EECS 649: Midterm Exam Information Sheet

Logistics (see assigned date in syllabus/webpage)
- **Per the syllabus, the exam is "in-person, in-class, closed-book, closed-notes, no electronic devices (no calculators, phones, computers, smart watches, headphones, etc.), programming fair game."**
- Topic Coverage: all lectures before exam; assigned reading in R&N (selections across Chs. 1-7, 11, 18), Turing's paper, Braitenberg's *Vehicles*; Problem Sets 1-6; Mini PS
- How to study: read/review notes and book, "skim" problem sets, do sample exam, read chapter summaries, ...

Topics in More Detail
- Four Approaches to AI
- History of AI
- State of the Art
- Agents and Environments
- Rationality
- PEAS framework: Performance, Environment, Actuators, Sensors
- Properties of task environments: fully/partially observable, deterministic/stochastic, ...
- Agent programs/architectures: reflex; model-, goal-, and utility-based; learning
- *Vehicles*: S/R functions, logic, evolution, ...
- Search problem specification: states, initial state, successor function, goal test, path cost
- General Search Algorithm
- Performance Metrics: completeness, optimality, time/space complexity
- Uninformed Search: BFS, UCS, DFS, Depth-limited S, IDS, Bidirectional
- Informed Search and Heuristics
- Greedy BFS
- A*: admissible, consistent (and implications)
- Heuristic Functions, including arising from relaxed problems, max
- Local Search: gradient methods, beam search, simulated annealing, GAs
- Constraint Satisfaction Problems (CSPs)
    - definition, backtracking, forward checking, heuristics (DH, MRV, LCV)
- Min-Conflicts
- Games and Game Trees
- Optimal Decisions, Minimax
- Alpha-Beta Search/Pruning
- Games in practice: depth limits, evaluation functions, horizon effect, quiescence, transposition tables
- Games with Chance
- Logic: semantics, models, sound, complete, entailment
- Propositional Logic: syntax, truth tables, inference, proof, valid, satisfiable
- Reasoning Patterns, Resolution Algorithm, CNF Form
- Satisfiability Algorithms: DPLL, WALKSAT
- Horn Clauses, AND/OR, Chaining
- STRIPS Planning: operators, forward, backward, recursive, GraphPlan
- Planning in Practice: constraints, nondeterminism, multiple agents