

15-112 Term Project Proposal

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Abstract

This is a brief proposal for 15-112 Term Project, the game **Cellular War**. I will discuss the modules I plan to use and my basic ideas below.

1 Introduction

Basically, using the knowledge about Python from course 15-112: Fundamentals of Programming and Computer Science, I am planning to make a partially-artificial-intelligence game named the **Cellular War**. The primary module I will use is *pygame*, but to construct a better user interface I will also perhaps include *Tkinter* as a GUI (Graphic User Interface).

2 Rule

This is a cell-attacking-cell game. In the main menu, user can click "Play", "Achievement", "Help" and "Settings." While the usages of the latter two are self-explanatory (one for help and the other for controlling preference), the "Achievement" is to record the activity of the player such that certain statistics can be saved. And if "Play" is clicked, the user will be able to choose the level of the game: there are a few levels, and the user can go to the next level if and only if the current highest level is cleared.

In this game, the player will be a green cell. For each cell, there will be one or two tentacles that can reach out to other cells. And for each cell, it has a life value that increases with time gradually. The goal of the user is to occupy and assimilate the other "enemy" cells, by clicking and dragging the mouse. The length of the tentacle reached out is proportional to the life value it carries. So as the tentacle getting increasingly longer, the life value of the cell drops. And if the distance

between two cells is farther away than the life value can supply, you will have to wait for the life value to increase.

2.1 Types of Cells

- EMB-Embrace cell. This kind of cell appear only after level 3 is cleared. It can move freely (so it's mobile) and once it gets in touch with any other cell (neutral, friendly or enemy, see below, its value will merge with the target value— it may cancel or add up based on the target's identity).
- ATT-Attacker cell. This kind of cell is immobile, but it can reach out tentacles to other cells. "Signals" that transfer the life value will be transported by the tentacles to the target cell. For instance, if the user is a green cell whose tentacle reaches a gray (neutral)/red smaller-in-life-value cell, the green life value it transports will attempt to assimilate the target. Once the assimilation is complete, the target becomes GREEN!

2.2 Cut

Once a tentacle connection is established, it can be cut by user dragging the mouse click "across" it— just like how you cut a line in life. As is introduced before, reaching out tentacles takes life value. So if the cell's life value reaches zero before its tentacle reaches the target, the tentacle gets back. Now say that the tentacle is worth of life value of $v = 13$. Note that the life value it worths has nothing to do with the life value **of the cell** that it transports. Then if we cut the tentacle, the part closer to the cell immediately gets back to the cell; and the back closer to the target will quick "collapse to the target." Based on the color of the target, this $v = 13$ may cancel or increase the life value of the target.

3 Artificial Intelligence

Besides the player end cell, there are enemy cell, which are controlled by the Artificial Intelligence (AI) algorithms. The algorithm will calculate the most optimal choice to make, and then execute it.

THIS PROPOSAL IS SUBJECT TO FURTHER UPDATES.