User Guide

Overview

The purpose of this program is to analyse the life cycle of Brine Shrimp by digitally simulating it. This program has the ability take in the number of shrimps to be tested and the simulation time from the user. These inputs are then used on a 1000x500 sized habitat, where the shrimps live. Once these inputs are taken in, the program them generates the number of shrimps and adds them to temporary 'buckets' which then release them into the habitat. These shrimps are in an egg state, where their movement is slow. Then they grow into hatchlings, followed by juvenile and adult stages. When they reach adult stage, after two simulation time units, they asexually reproduce; releasing an egg into the habitat. When the adult reaches age of 16 (16 simulation time units) it dies. Here in the program it is shown by the adult turning into an egg after it reaches age of 16 (starting over its lifecycle again). While executing the program will show a text output of shrimp details present in the exhibit during that particular time step.

How to use

The simulation program has two ways to be executed
1. using command line argument
2. using parameter sweep

Using Command line argument:

```
python3 shrimpSimBase_v2.py 5 15
```

The base code is executed via *shrimpSimBase_v2.py* file. The numerical values next to the file name above are **Number of Shrimps** and **Simulation Time** in order. These two are custom inputs that can vary.

```
argv too short, usage: python3 <noOfSeaMonkeys> <simulationTime(Steps)>

Using default values for noOfSeamonkeys (50) and simulationTime(10)
```

An error in running the command with wrong input will execute the program with default values, also informing the user. This feature of executing using command line parameters is similar to the one on Practical 6 - Scripts and Automation (Maxville, 2019).

So the ideal input to execute the simulation in this method will be

python3 <filename.py> <noOfSeaMonkeys> <simulationTime(Steps)>

Using Parameter sweep

```
sh shrimp_sweep.sh 1 1
```

Another method to execute this simulation program is by doing a parameter sweep (Maxville, 2019). When the code is executed in this way, with a default value of number of shrimps - 5 and simulation time - 10 , user inputs for **Number of experiments** and **Number of iterations** will be taken in and executed. In the above example, sh executes the file, followed by the file name (*shrimp_sweep.sh* here). The numerical values following the file name are Number of experiments and Number of iterations. This implies that, the simulation will be executed in a single experiment with single iteration.

This output of this method creates a folder with the simulation program files. With a text file output for every experiment and an image with the final state of the simulation. This folder could be identified by the naming convention **shrimpYYYY-MM-DD_HH/MM** .

so the ideal input to execute the simulation in this method will be

```
sh <parameter_sweep_filename.sh> <NumberOfExperiments in numerical value> <NumberOfIterations in numerical value>
```

To Execute the Simulation

Example:

```
python3 shrimpSimBase_v2.py 5 10
```

The above example will run a simulation with five shrimps for ten time-steps.

Example:

```
sh shrimp_sweep.sh 1 2
```

The above example will run a parameter sweep with one experiment and two iterations. The simulation results and files will be added to a new folder that is created within the current directory.

References

Maxville, V. (2019). Practical 6 - Scripts and Automation.