
CS 161: Fundamentals of Artificial Intelligence

Fall 2021 – Midterm Study Guide

Material

The following items are in the scope of the midterm:

1. What are common definitions of AI? What is the Turing test? What is a Winograd Schema?
2. Basic LISP programming, lists, recursion
3. Systematic search strategies:
Edition 3 & 4: Sections 3.0–3.4
4. Informed search strategies:
Edition 3: Section 3.5, excluding consistency, RBFS, MA* and SMA*
Edition 4: Section 3.5.0–3.5.3, excluding consistency; Section 3.5.5, excluding RBFS, MA* and SMA*
5. Heuristics:
Edition 3: Section 3.6
Edition 4: Section 3.6.0–3.6.3, excluding effective depth
6. Local search strategies:
Edition 3 & 4: Section 4.1
7. Game playing:
Edition 3: Sections 5.0–5.4.2, 5.4.4, and 5.5
Edition 4: Sections 5.0–5.3.2, 5.3.4, and 5.5
8. Constraint satisfaction:
Edition 3 & 4: Sections 6.0–6.2.2, 6.3.0–6.3.2, 6.5

I highly recommend studying from the book, it contains almost everything we covered, including detailed intuitions and examples. Do not study from the slides, which are not meant to be reading material, they are only meant to facilitate teaching.

Form

Questions will test for insight. Some questions will be factual, but their answers can be found by understanding the material, not by memorizing. The exam is closed book.

The following items will almost certainly be on the midterm and determine a large part of your score.

1. A simple LISP programming exercise
2. Formalize a real-world problem as a search or constraint satisfaction problem. Come up with an admissible heuristic. Determine branching factors and solution depths.
3. Label nodes in a search tree according to the order in which they will be expanded/generated for any of the search algorithms.

4. Determine completeness, optimality, time, or space complexity for an algorithm related to the ones we saw in class.
5. Perform steps of constraint satisfaction backtracking search, for various choices of variable order, value selection, and constraint propagation.
6. Compute minimax or expectiminimax values to solve a game.
7. Perform α - β pruning on a game tree.

Beyond these items, I may ask a few short questions about other parts of the material, in particular as true/false questions, for a smaller number of points.