Shalini Panthangi
TP1 Project Proposal

Project Description:

The name of my term project is Enzymes vs. Mutations. This is an Educational Cancer Biology game modelled off of Plants vs. Zombies, but with a biological twist. The mutations are this game's version of zombies, while the enzymes are the "plants" that have different functions to fight against the mutations with different fighting abilities.

Competitive Analysis:

Several 112 students in the past have done a version of plants vs. zombies, but their "plants" had different functions than my "enzymes". Their boards are also designed differently, with different capabilities. The main idea similar to this that I have seen online is plants vs. zombies, since my game will be modelled off this already existing game. However, my game is more of an educational game, with pop-ups at each level explaining different biological concepts. Furthermore, each of the "plants" will have different, almost-biologically-correct functions to fight the mutations, while the "zombies" will have almost-biologically-correct functions while trying to attack the good cells and kill them off.

The game will also be geared toward a more educational experience, with pop-ups describing each major biological concept as it appears in the game. While the purpose of the game is to win, the overall purpose of the project is to bring more awareness to cancer concepts. Lastly, this game also incorporates an infection-style concept, where if certain mutations come in contact with the good cells, the good cells also turn into mutations to target the rest of the good cells. This is similar to how in cancer, cancer cells divide uncontrollably and increase mutation rate.

Structural Plan:

I will have 2 main classes in my program. I will have one class for each enzyme group and one class for each mutation group. The enzyme class will hold information such as the number of enzymes allocated for each mutation group for the level, as well as the locations, times, and images for each of the enzymes. There will also be an overall availability and enough atp variables to keep track of whether all the enzymes have already been used or if there isn't enough atp to buy them yet. This makes it easier for me to know how many of a certain enzyme the user has remaining without having to loop through too many values in a list. In appStarted, I will create multiple lists, one for the enzyme groups I initialize, one for the mutation groups, one for the atp locations, one for the locations of the enzymes on the board, one for the positions of the shots, and one for the locations of the mutations on the board.

I will also split my file into controller functions (such as timerFired, mousePressed, mouseDragged, mouseReleased), model functions (where I update the board, change the positions of objects on the screen, and view functions, where I draw all the little parts of the board.

Algorithmic Plan:

One of the trickier parts of the project is the 2.5D, isometric projection board. To find the equation for a hardcoded board, I manually drew out such a board, mapped the coordinates to where I wanted them to go, and created my own function (I have proof in my notebook for this!).

From here, I will also add a rotating function using matrix transformations and the matrix multiplication method, so I will need to change these hardcoded values into values that change based on where the user's mouse is dragging on the screen. This will be done by calculating the distance the user's mouse is from the center of the board and changing the tile width and tile height accordingly.

The second algorithmically-complex portion of my project will be the procedural generation of the levels. To do this, I am planning to create a basic function which takes in a number that both randomly and based on the level number changes things such as the number of mutations on the board, how fast the mutations are coming, how many come at once, how many plants the user is given, what plants are open for them to use, etc. This function will map a natural number (level number) to a tuple of all these specifications using if statements and random integer functions.

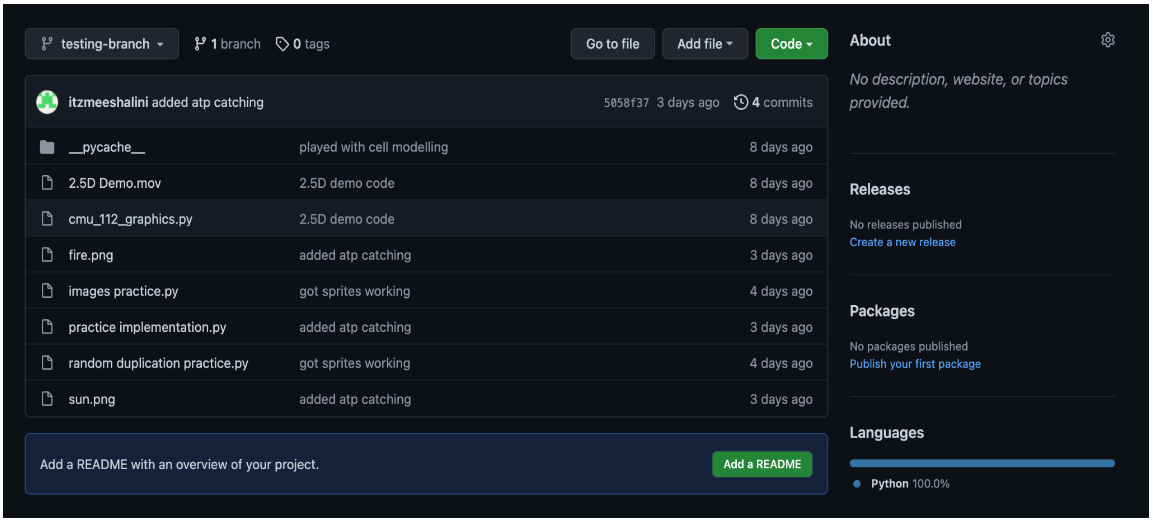
Timeline Plan:

Date	**Task**
11/20/2021	Get rotation to work for 2.5D board
11/22/2021	Add 2 more enzymes with different functions, get basic procedural generation done
11/23/2021	Add different mutations and get them to collide with the enzymes or die properly Make procedural generation a little more sophisticated
11/27/2021	Add educational message pop-ups that are accurate
12/03/2021	Add sounds, graphics, more modes, help function, different gameplay versions, maybe flipped mode, add more enzymes and mutations

Version Control Plan:

I am using github as my version control plan. I integrated this with vscode, and I will push all my code changes after every major code change that I make. If I do not make a significant change for the day, I will still push all of my code to my github repository daily.

Image of working github repository: (my username is itzmeeshalini)



itzmeeshalini added atp catching 5058f37 3 days ago 4 commits

__pycache__	played with cell modelling	8 days ago
2.5D Demo.mov	2.5D demo code	8 days ago
cmu_112_graphics.py	2.5D demo code	8 days ago
fire.png	added atp catching	3 days ago
images practice.py	got sprites working	4 days ago
practice implementation.py	added atp catching	3 days ago
random duplication practice.py	got sprites working	4 days ago
sun.png	added atp catching	3 days ago

Add a README with an overview of your project.

About

No description, website, or topics provided.

Releases

No releases published
Create a new release

Packages

No packages published
Publish your first package

Languages

Python 100.0%

Module List:

I am not planning to use any external modules in my project, except for PIL.