Design Proposal

\*Project Proposal

**-Project Description:**

“Help, Ditto!” is a game motivated by pokemon games on nintendo. The player solves an auto-generated maze to transform his or her ditto into a new pokemon. This new pokemon later helps the player fight against his or her CMU assignments.

**-Competitive Analysis:**

<https://www.youtube.com/watch?v=US4CUpPGtWA>

This project is similar to the link above in that it involves a maze generation and when the player encounters something on a maze, a battle begins. Unlike the project above, this project uses a kruskal’s algorithm to auto-generate a maze and the player gets to transform his or her ditto into another pokemon after using ditto’s skill “transformation”. The battle ends immediately when ditto transforms into another pokemon.

Furthermore, this project also involves a battle system in a certain condition like the project above does. However, the battle that occurs in this project is different from the original pokemon battle game in that the opponent is an assignment assigned by CMU professors, not another random pokemon. This project also not follows the different effects that different types of pokemons have on each other applied in the original pokemon battle.

**-Structural Plan:**

There are several modes in this game: a main starting screen, a maze screen, a help screen, a battle screen, and a CMU assignment screen. All the modes will have their own redrawAll, keyPressed, and/or timerFired functions. On the appStarted function, all the initial variables are written and some functions are called. A main starting screen involves some texts using a redrawAll function. When any key is pressed, the screen turns into a maze mode, which involves drawMap, drawGirl, moveGirl, formMazePattern, drawFollowingPokemon and other functions that help draw map and makes the player move and encounter a new pokemon. The next screen is a CMU assignment screen where the text on the screen lets the player decide which battle they want to do. If the player moves on to a battle screen, the battle screen uses drawing functions and functions related to minimax AI.

**-Algorithmic Plan:**

There are two most complex parts in this project: a maze generation and a pokemon battle.

A maze generation in this project involves Kruskal’s algorithm so that the maze can be randomly generated each time the game begins. As stated in wikipedia (<https://en.wikipedia.org/wiki/Maze_generation_algorithm#Randomized_Kruskal's_algorithm>), a list of all walls and a dictionary of a set for each cell will be created. For each wall in a random order, the cells divided by this wall will be checked if they belong to distinct sets. If they do, the current wall will get removed and the sets of the two divided cells will be combined.

For the pokemon battle part, a game AI, specifically minimax, will be used. Minimax AI will be used to determine the best possible move the opponent can make to reduce the player’s pokemon’s HP. Minimax will involve recursion to simulate what will happen in the future and choose the best possible move.

**-Timeline Plan:**

The basic goal is to finish at least MVP by the TP2 deadline. Specifically, maze generation algorithm will be implemented by 4/16, switching ditto using a simple pokemon battle will be implemented by 4/17, and the game AI will be implemented by 4/19. The rest of the days before the TP2 deadline will be used to clean up UI and edit some features.

After the TP2 deadline, if possible, the project will include more complicated features in the maze generation and more types of pokemons and assignments will be added so that the player has more choices.

**-Version Control Plan:**

All the versions of the code are stored in iCloud as shown below.

Graphical user interface, application

Description automatically generated

**-Module List:**

This project does not use any additional modules.

**\*TP2 Update:**

-Instead of using AI for the battle between the homework assignment and ditto, I used the same default values for the damages that the assignment gives to ditto.

**\*TP3 Update:**

-A timer was implemented in the maze mode. When the time is over and the player hasn’t transformed ditto into other pokemon, it is game over. When the time is over and the player has trasnformed ditto into some other pokemon, the player must move on to the next step.