# 2048 GAME

Python + Tkinter

* Combine tiles containing same numbers till we reach 2048
* Tiles contain only power of 2 [2,4, 8…]
* Ideally board is 4x4, but we need to have configurable dimensions
* Score tracking in GUI too
* Game restart button

Functional programming

* Functions for each move [up, down, left, right], function for merging tiles, generating new tiles
* Separation of logic and UI
* No global state [only passed explicitly]
* As dimensions are variable, need to consider that and hard code dimensionss

Components

1. Board
   1. 2D array
   2. Empty cells represented by “0”
   3. Non-empty = power of 2
   4. Eg: board =

[[2, 0, 0, 2],

[4, 4, 0, 0],

[0, 0, 0, 0],

[0, 0, 0, 0]].

1. Moves – After each move, we
   * 1. Compress – Slide tiles to a side [UDLR]
     2. Merge – combine equal sides after a move
     3. Compress – after merge, need to slide tiles to recent direction
     4. Spawn random 2/4 at empty spot
   1. These actions will be in 4 move functions, each returning a new board and score gained:
      1. move\_left(board)
      2. move\_right(board)
      3. move\_up(board)
      4. move\_down(board)
2. End Game:
   1. Win – when any cell is 2048
   2. Lose – when board is full and no valid moves
3. GUI:
   1. Grid displaying tiles
   2. Score
   3. Restart button
   4. Keyboard listeners [UDLR]
4. File (Logic) Separation
   1. main – starts GUI, initialize game
   2. logic – functions for game logic
   3. gui – Tkinter for UI
   4. utils – helper functions
5. Score calculation
   1. When merging, score += merged\_val [i.e., sum of 2 equal merged tile]
6. At start, ask user for the board configurations