Homework 3

Assigned on: Monday September 18, 2017.

Due: Friday, September 29, 2017.

Except for the programming questions (i.e., Exercices 1 and 7), which must be submitted with `webhandin` as probem#.*ext* (where *ext* corresponds to your languages extension), you may turn in your homework on paper or type it and submit it to `webhandin`.

Value: 80 points for ugrads and 85 points for grads.

---

1   Implementing a simple-reflex agent.   Total: 20 points

Bonus: Doing the programming in Common Lisp   5 points

- In the language of your choice, write a function that 'models' the simple-reflex agent for the vacuum-cleaner problem in an environment with two locations, as summarized on page 5 of the Intructor's notes #4. The function should take as input the percepts of the agent as location of the agent and status of the room.

- Write a function that takes any of the 8 possible states of the vacuum-cleaner of Figure 3.3 of AIMA and runs the simple-reflect agent until the goal is reached.

- Design a performance measure that penalizes the agent for each step and each suck action.

- Write a function that runs your agent for each of the 8 possible states and displays the agent performance of each one of the above states. Record the agent performance for each one of these states. In addition to your program, turn in a file `readme.txt` that describes how to compile (if necessary) and run your program on CSE's server so that the performance measures from above are displayed.

2   AIMA, Exercise 3.6, Page 113.   Total 10/15 points

- a: for ugrads and grads.   5 points

- b: for ugrads and grads.   5 points

- d: grads (bonus for ugrads).   5 points

3   AIMA, Exercise 3.15, Page 116.   Total: 10 points

4   Evaluation function.   Total: 6 points

Adapted from AIMA, Edition 1.

With $g(n)$ being the path length,

1. Suppose that we run a greedy search algorithm with $h(n) = -g(n)$. What sort of search will the greedy search emulate?
   Explain.   3 points

2. Suppose that we run a search algorithm with $h(n) = g(n)$. What sort of search will the greedy search emulate?
   Explain.   3 points

5   AIMA, Exercise 3.21, Page 117.   Total: 9 points

6   AIMA, Exercise 3.23, Page 118.   Total: 10 points

7   AIMA, Exercise 3.30, Page 119.   Total: 15 points

Bonus: Doing the programming in Common Lisp   5 points

- Question a   10 points
- Question b   5 points
- Question c: Optional challenge   15 bonus points
- Question d: Optional challenge   30 bonus points