UvA

Multi-Agent Systems

Welcome

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Who are we?

Mina Young Pedersen
Lecturer

Louise Wilk
Teaching Assistant

Who are you?

Lectures

- **Format:**
    - In-person, on campus, “2 hours” each
    - 45 min + 15 min break + 45 min
- **Schedule:**
    - 14 lectures, 2 per week for 7 weeks
        - 1. Thursdays 09:00-10:45 in SP G4.15
        - 2. Fridays 13:00-14:45 in SP G4.15
        - Exception: **This week, Friday 11:00-12:45 in SP G0.10-G0.12** (Open Campus Dag)

Lectures

- **First lecture:**
    - October 30
- **Last lecture:**
    - December 12
- **Exam:**
    - December 16, 09:00-12:00
- **Resit:**
    - January 29, 15:00-18:00

Check DATANOSE and Canvas for updated info!

Tutorials

- **Format:**
    - In-person, on campus, “2 hours” each
    - Two groups, A and B
- **Schedule:**
    - 7 lectures, 1 per week (per group) for 7 weeks
        - A: Thursdays 11:00-12:45 in SP A1.11
        - B. Thursdays 13:00-14:45 in SP G2.13

Homeworks

- **Format:**
    - Typeset nicely: use LaTeX (do not handwrite!)
    - Submit as pdfs via Canvas
    - You can submit alone or in pairs
        - Submit only one document, clearly authored
        - Always explain your solutions
- **Posted:**
    - Friday afternoon (after the lecture)
- **Due:**
    - (next) Friday, by 18:00

Evaluation

- **Grading scheme:**
    - From 10 (best) to 1 (worst), as per Dutch system
- **Passing grade:**
    - 6 (six)
- **Additional requirement:**
    - Have to get at least 5.5 for both average of homework assignments + final exam
- **Final grade composition:**
    - 50% from average of weekly homework assignments
    - 50% from final exam
        - There is a resit exam (but no resit for homework)

Course material

- **Slides!** (will be posted on Canvas after the lectures)
- Complementary material:
    - Yoav Shoham & Kevin Leyton-Brown: *Multiagent Systems: Algorithmic, Game-Theoretic, and Logical Foundations*. Cambridge University Press, 2008. https://www.masfoundations.org/download.html
    - Johan van Benthem: *Modal Logic for Open Minds*. Center for the Study of Language and Information, 2010.
    - Michael Huth & Mark Ryan: *Logic in Computer Science.* Cambridge University Press, 2004.
- Other complementary material: papers, tutorial exercises, homework assignments

What are Multi-Agent Systems

- There is no standard definition
- Systems of **multiple autonomous agents**, which may in one way or another **interact** with each other
- Sometimes regarded as a subfield of computer science
- Other way to think of it: interdisciplinary field spanning computer science, mathematics, and philosophy
- Area of research in AI

Topics in This Course

- **Game theory**
    - Non-cooperative game theory
        - Games in normal form and extensive form
        - Solution concepts
- **Voting theory**
    - Ways to combine votes (voting rules)
    - Properties of voting rules
    - Arrow’s Theorem

Topics in This Course

- **Auctions**
    - Different types of auctions
    - Strategies
- **Logics for multi-agent systems**
    - Logics for reasoning about preferences
    - Relationship between modal logic and games
    - (Temporal) logics for cooperating agents

Before we start: Quick survey on modal logic background!