CMSC 143: Introduction to Object-Oriented Programming with Robots

Lab 12: Robo-Cockroach
Due May 2, 2011

In this lab, we will create autonomous robot creatures; we'll turn our scribblers into robot cockroaches. Your goal is to create a robot program that will run as long as possible without any intervention – to make the robot autonomous. You should use the behavior-based approach outlined in the first ten pages of Chapter 7 of the textbook.

You can add as many levels of behavior as you like, but at the very least your cockroach should:

1. Scurry about randomly.
2. Avoid running into things (using the IR sensors: `getIR()` or `getObstacle()`, or `getStall()`)
3. Run away from light (using the light sensors: `getLight()`).

You might add one or more of these behaviors:

1. Interact with other cockroaches.
2. Allow a user to drive the cockroach with the gamepad.
3. Locate its nest (something bright green) and head home when it it gets tired (batteries run low).

Each robot behavior should be implemented as a separate function. That way we are able to add and remove each level of behavior easily (i.e. you should not create one loop with a bunch of if-statements). You should develop your program one behavior at a time. After each level is completed, you should write a paragraph (as a multi-line comment) describing how it works and how well it works. Finally, describe how the priority of the individual behaviors affects the cockroach's overall behavior.

Learning Objectives

- Program Robot Behaviors
- Employ Incremental Development

Deliverables

`cmsc143_lab12_LASTNAME_FIRSTNAME.py` – Your cockroach program.

Notes

- `setForwardness('scribbler-forward')` can be useful for orienting the movement commands with the scribbler's sensors.
- Cockroach Interaction - The latest fluke firmware (`upgrade('fluke')`) is capable of robot-to-robot communication[1].

[1] http://wiki.roboteducation.org/Robot_Communication

```
# robot A
from myro import *

init()
setIRPower(255) #set IR power to maximum

sendIRMessage("Hello Robot B")
```

```
# robot B
from myro import *

init()

while timeRemaining(15):
    msg = getIRMessage()
    if msg:
        print msg
```