Last update: October 16, 2012

Review for the Midterm Exam

CMSC 421: Midterm Review

Midterm Exam

♢ Scope: Chapters 1–6, and elementary Python

♢ Closed book, no electronic devices

♢ You may bring one sheet of notes; OK to write on both sides

♢ To help you prepare, the "resources" page has the midterm and final exams for the last three times I taught the course

- Both with and without answers

♢ To see all of them:

- Go to the bottom of the page and click on "show all resources"

Chapter 1: Introduction

♢ What AI is:

- thinking versus acting
- humanly versus rationally

Chapter 2: Intelligent Agents

♢ Agents and environments

- Rationality
- PEAS (Performance measure, Environment, Actuators, Sensors)
- Environment types
- Agent types

♢ I won't ask any questions about Chapters 1 and 2

Chapter 3: Search

- ♢ Problem types:
  - deterministic, nondeterministic,
  - fully observable, partially observable, non-observable
  - example: vacuum world
- ♢ Tree-search algorithms
  - Breadth-first search
  - Uniform-cost search
  - Depth-first search
  - Depth-limited search
  - Iterative deepening
- ♢ tree search versus graph search

Chapter 3 (continued)

- ♢ Heuristic search algorithms
  - Greedy search
  - A* on trees or on graphs with consistent heuristics
  - A* on graphs with inconsistent heuristics
- ♢ Heuristic functions
  - admissibility, consistency, dominance
  - problem relaxation
- ♢ Not on the exam:
  - IDA*
  - continuous spaces

Chapter 4: Beyond Classical Search

♢ Local search algorithms

- Hill climbing
- simulated annealing

♢ Not on the exam:

- beam search
- genetic algorithms

Elementary Python

- ♢ You should know the basics
- ♢ And I hope you've picked up some ideas about Python programming style

- ♢ But I'll keep it simple!

Chapter 5: Adversarial Search

♢ What type of game:
- two-player, perfect information, zero sum

♢ Game trees, minimax values

♢ Alpha-beta pruning

♢ Depth-bounded search, static evaluation functions

♢ Node ordering

♢ Nondeterministic game trees (e.g., backgammon)
- expectiminimax

Chapter 6: Constraint Satisfaction

- ♢ Variables, constraints, constraint graphs, backtracking search
- ♢ Variable selection heuristics:
  - MRV (minimum remaining values)
  - degree (most constraints on remaining variables)
- ♢ Value selection heuristic: least constraining value
- ♢ Pruning techniques
  - forward checking
  - arc consistency (constraint propagation)
- ♢ Problem structure:
  - independent subproblems
  - tree-structured CSPs
  - cutset conditioning