

91.450, Robotics I
Fall 2002, Prof. Yanco

Lab 6

Out: Thursday, 10 October 2002

Due: Thursday, 17 October 2002, *before class starts*

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, I 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.

Your kit has 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 30-2000mm. The value that is returned is the distance in mm to the closest object in the field of view.

For this lab, you should have the servo motor turn the sonar to 5 different positions spaced evenly through the servo's range, taking readings at each one. Then move your robot in the direction that had the farthest readings. (Break ties by picking the straightest route.) This will lead your robot into open space. It should also have the emergent behavior of turning your robot into a corridor follower in the hallways.

I've attached the relevant pages from the kit manual on the sonar sensor and the servo motors.