91.451, Robotics II
Prof. Yanco
Spring 2005

Lab 1

Out: Thursday, 27 January 2005
Due: Thursday, 3 February 2005, by start of class

Reading:
- Arkin, review Chapters 1 through 3
- How to Think Like a Computer Scientist (linked from course web page)

Overview*:* In this lab, you'll learn to use Pyro and will write your first Pyro brains. You'll run your code both in simulation (Player/Stage or Aria) and on the Pioneer robots.

This week's lab: On the course web site (http://www.cs.uml.edu/~holly/91.451), you'll find links to two Pyro modules: the Pyro introduction and Direct Control. You should read both modules completely. That said, focus on the sections that have been attached to this lab (The Pyro Interface, Sensors, Robot Attibutes, Brains, Aria Simulator, Stage Simulator, Direct/Reactive Control).

To run a program on the Pioneer, you'll need to log on to neo, trinity or morpheus (accounts on the robots will be created for you). If you've written your code on your desktop machine, you'll need to scp it to the robot from your desktop computer. When you run Pyro on the robot, you'll load the Aria.py robot (no simulator necessary), then load your brain. After pressing run in Pyro on your desktop machine, you'll need to hit the white button on the robot to engage the motors.

In addition to the exercises in the attached modules, write a direct control brain that will follow a person (or other object – the trash can outside the lab door works particularly well) at a hard coded distance. The robot should turn if the object moves left or right. You do not need to have obstacle avoidance behavior in this brain. The robot should drive forward until it has an object that is the specified distance away from its front sonars (make this distance between 1 and 2 robots). It should then continue to move forward or backward to keep the object the required distance away from its sensors (note that moving forward or backward can happen in an arc – turn to keep the object in view). While you don't need to implement obstacle avoidance, do check when backing up to make sure that you will not hit a wall in the back. If there is something too close in the back while you're trying to get away from something in the front, stop.

What to turn in: Commented code for all exercises that you wrote code and your answers to questions in the exercises. You also need to demonstrate your wall following and person following code to me on the robot before class starts next Thursday.

Tips for Using the Pioneer

To login to a Pioneer, follow these steps:

```
ssh <youracct>@<robot>.cs.uml.edu

<password>
```

To scp your brain to a Pioneer:

```
scp <file> <youracct>@<robot>.cs.uml.edu:<path>

<password>
```

To run your program, start Pyro. Select the Aria.py robot (no need to select a simulator), then load your brain. Click run, then press the white button on the Pioneer to engage the motors. You might want to get the robot into a good place to run before doing this.