

WATER COOLER FISH

# VeloCity

Game Design Document



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Written by Water Cooler Fish  
Version # 2.0

Wednesday, January 29, 2024

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# Design History

Brief explanation of the history of this document.

## Version 1.0

- ★ Initial design document
- ★ No storyboard
- ★ Schematic and noun / verb chart

## Version 1.1

- ★ More developed storyboard
- ★ Added concept art and some final designs

## Version 1.2

- ★ New document layout
- ★ Added concept art for characters and environment
- ★ Added finished characters and environment models

## Version 1.3

- ★ Reworked schematic
- ★ Reworked storyboard
- ★ Reworked noun / verb chart
- ★ Added information to each previous placeholder
- ★ Fleshed out the features list

## Version 2.0

- ★ Complete overhaul of document organization
- ★ Added more in depth descriptions of features to match the SRS requirements

---

# 1 | Game Overview

VeloCity is a fast-paced, multiplayer king-of-the-hill style game. Pick from six unique, cyberpunk style characters to play against your friends! Featuring high-energy mechanics such as combat tricking, momentum-based movement, and motion-captured animations, Roller Frenzy aims to create an immersive, adrenaline-filled gameplay experience that brings out players' competitive and cooperative sides.

## 1.1 | Theme Overview

Roller Frenzy is set in a sprawling retro future cyberpunk inspired city, where extreme roller skating tournaments dominate both underground and mainstream culture. Amidst upper city neon-lit skyscrapers and lower city graffiti-covered alleys, competitors battle for fame, freedom, and rebellion against oppressive mega-corporations. Players play as one of four vibrant characters, each with their own unique style and backstory, in 4 different zones that transform everyday cityscapes into their own arenas. The game's mood captures a mix of intense competition, punk rebellion, and dystopian glamour, inspired by classic cyberpunk aesthetics and the energy of modern skating subcultures.

## 1.2 | Art Overview

The art theme of the game is described as cyberpunk, dystopian, with bright color palettes. Along with mid-century modern inspired environment art, the art themes are represented in the environment and character models.

## 1.3 | Narrative Overview

VeloCity takes on the narrative of a dystopian planet Earth in the year 3000. Decades ago, the previous country abandoned all forms of traditional government. The VeloCity government implemented a chaotic entertainment system: Roller Frenzy. Competitors are forced into combat skating, king-of-the-hill style tournaments. Competitors must battle for control of the city districts, winning allows them to claim glory and influence for the future of the city's culture and politics.

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## 2 | Controls

The game controls allow the players to move, jump, and control the skating of their character as well as the execution of tricks/combat.

The game has controller support as well as keyboard compatibility.



Figure 2.1

Figure 2.1 shows the controller schematics.

Photo by [Pasqualino Capobianco](#) on [Unsplash](#)



Figure 2.2

Figure 2.2 shows the controller schematics from top angle.

Photo by [Anthony Choren](#) on [Unsplash](#)

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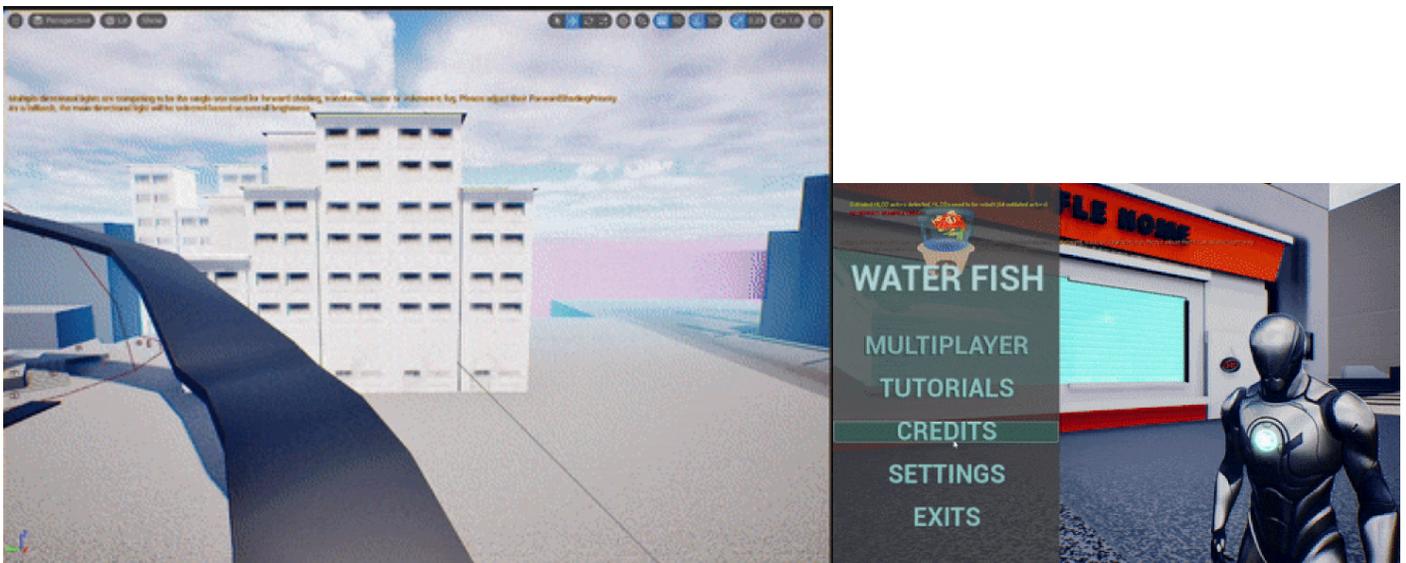
## R2.1 | Main Controller Buttons Requirement

- ★ R2.1.1 The player can tap Left and Right Triggers to Move forward 100 cm/s. If the player doesn't follow the rhythm of tapping left and right, the player slows down. Each rhythm of tapping left and right has a 1 second increment.
- ★ R2.1.2 The player can tap B to use Slow Break, which can slow the player down by 10 cm/s.
- ★ R2.1.3 The player can hold B to use Grind to Stop, which can fully stop the player.
- ★ R2.1.4 The player can press B while turning to execute a turn stop which will stop the player while turning them to face another direction.
- ★ R2.1.5 The player can rotate the Right Joystick to move the camera angle in the direction of the turn.
- ★ R2.1.6 The player can rotate the left joystick to turn the character. **(TBD)**
- ★ R2.1.7 The player can press the left joystick to use dodge, which can avoid an attack of another player by sliding to either side (left or right).
- ★ R2.1.8 The player can press A to Jump 100 ft in the air, which carries momentum.
- ★ R2.1.9 The player can press Y to Boost, which can increase the speed of the player by 100 cm/s in addition to the original movement.
- ★ R2.1.10 The player can press X to Attack, which launches the player 150 cm/s in the direction that the opponent player is facing.
- ★ R2.1.11 The player can press the Start Button to pause the game.
- ★ R2.1.12 Specific buttons when pressed in quick succession with X (attack) can be used for the Trick Combat System. See INSERT DOC SECTION HERE for more information.

Use	Controller Mapping	Keyboard Mapping
Left Leg	Left Trigger	A
Right Leg	Right Trigger	D
Break	B	S
Jump	A	SPACE
Attack	X	E
Boost	Y	LSHIFT
Turn	Rotate Left Joystick	Move Mouse
Dodge	Press Right Joystick	W
Camera Movement	Rotate Right Joystick	Move Mouse
Pause	Start Button	Escape

### 3 | User Interface

In this game, we are creating a dynamic 3D UI system that features our environment in the background of the UI.



---

## R3.1 | Title Screen Requirements



Figure 3.1

Figure 3.1 shows the main menu screen, where the title of the game is displayed. From here players can access menus for Settings, Credits, Tutorials, and playing the game.

- ★ R3.1.1 When the game is launched, this is the first screen the player has access to.
- ★ R2.1.2 Selecting the “Multiplayer” button takes the player to the “Host/Join” screen where the player can create or join a game.
- ★ R3.1.3 Selecting the “Tutorials” button takes the player to the “Tutorials” screen where the player can see the game’s controls.
- ★ R3.1.4 Selecting the “Credits” button takes the “Credits” screen where they can see the game’s credits
- ★ R3.1.5 Selecting the “Settings” button takes the player to the “Settings” screen where they can adjust their game’s Audio and Visual settings.

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## R3.2 | Host/Join Screen Requirements

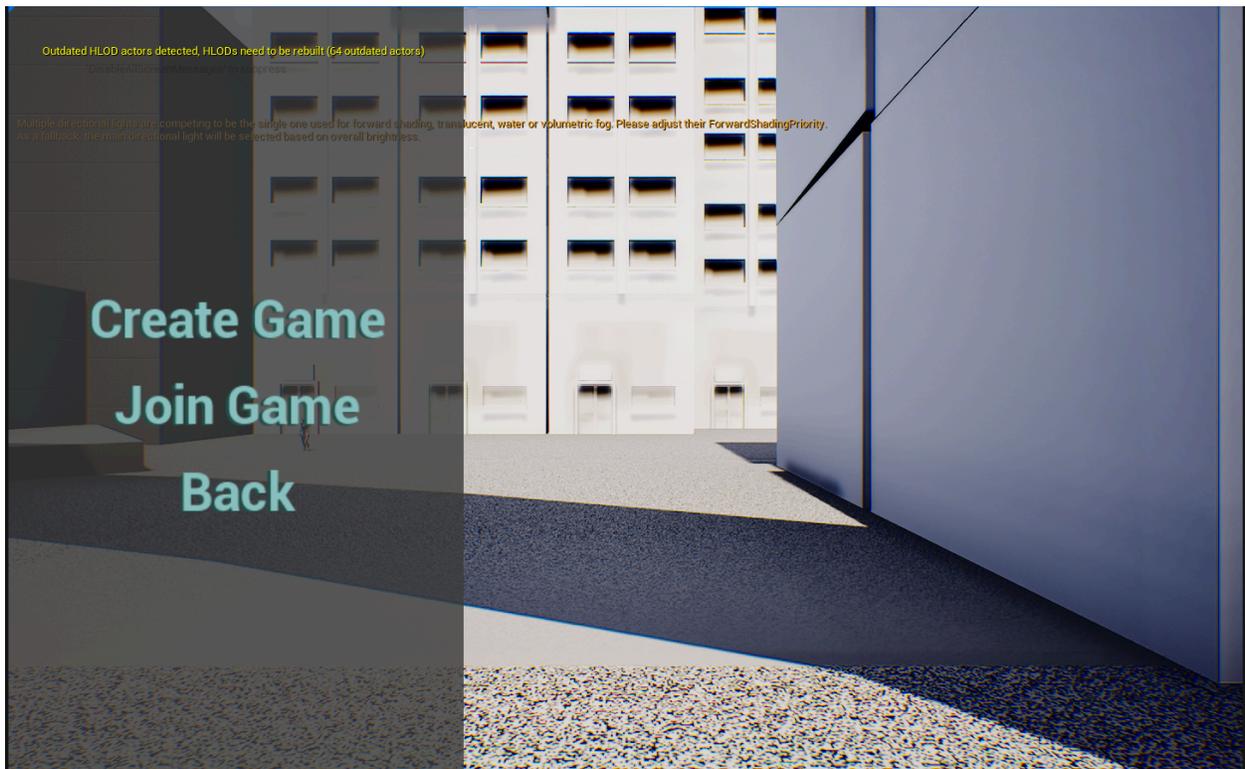


Figure 3.2

Figure 3.2 shows the Host/Join screen. From here players can decide to either create or join online game sessions.

- ★ R3.2.1 Selecting the “Create Game” button takes the player to the “Lobby Creation” page where the player can create an online session to play the game.
- ★ R3.2.2 Selecting the “Join Game” button takes the player to the “Session Search” page where the player can look for and join an online session.
- ★ R3.2.3 Selecting the “Back” button takes the player back to the Main Menu

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## R3.3 | Character Select Screen Requirements

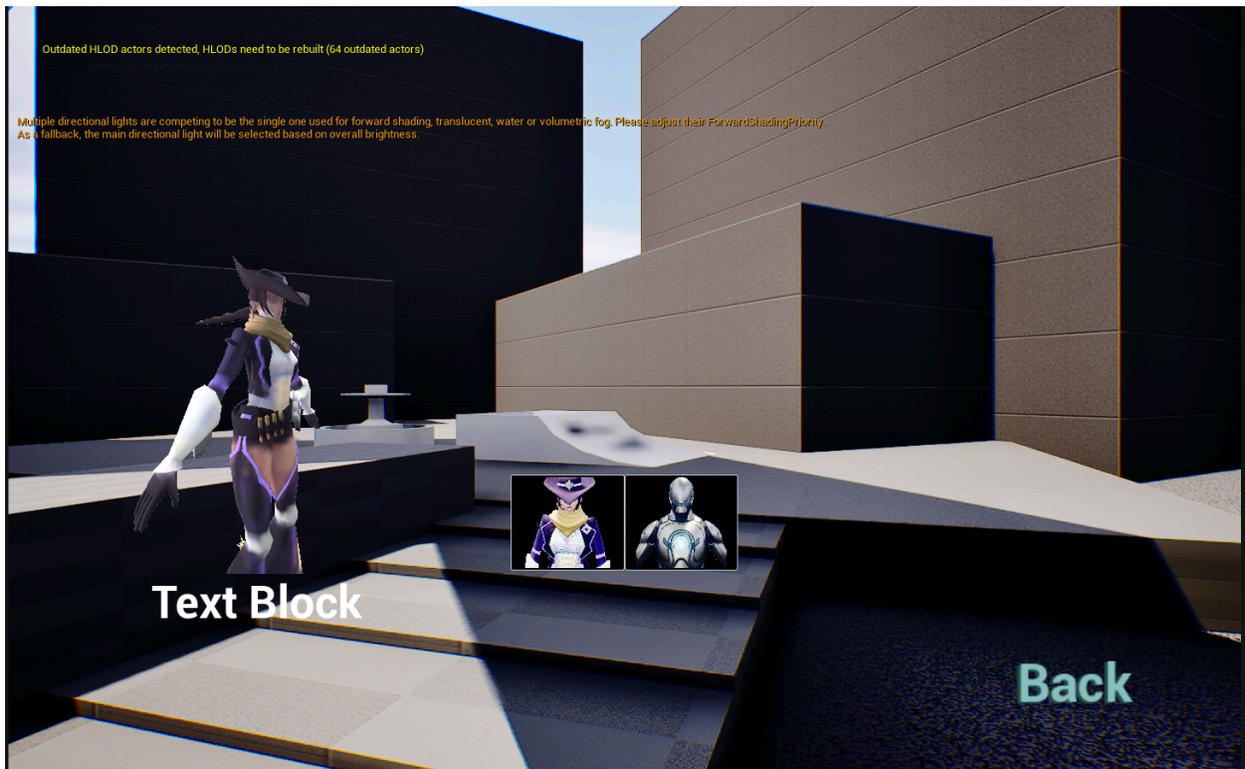


Figure 3.3

Figure 3.3 shows the Character Select Screen. From here players will be able to choose which of the game's 3 characters they will play as in their online game. Each character has a small portrait the player can click on as well as a full body shot of the character the player has chosen.

- ★ R.3.3.1 Selecting a character's portrait causes the player to load into online sessions they create or join as that character
- ★ R.3.3.2 Selecting the "Back" button returns the player to the Main Menu scene

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## R3.4 | Lobby Creation Screen Requirements

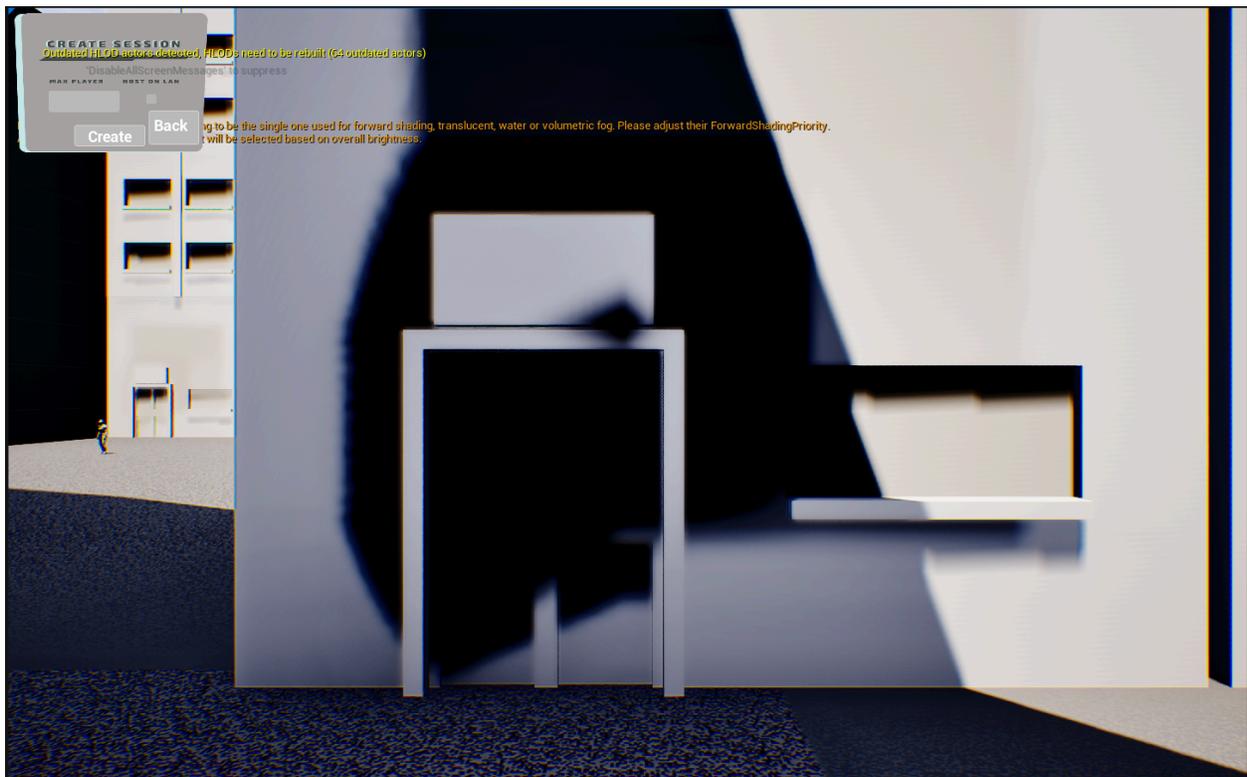


Figure 3.4

Figure 3.4 shows the Lobby Creation Screen. From here players will be able to create their own online session. They can choose whether the session is hosted over the Local Area Network, and how many players can join.

- ★ R3.4.1 Entering a Number in the “Max Players” field sets the upper limit on how many players need to join the online session before the game begins. The minimum number of players is 2, with the max being 6 (TBD)
- ★ R3.4.2 Clicking the “Host on Lan” box ticks a checkbox to set whether the online session will be hosted over the local area network or not
- ★ R3.4.3 Clicking the “Back” button will return the player to the “Host/Join” Screen.
- ★ R3.4.4 Clicking the “Create” button will create an online session using the parameters set by the player.

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## R3.5 | Lobby Search Screen Requirements

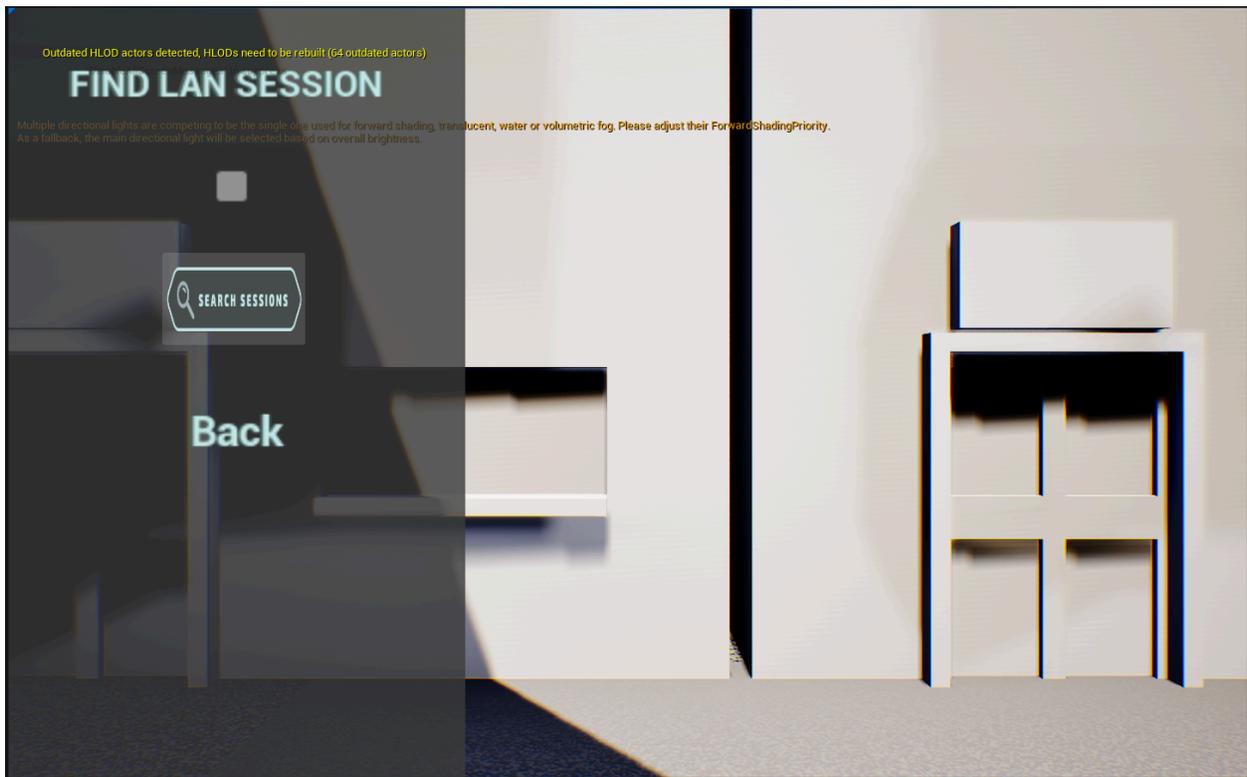


Figure 3.5

Figure 3.5 shows the Lobby Search Screen. From here players will be able to join other players' online sessions.

- ★ R3.5.1 Clicking the “Find Lan Session” box ticks a checkbox to set whether the player will see sessions hosted on their Local area network.
- ★ R3.5.2 Clicking the “Search Sessions” button looks for sessions hosted by other players based on the parameters set by the players.
- ★ R3.5.3 Clicking the “Back” button will return the player to the “Host/Join” Screen.

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## R3.6 | Heads Up Display (HUD) Requirements

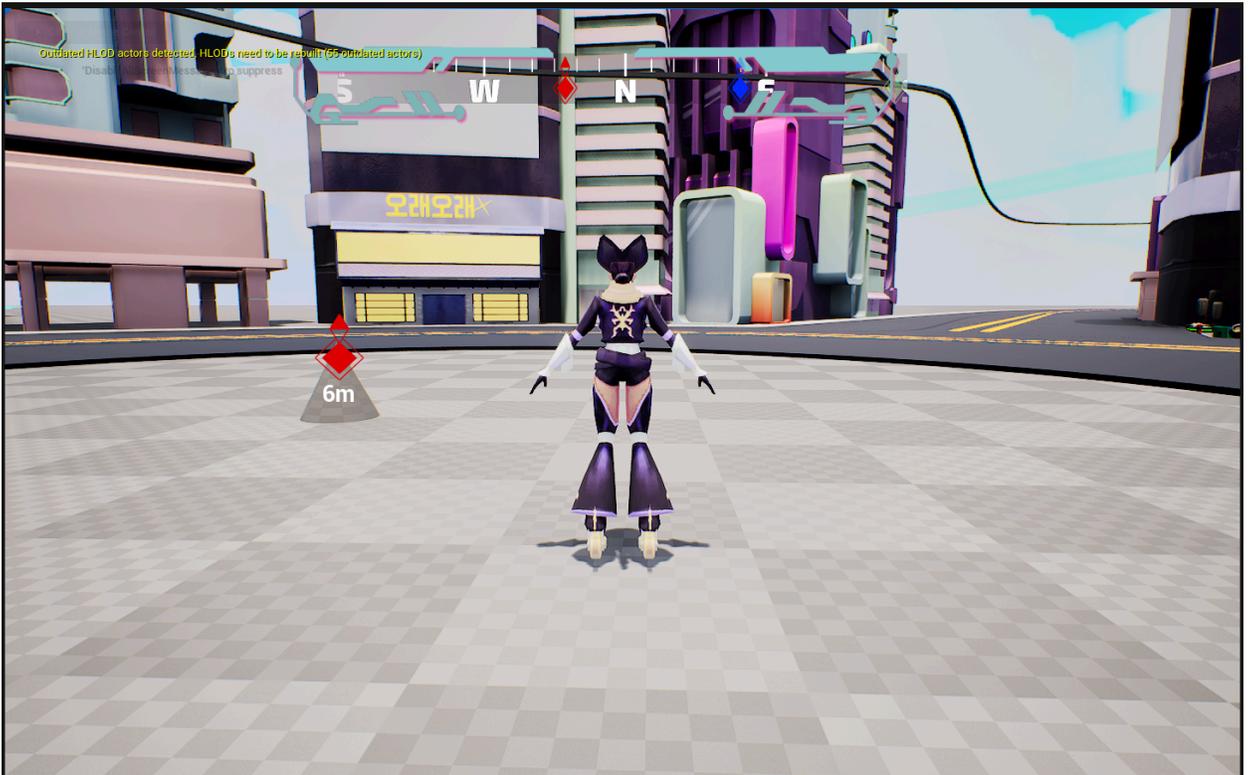


Figure 3.6

Figure 3.6 shows the player's HUD when in a game, the player is able to see a compass as well as 3 markers that show the player the location of the zones.

- ★ R7.1.1 Compass
  - R7.1.1.1 A Compass showing the player the direction they're currently moving
- ★ R7.1.2 Zone Markers
  - R7.1.2.1 Markers that show the player the approximate location and distance to each of the zones.
- ★ R7.1.3 Zone Leaderboard
  - R7.1.3.1 While a Zone is active, players are able to see which player is currently winning that zone,

---

## R3.7 | Pause Menu Requirements



Figure 3.7

Figure 3.7 shows the Pause Menu. This is a screen players are able to pull up while playing the game to access more features.

- ★ R3.6.1 Pressing the “Exit” Button causes the player to leave the game and return to the “Main Menu”
- ★ R3.6.2 Pressing the “Start” Button lets the player leave the Pause Menu and continue playing.

## 4 | Storyboard

During a session, this is the storyboard for screens and splash text once you have entered a session with the number of players for your game.

SPAWN ISLAND



PLAYERS SPAWN INTO A SPAWN ROOM AT THE START

GAME START



WHEN THE GAME STARTS, EVERYONE SPAWNS ON THE SUB

ZONE SPAWN



PLAYER RACING TO ZONE INDICATED AT TOP

PLAYER COMBAT



APPROACHING CURRENT "KING"

LANDING TRICK



WHEN LAYER LANDS A TRICK. GAIN CHARGE FOR BOOST

GETTING HIT



PLAYER GETS HIT

LOSING COMBAT/GETTING KNOCKED OUT



PLAYER IS BRIEFLY STUNNED AFTER HIT

ZONE WIN



SCREEN IF PLAYER WINS THE ZONE

ZONE LOSS



SCREEN IF PLAYER LOSES THE ZONE

PLAYER LEADERBOARD



GAME WIN



VICTORY FOR PLAYER, SPLASH OF THEIR CHARACTER

GAME LOSS



VICTORY FOR OTHER PLAYER SPLASH OF THEIR CHARACTER

## 5 | Game Schematic

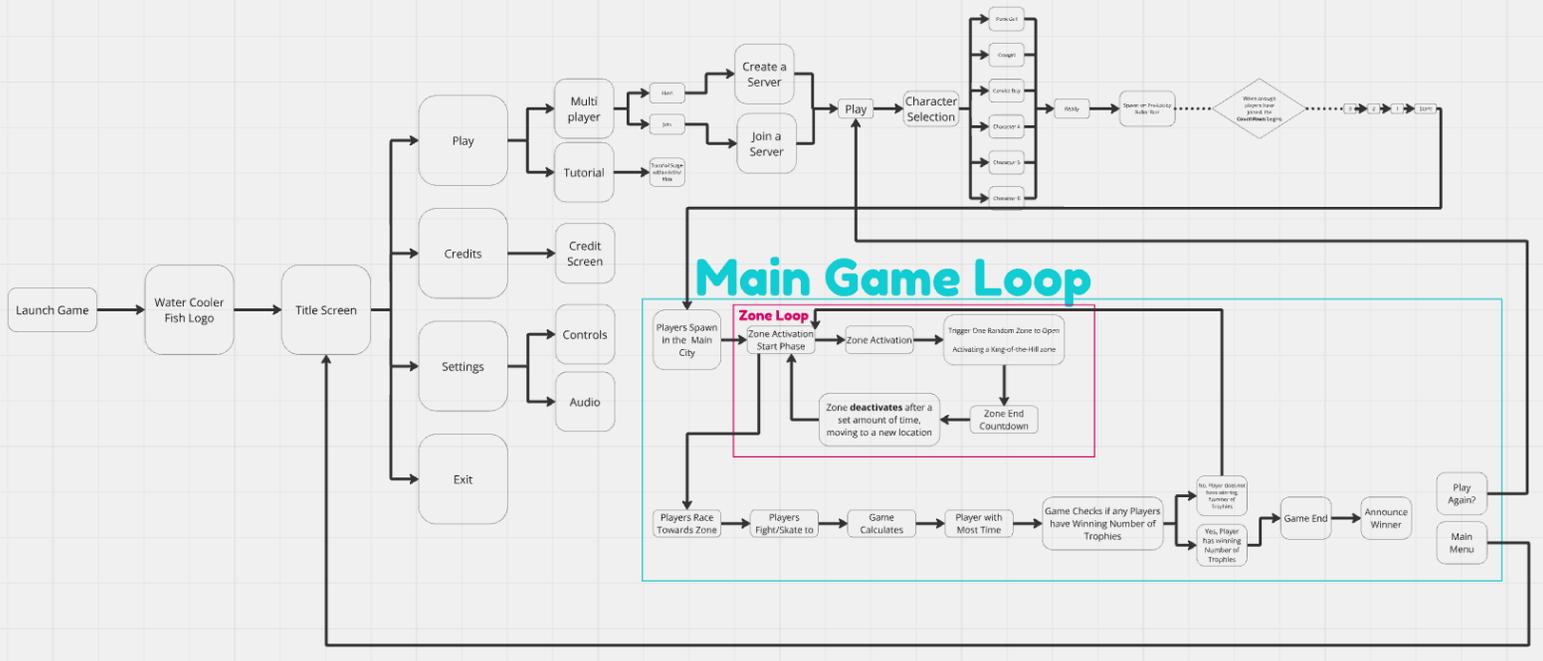


Figure 5.1

Figure 5.1 is the game schematic, which depicts the flow of gameplay for VeloCity. Each rounded rectangle represents one game state. During different game states, the game will display different game scenes on the screen, and the player will interact with the UI differently as well.

### R5.1 | Before The Game

- ★ R5.1.1 The player double clicks the icon of the game to launch the game.
- ★ R5.1.2 When the game launches, the logo of Water Cooler Fish will be displayed in the center of the screen.
- ★ R5.1.3 After the logo fades out, the game will go to the Title Screen.

### R5.2 | Title Screen

- ★ R5.2.1 When the game goes to the Title Screen, the buttons “Multiplayer,” “Tutorials,” “Credits,” “Settings,” and “Exit” will be displayed on the screen.

- 
- ★ R5.2.2 The player can select one of the buttons mentioned above to enter different game scenes.

## R5.3 | Play

- ★ R5.3.1 When the player selects the “Multiplayer” or “Tutorial” button, the game will enter the Play state.
- ★ R5.3.2 Multiplayer
  - R5.3.2.1 When the player selects the “Multiplayer” button, the game will go to the character selection scene.
  - R5.3.2.2 The available characters are shown as buttons on the character selection scene, and the “Back” button.
  - R5.3.2.3 When the player selects any of the players, the game will go to the game selection scene.
  - R5.3.2.4 The buttons “Create Game,” “Join Game,” and “Back” buttons will be shown on the game selection scene.
  - R5.3.2.5 Create Game
    - R5.3.2.5.1 When the player selects the “Create Game” button on the game selection scene, the game will go to the Create Room scene.
    - R5.3.2.5.2 The player can adjust the number of the player in the Create Room scene.
    - R5.3.2.5.3 The player can decide if the host LAN is enabled in the Create Room scene.
    - R5.3.2.5.4 When the player selects the “Create” button, the game is created and the game will enter Main Game Loop state and the player will become the host of the game.
  - R5.3.2.6 Join Game
    - R5.3.2.6.1 When the player selects the “Join Game” button on the game selection scene, the game will go to the Join Game scene.
    - R5.3.2.6.2 The player can decide if the (network) session is enabled.
    - R5.3.2.6.3 The player can select the “Search” button to search for any available games.

- 
- R5.3.2.6.4 When the player selects the “Join” button of one of available games, the game will enter Main Game Loop state and the player will join that game.
  - R5.3.2.7 Main Game Loop
  - R5.3.2.8 When the Main Game Loop ends, two buttons “Play Again?” and “Main Menu” will be displayed on the screen.
  - R5.3.2.9 If the player selects “Play Again?”, the game will go back to the beginning of the Main Game Loop again.
  - R5.3.2.10 If the player selects “Main Menu,” the game will go back to the Title Screen.
- ★ R5.3.3 Tutorials
- R5.3.3.1 When the player selects the “Tutorials” button, the game will go to the Tutorials scene.
  - R5.3.3.2 The tutorial information which can instruct players how to play the game will be displayed on the Tutorials scene.
  - R5.3.3.3 When the player selects the “Back” button, the game will return back to “Title Screen.”
- ★ R5.3.4 When the player selects the “Back” button on any scene when the game is in the Play state, the game will go back to the previous scene.
- ★ R5.3.5 When the player selects the “Back” button on the character selection scene, the game will return back to “Title Screen.”

## R5.4 | Main Game Loop

- ★ R5.4.1 When the game starts, Players spawn in the Main City (the map of the game).
- ★ R5.4.2 After all the players spawn, the game will enter Zone Loop
- ★ R5.4.3 Zone Loop
  - R5.4.3.1 Zone will enter the Zone Activation Start Phase.
  - R5.4.3.2 After the Start Phase, Zone Activation will be triggered to prepare the game resources the game requires.
  - R5.4.3.3 The game will trigger one random Zone to open
  - R5.4.3.4 When the game needs to go to another zone, Zone will enter Zone End state and start Zone countdown.

- 
- R5.4.3.5 After a set of countdown time, the Zone will be deactivated and the game moves to another zone.
  - R5.4.3.5 The game goes back to the Zone Activation Start Phase to load a new Zone.
  - ★ R5.4.4 While the map is loading, the player's Race will hold toward the Zone.
  - ★ R5.4.5 Players fight and move in the Zone.
  - ★ R5.4.6 The game will calculate the various values of the game.
  - ★ R5.4.7 Players spend most of the time in the Zone.
  - ★ R5.4.8 The game will check if any Players have the winning number of trophies.
  - ★ R5.4.9 If no player has the winning number of trophies, the game will go back to Zone Activation Start Phase.
  - ★ R5.4.10 If any player(s) have the winning number of trophies, the game will end.
  - ★ R5.4.11 The game will announce the winner of the game, and the main game loop ends.

## R5.5 | Credits

- ★ R5.5.1 When the player selects the "Credits" button, the game will go to the Credits scene.
- ★ R5.5.2 The name and the position of each developer and the "Back" button will be displayed on the Credits scene.
- ★ R5.5.3 When the player selects the "Back" button, the game will return back to "Title Screen."

## R5.6 | Settings

- ★ R5.6.1 When the player selects the "Settings" button, the game will go to the Settings scene.
- ★ R5.6.2 The buttons "Control," "Audio," and "Back" will be displayed on the screen.
- ★ R5.6.3 When the player clicks the "Control" button, the game will go to the Control scene, which allows players to customize their input options.
- ★ R5.6.4 When the player clicks the "Audio" button, the game will go to the Sound scene, which allows players to adjust the volumes of the music and the sound.

- ★ R5.6.5 When the player clicks the “Back” button, the game will go back to the Title Screen.

## R5.7 | Exit

- ★ R5.7.1 When the player selects the “Exits” button, the game application will be closed directly.

## 6 | Noun Verb Diagram

A noun / verb diagram of the player movement and options the player has to make.

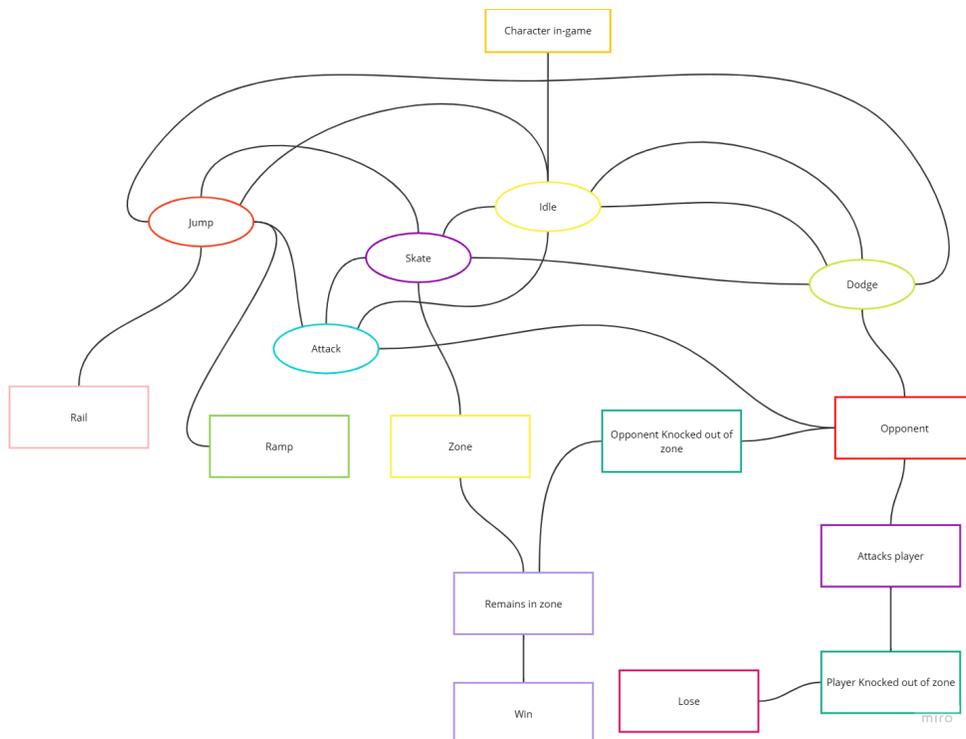


Figure 6.1

Figure 6.1 Shows the different states in the form of noun and verb. Their transitional relationship is also shown on the diagram. The squares are the nouns, and the ovals are the verbs. These verbs can also represent the player’s state in the game.

## R6.1 | Character in-game

- ★ R6.1.1 Character in-game is the player who plays the role of an agent in the game.

- 
- ★ R6.1.2 The player will be in Idle state at default if they do nothing.

## R6.2 | Jump

- ★ R6.2.1 Jump is the state that the character launches to the air vertically with speed and will gradually fall back to the ground.
- ★ R6.2.2 In this state, the character must be in the air.
- ★ R6.2.3 The player will enter the Rail state when jumping to a rail.
- ★ R6.2.4 The player will enter the Ramp state when jumping to a ramp.
- ★ R6.2.5 The player can press the Attack button to enter the Attack state.
- ★ R6.2.6 The player can press the Skate buttons to enter the Skate state.
- ★ R6.2.7 The player can press the Dodge button to enter the Dodge state.
- ★ R6.2.8 The player will be back to the Idle state when they fall on the ground and the speed is 0.

## R6.3 | Idle

- ★ R6.3.1 Idle is the default state of the player.
- ★ R6.3.2 The most common way to keep in this state is to do nothing.
- ★ R6.3.3 The player can press the Jump button to enter the Jump state.
- ★ R6.3.4 The player can press the Dodge button to enter the Dodge state.
- ★ R6.3.5 The player can press the Skate buttons to enter the Skate state.
- ★ R6.3.6 The player can press the Attack button to enter the Attack state.

## R6.4 | Rail

- ★ R6.4.1 Rail is the state that the player jumps to a rail and slides (rapidly moves) on the rail.
- ★ R6.4.2 The player can still jump while sliding on a rail.

## R6.5 | Ramp

- ★ R6.5.1 Ramp is the state that the player jumps to a ramp and slides on the ramp with the effect of gravity.
- ★ R6.5.2 The player can still jump while sliding on a ramp.

---

## R6.6 | Attack

- ★ R6.6.1 Attack is the state that the player attempts to attack Opponents.
- ★ R6.6.2 The player can press the Skate buttons to enter the Skate state after the Attack action ends.
- ★ R6.6.3 The player will be back to the Idle state after the attack action and the player doesn't do anything.
- ★ R6.6.4 The player can press the Jump button to enter the Jump state after the Attack action ends.

## R6.7 | Skate

- ★ R6.7.1 Skate is the state that the player moves on the ground in the Zone.
- ★ R6.7.2 The player will be back to the Idle state when the speed of the speed is 0.
- ★ R6.7.3 The player can press the Attack button to enter the Attack state.
- ★ R6.7.4 The player can press the Jump button to enter the Jump state
- ★ R6.7.5 The player can press the Dodge button to enter the Dodge state.
- ★ R6.7.6 The player can press the Jump button to enter the Jump state after the Dodge action ends.

## R6.8 | Dodge

- ★ R6.8.1 Dodge is the state where the player attempts to take an action such as sliding to their left or right quickly to avoid Opponent's attack.
- ★ R6.8.2 Different characters have different ways to dodge.
- ★ R6.8.3 The player will be back to the Idle state after the Dodge action ends.
- ★ R6.8.4 The player can press the Skate buttons to enter the Skate state after the Dodge action ends.

## R6.9 | Opponent

- ★ R6.9.1 Opponent is the hostile player.
- ★ R6.9.2 The opponent will attack the player.
- ★ R6.9.3 The opponent can be knocked out of the Zone.

---

## **R6.10 | Zone**

- ★ R6.10.1 Zone is the area the game is held and the player moves.
- ★ R6.10.2 The goal of the players is to stay in the Zone.

## **R6.11 | Remains in Zone**

- ★ R6.11.1 Remains in Zone is the goal of the players.
- ★ R6.11.2 The player will win when they successfully stay in the Zone after the game ends.

## **R6.12 | Attacks Player**

- ★ R6.12.1 Attacks Player is the action the opponents stop player to win by knocking the players out of Zone.

## **R6.13 | Player knocked out of Zone**

- ★ R6.13.1 Player knocked out of Zone is the purpose of Opponent's Attacks Player.
- ★ R6.13.2 If the players are all knocked out of Zone, they will lose.

## **R6.14 | Lose**

- ★ R6.14.1 Lose is the state the player loses the game.
- ★ R6.14.2 The game is ended when the players lose.

## **R6.15 | Win**

- ★ R6.15.1 Win is the state the player wins the game.
- ★ R6.15.2 The game is ended when the players win.

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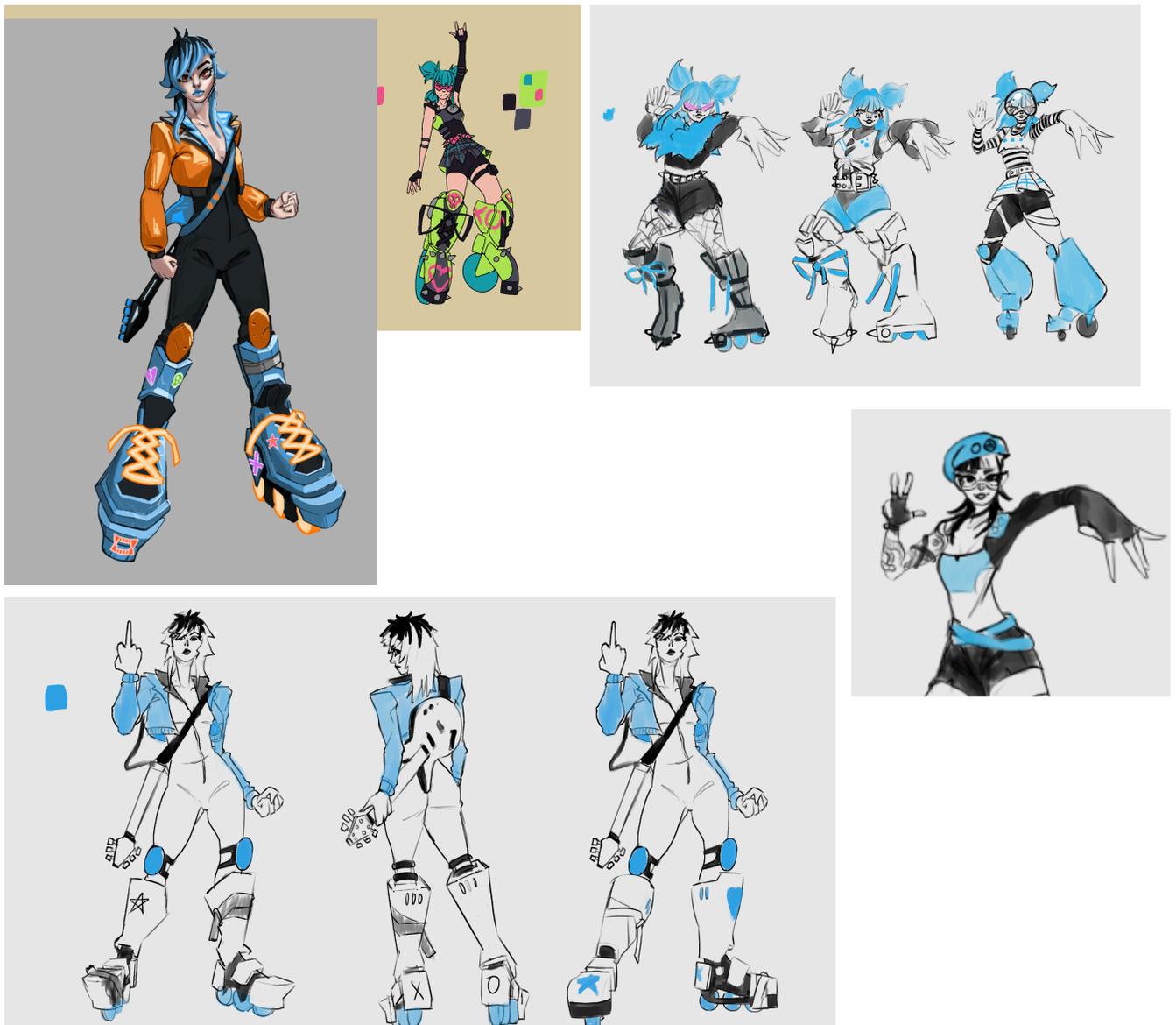
## 7 | Characters

There are four unique characters to pick that are cyberpunk, dystopian influenced.

### 7.1 | Character Concepts

Below are early concepts of the characters through various iterations of design. Each character will have their own statistics on how fast they skate and how strong their melee attacks are.

#### Coda - The Punk Girl



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**Jin-ae - The Barbie Girl**



# Marisol - The Ranger Girl



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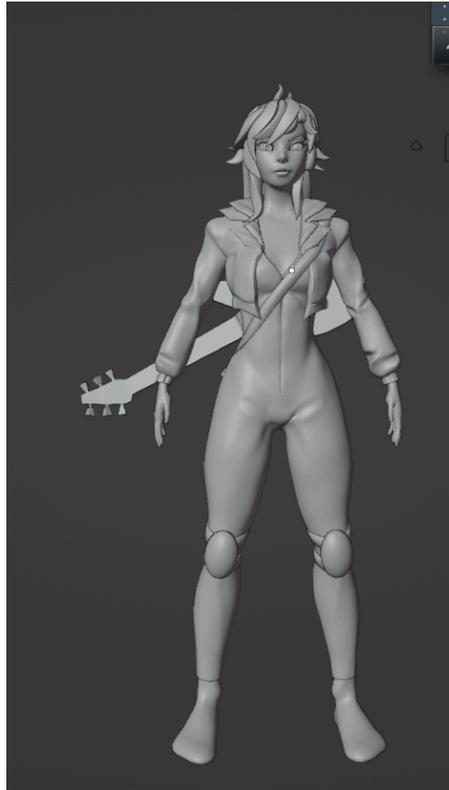
Vesper - The Poker Guy



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## 7.2 | Current Character Models

Below are the current models of the characters [Ranger] and [punk girl]. Each character will follow the stylized, hand-painted textures.



## R7.3 | Character Animations

R7.3.1 - Each character has its animations for skating and attacking. This is all connected through Unreal's animation blueprints.

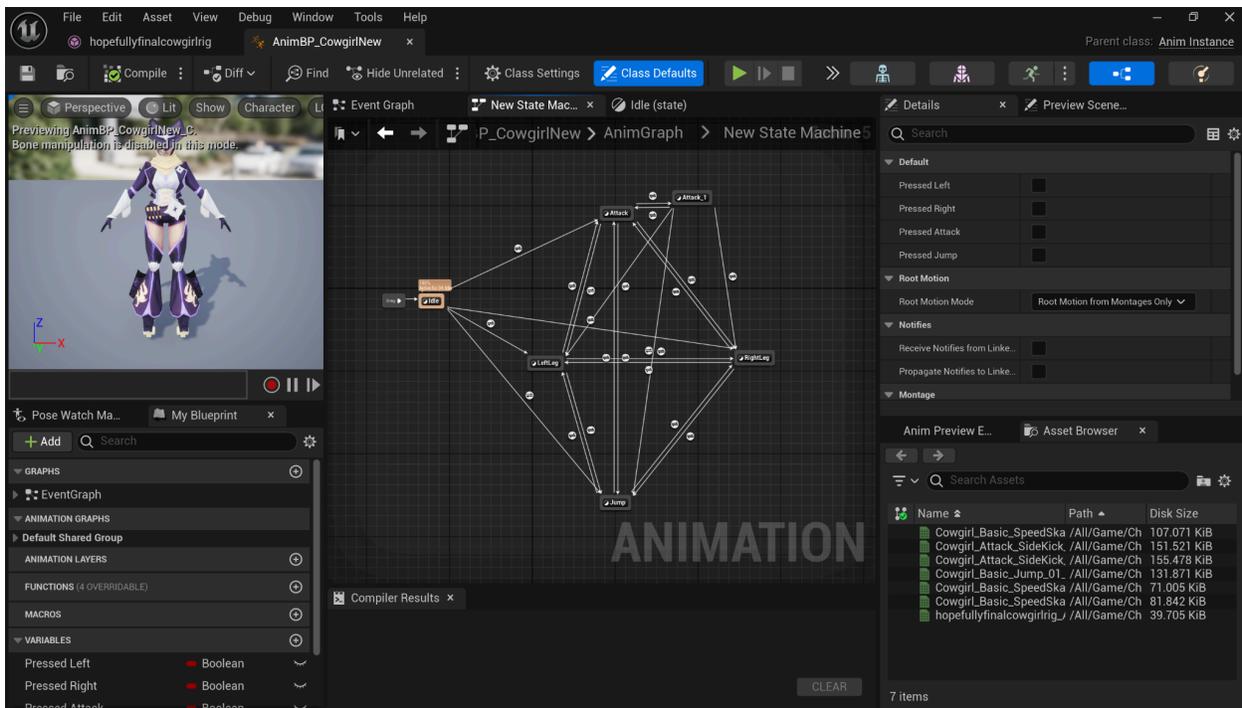


Figure 7.3.1.1 - animation state machine

Figure 7.3.1.1 Each character has a state machine. Each state is an animation for a particular action and how to get to that animation.

R7.3.2 - Each character has their own portrait within the character select screen.



Figure 7.3.2.1 - character select portraits

Figure 7.3.2.1 This screen shows a character portrait for every character.

## R7.4 | Character Stats

R7.4.1 - Coda - Skates at +25 speed. -25 launch power. These numbers are stacked on top of the original speeds and launch power.

R7.4.2 - Jin-ae - Skates at +25 speed. -25 launch power. These numbers are stacked on top of the original speeds and launch power.

R7.4.3 - Vesper - Skates at -25 speed. +25 launch power. These numbers are stacked on top of the original speeds and launch power.

R7.4.4 - Marisol - Skates at -25 speed. +25 launch power. These numbers are stacked on top of the original speeds and launch power.

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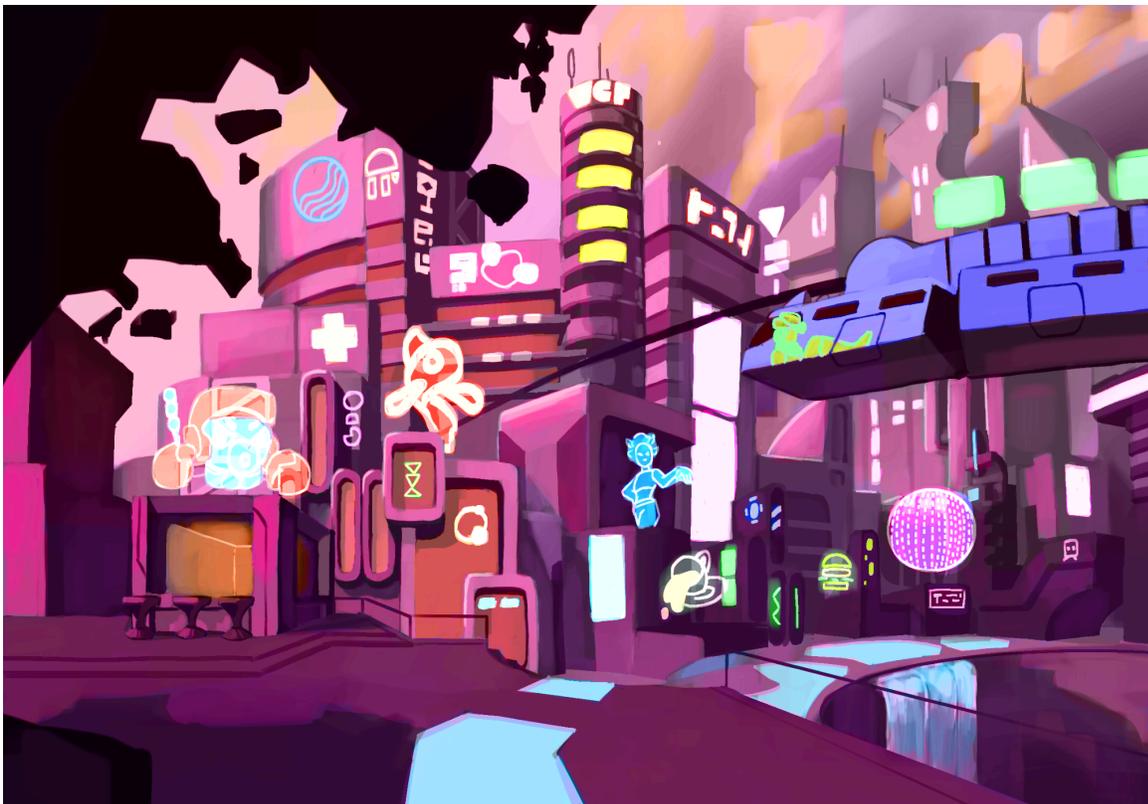
## 8 | The Game World/Environment

The world of VeloCity is a retro-future cyberpunk city segmented into distinct zones based on socioeconomic divides. The city's layers, Lower and Upper, reflect its dystopian society, with lower levels gritty and chaotic, while the upper layers boast their glamorous corporate-backed aesthetics.

The game's zones are pseudo arenas carved out of this city. Each zone offers unique traversal challenges and visual flair, enhancing replayability and immersion.

The game world consists of interconnected urban environments. Zones are crafted to emphasize verticality, speed, and player strategy. The city is alive with NPCs, environmental storytelling, and subtle nods to the larger dystopian narrative. It is year 3000, after an atomic bomb. The world of [Ve is stuck in a mid-century modern environment. Though, the colors are bright and loud compared to the shape and aesthetic of the buildings.

### 8.1 | Example of Environment Aesthetic



---

## 8.2 | Key Zone Locations

Lower City (Gritty, Chaotic, Grimy, Philadelphia..)

### ★ Red Light District

- Dimly lit with neon signs and holograms casting eerie glows.
- Tight alleyways and abandoned skate paths.
- Inspired by Chinese urban architecture, with densely packed living quarters.
- Hazards
  - Barriers, narrow paths, NPCs, canals
- Vertical gameplay
  - Ramps between rooftops, balconies, and precarious drops.

### ★ The Grindyard

- Classic half-pipes, rails, and grindable surfaces littered with graffiti.
- Feels like a nostalgic nod to street skating.
- Hazards
  - Explosive barrels, mud pits

Upper City (Corporate, Retro Futuristic)

### ★ City Center

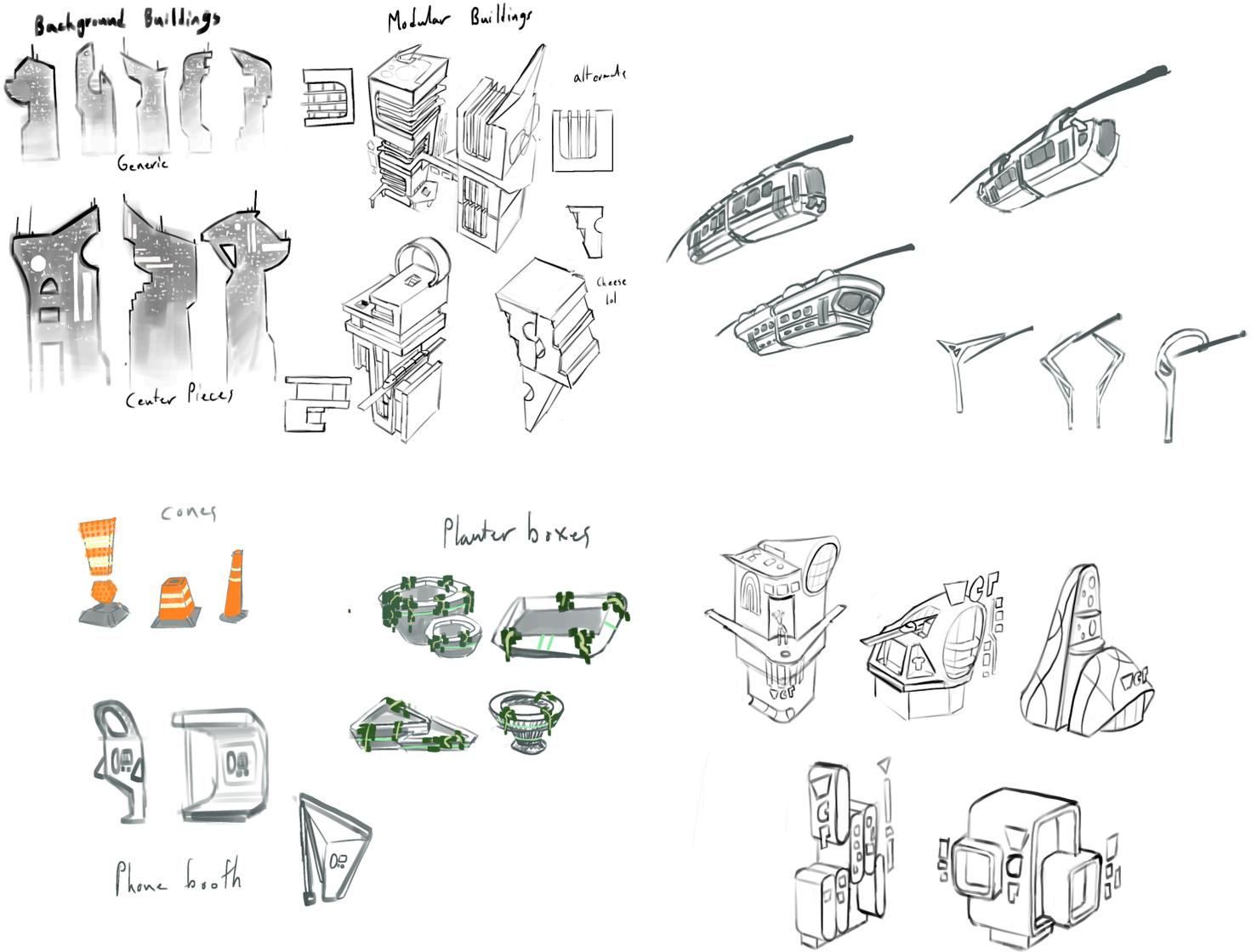
- The heart of the upper city, filled with corporate skyscrapers, flashing billboards, and drone taxis.
- Hazards
  - River, NPCs, Cars
- Vertical gameplay
  - Ramps between rooftops, balconies, and precarious drops.

### ★ Horticultural Park

- A rare green space with bioengineered plants and sleek, metallic bridges.
- Hazards
  - Shallow water

### 8.3 | Environment Concepts

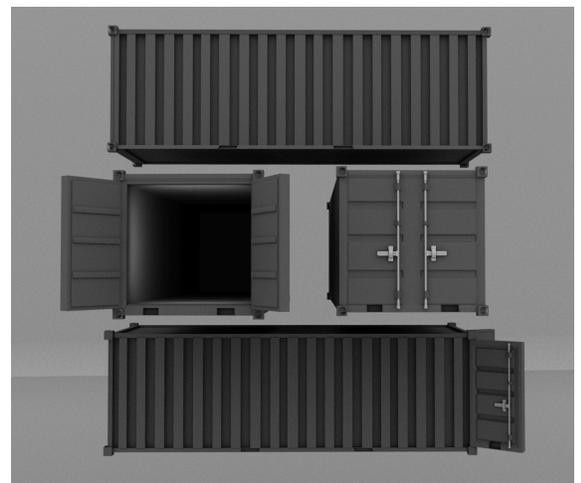
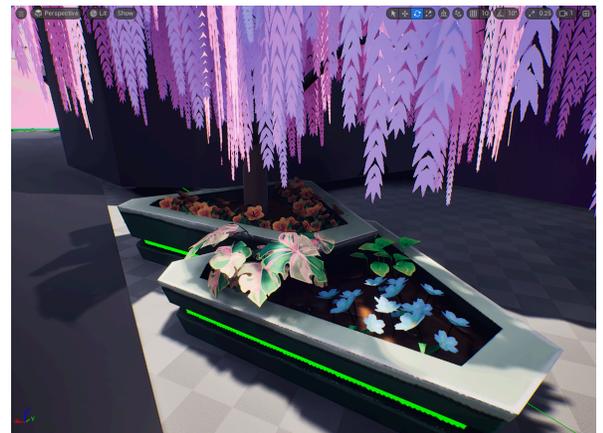
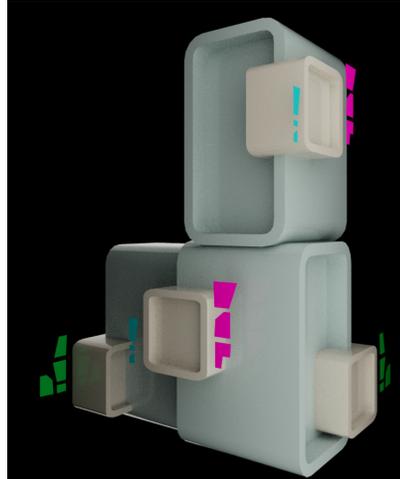
Below are early concepts of the environment models.



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## 8.4 | Current Environment Models

Below are finalized models of some environmental pieces.





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## 9 | Narrative

Though VeloCity is not a story driven game, there is a narrative that drives the life and energy to the world and characters which is detailed in this section.

### 9.1 | Setting

VeloCity takes place on planet Earth in the year 3000. After the political decline of the world, the United Nations abandoned all forms of traditional government. The new country [country name] is a divided governmental system, creating a class separation. Broken into two districts, the Lower District and the Upper District. The Upper District is a gleaming utopia, home to the wealthy elite. Skyscrapers touch the sky, technology thrives, and every corner is pristine and luxurious. It's a place of influence, power, and media control. The Lower District lies beneath the towering foundations of Upper City, trapped in a permanent shadow. The Lower City is overrun with pollution, smog, and the waste of the rich above. It's home to the rebels, outcasts, and survivors who scrape by on scraps while dreaming of a better life. The streets are gritty, and survival is a constant fight. Roller skates are the fastest and most effective way to navigate the crumbling infrastructure. The new United Nations called [government name] implemented a chaotic entertainment system, Roller Frenzy.

### 9.2 | Conflict

VeloCity's conflict surrounds the internal struggle between class and wealth. [New government name] has forced citizens of [country name] to participate in a battle for control of city districts. This competition is combat roller skating, which involves king-of-the-hill style tournaments. Competitors must battle for control of the city districts, winning allows them to claim glory and influence for the future of the city's culture and politics.

### 9.3 | The Skaters

#### Marisol

- ★ Marisol is an outsider from the outskirts of VeloCity. Marisol wanders to the City Center to head into the competition. She skates to make a name for herself, and to prove herself to others.
- ★ Traits

- 
- Strategic
  - Determined
  - Courageous
  - Eager
  - ★ Dialect / Speech
    - Representing the southern dialect, similar to Texian speech.
  - ★ Ethnicity | Mexican, Latina
  - ★ Age | Late 20s
  - ★ Background
    - Comes from the outskirts of the city. Not very friendly with any of the other racers as she doesn't know any of them very well.

## **Coda**

- ★ Growing up around the skate district of VeloCity, Coda made her living through playing her guitar on the streets. Coda has always been rebellious, though she has never been afraid to speak up for what she believes in.
- ★ Traits
  - Righteous
  - Adventurous
  - Daring
  - Fearless
  - Persistent
- ★ Dialect / Speech
  - Grunge and gritty speech. Raspy voice, more masculine sounding. Dialect similar to midwest America, midwestern emo.
- ★ Ethnicity | White
- ★ Age | Early 20s
- ★ Background
  - Comes from the lower district, specifically around the skatepark. Many friends in the lower district, despises everyone from upper, especially Jin-ae.

## **Jin-ae**

- ★ The epitome of perfection in VeloCity is Jin-ae. Jin-ae is the poster girl of the games.

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★ Traits

- Influential
- Leaderly
- Confident
- Motivated

★ Dialect / Speech

- Feminine and light voice. Dialect similar to Northeast America.

★ Ethnicity | Black, Asian - Ethiopia and Korean

★ Age | Mid 20s

★ Background

- Grew up in upper district, specifically the main city center.

**Vesper**

★ Growing up in the red light district, Vesper is infamously known for his gambling skills. Vesper is very charming and charismatic, easily able to con himself out of any situation.

★ Traits

- Witty
- Intelligent
- Funny
- Sassy
- Analytical

★ Dialect / Speech

- More feminine voice, dialect similar to midwest America.

★ Ethnicity | African-American

★ Age | Mid 20s

★ Background

- Grew up in the lower district, specifically the red light district.

---

## 10 | Game Camera

The game uses a third person Over-The-Shoulder camera attached to each player. The player is able to manipulate the camera using the Right Joystick, swiveling it around the player using a central Camera Arm.

## 11 | Features

### R11.1 | Skating

#### ★ R11.1.1 Double Button Skating

- R11.1.1.1 Movement mechanic that feels like roller skating through a gliding movement, which is propelled by pressing two alternating buttons to gain momentum.
- R11.1.1.2 Controls should be left and right trigger with variable input, which can read how long you press the trigger.
- R11.1.1.3 Speed Metrics:
  - R11.1.1.3.1 Speed Cap: 100,000 cm/s
  - R11.1.1.3.2 Amount of increase on correct press: 5 movement scale
  - R11.1.1.3.3 Amount of decrease on incorrect press: -2 movement scale

#### ★ R11.1.2 Basic Turning

- R11.1.2.1 Basic turning utilizing the left and right triggers input so that when you hold one of them, it slowly turns you in the direction of the trigger you pressed while you are accelerating.
- R11.1.2.2 This should be a softer turn and not a snappy turn where you whip around 180 degrees.

#### ★ R11.1.3 Types of Brakes

- R11.1.3.1 A light brake that slows down when you tap the brake button.
  - R11.1.3.1.1 Amount of decrease on tap: -10 Movement scale
- R11.1.3.2 A grind to stop which is a very fast stop when you hold the brake button.

- 
- R11.1.3.3 A turn stop which is a quick stop that is also a change in direction when you hold a trigger and press the brake button.

★ R11.1.4 Boost

- R11.1.4.1 As the player is skating, a marker of some sort on the HUD (Either a bar or a circle etc) should be slowly being filled over time. Additionally, whenever a player lands a successful attack on another player, it will give extra.
- R11.1.4.2 Once the player has a full boost, they can press a boost button which will give them a small speed boost on hit and then increase the speed cap.
- R11.1.4.3 Speed should increase by around 20% of maximum movement speed, 120,000 cm/s potential max speed.
- R11.1.4.4 The illusion of greater speed will be achieved through camera lag

★ R11.1.5 Grinding

- R11.1.5.1 When a player is within range of a collision trigger for a rail, if they jump then they will land on it to grind on the rail.
- R11.1.5.2 Once they are grinding, they will maintain a consistent speed and the triggers will instead of the normal functions, will just make the player lean in either direction when they hold it.
- R11.1.5.3 They can dismount by either reaching the end of the rail which manually triggers the jump animation OR they jump which manually takes them off of the rail to the left or the right based on which side they are leaning. If they aren't leaning, it randomizes the side they land on.



Figure 11.1.1

Figure 11.1 shows the player grinding on a rail. The player has to first gain speed by tapping the left and right triggers. Then press the jump button and the character will lock onto the rail.

★ R11.1.6 Falling

- R11.1.6.1 When a player is hit with enough force, it can trigger a fall. This animation is split into two sections, a falling animation directed away from the triggering hitbox, and a rising animation triggered after a set Stun Delay of 1.5 Seconds. Players can't earn points for the zone when they are knocked down.

★ R11.1.7 Dodge

- R11.1.7.1 When a player is engaged in combat, they might need to move out of the way of a player's attack. By hitting the dodge button, it will give them a small boost of speed in the direction they are looking and make the player invulnerable for a moment.

- R11.1.7.1.1 Dodge boost amount is 500 cm/s

★ R11.1.8 Jump

- R11.1.8.1 A basic jump that launches the player in the air when jump is pressed
  - R11.1.8.1.1 Jump Velocity is 700.0 cm/s
- R11.1.8.2 A double jump that launches the player further into the air when the jump is pressed two times back to back.
- ★ R11.1.9 Ramps
  - R11.1.9.1 When a player skates up a ramp and launches off the end, it will propel a focus on the player into the air and the force should be affected by the acceleration.



Figure 10.1.2

Figure 11.1.2 shows the first part of going up a ramp. The player can accelerate in the ramp direction. Then the ramp will launch the player straight up.



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Figure 11.1.3

Figure 11.1.3 shows the second part of going up the ramp. This is the result of going off said ramp.

★ R11.1.10 Wall Riding (Stretch Goal)

- R11.1.10.1 When the player is going at a high enough speed, the player is able to glide along the edges of the walls.

## R11.2 | Zone Control

★ R11.2.1 Zone Activation

- R11.2.1.1 Zones make up the primary game loop and will activate and deactivate on a set timer.
- R11.2.1.2 The player's max speed will be faster when a zone is active and reduced when the zone deactivates.
  - R11.2.1.2.1 Max speed when a zone is activated: 75,000cm/s
  - R11.2.1.2.2 Max speed when a zone is not activated: 100,000 cm/s

★ R11.2.2 Zone Marker

- R11.2.2.1 When activated, and leading up to activation during zone downtime, a zone marker will appear on the players hud to indicate the relative location as well as distance to the zone from the player.

★ R11.2.3 Game Timer

- R11.2.3.1 After all players have connected to the game lobby, the zone loop will alternate between the two following states:
  - R11.2.3.1.1 30 seconds for a randomly selected zone to become active
  - R11.2.3.1.2 2 minutes of active zone time

★ R11.2.4 5 King of the Hill Zone Locations

- R11.2.4.1 There are 4 major locations on the map, each containing 2 or 3 zones.
- R11.2.4.2 Zones track how long a player has spent within the zone while active

- 
- ★ R11.2.5 Zone + Game Win/Loss
    - R11.2.5.1 Upon deactivation, the player who has spent the longest time in the previously active zone is awarded one (1) trophy
    - R11.2.5.2 After a trophy has been awarded each players trophy count will be checked, if they've earned enough trophies the zone loop will conclude
      - R11.2.5.2.1 2 players | 4 Trophies to win
      - R11.2.5.2.2 3-4 players | 3 Trophies to win
      - R11.2.5.2.3 5-6 players | 2 Trophies to win
  - ★ R11.2.6 Player Leaderboard
    - R11.2.6.1 There will be a leaderboard on the player HUD ranking each players score from 1st to last as well as each players name
    - R11.2.6.2 When a zone is activated, the leaderboard will show how long it will continue to be active for
    - R11.2.6.3 When a zone is not activated/warming up, the leaderboard will be reflective of each players trophy count
  - ★ 4R11.2.7 TBD Player Nameplates
    - R2.2.7.1 Each player will have a nameplate above their head containing their username
  - ★ R11.2.8 First Place Marker
    - R11.2.8. The player with the most trophies will have a crown above their nameplate to indicate that they are in 1st place.

## R11.3 | Trick Combat System

- ★ R11.3.1 Motion Capture based trick system that functions as the combat to help a player overtake a zone.
- ★ R11.3.2 Visually, the tricks are a combination of skills from roller skating, rollerblading, tae kwon do, martial arts tricking, and gymnastics.
- ★ R11.3.3 Tricks will deal knockback and temporarily stun the player if they are hit with enough force, making them vulnerable to more attacks. The game does not have health or a death mechanic, so instead players will be disadvantaged by being stunned or knocked into a less favorable position from these attacks.

- 
- ★ R11.3.4 Tricks can be done in combos or done with more momentum to deal more knockback therefore skating with speed and jumping off obstacles will reward the player.
  - ★ R11.3.5 Certain tricks will inherently have more knockback than others and will be more difficult to perform (i.e. a simple punch with a 1 button press vs. a multiple-button press flip kick).
  - ★ R11.3.6 3 tricks at minimum and 12 tricks at Maximum. One trick for each character and the rest are for all characters
  - ★ R11.3.7 Trick Metrics
    - R11.3.7.1 Strength of single trick: TBD
    - R11.3.7.2 Amount of time between tricks to count as a combo: TBD
    - R11.3.7.3 Amount of increase in strength for every sequential attack: TBD
    - R11.3.7.4 How much force triggers a fall: TBD
    - R11.3.7.5 How close you need to be to a player to hit them: TBD

## R11.4 | Individual Tricks

- ★ R11.4.1 | Trick 1 | Elbow
  - Button Combination
    - X
  - Visual Description
    - Elbow at chest height
  - Character/s
    - All
- ★ R11.4.2 | Trick 2 | Punch
  - Button Combination
    - X + Arm
  - Visual Description
    - Punch
  - Character/s
    - All
- ★ R11.4.3 | Trick 3 | Side Kick
  - Button Combination

- 
- X + Leg
  - Visual Description
    - Side kick
  - Character/s
    - All
  - ★ R11.4.4 | Trick 4 | Backsweep
    - Button Combination
      - X + Crouch
    - Visual Description
      - Low ground level spinning kick
    - Character/s
      - ALL
  - ★ R11.4.5 | Trick 5 | Pop 360
    - Button Combination
      - X + Jump
    - Visual Description
      - TBD
    - Character/s
      - ALL
  - ★ R11.4.6 | Trick 6 | Flying Knee of Death
    - Button Combination
      - X + Boost
    - Visual Description
      - TBD
    - Character/s
      - ALL
  - ★ R11.4.7 | Trick 7 | Execute
    - Button Combination
      - X + Leg + X (+ high speed)
    - Visual Description
      - flip kick (full hyper hook)
    - Character/s
      - ALL
-

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★ R11.4.8 | Trick 8 | Unique Trick (Stretch Goal)

- Button Combination
  - X + X + X
- Character/s
  - Ranger Girl
    - Name: Pop Hurricane Kick
    - Description: Spin Triple Kick Radius Effect
  - Punk Girl
    - Name: AirDrop 1990
    - Description: Breaking Beat Plays? Aerial into windmill into spin on hands. Splash damage effect
  - Poker Guy
    - Name: TBD Name
    - TBD Description
  - Barbie Girl
    - Name: TBD Name
    - Description: TBD Description

## R11.5 | Misc. Features

★ R11.5.1 Full Controller Support

- R11.5.1.1 The game will be playable on keyboard/mouse as well as using a controller with controller being the main support.

★ R11.5.2 Voicelines System

- R11.5.2 A system that allows us to play voice lines when certain criteria are met.
  - X seconds between the same player triggering another voice line
- R2.5.2.2 20 recorded individual voice lines for each of the 4 characters.
  - 3 that can be done when they perform ANY trick (Local)
  - 1 that plays when they perform their unique trick (Global)
  - 3 that can play when the player falls (Local)
  - 5 zone specific (1 for each zone) (Local)
  - 1 for when a zone activates (Local)

- 
- 1 for when a zone deactivates and they WON (Local)
  - 1 for when a zone deactivates and they LOST (Local)
  - 3 general ones that can play anytime they are skating (Local)
  - 1 for when a player has been in 1st place for 15 seconds (Global)
  - 1 for when a player has been in last place for 15 seconds (Global)
  - R11.5.2.3 Character Conversations (Stretch Goal)
    - Short 2-3 line back and forth interactions with the various characters
  - ★ R11.5.3 Character Stats
    - R11.5.3.1 Our 4 characters will be classified into one of two categories, Heavy or Light.
    - R11.5.3.2 Heavy characters will have a 10% higher force during attacks than light characters. Marisol and Vesper will be Heavy. +25 launch power.
    - R11.5.3.3 Light characters will have a 10% higher speed cap than heavy characters (both when boost is and isn't active). Coda and Jin-ae will be Light. +25 speed.
    - R11.5.3.4 Heavy and light bonuses will be stacked on top of the original speed and attack power of the character.
  - ★ R11.5.4 Mocopi Support (Stretch Goal)
    - R11.5.4.1 Implement alternate controls using the Mocopi system for a more interactive experience where the player wears sensors so that when they move in real life, their character follows their movements.
    - R11.5.4.2 The controls would link up to movement of the player so different physical movements will trigger in game reactions.
  - ★ R11.5.5 Traffic Obstacles (Stretch Goal)
    - R11.5.5.1 Cars that slowly drive around and when a player is hit by them it causes a fall
  - ★ R11.5.6 AI movement for NPCs (Stretch Goal)
    - R11.5.6.1 NPCs that walk around and when a player skates into them, they both fall.
  - ★ R11.5.7 Emote System (Stretch Goal)
    - R11.5.8 Simple iteration of an emotes system with a button that triggers the emote menu to pop up and allow them to use a joystick to select one of the three options of unique motion captures emotes.
-

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## 12 | Multiplayer

### R12.1 | Overview

- ★ R12.1.1 The game is entirely multiplayer with a focus on individual matched play. Players are able to create sessions and other players on their network are able to join them. Games won't start until a number of players set by the Host have joined

### R12.2 | Specifics

- ★ R12.2.1 Max Players
  - R12.2.1.1 2-6
- ★ R12.2.2 Servers
  - R12.2.2.1 Our game uses a Client Server Relationship, as is the easiest to use architecture supported by the default Unreal Subsystem.
- ★ R12.2.3 Customization
  - R12.2.3.1 Players are able to choose from a variety of playable characters in each match that each offer a unique gameplay experience.
- ★ R12.2.4 Internet
  - R12.2.4.1 At the moment the game is planned to operate using the Unreal 5 Networked Subsystem which is mainly focused around Local Area Network play.
- ★ R12.2.5 Gaming Sites
  - R12.2.5.1 We are currently doing research into potentially utilizing the Steam or Epic Networked Systems, which would allow us to host our game on their platform and utilize their wider network, though the costs are still being considered.
- ★ R12.2.6 Persistence
  - R12.2.6.1 No, our game is fully match based, so persistence is a non-factor.
- ★ R12.2.7 Saving and Loading
  - R12.2.6.1 Again, as the game is entirely match focused, there's no saving or loading of states.

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## R12.3 | Class Diagram of Multiplayer

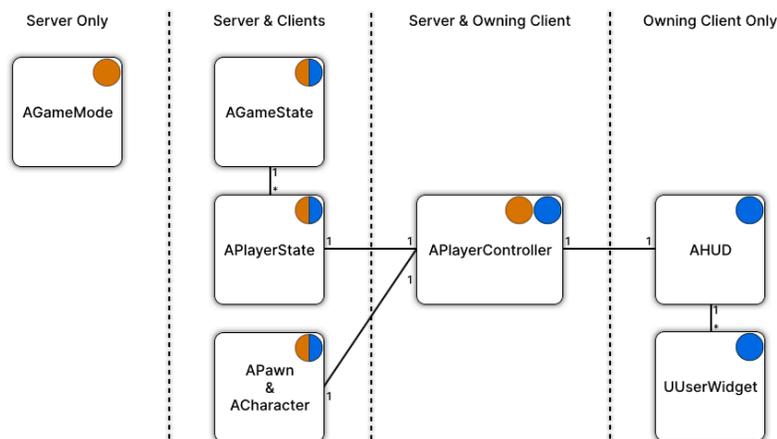


Figure 12.1

Figure 11.1 shows the controller schematics. `AGameMode` class is the main gameplay of the class, which is also the core of the game. `AGameState` describes the current game state, such as Main Menu or Game Starts. Players also have their own `APlayerState`, and the players are called Pawn or Character, which belong to `APawn` and `ACharacter` class. `APlayerController` includes the method to control the players. `AHUD` is the content we can see on the screen, and `UUserWidget` is for extending the UI's functions.

## 13 | Music and SFX

### 13.1 | Music Editing

- ★ Program used is DAW FL Studio
- ★ Composition is done using virtual instruments, plugins, samples, drum breaks
- ★ Edit tracks in chunks, then use for different cues within each game
- ★ Each chunk is a different variation
- ★ Increase intensity to accompany the player increasing their score during a run in each section of the city
- ★ Main screen - different instrument tracks, drums and sound effects

★ Midi for one instrument, individually set the notes for what the instrument will play

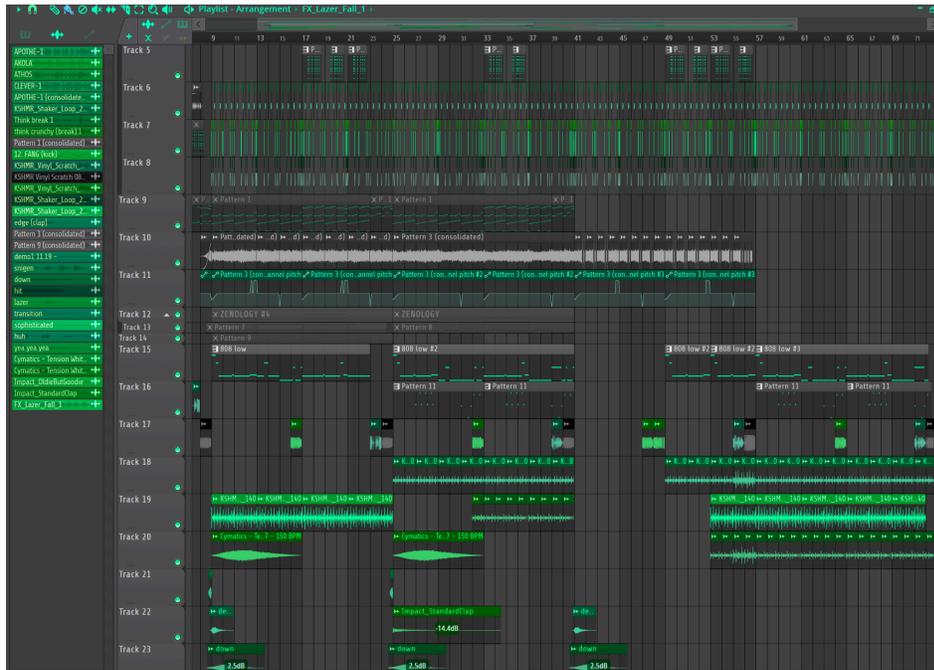


Figure 12.1.1

Figure 12.1.1 shows the music mixer.

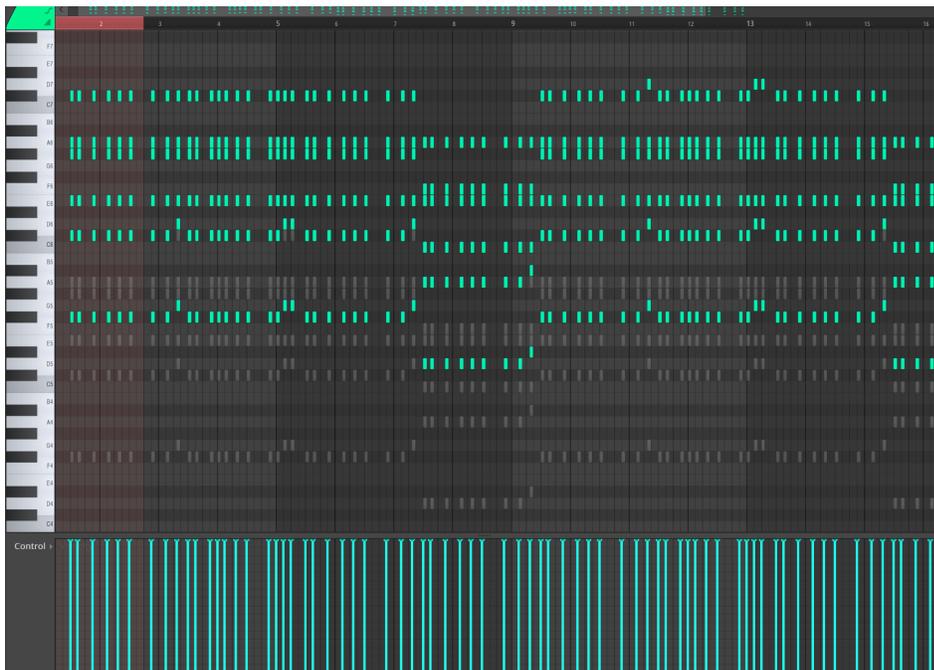


Figure 12.1.2

Figure 12.1.2 shows the piano mixer.

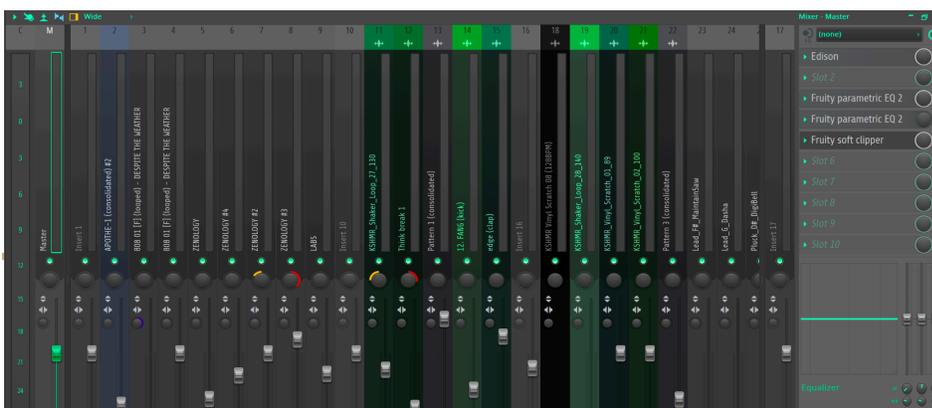


Figure 13.1.3

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Figure 13.1.3 shows the audio mixer and sound adjuster.

## 13.2 | Music List

- ★ Upper City Background Music
- ★ Lower City Background Music
- ★ Lobby Music

## 13.3 | SFX List

- ★ Skating Sounds - On different surfaces
- ★ Boost
- ★ Zone Activation
- ★ Player Falling Sound / Hitting the Ground
- ★ Point Added
- ★ Time Ticking
- ★ Time Running Out - Before Next Zone Opens
- ★ Time Running Out - Before Match Is Over
- ★ Match Starting
- ★ Character Selected
- ★ Winning
- ★ Losing
- ★ Grinding / Skating on Rail
- ★ Zone Narration
- ★ NPC Move

## 14 | Rendering Systems

### R14.1 | Game Engine

★ R14.1.1 The game is built in Unreal Engine version 5.4.

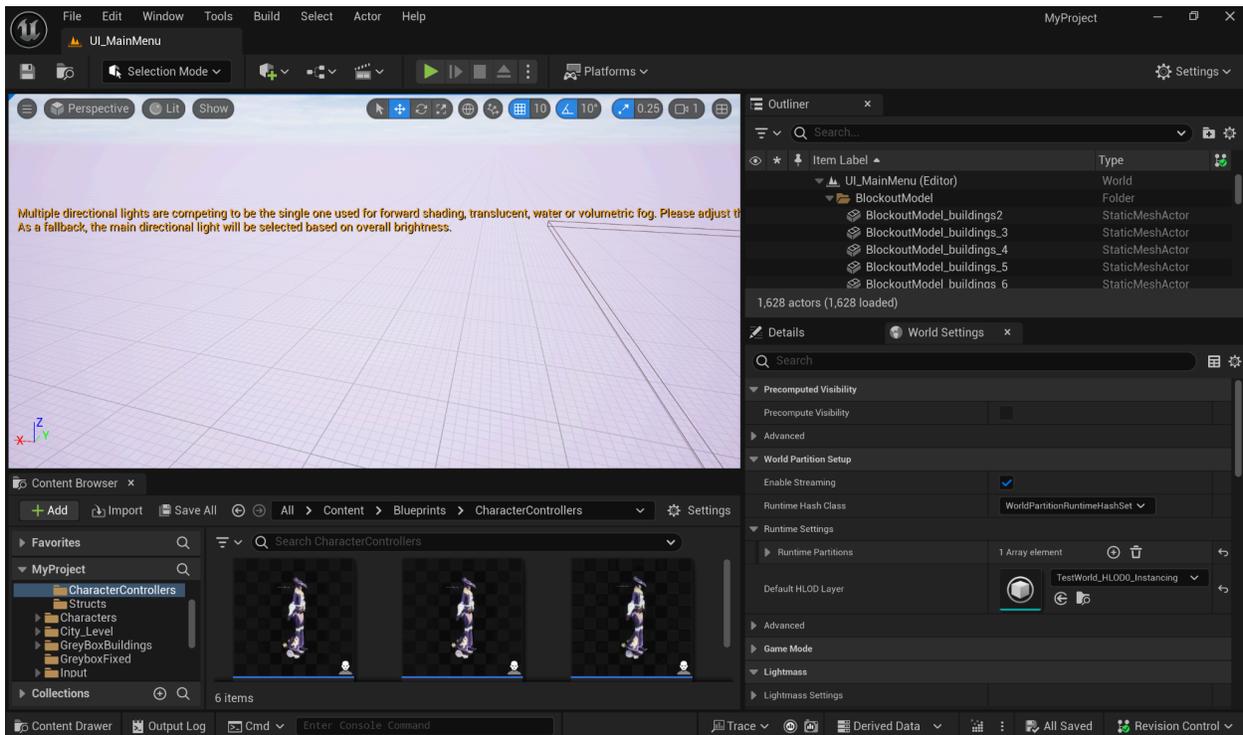


Figure 14.1

Figure 14.1 shows the game engine. There are too many sections to go through in images for the editor. The most important ones are the viewport that shows the game. There's a play button up top to play the scene. At the bottom left is the content browser which holds all the assets used in the game.

### 14.2 | Lighting

- ★ The game uses Unreal Engine 5.4's built-in lighting tools
  - There is one main directional light that acts as the game's Main Light source.
  - Sci-fi and modern structures use emissive maps to create glowing effects
  - The game uses a baked lighting system to optimize for performance.

- 
- ★ The game also uses Unreal Engine 5.4's post processing system to stylize the game's environments
    - A colored fog effect is used to mask the player's max rendering distance while still matching the game's visual tone
    - Sharpness and chromatic aberration will be used sparingly in order to create a slight outline to the objects within the world.

### 14.3 | VFX

- ★ The game uses the Niagara particle system to create particle effects for the player to convey gameplay information.
  - The Niagara system particles include a mix of particles, sparks, and smoke to convey different information.
- ★ When a player times their skating input correctly, the skates will spark in conjunction with the skater speeding up, so that the player gets visual affirmation that they timed their input correctly.
- ★ When a player times incorrectly, they will slow down and the skates will smoke, indicating that the timing was off.
- ★ Additionally, there will be a Niagara effect when a player falls and an effect when a player lands an attack. This will be a combination of a motion trail and an impact shockwave effect.
- ★ When a player wins a zone, there will be a celebratory effect reminiscent of confetti or fireworks.
- ★ Additional particles and smoke will be used to enhance the overall aesthetic of the map. The lower city and subway will require smoke and dust particles. The upper city may require ambient bright particles to enhance its beauty.

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## 15 | Art Direction and Style Breakdown

### 15.1 | Summary

VeloCity's art style is vibrant and colorful. Leaning into the cyberpunk aesthetics, focusing on palettes that are primarily blues, greens, pinks.

### 15.2 | Color Indicating Faction

The city's Upper and Lower Sides should reflect their allegiances through color:

- **Upper Side:** *Sophisticated characters wear white/silver with pastel accents, inspired by Mid-Century Modern elegance.*
- **Lower Side:** *Grungy characters feature dark grey/black with graffiti-like pops of bright color, evoking gritty brutalism.*

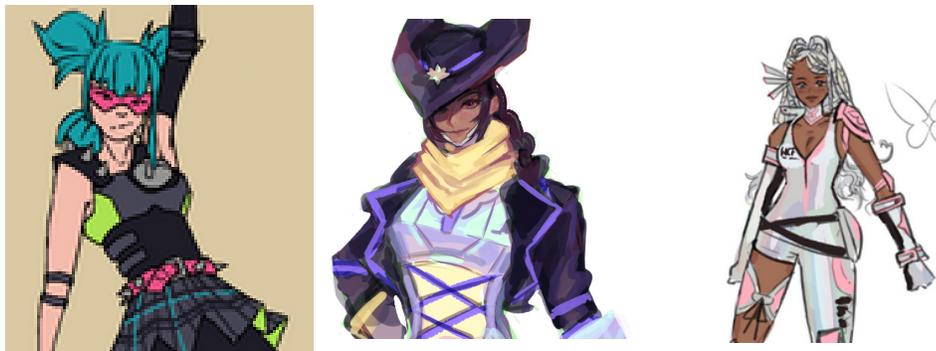


Figure 15.2.1- art demonstrating faction designation

Notice the dark primary contrasted with bright hues on the Punk girl (left). Compare this to [barbie girl](right), her silver dominant outfit with pastel accents. [Ranger] is a marriage of the two color palettes, indicating her lack of allegiance to either faction.

### 15.3 | Character Personal Colors

Due to the multiplayer aspect of the game, each playable character should have a unique KEY COLOR assigned to them.

### 15.4 | Compare and Contrast of Two Factions

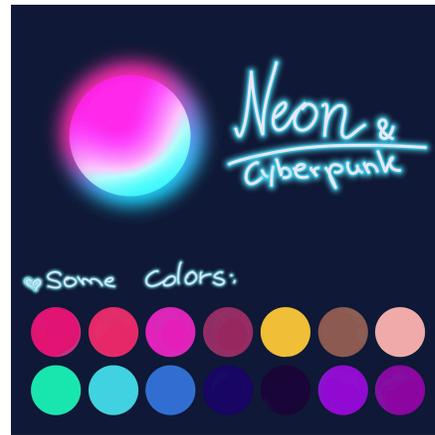
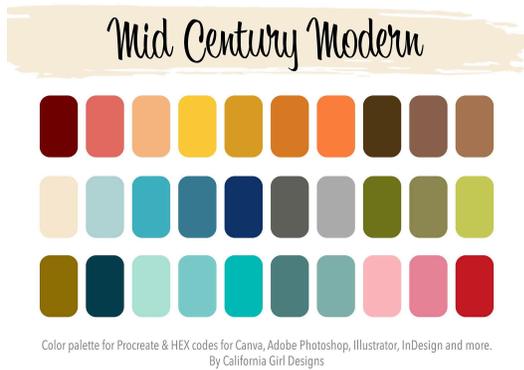


Figure 15.4.1 - Palettes for faction design colors

The Upper and Lower city are divided in architectural differences, with the Upper being Mid Century Modern and the Lower City being brutalism. However, due to the rich subculture and creative expression of the Lower City, these brutalist architects should be covered in graffiti to indicate while they are oppressed, the people living here have soul and a desire to break free.

## 15.5 | Lower City Color References



Figure 15.5.1 - From Jet Set Radio:

Color graffiti on grey concrete architecture invokes street art and murals. This allows for the undercity to have color while also being different from the Upper city. The colorful graffiti also serves as a nice homage to Jet Set Radio. The graffiti can be decals, so 3D Modelers don't have to texture the graffiti on each individual asset, saving space while also allowing for more exciting set dressing.

Figure 15.5.1



Figure 15.5.2 - Proposed Color Palette for Lower City Color Accents



Figure 15.5.3 - Proposed Color Palette for Upper City Color Accents

Main differences are in saturation and warmth. Upper city has more powdery, warm colors, while the lower city is more saturated and cool-toned. While the upper city has Green accents from the foliage, perhaps low city can have green accents from the Graffiti?

## 15.6 | Color In Environments

In order to create a readable contrast in the environment, a balance of WARM and COOL tones should be used. WARM and COOL colors shouldn't be used in a 50/50 combination unless for transition spaces. Keep it at a 70/30 or 80/20 ratio in terms of lighting.



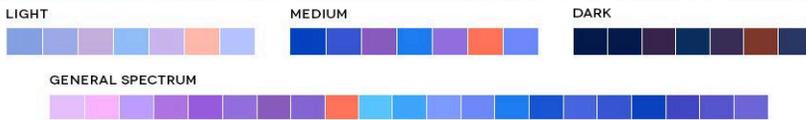
In the above image, notice how the majority of the lighting is an artificial cool green/yellow while areas of interest are highlighted with a warm orange tone.

Figure 15.6.1 - Screenshot from Mirror's Edge



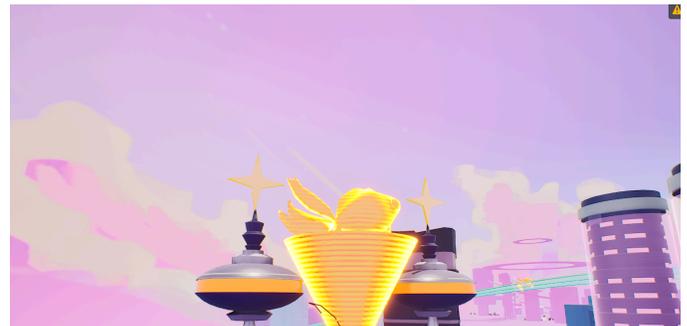
*Mirror's Edge Screenshot*

Eyes will naturally gravitate to the orange and red in the image. Your retinas are overstimulated from being exposed to so much stark white and blue, that your vision naturally is drawn to the warm spots.



If we put more blue in the sky and make the fog more blue, the pinks and purples of the Upper city could potentially pop more.

Figure 15.6.2 - Photo from Finding Nemo with color values demonstrating making colors pop



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Figure 15.6.3

Figure 15.6.3- Before vs After Post Processing and Fog Gradient

Which colors are more preferable to play in? What works better?

## 15.7 | Color for Traversal

Games such as Neon White and Mirror's Edge uses color to indicate pathing to the player. Due to the high speed and fast camera movements, paths from zone to zone should be supplemented by universal color indication to lead the player.

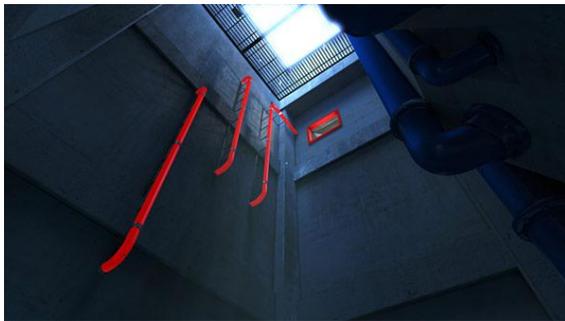


Figure 15.7.1 - Screenshot from Neon White and Mirror's Edge



## 15.8 | Distance Fog

Using the custom multicolor distance fog has different benefits:

- ★ *Smoothly blends the horizon into the skybox or scene, creating a natural-looking distance*
- ★ *Hides distant objects, reducing the load on rendering systems.*

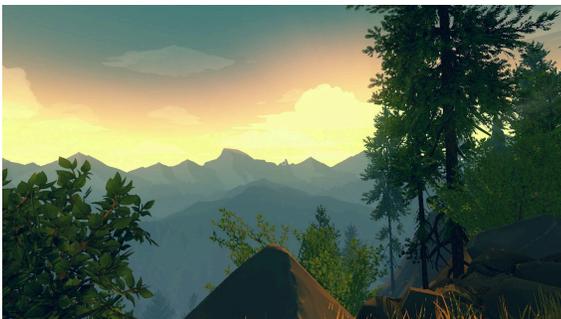


Figure 15.8.1 - Firewatch



Figure 15.8.2- Sable

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Figure 15.8.1 and Figure 15.8.2 - Screenshots from Firewatch and Sable demonstrating the use of custom multicolor distance fog and its different applications

**Resources used:**

<https://help.steampowered.com/en/faqs/view/0688-7692-4D5A-1935>

## 15.9 | Inspiration board



Figure 15.9.1- *Cyberpunk 2077*



Figure 15.9.2 - *Splatoon*



Figure 15.9.3 - *Jet Set Radio*



Figure 15.9.4 - *Mirror's Edge*

Figures 15.9 - Screenshots of games that inspired the art style, aesthetic, and design choices going into VeloCity

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## 16 | Appendix

- ★ [Website](#)
- ★ [Build History](#)
- ★ [Pipeline](#)