**Project 2 Proposal**

**Inspiration from “Simulating the Evolution of Aggression”:** [https://www.youtube.com/watch?v=YNMkADpvO4w&feature=youtu.be%20[5:40%20PM]&ab\_channel=Primer](https://www.youtube.com/watch?v=YNMkADpvO4w&feature=youtu.be%20%5B5:40%20PM%5D&ab_channel=Primer)

**Names of Team Members:** Kyle Dukart and William Simcox.

**Goal:** To create a simulation of the evolution of aggression in a population.

**Libraries:** We will use Seaborn for graphing our population of N agents and maybe DEAP and TensorFlow (if we expand our project by adding a neural network).

**Work Plan:** We’ll be using repl.it for coding together at the same time. Workload will be split evenly between the two of us and easiest functions will be made first.

**Planned Figure:** A Seaborn graph made of the population and its variation of evolved N agents.

**Planned Statistical Test:** Currently not sure if needed but one possibility is an ANOVA test with our population groups. We’re going to look more into this if we have time to expand.

**Input Data:** PrisonersDilemmaSimulation(n1 = number of first population, n2 = number of second population, s1 = “strategy of first population”, s2 = “strategy of second population”, x = number of generations)

## **Basic Simulation:** Simulate a population of N agents in competition over limited resources. Each agent has a game theory strategy.

Iterate over X number of generations:

* Each agent goes to a random resource (max of 2 per resource)
* If multiple agents arrive at the same resource, the resource is divided between the agents depending on the strategy of each agent
* Agents die or reproduce depending on how many resources they have received

Graph the populations of the agents, showing which strategy is dominant, or what ratio gives us equilibrium

**Iterated Simulation:** Simulate a population of N agents in competition over limited resources. Each agent has a game theory strategy.

Iterate over X number of generations:

* Each agent goes to a random resource (max of 2 per resource)
* If multiple agents arrive at the same resource, the resource is divided between the agents depending on the strategy of each agent
  + This process is repeated 40? times, as each agent is able to “react” to the other agent’s moves as defined in each agent’s strategy
* Agents die or reproduce depending on how many resources they have received

Graph the populations of the agents, showing which strategy is dominant, or what ratio gives us equilibrium

## **Ways to expand the project:**

* Allow for more than 2 strategies to compete at the same time
* Train a neural network to compete in the competition
* Add a statistical test