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1 Artificial Life: David Sugarman CSC22100 Final Project

1.1 Observations

I have found it to be extremely difficult (hitherto impossible, in fact) to create a stable system given the agents and their behaviors that I have defined and implemented. I have tweaked energy generation rates, reproduction requirements and spawn rates for the different agents. All scenarios have more or less consisted of carnivores gradually dying out due to lack of available prey, herbivores fighting each other to death/dying of starvation, and plants taking over the earth, often with one or three herbivores wandering through the forests. This plantpocalypse is stable in the sense that the herbivores survive for a long time (the odds of their running into each other being quite low), as do the plants, but is also stale.

1.1.1 Increasing the number of herbivores

I figured that by increasing the number of herbivores I could a) improve their reproductive chances and therefore population stability and b) keep the plant population in check. Unfortunately, what actually happens is the initial herbivore explosion decimates itself via infighting—reproduction not even being possible with all agents at such a young age—and though it also expands across the earth and eats a lot of plants, the massive reduction of herbivore population after a few turns combined with the now-sparse earth and few remaining plants leads them all to die out. Then, over time, the surviving plants reproduce and spread, causing the simulation to converge on plantpocalypse.

1.1.2 Reproduction is hard

The system implemented for reproduction of Locomotive agent subclasses requires two Locomotives of the same type but opposite sex, sufficient age, and sufficient energy levels to bump into each other on the map. While all of these requirements make logical sense, they result in astonishingly low reproductive rates as the already low chance of same-type runins is halved by the opposite-sex requirement. Furthermore, agents are often low on energy, and whenever a runin does happen but the opposite-sex requirement is failed the population is reduced by one.

1.2 Conclusion: life is a delicate and brutal balance

In addition to Java architecture and coding practice and skills, I have learned something unexpected from this project. Though I have considered these concepts before, this project was a tangible reminder of just what a delicate balance of simple yet intricately-connected behaviors and environmental factors must be at play for an ecosystem to remain stable and diverse. Nature is a remarkable system, and evolution a brilliant and effective means of keeping life alive and driving it forward. This Java project gave me a new perspective on how that all works and fits together. Tinkering with the parameters was a fun project in and of itself. I hope that we as a species, unlike the Herbivores, are able to do more than wander dumbly around the earth fighting, mating and eating, lest we and our world succumb to the plantpocalypse.