CS-540: Introduction to Artificial Intelligence
Summer 2003 Midterm Study Guide

I. Agents
   a. Agent architecture
   b. Types of agents
   c. Agent features
   d. Environment features

II. Search
   a. Goal/utility-based agents
   b. Formalizing problems as search
   c. Evaluation criteria
      i. Completeness
      ii. Optimality
      iii. Time complexity
      iv. Space complexity
   d. Uninformed methods
      i. Breadth-first
      ii. Depth-first
      iii. Uniform-cost
      iv. Depth-limited
      v. Iterative deepening
      vi. Bi-directional
   e. Informed search
      i. Heuristics/admissibility
      ii. Best-first search
      iii. Greedy search
      iv. A/A* search
   f. Partial vs. complete search
   g. Optimization search
      i. Objective surfaces
      ii. Local search
         1. Beam search
         2. Hill-climbing
      iii. Escaping local optimal
         1. Simulated annealing
         2. Tabu search
      iv. Evolutionary search
         1. Fitness
         2. Crossover
         3. Reproduction
         4. Genetic programming

III. Game Playing
   a. Game trees
   b. MiniMax principle
   c. Alpha-Beta pruning
   d. Dealing with uncertainty
   e. Other problems/techniques

IV. Logic
   a. Knowledge-based agents
      i. Knowledge bases
      ii. Interpretations/models
      iii. Validity/satisfiablity
      iv. Entailment/inference
      v. Soundness/completeness
      vi. Standard sentence forms
   b. Propositional logic
      i. PL primitives/syntax
      ii. Inference by search
      iii. Truth tables
      iv. Natural deduction/inference rules
   c. First-order logic
      i. FOL primitives/syntax
      ii. Translating English to FOL
      iii. FOL inference
         1. Unification/GMP
         2. Forward chaining
         3. Backward Chaining
         4. Conversion to CNF
         5. Resolution
   d. Prolog
      i. Logic programming vs. programming
      ii. Prolog syntax
      iii. Inference in prolog
      iv. Recursive predicates
      v. Rule ordering

Note: this is not an exhaustive list of topics we've covered so far... it is a representative sample. You are responsible for all the material from lectures and readings from the first 3 weeks.

The exam will be closed-book. You will be allowed a 1-sided page of hand-written notes and a calculator.