Database Design I – 1DL301
5c (33%)
periods 1 and 2

Lecturer:

Georgios Fakas

georgios.fakas@it.uu.se
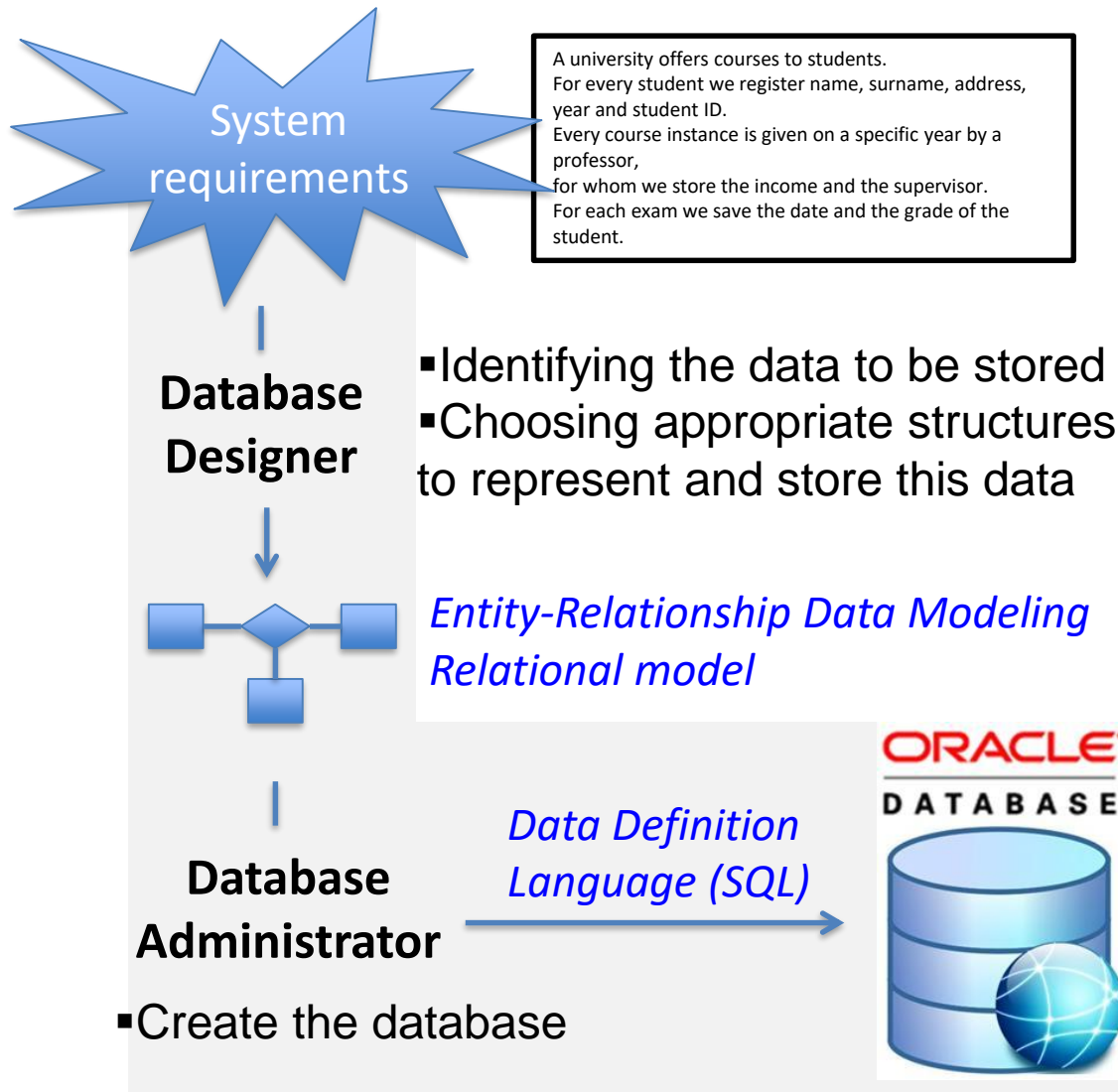
Tel. 0729999130

Data

- A fundamental asset in nearly all organizations, vital to enable basic operations.

- Think of Uppsala University.

- In this course, we focus on the most widespread type of systems used to manage large amounts of data:

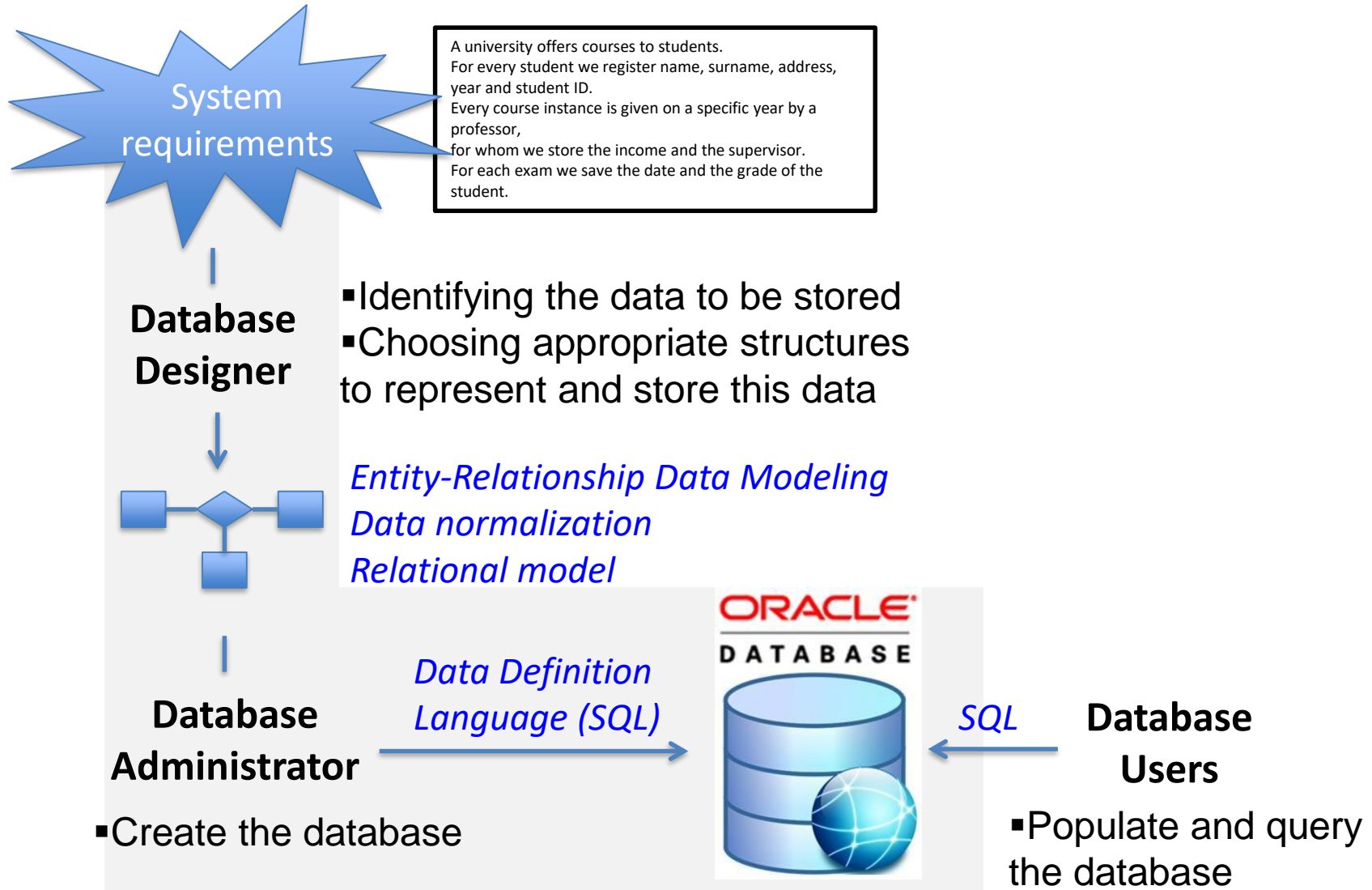- Relational Database Management Systems (RDBMSs).

RDBMSs in real life

- E-Commerce (Ebay, Amazon, …)
- Banks, credit cards, …
- Hospitals, …
- ERP systems, CRM, business intelligence, …
- Scientific databases (EPDB, …)
- Application software (Firefox, IPhones, …)
- …

Part I: from requirements to the database

System requirements

A university offers courses to students.
For every student we register name, surname, address, year and student ID.
Every course instance is given on a specific year by a professor,
for whom we store the income and the supervisor.
For each exam we save the date and the grade of the student.

Database Designer

▪Identifying the data to be stored
▪Choosing appropriate structures to represent and store this data

Entity-Relationship Data Modeling
Relational model

Database Administrator

Data Definition Language (SQL)

▪Create the database

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DATABASE

Part II: SQL as a query language

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- Choosing appropriate structures to represent and store this data

Entity-Relationship Data Modeling
Data normalization
Relational model

Database Administrator

Data Definition Language (SQL)

- Create the database

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SQL

Database Users
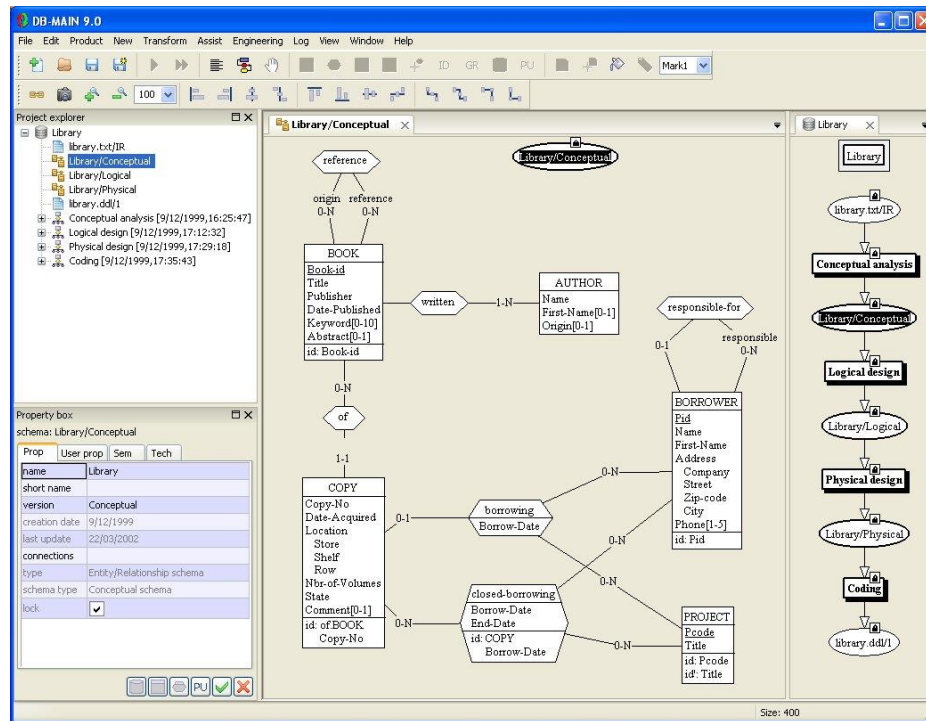
- Populate and query the database

Part III

- Physical database design and tuning.
  – Focus on efficiency.
- Security.
- Database programming.
  – SQL + Java.
  – Transactions.

Project- Milestone I: database design

- Realistic example (a trading database).
- Using a database modeling tool (DB-Main).
- Emphasis on modeling, not on technology.

Project Milestone II: SQL queries

- Access, manage the database on MySQL.
- Using MySQL Workbench.

Project Milestone III: Normalisation

- Improve database design by applying normalisation

Examination

- Project consisting of:
  - 3 Milestones.
- Written exam.