Introduction to NetLogo

Net Logo is a programming language for simulating interactions between "agents" in a suitable environment (such as the interactions between ants in a colony, or sheep and wolves in a field). This approach to modeling makes it possible to examine how the simple behavior of individuals results in the complex collective behavior of a group. Our focus in this program will be to model emergent behavior in biology – with an emphasis on on the origins of life. However, the scope of the language is much broader than this – encompassing models in economics, social sciences, physics and chemistry.

NetLogo can be used in a number of ways. First, we can explore the large number of existing models of emergent phenomena that come with NetLogo, to see the types of phenomena that NetLogo is well suited to modeling. We can conduct virtual experiments to adjust the various model parameters and observe the response of the system. By so doing we can test whether the model fits with observations in the real world, and whether it predicts unexpected behavior. We can also modify existing models, for example, by adding a a new species to a predator/prey model. Our ultimate goal, however, is to learn the programming language in sufficient detail to create our own models. In this first lab we will focus on familiarizing ourselves with the the NetLogo interface and some of the basic commands for controlling the "agents" and their environment. We will start programming in next week's Lab.

Tutorial #1: Models

Complete Tutorial #1: Models, from the NetLogo User Manual (available under help). This tutorial explores one particular model form the models library and serves as an introduction to NetLogo's graphical user interface and the elements that allow you to control the model. The tutorial poses questions and asks you to make predictions. Please ponder these questions seriously before moving on. While I don't think it is necessary to write responses to these questions, I do want you to jot down notes about new commands or useful information in your NetLogo notebook.

Tutorial #2: Commands

Complete Tutorial #2: Commands, from the NetLogo User Manual. This tutorial is an introduction to different ways to interactively control your modeling environment using commands. This is an important precursor to writing programs.

Homework Questions:

1. Read the Programming Guide from the NetLogo Manual and then write down the meaning of the following commands:
   (a) crt 20
   (b) ask turtle 5 [fd 10 rt 90]
   (c) ask patches with [(distancexy 0 0) < 10] [set pcolor red]
   (d) ask turtles [if (pcolor = red) [jump 20]]
   (e) ask turtles with [color = red] [bk 10]
   (f) ask turtles [if (pcolor-of patch at 0 0 = red) [die]]
   (g) ask patch 0 0 [sprout 1 [set color green]]
2. Write down commands that will do the following:
   (a) cause a turtle to move along a square path of length ten.
   (b) cause half the turtles to die.
   (c) cause all turtles to change the color of the patch that they are on to yellow.
   (d) cause all turtles to change color to the color of the patch that they are on.