

Danish Driving Simulator

"A Demolition Derby Party Game with Guns"

DH2650 Computer Game Design

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Danish Driving Simulator (DDS) is a PC local party game based on the concept of bumper cars. Up to four players attempt to defeat each other on different maps using unique weapons. With plenty of different ways to win along with constant progression, this game is directed to players of all ages looking for a game to play and bring out at parties and events.

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1. Document Versions

Milestone	Description	Date
0.8	Document Creation Concept	31.10.2018 09.11.2018
1.0	First Prototype GDD	16.11.2018
2.0	Final Game GDD	18.12.2018

2. Overview

DDS is an action packed top-down arena shooter, with cars! Destroy your friends with wide range of diverse weapons. The local multiplayer and the game atmosphere is perfect for parties.

2.1. Main Concept

Danish Driving Simulator is a Local multiplayer party game. One to four players control a car equipped with weapons. The primary game objective is to destroy the opposing players by damaging them and knocking them off the map. Damaged opponents are knocked further. Points are gained for kills and survival. The movement of the car is forward/reverse and steering. The game is meant to be played with one controller per player. The arena is static, the camera always have all players in frame (not split screen). Throughout the game players will get increasingly better weapons and tools.

2.2. Unique Selling Point

We want to create a game that is easy for everyone to play and learn, that can be played together locally. The game is fun for all skill levels. Upgrade and customize your car by buying new weapons. Bumper cars is a family activity but not everyone might like to be bumped around physically. Therefore we have created a game where anyone can bump around without any harm. Whether children are looking to explore the nature of controlling a car, or a group of adults are competing against each other over a bet, Danish Driving Simulator is a party game for people of all ages and sorts that can be played almost anywhere.

3. Inspirations

During the development of this game, influences were taken from:

Warcraft III: Warlock mod: A pvp mod for wc3 where you control a powerful warlock. You purchase spells which you use to push enemies out of the ring. Players outside the ring take periodic damage. Game goes on until last warlock standing.

Halo 3 Destruction Derby: A custom game in Halo 3 which involved four players trying to push eachother out of a donut shaped map with explosions outside the play-zone.

Full Auto: A game which includes cars with guns. This inspired our art styles. research on similar games, what are the core features, how does your game differ?

Super Smash: Nintendos ultimate showdown game, where characters from all their IPs fight. You select a fighter and use the characters moveset to damage your opponent. Damaging the opponent increases their percentage, which is a multiplier for the knock back effect from attacks.

4. Specification

This section will describe choice of target group, platform, art style, who to attract and how to attract.

4.1. Player(s) / Target-group

DDS targets party gamers. This is a great party game where anyone from the party might want to play. Due to its place in a more relaxed setting rather than being a competitive game, it should attract more casual gamers. The slight difficulty of using a controller might set the game's age minimum at around 6.

4.2. Genre

Local multiplayer; Action; Party game; Cars; Destruction; Top down; Tanks; Arena; PvP; Arena Shooter; Comedy;

4.3. Forms of Engagement

The player will get engaged in the challenge to beat their friends (or enemies). Intuitive driving and skill based weapons provide a satisfying experience to hit the opponent, dodge their attacks and adapt to their strategies.

Playing the game is also a nice way to spend the time with your social circle. The game is a good way to get to know new people at parties.

4.4. Game Flow Summary

The game is focused around quick rounds which last for 1-3 minutes each. Initially all players will start first round with low power weapons and vehicles which they may upgrade through progressing through rounds. Being active and getting kills is rewarded. These upgrades will improve the game pace and feature set at hand which will keep players stimulated. After a set of rounds a winner is presented and the game is reset.

4.5. Aesthetics

The game looks bright and colorful. The game features low-poly models and colorful visual effects, creating an arcade-like aesthetic with some retro inspirations.

5. Gameplay and Mechanics

This section will cover the defining gameplay and mechanics.

5.1. Main Objective

The goal of the game is to become the last man standing on a map and eliminate others, both are rewarded. Players eliminate each other by pushing each other off the map. Players may damage each other with different weapons. More damaged players are influenced greater by weapons and collisions.

5.2. Game Mechanics

Each player selects a car and customizes it with the shop. The shop sells various weapons. Weapons deal damage, knock back and other effects with the goal of knocking enemies off the map.

5.2.1. Cars

The base driving mechanisms has realistic car physics. Cars are controlled with acceleration, reverse, left and right steering. Cars may collide with other cars, the boundaries of the map, objects placed on each map, and weapon projectiles. Collision forces are exaggerated with extra forces added to simulate a bouncing effect upon collisions between cars and weapon projectiles. The more damaged a car is, the greater its collision bounce force becomes (Similar to Super Smash Bros). The different cars have unique starting weapons.

5.2.2. Weapons

Cars have weapons equipped which can be fired in different directions and deployed at different times depending on the weapon. Weapons have cool-downs in order to ensure no spamming. The game currently has 8 weapons:

1. Fireball - Shoots a controllable fireball. The fireball increases in speed and damage the longer it travels. It disappears after a couple of seconds.
2. Laser - Charges up a powerful laser over 3 seconds. After 3 seconds a powerful burst of light heavily damages anything in its path.
3. Boost - Gives the user an impulse speed boost forward. Use at your own risk.
4. EMP launcher - A grenade launcher shooting emp grenades. The grenade explodes when the trigger is released (minimum 1 second for safety). The grenade can be controlled between maximum push or maximum emp. Push knocks back the target EMP disables driving.
5. Mine - Place a mine that lasts until someone drives on it. The mine deals massive damage.

6. Tire - Shoot a tire that bounces off walls and terrain. Damages the player it hits. Limited life.
7. Barrier- Coats the user in a protective bubble that absorbs all damage. Prevents the user's control for the duration.
8. Confuse ray - Shoots a ray that confuses the target. Confused cars reverse right and left steering.

5.2.3. Map

Below is an image illustrating the map used. The blue watery areas are off-map areas which you will fall and die in. The red marked edges have no walls and are dangerous to be close by. The circuit road has rounded ramp-walls in the corners. Cars can drive up the walls to dodge some attacks or use them to do quick turns without losing velocity. The walls are not infinitely high, so if someone is pushed hard enough they will fly over the wall and probably fall outside. Four haystacks and four roadblocks provide solid hard cover. In the center is a large hole which players can fall into or jump over using the ramps to the left and right of it.

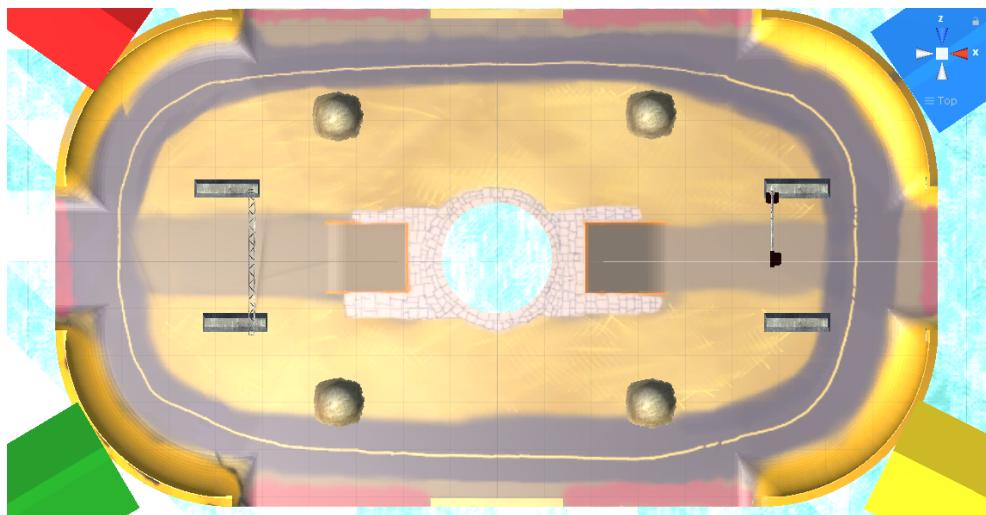


Figure 5.1.: Map Overview

Economy

Players receive score based on eliminations and placement. Last place also gains a bit of score. Both placement and kills are valued equally.

The score is transferred to coins, so players will get the same amount of coins as the amount of points they scored. The weapons cost from 1 to 5 coins based on the power of the weapon. Each car has three weapon slots, X, Y and B. Each weapon can be bought to any button. It is possible to buy the same weapon three times and have it on all three buttons.

5.3. Controls

Below is an illustration of the in-game controls. Other menu controls are displayed on each screen.

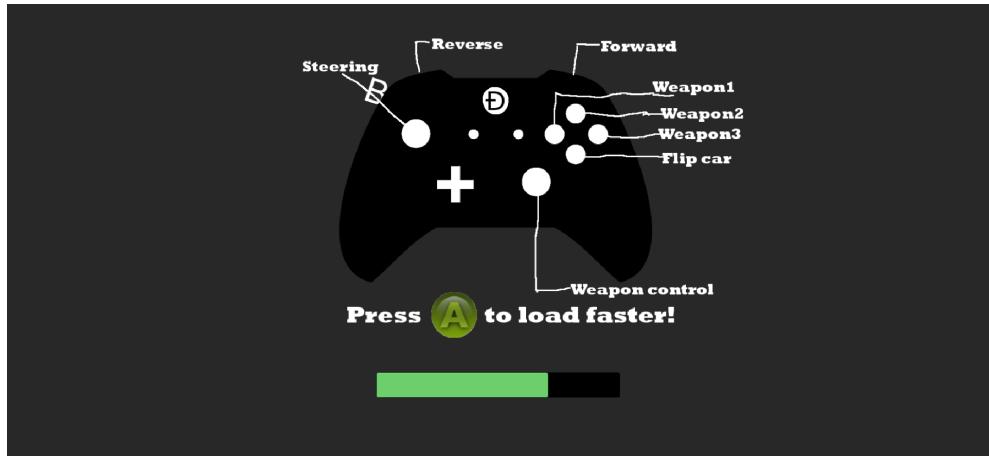


Figure 5.2.: Loading menu with control display

5.4. Replaying and Saving

There is currently no replay or save functionality across sessions. Bought items will however store between rounds.

5.5. Cheats and Mods

There is currently no ability for the user to modify the game, its mechanics and the winning conditions. This might be interesting to test in order to find out optimal settings.

6. Setting and Character

6.1. Mood and Emotions

The core gameplay and its mechanics are quite chaotic and clunky at times, creating a sense of nonsensical fun and unpredictability. It is this feature that hopefully generates laughter and fun between the players. The audio combined with the visuals provide a comedic experience.

6.2. World/Environment

There is currently one map available. This map contains a few ramps and obstacles. The map is a arena floating over the ocean. The arena is supposed to represent a dry-farm like wasteland. There is an ability to drive off the map. See the figures in Appendix C.

The game has assumed a more cartoon-like vibe with bright colors, low pixel shadows and simple models.

6.3. Strategies

Players win by pushing each other off the map. Since the pushing is amplified by the damage percentage, there is a balance between damaging others and keeping your own damage percentage low. This introduces an element of choice of whether to stay passive or play more aggressive. Winning through either strategy is equally rewarded.

6.4. Inclusion

The game may be played by anyone and is simple enough to target younger and older age groups. The objective and controls are simple to understand. The interface is simple enough to navigate despite of English knowledge.

6.4.1. Diversity

Players will pick cars with different weapons. Each weapon will lead to different game strategies. This allows more passive players to express their choice of play through their weapon choice. The weapon kit can be further customized in the shop.

6.4.2. Accessibility

Though not implemented, it might be important to consider different aspects of accessibility. Do the colors tend to the color blind audience? Use of sounds may aid people with vision issues to perceive what is happening on screen. It would also be practical to add left-hand, inverted and alternate controls for players who struggle to use the default configuration.

7. Interface

The interface is simplistic and does not provide more info than needed.

7.1. Start Screen

The start screen consists of a grey page displaying the name of the game. See figure C.1 to C.4 in Appendix C. As players join, the screen displays their car and weapons. It is here that players have the ability to switch between the different cars. If two or more players have joined, all players must ready up before the game will start.

7.2. Menus

Upon readying up, the game loads. The loading screen consists of a bar loader and an image which illustrates the controls. See figure C.5 Appendix C. An advanced algorithm was developed to make the game load faster when the 'A' button is pressed.

7.3. HUD

While in game, the HUD consists of a name and percentage for each player displayed at the bottom of the screen. See figure C.6 to C.10 in Appendix C. The percentage increases as each player takes damage. At the top right of the screen, the current and total rounds are always displayed. When all players have died, either "... WINS" or "GAME OVER" cover the middle of the screen depending on the player count.

7.4. Shop

After each round, players enter the shop. The next round starts automatically after a certain amount of seconds displayed at the bottom middle of the screen. Each player has a quarter of the screen displaying their current weapons and the ability to buy new ones. For reference, see figure C.11 to C.12 in Appendix C.

7.5. Interface Issues

There are some issues with the current HUD that are not yet addressed. For example, there is no ability to view the controls or pause the game during gameplay. There is also no ability to exit the game from the start screen, deeming the game unexitable through the interface itself. It might also be of interest to be able to skip the timer in the buy menu between rounds. Else players spend a lot of time waiting which might kill the mood.

7.6. Technical Aspects

7.6.1. Lighting Systems

A simple Directional Light is used during the gameplay scene. The scene is constantly lit and map always lit.

7.6.2. Camera

The camera zooms in and out depending on the amount of players and how far away they are from each other. All players will always be visible on the screen. For reference, compare figure C.8 and C.9 in Appendix C.

7.7. Audio

All audio in DDS is recorded by ourselves using our voices. A mid-end microphone was used to record the sounds. The sound could be improved with better recording devices and more experienced voices.

7.7.1. Sound Effects

Sound effects for each car are played during gameplay. Weapons, explosions, collision and game loss are examples of sound events.

7.7.2. Music

The main menu has a music that plays on repeat. Further music could be developed to play during the shop and maybe during gameplay.

8. Technical Bible

8.1. Target Systems

The game is developed in Unity3d, which allows for its port to several platforms. However, throughout this project the game will be built for on PC only. Mobile ports would require further optimizations and redesigns in the control systems. They would also compromise the use of DDS as a "party game" unless online multiplayer is implemented.

8.2. Hardware

DDS requires a Windows PC that can handle low-stress on graphics and processing power (most PCs released 2012-). The storage required is under 500MB (small game). Size of the game might however increase if graphics are improved. For the full experience, four controllers are required. Xbox One, Xbox 360 and PS3 controllers are supported and tested. Other controllers such as the PS4 controller sometimes may work but are not guaranteed.

8.3. Development Systems/Tools

The game is created in Unity3d. Organization within the team is managed using:

1. Development: Unity
2. Communication: Slack/Messenger
3. Version Management: Unity Collaboration
4. Work Management: Trello
5. recording: audacity

In Unity, scripting is done in C#. Individual development blogs are also made by each team member on a blogging platform of their choice. The map was built in Solid Edge and then converted into blender. Solid Edge worked great for the map since the geometry is easily mathematically defined.

8.4. Assets

Assets are all free and retrieved from the Unity Asset Store. Some assets such as sounds and logos are created by ourselves.

8.5. Installing

The game can be exported as an executable file (.exe file). Since save games and local data are not used, the executable file should be enough for a full gameplay experience across different play sessions. Such a file can be downloaded from a web page or game store and run directly.

9. Marketing and Publishing Strategy

The game is currently quite simple in its nature. Although DDS might be considered a MVP, it has much left to explore before distinguishing itself from competitive games and becoming marketable on a larger scale.

In order to ensure quality in further implementation of gameplay and functionality, it might be of interest to ship the game as an early release. By doing this, DDS would receive feedback on what players like and do not like about the game. If released for free, a large player base can be reached through youtubers and cheap online marketing in order to receive community feedback. If there is little intention to grow the game above a certain degree, the game can be released as it is now but for a low price as an indie-game and developed on the go. Doing this might however risk a negative outlook on the game if the initial release is bad, and less players willing to play the game since it requires an investment.

The party-game genre should have a large fanbase on consoles as well. This might tell us something about whether porting the game to platforms is a profitable move. It might be the case that releasing the game on consoles in the first place is more profitable, considering the game at the moment requires controllers.

10. Versions

Below is a table illustration each milestone of the game. Significant milestones will have their own subsection below.

Milestone	Description	Date
0.1	Official Start Date	31.10.2018
0.8	Presentation of Concept	09.11.2018
	Version 0.8 Hello World	16.11.2018
	Final Game	18.12.2018
	End of Project	01.04....

10.1. Version 0.8 Hello World

A full functioning game mechanic demo. Detailed models and music are outside the scope. The game should support up to four players. There should be at least one playable map.

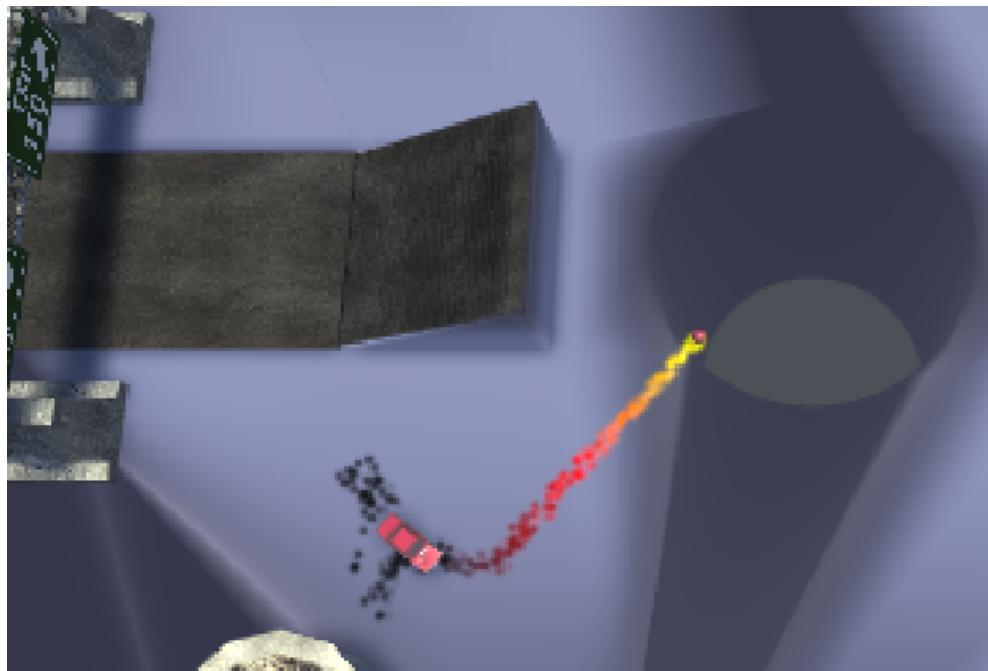


Figure 10.1.: Zoomed in screenshot of v0.8 gameplay

10.2. Final Game

The Final Game in terms of development within the course. A fully working prototype that is to be showcased to the rest of the class. Bugs are fixed, feedback is considered and graphics are improved for this release.

11. Team and Credits

Programming: Julian Hedén, Tor Sundman, Dennis Lioubartsev

Shop and UI: Julian Hedén

Design and Map Creation: Dennis Lioubartsev

Sound: Julian Hedén, Dennis Lioubartsev

Documentation and Marketing: Tim Wayburn

Additional Credits - Unity Asset Library

The team consists of four members:

Julian Hedén, Tor Sundman, Dennis Lioubartsev, Tim Wayburn

Appendices

A. First prototype

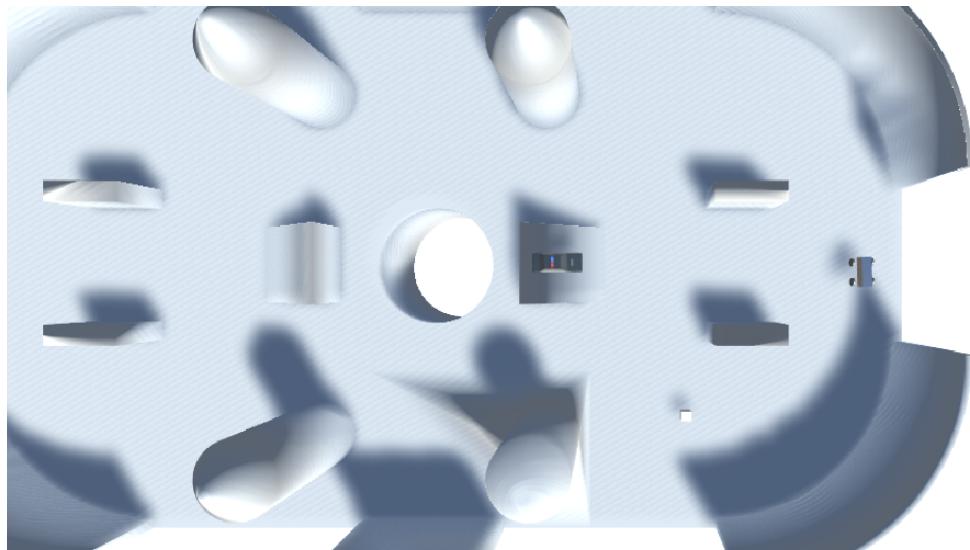


Figure A.1.: First prototype map and car

B. Version 0.8 Hello World Screenshots

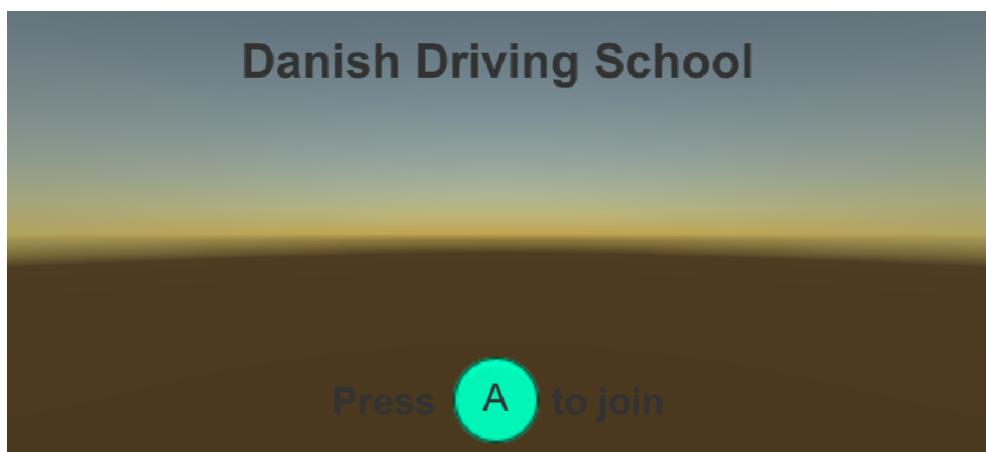


Figure B.1.: Main Menu

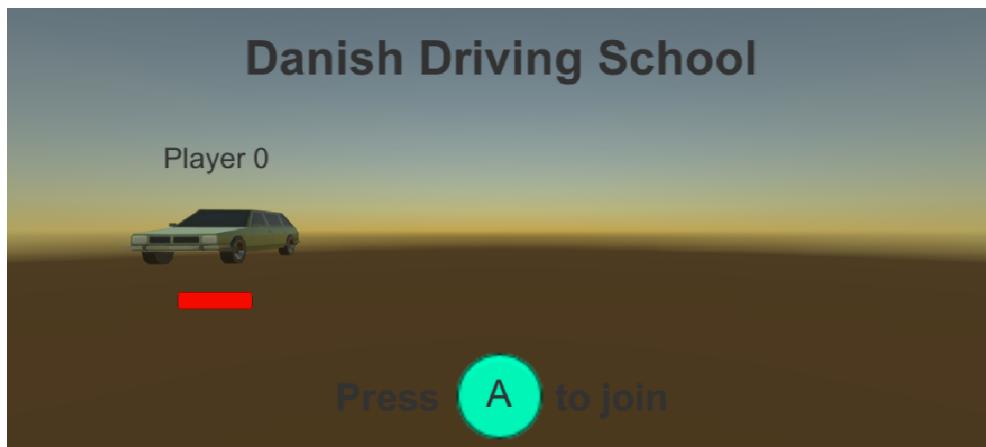


Figure B.2.: Main Menu with joined player

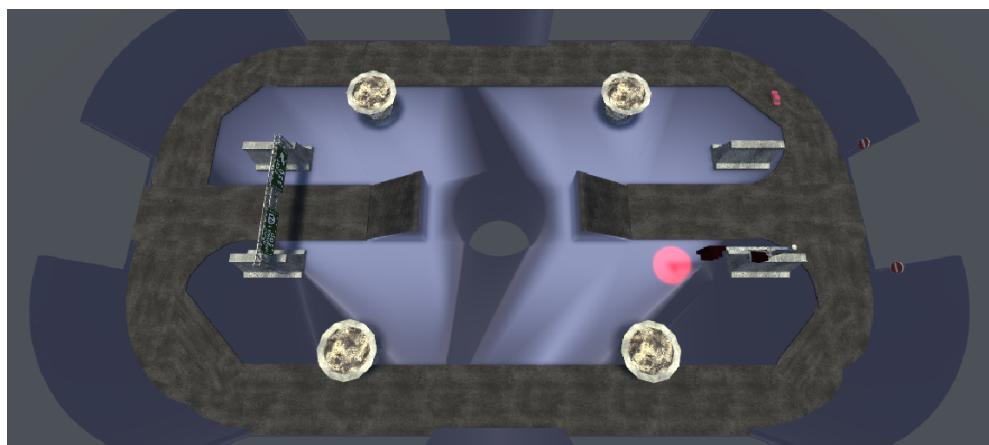


Figure B.3.: Screenshot of v0.8 map

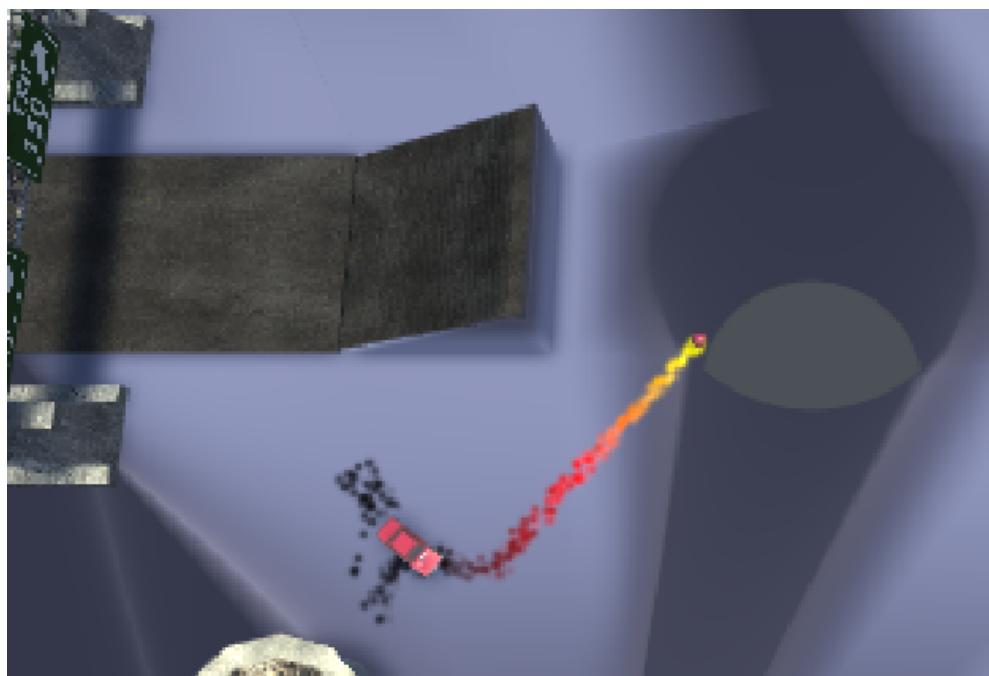


Figure B.4.: Zoomed in screenshot of v0.8 solo gameplay

C. Final Game Screenshots

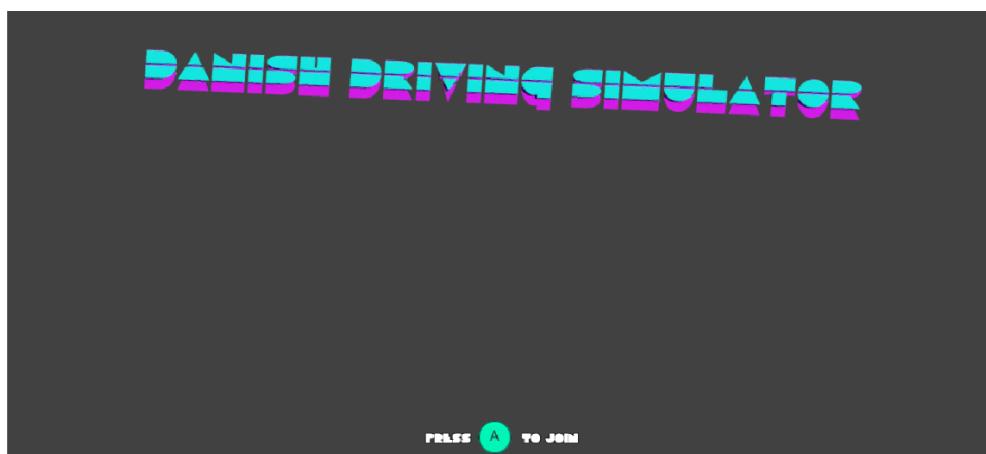


Figure C.1.: Initial Start screen

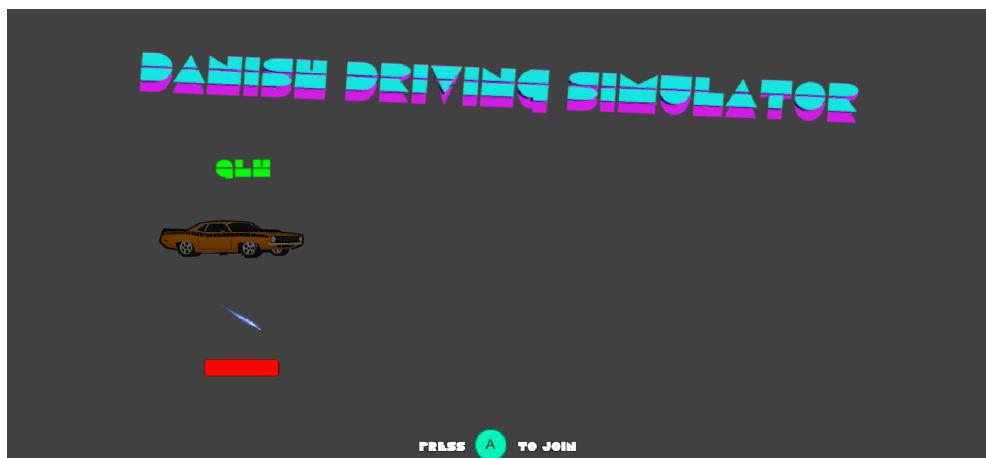


Figure C.2.: Player Joined, Car Select



Figure C.3.: Two Players Joined, Car select, Ready Up



Figure C.4.: Two Players Joined, Player 2 Readied Up

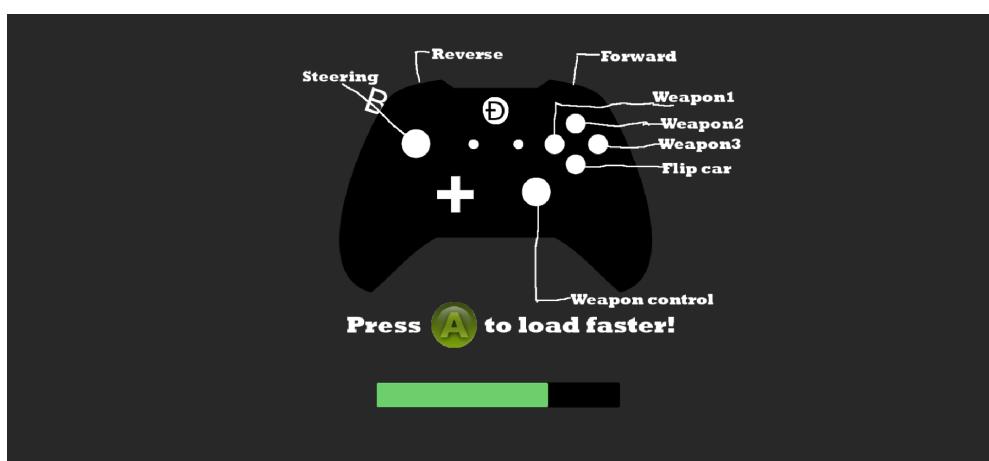


Figure C.5.: Loading menu with control display



Figure C.6.: Single Player Gameplay



Figure C.7.: Single Player Death Screen

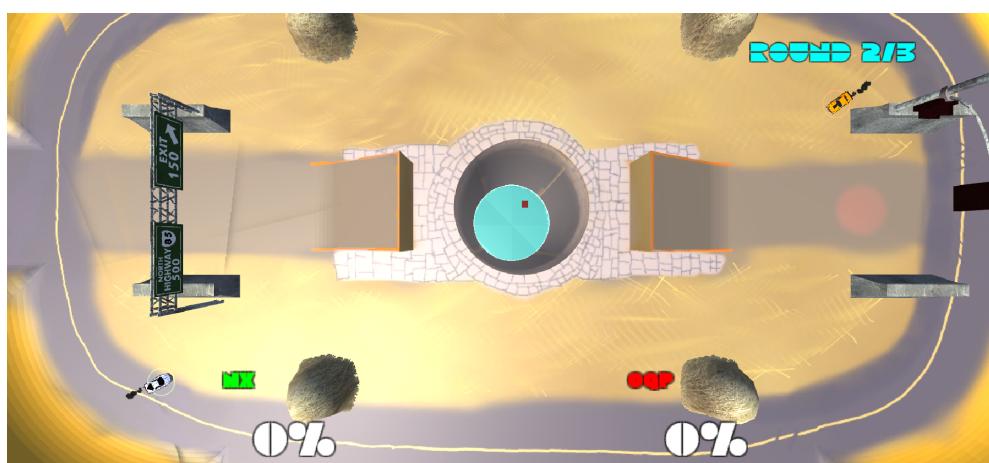


Figure C.8.: Two Player Gameplay - Game Start



Figure C.9.: Two Player Gameplay - Close Quarter Combat



Figure C.10.: Two Player Round End

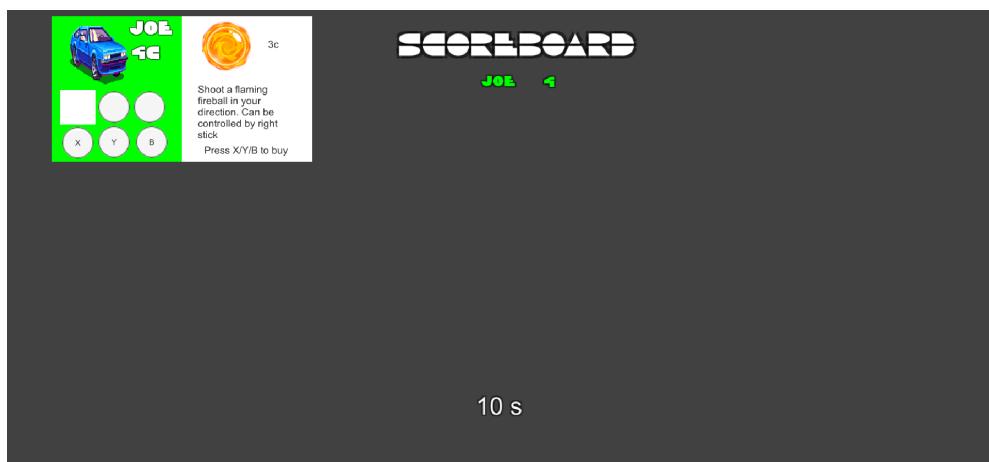


Figure C.11.: Single Player Shop

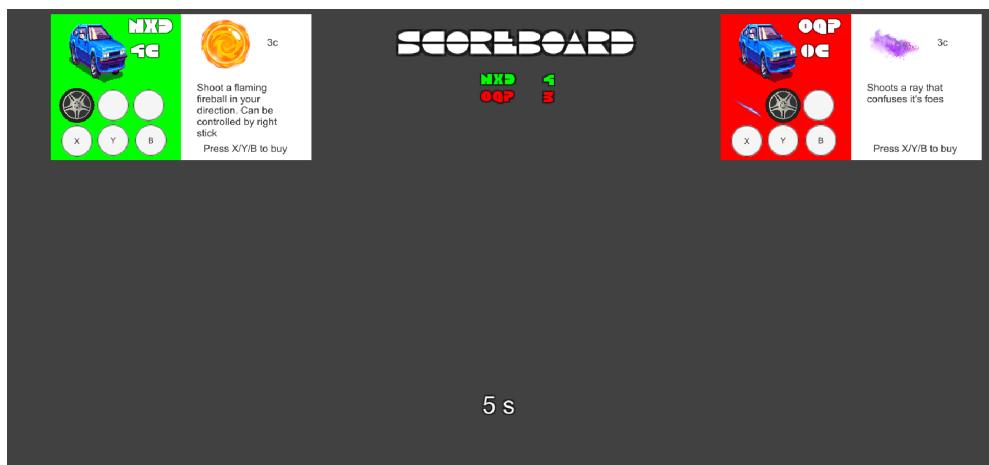


Figure C.12.: Two Players Shop - Player two has bought one item