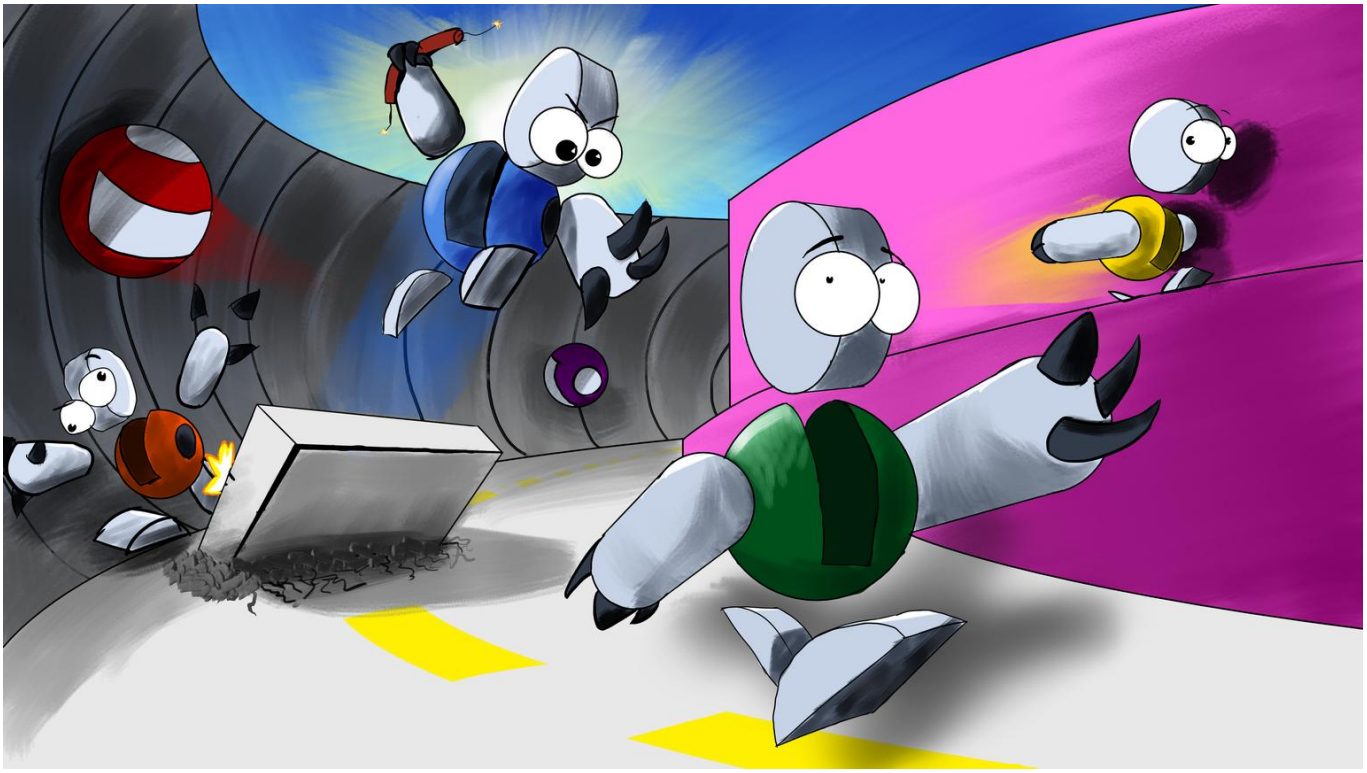
LOCO Motion

Game Design Document



Concept Art

Team Members

Name	Role
Lynk Klinefelter	Producer and Level Designer
Zane Kale	Animator and 3D Artist
Matthew Grabczynski	2D and 3D Artist
Connor Schaaf	Backend Programmer
Nicolas Uribe	Gameplay Programmer
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Game Overview

High Concept

This is a high-speed multiplayer racing game in which players compete head-to-head on a looping track, completing laps until the timer expires. Along the way, they must dodge obstacles, collect items, and push one another around to secure victory.

The twist is that objects created by items never leave the track. If a pillar is built on the track to launch a player forward, that pillar remains as an obstacle for everyone else during every subsequent lap. By the end of a race, the track will be filled with obstacles that players must avoid and navigate to complete more laps and beat the other players.

Genre and Platforms

The best way to describe the genre is as a party racer. It can be viewed in a similar realm to games such as Mario Kart, where players often play with friends and try to sabotage one another while maintaining their own chance of winning the race.

The game will be designed primarily for PC, but we plan to make it controller-compatible because controllers are generally the preferred way to play this style of game. If realistic in the future, we will explore options for expanding to consoles. There are currently no plans for a mobile version.

Target Audience

The target audience includes players of all ages. In practice, we expect an age range of six and older and an E for Everyone designation. We want anyone, from a child to a grandparent, to be able to enjoy the game. It is intended to be a family-friendly experience that can be played among siblings, families, friends, and work groups in any situation where people come together. We want this to be a game people think of when deciding what to play at a friend's house, just as many Nintendo games, including Mario Kart and Super Smash Bros., have become.

Competitive Positioning

There is major crossover between the games that inspired us and the games we view as competitors. The first that come to mind are Mario Kart, Fall Guys, and Ultimate Chicken Horse. Each contains elements that we have incorporated into our game.

What will help our game stand out is largely its movement and physics. Momentum will be a major component, and it will be boosted or hindered by different obstacles that remain on the map for the duration of the race after deployment, as well as by general player sabotage.

Player Fantasy

Although our game may not create a great deal of traditional immersion, we believe its competitive edge will create a player fantasy that can match that of any immersive game. Players race to complete laps faster than one another while actively sabotaging opponents and improving their own position. This creates an avenue for competition that is not often found in games.

Unique Selling Points

We hope the way all of our mechanics work together will set our game apart and create an engaging player experience. Although many individual mechanics are present in other games, there is nothing quite like the combination we are producing. Players have many strategic options and opportunities for sabotage, which will create a new and exciting experience each time they play.

Vision and Design Pillars

Nonnegotiable Experience Goals

1 Controlled Chaos

We want the race to feel chaotic. By the end of the race, reaching the end of a lap should feel like a struggle, but we do not want to prevent users from completing it entirely. The challenges should require a degree of skill or strategy while players continue to collect power-ups that can help them or sabotage others.

> This will be achieved mechanically through the item system. Users can receive power-ups that allow them to move faster or provide another ability. Most power-ups will give the player an advantage while also hindering opponents. Examples include spawning a pillar that propels the player forward but remains on the map as an obstacle that everyone must dodge, or creating a ramp that provides a speed boost and lets future players choose between taking the ramp and navigating the rest of the map. We plan to create many unique obstacle items so the game remains fresh while retaining its chaotic tone.

2 Enjoyable Movement

To a degree, we want players to feel as though they are always moving. At times, players may move very slowly because an obstacle or another player has hindered them, but they should always continue moving forward. There must also be ways for players to accelerate and build momentum. These changes in momentum will make the game unpredictable and more enjoyable.

> The movement system will rely heavily on interesting physics concepts that affect player movement both positively and negatively. We plan to implement actions such as rolling and grabbing so the player's movement can be affected at any point during the experience. We also want to create many ways to change movement, including speed boosts and obstacles that slow players down.

3 A Unique Experience Every Playthrough

Every race should be different. Players will have creative freedom in where they place obstacles, subject to constraints that prevent the map from becoming too cluttered. This should result in obstacles appearing at different key points in every race. We want players to return to the game repeatedly, feel excited each time, and avoid the experience becoming stale.

> As with many of our goals, the item and obstacle systems will be central to making each race unique. A major part of this work involves not only creating items and obstacles, but also creating enough of them to provide variety within each level.

4 No Player Is Ever Out

We want to take inspiration from games such as Mario Kart, where any player can return to contention, regardless of how far behind they are. This increases unpredictability and allows less-skilled players to remain competitive with more experienced players. However, the catch-up system should not be so powerful that it eliminates skill. As in Mario Kart, a player near the back may receive many power-ups, but the best player will usually still win. Giving trailing players a way back into the race makes the competition feel closer than it may actually be, increasing enjoyment for everyone involved.

> This would be implemented through a position-weighted item box system. Players near the back would be more likely to receive rarer and more powerful items and obstacles, allowing them to progress toward the front more quickly. Front-running players would not have access to items that could provide a huge jump. Instead, they would be limited to items that offer minor improvements.

Features That Violate These Pillars

We want to avoid anything that hinders a player's movement so severely that it feels more annoying than logical within the game. One example would be a long stun that hurts the player without a clear purpose when compared with simply slowing them down. Obstacles on the map should be the primary elements that hinder or help players, rather than individual items.

Similarly, we want to avoid features that disrupt the emergent movement too much. The game will include many moving pieces related to movement and physics, so we do not want to add anything that negatively affects how movement feels to the player.

Core Gameplay and Race Rules

Primary Game Loop

This is the central gameplay loop that will be essential to the player experience in each game.

1. Run and platform through the course.
2. Collect an item.
3. Decide when and where to use the collected item.
4. Create, remove, or avoid obstacles.
5. Complete a lap.
6. Adapt to the altered course on the following lap.
7. Finish with the best race result.

Race Format

All races will use timed rounds rather than a fixed number of laps. The race duration has not yet been decided because it will likely depend on the map or track size. In this format, players cannot be eliminated and will respawn on the map if they fall off.

Common Verbiage

These actions describe what a player may do during a game session. An action is defined only when its meaning is not self-explanatory.

Action	Definition
Run	
Turn	
Jump	
Recover	When a player falls off the map, they return to the last respawn point they passed.
Navigate Obstacles	
Collect Item	
Aim or Preview Item Placement	If an item must be placed on the map, the player can preview its location before activating it.
Activate Item	
Create Obstacle	
Destroy Obstacle	

Success and Failure

The winner is the player who has completed the most laps by the end of the round. If multiple players have completed the same number of laps, the player farthest along the track toward completing another lap ranks higher. The remainder of the order is determined by lap count and track position in the same way.

The game does not end when the first-place player crosses a finish line. Instead, every game ends when time expires. At that point, the session stops completely, and a game-over popup appears on each player's screen before moving them to the final leaderboard. If a player disconnects from the lobby before time expires, they are treated as the last available place.

Item and Track Manipulation

Item Acquisition

Item boxes will appear at fixed locations on every map. After an item box is collected, it will take three to five seconds to respawn. The delay is appropriate for our small lobby size. The boxes do not need to respawn more quickly, and we do not want to overpopulate the item market.

Players will be able to carry only one item at a time. This encourages them to use an item before reaching another item box, spacing item use more effectively across the map.

The player will be alerted to the item they receive through an icon in the item-box portion of the HUD. Players who do not already recognize an item may find it difficult to understand during a race, so tutorial options will be available before entering a game to explain how the different items work.

Weighted Item System

To ensure that players are never out of the game, trailing players need a way to recover their position and return to a level playing field with those farther ahead.

We have created a weighted item system similar to the systems found in games such as Mario Kart. More powerful items are harder to receive and virtually unavailable to players near the front. Players farther back can receive these powerful items to help them move closer to the front pack. Front-runners receive less powerful abilities that still provide an advantage but lack the lasting impact of the power-ups given to backmarkers.

The system creates an item weight based on the player's location in the running order. Although many games use position to determine weight, we will use the player's distance from the leader. If several players are grouped closely together, the player at the back of that group will not receive a major advantage over racers who are only slightly ahead. Players who are genuinely far behind and need the help can receive it.

Items

These are all the proposed items for our game. While it is not likely that all are implemented prior to release, it is a goal our ours to implement as many as possible.

The weight attached to the item is its general likelihood of acquisition. For example, when getting an item, the players have an expected 8% chance to get the item "Propeller". Because the weight is high though, a player at the front has a much higher chance to get the item than a player at the back. In the end though, that chance averages out to 8%.

Item	Description	Weight
Pit Puncher	Gives the player a short forward leap and removes a modular track panel behind them. The resulting hole remains for the rest of the race.	3%
Mimic Item Box	Places a reusable fake item box. When touched, it launches the racer backward before entering a short cooldown.	3%
BOOMER-MITE	Throws an explosive that follows the track. Its explosion radius and stun duration increase based on how far it travels before hitting someone.	4%
Rolling Boulder Transformation	Transforms the player into a rolling boulder, providing powerful momentum and collision potential.	4%
Piston Pillar	Raises a mechanical pillar beneath the player, launching them upward. The pillar remains as a platform or obstacle.	5%
Oil Slick	Throws or places a persistent oil slick. Racers who touch it fall apart and must roll themselves back together before continuing.	5%
Phase Through Obstacles	Temporarily allows the player to move through environmental and player-created obstacles.	6%
Pop-Up Ramp	Creates a ramp in front of the player while providing a short speed burst. The ramp remains as a shortcut, launch point, or hazard.	6%
Trick Dash Pad	Places a fake dash pad behind the player. Instead of boosting racers who use it, the pad slows them down.	6%
Nitro Sneakers	Provides a powerful forward speed boost that can clear gaps, restore momentum, or reach difficult shortcuts.	7%
Slingshot Sprint	Pulls the player toward the next racer and converts the pull into a speed boost. It becomes stronger when the player is farther behind.	7%
Propeller	Places a low, spinning obstacle that knocks away racers caught by its prongs. Players can jump over it or move between the rotating arms.	8%
Automatic Door	Places a door that repeatedly opens and closes. Passing through while open provides speed, while hitting it closed removes momentum.	8%
Wrecking Dash	Gives the player a short armored dash that can smash through one player-created obstacle.	9%
Fire Trail	Ignites the player and leaves a temporary fire trail. Racers touching it are launched slightly upward and lose speed.	9%

Item	Description	Weight
Phase Through Player-Placed Obstacles	A single-use item that temporarily allows the player to pass through player-created obstacles without being hit.	10%
Total		**100%**

Obstacle Creation

To prevent the track from becoming overly cluttered or blocking overall progress, the game will prevent players from placing obstacles too close together. The item-preview tool will be important for showing whether an item can be placed. However, we do not want to impose so many restrictions that the map loses its potential for chaos. We must balance continued forward progress with a chaotic racing experience.

Level Design

Initial Map Design

We wanted our first map to be simple for the player to navigate and understand, while also allowing enough room to create interesting obstacle interactions.

As shown in the layout, the player starts the lap and immediately enters an already implemented obstacle where they must jump between platforms. While moving through the platforms, the player can collect an item. They will continue around the map, which includes open space where different obstacles can be placed. They then move onto a ramp over another pit, followed by another section for obstacles in the air.

There is one small change from the map's initial design: banked walls will surround the map, allowing the player to gain extra speed over other players while in rolling form. This map is intentionally simple, but it supports many of our early goals for testing and playability.

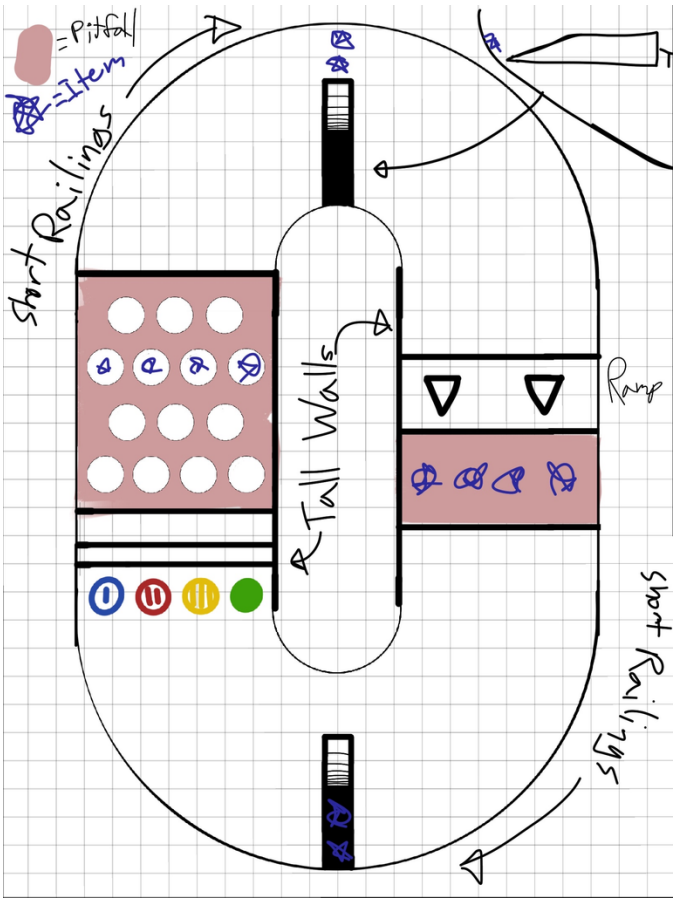


Figure 1 Initial Map Layout Sketch

Future Map Plans

Prior to a full release, we plan to create at least two more maps, both of which will be playable in-game. There are many potential options for these maps. One concept discussed for a second map is a mostly interior layout or a map with a highly curved structure that more heavily emphasizes the character's rolling ability. We have also discussed making future maps compatible with eight players, which would require the maps to be slightly larger.

Level Design References

Figure 2 Curved Track Reference	Figure 3 Open Track Reference
	

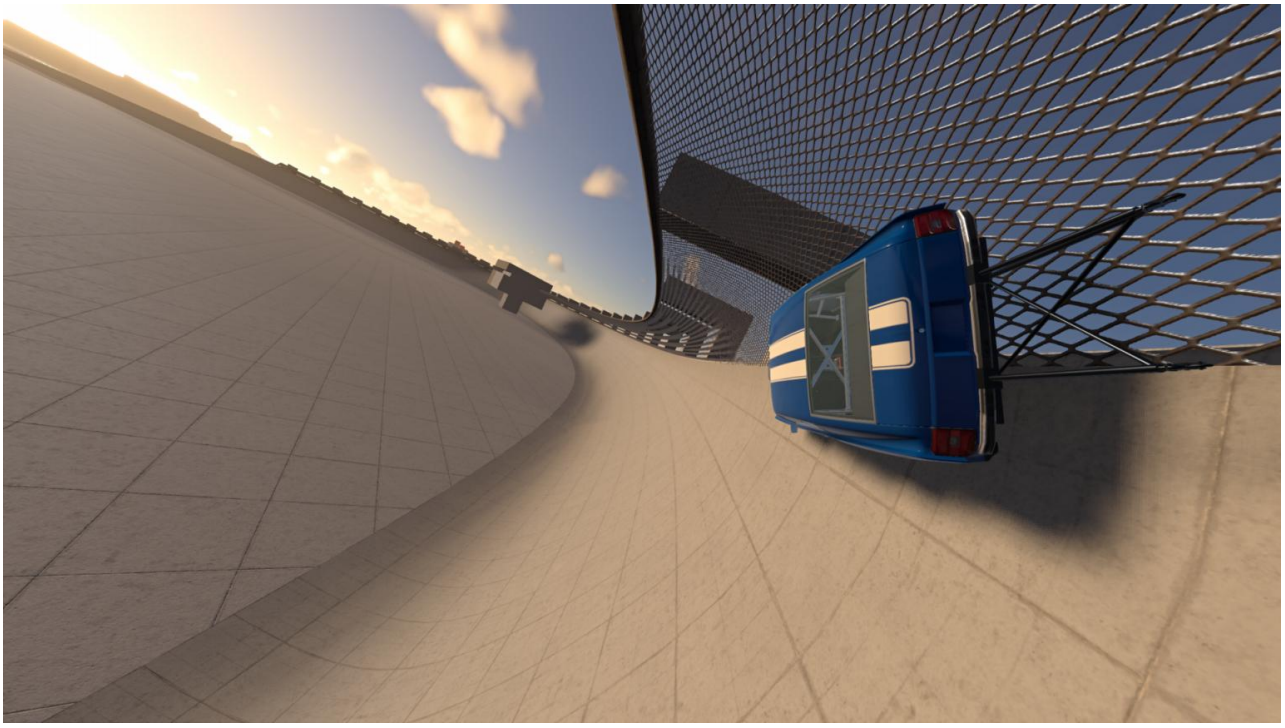


Figure 4 Banked Wall Reference

Movement and Camera

Movement

A major goal of our game is constant movement. To achieve this, we are using a tiered speedometer system that indicates the player's speed tier and corresponding level of character control.

We want players to move as quickly as possible, but there should be a penalty for reaching certain speeds. Upon reaching Tier 2 on the speedometer, a player stops running and transforms into a ball, beginning to roll. This form plays an important role on banked corners, which players can use to their advantage while rolling.

In the rolling form, players gain substantial speed and may enter Tier 3. At this speed, they begin to lose control of the character while moving forward. When accelerating, the character shifts left and right, making obstacles more difficult to complete. Players must therefore manage their speed while still trying to move as quickly as possible.

Players will gain speed naturally as they move around the track, and power-ups and speed boosts will provide additional opportunities to accelerate.

Camera

The game uses a third-person camera that trails the player's head. The camera will be positioned at approximately a 45-degree downward angle over the back of the player's head so the player can see both the path ahead and the ground.



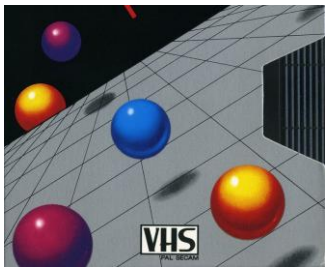
Figure 5 Camera Positioning Reference

Art and Audio

*As of right now, we are still in a very open state with art. We have a general direction, but at the moment are experimenting as we go with styles. *

Current theming is based around 1990s and 2000s retro games, though we have taken a slightly more cartoonish and modern approach. The number one showcase of this theme is our simple geometry. From a modeling perspective, we want the game to be “low poly” and not overwhelm the player. There will also be notable grid and wireframe patterns used throughout the art products.

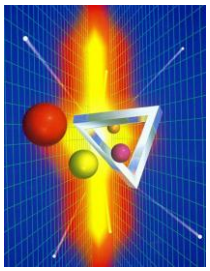
Art References



Art Reference 1 VHS Era Geometry



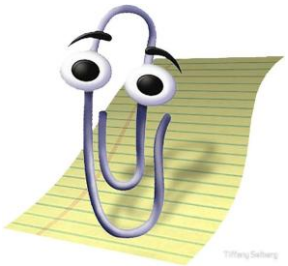
Art Reference 2 Retro Geometric CGI



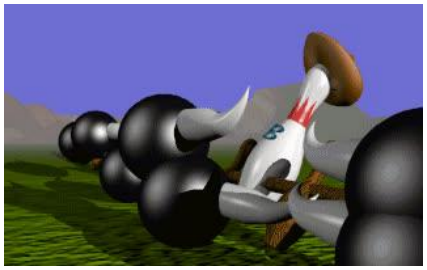
Art Reference 3 Neon Wireframe Graphics



Art Reference 4 Tamagotchi Town



Art Reference 5 Eye Mascot Design



Art Reference 6 Bowling

How the References Support the Game

VHS Era Geometry, Retro Geometric CGI, Neon Wireframe Graphics

These all showcase the general style that we are going for the environment. It is going to be very geometric but stylized in a way that gives our product a unique feel in comparison to the market.

Tamagotchi Town

This showcases a retro cartoon city environment. It is very busy and full, showcasing what our surrounding backdrop could look like.

Eye Mascot Design

This is an essential reference to our character design, especially when looking at the eyes coming out of the character. This plays heavily into our subtle cartoon style within the game.

Bowling

While the more it is discussed the less popular it has become among our team, bowling theming, and especially retro, stylized, bowling theming is still a major inspiration for our character and game design.

Player Character Design

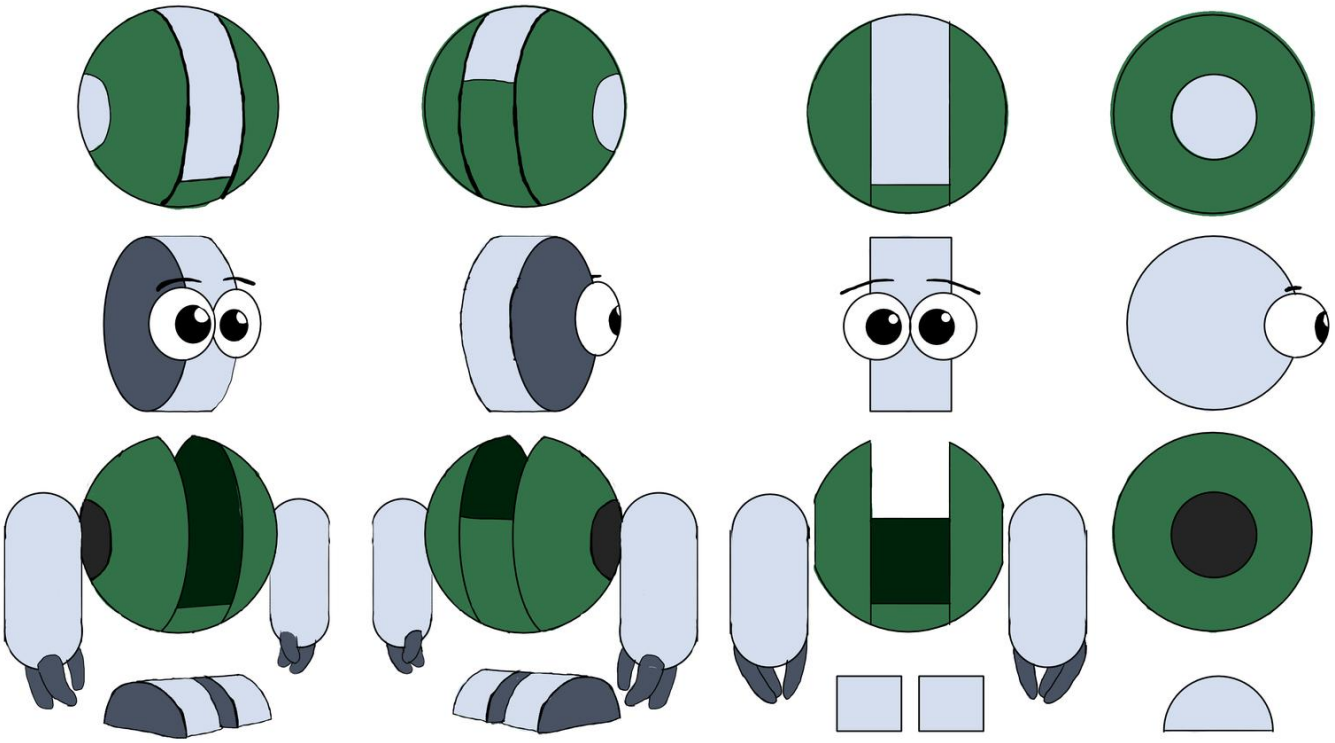
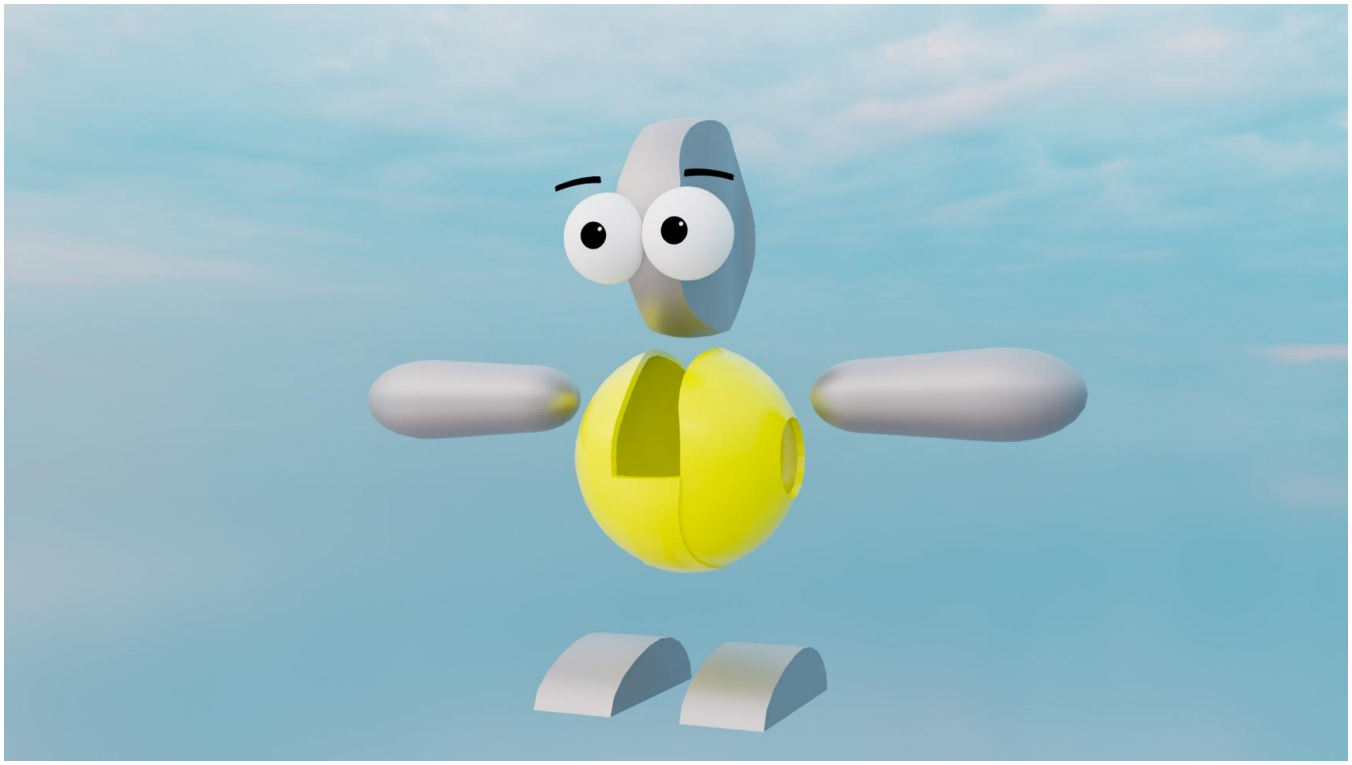


Figure 6 Player Character Design

Preliminary 3D Character Model

The character must look a way that makes it logical to achieve its running and rolling form. This design, while simple, achieves both of those goals. While the design might have slightly more "shape" to it in future renditions, this almost entirely captures the look and proportions of the character design.



Preliminary 3D Character Model

Interface and Controls

User Interface

The attached image shows a wireframe of the expected interface.

- The top-left corner shows the player's position relative to the rest of the lobby. Directly below, a live ranking leaderboard works similarly to a Formula 1 timing table, showing the abilities held by other players and the distance between racers.
- The bottom-left corner contains the player's speedometer and currently held item. The speedometer helps the player understand when they may be starting to lose control of the character.
- The top-right corner shows the timer and the number of completed laps.
- The bottom-right corner shows a minimap with each player's position on the track.

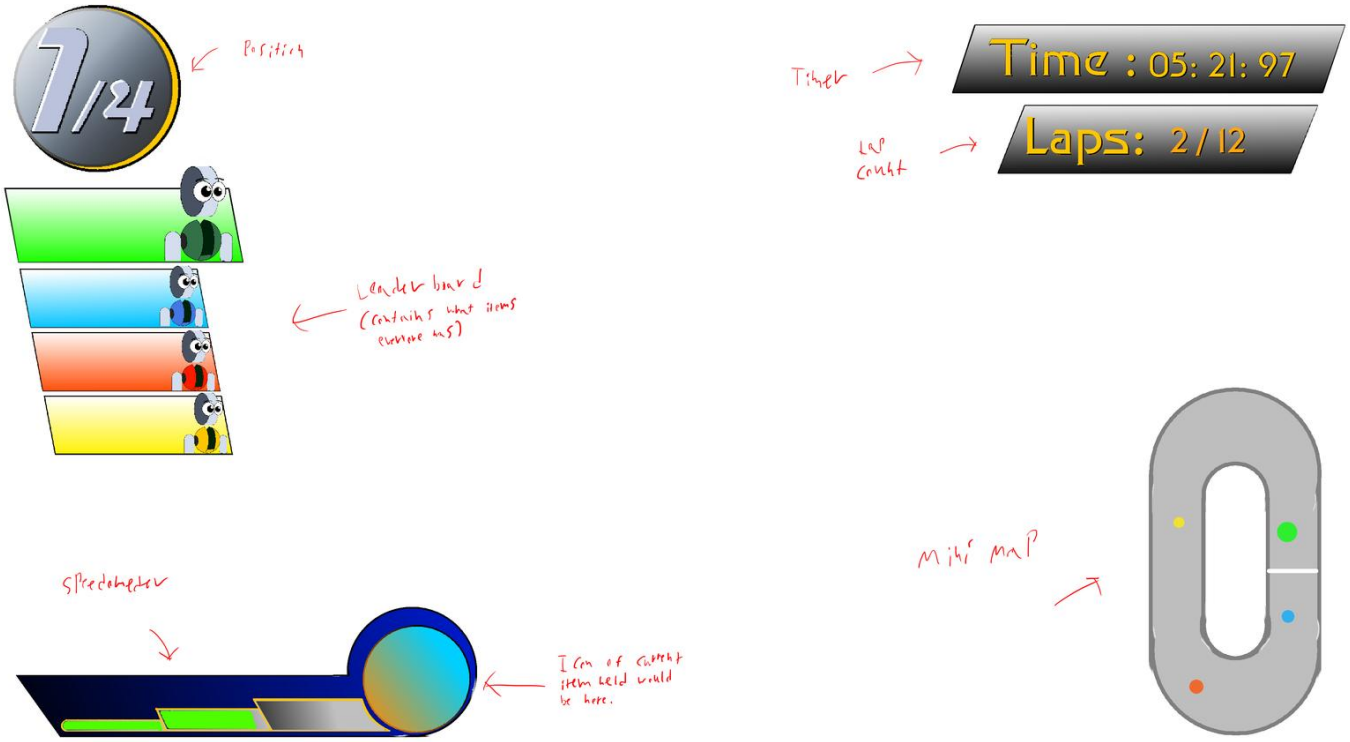


Figure 7 Interface Wireframe

Controls

LOCO Motion supports two PC control schemes and standard Xbox and PlayStation controller layouts. Players can choose between traditional keyboard steering and mouse-based steering.

Player Action	Keyboard Steering	Mouse Steering	Xbox Controller	PlayStation Controller
Accelerate or Move Forward	W	Left Mouse Button	Right Trigger	R2
Steer Left	A	Move Mouse Left	Left Stick Left	Left Stick Left
Steer Right	D	Move Mouse Right	Left Stick Right	Left Stick Right

Player Action	Keyboard Steering	Mouse Steering	Xbox Controller	PlayStation Controller
Slow Down	Left Shift	Left Shift	Left Trigger	L2
Jump	Spacebar	Spacebar	A Button	Cross Button
Aim Left	Move Mouse Left	A	Right Stick Left	Right Stick Left
Aim Right	Move Mouse Right	D	Right Stick Right	Right Stick Right
Use Item	Right Mouse Button	Right Mouse Button	Right Bumper	R1

Keyboard Steering

This control scheme uses traditional keyboard inputs for player movement. The mouse controls item aiming, allowing players to move with one hand and aim or activate items with the other.

Mouse Steering

This alternative control scheme allows players to steer by moving the mouse left or right. The left mouse button accelerates, while the A and D keys control item aiming.

Controller Input

The controller layout uses the left analog stick for steering and the right analog stick for item aiming. The analog triggers control acceleration and slowing, giving players more precise control over their movement speed.

Accessibility

Although our game does not rely heavily on audio cues or other mechanics that require extensive accessibility support, several considerations remain. We will provide clear audio and visual cues for every major interaction. We will also include color-blind options for the interface. *Symbols as well as colors will be used to communicate visual information, ensuring color-blind friendly gameplay.* The interface will be scalable for different screen sizes, and subtitles will be available when necessary.

Multiplayer and Match Flow

Lobby Structure

At the moment, we have set a limit of four players per lobby. We believe this is the best short-term approach for matchmaking because it provides a large enough group for action to occur on the track without requiring too many people to test or play. If this number seems low compared with other games, it is important to remember that a lap around our map will take only about 30 seconds. Even with four players, the track should develop the cluttered feeling we want by the end of the game.

Currently, multiplayer uses a local area network system. The first player to connect to a lobby becomes the listen server. Any other players who join are connected to that original player's server. Once two players have joined, a 30-second lobby countdown begins. A game may start with two players, but not with one. If the four-player limit is reached before the 30-second countdown ends, the lobby starts immediately.

Once that lobby is created, whether full or smaller, the next player to select "Join Game" starts another listen server. Players who join before that lobby's countdown ends are placed in that lobby, and the process repeats. This allows many concurrent servers to operate and improves testing capabilities.

In the future, we plan to shift to a Steam-based multiplayer system. In theory, this could be implemented now, but we believe completing the game's primary mechanics is a higher priority. Steam-based multiplayer will be essential to our plans to publish the game on Steam.

We have not ruled out expanding lobby sizes in the future. Four-player lobbies currently appear to be the most realistic option, but we would eventually like to consider maps designed for larger groups.

Match Lifecycle

This is the progression a player follows through the lobby and server when joining and playing a game.

1. The player selects the "Join Game" button.
2. The game searches for an open lobby.
3. If a lobby exists, the player joins it. If not, the player hosts a new lobby.
4. The game determines whether the minimum player requirement has been reached.
5. The countdown to start the game begins.
6. The lobby reaches the maximum number of players or the countdown expires.
7. All players currently in the lobby are loaded onto the racetrack.
8. The race begins.
9. The race results are calculated.
10. Players return to the main menu.
11. The session is destroyed.

Future Matchmaking Plans

AI Races

One prospective idea our team has discussed extensively is player-versus-AI racing. From our perspective, this would be a logical next step once most major mechanics have been implemented. The difficulty of adding the feature will depend on the sophistication of the AI. A simple AI that immediately uses each item it receives and follows the racetrack would be easy to implement. An AI that applies strategy and skill could be more difficult. Either way, this is a desired future goal.

Time Trials

This will almost certainly be a feature by release. It will allow users to load a map and complete laps while trying to record the fastest possible time. We plan to implement leaderboards so players can compare their fastest times with their friends and the best overall times.

Project Timeline

9/16 GDD and Pres1
Task Management setup complete and preproduction efforts are exchanged for development tasks.

9/18 Imperative Systems
A whitebox of the track has been completed. Game systems needed for testing and iteration to occur should work generally as intended. These can be simple and cheesy, but are required to be completed in some sense before the core design work begins:
Respawning Item Boxes
Start/Finish Line + Lap Counter
Multiplayer

9/25 First Playable Complete
Can run around a placeholder art track with other players to complete laps and use at least one functioning item. The character has been modelled and has a ball form.
*At this stage, we should be iterating immensely on the movement system and track design and have come to **some** conclusions on how we want it to feel. This is the time for aggressive testing as we move towards Alpha!*

10/21 Alpha Complete
Track 1 is design complete and has some completed art. Movement system capabilities have been **set in stone**. All **Imperative Systems** are now fully functioning as intended. Item pickup system and item usage largely works. Several track-affecting items exist. Several player-affecting items exist. Multiple character animations exist. Multiple recolors of the character exist. Some basic audio and placeholder audio exists.

10/28 Pres2
Demonstrable basic gameplay and art exist as per Alpha stage. Mild refinements and artifact gathering should occur to ensure a quality presentation.

11/20 Beta 1.0
Track1 is art-complete. Movement system is no longer being tweaked **at all**. Item system design-locked and fully functioning with numerous items and only minor bugs. Item-preview is largely functioning. Items have been modelled (for those where it's relevant). Character is fully animated. Basic FX and animations have been created for items and track hazards. UI functions but not necessarily art/FX-complete. Track2 has been whiteboxed, Track3 is under active discussion. 50% completion of important audio assets. Track1 music is in development.

12/9 Pres3
Refined Beta is presented to class with game expansion on the horizon. A short gameplay sizzle reel has been created.

Semester 2

At this phase content creation is still occurring, but programmers primary objectives will shift towards debugging and design polish rather than system creation.

1/30 Beta 1.5

Track 2 is fully complete. Track3 has a paper design. Items have had a polish pass. Player and Obstacle cosmetic system is ready for asset creation. UI is completed. Item FX and animations have been improved. 80% of important SFX are fully completed with placeholder for incompleted items, and basic audio for less relevant needs. Time trial mode is in development. Track1 soundtrack is complete and Track2's is in development. A social media account on instagram and an organization on LinkedIn has been created and populated with basic information.

2/27 Beta 2.0

Track3 is fully complete. Multiple simple player customization options exist. Time Trial Mode is complete. Item FX and animations are complete. SFX are complete. Track2's soundtrack is complete with Track3's in development. A post about our progress has been made, beginning hype for P3.

3/5 Sizzle for P3

Track3 soundtrack is complete. A trailer for our game has been created to show off at P3/Fractal/on social media. Our social media has been populated with our trailer and at least one silly development video.

4/18 FULL COMPLETION

All systems are complete and fully functioning. All art is final. Audio is fully complete. Time for last-minute polish and preparation for our final presentation moving forward.