1 Motivation

The motivation of this course is to put together theory and practice of database and knowledge base systems. The main content includes a formal approach for the underlying existing technology from the point of view of logical expressiveness and computational complexity. New and recent database models and systems are discussed from theory to practical issues.

2 Goal of the course

The main goal is to introduce the student to the logical and computational foundations of database systems.

3 Sylabus

The course in divided in two parts:

Classical part: relational database model

1. Revision and formalization of relational databases. Limits of the relational data model;
2. Relational query languages; DataLog and recursion;
4. Computational complexity and expressiveness of database query languages;

New approaches for database logical models

1. XML-based models, Monadic Second-Order Logic, XPath and XQuery;
2. RDF-based knowledge bases;
3. Decidable Fragments of First-Order logic, Description Logic, OWL dialects;
4. NoSQL and NewSQL databases;
4 Evaluation

The evaluation will be based on homework assignments (70 %) and a research manuscript + seminar (30%).

5 Supporting material

Lecture notes, slides and articles. Referenced books are freely available online. More details at a wiki-based web page (available from August 7th on)

References


