People, books, web

People:
- Jesse Hoey (Instructor)
- TAs:
  - Ashutosh Adhikari
  - Ehsan Ganjidoost
  - Joshua Jung
  - Charupriya Sharma
  - Kyle Tilbury
  - Ethan Ward
  - Allen Wang

Lectures:
- Section 001: T/Th 4:00pm-5:20pm in MC-2038
- Section 002: T/Th 11:30am-12:50am in RCH-307

Office hours: TBA (none first week)
Office hours (TA): near assignment due dates
Assignments, etc

- **CS486** (undergrad students)
  - 4 Assignments (40%: 10% each)
  - 1 midterm exam (15%) (Feb 7th, 630pm in M3-1006)
  - 1 final exam (45%) (must pass to pass course)
  - optional project (5% bonus, proposal at midterm)

- **CS686** (grad students)
  - 4 Assignments (25%: 6.25% each)
  - 1 midterm exam (10%) (Feb 7th, 630pm in M3-1006)
  - 1 final exam (35%)
  - 1 project report (30%, proposal due at midterm)

- Students wishing to write a project (and all CS686 students) **must** submit a project proposal.
Projects

- Optional for CS486 students (5% bonus)
- Mandatory for CS686 students (30% of grade)
- You must submit a correctly constructed and formatted proposal by the midterm - will be pass/fail with no mark
- Final project due before the final exam
- Individual project (CS686)
- Group project (up to 3 members, CS486):
  - Must be substantially more involved than individual projects,
  - Each team member's contributions must be clearly and specifically described
  - There must be more papers referenced and discussed for team projects (3 more per team member)
Textbooks, websites

- Textbook: David Poole and Alan Mackworth
  **Artificial Intelligence: Foundations of Computational Agents.**
  available online at artint.info

- Secondary textbooks:
  - Russell and Norvig
    **Artificial Intelligence** aima.cs.berkeley.edu/
  - Ian Goodfellow and Yoshua Bengio and Aaron Courville
    **Deep Learning** - deeplearningbook.org/

- Website:
  https://cs.uwaterloo.ca/~jhoey/teaching/cs486/index.html

- Discussion forum and email: Piazza
  piazza.com/uwaterloo.ca/winter2020/cs486686/home

- assignments handed in and returned, grades, on LEARN
Current Research in A.I.

- **Organizations:**
  - Waterloo AI institute waterloo.ai
  - Assoc. for the Advancement of A.I. (AAAI) aaai.org
  - European Association for A.I. (EurAI) eurai.org
  - Canadian A.I. Association caiac.ca
  - Intl. Machine Learning Society machinelearning.org
  - Association for Affective Computing (AAAC) emotion-research.net

- **Journals:**
  - Artificial Intelligence
    journals.elsevier.com/artificial-intelligence/
  - Journal of AI Research jair.org
  - Journal of Machine Learning Research jmlr.org
  - arXiv AI https://arxiv.org/list/cs.AI/recent

- **Conferences:**
  - International Joint Conferences on A.I. ijcai-18.org
  - AAAI 2018 aaai.org/Conferences/AAAI-18
  - Neural Information Processing Systems neurips.cc
  - International Conf. on Machine Learning icml.cc
Overview of the Course

Lectures:
- Introduction
- Agents and AI
- Representation and Reasoning
  - States and Searching
  - Features and Constraints (CSPs)
  - Logical inference
  - Uncertainty (Bayesian probability)
- Learning
  - Supervised learning (Regression)
  - Neural Networks and Deep Learning (Stochastic gradient descent)
  - Bayesian learning (learning Bayes Nets)
  - Unsupervised learning (Expectation-Maximization)
- Planning
  - deterministic (under certainty)
  - with uncertainty (Markov decision processes)
  - reinforcement learning
- Topics (time permitting)
What is Artificial Intelligence (AI)?
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The synthesis and analysis of computational agents that act intelligently.

An agent acts *intelligently* when

- what it does is appropriate for its circumstances and its goals, taking into account the short-term and long-term consequences of its actions
- it is flexible to changing environments and changing goals
- it learns from experience
- it makes appropriate choices given its perceptual and computational limitations
Next:

- What is AI? (Poole & Mackworth chapter 1.2-1.10, 2.1-2.3)
- Search (Poole & Mackworth chapter 3)