

Game Design Proposal - Ireoluwa Alarape

Project Description

'Youkaryote' is a simulation type game. It treats the parts of a eukaryotic cell as a city/castle that the player has to build, micromanage, and improve for the goal of producing protein, expanding and conquering the entire map.

Competitive Analysis

My game is inspired by similar expansion/domination strategy based games. Specifically, civilization 6, cities skyline and goodgame empire. The hexagonal tile structure and ability of viruses to move around the wider map is reminiscent of civilization. The structure of the cell itself and ability to place objects to increase production is inspired by Goodgame empire.

Youkaryote is going to be different in its faster paced nature. I plan on having energy buildup and upgrades be faster than the other proposed games. The game will also not be turn- based, as viruses will continuously be moving across the map, not waiting for the player to be ready or make their turn. Youkaryote is also different in scale, As every tile on the map is a potential cell that the player can own, the player will eventually have to manage a massive amount of cells (the entire map).

Structural Plan

After MVP, sprite and all animations will be kept in a separate folder

Game save files will be saved on local computer

Different files will handle different logical aspects of the game. I have a draw and classes file, I plan on separating all the map generation logic in separate folders as well.

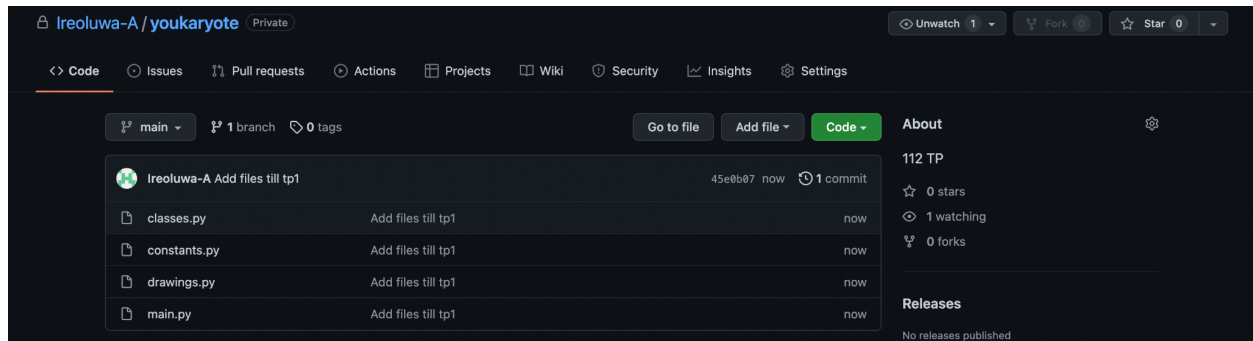
Algorithmic Plan

Map: Generate using cellular automata, and both flood fill and prims algorithm to ensure there are no islands. I.e always a viable path from one section of the map to another.

Viruses AI: Weighted A* pathfinding algorithm. Viruses main goal is to reach the player's cell and will generally take the fastest path to this objective. However, cells have different resources and the virus will prioritize getting resources from these cells on their path to the player's cell

Version Control Plan

Currently have a github repo, where I will be saving the different versions



Module list

Aside from PIL for animations/images, I do not plan on using any other modules.

Timeline Plan:

Complete main basic gameplay: 22nd April

Add post mvp features i.e saving file, loading pre saved maps: 24th April

Monte carlo and tips on what to upgrade: 26th April

TP2 updates

No major changes to the design. Fixed virus pathfinding so its weighted, taking into account the resources on each tile. Made terrain always playable, with primis and floodfill algorithm. Also added several features to enhance gameplay. This includes having the cell have a region around it the player controls and gains resources from.

TP3 Updates:

Updated gameplay: Made pressing s show stats of individual organelles and current production of already placed organelles. S also show stats of nucleus

Added centrosomes, an organelle that has to be placed before cell is allowed to perform mitosis, along with regular atp and protein requirements.

Added general cell information, including current total energy and output production and steps left to complete mitosis.

Added settings page to customize map, also useful for game testing. Can change size of hex tiles, smoothness of map, abundance of resources on map, density of map tiles.

Can also change virus settings: virus respawn rate and virus movement speed.