Gentle Garden   Minjoo Kim (minjooki)

Project Proposal

As an interactive gardening game, this game is meant to simulate growing and tending for plants with different terrains, from planting seeds all the way to harvesting fruits and vegetables. The changing weather and the user's ability to properly water the plants influences each plant's growth. As there are more plants planted, leveling up grants the user more space to grow more plants.

Competitive Analysis

Much of my inspiration for this project comes from games that involve interaction with the environment, like Minecraft and Stardew Valley, and games that revolve around farming, like Harvest Moon. Similar to Stardew Valley and Harvest Moon, planting areas are determined by rectangular areas, and plants require the right amount of watering to grow. However, unlike both of those games, the user in this game grows fruits from both trees and smaller flowering plants rather than mainly growing crops for sustenance. The user also does not have the ability to directly change and interact with the environment beyond planting and harvesting.

Instead, the game is focused more on simulating a real life garden, where each fruit has different optimal temperature ranges that, when paired with the user's watering, determine the growth rate of the plant. The speed at which the plant will advance through growth stages is based on the current temperature of that day and the watering level. Similar to Minecraft, harvesting plants returns some amount of seeds that ensure that the user will be able to plant more.

Structural Plan

The main file will contain animations and some of the more central algorithmic aspects of the game. Big classes, such as the Plant class, will be organized into a separate file and imported into the main file to be accessed. Branching off of the Plant class will be smaller classes for each growth stage. Smaller helper functions that can be used across multiple files will be sorted into a separate file that will be imported into all the files that need access to it. Other important aspects of the game, such as terrain generation and

Algorithmic Plan

The first complex algorithmic component is terrain generation through a variation of Voronoi noise. While Voronoi noise is often used to create maps of biomes, I plan on using Voronoi noise diagrams to divide the initial starting farm into the different types of terrain available–tree planting plots, regular planting plots, and grass/walkways. This starts by randomly initializing five points on the canvas, each point representing a type of terrain. From there, the canvas is divided into rows and columns that will be plotted to the nearest point, which will create a "cell," or the bounds of the terrain.

Another important feature of the game is the ability to grow fruits in a way that mimics real life. Part of this implementation includes changing weather/temperature conditions that have an impact on the plants' growth rates. These changes in the temperature will be modeled through a midpoint displacement hill generation algorithm, where the values generated by the

resulting hill will instead represent temperature values that gradually change to mimic temperature changes in real life.

Timeline Plan
TP1 - Terrain generation and main aspects of picking and planting seeds
TP2 - Cooking, wrapping up planting/growth algorithm, adding more terrain from leveling up, saving progress
TP3 - sprite movement, final graphics/images, sound

Version Control Plan
Github/Git backup with branches and commits – I make sure to push everything to the cloud every night or after I am done with an important part of the code.
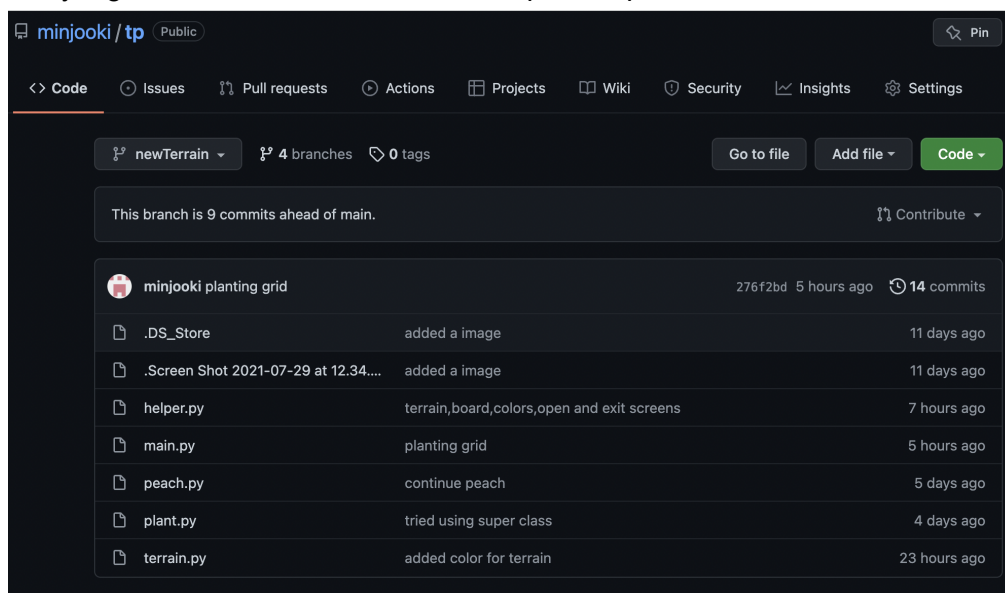
Module List
None

TP 2 Changes:

- Added Dijkstra's pathfinding to user's home from current location
- Did not use midpoint displacement for temperature generation
- Removed cooking as a main game play point