Homework #2
Dickinson College
Computer Science 364
Artificial Intelligence
Fall 2006

Each of the following exercises asks you to write a Brain using either the PyrobotSimulator or the Hemisson robot. For each of your Brains be sure to include comments that explain exactly what the Brain is doing and why it is doing what it is doing. The clarity and accuracy of the explanations included in your comments will be a factor in grading each of your Brains.

1. Complete each of the tasks below using the PyrobotSimulator with the PyrobotRobot6000.py robot and the Room4by4.py world in the /Worlds/Pyrobot directory on the Course CD.

a. Write a Brain named ForwardOneMeter.py that causes the robot to move forward by one meter. Try to have the robot arrive at its destination as quickly as possible but also to end up as close as possible to one meter away from its starting point.

b. Write a Brain named ApproachAndStop.py that causes the robot to approach a wall directly in front of it and stop 30 centimeters before hitting it. For this exercise you can assume that the robot always starts pointed directly at a wall and is at least 30 centimeters away. You can test your Brain in different situations by dragging the robot around in the PyrobotSimulator.

c. Write a Brain called AlignToRightWall that causes the robot to align its right side to be parallel to the wall currently to its right. For this exercise you can assume that the robot always starts with a wall directly to its right, though of course the robot will not necessarily start out parallel to that wall.

d. Write a Brain named FaceNearestWall.py that causes the robot to turn to face the nearest wall. When finished the front-to-back axis of the robot should be perpendicular to the nearest wall. If the robot is approximately equal distance from a number of different walls, then it may turn to face any of the equidistant walls.

2. Complete each of the tasks below using a Hemisson robot:

a. Write a Brain called HemiRoach that causes the Hemisson to try to avoid bright lights. For example, if one were to shine a flashlight on one of the Hemisson’s sensors, it should try to move away from the light. Do not worry about preventing the robot from running into obstacles. We’ll assume that the person wielding the flashlight wouldn’t be so cruel as to chase a poor helpless robot into an obstacle.

b. Write a Brain called HemiWander that allows the Hemisson to wander around a “box top” without bumping into the sides.

BONUS: Combine your solutions to #3 and #4 into a Brain called CarefulHemiRoach such that the Hemisson moves away from bright light but also will not bump into obstacles in the event that a malicious flashlight wielder attempts to make it do so.