

EECS 391: Introduction to AI (Spring 2012) Written Homework 1 (Max Points: 100)

Assigned Thursday January 19, due 5pm Thursday January 26. Write your answers neatly and remember to show all relevant work. Before turning in your work, staple your answer sheets together and write your name and Case ID on the front page. If a pair of you did this assignment together, both your names and IDs should appear on the front page.

1. Research any recent (2000 or newer) Loebner prize winner. Write a short paragraph describing the system based on the information you find. Chat with the system and see if you can tell from the conversation that you are not chatting with a human. What gives the system away? Can you think of ways to address the flaws you see? Attach a short transcript of ten to twenty sentences of your conversation. (10 points)
2. Research one application of AI from slide 19 of lecture 1 and write a paragraph about current methods used to solve it. (10 points)
3. There are known classes of problems that are intractable for computers, and others that are undecidable. Does this mean AI is impossible? (10 points)
4. Discuss briefly: "Computers cannot be intelligent because they only do what their programmers tell them." (10 points)
5. Develop a PEAS description for the tasks: (i) Internet book-shopping agent, (ii) Mathematician's theorem-proving assistant. (10 points)
6. Consider a discrete fully observable world with S states. How many distinct simple reflex agents, each with A actions, can be written for such a world? Two agents are distinct if there exists some world state where they take different actions. (10 points)
7. Now suppose each agent in Question 6 is equipped with a *memory* so it can remember the past k states when choosing an action at the current state. How many distinct agents, each with A actions, can be written for such a world? (10 points)
8. Describe a state space in which iterative deepening is much worse than depth first search. (10 points)
9. Prove that uniform cost search is optimal, i.e. it always finds the lowest cost solution if a solution exists. (10 points)
10. The "heuristic path" algorithm is a best-first search algorithm with $f(n)=(2-w)g(n)+wh(n)$. Assuming h is admissible, for what values of w is this optimal? What kind of search does this perform for (i) $w=0$ (ii) $w=1$ (iii) $w=2$? (10 points)