IM3002 Term Project C - Design Document

Nabeeha Ali, Amy Truong

April 12, 2022

Objectives

For this term project, we decided that our goal is to procedurally model an application in Maya that produces a complex vegetation pattern. The application will feature an L-system based model of ~~tree~~ gazebo vines and fencing around an adjustable ground size, and stochastically generated vegetation on grassland. The group members of this project are Amy Truong and Nabeeha Ali. Since there are two members of this project, we have chosen two items from the provided list in order to double our scope. Amy will be responsible for creating the vegetation land featuring various types of plants and objects, while Nabeeha will be focusing on the development of the ~~tree~~ gazebo vines and fencing. ~~Since project scopes are always changing, we have planned ways to adjust our plans depending on if there is more or less time:~~

~~*Scope Reduction:*~~
- ~~Decrease the number of items to feature on grassland~~
- ~~Remove the option to choose the dimensions of the vegetation plane~~
- ~~Decrease the number of vegetables to feature on L system vine~~
- ~~Remove fencing L-system~~

~~*Scope Expansion:*~~
- ~~Increase number of plant options~~
    - ~~Add more plant types in the GUI~~
- ~~Add subtle animations to objects such as flowers moving up and down~~
- ~~Random cloud generator for scene~~
- ~~Add parameters to change axiom for vegetable vine~~

High-Level Modules

This project will be divided into four main modules, one for the GUI, one for the grassland, one for the ~~vegetable~~ vine, and one for the fencing.

1. GUI window
2. Generate grassland (plane)
    a. Generate tall grass
    b. Generate daisies
    c. Generate ~~pumpkins~~ sunflowers
3. Generate ~~tree~~ gazebo vine

      a. Generate two variations of leaves

      b. Develop rules for L-system (regular L-system)

4. Generate Fencing

      a. Include fence

Mockup

The GUI will have a combination of buttons to generate elements of the scene as well as options to modify the parameters of the grasslands.

- **Grasslands:** For the grasslands, the GUI will have a slider for the user to adjust the size of the land, checkboxes to indicate what plants they want to generate, and a button to generate the vegetation plane
- ~~**Tree**~~ **Gazebo** **vines:** The GUI options for the vines will include a slider to determine the length of the vine for the ~~tree~~ gazebo
- **Fencing:** The GUI options for the fence will include one checkbox that will determine whether fencing is added to the perimeter of the ground
- A **button** to clear everything in the scene
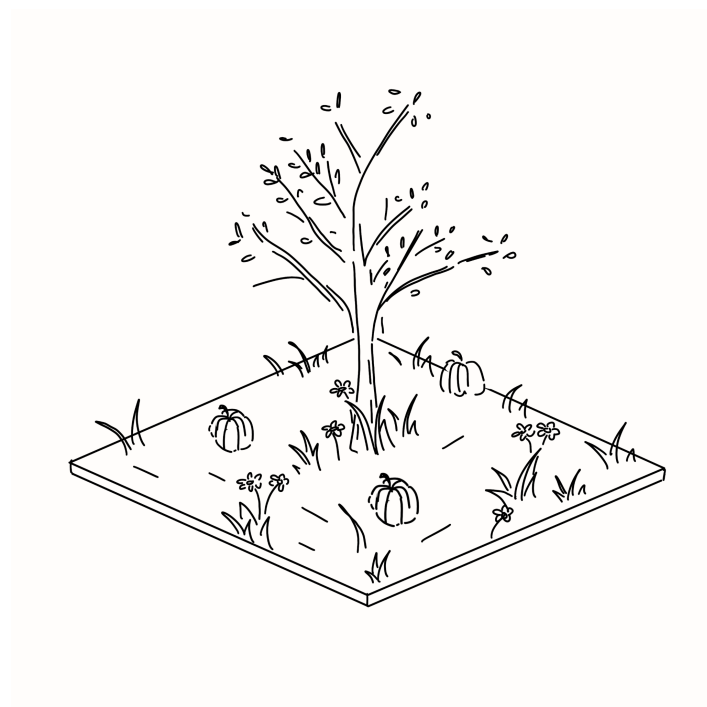
We created a rough sketch to help visualize the layout of our final model. The ~~tree~~ gazebo will be placed in the middle by default and the user will have the option to select how they wish to decorate their garden. They can decorate by adding plants, adding a ~~tree~~ gazebo vine of various lengths, and fence the surrounding area.

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Backlog

Task	Assignee	Progress
Add grassland parameters to GUI	Amy	Completed on March 12
Poly model tall grass patch	Amy	Completed on April 9
Randomize position 3D models (done to one object, applied to all)	Amy	Completed on March 12
Poly model daisy	Amy	Completed on April 11
Poly model sunflowers	Amy	Completed on April 9
Generate random daisies	Amy	Completed on March 13
Generate random sunflowers	Amy	Completed on March 13
Generate random tall grass patches	Amy	Completed on March 12
Create GUI window	Amy/Nabeeha	Completed on March 12
Poly model ~~tree~~ gazebo in the centre of the grassland	Amy/Nabeeha	Completed on April 11
Create clear button for scene	Amy/Nabeeha	Completed on April 2
Add tree vine and fencing generator buttons to GUI	Nabeeha	Completed on March 12
Add text field to name the garden in the GUI	Nabeeha	Completed on April 2

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Define rules for ~~tree~~ gazebo vine L system	Nabeeha	Completed on April 1
Define axiom and variables for L system	Nabeeha	Completed on March 11
Poly model leaves on vines	Nabeeha	Completed on April 1
Poly model fence	Nabeeha	Completed on April 1
Connect fencing to plane dimensions (to fit around perimeter)	Nabeeha	Completed on March 12
Keep tree vines within the area of the given vegetation plane	Nabeeha	Completed on April 1

Summary of Changes:

- Overall, we stayed faithful to our initial scope of this project, with the exception of changing the tree to a gazebo
    - Since the vines move linear downwards, having a tree with various branch heights would make the vines go below the ground
    - A gazebo is a non-organic object, making the vines look more visually pleasing while staying in the garden theme
- We polymodeled our existing elements to add details to the scene
- Minor adjustments were made to the rules of the l-system to see what looked visually pleasing
- Code to produce vines has been optimized to be built using one function