



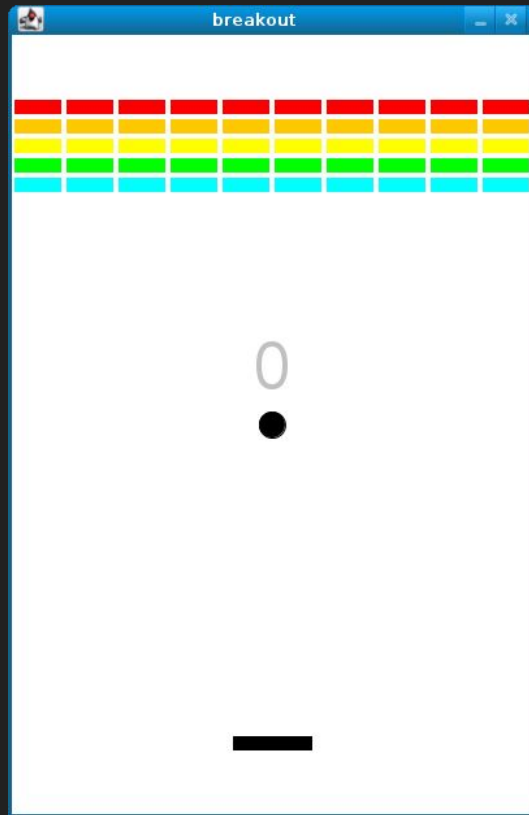
# GD50

## Lecture 2: Breakout

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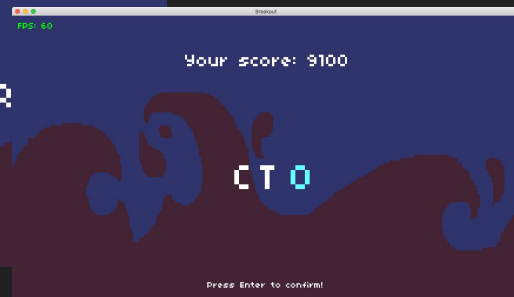
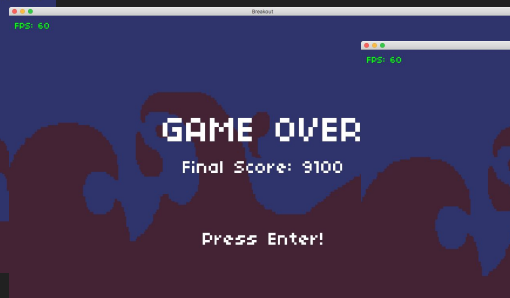
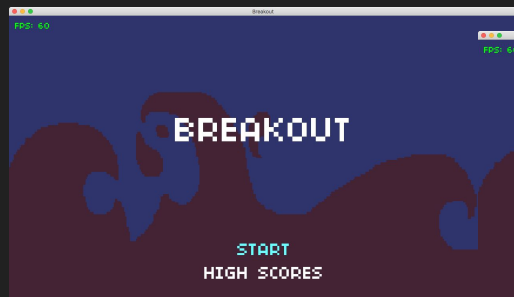
<http://cdn.cs50.net/2015/x/psets/3/pset3/pset3.html>

# Topics

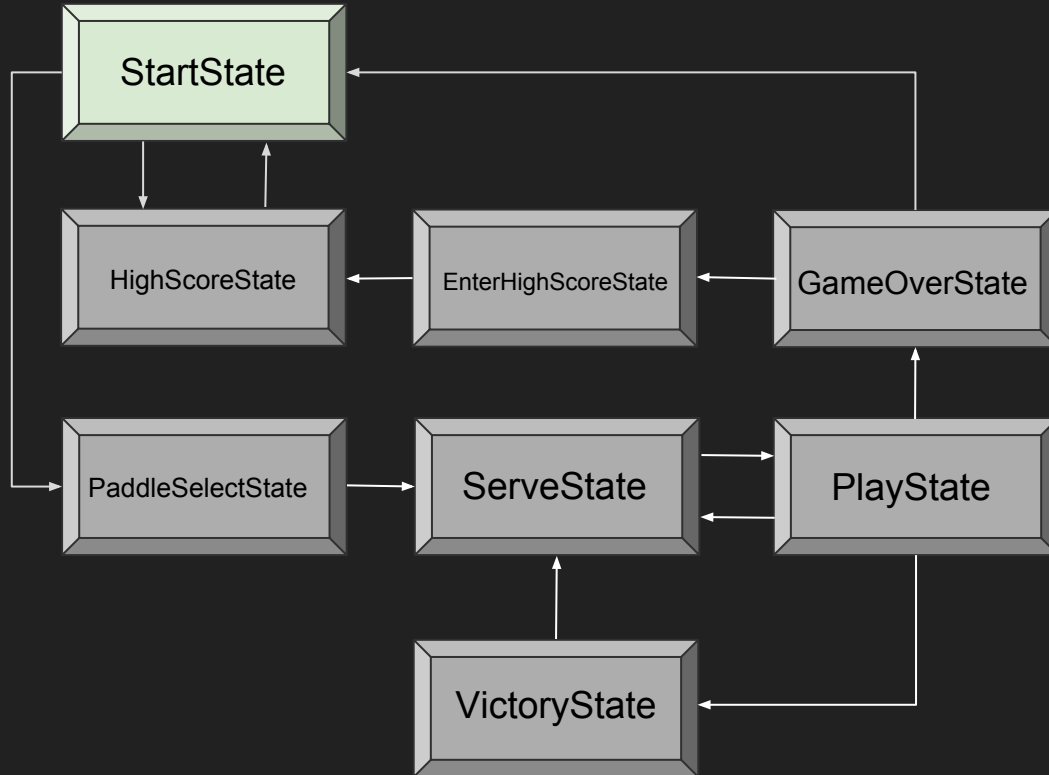
- Sprite Sheets
- Procedural Layouts
- Managing State
- Levels
- Player Health
- Particle Systems
- Collision Detection Revisited
- Persistent Save Data

But first, a demo!

# Our Goal



# Breakout State Flow



# breakout0

“The Day-0 Update”

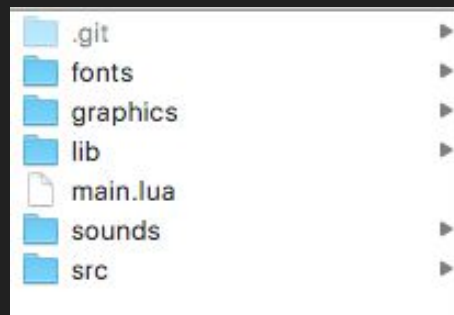


# Project Organization

Bad :(



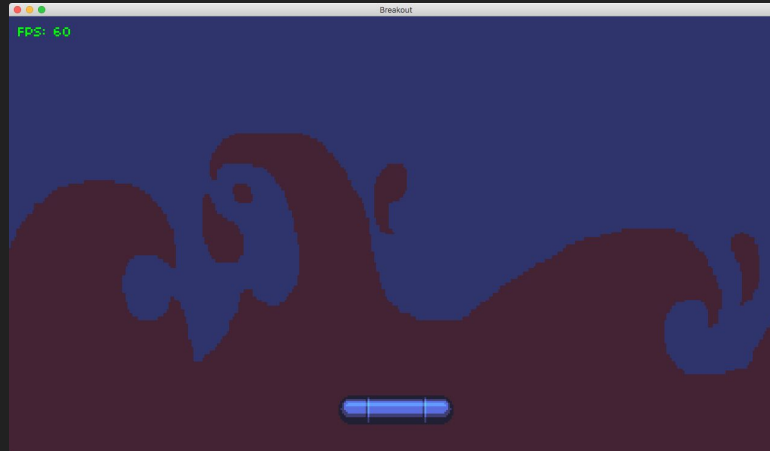
Great! :D



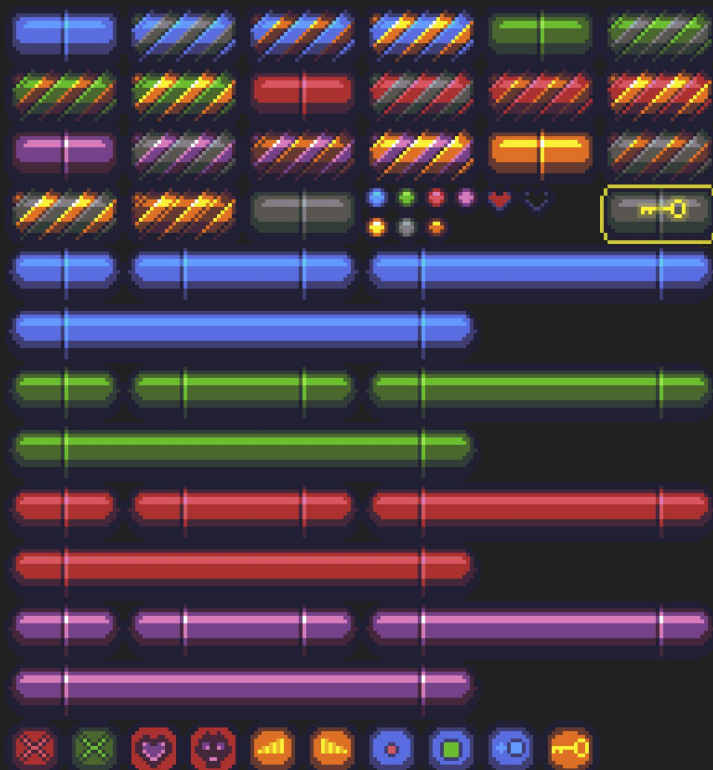


# breakout1

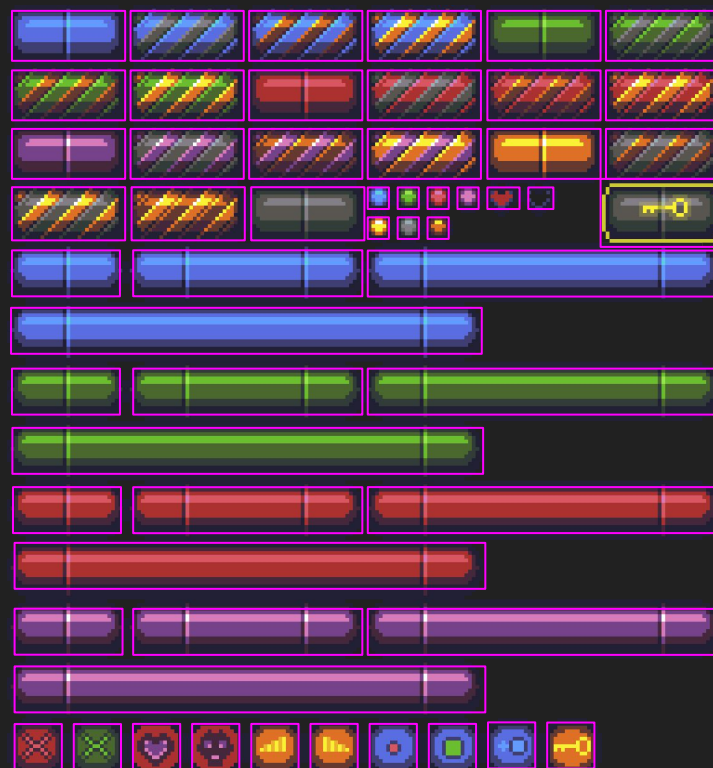
“The Quad Update”



# Sprite Sheet



# Quads

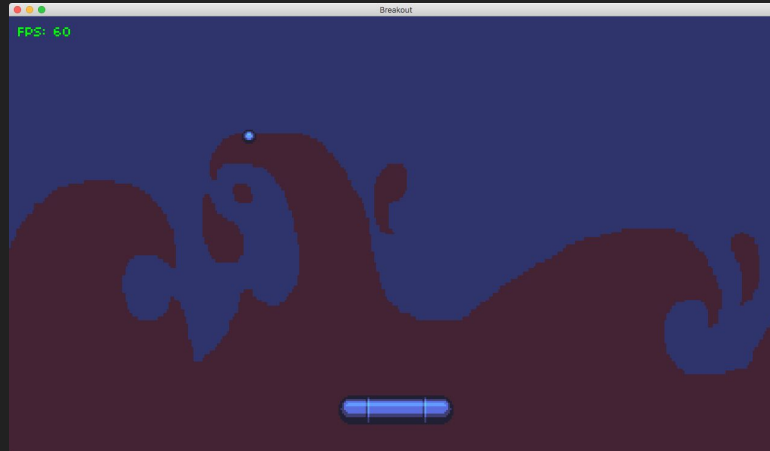


# breakout1: New Functions

- **love.graphics.newQuad(x, y, width, height, dimensions)**
  - Specify rectangle boundaries of our Quad and pass in the dimensions (returned via `image:getDimensions` on whichever texture we want to make a Quad for.
- **love.graphics.draw(texture, quad, x, y)**
  - Variant of `love.graphics.draw`, which we've seen, but this time we can pass in a Quad to draw just the specific part of the texture we want, not the entire thing!

# breakout2

“The Bounce Update”



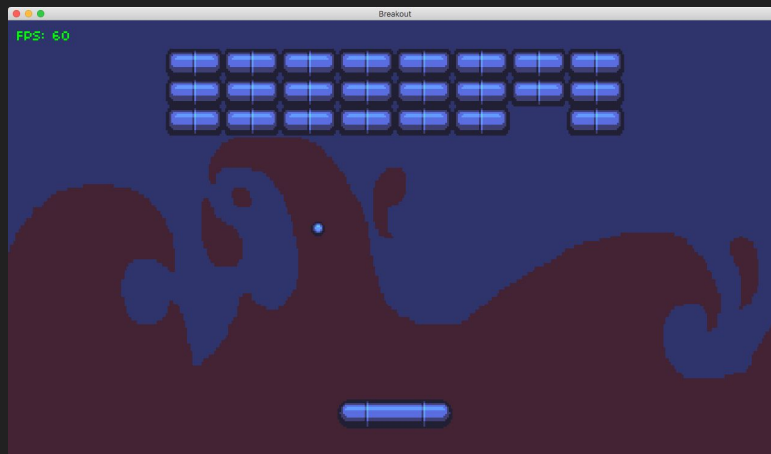
# breakout3

“The Brick Update”



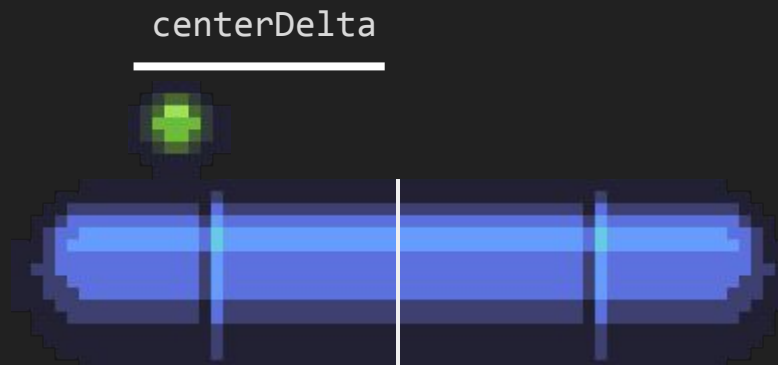
# breakout4

“The Collision Update”



# Paddle Collision

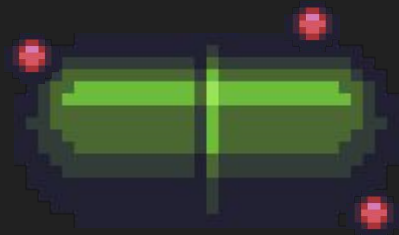
- Take the diff between the ball's x and the paddle's center, which is `paddle.x + paddle.width / 2 - ball.x`; use this to scale the ball's dx in the negative direction.
- Perform the operation on either side of the paddle based on paddle's dx; if on the right side, the differential will be negative, so we need to call `math.abs` to make it positive, then scale it by a positive amount so dx becomes positive.





# Brick Collision (Simple)

```
if left edge of ball is outside brick and dx is positive:  
    trigger left-side collision  
elseif right edge of ball is outside brick and dx is negative:  
    trigger right-side collision  
else if top edge of ball is outside brick:  
    trigger top-side collision  
else  
    trigger bottom-side collision
```



## Alternative Way (Better)

[https://github.com/noooway/love2d\\_arkanoid\\_tutorial](https://github.com/noooway/love2d_arkanoid_tutorial)

[https://github.com/noooway/love2d\\_arkanoid\\_tutorial/wiki/Resolving-Collisions](https://github.com/noooway/love2d_arkanoid_tutorial/wiki/Resolving-Collisions)

# breakout5

## "The Hearts Update"



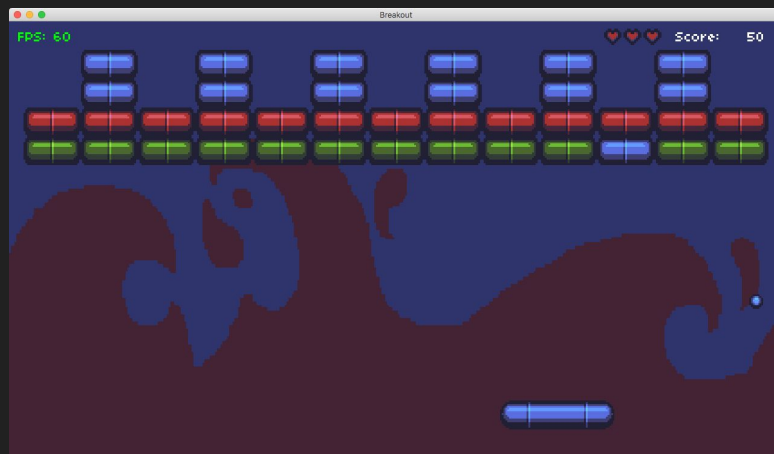
# breakout6

## “The Pretty Colors Update”



# breakout?

## “The Tier Update”



# breakout8

## “The Particle Update”



# breakout8: New Functions

- `love.graphics.newParticleSystem(texture, particles)`
  - Takes in a particle texture and maximum number of particles we can emit and creates a particle system we can emit from, update, and render.

More LÖVE particle system functions and info here:

<https://love2d.org/wiki/ParticleSystem>

# breakout9

## "The Progression Update"





# breakout10

## “The High Scores Update”

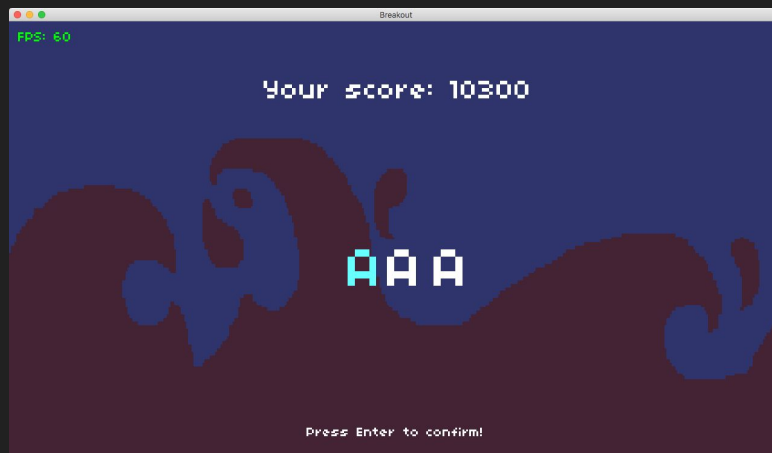


# breakout10: New Functions

- **love.filesystem.setIdentity(identity)**
  - Sets the active subfolder in the default LÖVE save directory for reading and writing files to.
- **love.filesystem.exists(path)**
  - Check if a file exists in our save directory.
- **love.filesystem.write(path, data)**
  - Writes data, as a string, to the file location at path.
- **love.filesystem.lines(path)**
  - Returns an iterator over the string lines in a file at path, located in our active identity path.

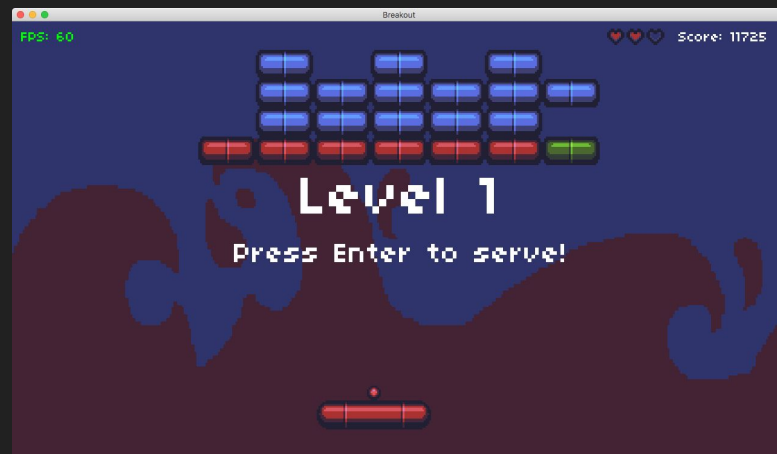
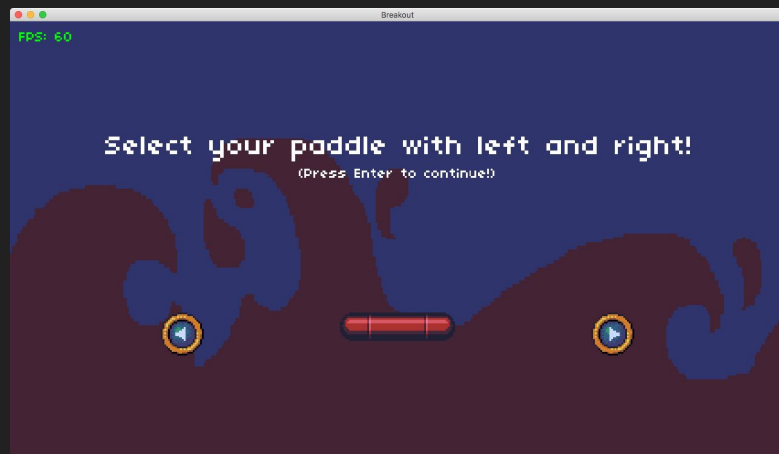
# breakout11

“The Entry Update”



# breakout12

## “The Paddle Select Update”



breakout13

"The Music Update"

# Next Time...

- Basic Shaders
- Anonymous Functions
- Tweening
- Timers
- Solving Matches
- Procedural Game Grids
- Sprite Art and Palettes

# Assignment 2

- Create a Powerup the Player can grab that spawns two additional Balls for the current level.
- Add growing and shrinking to the Paddle when they gain enough points or lose lives (included in the sprite sheet!).
- Add locked blocks and key drops (in the sprite sheet as well) to spice up the level generation.



See you next time!

