

CS:4980 Topics in Computer Science II  
Introduction to Automated Reasoning

Course Introduction

Cesare Tinelli

Spring 2024



# Credits

These slides are based on slides originally developed by **Cesare Tinelli** at the University of Iowa and by **Clark Barrett, Caroline Trippel, and Andrew (Haoze) Wu** at Stanford University. Adapted by permission.

# Learning objectives

Through active engagement and completion of course activities, you will be able to:

- Understand the **syntax**, **semantics**, and **properties** of different logical languages for encoding different decision problems
- Understand and prove properties about popular automated reasoning methods and procedures
- Get hands-on experience in using off-the-shelf **SAT/SMT solvers**
- Understand the roles of automated reasoning in real-world applications such **model checking**, **symbolic execution**, and **synthesis**
- Get exposure to formal methods literature and engage in formal methods research

# Instructors

Professor



**Cesare Tinelli**

Teaching Assistant



**Kartik Sabharwal**

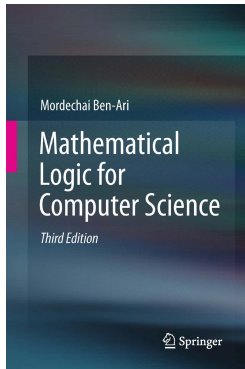
# Assessments

- In-class participation
  - We'll use ICON for in-class *quizzes*
  - We'll use Piazza for discussions
- Four homework assignments
  - Writing components and programming components
  - Submitted on ICON
- Two take-home midterm exams
  - **24 hour period** to take exam
  - Completed on your own

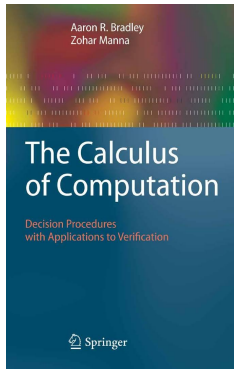
# Assessments (cont.)

- Final project
  - Done **in teams** of 2–3 people
  - **Option 1:** Implement a decision procedure and an optimization of it
  - **Option 2:** Investigate a new AR-related research problem
  - Deliverables: **project proposal**, **final report**, and code/proof **artifact**

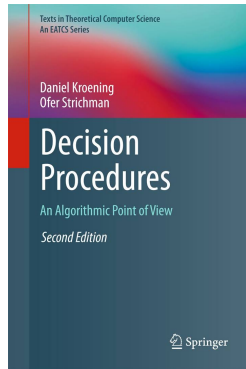
# Textbooks



ML



CC



DP

- All freely available electronically through Ulowa library (see course website)
- Please complete the assigned readings (on course website) before the lecture!

# Other Course Details

- Course website:  
<https://homepage.cs.uiowa.edu/~tinelli/classes/4980/Spring24>
- All slides and readings on the course website
- All assignment materials accessible via ICON
- All announcements via Piazza