MASSACHVSETTS INSTITVTE OF TECHNOLOGY
Department of Electrical Engineering and Computer Science
6.01—Introduction to EECS I
Fall Semester, 2007

Assignment for Tuesday 12/4

Final exam: The final exam for 6.01 will be held on Wednesday, December 19th. It is a 6-hour *ex camera* (take-home) exam. You can pick up in 34-501 starting at 1:30PM, and bring the exam back to 34-501 from 6:30-7:30pm (or you can e-mail your solutions by 7:30pm). The exam will consist primarily of conceptual and technical questions associated with the course. The exam is open-book, open-notes, but you must work on the exam by yourself.

All that glisters is not gold

This final lab is a single project spanning three lab periods. You will work with a partner and together you will design a robot and head system that can, from any starting position, navigate through a simple world and stop in front of a lamp. However, there are two lamps, and your robot must stop in front of the correct lamp. More specifically, we have mounted two lamps in *Shannon's* world. One lamp is mounted in the middle of the short wall near the obstacle in *Shannon's* world, and one is mounted on the short wall further from the obstacle. Your job will be to drive up to, and stop in front of, the lamp in the center of the wall farthest from the obstacle.

The two key problems will be to find the lamp given your robot can be started at any random position and orientation in *Shannon's* world, and then to avoid being fooled by the incorrect lamp.

You will have three lab periods to complete this final project. During today's first lab period you will attach your robot head to the robot. Then you will design and implement an approach so that the robot can find a lamp that is a short distance away and in an arbitrary direction (think about the case when the lamp is behind the robot). Then the robot should reliably drive up to and stop near that lamp.

To begin, get a lab laptop and make sure you update your laptop.

Run
`athrun 6.01 update`
to get `Desktop/6.01/lab14` directory which has the files needed for this lab.

While attaching your robot head to the robot, please test at each step to avoid damaging your robot head or the robot. Specifically, you should

- Get a robot and a robot head (either your's or your partner's).

- Test your robot head using a protoboard power supply.

- Use the robot's NIDAQ GND, AI4, AI5, AI6 and AI7 inputs, and AO0 outputs to interface to your robot head.

- Modify the `exampleControl.py` brain in the lab14 directory and demonstrate you can communicate with your robot head.

- Connect your robot head to the robot (you may need some velcro tape).

- Use the white(+12) and black (Ground) wires from the robot for power.

Once you have the robot head tested and mounted on the robot, modify the `exampleControl.py` brain to make the robot move to and stop near a lamp.

Checkpoint: 1:00

- Demonstrate that the robot can find a lamp in an arbitrary direction and move to and stop near the lamp.

To Hand In

Nothing. Just make sure you and your partner get checked off!