quiz counts as one)

- 10 exercises: 10 points
  - 5 modelling exercises
  - 5 database management exercises
  - Document your learnings and answers to your learning diary

- The deadlines are shown in the course's home page
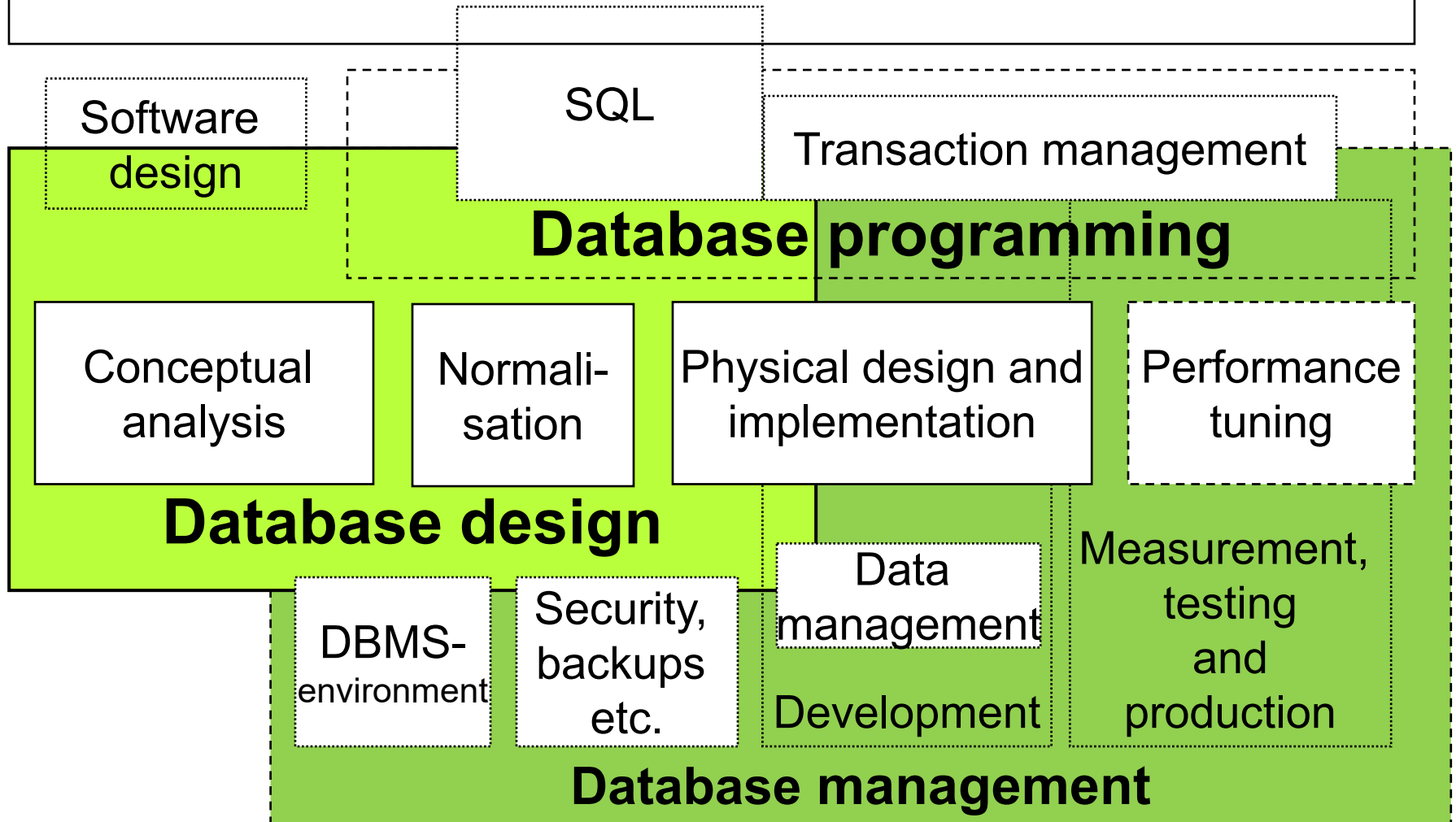
Learning report

- In the beginning: your background, personal goals etc.

- Every week: what you have learned etc.

- In the end: how did you achieve your goals, what things to improve etc.

- Return a (link of) the report to the learning environment

- The format is free; you can use my template

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Learning material

- Slides and other web-based material
- Janet / Finna, e.g.
  - Database modeling and design (Toby J. Teorey)
  - Relational Database Design and Implementation (Jan L. Harrington)
  - Note: Database management books are DBMS specific => no recommendations; choose one that suits you

- Connolly & Begg: Database Systems (in the library)
- Tietokantojen suunnittelu & indeksointi (Hovi, Huotari, Lahdenmäki, Docendo) part I (DB design: chapters 1-9; DB management: mainly chapters 10-12)

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Basics of Databases

Software design

SQL

Transaction management

Database programming

Conceptual analysis

Normali-sation

Physical design and implementation

Performance tuning

Database design

DBMS-environment

Security, backups etc.

Data management

Measurement, testing and production

Development

Database management

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Enterprise applications module

- TTOW0100 Advanced Databases   7 ECTS
- TTOW0130 Service-oriented applications   8 ECTS

  Total   15 ECTS

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Practical issues

- Online lectures
  - We begin with a short summary of the previous week's topic
    - Are there any questions?
    - Did you apply the learnings to your group work => are there any problems?
  - Flipped learning:
    - You listen the recorded video about the new topic before attending the lecture
    - During the classroom session, we discuss the most essential things in order to deepen understanding
- After a coffee break
  - Instructions for the problem-solving assignment => individual or group work
  - One possible answer can be found from Moodle (files + video)
  - Introduction of the new topic
- Individual and group guidance (through Teams, code wf2yfk6 to join)

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Questions?

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