CS 161 - Fundamentals of Artificial Intelligence - Fall 2022

- **Instructor:** Professor Guy Van den Broeck <guyvdb@cs.ucla.edu>; Office Hours: Tuesday 8.30am-9.30am
- **TA:** Zhe Zeng <zhezeng@g.ucla.edu> ; Discussion 1A: Broad Art Center 2160E / Friday / 12pm-1:50pm; Office hours: Zoom (link on Bruinlearn), Friday 9-11 AM
- **TA:** Xuheng Li <xuhengli99@ucla.edu> ; Discussion 1B: Renee and David Kaplan Hall A65 / Friday / 12:00pm-1:50pm; Office hours: Zoom (link on Bruinlearn), Tuesday 9-11 AM
- **TA:** Tung Nguyen <tungnd@g.ucla.edu> ; Discussion 1C: Bunche Hall 3211 / Friday / 2pm-3:50pm; Office hours: Zoom (link on Bruinlearn), Monday 1-3 PM
- **TA:** Honghua Zhang <joshuacnf@g.ucla.edu> ; Discussion 1D: Royce Hall 162 / Friday / 2pm-3:50pm; Office hours: Zoom (link on Bruinlearn), Thursday 9-11 AM
- **Lecture:** Fall 2022, MW 10am-11:50am; HAINES 39
- **BruinLearn:** https://bruinlearn.ucla.edu/courses/140099

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.

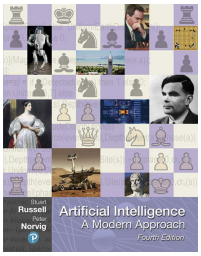
Grading

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
- The Publisher

Schedule

Week	Date	Topic
Week 1	Sep 26	Course introduction: What is

	Sep 28	Problem solving as search
Week 2	Oct 3	Uninformed search strategie
	Oct 5	Informed search strategies
Week 3	Oct 10	Heuristics
	Oct 12	Constraint satisfaction
Week 4	Oct 17	Constraint satisfaction
	Oct 19	Local search
Week 5	Oct 24	Game playing
	Oct 26	Game playing
Week 6	Oct 31	**Midterm exam**
	Nov 2	Propositional logic: Represer
Week 7	Nov 7	Propositional logic: Inference
	Nov 9	Propositional logic: Inference
Week 8	Nov 14	Reasoning under uncertainty
	Nov 16	Bayesian Networks
Week 9	Nov 21	Machine Learning Basics
	Nov 23	Machine Learning Basics
Week 10	Nov 28	First-order logic: Representa
	Nov 30	First-order logic: Inference
Week 11	Dec 8	**Final exam**

Additional Readings

- David Poole and Alan Mackworth. Artificial Intelligence: Foundations of Computational Agents
- Peter Seibel, Practical Common Lisp
- Guy L. Steele Jr., Common Lisp the Language, 2nd Edition

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.