Slow and steady wins the race

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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	Characters Design
Lombardi	29/10/2019	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

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 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 it out! Buy your ticket now and remember: **slow and steady wins the race**!

2.1 - Game logline

Slow and steady wins the race.

2.2 - Gameplay synopsis

Be Strong, Be the Last is a **3D racing single player game** with the possibility of playing 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 **race** or before a **tournament** (a set of 5 races). The player who arrives last wins the race and takes more **points** than the others (the points decrease as the position in the ranking increases).

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, but if abused it will **overheat** and **be disabled** for some time.

Driving well is essential to avoid hitting the edges of the track, traps 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 opponent's kart. 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 abilities** to alter the course of the race. These abilities have several effects like slowing down the user's kart, accelerating the others or giving them other maluses. Upon usage, **each ability will consume a certain amount of power**. Power **slowly regens** while driving (the drift maneuver increases this amount). It's also possible to regain a huge amount of power by collecting the **pickups 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

Describe the demographic you are targeting (age, geographic location, player type, etc.).

3.1.1 - Bartle's taxonomy

About Bartle's players 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 in particular, to advantage you to win the race.

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

Achiever and **Explorer** are much less involved.
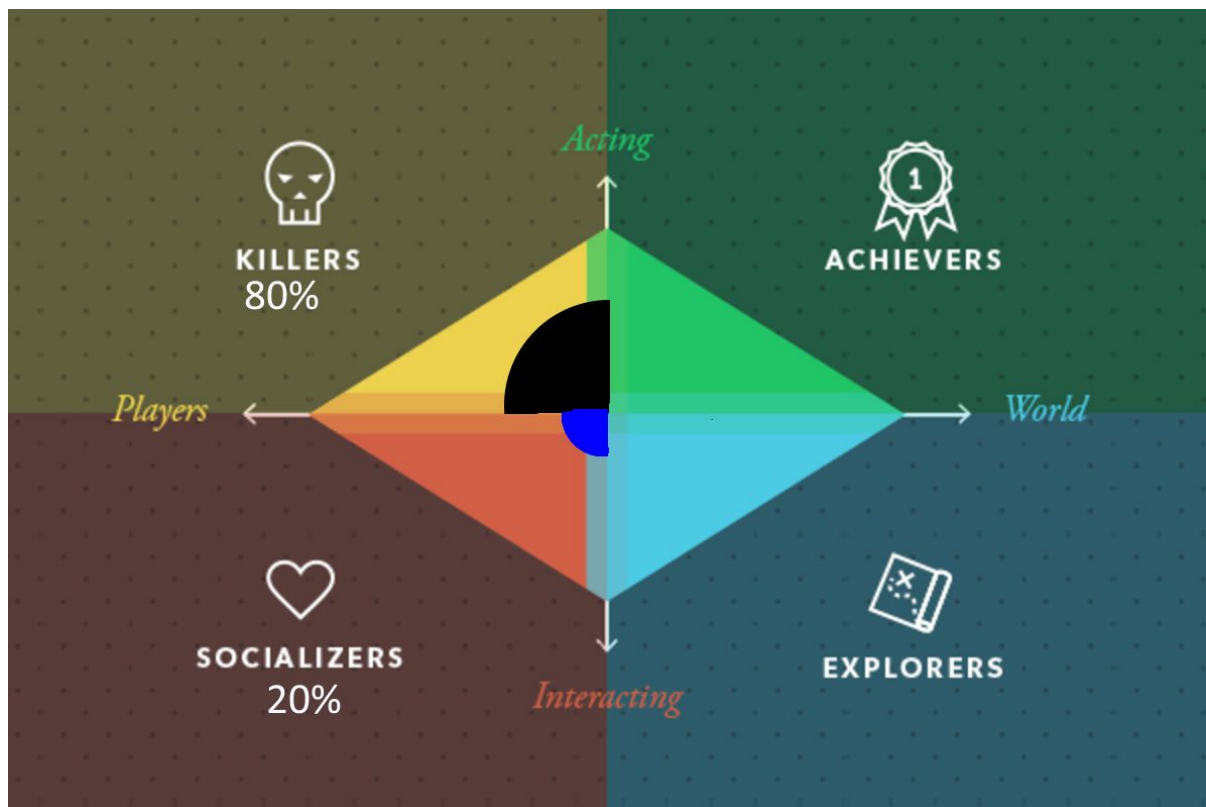
3.1.2 - Genre spread

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 underline 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.[1]

Genre breakdown of video game sales in the United States in 2018

3.1.3 - Age distribution

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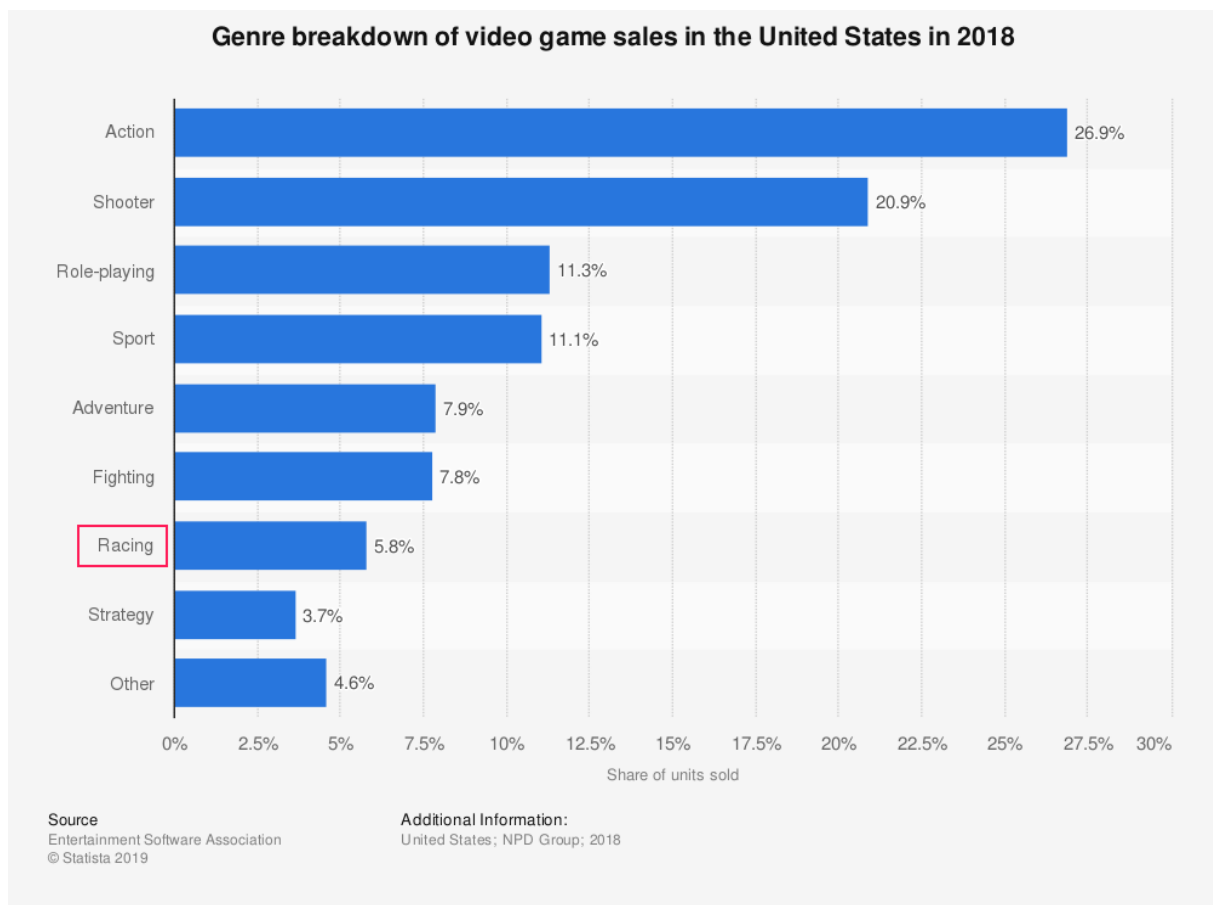d **25 years**. We chose this particular target audience because they are people with well-defined interests and with a lot of time to play, especially with friends.

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/girls between 12 and 16 will play this game in particular 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.

3.1.4 - Geographical distribution

To better understand the geographical distribution of future users, we rely on the distribution of the sales of games of the same genre of the major competitors in different continents.
Consulting different video game sales tracking website we can see the sales numbers of the major competitors for our game, below the data used for comparison.

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[1] https://www.statista.com/

3.1.4.1 - Mario Kart 8 Deluxe

Stats from VGChartz Network[2]:

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

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

Stats from GamStat[3]:

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

	Relative popularity compared to other regions	Region's share
North America	1.7x less popular	25%
Central and South America	1.4x more popular	14%
Western and Northern Europe	worldwide average	40%
Eastern and Southern Europe	worldwide average	4%
Asia	2x less popular	2.5%
Middle East	worldwide average	7%
Australia and New Zealand	2x more popular	6%
South Africa	2x less popular	0.2%

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[2] http://www.vgchartz.com/game/153114/mario-kart-8-deluxe/
[3] http://gamstat.com/games/Crash_Team_Racing_Nitro-Fueled/

3.2 - Platform

We decided to develop the game for **PC** only at first and publish it **on Steam**.
In case of success we have planned to publish it also on **Nintendo eshop** because we think it can be a great product to play on Switch given the party game component present.
In case of further success it was also planned to release it on **Playstation Store, Microsoft Marketplace (Xbox).**

We decided at first to **avoid** the development for **mobile devices** as for an indie game like ours it can be difficult to establish itself in this market. The driving system and the controls could allow us to develop the game in an agile way even for mobile but we want to affirm ourselves first on other platforms.

3.3 - System requirements

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

It's **not** required an **internet connection** because the game is based on **offline modes**. It is a single player game with the possibility to play with friends but in a local multiplayer.

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 or 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.[4]

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[4] 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.[5]

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[5] 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.[6]

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[6] 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	1-4 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 four players). Remaining characters will still be controlled by the AI.
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 car will accelerate up to a maximum speed cap.
Every mechanic of the game will be analyzed in the following sections.

5.1.1 - Obstacles and pickups

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. The term "obstacle" not only refers to physical objects like rocks, walls and many others, but also to special parts of the track that slow down the character who drives on them.
Obstacles have different shapes and behaviors:
- **fixed** obstacles that remain on the track always on the same position and effect;
- **moving** obstacles that follow a simple pattern of movement on the track so that players have to predict the right moment to approach them.

Other things players will find on the track are the **power cores**, little floating spheres that can be collected and will restore a good amount of power (more on that in the abilities section).
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 repel the kart that is going to hit them and push it back on the track while accelerating it.
In order to win the race is then necessary to avoid the edges of the track, 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 them.
For this reason, there's another important maneuver, the **drifting**. This maneuver can be done only while steering left or right and consists on the kart moving almost sideways while maintaining the curve's trajectory. The drifting maneuver can't be abused though, since it will overheat, otherwise players can abuse even when is not needed. If performed well it will also provide the user with some recovery of power (more on that in the abilities section).

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 a lot while the *hit* one is accelerated;
- **On sides:** if the *hit* one tries to push the *hitting* one as well, they will be both slowed down a little bit. 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.

Several abilities also affect the result of the collision (more detailed in the next section).
The main one is the **Counter** ability, available to all characters.
If performed right before the collision occurs it will revert its effects: the *hitting* kart will be pushed and accelerated while the *hit* one will be slowed down.

5.1.4 - Abilities

In **Be Strong, Be The Last** karts have the possibility to use abilities to alter the course of the race, providing that the ability is not cooling-down and the user has the right amount of power required by it.
Abilities divide in three categories with different consumption of power:
- **Counter:** If used when an opponent tries to hit the kart, deflects the incoming attack pushing away the opponent. It can also be used to avoid being hit by traps or the speed boost received by the edges of the track. Is the ability that requires the lowest amount of power;
- **Projectile:** Can be shot both in front or in the backs of the kart to attack the opponents. These abilities require a medium amount of power;
- **Special:** Temporary bonus to the user or malus to the opponents. These abilities require the greatest amount of power. The length of these abilities will vary depending on the position of the user while activating them.

Each character has the counter ability, a projectile ability and a special ability. All characters have unique combinations of abilities (see section).

There are four types of **projectile abilities**:
- **Homing:** a single target projectile that follows the nearest opponent in the chosen direction;
- **Bouncing:** a projectile that moves straight in the chosen direction and bounces on the wall following the track's curves;
- **Trishot:** three projectiles at a certain distance between each other that move straight in the chosen direction. Each one is treated as a single projectile and they can hit different opponents;
- **Attracting:** attracts and nullifies incoming projectiles or nearby traps, then shoot them in the chosen direction. It can also be used to attract **moving** obstacles to guarantee a collision with them.

There are four types of **special abilities**:
- **Tanking:** the user becomes heavier, slowing down and being harder to push by other characters;
- **Annoying:** the user's opponents steering is limited and their drifting action is disabled;
- **Blinding:** the user's opponents visibility is reduced;
- **Rotating:** a repulsive field appears around the user, pushing away any opponent that touches it and avoiding being hit by traps or the speed boost received by the edges of the track.

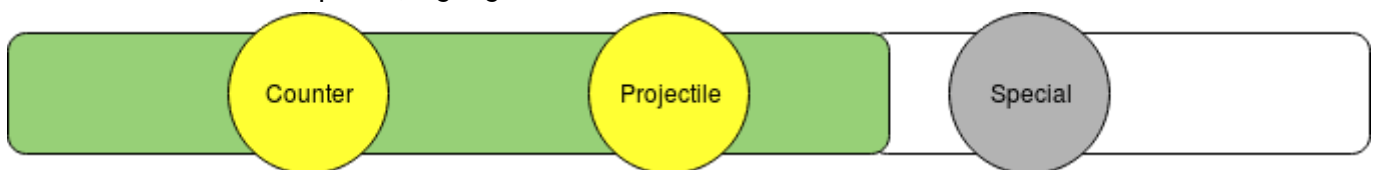Since abilities consume power, a gauge indicates the current amount of it:

Figure 5.1 Power gauge

The green part is the portion of the gauge filled with power and the available abilities are highlighted in yellow. The grayed-out ones are those currently unavailable due to not having the right amount of power.

There are several ways to recover power:
- **Collecting power cores:** There will be several pickups scattered on the track and collecting them will give a huge amount of power. Since the characters that are more advanced on the track are those

who are losing the race, they will be the one to collect most of the pickups and this is also a mean to balance the game and give them the possibilities to rebound the race;

- **Collisions:** hitting obstacles or other karts (if done properly) will reward the user by recovering a small amount of power;
- **Special actions:** jumping off ramps, performing a good drifting or other well-driven situations, will reward the user by recovering a good amount of 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 in turbo speed. While in turbo speed, the karts will reach a speed even greater than the maximum allowed under normal conditions. 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. The player controlling the kart in turbo speed will also have a slightly less control over the vehicle, with harder steerings 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 pickups during turbo speed.

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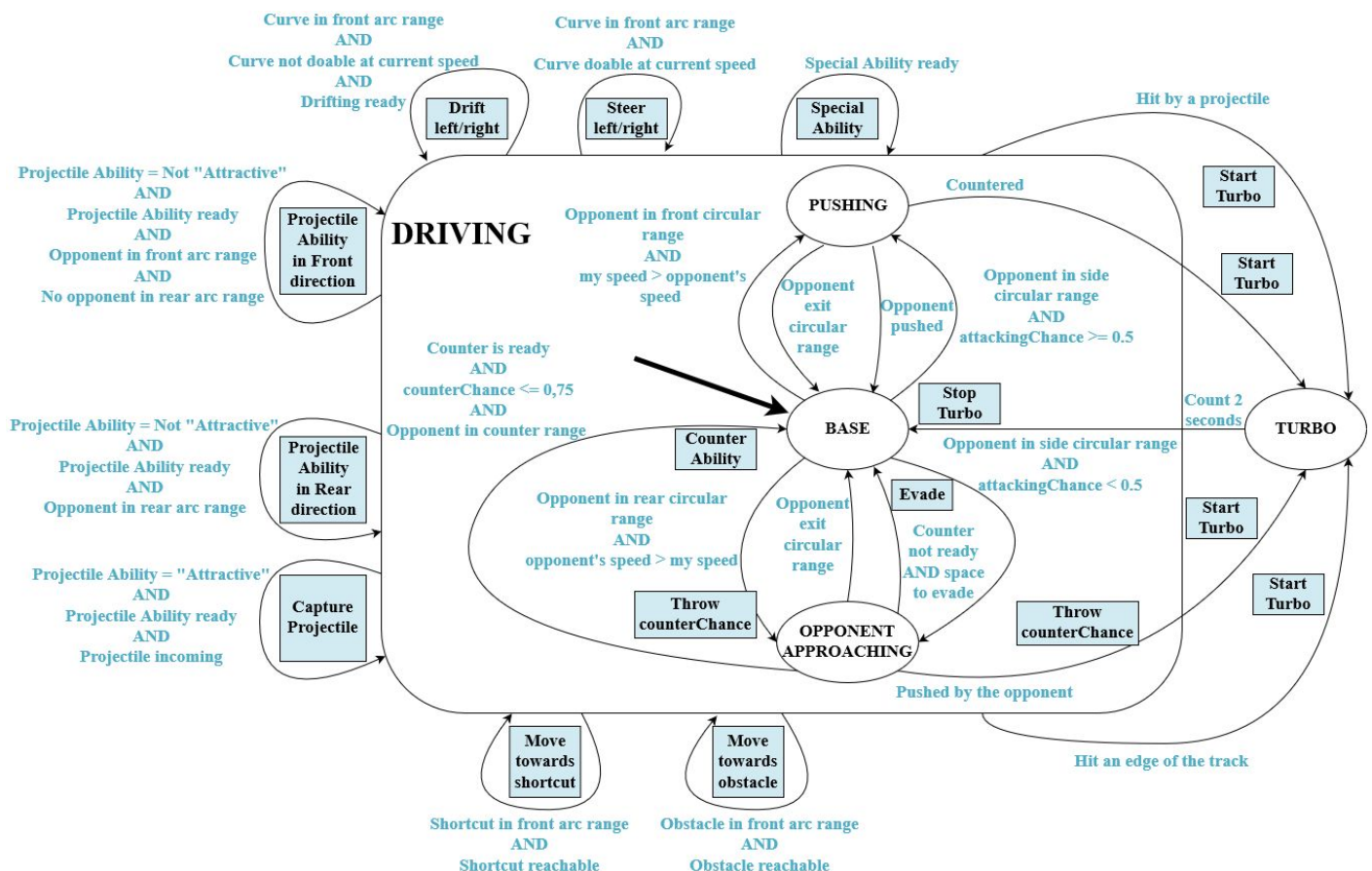
The AI for CPU-controlled characters is a hierarchical finite state machine.

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 counterChance** 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 hit 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 countered by the opponent's counter 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 counter it 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 counter ability is ready AND counterChance is lower than or equal to 0,75 AND the opponent is in counter range:
  - the action **Counter Ability** is executed, reverting the effects of the push on the opponent;
- **BASE** if the agent's counter 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:
  - the action **Start Turbo** is executed, in which the agent goes in turbo speed.

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 opponent projectile 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 enough power to use the *special ability* it will use it;
- if the agent sees a curve in the *front arc range* AND is able to pass it at the current speed, it 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, it will try to steer and drift in the direction of the curve;
- if the agent's *projectile ability* is not of the *attractive* type AND the agent has enough power to use it AND there's an opponent in the *rear arc range*, it will fire the projectile in the rear direction;
- if the agent's *projectile ability* is not of the *attractive* type AND the agent has enough power to use it AND there's an opponent in the *front arc range* AND there's no opponent in the *rear arc range*, it will fire the projectile in the front direction;
- if the agent's *projectile ability* is of the *attractive* type AND the agent has enough power to use it AND there's a projectile incoming, it will use it to capture the projectile. Until is fired again, the agent will be able to use that projectile as if it had that very own *projectile ability*;

- if there's a **shortcut** in the *front arc range* AND the agent is able to reach it at the current speed, it 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, it will move towards it.

The **TURBO** state indicates the situation in which the agent is stunned, goes in turbo speed and can't control the kart for some time.
From **TURBO** the agent can move to:
- **BASE** after 2 seconds elapse:
  - the action **Stop Turbo** is executed, in which the agent starts to return to normal speed and retrieves all the previous commands.

5.1.6.2 - Agent field of view

Schema of kart's field of view   Schema of kart's circular field of view (detailed)
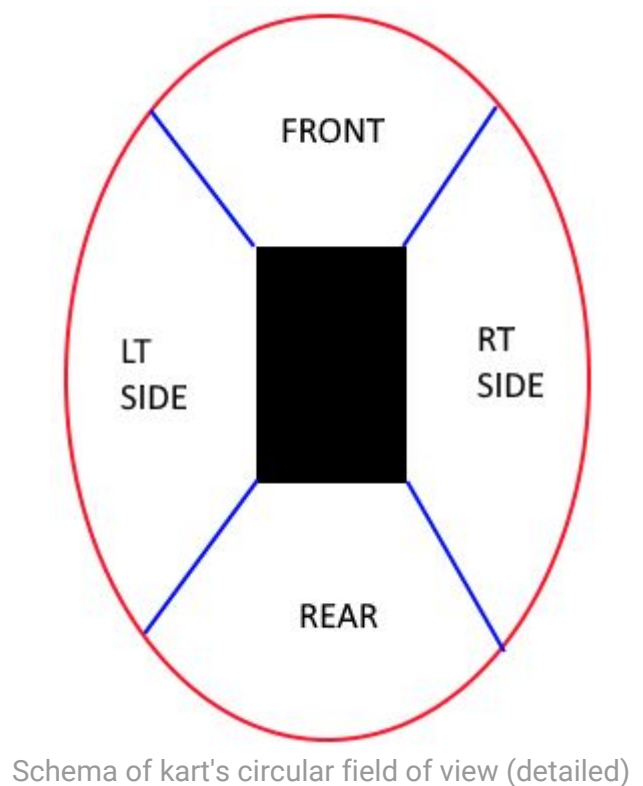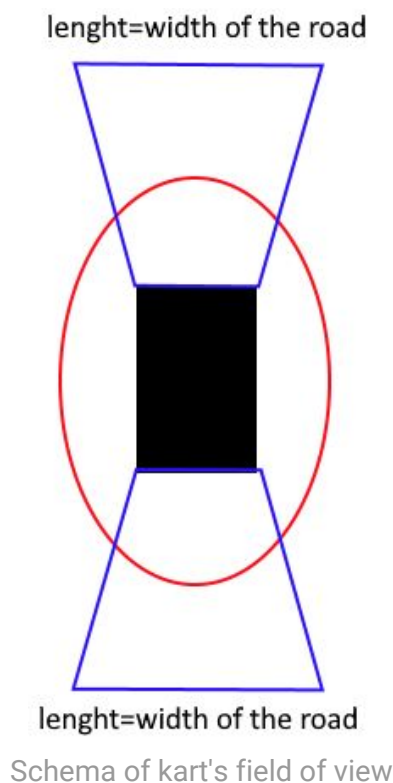
5.2 - Controls

Since the first release is going to be for PC, controls here stated refer to a standard XBox One Controller. However controls easily overlap with other platforms.
In Be Strong, Be The Last controls are very simple:
- the kart accelerates on its own and there's no possibility to brake;
- the kart steers with the left analog stick;
- pressing RB or A buttons while steering left or right activate the drifting action;
- pressing RT or B buttons activate the counter ability;
- pressing LB or X buttons activate the projectile ability;
- pressing LT or Y buttons activate the special ability.
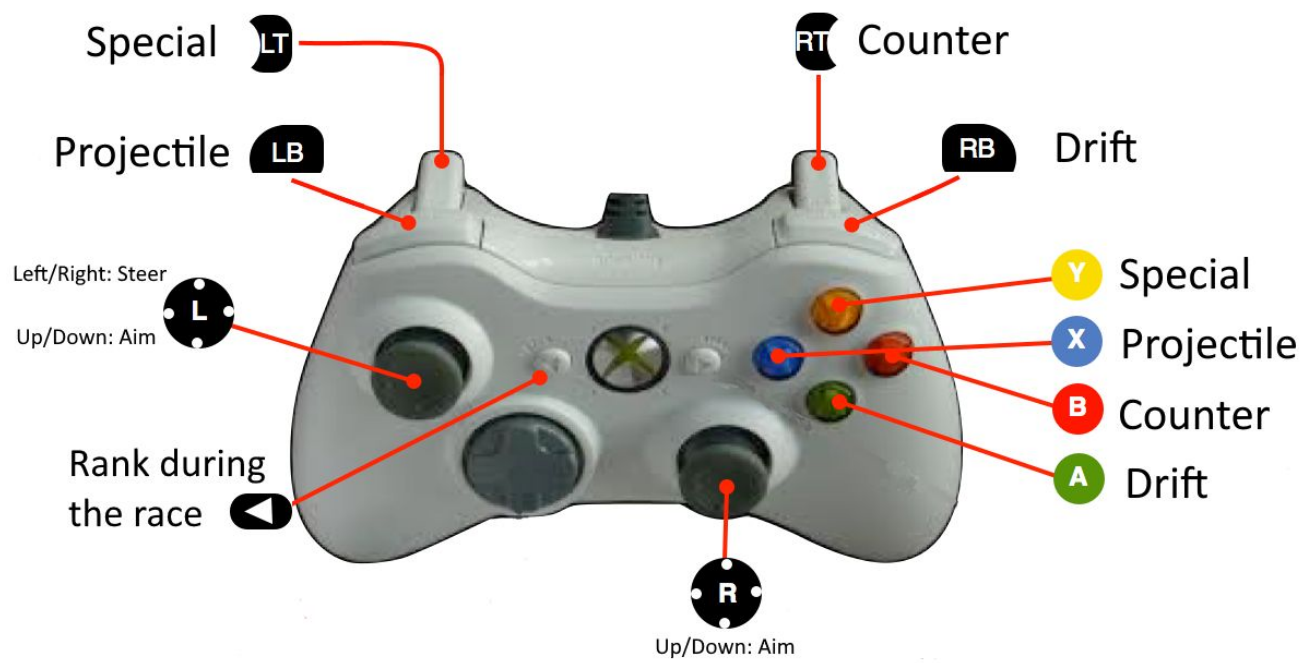
Controller with 8 buttons, two analog sticks and a digital D-pad.

5.2.1 - Interfaces

5.2.1.1 - Main Menu
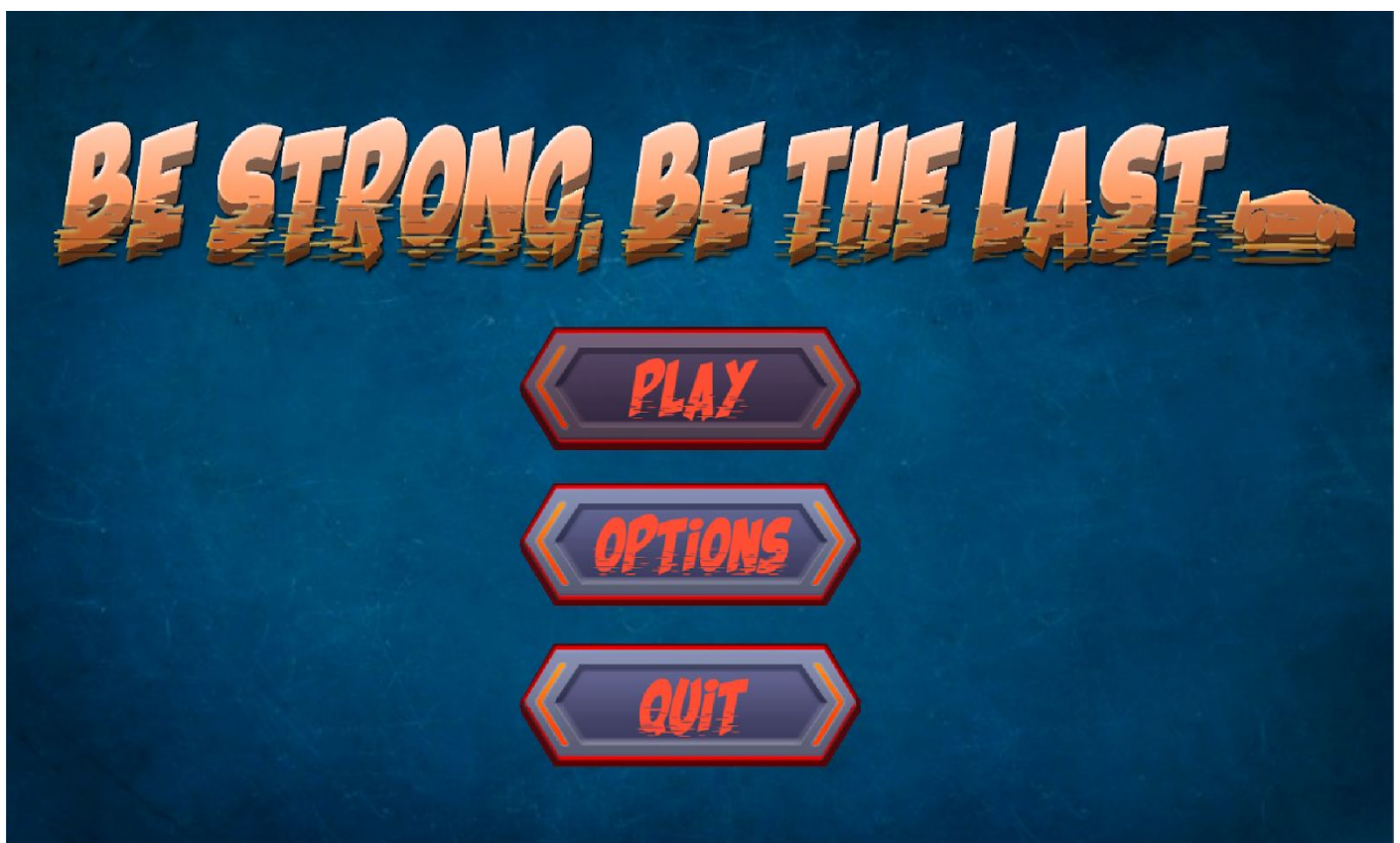
5.2.1.2 - Race Selection

FUTURE CITY (2 PLAYERS)

MARS (SINGLE PLAYER)

Kiddo

Steamdunker

Imps

KART4

KART5

KART6

KART7

KART8

5.2.2 - Rules

Description of the rules of the game.

5.2.3 - Scoring/winning conditions

5.2.3.1 - Single Race

There are a **specific number** of laps for each race, the player **who arrives last wins the race.**

5.2.3.2 - Tournament

The tournament is composed by a number of races, in each race the player who arrives last wins and he takes an amount of points. At the end of the tournament, the player who has accumulated the most amount of points wins.

5.3 - Modes and other features

In the **first release**, the game will have **2 modes**: Single Race and Tournament. **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 together.

5.3.1 - Single race

In this mode the player selects a specific race, his kart and competes against other karts to be the last. So he has to win the race.

5.3.2 - Tournament

In the tournament mode the player select the specific tournament (each tournament is composed by a set of races), he selects his kart 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 his position in the ranking at the end of the race and at the end of the tournament who has the highest number of points wins.

5.4 - Levels

5.4.1 - Futuristic City

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 take place in full. 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 - Obstacles

On the track, obstacles are divided into two categories: obstacles to be taken to slow down your vehicle and obstacles to be avoided because they accelerate it.
In particular:

- Obstacle to avoid:
  - Bombs
  - Rainbow planes
  - Electric portal

- Obstacle to hit:
  - Jumping robot
  - Wandering robot
  - Water puddles

5.4.2 - Iridescent planet

The second track is set in nature, particularly in a desert. The track has always been built on the sports planet, in a very particular area. It is as if you were on Mars: the earth has a bright red color and does not seem to be a hospitable land. The track was built in a basin among the dunes of these lands, in a kind of canyon to allow spectators to observe the race from the heights to get a full view of the race.
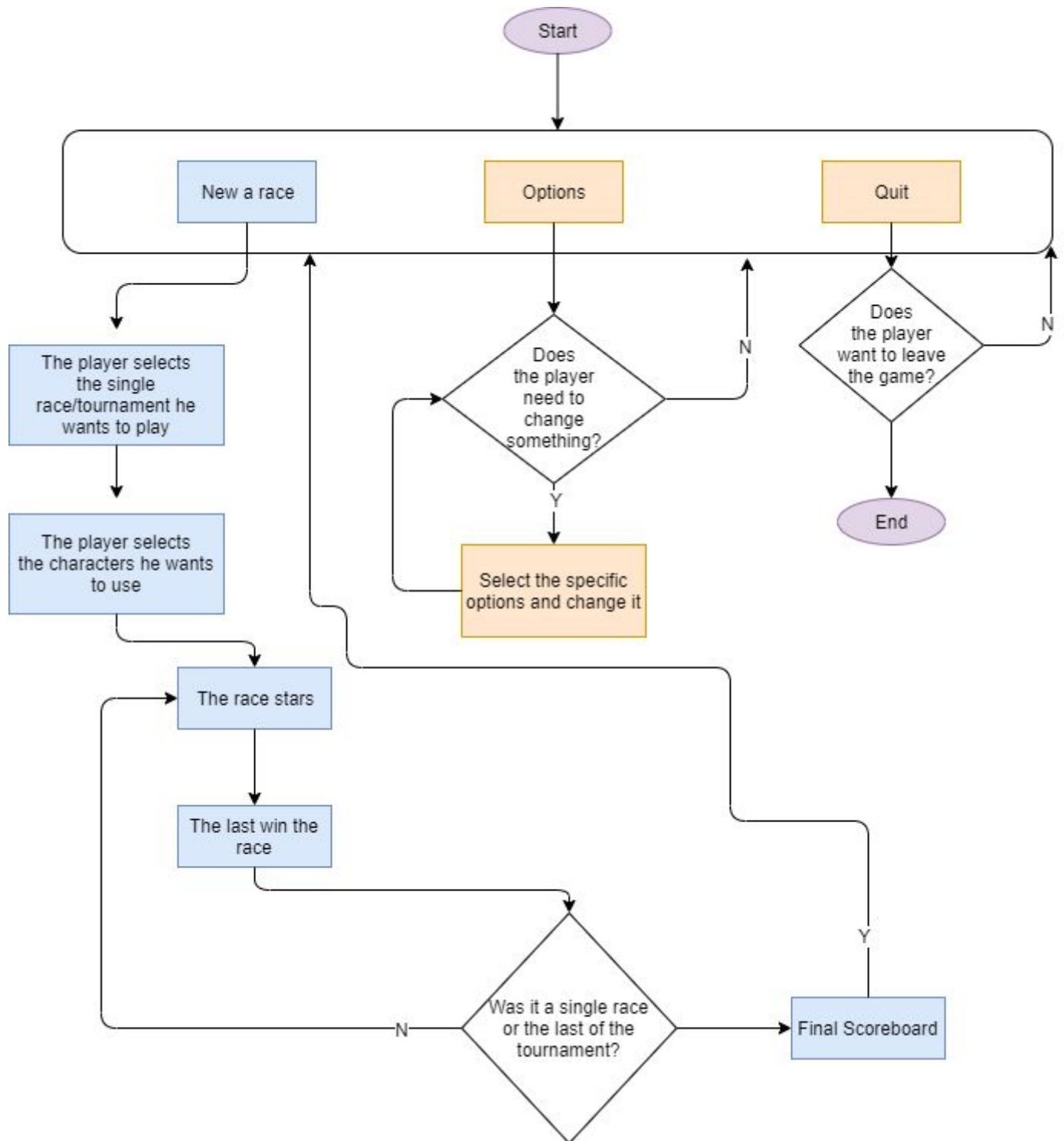
5.4.2.1 - Obstacles

In particular:
- Obstacle to avoid:
  - Bombs

- Obstacle to hit:
  - Jumping Aliens
  - Wandering Aliens

5.5 - Flowchart

5.5.1 - Main 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, stats and set of abilities. 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 counter ability's graphic effect;
- the projectile ability and its effect;
- the special ability and its effect.

For further informations on abilities see section

6.2 - Champions

6.2.1 - Hypogeum car

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.
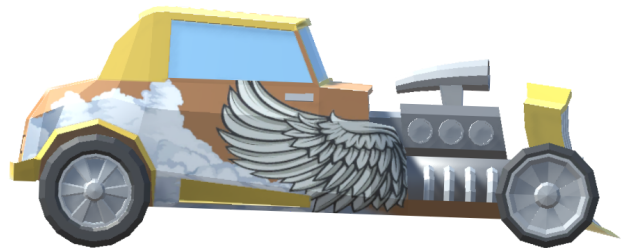
Trail: Eagle's feathers;
Counter: Lion's roar. Scare the incoming opponent making him flee;
Projectile ability: Shark's fin (*Homing*). A shark's fin appears and swims on the track while chasing the target.
Special ability: Rhino's bulk (*Tanking*). The car changes appearance to a heavier one.

6.2.2 - Earth restorer

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;
Counter: Stun gun attack. Hits the incoming opponent with an electric cosh that stuns him;
Projectile ability: Exploding barrel (*Bouncing*). Throws a barrel that rolls on the track;
Special ability: Radioactive field (*Rotating*). Radioactive wastes rotate around the kart.
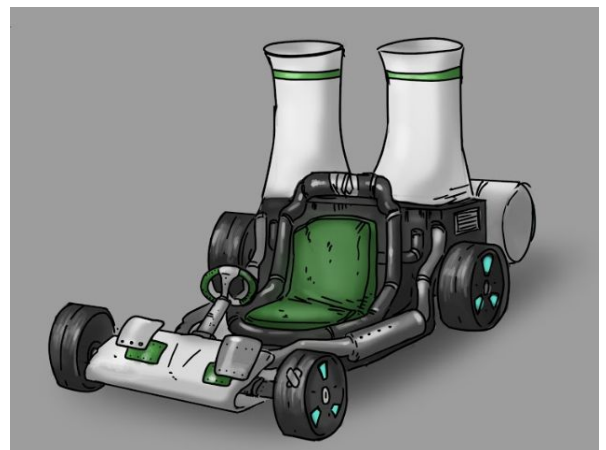
6.2.3 - Steamdunker

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 both capable of attracting stuff and shooting powerful steam jets.

Trail: Steam jet;
Counter: Steam discharge. A hot burst of steam all around the kart that burns the incoming opponent.
Projectile ability: Vacuum (*Attracting*). Projectiles are absorbed by his steam gun;
Special ability: Steam cloud (*Blinding*). Releases a huge mist all over the track.

6.2.4 - Imps

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 stick together.

Trail: Hell fire;
Counter: Phalanx. The imps deflect attacks with their shields pushing away incoming opponent;
Projectile ability: Spear throw (*Trishot*). The imps throw their spears;
Special ability: Vicious demons (*Annoying*). Imps appear and disturb the opponents' drive.

6.2.5 - Flapper

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. It can also transform rapidly to gaseous, liquid or solid state by changing its temperature.

Trail: Slime;
Counter: Gaseous state. Releases high pressure gas around the kart pushing away incoming opponent;
**Projectile ability:** Liquid state (*Bouncing*). Releases a water ball that rolls on the track;
Special ability: Solid state (*Tanking*). Flapper becomes solid applying a greater friction on the track.

6.2.6 - Kiddo

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 (his kart) allowing them to do impressive things unlike other drivers.
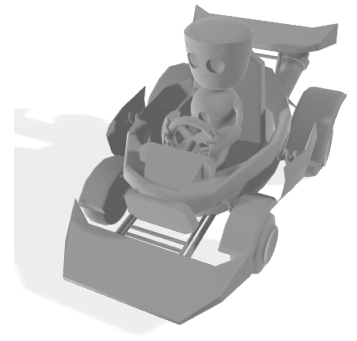
Trail: Bolts;
Counter: The kart's doors extends outside the vehicle to push away the incoming opponent;
Projectile ability: Magnet (*Attracting*). Projectiles attach to the kart;
Special ability: Electric field (*Rotating*). Lightnings rotate around the kart.

6.2.7 - 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;
Counter: Bribe. Convinces the incoming opponent to go away in exchange for a good amount of money;
Projectile ability: Flier launch (*Trishot*). The kart launches leaflets with a great strength to provoke a paper cut in the wheels of the opponents;
Special ability: Followers indignation (*Blinding*). Convinces the people to insult the opponents on their social network profiles, getting them distracted by the race.

6.2.8 - 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 his opponents and make them dance.

Trail: Musical notes;
Counter: Sound wave. A very high-pitched noise that deafens the incoming opponent;
Projectile ability: Sound dart (*Homing*). A magic missile commanded by music;
Special ability: Bard's beat (*Annoying*). Releases a charming song that makes the opponents dance.

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 7.2.1 - Music
SFX	Sound	See Section 7.2.2 - Sounds

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.
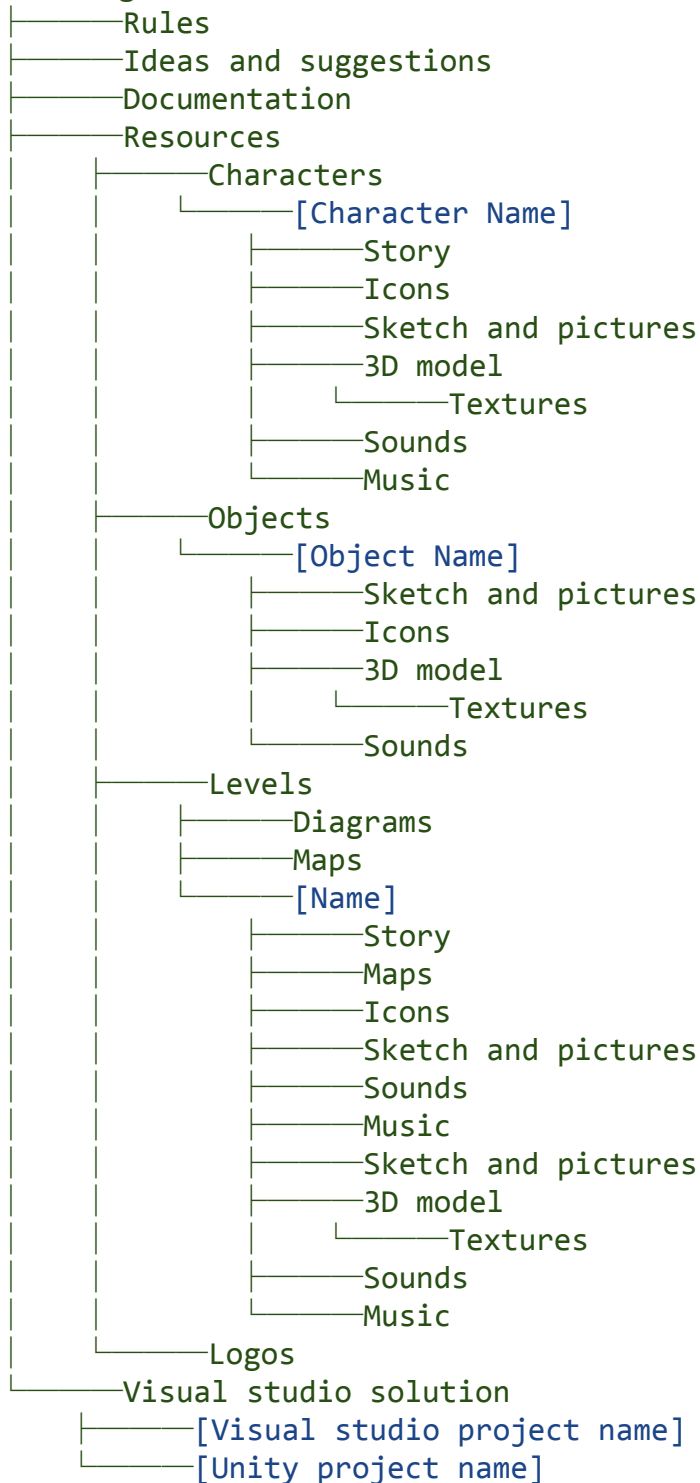For changes and access requests contact the administrator.

7.10.1 - Information

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

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
├───────Rules
├───────Ideas and suggestions
├───────Documentation
├───────Resources
│   ├──────Characters
│   │   └──────[Character Name]
│   │       ├──────Story
│   │       ├──────Icons
│   │       ├──────Sketch and pictures
│   │       ├──────3D model
│   │       │   └──────Textures
│   │       ├──────Sounds
│   │       └──────Music
│   ├──────Objects
│   │   └──────[Object Name]
│   │       ├──────Sketch and pictures
│   │       ├──────Icons
│   │       ├──────3D model
│   │       │   └──────Textures
│   │       └──────Sounds
│   ├──────Levels
│   │   ├──────Diagrams
│   │   ├──────Maps
│   │   └──────[Name]
│   │       ├──────Story
│   │       ├──────Maps
│   │       ├──────Icons
│   │       ├──────Sketch and pictures
│   │       ├──────Sounds
│   │       ├──────Music
│   │       ├──────Sketch and pictures
│   │       ├──────3D model
│   │       │   └──────Textures
│   │       ├──────Sounds
│   │       └──────Music
│   └──────Logos
└───────Visual studio solution
    ├──────[Visual studio project name]
    └──────[Unity project name]
```

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

In the following, we present additional reference images for the artists, divided by category.

7.12.1 - Other resources

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.