Heading

Shared Sprint planner: CSE115A - Simulated Evolution - Sprint 1 Planner

Product Name		Simulated Evolution project	
Team name		Everstone	
Release name		Release 1	
Release Date		**10/24/23**	
Revision number	3	**Last revision**	10/23/23

High-Level Goals

- Simulate Evolution
- create organisms that behave(reproduce, eat, die, move) according to their genome and interaction with their environment
- Create a design tool/settings page that adjusts the features of a simulated environment
- Allow multiple people to interact with the same simulation?
- Statistics and graphs to display data gathered from the simulation

User Stories Defining Project Scope

Note: User stories should meet the "INVEST" criteria

- **Sprint 1**
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Priority	User Story	Sprint Reference	Story Points
1	As a student, I want to create an organism	1.1	5
2	As a student, I want to see an organism in an environment	1.2	2

- **Sprint 2**
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Priority	User Story	Sprint Reference	Story Points
1	As a student, I want organisms to interact	2.1	4
2	As a student, I want organisms to evolve	2.2	6

3	As a user, I want to set the amount of organisms in a simulation	2.3	2

- **Sprint 3**
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Priority	**User Story**	**Sprint Reference**	**Story Points**
1	As a student, I want to see the information of organsims	3.1	3
2	As a user, I want to have my own simulation	3.2	5

- **Sprint 4**
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Priority	**User Story**	**Sprint Reference**	**Story Points**
1	As a student, I want to be notified when an organism evolves	4.1	4
2	As a teacher, I want the option to make a shared simulation for students	4.2	??

Product Backlog

"Remember MoSCow user story prioritisation"

1. As a student, I want to create an organism
2. As a student, I want to see my organism
3. As a student, I want to see many different organisms with different behavior
4. As a student, I want organisms that interact with each other
5. As a student, I want to see the population evolve over time
6. As a Teacher, I want a simulator that clearly demonstrates the mechanisms of evolution
7. I want to be able to adjust environmental factors like resource availability and climate
8. I want to interact with the simulated environment with an intuitive and visually appealing user interface.
9. I want access to detailed genetic information about an organism to acquire an understanding of the genetic mechanisms at play
10. As a general user, I want to be able to see detailed summary/graphs/diagrams of the genome statistics at the end of the simulation
11. I'd want a way to seed the simulation with creatures before the simulation starts with a pre-simulation screen.
12. As a student, I'd like a way to be introduced to the simulation via presets.

Brainstorm

- Grid-based environment
    - Ambitious: visual method of displaying simulation
- Organisms needs energy to live, seek out energy, reproduce
- Organisms' traits controlled by a genome
    - Genome computed + set when born, remains static
    - Separate Producer / 1st Consumer / 2nd Consumer roles
        - Producers grow outwards, don't move
        - Consumers move
            - Neural network
    - Array of floats / vector of bits
    - Environmental mutation rate
- Simulation for a set amount of time, statistics displayed at end
    - Genetic diversity
    - Graphs to visualize data
- UI for users to interact with simulation

Gene Ideas:

- Sensory
    - Vision range
    - Light
    - Food
    - Temperature(?)
- Movement / behavioral
    - Eat
- Rate of reproduction
- **Life-span**
    - Needs cost for having a long life-span

Gamification features

- Some way of saving genome preset to an easily copy-pastable code that can be shared among users
    - Might be difficult depending on the complexity of the genome

Technology

Python
Github
https://nicegui.io/
https://numpy.org/