COMP 4500, Mobile Robotics I
Spring 2018, Prof. Yanco

Lab 5: Servo Motors

Out: Tuesday, 6 March 2018
Due: Tuesday, 20 March 2018, at the start of class

Overview:

In this lab, you'll use the IR distance sensor ("ET") 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 distance sensor to the servo. This design will allow you to turn the distance sensor to point in different directions, so that you can find free space.

Using servo motors:

The servo pins on the Wallaby are labeled -, + and S. Black goes to – (black is usually ground in electronics), red to + (red is usually power in electronics), and yellow to S (signal).

To enable your servos, you need to call
```
enable_servos();
```

To disable your servos (do this when you're not using them anymore to save power – when servos are enabled, they are using power to maintain their position):
```
disable_servos();
```

To change a servo position, call
```
set_servo_position(<servo_num>, <servo_position>);
```
where `servo_num` should be 0-3, depending upon the port your motor has been plugged into. Values for `servo_position` should range between 0 and 2047, and give you about 180 degrees of movement. Note: Servos may run up against their stops at low or high position values. Giving a servo such a position command will use your battery's power at an alarming rate.

```
get_servo_position(<servo_num>);
```
returns an `int` corresponding to the position at which that servo is set.

If your servos are acting really strangely (e.g., twitching), your battery power is probably low.

There's a bin of attachments for the servo horn in the center of the room, with screws to attach. Pick a piece to screw onto the servo horn. To this piece, you

can attach a piece of Lego using the sticky tabs. Then you can attach the sonar to the servo.

What to do:

For this lab, you should have the servo motor turn the distance sensor 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.

You may need to insert a short sleep between taking distance readings at each position, if you find that you're reading the prior position's IR return (you'll notice odd behavior if this is happening).

What to turn in:

Turn in a copy of your code (commented, of course) at the start of class on Tuesday, 20 March. You should also show your robot's behavior to Zhao in today's lab (if you finish during class – it's a pretty short lab) or at the start of class on Tuesday, 20 March.