



University of
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Learning Population Dynamics in Ant Colonies

The AH-HA Model

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Introduction

The AH-HA model was originally written in 2004 and later augmented until 2006. The purpose of this document is to provide information on how to get the model using modern technology.

Required Libraries

There are a number of libraries required in order to run the original model. These are found in the *Required.Lib* folder of the submission and include:

- colt-1.2.0.jar
- commons-csv-1.1
- jfreechart-1.0.19
- ptplot5.8
- Repast 3
- teatrove-Trove-1.3.0-src

Also necessary for running the model is *Repast_Simphony*, which can be downloaded from <http://repast.sourceforge.net/>.

Creating Necessary Packages

As Repast Simphony does not support importing packages, we must create the necessary files and folders manually in the IDE.

1. Create a new Java project. It can be called anything you like, but for this document we will name it '*AH-HA*'
2. Right click on the '*src*' folder that appears, create a new package, which **must** be called '*ahha*' to match up to the file dependencies.
3. Right click on the new package, add three **.java** files which **must** be called *Ant.java*, *AntColony.java* and *NestSite.java*.
4. Copy the contents of the relevant files given in the submission into these new files.
5. Create another package in the '*src*' folder which **must** be called '*nests*'.
6. Create two new **.java** files in this package called *Nests.java* and *Nest.java*. Copy in the contents of the relevant files from the submission.

When finished your project should resemble the following figure.

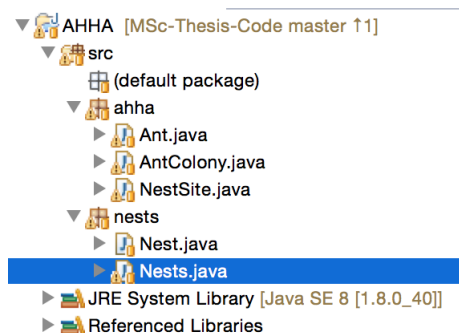


Figure 1: Completed package.

Now all of the relevant packages and files have been created we must include the necessary libraries.

Connecting Libraries

Now we must connect the relevant libraries.

1. Right click on the AH-HA model project itself (the highest up folder in the previous figure) and go to *Properties*.
2. On the right hand side go to *Java Build Path*, and then to *Libraries*.
3. Now we must add the external **.jar** files by clicking on the appropriate button on the right hand side of the window. The required files are in the submission, and the relative directory paths to the relevant packages are given below:

- *colt-1.2.0.jar/colt-1.2.0.jar*
- *commons-csv-1.1/commons-csv-1.1.jar*
- *ptplot5.8/ptolemy/plot/plot.jar*
- *Repast 3/Repast J/plot/repast.jar*
- *teatrove-Trove-1.3.0-src/Trove1.3.0/Deliverables/Export/com.go.trove.jar*

Add each of these to the project. **DO NOT PRESS OK YET.**

4. Now move from the *Libraries* tab to the *Order and Export* tab in the open window. Tick the boxes next to all of the libraries. Then press OK.

This will have linked the required libraries. The errors that will have shown previously in the files will have disappeared, leaving only warnings.

Running the Model and Command Line Arguments

The model can now be run in two separate modes: single runs and batch mode.

Single runs: To make a single run of the model, right click on the *Nests.java* file, go to *Run As* and then *Run Configurations*. Cycle to the second tab and go to run arguments. Set the program arguments to *'false'* and run.

Batch mode: To run batches of the model first copy the provided **.pf** file into the directory containing the *ahha* and *nests* package folders. Alter the parameters of the **.pf** file to set different parameters for the batch runs. Then follow the same steps as in the single runs configuration, but instead of having argument *'false'* have arguments *'true'*, *'<.pf file name>'* and *'<.csv filename>'*. The batch of runs should then output to the specified **.csv**.