Foundations of Artificial Intelligence

0. Organizational Matters

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University of Basel

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0.1 People

Teaching Staff

Lecturers

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Teaching Staff

Tutors

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Students

prerequisites:

- algorithms and data structures
- basic mathematical concepts
  (formal proofs; sets, functions, relations, graphs)
- complexity theory
- programming skills (mainly for exercises)

0.2 Format

Structure Overview

Foundations of AI week structure:

- Monday: release of exercise sheet
- Monday and Wednesday: lecture
- Wednesday: exercise session
- Sunday: exercise sheet due
- exceptions due to holidays

Time & Place

Lectures

- Mon 16:15–18:00 in Biozentrum, lecture hall U1.141
- Wed 14:15–16:00 in Biozentrum, lecture hall U1.101

Exercise Sessions

- Wed 16:15–18:00 in Biozentrum, SR U1.193 (English)
- Wed 16:15–18:00 in Biozentrum, SR U1.195 (German)

first exercise session: February 22 (this week)

Exercises

exercise sheets (homework assignments):

- mostly theoretical exercises
- occasional programming exercises

exercise sessions:

- initial part:
  - discuss common mistakes in previous exercise sheet
  - answer questions on previous exercise sheet
- main part:
  - we support you solving the current exercise sheet
  - we answer your questions
  - we assist you comprehend the course content

Theoretical Exercises

theoretical exercises:

- exercises on course homepage every Monday
- covers material of that week (Monday and Wednesday)
- due Sunday of the same week (23:59) via ADAM
- solved in groups of at most two ($2 = 2$)
- support in exercise session of current week
- discussed in exercise session of following week

Programming Exercises

programming exercises (project):

- project with 3–4 parts over the duration of the semester
- integrated into the exercise sheets (no special treatment)
- solved in groups of at most two ($2 < 3$)
- implemented in Java; need working Linux system for some
- solutions that obviously do not work: 0 marks

Remote Participation

- course is taught in person and not optimized for remote participation
- remote participation in lecture possible but restricted to students that have good reasons
- request zoom credentials via email sufficiently before lecture
- exercise session: no remote participation

0.3 Assessment

Course Material

course material that is relevant for the exam:

- slides
- content of lecture
- exercise sheets

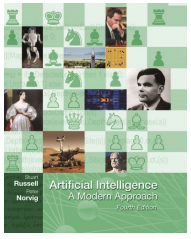
additional (optional) course material:

- textbook
- bonus material

Textbook

Artificial Intelligence: A Modern Approach
by Stuart Russell and Peter Norvig
(4th edition, Global edition)

- covers large parts of the course (and much more), but not everything



Exam

- written exam on Wed, July 05
  - 14:00-16:00
  - 105 minutes for working on the exam
  - location Biozentrum, lecture hall U1.131
- 8 ECTS credits
- admission to exam: 50% of the exercise marks
- class participation not required but highly recommended
- no repeat exam

Plagiarism

Plagiarism (Wikipedia)

Plagiarism is the "wrongful appropriation" and "stealing and publication" of another author's "language, thoughts, ideas, or expressions" and the representation of them as one's own original work.

consequences:

- 0 marks for the exercise sheet (first time)
- exclusion from exam (second time)

if in doubt: check with us what is (and isn't) OK before submitting

exercises too difficult? Join the exercise session!

0.4 Tools

Course Homepage and Enrolment

Course Homepage

`https://dmi.unibas.ch/de/studium/computer-science-informatik/lehrangebot-fs23/lecture-foundations-of-artificial-intelligence-1/`

- course information
- slides
- exercise sheets and materials
- bonus materials (not relevant for the exam)
- link to ADAM workspace

enrolment:

- `https://services.unibas.ch/`

Communication Channels

Communication Channels

- lectures and exercise sessions
- ADAM workspace (linked from course homepage)
  - link to Discord server
  - forum for Q&A and official announcements
- Discord server (linked from ADAM workspace)
  - opportunity for Q&A and informal interactions
- contact us by email
- meet us in person (by arrangement)
- meet us on Zoom (by arrangement)

0.5 About this Course

Classical AI Curriculum

"Classical" AI Curriculum

1. introduction
2. rational agents
3. uninformed search
4. informed search
5. constraint satisfaction
6. board games
7. propositional logic
8. predicate logic
9. modeling with logic
10. classical planning
11. probabilistic reasoning
12. decisions under uncertainty
13. acting under uncertainty
14. machine learning
15. deep learning
16. reinforcement learning

$\rightsquigarrow$ wide coverage, but somewhat superficial

Our AI Curriculum

Our AI Curriculum

1. introduction
2. rational agents
3. uninformed search
4. informed search
5. constraint satisfaction
6. board games
7. propositional logic
8. ~~predicate logic~~
9. ~~modeling with logic~~
10. classical planning
11. ~~probabilistic reasoning~~
12. ~~decisions under uncertainty~~
13. acting under uncertainty
14. ~~machine learning~~
15. ~~deep learning~~
16. ~~reinforcement learning~~

Topic Selection

guidelines for topic selection:

- fewer topics, more depth
- more emphasis on programming projects
- connections between topics
- avoiding overlap with other courses
  - Pattern Recognition (B.Sc.)
  - Machine Learning (M.Sc.)
- focus on algorithmic core of model-based AI

Under Construction...

- A course is never "done".
- We are always happy about feedback, corrections and suggestions!