CSE 473: MIDTERM REVIEW LIST
OPEN BOOK, OPEN NOTES, IN-CLASS EXAM

1. Search

   - Be able to give a formal state-space model for a problem expressed in English. Formal means to specify S, s, A, f, g and c as sets or functions as appropriate.
   - Be able to specify what would be the dead states for a given problem.
   - Be able to generate part of a search tree for a given model, either depth-first or breadth-first.
   - Be able to answer questions about the general tree-search and general graph-search algorithms given in Chapter 3 and how they differ.
   - Be able to answer questions about the completeness and complexity of the various search variants given in Chapter 3.

2. Informed Search

   - Be able to explain the use of a heuristic function in a search or to give an example of one for a stated problem.
   - Be able to motivate the use of heuristic-search vs. blind search.
   - Be able to apply any of the following search methods to a well-stated problem and show a portion of the search.
     - best-first search/A* algorithm
     - basic hill climbing
     - steepest-ascent hill climbing
   - Be able to answer questions about admissibility and consistency with respect to heuristic functions for A*.
   - Be able to describe the simulated annealing approach and its advantages/disadvantages and variants.
   - Be able to answer questions about complexity, completeness, and optimality for the above algorithms.

3. Game Playing

   - Be able to develop a utility function for a given game or show how a given one works.
   - Be able to show how a basic minimax search works for some given example.
   - Be able to show how the alpha-beta procedure works for some given example.

- Be able to show how shallow search might be used to improve the alpha-beta procedure.
- Be able to answer questions about how Samuel's checker player works.
- Be able to answer questions on how minimax generalizes to games of chance.

4. Constraint Satisfaction Problems

   - Be able to formalize a constraint satisfaction problem by specifying the sets of variables, possible values, and constraints.
   - Be able to explain or illustrate how a backtracking tree search for a constraint satisfaction problem would work: alone, with forward checking, or with arc consistency checks.
   - Be able to compare how a general heuristic search would compare with a constraint satisfaction search when both are applicable to a given problem.

5. Logic and Reasoning

   - Be able to interpret predicate calculus formulas in English.
   - Be able to answer questions about the normalization done by resolution theorem provers for predicate calculus in order to get the formulas into conjunctive normal form.
   - Be able to give the clause form equivalent of a SIMPLE set of formulas.
   - Be able to show how to produce a resolvent on a SMALL set of SIMPLE formulas.
   - Be able to explain what is going on in a given small resolution proof.