91.450, Robotics I
Fall 2003, Prof. F. Martin

Lab 6

Out: Fri Oct 10
Due: Fri Oct 17

In this lab, you'll use the sonar sensor and a servo motor to create a robot that drives towards open space. You'll create a mount for your servo motor on the front of your robot, then attach the sonar sensor to the servo. This will allow you to turn the sonar to point in different directions, so that you can find free space.

Servo motors attach to the expansion board, with the black wire on the left. (To remember how to hook up the servos, think Black-Red-Yellow, BRY, going alphabetically from left to right.) To enable your servos, you need to call

```
init_expbd_servos(1);
```

To disable your servos (do this when you're not using them anymore):

```
init_expbd_servos(0);
```

To change a servo position, change the value of `servo0`, `servo1`, …, `servo5`, depending upon what port you plugged into. Values should range between 100 and 3900, and give you about 180 degrees of movement. If your servos are acting really strangely (e.g., twitching), your battery power is probably low.

There are attachments for the servo horn, with screws to attach. Pick a piece to screw onto the servo horn. To this piece, you can hot glue a piece of Lego (take care not to get glue on the motor). Then you can attach the sonar to the servo.

The sonar sensor has a range of approximately 30–2000 mm. The `sonar()` function returns a round-trip timing delay scaled to give a distance measure in mm, based on the closest object in the sonar's field of view.

The objective of this lab is to create a robot that drives towards open space. One way to do this is have the servo motor turn the sonar to 5 different positions, spaced evenly through the servo's range, and take readings at each one. Then move your robot in the direction that had the farthest readings; this will lead your robot into open space.

If you have a different idea for solving the problem, feel free to pursue it.

In your lab writeup, describe your implementation and the resulting behavior of your robot. Test if your solution also has the emergent behavior of turning your robot into a corridor follower in the hallways.