

Covered on Midterm Exam Introduction to AI – CISC481/681 – Spring 2012

The following topics/readings will be covered on the midterm taking place on Thursday, March 22, 2012. The readings are all from the course text, *Artificial Intelligence A Modern Approach, Third Edition*, by Stuart Russell and Peter Norvig.

- Chapter 1, pp. 1-31, Introduction, Foundations, History.
- Lisp will not be explicitly covered on the midterm.
- Chapter 2, pp. 34-59, Intelligent Agents and their Structure, Nature of Environments, Rationality.
- Chapter 3, pp. 64-112, Solving Problems by Searching
 - Problem Solving Agent
 - State Space Problem Representation/Formulation (representing problems)
 - Simple Search Algorithms (handouts)
 - Evaluating Strategies – completeness, time complexity, space complexity, optimality.
 - Uninformed Strategies
 - * Strategies Covered – breadth first, uniform cost search, depth first, depth limited search, iterative deepening depth-first, bidirectional.
 - Informed (Heuristic) Search Strategies
 - * Greedy Best-First Search
 - * Algorithm A and A* – admissible heuristics, proof that Algorithm A* is admissible, etc... (handout)
 - * Iterative Deepening A* (Note: you are **not** responsible for Recursive best-first search, Memory-bounded A*, or Simplified Memory-bounded A* - Iterative Deepening A* is the only memory-bounded heuristic search you are responsible for.)
 - * You are **not** responsible for Section 3.5.4 Learning to search better.
 - * Characteristics of heuristic functions (especially with respect to Algorithm A and the effect of heuristic accuracy and performance) – we did **not** cover and you are not responsible 3.5.3 - Pattern databases, or for 3.6.4 Learning heuristics from experience.
- Chapter 4 - Sections 4.1 (pp. 120-129)
 - Local Search Algorithms and Optimization Problems
 - * Hill Climbing
 - * Simulated Annealing
 - * Local Beam Search
 - * Genetic Algorithms
- Chapter 5 - 5.1-5.3 (pp. 161-171) and 5.5 (pp. 177-180), Adversarial Search (Game Playing).
 - Mini-max search

- Alpha, Beta Pruning
- Stochastic Games (that include an element of chance)
- Chapter 6, pp. 202-222, Constraint Satisfaction (note we did **not** cover 6.5 pp. 223-227).
 - Definitions of constraint satisfaction problems
 - Backtracking and Heuristics: minimum remaining values, degree heuristic, least-constraining value
 - Forward checking
 - Constraint Propagation and Arc Consistency