

# Be Strong, Be The Last - Game Design Document



Fig. 1 - Game cover

## Fjrm Games Team - Academic Year 2019/2020

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*Fig. 2 - Team Logo*

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# 1 - Changelog

Name	Date	Description
Dettori	09/10/2019	Created the document
Maione	10/10/2019	Legal analysis
Dettori	12/10/2019	Vision statement
Dettori	14/10/2019	Audience, platform, and marketing
Lombardi	17/10/2019	Vision statement review, general review
Maione	20/10/2019	Media
Lombardi	20/10/2019	Gameplay synopsis review
Dettori	22/10/2019	Top performers, Feature comparison & flowchart
Lombardi	23/10/2019	Controls, Characters Design
Lombardi	24/10/2019	Characters Design
Dettori	27/10/2019	Characters design review, Interfaces
Lombardi	28/10/2019	Game Characters - Characters Design
Lombardi	29/10/2019	Gameplay - Controls
Lombardi	30/10/2019	Gameplay - Abilities
Lombardi	31/10/2019	Gameplay - Collision with karts
Lombardi	01/11/2019	Gameplay - Edges of the track, curves and drifting
Lombardi	02/11/2019	Gameplay - Obstacles and pickups, Turbo speed
Lombardi	06/11/2019	Gameplay - Characters AI Design
Lombardi	07/11/2019	Gameplay - Characters AI Design
Dettori	11/11/2019	Initial description of the levels, Gameplay-Review
Lombardi	11/11/2019	General review
Lombardi, Dettori	01/12/2020	Game design revision after intensive playtest
Lombardi	02/12/2020	Gameplay - Time attack
Lombardi	03/12/2020	Gameplay - Controls, Powers & Shield
Lombardi	03/12/2020	Game Characters - Champions
Dettori	04/12/2020	Update of some references
Lombardi	04/12/2020	Gameplay - CPU-controlled characters

Dettori	05/12/2020	Levels - Future City, Mars
Lombardi	05/12/2020	Gameplay - Edges of the track, curves and drifting
Dettori	06/12/2020	Gameplay - Obstacles FSMs
Lombardi	06/12/2020	Vision statement - Game logline
Dettori, Lombardi	07/12/2020	Complete GDD review

## 2 - Vision statement

It's the third millennium on planet Earth. Technology has become impressive and space trips are within everyone's reach. However, technology has also completely changed the concepts of entertainment and having fun, with robots doing most of the work. Nowadays, car races last only a couple of milliseconds and nobody enjoys them a lot.

That's why a completely new kind of race has been invented: **Be Strong, Be the Last**.

A race in which the slowest wins!... Except that cars accelerate on their own, drivers can't brake and the edges of the track accelerate the car even more! The only way to slow down a little bit is to hit other cars or carefully placed death traps like rocks, robots and of course that herd of robot sheeps crossing the track right now. Only the bravest (or the luckiest) will reach the end of the track after all the others and be the rightful champion! In this peculiar race, challengers from all over the galaxy compete to gain prizes and bring honor to their native planet's technology.

Who's going to prevail? Only you can find out. Buy your ticket now!

### 2.1 - Game logline

Your classic kart game but with a twist: instead of accelerating, you have to slow down and instead of dodging obstacles you have to hit them. **Slow and steady wins the race!**

### 2.2 - Gameplay synopsis

Be Strong, Be the Last is a **3D single player racing game** with the possibility of playing online multiplayer or local multiplayer with split screen.

In this racing game **the goal** is quite unusual: **the player who arrives last, wins the race**.

Each player **will choose a character with its own specific kart** before each **game**.

The **driving system** is designed to **accelerate the car on its own and there's no braking system** so the player has to find out a way to slow down her race. She can also **drift** to obtain a better steering.

Driving well is essential to avoid hitting the edges of the track and the opponents' attacks (that accelerates the kart), while reaching obstacles to slow down the kart.

Another basic mechanic of the game is the **collision between karts**. Players will need to use them to slow down their kart and accelerate their opponents' one. Whenever a kart hits another one, the latter **gets pushed in the direction of the collision**. If performed correctly the car that is *hit* will be accelerated while the *hitting* one will be slowed down. If both cars try to push each other the result will be that they will both slow down a little bit.

Karts also have the **possibility of using powers** to alter the course of the race. These powers have several effects like accelerating the opponents or giving them maluses. A random power will be given to the player whenever she collects one of the **power cores** scattered on the track.

Graphically the game is in **cartoon style with fun characters and colorful settings**.

# 3 - Audience, platform, and marketing

## 3.1 - Target audience

### 3.1.1 - Bartle's taxonomy

About Bartle's player classification, we can say that Be Strong, Be the Last is a game especially for **killers**. Indeed the core mechanics are based on bringing **disadvantage** to the **other players**, making them accelerate while you slow down to win the race.

The other type that could be involved although to a lesser extent are **socializers**, because the possibility to play with friends, online or in local-multiplayer, adds an important party-game component.

**Achievers** and **Explorers** are much less involved.

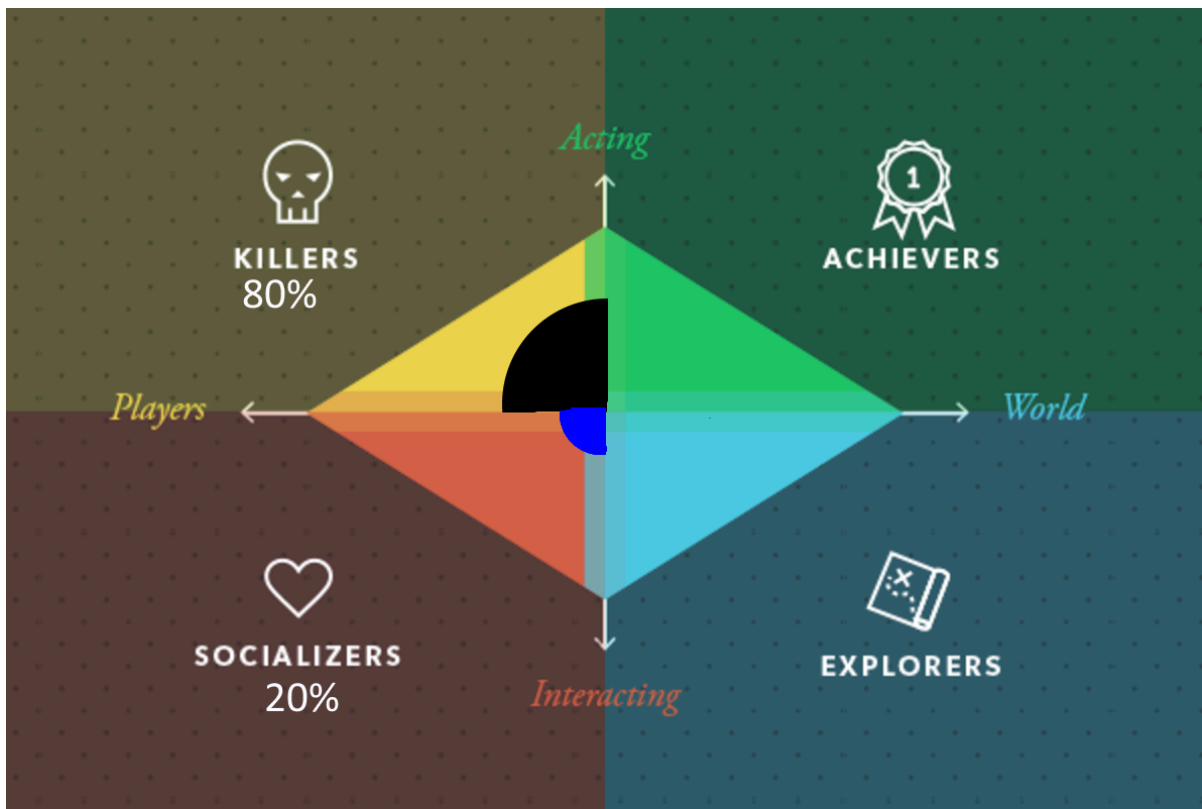


Fig. 3 - Bartle Test diagram

### 3.1.2 - Genre spread

Based on data collected on the distribution of video games, we can see how our game, being a racing game, belongs to a small part of the market. The image below underlines that **the racing games** are only **6%** of the **total genre of video games** sales in the US in 2018. So it is appealing only for a niche of players.<sup>1</sup>

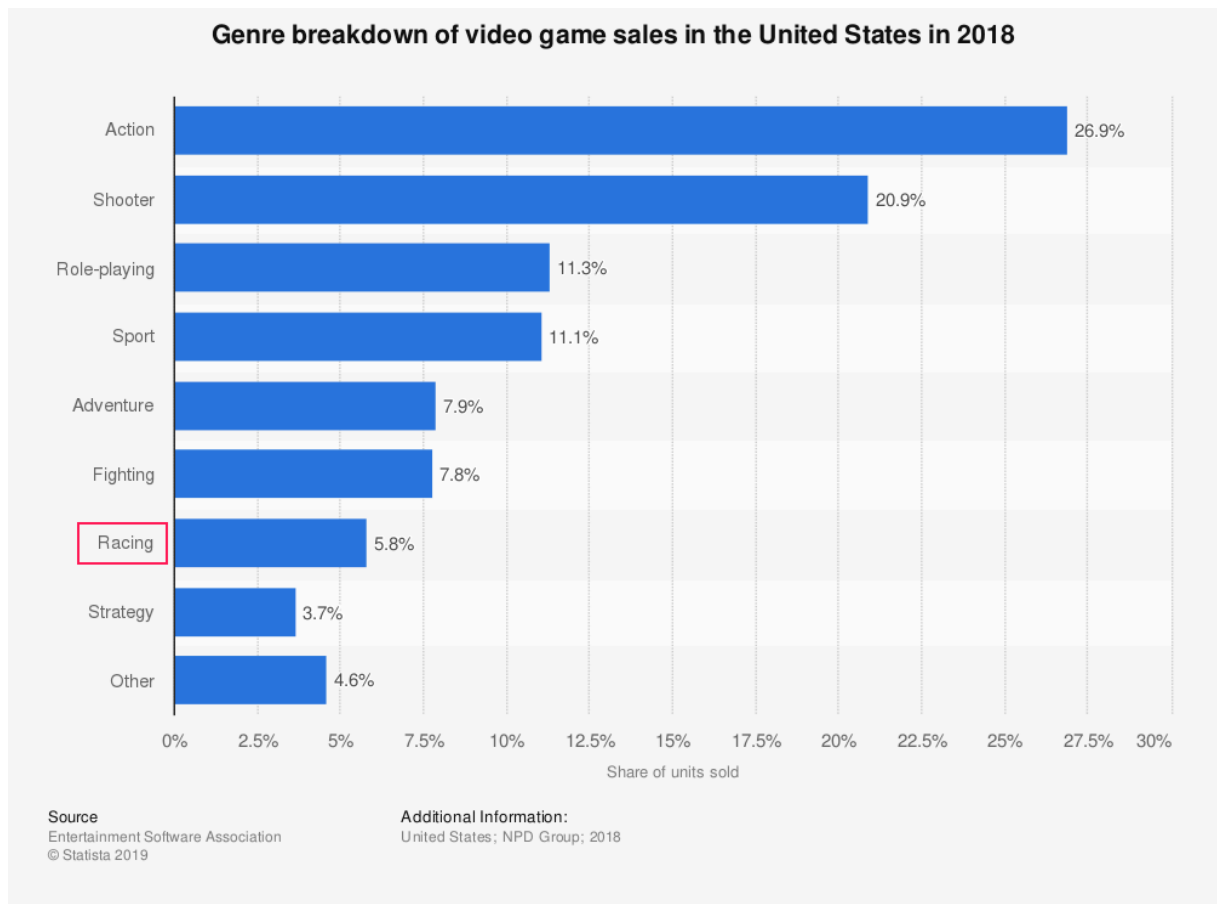


Fig. 4 - Genre distribution diagram

### 3.1.3 - Age distribution

Be Strong, Be the Last is a competitive party game, with a cartoon and fun setting, so the core **target audience** will be composed of young people aged between **16 and 25 years**. We chose this particular target audience because they are people with well-defined interests and with a lot of time to play, especially with friends.

Of course we expect to have many players from other age groups given the style of the game. In particular, let's imagine that many boys and girls between 12 and 16 will play this game to challenge their friends.

But also younger people (6-11 years old) may be attracted by the visual style and the easy to understand style of play that does not require too complex strategies to be understood and applied.

<sup>1</sup> <https://www.statista.com/>

### 3.1.4 - Geographical distribution

To better understand the geographical distribution of future users, we rely on the sales distribution of the major competitors' games in different continents.

Below are the data used for comparison, obtained by consulting different sales tracking websites.

#### 3.1.4.1 - Mario Kart 8 Deluxe

Stats from VGChartz Network<sup>2</sup>:

Latest Sales Updates					
17,890,000	Marth	30th Jul 2019			
16,690,000	Marth	25th Apr 2019			
15,020,000	Marth	31st Jan 2019			
11,710,000	Marth	08th Jan 2019			
Sales History					
Total Sales	2.11m Japan	5.05m NA	4.98m Europe	0.91m Others	13.05m Total
1	283,607	471,302	380,412	125,752	1,261,073
2	92,357	120,630	95,049	32,047	340,083
3	35,688	62,156	51,114	16,641	165,599
4	23,833	43,839	41,637	12,073	121,382
5	21,323	56,732	43,847	15,020	136,922

Fig. 5 - Mario Kart 8 Deluxe sales

<sup>2</sup> <http://www.vgchartz.com/game/153114/mario-kart-8-deluxe/>

### 3.1.4.2 - Crash Team Racing Nitro-Fueled (PS4 Only)

Stats from GamStat<sup>3</sup>:

**2,300,000** players (83%)  
earned at least one trophy

**24,000** accounts (0.9%)  
with nothing but Crash Team Racing Nitro-Fueled

**26** games  
the median number of games on accounts with Crash Team Racing Nitro-Fueled

**11** days  
the median retention period (between the first trophy and the last gaming session), players without trophies are excluded

#### Popularity by region

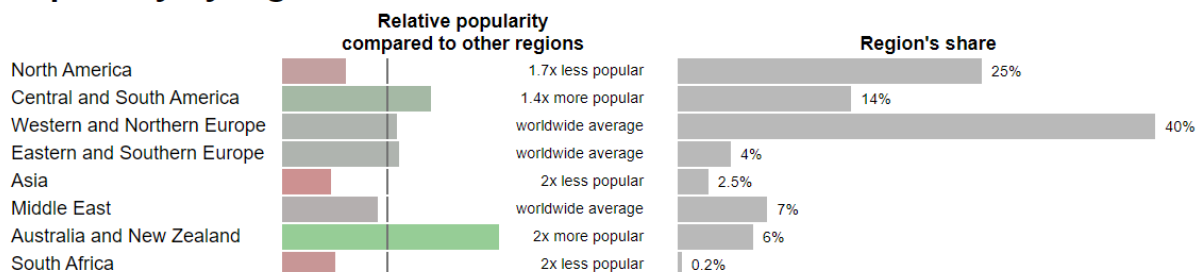


Fig. 6 - Crash Team Racing Nitro-Fueled players activity

<sup>3</sup> [http://gamstat.com/games/Crash\\_Team\\_Racing\\_Nitro-Fueled/](http://gamstat.com/games/Crash_Team_Racing_Nitro-Fueled/)



## 3.2 - Platform

The first release for the game will be on **PC** published **on Steam**.

In case of success we are planning to publish it on **Nintendo Switch**, the best console for indie party games, with a player base already used to these kinds of experiences.

In case of further success we plan to release it on **PS5** and **Xbox Series X/S**.

We decided at first to **avoid** the development for **mobile devices** as for this kind of indie game it can be difficult to establish itself in this market. The driving system and the controls could allow us to develop the game for mobile too, but we initially want to affirm ourselves on other platforms.

## 3.3 - System requirements

The game is played with a **mouse and keyboard** or a **standard controller** (Steam Controller, Xbox 360 PC edition and Xbox One controller, Sony DualShock 4, Nintendo Joy-Con, third party compatible controllers).

While the game will have a **multiplayer online** mode and **online scoreboards**, it will be totally playable in **single player** mode or in **local multiplayer** with friends.

For this reason it's **advisable** to have an **internet connection**, but **not required**.

### PC version minimum requirements:

- **OS:** Windows 7 SP1+;
- **Graphics card:** with DX10 (shader model 4.0) capabilities, GeForce GTX 480 (1536 MB) / Radeon HD 7850 (2048 MB);
- **CPU:** SSE2 instruction set support, Intel Core i7-950 or equivalent / AMD Phenom II X4 965 or equivalent;
- **RAM:** 6 GB;
- **Storage:** 6 GB.

## 3.4 - Top performers

For comparison with competitors we take into consideration the best recent titles of the same genre and style, that share similar mechanics to our game and reached a certain popularity.

### 3.4.1 - Mario Kart 8 Deluxe



**Developer:** Nintendo EAD, Namco Bandai Games

**Release:** April 28, 2017

**Platforms:** Nintendo Switch

**Genre:** Kart Racing

**Description:** Mario Kart 8 Deluxe is a kart-racing game exclusive to the Nintendo Switch. It is the enhanced port (or reboot) version of Mario Kart 8 and was released worldwide on April 28, 2017. The game continues the traditional gameplay of the Mario Kart series, in which characters from the Mario universe race against each other in go-karts, attempting to hinder their opponents or improve their racing performance using various tools found in item boxes. In addition, the game includes four different difficulties, which can be selected before beginning the race to challenge players.<sup>4</sup>

<sup>4</sup> [https://en.wikipedia.org/wiki/Mario\\_Kart\\_8](https://en.wikipedia.org/wiki/Mario_Kart_8)

### 3.4.2 - Crash Team Racing Nitro-Fueled



**Developer:** Beenox, Activision

**Release:** June 21, 2019

**Platforms:** Nintendo Switch, PlayStation 4, Xbox One

**Genre:** Kart Racing

**Description:** Crash Team Racing Nitro-Fueled is a kart racing game featuring characters from the Crash Bandicoot series. Players must avoid obstacles and navigate the various tracks to reach the finish line, performing boosts via power sliding and jumping to gain speed, and using power-ups scattered across the track to give themselves a boost or hinder their opponents. The game supports local quick races and grand prix circuits, online races, as well as featuring a full adventure mode with new areas, characters and boss battles being unlocked as the player progresses.<sup>5</sup>

<sup>5</sup> [https://en.wikipedia.org/wiki/Crash\\_Team\\_Racing\\_Nitro-Fueled](https://en.wikipedia.org/wiki/Crash_Team_Racing_Nitro-Fueled)



### 3.4.3 - Mario Kart Tour



**Developer:** Nintendo EPD, Nintendo

**Release:** September 25, 2019

**Platforms:** Android, iOS

**Genre:** Kart Racing

**Description:** Mario Kart Tour is a kart racing mobile game that deviates from the traditional gameplay of the Mario Kart series, in which famous characters of Nintendo's Mario universe compete with one another in competitive racing in go-karts. In traditional gameplay, players try to make their way up to first place while trying to hinder other opponents' progress towards the same goal, using various items found in item boxes at some portions of the race. Mario Kart Tour's gameplay is unique, with the game only requiring players to steer the kart, (Players choose between manual drift and normal steering) while the game helps to auto-accelerate their vehicle and perform jump tricks.<sup>6</sup>

<sup>6</sup> [https://en.wikipedia.org/wiki/Mario\\_Kart\\_Tour](https://en.wikipedia.org/wiki/Mario_Kart_Tour)

### 3.5 - Feature comparison

	Be Strong, Be the Last	Mario Kart 8 Deluxe	Crash Team Racing Nitro-Fueled	Mario Kart Tour
Genre	Kart Racing	Kart Racing	Kart Racing	Kart Racing
Graphics	3D	3D	3D	3D
Platforms	PC, Nintendo Switch, PlayStation 4, Xbox One	Nintendo Switch	Nintendo Switch, PlayStation 4, Xbox One	Android, iOS
Maps	Tracks	Tracks	Tracks	Tracks
Movement	Automatic acceleration	Manual acceleration	Manual acceleration	Automatic acceleration
Number of players	1-2 Local	1-4 Local	1-4 Local	1
Gamemode	Single Player, Local Multiplayer	Single Player, Local Multiplayer, Online Multiplayer	Single Player, Local Multiplayer, Online Multiplayer	Single Player, Online Multiplayer
In-game Objects	✗	✓	✓	✓
In-game Characters abilities	✓	✗	✗	✗
Characters "Classes"	✓	✓	✓	✓
In-game Tournaments	✓	✓	✓	✓
F2P	✗	✗	✗	✓

## 4 - Legal analysis

The "**Be Strong, Be The Last**" name is free from copyright.

The prototype is implemented in Unity, with the Personal Edition license.

Most of the resources and assets used in the game prototype are available with a free license, whereas some assets might be purchased from the Unity Asset Store.

All the digital contents included in the final game will be designed and created by the development team, in collaboration with graphic and music artists.

**PEGI 3:** suitable for all age groups. The game does not contain any sounds or pictures that are likely to frighten young children. A very mild form of violence (in a comical context or a childlike setting). No bad language.

## 5 - Gameplay

### 5.1 - Detailed description

The player competes against 7 other AI-led characters in a racing game where the goal is to finish last. There's also the possibility to play with friends in local multiplayer split-screen (up to two players). Remaining characters will still be controlled by the AI.

In future releases we plan to add an online multiplayer mode.

The driving system is designed to accelerate the car on its own and there's no braking system so the player has to find out a way to slow down her race.

The kart will accelerate up to a maximum speed cap of **200 km/h**.

Every mechanic of the game will be analyzed in the following sections.

#### 5.1.1 - Obstacles and power cores

Players can reduce their speed in order to be surpassed by the others or maintain the last position.

To do so, they will have to hit the obstacles scattered around the map that provide a huge slowdown.

Hitting an obstacle will decrease the speed to **150 km/h**.

Obstacles have different shapes and follow a simple pattern of movement on the track so that players have to predict the right moment to approach them.

Some obstacles can also flatten a kart when they hit it. While **flatten** the speed of the kart will decrease up to **125 km/h**.

The **different behaviours** are:

- **Wandering behaviour:** the agent walks around in a specific area. When a player tries to catch it, the agent starts to run away from him to avoid being hit. If the player hits the agent, her kart is slowed down and the robot is thrown away off the map and respawns in the original position after **30 seconds**.

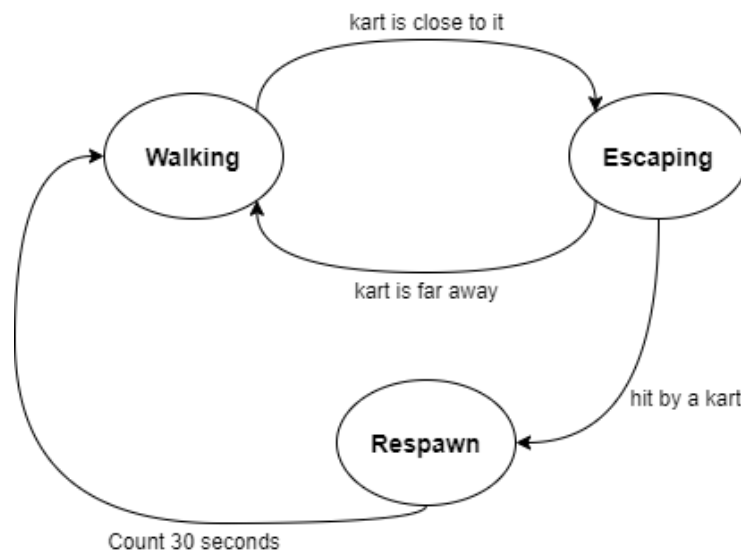


Fig. 7 - Wandering Obstacles FSM

- **Jumping behaviour:** the agent walks around in a specific area. After **2 seconds while grounded** it jumps in a random direction (it cannot exit the defined area). When the jumping animation ends, it starts to walk again.

If the player's kart hits the agent, her kart is slowed down and the robot is thrown away off the map and respawns in the original position after **30 seconds**.

If the jump ends while a kart is underneath the robot, the kart's shape is flattened, receiving a hard slow down.

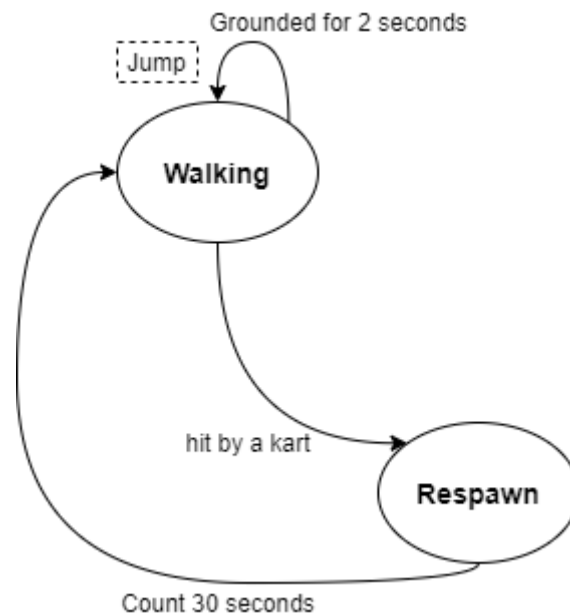


Fig. 8 - Jumping Obstacles FSM

- **Flying behaviour:** the agent flies around over a specific area. While it is flying, the players can see its shadow over the road. After a random number of seconds between 2 and 4, it stops and casts a vertical beam for 2 seconds. If a kart passes through the light, it is slowed down. When the beam disappears, the agent starts to fly around.

This agent can't be hit by the karts.

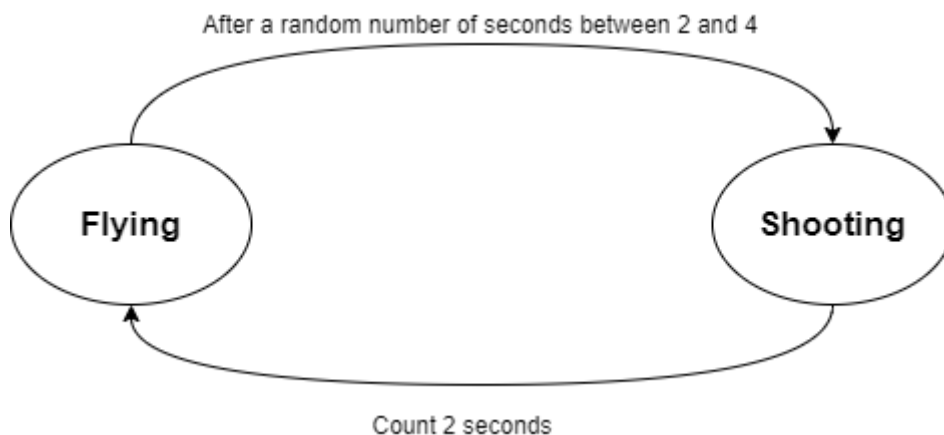


Fig. 9 - Flying Obstacles FSM

Other things players will find on the track are the **power cores**, floating batteries that can be collected and will give the player a random power to use. After **30 seconds** since a player has taken it, the power core respawns.

These are also the only form of pickups in the game.



## 5.1.2 - Edges of the track, curves and drifting

In order to avoid the characters to remain stuck on the edges of the track, their behavior is to turn the karts in the direction of the track and put them in **turbo speed** (see section [5.1.5 - Turbo Speed](#) at page 22) until they move away from the edges of the track.

In order to win the race is then necessary to avoid them, but when approaching some particularly tight curve it might be difficult since there's no possibility to brake and slowdowns rely heavily on obstacles, which not all the characters might have hit.

For this reason, there's another important maneuver, the **drifting**. This maneuver can only be done while steering left or right and consists on the kart moving almost sideways while maintaining the curve's trajectory. If a player is capable of drifting in the same direction for at least **3 seconds** consecutively, the kart will receive a small slow down decreasing the speed up to **175 km/h**, but this is tricky to do while avoiding to touch the walls.

## 5.1.3 - Collisions with karts

Another basic mechanic consists on the kart hitting on purpose other karts to push them. The direction and the effect of the push depends upon different situations that will be analyzed taking into account two karts: the one who is performing the push will be called the *hitting* one, while the one who is receiving it will be called the *hit* one.

- **On the back:** the *hitting* one slows down up to **150 km/h** while the *hit* one is put in **turbo speed**;
- **On sides:** if the *hit* one tries to push the *hitting* one as well, they will be both slowed down up to **175 km/h**. On the other hand if the *hit* one doesn't try to respond it will be pushed towards the direction of the collision, usually moving it towards the edges of the track.

## 5.1.4 - Powers & Shield

There are 7 powers in the game that can be acquired by collecting a **power core**. This will start a slot machine that will roll over the 7 powers for 2 seconds. After this time it will stop automatically on 1 of the powers and give the player the ability to use it at any moment to apply its effect.

Each power is related to a specific character, but none of them is exclusive to a single character. It's like all their unique powers have been mixed up. That being said, whenever a character gets and uses its **favorite power** it will receive a small bonus that is exclusive to each character-power combination. This resembles their affinity with that power and the fact they can naturally use it better (for further information see paragraph [6.2 - Champions](#) at page 38).

The powers have several effects and some of them can be manually aimed in front or in the backs of the player. They are:

- **Sound dart:** a single target projectile that follows the nearest opponent in the chosen direction.  
Duration: 30 seconds;
- **Wastes barrel:** a projectile that moves straight in the chosen direction and bounces on the wall following the track's curves  
Duration: 45 seconds;
- **Trident:** three spears at a certain distance between each other that move straight in the chosen direction. Each one is treated as a single projectile and each of them can hit a different opponent;  
Duration: until it touches something;
- **Water Puddle:** creates a puddle of water that is placed on the track's surface behind the character. It will accelerate any character that touches it;  
Duration: 60 seconds;
- **Rhyno's Bulk:** the user becomes larger, is harder to push by other characters and is not affected by the puddle of water;  
Duration: 5 seconds;

- **Steam cloud:** the visibility of the 4 nearest opponents is reduced (AI characters will drive less accurately). In the rare case in which the same character should be affected by the steam cloud, while still under the effect of it, the first one will be replaced by the second (resetting its duration);  
Duration: 3 seconds;
- **Electromagnetic field:** a repulsive field appears around the user, pushing away any opponent that is hit by it. The character is not affected by the steam cloud;  
Duration: 5 seconds;

Other than powers, the player can always count on the **shield** ability.

It consists in a small AoE attack around the kart that can be used to push incoming opponents and avoid projectile powers used against the player. The shield ability has a very brief window of effectiveness (about **0.5 seconds**) so in order to hit opponents or avoid projectiles the player has to time it carefully, or she will be left open to incoming attacks.

The shield ability can be used at any moment by pressing the corresponding button and can be even used while carrying another power.

If the player uses a power or the shield ability she will have to wait for a **5 seconds cooldown** before being able to do one of these actions again. This is useful to prevent abusing the shield ability (since it's free to use at any time), but also to give a **meaningful choice** to the player in case she has to decide between defending herself (and her current position) by using the shield ability or harming her opponents by using the given power.

### 5.1.5 - Turbo speed

Whenever a character gets accelerated due to being hit by another kart or projectile, or hitting the edges of the track, the kart will go at turbo speed. While in turbo speed, the kart's speed is increased up to **250 km/h**. They will also release a **trail** to highlight their status.

Turbo speed will last 2 seconds and in this period the kart will be invincible to other collisions or projectiles. While in turbo speed, the player will also have a slightly less control over the vehicle, with harder steering and abilities and drifting disabled. Even in this situation, she should still try to remain on the track so that once the turbo period is over, she is going to find herself back on the track and can start the race over.

Hitting an obstacle while in turbo speed will disable it instantly and is still possible to collect power cores during turbo speed.

## 5.1.6 - CPU-controlled characters AI

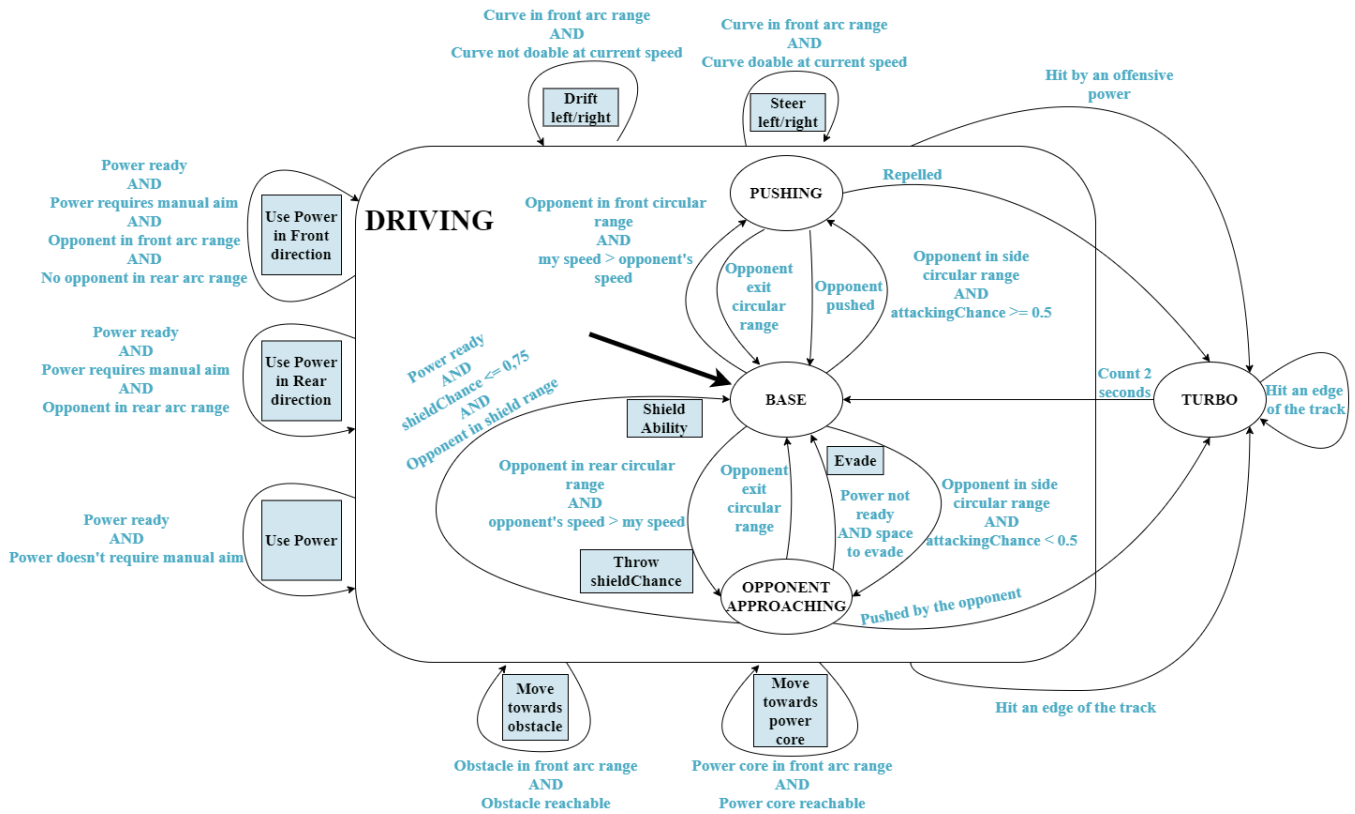


Fig. 10 - CPU-controlled characters FSM

The AI for CPU-controlled characters is a hierarchical finite state machine.

The starting state is **BASE** under **DRIVING** and there are no final states since characters will be despawned at the end of the race.

### 5.1.6.1 - States

The **BASE** state indicates the situation in which the character has no opponent nearby, all the transitions that applies to the **DRIVING** state still applies.

From **BASE** the agent can move to:

- **PUSHING** if an opponent is in the front circular range and the speed of the agent is greater than the opponent's one, or if the opponent is in the side circular range and the attackingChance is greater than or equal to 0,5;
- **OPPONENT APPROACHING** if an opponent is in the rear circular range and the speed of the opponent is greater than the speed of the agent, or if the opponent is in the side circular range and the attackingChance is smaller than 0,5:
  - the action **Throw shieldChance** is executed drawing a randomly generated number that indicates the likelihood the agent will try to counter the opponent's push;
- **attackingChance** is a randomly generated number that is drawn when an opponent enters the side circular range.

The **PUSHING** state indicates the situation in which the agent decided to push one of its opponents, so it will keep moving towards it until it either hits it or the opponent exits the circular range for any reason.

From **PUSHING** the agent can move to:

- **BASE** if the opponent is actually hit or exits the circular range on its own;
- **TURBO** if the agent's push is repelled by the opponent's shield ability.

The **OPPONENT APPROACHING** state indicates the situation in which an opponent is trying to push the agent, so the opponent will keep getting closer to it, whose only way to avoid the collision is to either repel it with the shield ability or trying to evade.

From **OPPONENT APPROACHING** the agent can move to:

- **BASE** if the opponent exits the circular range on its own;
- **BASE** if the agent's shield ability is ready AND shieldChance is lower than or equal to 0,75 AND the opponent is in shield range:
  - the action **Shield Ability** is executed, pushing away the incoming opponent;
- **BASE** if the agent's shield ability is not ready AND there's enough space to evade from the opponent:
  - the action **Evade** is executed, in which the agent exits the circular range;
- **TURBO** if the agent is actually hit by the opponent:

All of them are included in the state **DRIVING** that indicates the agent driving under normal circumstances.

From each of **DRIVING** states the agent can move to:

- **TURBO** if is hit by an offensive power or if the agent hits the edges of the track.

Other **DRIVING** transitions have to be considered as if the agent remains in the sub-state it currently is:

- if the agent has a power that doesn't require to aim **AND** the power is ready, **the agent** will uses it;
- if the agent sees a curve in the *front arc range* **AND** is able to pass it at the current speed, **the agent** will only steer in the direction of the curve;
- if the agent sees a curve in the *front arc range* **AND** is not able to pass it at the current speed, **the agent** will try to steer and drift in the direction of the curve;
- if the agent has a power that requires to aim **AND** the power is ready **AND** there's an opponent in the *rear arc range*, **the agent** will use the power in the rear direction;
- if the agent has a power that requires to aim **AND** the power is ready **AND** there's an opponent in the *front arc range* **AND** there's no opponent in the *rear arc range*, **the agent** will use the power in the front direction;
- if there's a **power core** in the *front arc range* **AND** the agent is able to reach it at the current speed, **the agent** will move towards it;
- if there's an **obstacle** in the *front arc range* **AND** the agent is able to reach it at the current speed, **the agent** will move towards it.

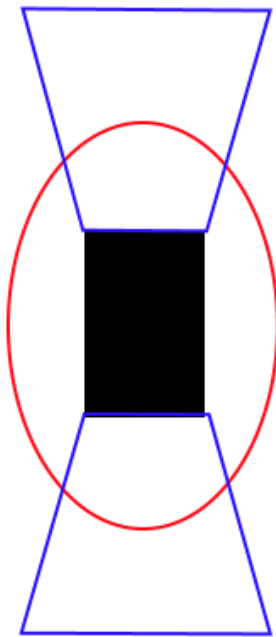
The **TURBO** state indicates the situation in which the agent goes in turbo speed and can't use powers nor the shield ability or the drifting action. The agent can only steer left or right.

From **TURBO** the agent can move to:

- **BASE** after 2 seconds elapse;
- **TURBO** if the agent keeps touching the wall;

5.1.6.2 - Agent field of view

length=width of the road



length=width of the road

Fig. 11 - Schema of kart's field of view

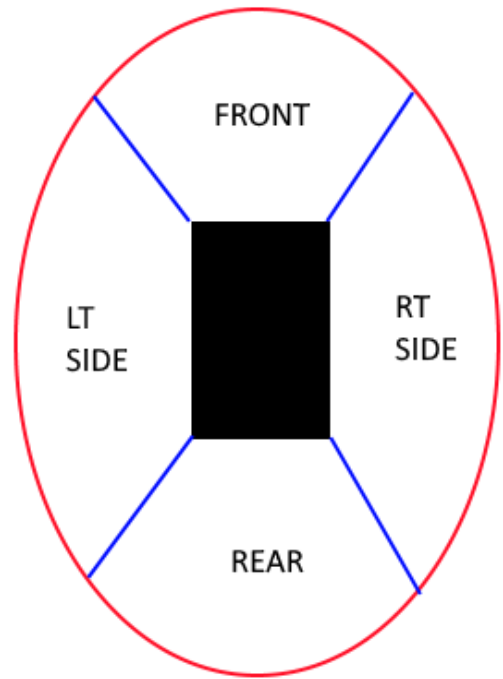


Fig. 12 - Schema of kart's circular field of view (detailed)

## 5.2 - Controls

Since the first release is going to be for PC, controls here stated refer to a mouse+keyboard configuration and to the standard Xbox One Controller. However controls easily overlap with other platforms.

Controls in Be Strong, Be The Last are very simple.

- the kart **accelerates on its own** and there's **no possibility to brake**;

### Mouse+keyboard:

- the kart steers with **A** to the left or **D** to the right;
- holding the **Spacebar** key while steering left or right activates the drifting action;
- pressing the **Left mouse button** will activate the power;
- pressing the **Right mouse button** will activate the shield ability;
- if a power needs manual aim the direction can be chosen by pressing **W** key to activate it forward or **S** key to activate it backward;
- pressing **Tab** key will open the rankings window;
- pressing **Esc** key will pause the game.

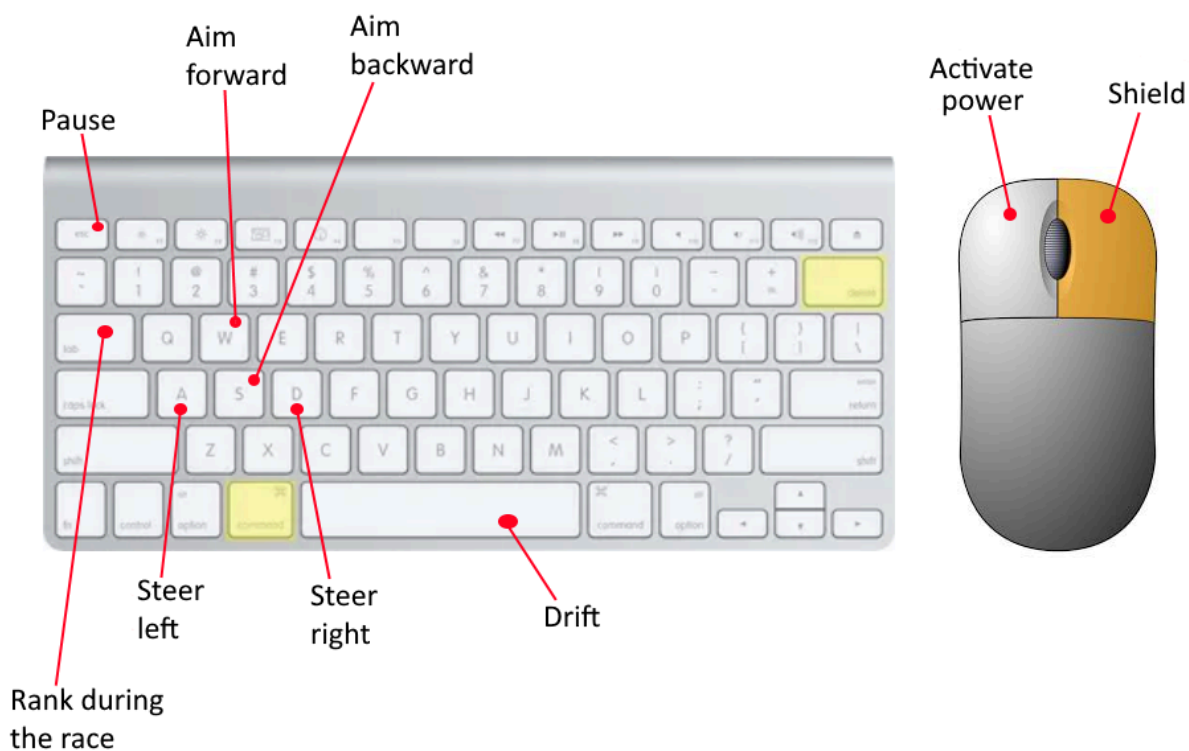


Fig. 13 - Keyboard + Mouse configuration

### Xbox One controller:

- the kart steers by **tilting the left analog stick, left or right** respectively;
- holding **RB** or **A** buttons while steering left or right activates the drifting action;
- pressing **RT** or **B** buttons activates the shield ability;
- pressing **LB** or **Y** buttons to activate the power forward (if it needs manual aim);
- pressing **LT** or **X** buttons to activate the power backward (if it needs manual aim);
- if a power needs manual aim the direction can be chosen by **tilting the left analog stick, up or down** respectively;<sup>7</sup>
- pressing **Back** will open the rankings window;
- pressing **Start** will pause the game.

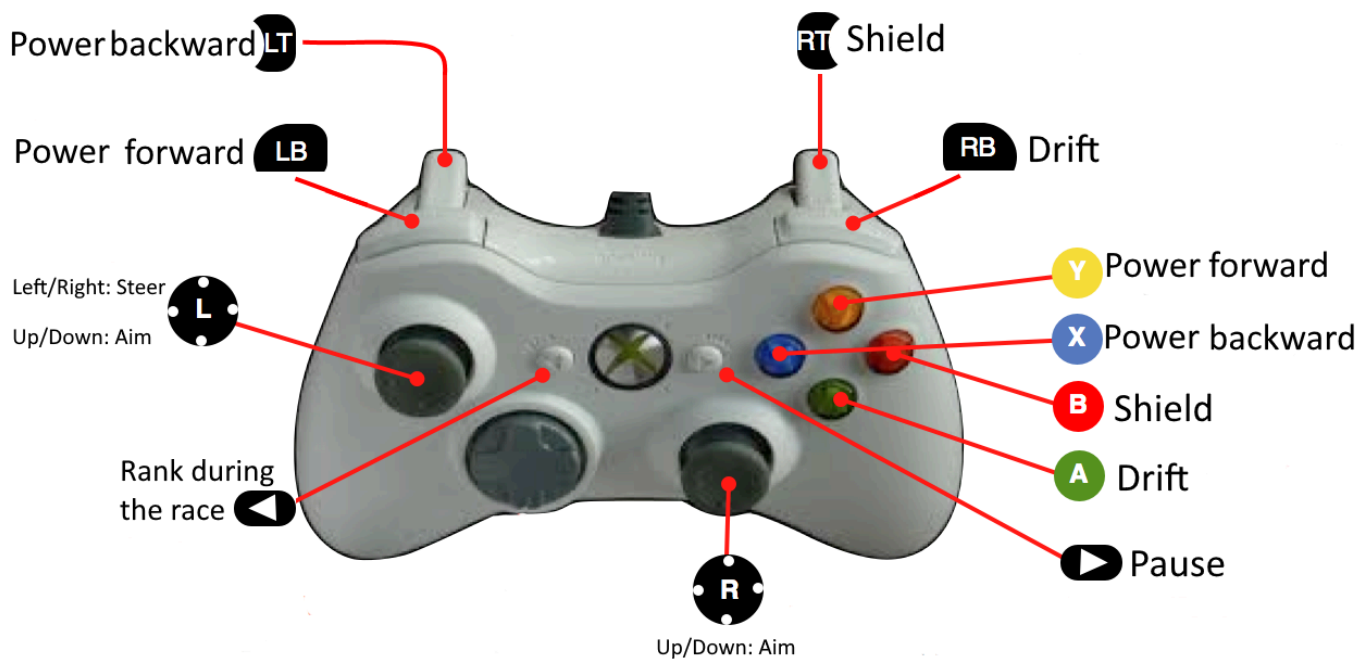


Fig. 14 - Xbox Controller configuration

The player can modify the default configurations at any moment by accessing the appropriate settings in the menu.

<sup>7</sup> This overwrites the default direction given by a specific button, meaning that you can use Y/LB or X/LT arbitrarily and will still activate the power in the direction chosen by the manual aim.



## 5.2.1 - Interfaces

### 5.2.1.1 - Main Menu



Fig. 15 - Main Menu interface

### 5.2.1.2 - Champion Selection



Fig. 16 - Champion Selection interface



### 5.2.1.3 - Track Selection



Fig. 17 - Track Selection interface

### 5.2.1.4 - Player interface



Fig. 18 - Player interface

The player interface is quite essential trying to maintain a small amount but very important informations constantly on screen:

- the number of laps and the player's position are put in the center of the topmost part of the screen;
- in the top-left part of the screen will be the minimap of the track with all the characters and their position highlighted by arrows (the player's character will be highlighted by a bigger arrow);
- in the lower-left part of the screen there will be the Shield ability icon and next to it the Power collected (if a player has taken it). If they are ready to use they will be highlighted, while if they are currently cooling down, they will be grayed out with the number of seconds needed to use them again;
- given the particular gameplay a strong emphasis has to be put on the retro camera which is more important than in other kart games. For this reason we decided that the retro camera should always be visible and part of the interface. In particular it will be in the top-right part of the screen to not cover too much of the action.

## 5.3 - Modes and other features

In the **first release**, the game will have **3 modes**: Single Race, Tournament and Time attack. **Other modes** will be added through **free DLCs** to give the players new activities.

Both modes can be played single player or in local multiplayer with split screen.

In a **future release** we want to release **online multiplayer** to allow players to face their friends even when they can't meet in place.

### 5.3.1 - Single race

In this mode, the player selects a specific race, the kart she prefers and competes against other karts to be the last in order to win the race.

### 5.3.2 - Tournament

In the tournament mode, the player selects the specific tournament (each tournament is composed by a set of races), selects the kart she prefers and competes against other karts to win each race. In this case, the important thing is to obtain the highest number of points to win the tournament. In each race, the player takes an amount of points depending on her position at the end of the race.

At the end of the tournament, the player who has the highest number of points wins.

### 5.3.3 - Time attack

In this mode the player races alone and the goal is to reach the end of the track in the longest time possible. The obstacles are still on the track but there's no power pickup. It's a good way to fully understand how a track is composed, learn how to properly curve in order to traverse the longest amount of space, where to find all the obstacles and how to hit them in preparation of a normal race.

The time the player gets is added to a scoreboard for that track and can be seen in any time so that subsequent races can be done to get a better (longer) time.

The player can also specify a 8-character nickname for that score.

In local multiplayer mode the players will run simultaneously but each one on her specific instance of the race, so that they can't interfere with each other. At the end of the race, the player with the longest time will be declared winner. Both scores will then be registered on the scoreboard with their respective nicknames.

## 5.4 - Levels

The contents of this paragraph represent the goal for the **demo version** of the game we plan to use for playtest. This isn't the extensive list of levels that will be in the final game: number, names, contents and shape of the actual levels will probably change and be placed in their respective Level Design Documents. Given the university project nature of this game (and the absence of proper level design documents) we placed the informations here for the sake of clearness of exposition.

There are two tracks:

- one with a linear fashion with very large curves and straight roads that allows a very fast gameplay;
- one with a more classic fashion that requires a more careful driving.

Playtesting with both of them will help us to understand which one is better for this kind of game.

### 5.4.1 - Future City



*Fig. 19 - Future City track reference image*

The first track is in a futuristic city, the capital of the planet that hosts this competition. When this show has to go on stage, the city is properly decorated and the urban plan adapted to allow the race to entirely take place. The track follows the structure of the city and is therefore divided on several levels and crosses the different areas of the capital in order to allow all citizens to benefit from the vision of the race.

#### 5.4.1.1 - The track

The concept of this track is a medium length race, where the players have to complete two laps. The shape is particular because it's linear and does not cycle like the classic circuits. When a kart ends the first lap, there is a portal that teleports the kart at the beginning of the track for the second lap. After all the players completed the first lap, the portal disappears and the players can reach the finishing line. The track is composed of straight roads and large curves to enable a high velocity for the karts without penalizing driving.

There are 4 jumps to give a variety to the track.

A long rainbow wall-to-wall stripe must be placed at the base of the climb of each jump to accelerate all players in that stretch.

This is useful to make the karts pick up more speed in the jump phase, giving the player a more adrenaline-pumping experience.

Power cores are placed horizontally (wall-to-wall) and in a specific pattern: 5 for spot. The power cores marked on the map inside the jumps are in mid-air and they can only be taken by the players during the jumps.

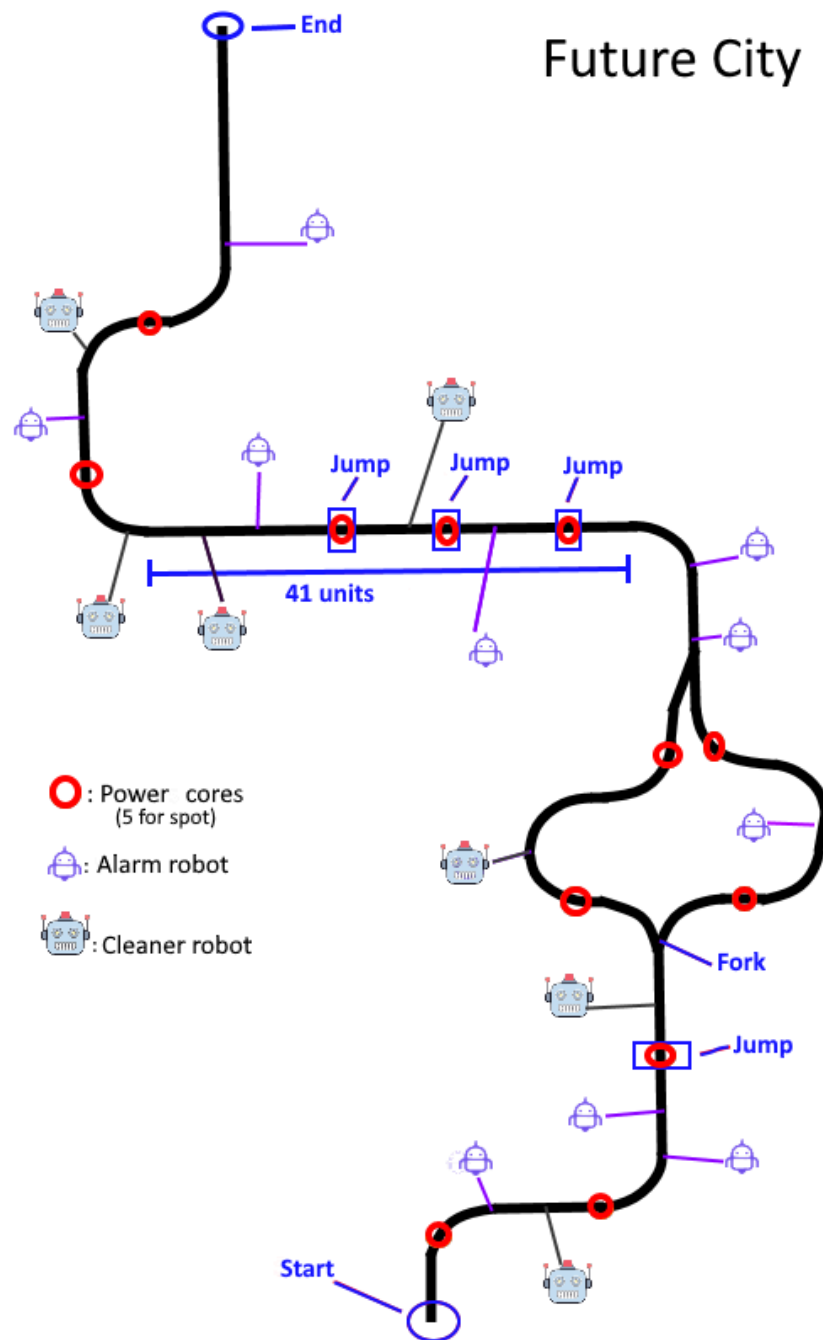


Fig. 20 - Future City track design image



#### 5.4.1.2 - Obstacles

In this track the obstacles are thematically linked to robots and other futuristic objects. There are two types of obstacles:

- **Alarm robot** (inherits the **wandering behaviour**);



*Fig. 21 - Alarm robot model*

- **Cleaner robot** (inherits the **jumping behaviour**)



*Fig. 22 - Cleaner robot model*

## 5.4.2 - Mars



*Fig. 23 - Mars track reference image*

The second track is set on Mars: the earth has a bright red color and does not seem to be a hospitable land. The track was built in the basin among of a canyon to allow spectators to observe the race from the heights to get a full view of the race.

### 5.4.2.1 - The track

The concept of this track is a small length race, where the players have to complete three laps.

The shape is the classic. To complete a lap the player's kart has to come back to the starting line.

Power cores are placed horizontally (wall-to-wall) but in this race there are two specific patterns: 5 cores for spot or 3 cores for spot.

On this track, some areas are narrower than the futuristic one, making driving at high speeds slightly more difficult, thus implying greater attention from the drivers.

## Mars Track



Fig. 24 - Mars track design image

### 5.4.2.2 - Obstacles

In this track the obstacles are thematically linked to aliens. There are three types of obstacles:

- **Virus alien** (inherits the **wandering behaviour**);

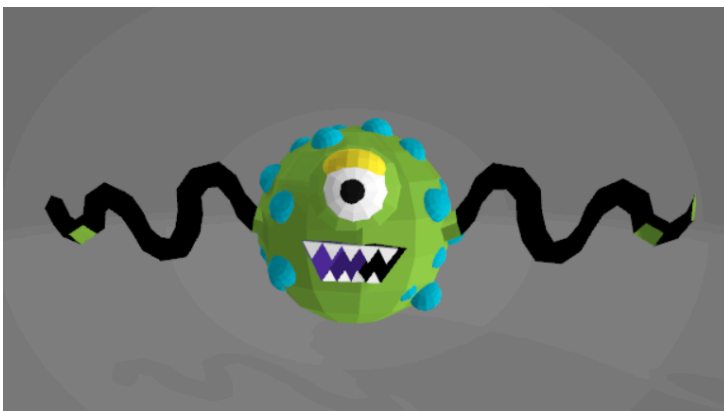


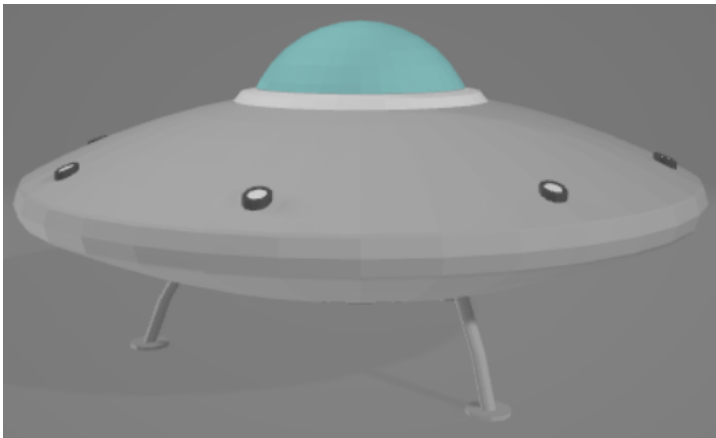
Fig. 25 - Virus alien model

- **Giant alien** (inherits the **jumping behaviour**)



*Fig. 26 - Giant alien model*

- **UFO** (inherits the **flying behaviour**)



*Fig. 27 - UFO model*



## 5.5 - Flowchart

### 5.5.1 - Main flowchart

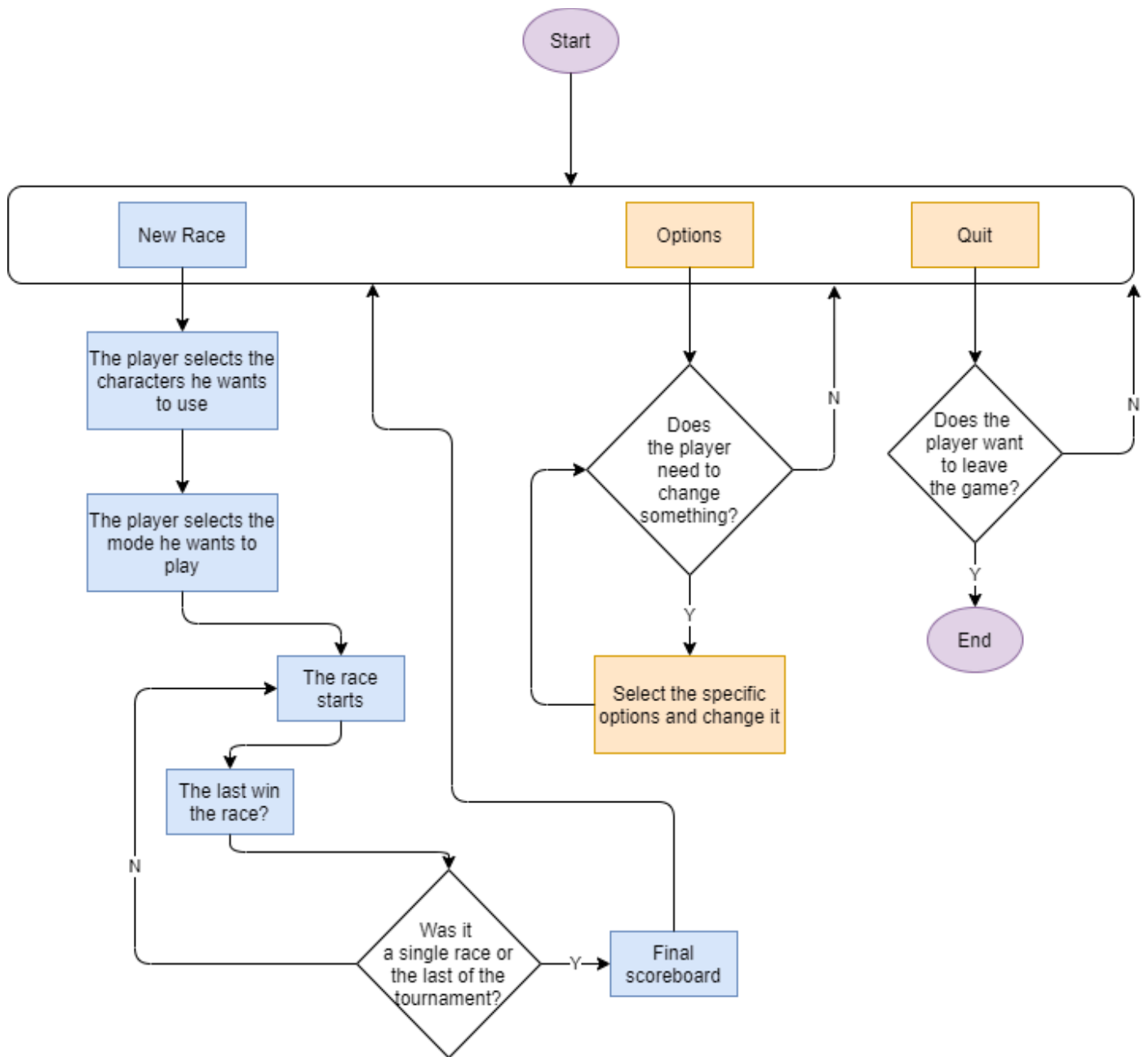


Fig. 28 - Main gameplay flowchart

## 6 - Game characters

### 6.1 - Characters design

In Be Strong, Be The Last there are 8 champions, each with its own kart's model, graphical effects and the affinity with a specific power that, upon usage, will grant a small bonus exclusive to that character.

Visually it will be like the unique energy each of them possesses (that can be seen when executing the shield ability) will imbue the power making it even stronger.

Each of them comes from a different world and their design heavily resembles the technology and culture of their native planet.

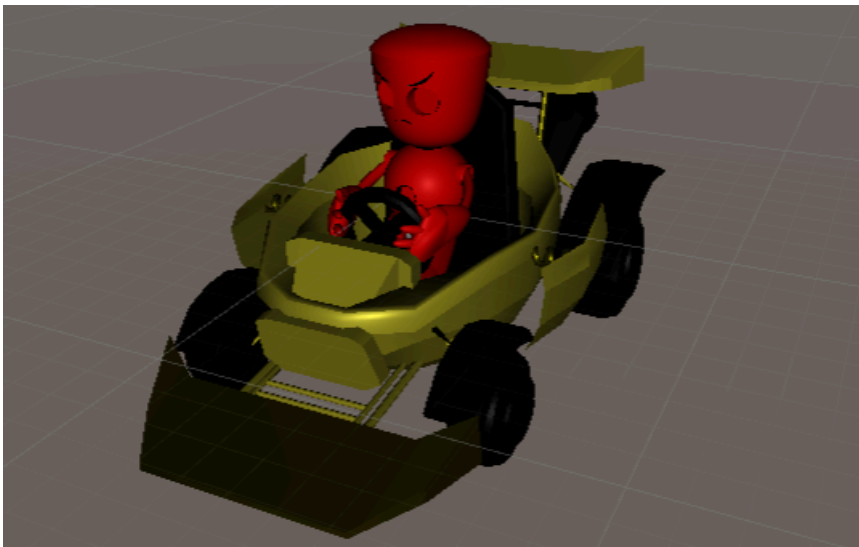
They will now be analyzed in terms of:

- the **trail** left when in turbo speed;
- the **shield** ability's graphic effect;
- the **favorite power** and the **bonus** granted upon usage.

For further information on powers see section [5.1.4 - Powers & Shield](#) at page 21.

### 6.2 - Champions

#### 6.2.1 - Kiddo



*Fig. 29 - Kiddo model*

A robot that once was a wrestler and now has decided to do an even more extreme sport. Due to his nature, he can establish a strong relationship with his fellow companion (its kart) allowing them to do impressive things unlike other drivers.

**Trail:** Bolts;

**Shield:** A shockwave around the kart that pushes the incoming opponent;

**Favorite power:** Electromagnetic field;

**Bonus:** The opponents receive a stronger push getting accelerated up to a turbo speed cap of **275 km/h**.

## 6.2.2 - Imps

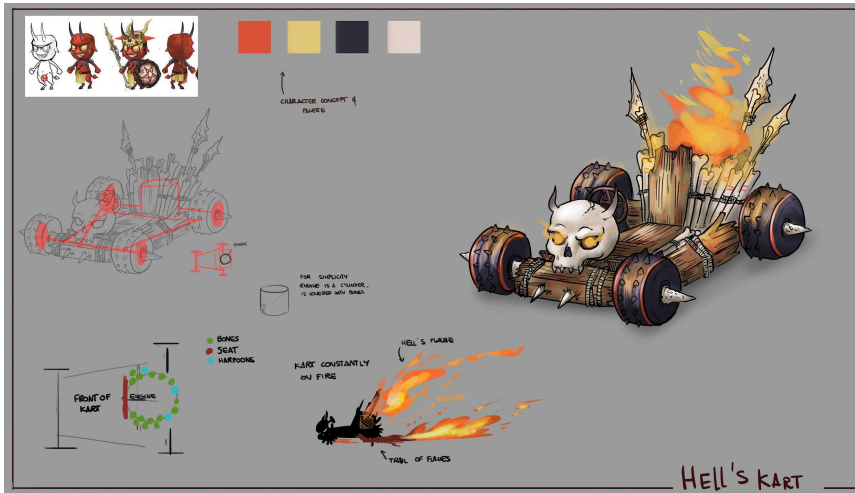


Fig. 30 - Imps concept art

A horde of imps coming from the *Inferno* planet. One of them alone is very weak, but when they band together they become an unstoppable force of spite. Usually 4 of them are required to drive, but someone says the kart itself is made of tons of them stuck together.

**Trail:** Hell fire;

**Shield:** A fiery explosion around the kart that pushes the incoming opponent;

**Favorite power:** Trident;

**Bonus:** The spears get engulfed in flames covering a larger area of effect.

## 6.2.3 - Steamdunker

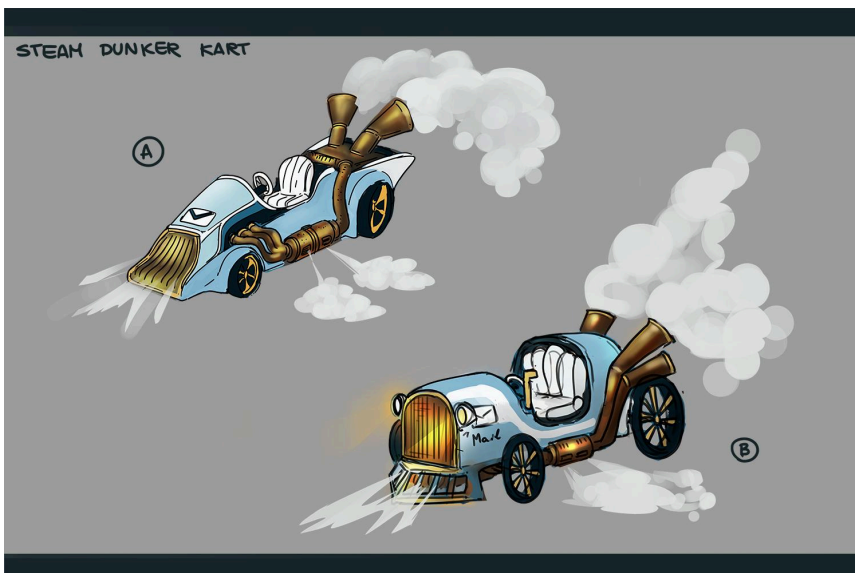


Fig. 31 - Steamdunker concept art

He came from a world made of endless ocean and floating islands. His native planet technology revolves around the use of steam which is extremely adaptable to many situations. Their proudest tool is the steam gun capable of absorbing air and shooting powerful steam jets.

**Trail:** Steam discharge;

**Shield:** A hot burst of steam around the kart that burns the incoming opponent;

**Favorite power:** Steam cloud;

**Bonus:** It affects all the opponents.

## 6.2.4 - Earth restorer\*

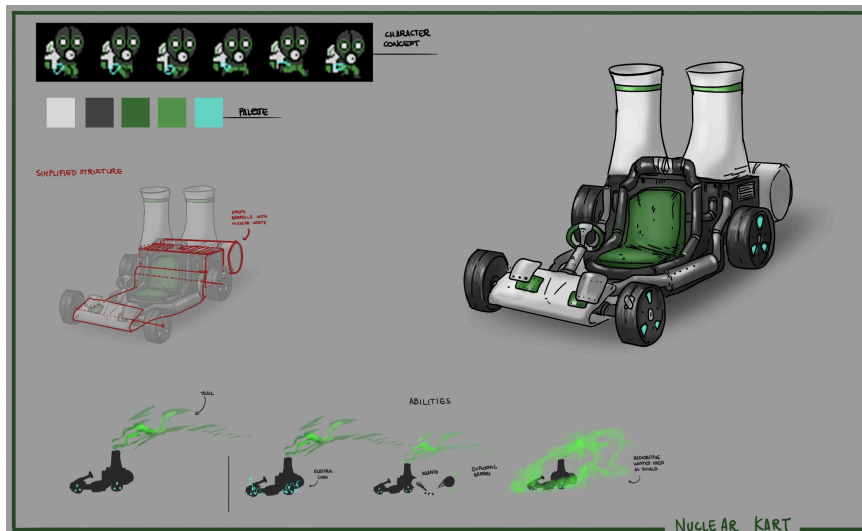


Fig. 32 - Earth restorer concept art

Their world was destroyed due to a nuclear fallout. The few survivors started to build it again by retrieving wastes and garbage. A new technology was born and their champion is now eager to show it to the whole galaxy.

**Trail:** Nuclear wastes;

**Shield:** Radioactive wastes around the kart that pushes the incoming opponent;

**Favorite power:** Wastes barrel;

**Bonus:** After touching an opponent or at the end of its time, the barrel will produce a small AoE nuclear explosion that will affect anyone around it.

## 6.2.5 - Flapper\*

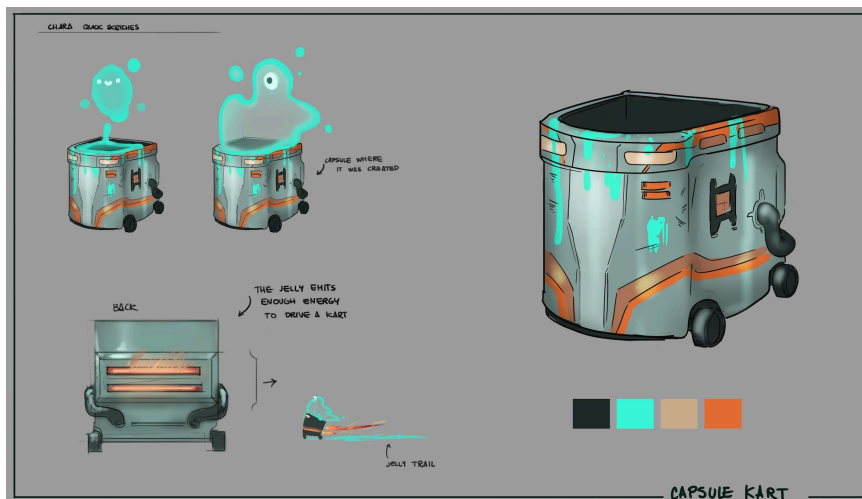


Fig. 33 - Flapper concept art

A slimy material created by a scientist in the laboratory. While doing some experiments, he discovered that this material is somehow intelligent and can also drive better than many humans due to its fluid properties.

**Trail:** Slime;

**Shield:** Water bomb around the kart that pushes the incoming opponent;

**Favorite power:** Water puddle;

**Bonus:** The puddle is larger and lasts 90 seconds (+30 seconds than normal).

## 6.2.6 - Hypogeum\*



Fig. 34 - Hypogeum car model

A car coming from a world in which animals learned how to use human technology. It resembles both the primal instincts of the feral beast driving it and the human intelligence that built it.

**Trail:** Eagle's feathers;

**Shield:** A lion's roar around the kart that scares the incoming opponent;

**Favorite power:** Rhino's Bulk;

**Bonus:** Slows down the user a little bit, reducing the speed cap up to **175 km/h**. The turbo speed cap is adjusted to **225 km/h**.

## 6.2.7 - Bard\*

In their native planet he plays music to summon powerful magic and use it to fight against demons and other bards. Here he uses his songs to enchant the opponents and make them dance.

**Trail:** Musical notes;

**Shield:** A powerful sound wave around the kart that pushes the incoming opponent;

**Favorite power:** Sound dart;

**Bonus:** It pierces the shield ability.

## 6.2.8 - Politician\*

A rich and exuberant politician who participates in the race to influence the masses, and make them think that he's just like them. In reality he just wants more power and fame. It's a mystery how he got the title of champion needed to participate...

**Trail:** Money;

**Shield:** Throws money around the kart to convince the incoming opponent not to hit him;

**Favorite power:** None;

**Bonus:** The slot machine lasts for 4 seconds instead of 2 and rolls a little bit slower. If the player presses one of the "Activate Power" buttons it will make the slot machine stop and obtain the selected power. This means that a very skilled player would be able to get the power she prefers whenever she collects a power core. If the player doesn't do anything she will obtain a random power as usual.

\*This champion is not included in the demo and will be added in the actual release of the game.

# 7 - Media

## 7.1 - Media list

Group	Media type	Description
Menu	Image	Title screen background
		Player scene background
		Setting scene background
Level	3D model	Arena pieces
Character	Image	Hypogeum car
		Earth restorer car
		Steamdunker car
		Imps car
		Flapper car
		Kiddo car
		Politician car
		Bard car
	3D model	Hypogeum car
		Kiddo car
		Steamdunker car
		Bard car
		Earth restorer car
		Imps car
		Flapper car
Politician car		
HUD	Image	Speedometer
Level props	3D model	Ramps
		Track
		Track edge
		Gutters
Trail	Particle system	Eagle's feathers

		Nuclear wastes
		Steam jet
		Hell fire
		Slime
		Bolts
		Money
		Musical notes
Projectiles	3D model	Shark's fin
		Exploding barrel
		Cannon ball
		Spear
		Fliers
		Sound dart
Music	Sound	See section <a href="#">7.2.1 - Music</a>
SFX	Sound	See Section <a href="#">7.2.2 - Sounds</a>

## 7.9 - Music and sounds

### 7.9.1 - Music

- In the menu, reference: Swing Doors - Allan Gray;
- Track 1 music;
- Track 2 music.

### 7.9.2 - Sounds

List of the necessary sounds.

#### 7.9.2.1 - In game

- Engine;
- Drift sounds;
- Collisions with cars;
- Collisions with walls;
- Projectiles shot (different for every car);
- Projectiles hitting;
- Ability activation;
- Air sound when reaching high speed;
- Obstacles (different for every obstacle);
- Collecting pickups;
- Win sound.

#### 7.9.2.2 - In menu

- Game start sound.

## 7.10 - Version control

The web-based hosting service for version control that we use is GitHub.  
For changes and access requests contact the administrator.

### 7.10.1 - Information

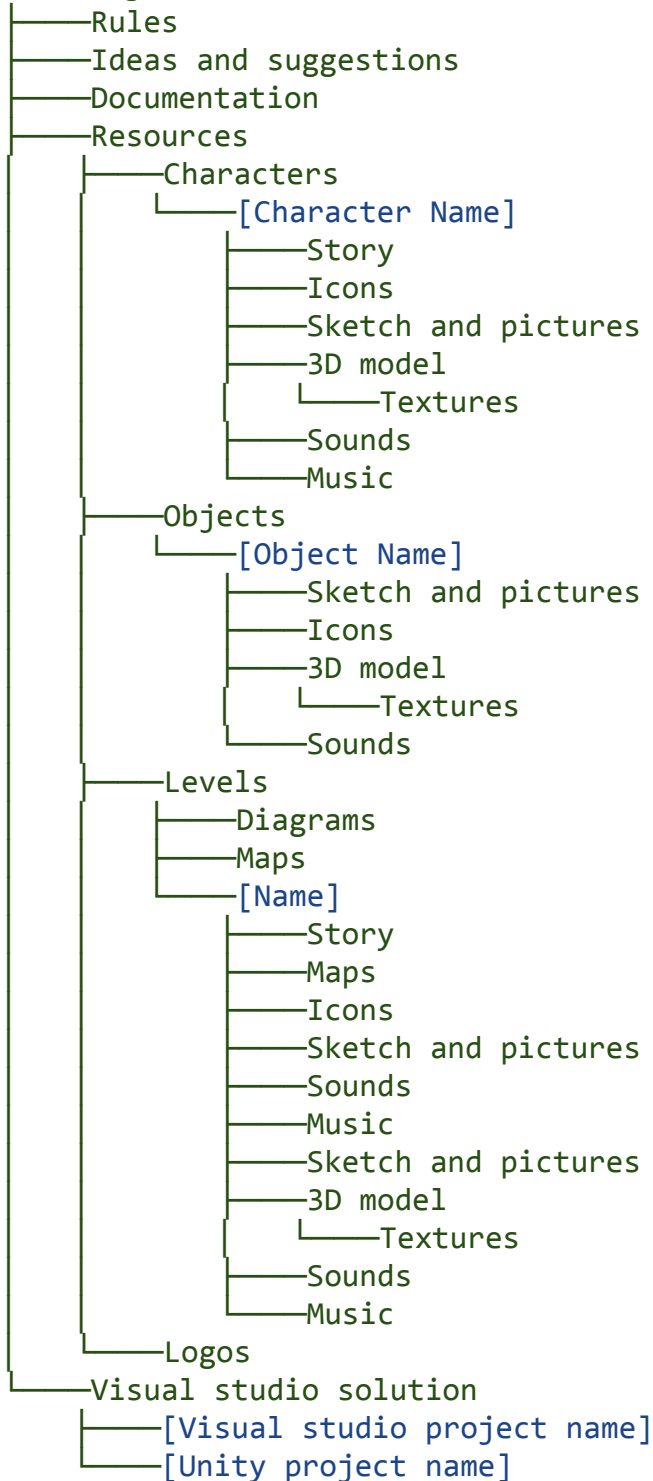
- Url: <https://github.com/FraDetto/BeStrong-BeTheLast>
- Administrator: Francesco Dettori ([francesco.dettori@studenti.unimi.it](mailto:francesco.dettori@studenti.unimi.it))



## 7.10.2 - Paths and project structure

The project directory is the one that contains the ".git" folder (regarding git see Version control ).

BeStrong-BeTheLast



## 7.11 - Export formats

We have specific export formats for some types of files:

File type	Extension	Format
3D objects	.blend; .fbx	
Raster image	.png; .jpg; .tiff	32px; 256px; 512px; 800×600px
Vector image	.svg	2000×2000
Music and sounds	.mp3	320 kbps

## 7.12 - Additional reference images

Other visual references can be found on the GitHub repository, in the folder “./Resources” (see the following link <https://github.com/FraDetto/BeStrong-BeTheLast/tree/master/Resources> for more details) and will be added and updated during the whole development process.