CS 161 - Fundamentals of Artificial Intelligence - Winter 2024

- **Instructor:** Professor Guy Van den Broeck <guyvdb@cs.ucla.edu>; Office Hours: by appointment
- **TA:** Honghua Zhang <joshuacnf@g.ucla.edu> ; Discussion 1A: TBD; Office hours: TBD
- **TA:** Poorva Garg <poorvagarg@cs.ucla.edu> ; Discussion 1B: TBD; Office hours: TBD
- **Lecture:** Winter 2024, MW 2pm-3:50pm; BOELTER 3400
- **BruinLearn:** https://bruinlearn.ucla.edu/courses/176721

Course Description

This course studies the design of intelligent agents. It introduces the fundamental problem-solving and knowledge-representation paradigms of artificial intelligence. We will study the AI programming language LISP, state-space and problem reduction methods, brute-force and heuristic search, planning techniques, two-player games, and recent developments in game AI. In knowledge representation and reasoning, we will cover propositional and first-order logic and their inference algorithms. Finally, the course covers probabilistic approaches to AI, such as Bayesian networks, and machine learning algorithms to improve the agent's performance with experience.

Prerequisites

This course requires knowledge of basic computer science, algorithms, complexity analysis, and programming principles.

Class Attendance

Class attendance is not required. However, if you miss part or all of a class, it is your responsibility to retrieve relevant information, material, announcements, etc., from friends and classmates. Some limited material will not be covered by the textbook.

Grading

Grading will be based on Homework (20%), Midterm (35%) and Final (45%). Midterm and final will be closed book. Midterm will be a mix of free-form and multiple choice questions. Final will be entirely multiple choice. You are allowed to bring a simple calculator.

Homeworks

Regular homeworks will be announced with a one-week deadline. The late policy subtracts 25% of the total points for each day you submit late. Make sure to read the honor code below.

Textbook
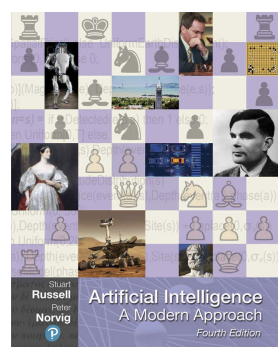
Stuart Russell and Peter Norvig. *Artificial Intelligence: A Modern Approach.* (4th Edition), Pearson 2020.

Available from:

- UCLA Bookstore
- Online Stores

Schedule

Week	Date	Topic
Week 1	Jan 8	Course introduction: What is AI?
	Jan 10	Problem solving as search
Week 2	Jan 15	**Martin Luther King**
	Jan 17	Problem solving as search
Week 3	Jan 22	Uninformed search strategies
	Jan 24	Informed search strategies
Week 4	Jan 29	Heuristics
	Jan 31	Constraint satisfaction
Week 5	Feb 5	Local search
	Feb 7	Game playing

Additional Readings

- David Poole and Alan Mackworth. [Artificial Intelligence: Foundations of Computational Agents](#)

Honor Code

You are encouraged to work on your own in this class. If you get stuck, you may discuss the problem with up to two other students, **PROVIDED THAT YOU SUBMIT THEIR NAMES ALONG WITH YOUR ASSIGNMENT**. **ALL SOLUTIONS MUST BE WRITTEN UP INDEPENDENTLY, HOWEVER**. This means that you should never see another student's solution before submitting your own. You may always discuss any problem with me or the TAs. **YOU MAY NOT USE OLD SOLUTION SETS UNDER ANY CIRCUMSTANCES**. Making your solutions available to other students, **EVEN INADVERTENTLY** (e.g., by keeping backups on github), is aiding academic fraud, and will be treated as a violation of this honor code.

You are expected to subscribe to the highest standards of academic honesty. This means that every idea that is not your own must be explicitly credited to its author. Failure to do this constitutes plagiarism. Plagiarism includes using ideas, code, data, text, or analyses from any other students or individuals, or any sources other than the course notes, without crediting these sources by name. Any verbatim text that comes from another source must appear in quotes with the reference or citation immediately following. Academic dishonesty will not be tolerated in this class. Any student suspected of academic dishonesty will be reported to the Dean of Students. A typical penalty for a first plagiarism offense is suspension for one quarter. A second offense usually results in dismissal from the University of California.