AI Comprehensive Exam
Fall 2002

Tick all (but only) correct cases. Some questions may have more than one correct alternative!

Each question has a number of points mentioned within parentheses.

1. (10p) Which ones of the following inference types are sound in the most general case?
   □ a) abduction
   □ b) induction
   □ c) deduction

2. (10p) Give the Modus Ponens inference rule:

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3. (10p) Which of the following algorithms is not guaranteed to return first the shortest solution?
   □ a) DFS
   □ b) BFS
   □ c) Iterative Deepening Search
   □ c) Greedy Search
   □ d) Bidirectional BFS

4. (10p) What is the advantage of Iterative Deepening Search over BFS?
   □ a) the cheapest solution is the first found one.
   □ b) no suboptimal solution is explored.
   □ c) the time complexity is lower.
   □ d) the space complexity is lower.
   □ e) the queue ordering is cheaper.
5. (10p) What are the 3 elements of a general search problem?
   □ a) initial state, final state, operators
   □ b) states, operators, cost
   □ c) queue-ordering, heuristic-cost function h, generated-cost function g
   □ d) states, cost, queue

6. (10p) What is the main design issue in approaching a problem with a general search algorithm?
   □ a) the choice of the operators
   □ b) the choice of the heuristic cost function
   □ c) the choice of the states

7. (10p) Write in First Order Logic.
   a) All my books are interesting
   b) I have no small book
   c) Everybody speaks a language
   d) There is exactly one language spoken by everybody.

8. (10p)
   a) Discuss why do you think Hierarchical planning may be a better choice in terms of efficiency.

   b) A plan that uses the “sensing action” and can handle contingencies is called ------.

10. (10p) Between Depth-First Search and Iterative Deepening Search algorithms, which one would you recommend for solving Constraint Satisfaction Problems (CSPs)? Discuss your answer.