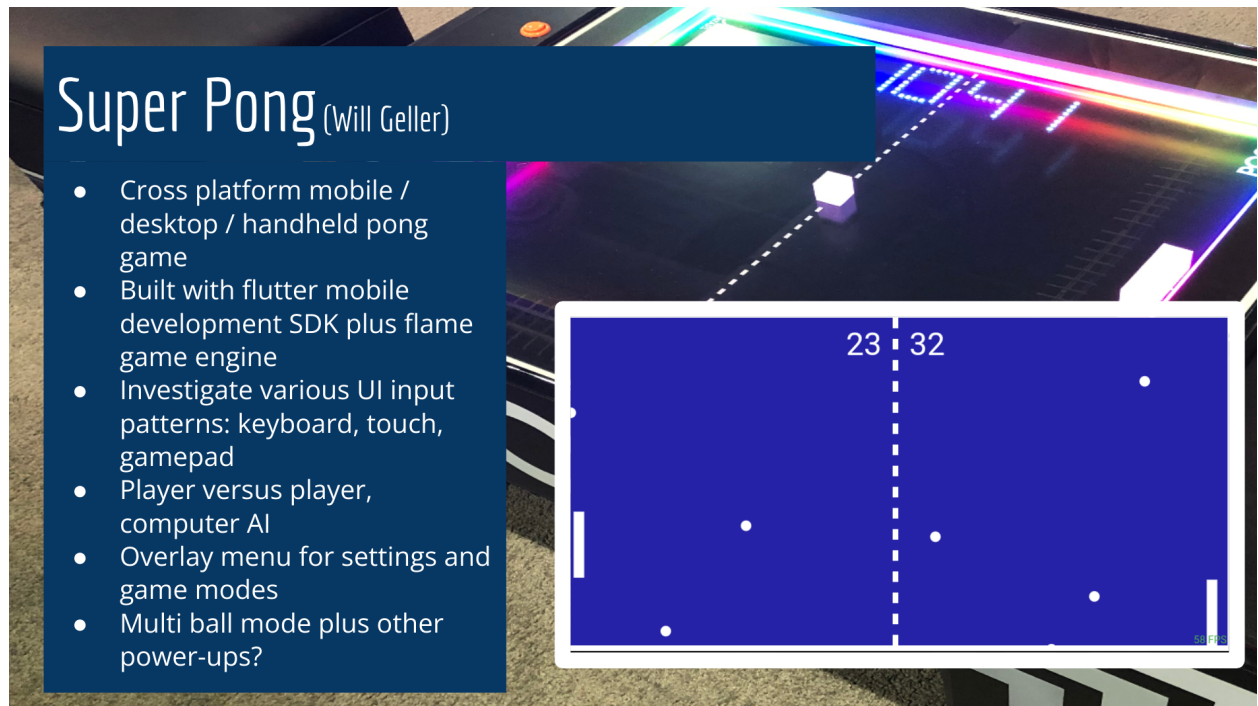


# SUPER PONG!

## Design Document and Digital Game Pitch

---



### Abstract

For my final project I am building a cross-platform version of a pong game. I wanted to pay homage to one of the first graphic based video games to release on the classic Atari arcade system, Pong.

---

---

## Technical Background

I currently don't have a strong proficiency in Unity or Unreal Engine, but fortunately I have a background in software engineering and wanted to build my game in a primarily code based environment. I was very impressed by the Construct game engine and I would like to work on some future no-code based game projects but for this assignment I wanted to learn a new game programming tech stack.

I work 9-5 as a frontend web developer and while Javascript based game engines exist, I chose to build my game in a more obscure platform.

## Tech Stack: Flutter Framework + Flame Game Engine

I recently learned that more people are building games on top of the Flutter Framework. Flutter is a popular framework built by Google for building cross-platform mobile applications. One of the key characteristics that make it well posed for building games is that it is highly performant, running at 60-120 fps on most devices. Additionally it also has build targets for web browsers, Windows, OSX in addition to iPhone and Android. In theory one could build a game with this platform and release versions both to mobile app stores and Steam.

Lastly it has a great developer experience, being written in the statically typed Dart language with hot-reloading makes iterating fast and catching bugs in your code quite easy. In my experience this coding environment has a much better developer feedback cycle than that of C# in Unity.

While I could build a 2D 'casual' game in Flutter without any other libraries, the community based Flame Game Engine is available and provides many niceties out of the box, such as Sprite, Collision and Physics support. In addition to Flame I will utilize a few additional Dart/Flutter dependencies to support audio playback and aid in state management.

---

## Multi Device Development and Various Input Controls

While Pong is a fairly simple game, I wanted to test the limits of being able to build a game for various platforms/devices, and support multiple input types. I am doing all of my development within a Linux environment on a Chromebook. Chromebooks also natively run Android apps so I am able to live preview my game in a proper build target. In addition, I own a small handheld device, the *Retroid Pocket 3*, that runs Android and is intended for retro game emulation. The handheld has a touchscreen, and built in joystick and gamepad controls. Since it runs Android apps I am also able to live preview my game on this handheld device as I am developing the game.

Input controls are touch or mouse for selecting options on the menus, and controlling the paddle up and down. I am building support for keyboard arrow keys and gamepad D-stick/Joystick for controlling the paddle movement. In addition there are various special moves that will be triggered with keys on the keyboard or other buttons on the gamepad.

## Game Modes and AI

I wanted to make single player and PvP game modes. For the single player mode I had to implement a simple AI script to make the computer controlled paddle track the ball. This also allowed me to create a Computer vs. Computer game mode, which proved to be useful for testing.

For PvP mode I had to make sure the second player has input controls, eg. WASD keys for controlling the left paddle vs. arrow keys for the right. On the handheld device each joystick could control a different paddle.

The AI also has a difficulty parameter which I plan to tie into a settings page. An easier difficulty AI will be slower and less optimized at tracking the ball.

---

## Game Art and Audio

The original Pong arcade game features very simple audio and graphics. Being released in 1972 and known as one of the first publicly available video games makes this no surprise.

Therefore I will not be investing a ton of time into fancy sprite based graphics and animation. Currently there is a simple blue and white theme with rectangle paddles and a game board drawn on screen. I plan to further spruce these graphics up with more color and possibly some particle effects on collisions just to make the game more visually enticing.

As far as audio I have audio effects on the collision of the paddle and the ball, as well as when a point is scored. In addition I have some background music which can be turned off in the game settings.

## Advanced Gameplay Features

At a minimum I plan to recreate the features of the original Pong game. This is mostly just simple single ball play and one point scored each time you bounce the ball past your opponents paddle.

I plan to implement a special move that will launch additional balls onto the game 'court' this will make it harder to return every shot and will likely rack up some points. Currently a special key or button launches additional balls but I plan to make it an ability that perhaps is backed by a power meter or 'combo move'.

In the original Pong game you just move the paddle up and down, timing paddle movement to return the ball in its trajectory. One thing that would make this gameplay more interesting is the ability to aim the ball to some extent. I am thinking this could be accomplished by adding a control to tilt the paddle, allowing you to angle the paddle so the collision results in a different return angle then that of a simple vertical paddle.

---

I have a couple other ideas that involve targets that spawn in the game that hitting will give you some type of power-up. While this would be cool I am not sure if it fits within a Pong style game and I don't know if it would be part of an MVP project.

## Feature Sets for Staged Development

### → Low Bar - MVP Game

- ◆ All functionality of original Pong game
- ◆ Single player versus AI and PvP game modes

### → Expected Target - MVP+

- ◆ All of the above
- ◆ Menu for controlling difficulty of AI
- ◆ Multi-Ball mode
- ◆ Custom Audio and Neon Art Style

### → Stretch Goal - Super Pong!

- ◆ All of the above
- ◆ Tilt control for paddles
- ◆ Particle effects on Paddle-Ball collision
- ◆ Touch controls for paddle movement to make game fully mobile friendly
- ◆ Demo at Fall Showcase on 3 different devices
  - Handheld Game System
  - Laptop
  - Tablet
- ◆ Deploy to App Store!