CareBears
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Period 01
Plants vs. Bacteria

Final Project Proposal

Plants and Bacteria Simulation

(The Bigger They Are, The Harder They Fall)

Description:

Our trio would like to propose a virtual simulation of a natural environment. As the title implies, there will be two categories of objects: plants and bacteria. **For our MVP, we will start out by simulating plant growth in a closed system where the user controls different variables, such as seed types, rainfall, and possibly a predator.** The main goal of the simulation is to theoretically have the player balance the diversity of the plants in the ecosystem, and make it so all the plants can survive. Initially, the simulation can fail if a certain breed of plant takes over the board and weeds out the others, and later on we can try to incorporate a competition between these plants and new coming bacteria. We can also try to add different environmental factors such as weather, temperature, and natural phenomenon which make the simulation/game harder.

Concepts Used:

ArrayPriorityQueues → different plants can have different resiliencies, and can be better at receiving nutrients and water. It will be necessary to determine who receives water. ArrayPriorityQueues can help by telling the player which plant needs more water.

Trees → Plants (and bacteria) will produce offspring that will also take part in the simulation. Being able to track the growth of the species will be easiest through a tree.

HeapSort → The user can track different resources and attributes a plant has, and sort plants based on these qualities. This helps make future judgement calls on plant placements and resource allotment.

Stacks → Resources can be filed into a stack, and dished out into the environment at regular intervals. This can give the simulation a chronology that works in waves, similarly to tower defense games like Bloons.

Possible Expansions:

Later versions of the game may include:

1. The inclusion of bacteria to accompany the plants. This can lead to a competition for resources not just among a species, but between them too.
2. There may also be a balance of bacteria and plants in which the system requires both of them to function.
3. Possible addition of bugs to help create a reasonable vector to carry objects across the map. This would also connect points very far away from each other.
4. Expansion to include different types (species) of plants and bacteria that possess slightly altered attributes.
5. Inclusion of an endgame phase, where the user has successfully kept the ecosystem running for as long as they did.