

Name: \_\_\_\_\_

Instructor: N. Reed

## Instructions

The exam is open book and notes. No calculators are allowed.

Answer in complete sentences unless otherwise instructed.

This exam has 9 questions, for a total of 220 points, including 20 points of extra credit.

## Questions

1. (20 points) Draw a diagram to describe how an agent interacts with its environment. Briefly explain.
2. (20 points) Draw a diagram of the internal structure of a **goal-based agent**.
3. (30 points) Write the main control loop (algorithm) for a **reflex agent with memory**.
4. (20 points) Describe at least 4 characteristics that distinguish an **agent** from a “regular” computer program.
5. (a) (10 points) What is an **agent architecture**?  
(b) (15 points) Describe at least 5 ways agent architectures can be compared by industry for the purposes of developing commercial agent software. Give examples.
6. (35 points) Show the order of nodes examined using **depth-first, breadth-first and best first** searches on the following graph. Use open and closed lists for the searches.
7. (20 points) Create a vacuum world with 2 squares, 1 vacuum, and yes/no dirt. Draw the complete state space diagram for the world. Label all arrows with the actions that change the state of the world.
8. (a) (10 points) Describe planning and planners.  
(b) (20 points) For a Strips style planner in a blocks world, define a **stack(x,y)** action in terms of its pre, add and delete lists.

Extra credit

9. (20 points) Describe in detail the BDI model of agent reasoning. Give an example.