Warm Up Project — Kaitlin Gallagher
CompRobo — Fall 2014

Wall following:
The wall following strategy is very simple. The neato takes fave measurements at a 45 degree angle ahead and to the right and at a 45 degree behind and to the right. The robot travels forward unless these two measurements are more than 0.3 m off, at which point it tries to correct by turning towards or away from the wall as necessary.

Object Avoidance:
I chose to make a robot with a strict personal bubble. If an object appears within that bubble, it will begin to turn away from it. Once it's facing away from the disturbance, it begins to move forward quickly, slowing down as the disturbance reaches the edge of it's bubble. Linear and angular motion are determined separately. Turning speed is proportional to the angle of the disturbance, regardless of linear speed. Linear motion is inversely proportional to the distance of the disturbance, but only takes into affect if the disturbance is less than 90 degrees from directly behind it.

State Machine:
My state machine relies on human input to decide whether to follow the wall or run away from it. It waits for the user to enter an 'f' for follow or 'r' for run, then executes that task until it receives a new command. Hitting 'ctrl-c' at any time will exit the program.

Structure:
Each behavior has its own script. To implement the state machine, I imported each of the scripts and ran the appropriate functions from that behavior's script. It's not the most scalable solution, but it enables basic changes to the behaviors without rewriting the state machine.

Challenges and Learning:
I found the tasks for this project to be conceptually simple, but I underestimated the time required to do them well, rather than simply complete the minimum deliverable. Given more time (and sleep) I would have greatly improved the wall following function, made a more intelligent state machine that made decisions on actions besides simple user input, and possibly added different features to the obstacle avoidance. My biggest takeaway from this project is that projects will take more time than I initially anticipate. I'm also now comfortable navigating ros and running basic commands.