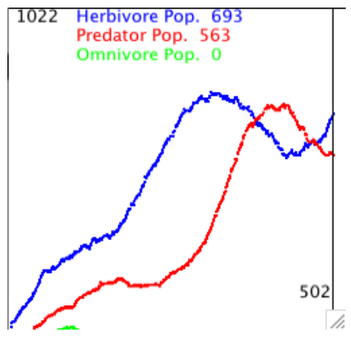
Evolution Simulator

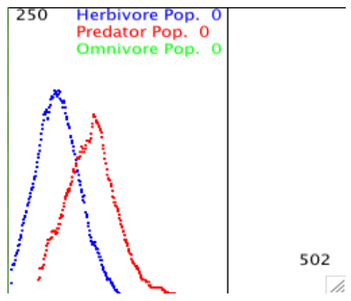
Eric Turner, TJHSST Computer Systems Lab 2006-2007, Period 3

Abstract

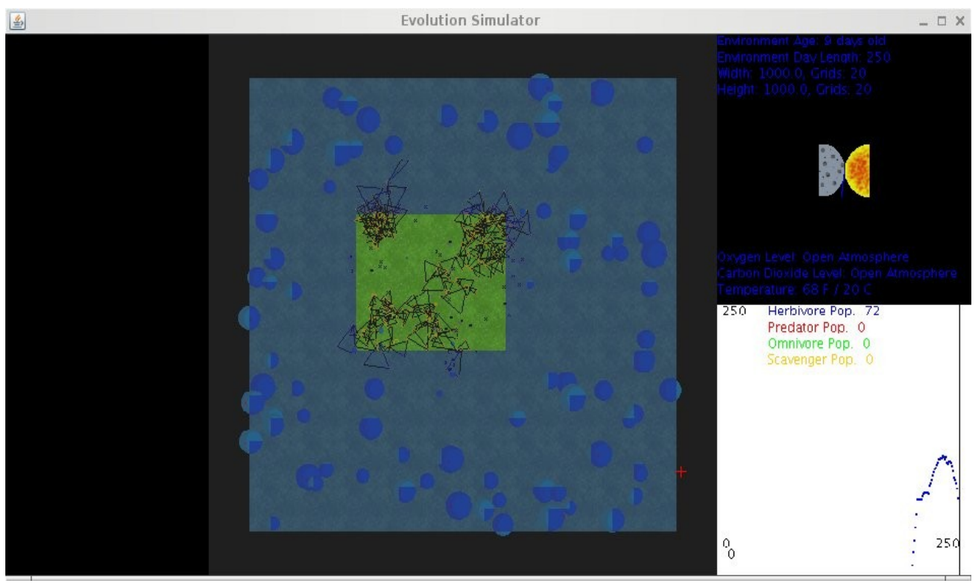
This project demonstrates the evolution of different organisms within an environment. These organisms adhere to basic characteristics of real-world organisms, such as the need for food, the ability to breed and die, and basic emotional states. Their function and lifespan are based on dozens of genetic characteristics and these characteristics will be passed on to offspring. There will be a genetic variability that will allow the organism species to evolve or devolve. The hope is to show natural selection, and after several generations the collective gene will be more advanced than the original.



The natural interaction of a predator prey relationship can develop an equilibrium between the two populations...



...it can also result in predators overeating, causing the extinction of both species



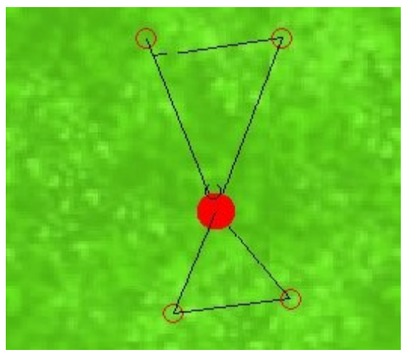
As an example of the modeling capabilities of the simulator, the development of genetic qualities are directly effected by their environment. In a world mostly made of water, the lung capacity of organisms will grow much more rapidly than a dry environment. All evolution is due to natural selection, and genes have an equal change of mutating up or down.

The environment can be affected by a physical characteristic, such as a location that is abnormally hot or cold, but it can also describe other organisms. There are four different species that can interact with one another, and determine how each evolves.

Results and Conclusions

Judging from the experimentation discussed above, the simulations generated from this program show similar trends to those observed in reality. While the program by no means incorporates all of the factors that affect an animal society, it does approximate them. The simulator develops an isolated system, which shows the appropriate population growth. It shows that organisms evolve in mostly expected manners, for instance their metabolism and probability of dying consistently decrease over time.

Both the genetic evolution, and the interspecies interactions show the same trends that have been documented in real-life situations. This is a confirmation that Darwinian natural selection and logistic population growth works on a system whose complexity is scaled down significantly.



The transportation mechanism of the organisms are triangular-shaped legs that are able to expand and contract to pull them along. While more processing time is devoted to the program because of this, it allows the organisms to more realistically experience obstacles in their environment, increasing the realism of the evolution that occurs.