

COSC 370 Exam Review #1  
Spring 2011

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- 1.) Define the Turing Test.
- 2.) What do we mean by a rational agent?
- 3.) For the following tasks, note if they can be done at present or not (with AI) and justify:
  - a. Play a decent game of table tennis
  - b. Buy a week's worth of groceries at Giant
  - c. Discover and prove a new mathematical theorem
- 4.) Give the PEAS, including a full accounting of the environment for a chess playing agent.
- 5.) Using pseudo-code give an example of a simple reflex agent for a 2x2 vacuum cleaner
- 6.) What's the difference between a goal-based agent and a utility-based agent?
- 7.) What's the difference between online and offline search?
- 8.) Give the problem formulation (goal, states, action, solution) for the problem of attempting to get from Arad, Romania to Bucharest, Romania.
- 9.) What are the four problem types in agent design? Define them.
- 10.) Give a single-state, conformant and contingency agent design for the vacuum world problem
- 11.) Give the state space description for the Arad to Bucharest problem.
- 12.) Give a tree expansion for a simple 3-puzzle where blank is in the upper left corner, 2 is in the upper right, 1 is in the bottom right and 3 is in the bottom left. What tree search technique is best in this situation? Why?
- 13.) Describe depth limited and iterative deepening search. Include all of the properties discussed in class.
- 14.) Design an A\* algorithm for a robot that has to navigate from one side of a room to the other, avoiding any obstacles along the way.

15.) Would A\* or Greedy search be better for the following problem: I have a weighted tree of finite depth and width and I want to find the path from a particular vertex  $v$  that has the largest cost. Note that the algorithm would return the destination vertex in this case.

16.) What is required for a heuristic to be admissible? What is required for a heuristic to dominate another heuristic?

17.) Describe a simulated annealing solution to the classic Sudoku problem.

18.) Describe a hill-climbing solution to the n-queens problem.

19.) Give an example of a constraint satisfaction problem and how it is solved.