SIF8015 Logic

Plan for today's lecture:

MM:

- Course information
- Introduction to the course
- Course content

PKL:

- Informal Statement Calculus

Course info

•Web: http://www.idi.ntnu.no/~logic

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•Course stuff

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Course info

- Lectures: Tuesdays (12-14) and Thursdays (12-14, R1)
- Exercises: Wednesdays (17-18, F3) and from October 22, also Tuesdays (12-14, F3)
- Pensum:

  A. G. Hamilton *Logic for Mathematicians* Cambridge Univ. Press, 1990, ISBN 0-521-36865-0 ss. 1-104

  M. Huth et. Al *Logic in Computer Science* Cambridge Univ. Press, 1999, ISBN 0-521-65602-8 ss. 6-37,148-195,261-302

  U. Nilsson et. Al *Logic, Programming and Prolog* Online, Bare kap. 1-3!

  M. Matskin et. Al *Strategies of Structural Synthesis of Programs and its ext.* Online
- Exam: 3. Desember 2002, skriftlig
- Reference group

Introduction to the Logic course

- Ancient Greeks – logic as a formalization of deduction

  A syllogism rule:

  1. All men are mortal
  2. X is a man
  3. Therefore, X is mortal

Introduction to the Logic course

- Logic should be used carefully.
  1. Some cars rattle
  2. My car is some car
  3. Therefore, my car rattles
- Even careful use of logic may lead to unexpected results:

  "This statement is false"

Introduction to the Logic course

- XIX-th century: Mathematicians revived the study of logic in order to formalize the concept of mathematical proof
- Mathematical logic:
  - Defines systems of logic appropriate for studying mathematics
  - Develops the mathematical theory of these systems

Introduction to the Logic course

- Program verification
- Protocol verification
- Program synthesis
- Digital circuits
- Knowledge management
- …

Introduction to the Logic course

- Propositional logics
  - Syntax, semantics
  - Structural Program Synthesis
  - Computational Tree logic
- Predicate calculus logics
  - Syntax, semantics
  - Logic programming: Prolog
- Modal logics
  - Syntax, semantics
  - Knowledge management and agents

Introduction to the Logic course

- Some other logics which are not a part of the course:
  - Multi-valued logics,
  - Approximate logics,
  - Linear logic
  - …