Study on the outputs and design of an Abstract Evolution Simulator

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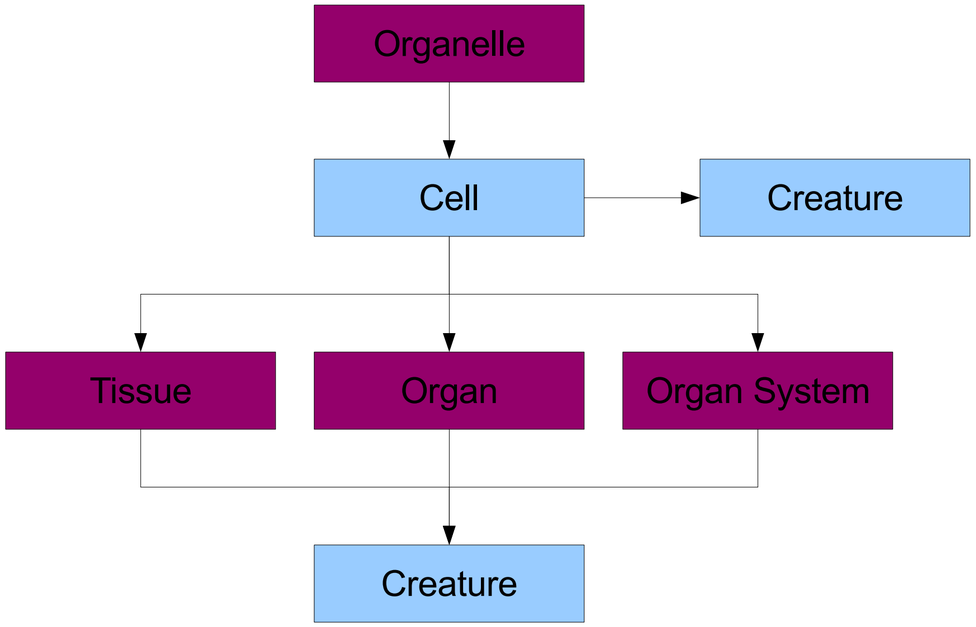
Complexity Structure



This is a diagram of the organism class structure and how they fit into each other. Blue classes are organisms and purple ones are individual components that can not survive on their own.

Abstract

Create an Abstract Evolution Simulator that accurately and effectively simulates the mutation of organisms and the transition from single celled organisms to multicellular complex organisms and organ systems with theoretical applications in the study of evolution and population dynamics.

Background

One of the most controversial and most studied areas of science to day is evolution. One side is attempting to disprove it and the other side seeks for it to be recognized as the well verified theory that it is. I am seeking to model the evolution of single cellular organisms into complex multicellular ones with hundreds of cell types and a regenerating cell structure.

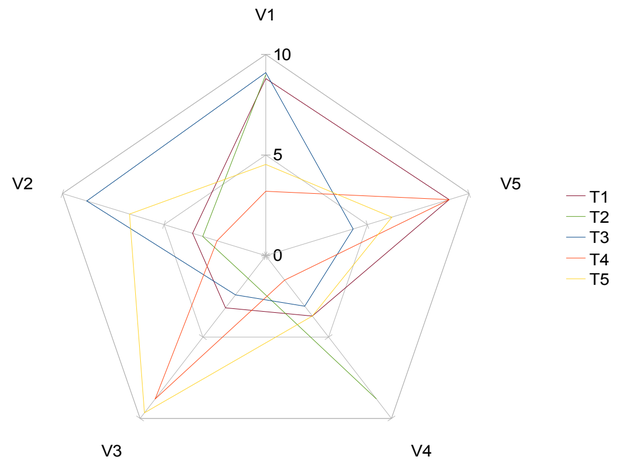
Defining an Organism Abstractly

The abstract definition of an organism is simply a numerical summary through variables and equations of the characteristics of that organism. For example the color of an organism is modeled through an equation representing the frequencies of light that it reflects and the amounts of these reflections. There are a large number of other variables that represent things such as organelles in a cell which themselves may be bacteria that entered the cell and then mutated. The difficult part of this is determining the correct level of detail to attempt to represent that strikes a balance between simplicity and accuracy.

Complex Organisms

These are groups of cells that have joined together based on the array that lists what cells can achieve cohesion with what other cells. These groups of cells can join together to form an organism which will in turn evolve with each generation and in response to random environmental stimuli. Tissues, Organs, and Organs Systems are defined by groups of cells that have different levels of interaction with each other. For example a tissue would be a few cells in a relatively small area that work together and then interface with other tissues through a few types of cells. This forms an Organ witch will in turn link through resource inputs and outputs, and one or two tissues to form an organ system. These are what should make up the most complex organisms by the end of the simulation's run.

The Development of a Cell



This represents the development of 5 features of a single cell at five times in the simulation.