

## Final Project Proposal

# [Doubling our way to] 2048

### User Experience

We will be creating 2048 as a single-player interactive game played in the terminal. When the root file is compiled and run, an initial welcome message and a 4 x 4 grid will be displayed. Instructions will be displayed underneath the grid. The player will be shown a **Grid** with 2-value and 4-value instances of **Tile** sparsely scattered within. The player will “swipe” the tiles in one direction, resulting in same-value tiles “merging” and therefore doubling in value, until s/he exhausts the amount of opened and/or mergeable tiles or reaches the exalted holy 2048 tile. Swipes will be dictated by using letters [w, a, s, d] instead of the direction keys on the keyboard.

### Classes:

- **Grid**: this class will act like a 2D ArrayList, but will not use ArrayList. It will use actual Objects arrays, with distinctive add and remove functions. It can also right, left, up, down justify.
- **2048**: This class will use Grid (that is, have an instance variable Grid with each instantiation) and its functions to model the game.
- **Tile**: This class will be the object that fills the Grid in 2048
- **Empty**: This class will act as a placeholder for empty slots in the Grid during the 2048 game

### Interface:

- **Equalizing**: use to set guidelines for the **Tile** and **Empty** class
  - public int value()
  - public boolean isEqual(**Equalizing** other)

### Showcase:

#### Tools:

- Tiles[][] : Grid system for 2048 **[2D Array]**
- User input : User dictates direction of justification (left/right/up/down justify) **[Importation]**
- Math.random() : randomizes whether the 2 or 4 tile will appear
- Math.random() : randomizes location where the 2 or 4 tile will appear
- add-at-index() : adds a tile to a given location
- isEqual() : compares if tiles are equal
- System.out.print() : to print the 2048 grid

#### Concepts:

- The user tries to reach 2048 by swiping [ A for left, S for down, D for right, W for up] and combining tiles
- Instances of class **Empty** will be used to indicate placeholders, or no Tiles
- **Tiles** only combine when two tiles are of equal values and are adjacent in input direction from user
- **Tiles** can only merge once every turn
- After every turn, **Grid** is printed out
- When the user reaches 2048, the game ends and a notification of winning the game will be printed out
- When the user fills up the grid and no possible moves can be made, a notification of losing the game will be printed out
- Insignificant values would “bubble” to the opposite direction of justification

### Stretch:

- Shift elements vertically in a 2D Array

### **Additional Functionality (for fun)**

- Allow user to choose the size of the grid
- Allows user to reach numbers beyond 2048
- Allows user to choose difficulty, more difficult modes will have a higher chance of a new tile having a higher value.