Instructions for Lab 1

Modelling of Systems for Sustainability

25th September 2024

1 Introduction

1.1 Aim

This Lab session is designed to familiarise you with the NetLogo framework. It is based on Chapter 2 of Railsback and Grimm (2019).

1.2 Overview

You should work through all the instructions listed below. In most cases, this will be in reference to Chapter 2 of Railsback and Grimm (2019). While the labs are not assessed, they are an integral part of the learning experience and will help you in getting the most out of this course. The labs are intended to be executed on DICE computers within the School of Informatics (see this blog here for an introduction).

1.3 Pair Programming

To get most benefit from the lab session, we advise you to go through the lab in pairs and use Pair Programming. This means:

1. Pair up with another student who is taking the course;
2. There are two roles: the **driver** is at the keyboard, while the **navigator** watches the screen and makes suggestions to the driver;
3. When doing the lab, take it in turns at being the **driver** and **navigator** — swap every 10 minutes.

There is evidence that pair programming helps you to solve problems when you get stuck, leads to greater confidence, and talking about what you're doing can lead to better understanding. Of course, this is only a suggestion: if pair programming really does not work for you, it is not a problem.

1.4 Using DICE

We will be running the lab on the Computing setup in Informatics, which runs DICE. This is informatics' own flavour of Ubuntu Linux (see the Computing Support Help). Those who are not familiar with Linux may wish to read up this gentle introduction.

2 Setting Up

Since this is the first lab, you will need to set up the environment to be able to use NetLogo. This only needs to be done once.

2.1 An Aside: using your own Computer

Note that we can only provide support for using NetLogo on DICE machines. You are welcome to install NetLogo on your own machine running Windows/Linux/MacOS, but you will need to deal with any troubleshooting this may entail.

You can obtain the installation files from the NetLogo Download Page: make sure to select NetLogo **Version 6.3.0**! In general, installation is as easy as running the '.msi'/'.dmg' executable on Windows/Apple or extracting the '.tar.gz' file on Linux. You need to make sure that you have an up-to-date Java Runtime Environment (see here).

2.2 Using NetLogo on DICE

We have provided a pre-packaged 'installation' of NetLogo available on the AFS file-system, available at `/afs/inf.ed.ac.uk/group/project/moss/NetLogo_630`. To use this:

1. Open up a Terminal:
   `Menu > System Tools > MATE Terminal`
2. Ensure that JAVA is installed:
   `java -version`
   This should print some lines starting with `openjdk version "18.0.2" ...` : if it does not, contact the Demonstrator.
3. Execute the following command:
   `echo alias netlogo="/afs/inf.ed.ac.uk/group/project/moss/NetLogo_630/NetLogo" >> ~/.bashrc`
4. Exit the terminal and open a new one (to source the bash file).
5. From now on, you should be able to start NetLogo by opening up a terminal and typing `netlogo` .

3 Instructions for Lab 1

3.1 Obtaining the Book

Most of the steps you need to do to complete Lab 1 will be based in reference to Railsback and Grimm (2019). The book is available online through the library. Use this link: you will need to provide your university student email and then sign in through your University Credentials.

3.2 Part 1: Familiarising with NetLogo

1. Start up NetLogo (see above)
2. Click on `Help`, then `NetLogo User Manual` to open the NetLogo Manual:
3. Run through `Tutorial #1: Models`
4. Read through Section 2.2 of Railsback and Grimm (2019), starting from the bottom of page 16 (starting "By now you will have seen ... ")

3.3 Part 2: A Demo Program

Follow Section 2.3 of Railsback and Grimm (2019) to build the "Mushroom Hunt" program. If you have any queries, discuss it with your pair-programmer or ask the Demonstrator.

3.4 Part 3: Next Steps

If you have time try problems 3, 4 and 7 from Section 2.5 Exercises of Railsback and Grimm (2019).

Useful Links

Book	`https://read.kortext.com/reader/pdf/653121/Cover`
DICE	`https://blogs.ed.ac.uk/infstudenttips/introduction-to-dice/`
Linux	`https://ubuntu.com/tutorials/command-line-for-beginners`
Java	`https://www.java.com/en/download/help/download_options.html`
NetLogo	`https://ccl.northwestern.edu/netlogo/`

References

Railsback, S. F. and Grimm, V. (2019). *Agent-Based and Individual-Based Modeling: A Practical Introduction*. Princeton University Press, New Jersey, US, 2nd edition.