CS148 Lego Track – Project 1
Insect Robot/Subsumption

1 Dates

- Assigned: September 13, 2005
- Project demonstration: September 28, 2005
- Project writeups due: September 30, 2005

2 Introduction

The purpose of this project is to implement a robot controller for autonomous insect behavior using the subsumption architecture. This project depends on concepts learned in lab 1 (Line Following) and lab 2 (Subsumption) and their successful completion.

3 Specification

In this project, you will be creating an insect robot that will require several behaviors critical for its survival. You must design and implement controllers for these behaviors and an arbitration mechanism for determining their priority using subsumption. Specifically, these emergent behaviors should arise from your control architecture:

1. *Gather food*: Your robot must look for and stockpile food present in the environment. Refer to Figure 1 for an example of the environment.
   (a) wander looking for food
   (b) line following back to nest
   (c) leave food at nest
2. *Avoid obstacles*: When your robot senses or encounters an obstacle or predator, it should try to maneuver or flee to safe locations.
3. *Cliff detection*: The robot should not fall off the edge of a cliff.
4. *Termination Behavior*: The robot should terminate and play a tune when the "View" button is pressed.

It is your responsibility to design, implement, and prioritize control modules such that your robot performs all of the above behaviors (and survives!).

4 Deliverables

Refer to the course missive for information about project deliverables (source code and writeup) and electronic submission. In particular, your project writeup should address the design choices and implementation approach for your robot contstruction, subsumption architecture, and calibration procedures.

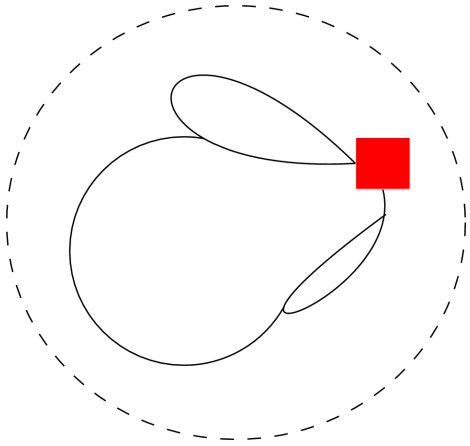

Figure 1: Diagram of example environment. The shaded area is the insect's nest. The solid black lines are pheromone trails leading back to the nest. The dashed black lines are the cliff edges of the environment.

5 Grading

Both your handin and your actual robot will determine your grade. Your implementation and writeup will be scored in the following manner:

Implementation		Writeup	
No internal state	5%	Thesis/motivation	5%
Proper functionality	15%	Approach	15%
Behavior design	15%	Evaluation	10%
Proper priortization	15%	Discussion	15%
		Conclusions	5%