Final Project Design Document

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Predator Prey Simulation

Description

The program will be a visual simulation of predator and prey population fluctuations over time. The program will use object oriented programming similar to the flocking program. There will be a world with agents, there will be two types of agents, one being the prey and the other being the predator. At the beginning, there will be an interface to set starting conditions which will be the number of predator and prey agents at the beginning and maybe more. The simulation will depict predators eating prey, starvation if they do not eat prey in a certain amount of time, and reproduction of prey and predators. User interaction so far will be a speed up and slow down button.

Additional ideas include a upgrading graph that graphs the population between prey and predator. I am also thinking about adding a third agent representing plants that the prey will eat and pop up at random locations at a certain rate. The rate might be adjustable during simulation to allow the simulation of different times of years and show how it affects prey population and then predator populations.

Implementation

World -> Agents -> Prey, Predator, Plants

The world class will create a grid with x width and y height and also a list of agents. The agent class will give instances of agents x and y coordinates and methods all agents should have. There will be at least two subclasses of agent with one being predator and one being prey. Each will have their own reproduction times and predators will seek out prey while the prey try to run

away. The predators will also have a hunger value where they die if they do not eat in a certain amount of time. The prey will also have this hunger value if the plant agent is implemented. The plants will spawn in random x and y coordinates. I also plan to use the vector and pair class.