

# **Computational Logic**

**— Logical Foundations of Databases —**

**General Information**

**Free University of Bozen-Bolzano, 2010**

**Werner Nutt**

## Learning Outcomes

Students will be able to

- explain the theoretical concepts underlying database query languages and the methods to evaluate queries
- compare query languages with regard to their expressivity
- analyze the tradeoffs in the design of database systems between expressivity of languages and their computational cost . . .

and maybe more importantly will improve their skills in

- making precise formal statements, guessing whether they are right wrong, proving or disproving them.

## Provisional Syllabus

- Relational Query Languages: conjunctive queries, equivalent fragments of SQL and relational algebra, mappings between relational algebra and relational calculus
- Query Processing and Optimization: algebraic optimization (short), containment and equivalence of conjunctive queries, conjunctive query optimization
- Datalog and Recursion: plain datalog, evaluation mechanisms, datalog with negation
- (Possibly, a glimpse at:) Incomplete Information, Information Integration

## Teaching Material

- Slides (essentially by Thomas Eiter, Leonid Libkin + others)

The slides will be published on the course website (link from my home page).

- Books:

- S. Abiteboul, R. Hull, and V. Vianu. *Foundations of Databases*, Addison-Wesley, 1995.

Most of the material follows this book, which is available on the Web

- H. Garcia-Molina, J. D. Ullman, and J. Widom. *Database Systems – The Complete Book*, Prentice Hall, 2002.

Can be read as complementary material

## Coursework

- Problems will be distributed every week during lectures
- Students work in groups of 2
- There are two weeks to finish a set of problems
- Lab marks will be based on solutions submitted.

For students who do submit exercises, the final mark will be based on both the exam mark and the exercise mark (weighted average of the exam mark (70%) and the exercise mark (30%)).

If this average is greater than the exam mark, the average will be the final mark, otherwise, it's the exam mark.

## Office Hours

Please, make an appointment before coming. Thus you will avoid waiting.

- Office: Faculty Building, Dominikanerplatz 3, Office 209
- Time: to be agreed in the first lecture
- Email: [nutt@inf.unibz.it](mailto:nutt@inf.unibz.it)