AAA528: Computational Logic

Lecture 0 — Course Overview

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Basic Information

Instructor: Hakjoo Oh

- **Position:** Associate professor in CS, Korea University
- **Expertise:** Software Analysis, Programming Languages
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- **Office Hours:** 1:00pm–3:00pm Mondays and Wednesdays (by appointment)

About This Course

- *Computational logic*
  - Logic for reasoning about program behavior
  - Why study logic?
    - ★ Logic is the mathematical basis of software
    - ★ Just as calculus is the basis of science and engineering
    - ★ Used for designing, implementing, and verifying software
- *Program verification*
  - Techniques for proving that programs meet their specifications

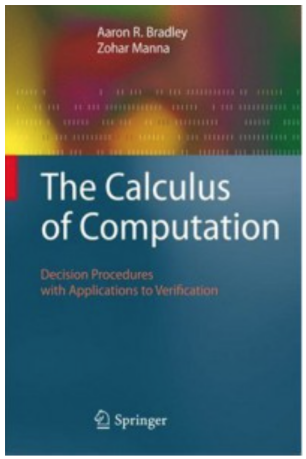
Topics

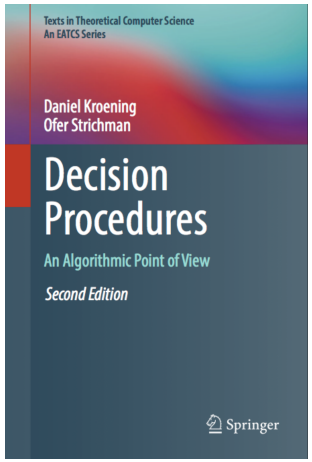
Computational logic and its application to program verification.

- **Part 1 (Foundations)**:
  - Propositional logic
  - First-order logic
  - First-order theories
  - Program verification
- **Part 2 (Decision Procedures)**:
  - SAT/SMT solvers
  - Linear Arithmetic
  - Equalities and Data Structures
  - Combining Decision Procedures

Course Materials

- Aaron R. Bradley and Zohar Manna. The Calculus of Computation.
- Daniel Kroening and Ofer Strichman. Decision Procedures.





- Materials from related courses:
  - Computer-Aided Reasoning for Software. Univ. of Washington
    `https://courses.cs.washington.edu/courses/cse507/17wi/`
  - Automated Logical Reasoning. Univ. of Texas at Austin
    `http://www.cs.utexas.edu/~isil/cs389L/`

Grading

- Quiz & Homework – 40%
- Mid/Final exams – 60%