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Assignment 6: **Graphical User Interface Design**

Entry Class: **Assignment-6.src.a6.Main.java**

Summary

The most challenging aspect of the assignment was learning to use JavaFX appropriately to display the CritterWorld. It is a completely new experience for us as we have never done anything serious with GUI's before. Therefore, we were not exactly sure how to deal with Panes and formatting and Boxes. We decided to create two main Panes, one representing the world itself, and the other used for user input and information output. We used the Model-View-Controller design method, using CritterWorld from Assignment 5 as the model. We created the controller and view separately from the model so as not to affect the model at all. We had issues properly displaying the CritterWorld, partially due to the hexagonal grid that the world is based on. We have decided to portray critters of different species (programs) with different colors by adjusting the hues of the images.

We have no current known problems in our project.

Specification

Package ast holds the classes that represent the Abstract Syntax Tree (AST). Package parse handles parsing a file and creating the corresponding AST. Package a5 interprets the AST for a particular Critter and simulates the corresponding critter, initializing it with rules and a state. All the Critters thus initialized make up the CritterWorld, which is represented through the Hex class that keeps tracks of all other aspects of the critter world like rocks. Package a6 handles the controller and view, as well as containing the main method which starts the GUI.

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Design Implementation

Classes and Architecture:

Controller: The controller for the GUI. Listens for mouse action and updates the program accordingly.

HexPolygon: A class that extends from Polygon used to display the hexagonal grid. Each HexPolygon contains a column and row that relates to its position in the CritterWorld.

Main: The class that coordinates the Model, View, and Controller. It is the entry class of the program.

View: The class that handles the visual aspects of the GUI. Currently handles the representation of the CritterWorld as a whole.

The classes in a5, parse and ast have been documented earlier.

Code Design.

The main part of the assignment that required algorithms was finding a way to efficiently create the hexagonal grid display. Our algorithm uses a general method to create a hexagon, and adds to each point a certain distance to separate it from the top left corner. Thus, we are able to create a hexagonal grid with any number of maximum columns and rows.

We use 2d Arrays and ArrayLists to represent the Hexes and Critters.

Programming.

We have implemented a Model View Controller design for our classes. We use a Top-Down approach by originally planning our GUI design and implementing each class after.

Our main challenge was how to represent the world properly and format the program to allow for user input. Most of these problems occurred due to our lack of experience with JavaFX, but we are able to find ways to solve them.

Jonathan Chen wrote View and HexPolygon. Ishaan Jhaveri wrote Controller. We then edited what each other wrote. We worked together to edit Main and anything we needed to change in previous assignments.

Testing

We will run the program and test each function that is required of it. We will make sure the program is able to load worlds, create new critters, select certain critters, and so on by visually inspecting the world. We do not think JUnit tests are needed for this portion of the assignment, as we can tell ourselves by looking at the program if it is working properly or not.

Known Problems

We have no known problems with our assignment.

Comments

This assignment is not extremely challenging, as much as time-consuming because of our lack of knowledge of JavaFX. After we learned more about how to use it, the assignment became easier. It is also nice to finally see the critters and world that we have been working on for so long.

Time: Roughly 20 hours

Advice: Draw out your GUI before implementing it. Have some solid knowledge of JavaFX.

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Surprising: How long GUI code is to implement, leading us to pay extra attention to how to organize the code.

Hard: Attempting the assignment without much knowledge of JavaFX.

Like: Being able to see the world in a graphical representation.