IDIS210 Winter Term 2014

Creative Practice Assignment

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Jar is a project exploring the complexities of an imagined ecosystem, and the beauty of the dynamic balance maintained by the biological world. It will be a computer simulation of colorful life-forms living and dying in a low res landscape. Though the rules that these entities follow will be simple, the interactions that unfold will be beautiful, unpredicted, and reflective on the complex interactions in our own biological landscapes.

The simulation will be a computer program that takes randomly seeds life inside a two dimensional box of finite dimensions with rigid borders. This box will be filled partially with dark red substrate, analogous to loamy soil. Each chunky pixel of soil will have a digital value for its richness, and its appearance will be tinted correspondingly. Dwelling in this substrate will be bright, desaturated worms. The worms' movement will be reminiscent of the retro arcade game Snake, and they live their lives blindly tunneling through the red soil, absorbing a portion of its richness as they pass though each square, and growing longer when their own level of consumed life-force has grown high enough.

The concept of life-force will be one of the game's central rules running in the background. For any interaction that happens in Jar, the total energy of the system will be conserved. Life and death will be a closed loop with no waste. Energy will be stored inside the creatures and moved around, but returned to the air, soil, and their children when they die.

On the surface, single pixel birds will flow through the air like starlings, leaving the flock only to eat the yellow flowers that blossom on the tips of mature plants that grow upwards from the soil. When the bird-creatures grow old and fall from the sky the seeds inside their bodies will have a chance to sprout into a new plant, provided that they fall into suitable soil.

The second important rule of the Jar is another one borrowed from our own world, which is that all entities will be transient. They will grow from a seed, hatch from an egg, or branch off from their parent. And on the other side of this duality, there will be an eventual death when their size gets too large to support, they give their energy to their offspring, they're eaten by another creature, or they starve.

With these main rules governing life in the ecosystem, I hope that two major meta-dynamics will be observable to the viewer. The first is dynamic equilibrium, or sameness while changing. I want the simulation to be as enjoyable to watch as a campfire or moving water, and to not run itself aground if left running for long periods of time. The ecosystem's health may wax and wane, but I hope to design it to be robust and very rarely result in the extinction of any of the vital species (without user intervention, which may be incorporated eventually). The second important dynamic that I hope will be apparent to the viewer will be the interconnectedness of the simple ecosystem. Events such as the scarcity of plants

or overpopulation of worms should naturally have their own effects and consequences. These narratives and others I cannot predict will provide and interesting and thought provoking viewing experience, without ever being explicitly programed to occur.

Media

The simulation will be programmed in Java, a language that facilitates portability across different devices and operating systems, has facilities for graphical output, and is well-suited to the object-oriented nature of this program (Object oriented programing is a programing paradigm that builds upon a hierarchy of nouns with their own associated verbs, as opposed to a list of verbs to be executed in order). Another very nice benefit to using Java is that the app will be able to be embedded into a webpage, which will make it friendlier for online distribution.

The graphical style will strictly be a grid of colored pixels, like an 8bit ant farm. The pixel structure will extend beyond just the graphical output, because the entities themselves will also be shaped by this structure. Each creature will inhabit a discrete number of tiles. This means that what's visible on the screen is actually all that exists. There will be no unseen creatures or background interactions that aren't expressed as pixels on the screen, resulting in a simple universe laid out for the viewer.

Another important aspect of the media is the use of color. Color is very important in capturing the fantasy ecosystem and the color pallet will use contrast and desaturated colors to achieve an aesthetically cohesive result. Color will also be tied to the health or contained life-force of pixels. Each entity will have a color ramp that conveys it's concentration of life force. For instance, a pixel of soil may be a deep loamy red when high in nutrients, but more brown and dull when depleted.

The world will also create music by living. Each creature will have simple noises that work together to procedurally generate music that reflects the activity of the world. Like wind chimes, the music will be tied to the movement of the simulated world.

Site

Jar will be hosted online, but I want to encourage viewers to download the simulation software in order to have more long-running and permanent worlds than a browser tab provides. I believe that the world of Jar will be more engaging with minimal explanation. An important part of the experience will be each user's discovery as they figure out for themselves how the world operates and what each creatures' lifecycle and place in the ecosystem is. Related to this sense of discovery, I will refrain from publishing official names for any of creatures, leaving that process open to the viewer. I hope that people make connections with their world through watching its growth and the stories that it provides, like an ant farm, terrarium, or windowsill garden, and these connections help them to see patterns outside of the Jar.

Jar could also be enjoyed in a more traditional public setting, projected on a wall in a gallery or quiet space, I hope that it would provoke curiosity and start conversations between viewers, hopefully using their own names for the creatures!

Reference Points

Jar is a synthesis of elements from similar projects, both digital and real. Other biological simulations, games, and real ecosystems heavily influenced my ideas and creative process.

John Horton Conway's Game of Life is a notable cellular automaton game, in which pixels in a grid follow simple rules that govern their existence. The "game" (there is no user input besides setting initial state) is famous for the level of emergent complexity from the simple rules that run it. [1]

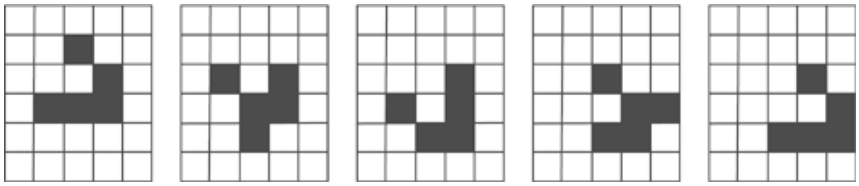

Figure 1 "Glider" one of the most famous emergent structures found in Conway's Game of Life

Falling sand games are more contemporary and less academic than the game of life. Falling sand is a genre of open ended particle simulation games dating back to 2005. You are given a pallet of pixelated elements, usually including seed, dust, water, stone, oil, fire, and gunpowder to build and experiment with. The games captured my childhood imagination and I always wished that the interactions were more dynamic and systems could be made to grow beyond what the user inputs. Jar's particle based engine is inspired by falling sand games, but I hope to explore a more procedural unfolding of complex events and a passive mode of interaction with the player.[2]

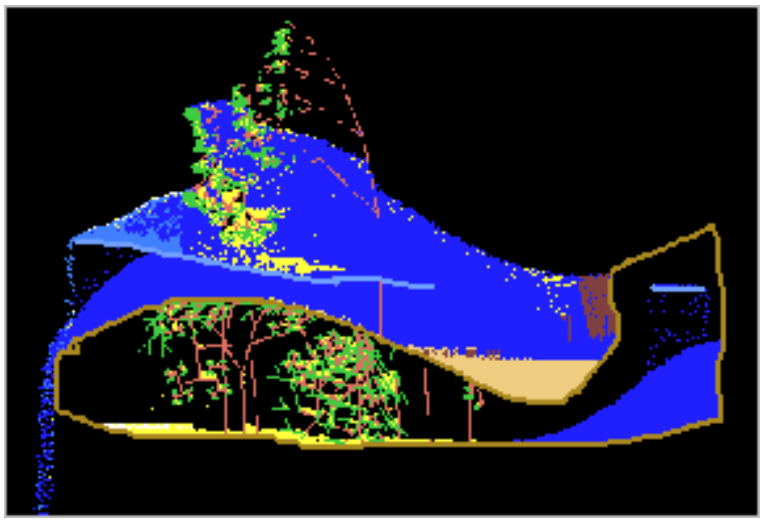

Figure 2, Scene from a Falling Sand game, featuring water and plants

Self-contained terrariums are fascinating crystallizations of working ecosystems. Most commonly sealed in a glass vessel, the balance of flora, fauna and sunlight work together to provide everything needed by the others. Jar hopes to capture this phenomenon in a fantastical and visually striking format.

Figure 3, left, David Latimer with his garden sealed since 1960

[1] http://en.wikipedia.org/wiki/Conway's_Game_of_Life
[2] http://dan-ball.jp/en/javagame/dust2/

Proteus is an art game built by Ed Key and David Kanaga. In their words, it's a game about "exploration and immersion in a dream-like island world where the soundtrack to your play is created by your surroundings". Visiting the island of Proteus is a serene and memorable experience, and I hope to capture the same sense of wonder when people interact with Jar. The major aspects of Jar inspired by Proteus will be the color pallet and the generative music. Proteus uses beautiful color pallets to take the player to a different world, and to send messages about the mood of the pulsating world around you. The music in Proteus is generated by the reeds, wind, trees, flowers, and creatures as you walk among them and is as well designed and incorporated into the experience as the visuals. I hope to use similar techniques in Jar to play generative music.

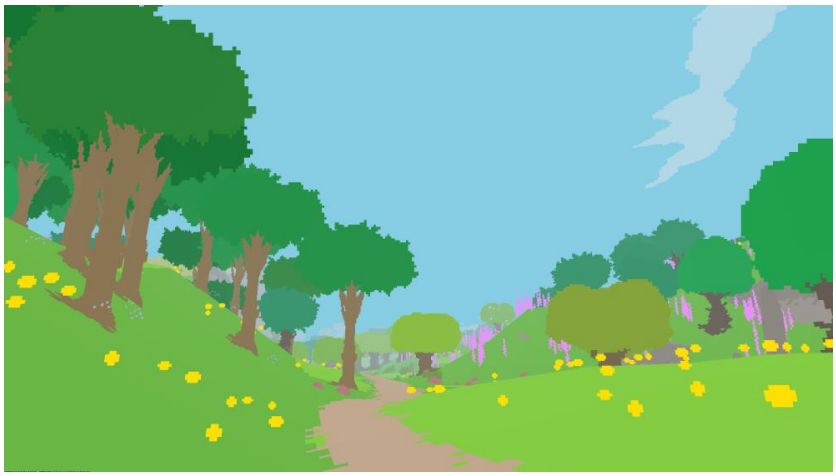

Figure 4, Summer scene from Proteus

Darwin pond, developed in 1997 as a research project is an "Artificial Life Simulation": a virtual world exhibiting the emergence of life-like evolution behaviors. It is a virtual primordial soup, where randomized swimming creatures compete for food and mates, evolving over generations, and displaying accelerated natural selection right before your eyes. The software is amazing because the evolution really does work, and you can see a population of flailing creatures reach higher levels of fitness until only the most refined swimmers are left. It is also fascinating what wide variety of life emerges from the simple simulations. Biodiversity in a computer program! Jar is inspired by Darwin Pond because it shows how amazing computer simulations of life can be, and how closely they can mirror real biological phenomenon like natural selection.[3]

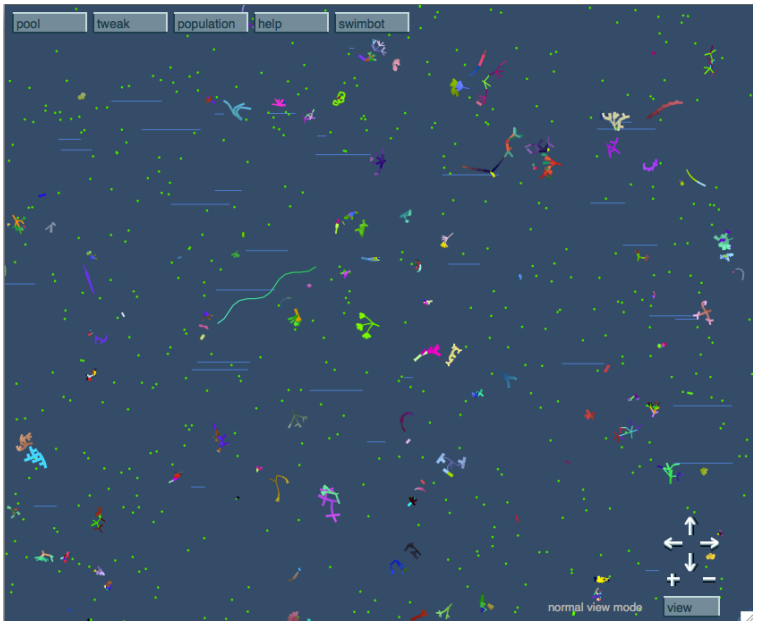

Figure 5 Screen from a Darwin Pond simulation

[3] http://www.darwinpond.com/

Ethical Implications

Jar is a game that is tied to our understanding of ecosystems, which we all exists inside of but can often be too large to fathom or understand. Giving the viewer a chance to be absorbed into the workings of a more manageable ecosystem will give them new perspectives and understanding on the ecosystems they are really part of. Future versions of the game could include opportunities for player interactions that could affect the state of the Jar's balance and health. I hope also that Jar will be a meditative experience, and tracking the progress of their small world can soothe and engage those whose imaginations are captured by the project.

Supporting material

This is my rendition of what Jar may look like when finished. Note the worms, plant life, soil, and birds. These are the currently planned entities, but others may be added to fill niches in the ecosystem and to increase biodiversity. The size and resolution of Jar are also open to adjustment.

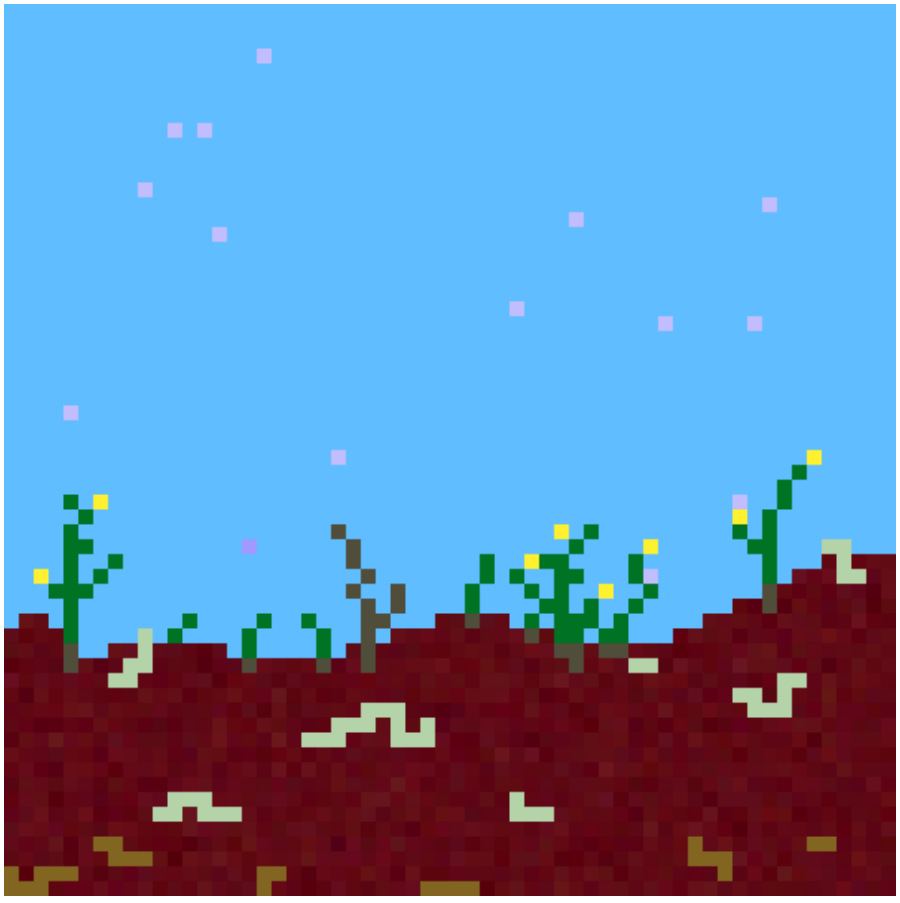

Figure 6, Prototype rendering of Jar

Jar is a real project that I am working on as I learn Java, and the current version can be found hosted on my GitHub page.[4]

The most interesting challenge I face in Jar's development is tuning interactions to be dynamic, balanced and complex.

[4] https://github.com/MaxBittker/vessel