Midterm Exam – EECE 216
Artificial Intelligence

Instructions

First be sure to write your name, initials, and MU ID number in the places provided. Next please check to make sure this exam has all the pages.

The exam consists of 5 problems worth 10 points each, 6 problems worth 15 points each, 1 problems worth 20 points, and 2 problems worth 25 points each for a total of 200 possible points. **Quickly review all the questions to make sure you don't skip the more *heavily weighted questions that are at the end***. Remember smart test taking.

1. Don't waste time on a problem you get stuck on. Try other problems and come back.
2. Show your work. Even if your answer is wrong you'll get credit for correctly attacking the problem. And even if your answer is correct you'll lose points for not showing your work.
3. Read all questions carefully to be sure you know what is being asked.

The exam is open book, but closed notes, and closed calculator. The only objects on your desk should be this exam, a writing instrument, and your text book. Put your book bag and other belongings along the front wall. Sit only in a seat with an exam.

You have the full 170 minutes to complete the exam. Be sure to show all work so I can give partial credit where applicable.

Good Luck!

Name: _____ MU ID #: _____

1. (10 points) You are a test-taking agent for AI exams. Describe the PAGE for yourself and classify your environment.

2. (10 points) Formulate the game of chess as a search problem.

3. (10 points) Define a game.

4. (10 points) List the properties to judge the quality of a knowledge base.

5. (15 points) Provide definitions from each of the perspectives of Artificial Intelligence (AI) we have discussed in class. Evaluate the definitions of AI you have provided.

6. (15 points) Look at the following sentences and decide for each if it is valid, satisfiable, or invalid. Verify your decision.
   a. Smoke $\Rightarrow$ Smoke
   b. Smoke $\Rightarrow$ Fire
   c. (Smoke $\Rightarrow$ Fire) $\Rightarrow$ ($\neg$Smoke $\Rightarrow$ $\neg$Fire)
   d. (Big $\wedge$ Dumb) $\vee$ $\neg$Dumb

7. (15 points) Give first-order logic that preservers the intended meaning in English of the following sentences. Say whether each translation is valid, satisfiable, or invalid.
   a. One more outburst like that and you'll be in contempt of court.
   b. Well, I like Sandy and I don't like Sandy.
   c. If you lived here you would be home now. If you were home now, you would not be here. Therefore, if you lived here you would not be here.
   d. Maybe I'll come to the party and maybe I won't.

8. (15 points) Evaluate and compare the minmax and alpha-beta algorithms.

9. (15 points) Compare and contrast propositional logic and first-order predicate calculus.

10. (15 points) Recall the results of the alpha-beta deterministic game player assignment. Why did the alpha-beta checkers player even with 7 or 8-ply search fail to play above the 1300 level? How would you solve this problem?

11. (20 points) List the major precursor fields of AI. For each field provide a two sentence summary of its contribution.

12. (25 points) Compare and contrast the various agents discussed in class.

13. (25 points) Using commonly employed criteria in this field, evaluate the following search strategies: breadth-first, uniform-cost, iterative deepening, bidirectional, greedy, A*, SMA*, hill-climbing, and genetic algorithm. Additionally, classify the search strategies in an appropriate manner.