DD2380
Artificial Intelligence

Course setup HT20

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Intended learning outcomes

After passing the course, the student should be able to

- apply different principles of Artificial Intelligence (AI)
- choose appropriate tools and implement efficient solutions to problems in AI
- integrate tools to design computer programs that show different properties that are expected by an intelligent system
- present, analyse, and entitle an own solution to an AI problem
- reflect on and discuss current social and ethical aspects of AI

in order to be able to

- draw use of methods of artificial intelligence in analysis, design and implementation of computer programs
- contribute to design of an intelligent system in both academic and industrial applications.

Content

- Topics
  - **AI and society**
  - **Taming uncertainty:** Probabilistic reasoning, Bayesian Networks and Hidden Markov Models
  - **Machine learning**
  - **Problem solving:** Search, Games
  - **Decision making under uncertainty:** Decision making using MDPs and POMDPs, Reinforcement learning
  - **Knowledge, reasoning, and planning:** Logic, Classical planning, Advanced planning
  - **Communicating and perceiving:** Natural language processing, Computer vision
  - **Applications:** Robotics

Many courses related to this

- Artificial intelligence
  - DD2438 Artificial Intelligence and Multi Agent Systems (p4)
- Machine learning
  - DD2421/DD2431 Machine Learning (p1/p3)
  - DD2434 Machine Learning, Adv course (p2)
  - DD2432 Artificial Neural Networks and Other Learning Systems (p3)
  - DD2424 Deep Learning in Data Science (p4)
- Robotics
  - DD2410 Introduction to Robotics (p1),
  - EL2320 Applied Estimation (p2)
- …

Examination overview

- RAP1
  - Essay
- TEN1
  - 9 quizzes

- LAB1
  - Prerequisite: Code of conduct quiz
  - 3 programming assignments requiring implementation (HMMs, Search, RL)
  - 1 assignment on Logic and Planning

Essay

- Aim and idea:
  - Impossible to talk about AI without talking about societal and ethical issues
- An individual reflection, a group discussion, and a group summary (essay) on risks of AI

Already up, due on Sep 4, 11:59pm

https://kth.instructure.com/courses/20696

- Pass/fail

Quizzes

- Aim and idea:
  - Recall and apply the basic concepts
  - A way to stimulate continuous learning

- Quizzes released online after lectures on a topic
- A quiz has to be completed (typically 4-5/6 points)
  - Individually, within a certain amount of time (typically 60min), within N attempts (typically 5)
  - Before the deadline (one for all at the end)
- Typically multiple-choice/multiple-answer questions

- Pass/fail

Quizzes: a tip from previous generations

Do them after each lecture, not all in the end

Programming assignments – NEW!

- Aim and idea:
  - Get you to work hands-on with the course material
  - You will implement things
  - Each assignment structured into E-D, C, B-A levels
    - HMMs
    - Search
    - RL
  - You need to be comfy with **Python** (prerequisite)

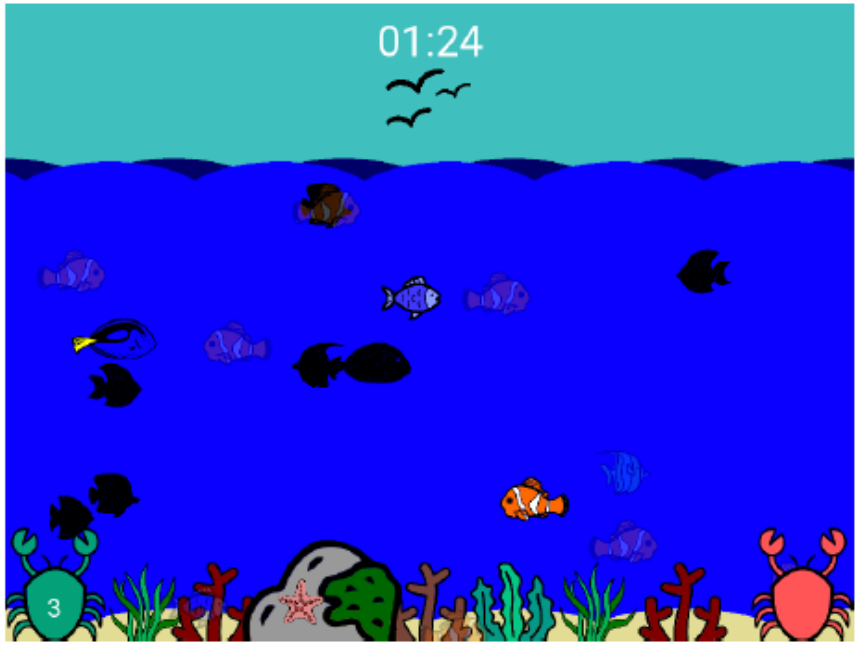


Figure 4.1: Fishing derby

Programming assignments

- Strongly encouraged to be carried out **in pairs**
  - Graded individually during presentations week 42, 43
- Assessed by
  - A computer (“Kattis”)
    - Does the initial scoring of your homework
    - Fast feedback, flush out “stupid” errors
    - https://kth.kattis.com/courses/DD2380
  - And a person (presentation in a computer lab)
    - The pair comes to the presentation together
    - Also questions on the related theory
    - Adapted to the grade you are aiming for
- Deadline for A grade only

Programming assignments: tips from previous generations

Start right away when they are up

NEW: Labs to help you get started

Logic and planning assignment

- Aim and idea:
  - Get a deeper understanding of knowledge representation, reasoning and planning

  - 1 PDDL exercise
  - 1 SWISH exercise
  - In online tools, submission via Canvas, no presentations
  - Pass/fail

Grading

Assignment	Evaluation
Essay	Pass/Fail
Quizzes	Pass/Fail
HMMs	A-F
Search	A-F
RL	A-F
Planning	Pass/Fail

Pass the course:

- Pass all the quizzes
- Pass the essay
- Get at least E on HMMs, Search, RL
- Pass the Planning assignment
- Your final grade: AVG(A1,A2,A3)

Something extra: Awards

- The Hattrick
- Peer of the year Award
  - We encourage you to answer on the discussion forum to your peers' questions, within the limits of code of conduct
- Outstanding Score Awards

What to expect

- DD2380 2018: Results at a glance
  - 450+ students
  - Approx. 85 %passed, cca 20% scored A, cca 8% scored hattrick
  - The course is 6hp spread over approx. 8 weeks, so you should be spending approx. 20 hours weekly on it

Practicalities

The course Canvas site

https://kth.instructure.com/courses/20696

The course zoom link

https://kth-se.zoom.us/j/62257965830?pwd=MDI4SWdkVFl2ajlHWHBsTUxUeU96dz09

All events start quarter past.

Crew this year

- Lecturers:

Jana Tumova (responsible)
Iolanda Leite

- Guest lecturers

Josephine Sullivan, Johan Boye, Gabriel Skanze, Mårten Björkman and more

- 20 teaching assistants (TAs)

Understanding the schedule

- **Lectures:** 16 zoom lectures, each given once; some fundaments and some guest lectures
- **Lessons:** 5 lessons, each given three times in up to two parallel sessions + two zoom sessions
- **Labs:** 3 labs, each given three times in up to three parallel sessions + zoom session
- **Presentations:** week 42 and 43, on zoom
- There will also be some 1-1 zoom consultation sessions for the assignments.

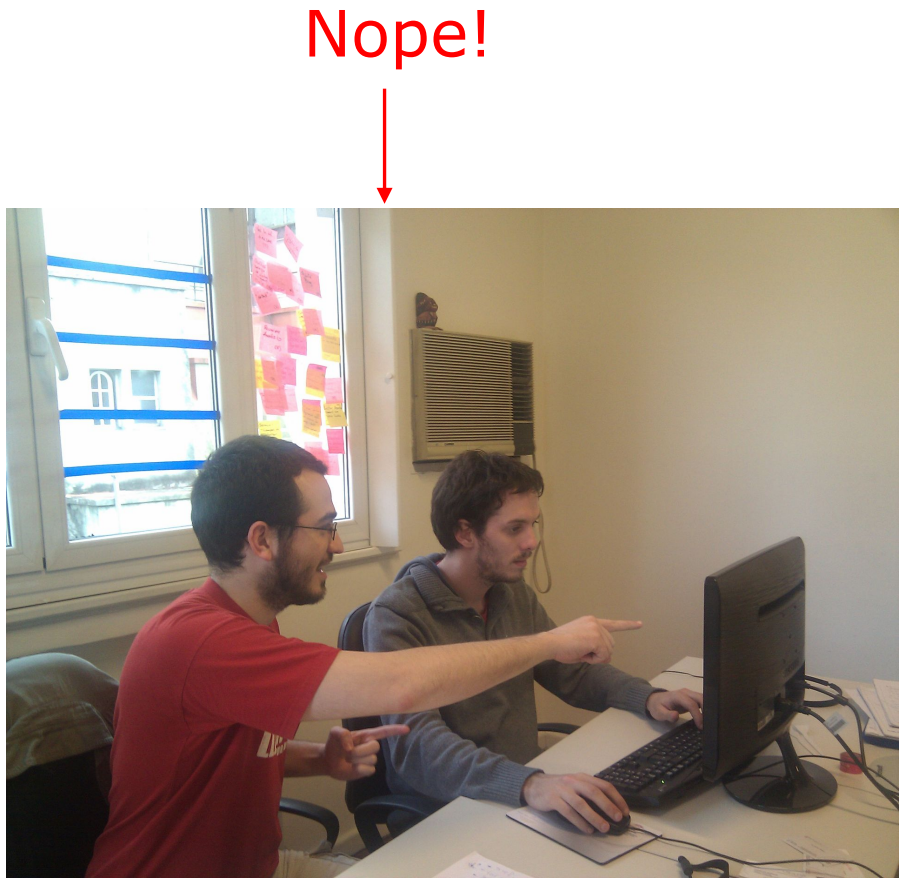
- **For lessons, labs, consultations, presentations, you need to register -> Canvas, Calendar, Appointments.**

Tutorials

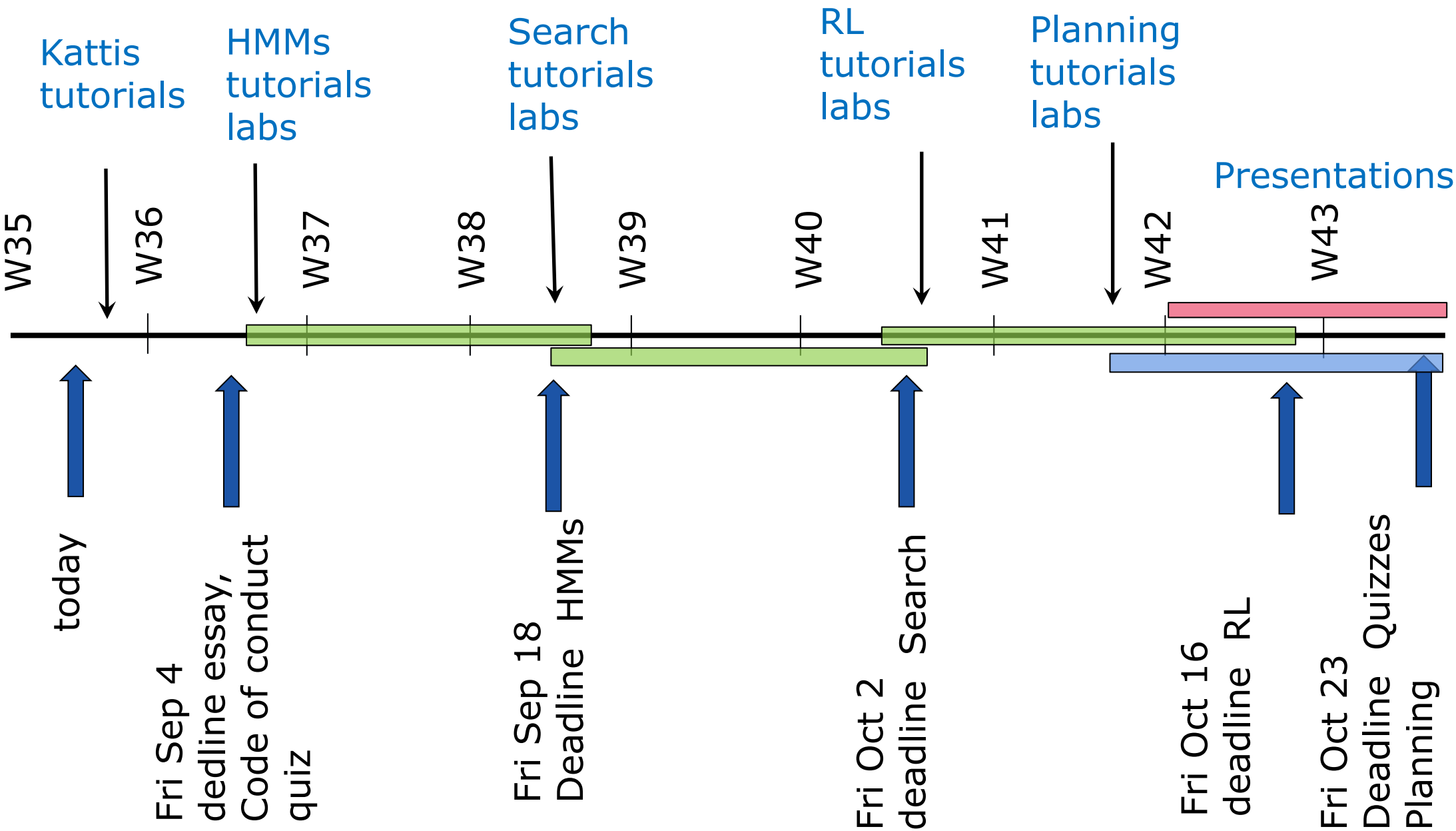
- **Zoom:** some parts in the main window, some parts in (random) breakout rooms
- **Physical:**
  - ½ capacity in the rooms
  - Interaction with the TA is from distance
  - Do not be afraid of asking questions, we are all learning

Labs

- **Zoom:** get started on your assignment; if you have a question, raise a digital hand, and a TA will take you to a breakout room
- **Physical:**
  - ½ capacity in the rooms
  - Interaction with the TA is from distance
  - Do not be afraid of asking questions, we are all learning



Timeline


Kattis tutorials
HMMs tutorials labs
Search tutorials labs
RL tutorials labs
Planning tutorials labs
Presentations
W35
W36
W37
W38
W39
W40
W41
W42
W43
today
Fri Sep 4 dedline essay, Code of conduct quiz
Fri Sep 18 Deadline HMMs
Fri Oct 2 deadline Search
Fri Oct 16 deadline RL
Fri Oct 23 Deadline Quizzes Planning

Kattis tutorial tomorrow

- Just a quick introduction/demo of Kattis for the people that have never worked with it

Where is the course material?

- Lecture slides will appear on Canvas in Modules (we will try to upload them around 1 day before the lecture)

- Recommended reading is Russell & Norvig's "Artificial Intelligence A Modern Approach", Pearson New International Edition, 2013.
- You can find an electronic copy at the KTH library

Communicating with us

- English only

- We will be updating the Canvas home page with news
- Important and urgent matters will be posted in **Announcements**
- If we contact you directly, it will be through Canvas Conversations (Inbox) or KTH email

- Primary communication is via discussion forum at Canvas

Email communication

When to send an email:

- I did a part of the course in HT16 and would like to know what to do to finish.
- We created an essay group of 3 people and a 4th person just clicked themselves in in the Canvas. The person is not responding, not doing their job. Can you remove them from our group?
- …

When not to send an email:

- When is the next tutorial? How do I sign up for it?
- I keep getting timeout on HMM assignment. Why?
- We are three friends and would like to do the programming assignments together. Is it ok?
- …

Registration for the course

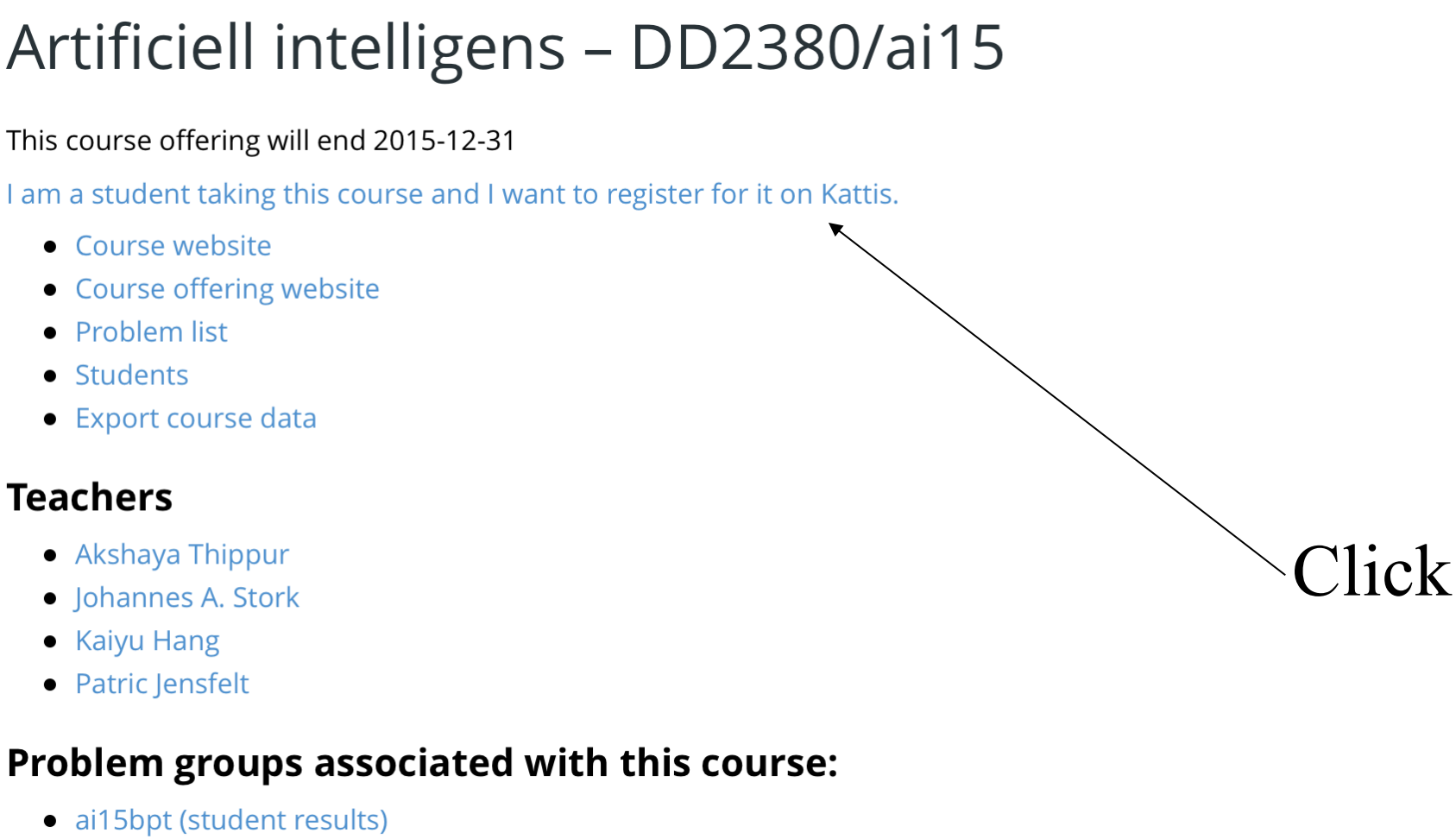
- You need to **register for the course** on the course web (prev. “My pages”) for us to be able to report results.
  - Make sure to have **registered for the semester**
  - Once you get registered, you get to see the course in Canvas, too (within 3 hours or so)

Registration in Kattis

- You need to have an **account in Kattis** (https://kth.kattis.com) and you need to **register for the course in Kattis** to submit assignments
  - Kattis account: now
  - https://kth.kattis.com/courses/DD2380/ai20

Register for the course in Kattis

- Example from ai15



Registration for tutorials and labs

- Canvas, calendar, appointments

Three rules

1. **Stay safe and keep others safe**
   - Stay at home if sick, even a little bit. There is always a zoom session
   - Keep your distance at all times (at least 1.5m)
   - Be considerate to people who might not feel as comfy as you
   - Listen to your TA
2. **Register** for all tutorials, labs, consultations and presentations. If you cannot make it, **unregister.**
3. **Follow the code of conduct.**

TODO NOW

IMPORANT TODO NOW: Practicalities

- Register for the course (web)
- Get access to Kattis
- Make sure you know your Python
- Go to Canvas,
  - Go to Account -> Notifications, consider switching on Announcement, Conversation Message, Appointment Availability as right away, or daily summary
  - Go to Courses -> DD2380 HT20-1, checkout the Home page, the Syllabus, the Grading criteria

IMPORANT TODO NOW: Already some real stuff

- Till **tomorrow** lecture: Make sure you know your probability theory; go through the Pre-study material in the Taming uncertainty module (Basic probability self study + the quiz)
  - Try quiz Q0 on basic probability
- Register for tomorrow Kattis tutorials (if interested joining)
- Start on your essay (due on Sep 4)
- Do your Code of conduct quiz (due on Sep 4)

Questions?