

ECE 493 Final Report

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April 14, 2021

1 Problem domain

The goal of our project is to provide a fun multiplayer social game that provides an experience similar to Pong, but is easily accessible with modern technology. Imagine you have a bunch of friends that want to play a game together, but you all are physically separated. Furthermore, your friends do not want to install any new software on their computers. You and your friends each have a computer with either Firefox or Google Chrome installed on it and internet access. If you ever find yourself in this situation, this game is for you!

2 Existing Solutions

A quick google search reveals that there are a plethora of online projects which already exist that allows one to play a multiplayer game online, with balls and paddles.

3 Our Solution

We chose a client server model over a peer-to-peer model

We use WebSockets for quick, bi-directional communication between the game server and clients

We decided to use Typescript as the main language for writing our frontend and backend code in. This allowed us to define common classes and interfaces that were shared between the frontend and backend code. This

helped to standardize the code base, since the backend and frontend are use the same interfaces, we avoided problems where the data passed between the client and server could be mismatched.

Furthermore, the Typescript language can be compiled to Javascript, which runs in modern browsers, so a user of our application does not have to install any new programs on their computer. Typescript gives us the advantages of having a type system, so some errors like referencing a null value can be avoided by statically analyzing the code before it is run. The type system also allowed us to standardize the classes and interfaces that the frontend and backend depended on.

For our frontend client library, we chose to use svelte as a framework for the website. There is no particular reason we chose Svelte over some other javascript framework like React, other than it is a newer framework and seemed interesting to use. We did find that using Svelte was kind of nice, since a lot of the code is in the same style as vanilla HTML and CSS, whereas with something like react has a little bit more of a learning curve with its JSX syntax and subtle differences. With svelte, we also converted a vanilla HTML and CSS prototype with minimal effort, whereas it would have taken longer to do with React, and we would have likely needed to rewrite more of our initial prototype.

For our backend, we chose to use Deno. We could have used Node.JS instead, but we chose deno because it seemed cooler. Plus, it has Typescript support out of the box, and claims to be more secure. Honestly, our lives would have been easier if we went with Express, because Deno is not widely adopted yet, and the community is not as large, however, I like where Deno is going, and it was fun to work with. I'd probably still use it in a future project.

We added powerups to add something different to the base pong-like experience, to help vary things. We think this helps us distinguish ourselves from the competition

4 Potential Impact on Society and the Environment

To be honest, I don't see our project significantly changing someone else's life for better or worse. It's a simple, fun game that friends could get together

and play for a bit, but also it is a simple game with not much depth

Hosting our project online as a website accessible at polypong.ca undoubtedly has an environmental impact. Our frontend is hosted using Cloudflare Pages, a service offered for free by Cloudflare. Our domain is also registered with Cloudflare, and we are using their DNS services. Because this is an on-demand service, this means that the servers used to run our frontend code does not always need to be active, if users are not using the website. These resources can be used by other users of the cloudflare network when our demand is low. Furthermore, Cloudflare appears to be a company which is conscious about their impact on the environment. For example, in 2019, they purchased Renewable Energy Certificates to match their electricity use for all of their data centres and offices around the world. <https://blog.cloudflare.com/the-climate-and-cloudflare/>

Our backend code is hosted on Cybera, a local nonprofit organization in Alberta. Unfortunately, due to how we designed the project, the backend server must run constantly to be ready for a client to connect to it. Also, this code does not automatically scale back when the demand is low. Fortunately, it is not running on dedicated resources, as the CPU and memory resources are shared, so other users of the service can use the resources when we are not.

In my limited searching, I did not find any information about efforts Cybera is making to lessen their impact on the environment, however, we did find that Cybera is using data science to support green tech solutions <https://www.cybera.ca/cybera-uses-data-science-to-support-green-tech-solutions/>

5 My Role

For this project, I found myself acting as a senior developer of sorts. In the sense that I got to make decisions about which technologies we were using, and I found my teammates asking for advice on best practices and such, because I have previous experience with Javascript frameworks like React and Node.JS. I got to make the big design decisions, and get the ball rolling, so to speak, Things like creating initial boilerplate code that we could all build on later. I worked mainly on the backend and database side of things. I also touched a fair bit of the frontend code, mainly hooking up core functionality and making sure that the frontend can communicate properly with the server. I also worked entirely on the authentication system, database

functionality, and getting our project deployed so that we can play the game on polypong.ca. The deployment involved writing Dockerfiles to make sure our program can be easily deployed on most platforms. The authentication system involved

Michael mainly focused on the frontend, UI design, making my initial “functional” prototypes look pretty. He came up with the initial UI prototype for the frontend, a large portion of which we have tweaked and kept in the final product. He also worked on getting the game to render on the HTML canvas, and did geometry work, collision detection, input handling, and designing the game loop. I pair programmed with Michael a lot over the course of the project, getting things between the frontend and backend in sync, and making sure they communicate with each other. Together, we got a basic game working, one without synchronization. “Basic game” meaning that we got multiple players to connect to the server, get their paddles to move on each others’ screens, and a ball moving. However, at that point, there was no synchronization, and although we could see the ball moving in the same direction on all screens, they were in different positions because of the lack of synchronization

Josh mainly worked on the synchronization algorithm. We also pair programmed for a bit, like when we got the paddles to move simultaneously. He also implemented the remaining power ups

6 History of Changes

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* a1dfbdc 2021-04-13 mantifao Adding async so that await works, back to 60 FPS after demo
* b58afcc 2021-04-13 Arunscape remove these buttons bc they won't be implemented
* fb3fd32 2021-04-13 mantifao Merge branch 'master' of https://github.com/PolyPong/PolyPong
|\
| * 75115ec 2021-04-13 Joshua Chang add logo and favicon
* | d9a020c 2021-04-13 mantifao Switch to 30 FPS for the demo
|/
* 6fe8715 2021-04-13 mantifao Fix bug where Lobby not created when websocket not ready
* 8254b39 2021-04-13 mantifao Fix bug of username being empty: Await getUsername since it is async
* 98b4e09 2021-04-13 mantifao Update local leaderboard for newly created users
* 19eb609 2021-04-13 mantifao Username exists message
* c943793 2021-04-13 mantifao Username exists message
* ef5991e 2021-04-13 mantifao Getting username exists message working
5 * adf6b9d 2021-04-13 mantifao Display username exists to user if username exists
* 8104398 2021-04-13 Arunscape pin oak dependency so that the server can actually build
* 524b0dc 2021-04-13 mantifao Merge branch 'master' of https://github.com/PolyPong/PolyPong
|\
| * 65431a6 2021-04-12 Arunscape change git log command in report
* | 76fd5cc 2021-04-13 mantifao Fix bug with Arun where game was restarting when a player who had lost closes
* | 706caee 2021-04-13 mantifao Fix not logged in when joining Lobby using a link, add sound effects for xp ea
|/
* 85a494c 2021-04-12 mantifao Rename bomb - commit 2/2. Should now appear in the powerups selection screen
* 277950d 2021-04-12 mantifao Rename bomb - commit 1/2
* 5972aad 2021-04-12 mantifao Add images for shaped paddles
* db7877b 2021-04-11 Arunscape local leaderboard returns indices :)
* 4f343f8 2021-04-11 mantifao Fix bug causing shrunk paddles to become super expanded when setTimeout expired
* 3f52c62 2021-04-11 mantifao Merge branch 'master' of https://github.com/PolyPong/PolyPong

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| * d0cd47f 2021-04-11 Arunscape fix local leaderboard bug SPOILER: I wasn't sorting lol
* | 1ecf59f 2021-04-11 mantifao pathTrace powerup now working with multiple balls
|/
* a41647a 2021-04-11 mantifao Adjust path trace to work with multiple balls
* 1da988a 2021-04-11 mantifao Another ball small bug fixes to make consistent across all clients
* 4b9ea1f 2021-04-11 mantifao Merge branch 'master' of https://github.com/PolyPong/PolyPong
|\
| * 17d3007 2021-04-11 Arunscape nice we are testing everything on the frontend except for the game itself
| * 9e49e1e 2021-04-11 Arunscape here's a login test
* | 15acceaa 2021-04-11 mantifao Collision detection now working for different shaped paddles
|/
* 84f1669 2021-04-11 mantifao Fix bug where alert was coming up when lobby_id was ""
9 * f93d8f9 2021-04-11 mantifao Merge branch 'master' of https://github.com/PolyPong/PolyPong
|\
| * 53d7e6a 2021-04-11 Phlana Merge pull request #19 from PolyPong/add-ball
| |\
| | * 632209f 2021-04-11 Joshua Chang add ball powerup finished
| | |\
| | |/
| ||/
| | * a545f53 2021-04-11 Joshua Chang additional ball
| | * c0c9fa6 2021-04-11 Joshua Chang array of balls working
* | | c9e64f5 2021-04-11 mantifao Update getPaddleY() for 8-12 players
|/ /
* | 32d989b 2021-04-11 mantifao Shapes are now rendered consistently across rounds
* | 760da7b 2021-04-11 mantifao Fix bug where powerup names were not correctly displayed on client (were being

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* | 75c96a8 2021-04-11 mantifao CurvedInwards, CurvedOutwards and Bumpy render correctly for one round; fixed
|/
* 2dfb8d9 2021-04-11 mantifao Skins should now be correctly rendered
* cd2b13f 2021-04-11 mantifao Fixing skins
* 000e87c 2021-04-11 mantifao Fixing bug where skins are not showing
* a7b9922 2021-04-11 mantifao Update mergeState
* 502b95b 2021-04-10 mantifao Reduce volume of client-server keypress communication
* ea03666 2021-04-10 mantifao Remove some logs, add some logs
* ad870ba 2021-04-10 Joshua Chang added debugging statments
* 80cd847 2021-04-10 mantifao Better Lobby Names; sound effects that only work in certain browsers (Firefox w
*   afdc17a 2021-04-10 mantifao Merge branch 'master' of https://github.com/PolyPong/PolyPong
|\
| * 59953fa 2021-04-10 Arunscape here's how we do testing for oak
* | bcfa680 2021-04-10 mantifao Powerups now working properly across clients
|/
* 57446c5 2021-04-10 mantifao Small code refactoring, no additional functionality, just cleaner code
*   500411e 2021-04-10 mantifao Merge branch 'master' of https://github.com/PolyPong/PolyPong
|\
| * 4c7ccd4 2021-04-10 Arunscape test script for server
| * 1e94b08 2021-04-10 Arunscape fix database tests
* | 0eafcf4 2021-04-10 mantifao Stats are updated and saved in the DB; queried using API and displayed to the
|/
* 17d7cf7 2021-04-10 mantifao This should fix one player game starting
* 048fa33 2021-04-10 mantifao Fix lobby doesn't exist error
* 1a1467e 2021-04-10 mantifao When a user exits a game, it restarts without them; minor changes so in-game po
* 2a4c65e 2021-04-09 mantifao Combine Stats.svelte with Leaderboard.svelte, Remove Login and Stats routes sin
* a5860b6 2021-04-09 mantifao Update Settings.Svelte, tell the user what their current paddle color is

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- * b557edd 2021-04-09 mantifao Leaderboard almost done, just need place returned for local leaderboard
- * a155f05 2021-04-09 mantifao Fixed canvas equal to null bug by clearing all the intervals and remove the even
- * c3eb94b 2021-04-09 mantifao Fixes bug where keyDownHandlers were not removed when a game was won (they were
- * 543859b 2021-04-09 mantifao Fixed a bug with lobby system: when two players are in a lobby and one lost conn
- * bdf06cc 2021-04-09 mantifao Lobby improvements, on closing a window, users are now removed from a lobby
- * c40b848 2021-04-09 mantifao Update settings and skin selection pages
- * dc9dfec 2021-04-09 mantifao Lobby redesign, works with link sharing and shows when users (registered or gues
- * 7ba7b18 2021-04-07 mantifao Fixes a bug where skins were set correctly on the server, but not on the client
- * 4c6b4c5 2021-04-07 mantifao Remove lobby_id resetting
- * 0a19ca8 2021-04-07 mantifao XP bug should now be fixed
- * 8fc7df1 2021-04-07 mantifao Fix bug where XP was not assigned due to lobby_id being reset on the client befo
- * bad880b 2021-04-07 mantifao Merge branch 'master' of <https://github.com/PolyPong/PolyPong>

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∞ | * c187963 2021-04-06 Joshua Chang replace fewer players when merging states

| * b15fddc 2021-04-06 Arunscape we weren't specifying the port!!!

| * 3c71308 2021-04-06 Joshua Chang add and remove event listeners when needed

* | ac4755d 2021-04-07 mantifao Fixed game breaking bug where second round of game couldn't start after first

| | * 1b69116 2021-04-06 Arunscape WIP on master: 9f305e3 we weren't specifying the port!!!

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| | | * 82d832f 2021-04-06 Arunscape index on master: 9f305e3 we weren't specifying the port!!!

| | | /

| | * 9f305e3 2021-04-06 Arunscape we weren't specifying the port!!!

| | /

| * 1f029a4 2021-04-06 Joshua Chang good paddle movement

| /

- * d79b9bd 2021-04-06 mantifao Fixed lobby selection bug
- * fd04f02 2021-04-06 mantifao Add package.json

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- * 61bace9 2021-04-06 mantifao Skins are now working! Strong start on lobby selection, need to fix bug where tv
- * 64e089c 2021-04-05 mantifao Skins are now working!
- * 5717d7f 2021-04-05 mantifao Merge branch 'master' of <https://github.com/PolyPong/PolyPong>
|\
- | * b6c363b 2021-04-05 Arunscape final report draft
- | * c368319 2021-04-05 Arunscape bind:this for canvas
- * | 33f7a48 2021-04-05 mantifao Game XP is now added and displayed to the user
|/
- * c35b6f8 2021-04-05 mantifao Code cleanup, adding comments
- * cb34633 2021-04-05 mantifao Update getPaddleY() for up to 7 players (need to finish 8-12 later)
- * 55f9aa7 2021-04-05 mantifao Add attribution
- * 708e3ee 2021-04-05 mantifao Path Trace powerup done, better initial ball speed
- * 9849a65 2021-04-04 mantifao Distracting background working, stops when player who applied it is eliminated
- * d8bed85 2021-04-04 Arunscape this was confusing the compiler I guess
- * 42495dc 2021-04-04 mantifao Merge branch 'master' of <https://github.com/PolyPong/PolyPong>
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- | * 97409a6 2021-04-04 Arunscape one space
- | * 1866e33 2021-04-04 Arunscape cleanup
- | * d831fe9 2021-04-04 Arunscape formatting
- * | e3b97e1 2021-04-04 mantifao 2 Player wall collision detection working
|/
- * 2635ddd 2021-04-04 mantifao Merge branch 'master' of <https://github.com/PolyPong/PolyPong>
|\
- | * e5a8ccb 2021-04-03 Arunscape signup works now
- | * 7c088c8 2021-04-03 Arunscape oops
- | * 6e5ccce 2021-04-03 Arunscape oops
- | * ac7d5c2 2021-04-03 Arunscape signup theoretically works

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| * 475f2fe 2021-04-03 Arunscape missing }
| * a0a7a2c 2021-04-03 Arunscape redirect user if logged in but account does not exist
| * 81cc3fd 2021-04-03 Arunscape handle loginwithredirect callback
* | 6074ad7 2021-04-04 mantifao 5 Powerups implemented (bigger, smaller and 3 invisibles)! Need testing to en
|/
* 69fe1c4 2021-04-03 mantifao Merge branch 'master' of https://github.com/PolyPong/PolyPong
|\
| * 2b9e162 2021-04-03 Arunscape copy, share link works now
| * 344cc95 2021-04-03 Arunscape oops
| * a94864f 2021-04-03 Arunscape create get username endpoint
* | 53f0a36 2021-04-03 mantifao Added list of powerups on each client
|/
* 70804d4 2021-04-02 mantifao Update images, Lobby now waits for everybody and has power up selection
* 081f246 2021-04-02 Arunscape global and local leaderboard now using rest methods, just need to get username
* e8e23a8 2021-04-02 Arunscape setskin works from the frontend now (in the sense that it saves the new value
* 1b40a09 2021-04-02 Arunscape oops
* ad0b811 2021-04-02 Arunscape we're using rest to handle this stateless data instead of passing it over the v
* c11e716 2021-04-02 Arunscape set skin rest endpoint
* 72a2fb8 2021-04-02 Arunscape remove unused code in server.ts
* 7306fc0 2021-04-01 Arunscape local leaderboard rest endpoint
* 6009ccc 2021-04-01 Arunscape global leaderboard rest endpoint
* ade41a6 2021-04-01 Arunscape getavailableskins rest endpoint
* 759dd24 2021-04-01 Arunscape use auth0client.isAuthenticated
* 8f9836d 2021-04-01 Joshua Chang Merge branch 'master' of https://github.com/ECE493Capstone/project
|\
| * bb8bda8 2021-04-01 Arunscape login with redirect also, getTokenSilently() returns a proper token now
| * 9463ba2 2021-04-01 Arunscape implement getxp endpoint using traditional rest for simplicity

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* | 5e54f66 2021-04-01 Joshua Chang smoother paddle movement
|/
| * 4821c69 2021-04-01 mantifao Work in progress to synchronize emails and usernames across client and server
|/
* a956424 2021-03-31 mantifao Game background colour is now the same as rest of background
* 5628aca 2021-03-31 mantifao Fix background color
* ab60467 2021-03-31 mantifao Merge branch 'master' of https://github.com/PolyPong/PolyPong
|\
| * 5c0a06c 2021-03-30 Arunscape leaderboard functionality
| * 4c4bf61 2021-03-30 Arunscape leaderboard also theoretically works now
| * 0e8cf83 2021-03-30 Arunscape add logic for getting skins and setting it (with authentication!) (untested )
| * c65fecf 2021-03-30 Arunscape fix some linting and allow port to be specified as an environment variable
| * 26fff32 2021-03-30 Arunscape add leaderboard functions for dbhelper, and tests for all of dbhelper
| * 6c3827e 2021-03-30 Arunscape server can run locally again
| * d6916f4 2021-03-29 Arunscape let's see if this is faster
| * 14b0ff6 2021-03-29 Arunscape oops
| * 3812267 2021-03-29 Arunscape ooh let's try this
| * 3177e7a 2021-03-29 Arunscape pls
| * bd9b095 2021-03-29 Arunscape ohhh it might be a CORS thing
* | 0a6155f 2021-03-31 mantifao When we finish one game, a new game is started!
|/
* a7d7ffa 2021-03-29 mantifao Improve the animation
* 9c827df 2021-03-29 mantifao Update getPaddleY() to work better, add Game Over text animation
* 1ec3a21 2021-03-29 Arunscape try this port on cloudflare
* 09dd68a 2021-03-29 Arunscape let's see if this works
* 32ff7d0 2021-03-29 Arunscape try binding to 0.0.0.0
* dec0d48 2021-03-29 Arunscape oops I spoke too soon

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* 272adda 2021-03-29 Arunscape aaand theoretically we should be live
* ec610f9 2021-03-29 Arunscape it works
* e8d3dc4 2021-03-29 Arunscape rename it so it works on cybera (because I'm already running another instance of
* 9ccb72f 2021-03-29 Arunscape this should work
* 54788c8 2021-03-29 Arunscape create dockerfile
*   a852a09 2021-03-28 mantifao Merge branch 'master' of https://github.com/PolyPong/PolyPong
|\
| * 2917325 2021-03-28 Arunscape oops
| * acd4dc4 2021-03-28 Arunscape logic for levelling up and setting skins and getting available skins
| * fa4b545 2021-03-28 Arunscape add some pretty colours
* | cfae28a 2021-03-28 mantifao Gameplay working and smooth, graphically glitches ironed out, Client can now de
|/
*   a25d53e 2021-03-28 mantifao Merge branch 'master' of https://github.com/PolyPong/PolyPong
|\
| * 260a729 2021-03-28 Arunscape undo rotation
* | 4bf30cc 2021-03-28 mantifao Collision detection working across multiple clients, graphical glitches abound
|/
*   6940d71 2021-03-28 mantifao Merge branch 'master' of https://github.com/PolyPong/PolyPong
|\
| * 42f197a 2021-03-28 Arunscape don't send websocket buffer
* | 74d6856 2021-03-28 mantifao Working on getting ball consistent
|/
* 1d95da8 2021-03-28 mantifao Collision detection is poor but working
* 00757ec 2021-03-28 Arunscape send unrotated dy dx for ball
* 8f4370a 2021-03-28 Arunscape skip sending websocket buffer in the update lol
* 035bb48 2021-03-28 Arunscape red paddle should move now on other clients
* 8e626d9 2021-03-28 mantifao Collision detection now works client-side! Ball is also drawn correctly (but not

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- * 5cf8b12 2021-03-27 Arunscape idk :/
- * ac0a03b 2021-03-27 Arunscape oops
- * 0e12240 2021-03-27 Arunscape ball should be in sync now
- * b8ae6e0 2021-03-27 Arunscape ball moves in sync until there is a collision also collisions are broken
- * 3814bc4 2021-03-27 Arunscape refactor
- * 61f7b36 2021-03-27 Arunscape refactored game object
- * dfce8ff 2021-03-26 mantifao Include interface from PPC (removes error message)
- * 3e67b26 2021-03-26 mantifao Login now checks db, we let users set their username on first login
- * 0dc17aa 2021-03-25 Arunscape we can see other players' paddles moving now!!!
- * a3da283 2021-03-22 mantifao Log In on Home page now prints user email to console if authenticated
- * 07f5092 2021-03-22 mantifao Fix Auth0 bugs
- * 9c3dd00 2021-03-22 mantifao Update db.ts to import from PP-Common
- * aa6ce39 2021-03-22 mantifao auth0Client now in store.ts
- * 4d4227e 2021-03-19 mantifao Change default port to 3000
- * ec001d6 2021-03-19 Arunscape attempt to start game
- * a395ced 2021-03-19 Arunscape moved client side lobby websocket stuff to global scope in store.ts
- * ccdf142 2021-03-16 Arunscape why did I change these types lol
- * 370549f 2021-03-12 Arunscape delete old stuff
- * 895b5d6 2021-03-12 Arunscape format tsconfig
- * 7a7f748 2021-03-12 Arunscape idk
- * 05fdd37 2021-03-12 Arunscape Revert "install in preinstall?" mistakes were made...
- * fbd103e 2021-03-12 Arunscape install in preinstall?
- * b22b713 2021-03-12 Arunscape frontend can build now
- * 603ebdd 2021-03-12 Arunscape if I have to do another UML diagram I'll wanna fucking kms
- * a0ca534 2021-03-12 Arunscape render diagrams
- * 65c19d3 2021-03-12 Arun Woosaree Create fr26.puml
- * 1b90018 2021-03-12 Arun Woosaree Create fr25.puml

- * 0ce9d9f 2021-03-12 Arun Woosaree Update fr16.puml
- * 82f5fab 2021-03-12 Arun Woosaree Create fr24.puml
- * 3dcd30e 2021-03-12 Arun Woosaree Create fr23.puml
- * a16f102 2021-03-12 Arun Woosaree Create fr22.puml
- * 74b20bb 2021-03-12 Arun Woosaree Create fr21.puml
- * 95b4032 2021-03-12 Arun Woosaree Create fr20.puml
- * b47b915 2021-03-12 Arun Woosaree Create fr19.puml
- * 38a674c 2021-03-12 Arun Woosaree Create fr18.puml
- * fed2552 2021-03-12 Arun Woosaree Create fr17.puml
- * 3402647 2021-03-12 Arun Woosaree Create fr16.puml
- * 747b23f 2021-03-12 Arun Woosaree Create fr15.puml
- * 6b0ac6b 2021-03-12 Arun Woosaree Create fr14.puml
- * 1b2907e 2021-03-12 Arun Woosaree Create fr13.puml
- * 61dd277 2021-03-12 Arun Woosaree Create fr12.puml
- * aa1e2b8 2021-03-12 Arunscape we have a basic database
- * 254af7d 2021-03-12 Arun Woosaree Update fr27.puml
- * 2649182 2021-03-12 Arun Woosaree Update fr28.puml
- * e18eca7 2021-03-12 Arunscape changes
- * d339d94 2021-03-12 Arunscape delete fr12 for now
- * 86248f7 2021-03-12 Arunscape oops forgot to commit this one
- * 5ba66dd 2021-03-12 Arunscape add docker-compose
- * 1f4c0b0 2021-03-12 Arun Woosaree hopefully last time updating fr1sequence
- * 758aaa0 2021-03-12 Arun Woosaree Update fr1.puml
- * f780ed8 2021-03-12 Arun Woosaree Update fr6.puml
- * 53a72bb 2021-03-12 Arunscape final fr28 hopefully
- * db93bfa 2021-03-12 Arunscape final fr27 hopefully
- * 56449d8 2021-03-12 Arunscape final fr28 hopefully

- * 92291c5 2021-03-11 Arunscape final fr10 hopefully
- * 69de270 2021-03-11 Arunscape final fr9 hopefully
- * 36c7fa2 2021-03-11 Arunscape final fr8 hopefully
- * 96d460d 2021-03-11 Arunscape final fr7 hopefully
- * b056895 2021-03-11 Arunscape final fr6 hopefully
- * 8caa1aa 2021-03-11 Arunscape final fr5 hopefully
- * ab61aa3 2021-03-11 Arunscape final fr4 hopefully
- * 818bbb0 2021-03-11 Arunscape final fr3 hopefully
- * 7e35a5f 2021-03-11 Arunscape final fr2 hopefully
- * 1d17042 2021-03-10 Arunscape script to generate power up sequence diagrams when we figure out how they're s
- * 91b3235 2021-03-10 Arunscape tweaks
- * 0875ad3 2021-03-10 Arunscape remove need for jwt to view leaderboard
- * c6a266b 2021-03-10 Arunscape play game does not involve lobby
- * e0930b3 2021-03-10 Arunscape check for 3+ users fr3
- * cbeddbd 2021-03-10 Arunscape fr12sequence
- * c21c408 2021-03-10 Arunscape fr28sequence
- * 7fb4f70 2021-03-10 Arunscape fr27sequence
- * 2879334 2021-03-10 Arunscape fr10sequence
- * 7360541 2021-03-10 Arunscape fr9sequence
- * 4e54651 2021-03-10 Arunscape fr8sequence
- * 51c2cc5 2021-03-10 Arunscape fr7sequence
- * 72d270e 2021-03-10 Arunscape fr6sequence
- * 49b9cd4 2021-03-10 Arunscape fr5sequence
- * 9d5c1ef 2021-03-10 Arunscape fr4sequence
- * 7aad86c 2021-03-10 Arunscape fr3sequence
- * fe90914 2021-03-10 Arunscape fr3sequence
- * dd09d87 2021-03-10 Arunscape update fr2sequence

- * 33bcadc 2021-03-10 Arunscape update fr1sequence
- * 8ac287e 2021-03-10 Arunscape fr2sequence
- * ff37e84 2021-03-10 Arunscape fr1sequence
- * c6c7837 2021-03-10 Arunscape the websocket is now accessible from anywhere in the application
- * 04c6bb7 2021-03-09 Arunscape use the types I defined for transmitting messages
- * de4b815 2021-03-09 Arunscape add joinsuccesspayload to payload.ts
- * c9a8575 2021-03-09 Arunscape fixed the enter lobby id bug. now uses the textbox input
- * e250620 2021-03-08 Arunscape here's what the communication protocol might look like
- * f9e9273 2021-03-08 Arunscape hey we can now create a lobby, and join it with a unique id!!!
- * b180a2f 2021-03-08 Arunscape add uuid
- * 0d70162 2021-03-05 Arunscape package-lock go brrrrrrrrrrrrrrrr
- * 95a3d19 2021-03-05 Arunscape document how to install private package
- * f2eb902 2021-03-05 Arunscape create polypong-common package
- * c6d248a 2021-03-05 Arunscape v0.0.1
- * 0a64f51 2021-03-05 Arunscape move Game types to npm package
- * 51b2d4e 2021-03-01 mantifao Player number done; paddles rotate accordingly
- * 0d60aee 2021-03-01 mantifao Ball now scales based on client's window size
- * c5d9a42 2021-03-01 mantifao Added a ball and basic collision detection
- * 7cc2cc0 2021-02-28 mantifao Cleaned up code, paddles have colors!
- * ffad707 2021-02-28 mantifao Paddles are now bounded!
- * 0dfdaf9 2021-02-28 mantifao Bottom paddle moves! No boundary checking yet
- * dcccc91 2021-02-28 mantifao Initial paddles are drawn
- * 0fb8f2c 2021-02-27 mantifao Adding classes but not yet working
- * d81ecac 2021-02-27 mantifao Shapes are drawn again
- * 6f9fadb 2021-02-25 Arunscape work breakdown structure
- * 345723b 2021-02-17 Arunscape idk what I changed but it works beautifully now. If the user is already signed
- * e07fb58 2021-02-16 Arunscape getting somewhere

- * 34625da 2021-02-16 Arunscape hm
- * 61928d8 2021-02-16 Arunscape add auth0 client library again
- * d158d9c 2021-02-16 Arunscape oh boy lots of changes
- * 5c62216 2021-02-15 Arunscape add auth0 client library
- * ccea9cc 2021-02-08 Arunscape frontend mockup but now in Svelte still kind of ugly because we're not reusing
- * 739fbe9 2021-02-08 Arunscape actually let's try svelte@next
- * f51de3c 2021-02-08 Arunscape add lockfile to gitignore for now
- * 3573a86 2021-02-08 Arunscape use typescript
- * 0acc958 2021-02-08 Arunscape init svelte
- * 4369d8e 2021-02-08 Arunscape move frontend mockup
- * bd0191d 2021-02-08 Arunscape copy over stuff from main branch
- * 7b293ed 2021-02-06 Arunscape signin works
- * d38e4b4 2021-02-06 Arunscape signin works
- * 026077b 2021-02-05 mantifao Create README.md
- * 61a93f6 2021-02-05 mantifao Delete .DS_Store
- * 279df4a 2021-02-05 mantifao Delete .DS_Store
- * c3a08ef 2021-02-05 mantifao Delete .DS_Store
- * 58569af 2021-02-05 mantifao Delete .DS_Store
- * 1d00abd 2021-02-05 mantifao Delete .DS_Store
- * 1aab6ff 2021-02-05 mantifao Delete .DS_Store
- * fe524da 2021-02-05 mantifao Add gitignore
- * 72beaa3 2021-02-05 mantifao Initial mockups

7 Summary of Defects

oh boy. . . .