

# BACK TO THE FUTURE HOVERBOARD

**BACK TO THE FUTURE: HOVERBOARD**

**DESIGNED BY**

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## GAME OVERVIEW

**Title:** Back to the Future™: Hoverboard  
**Target Platform:** PC  
**Genre:** Single-player / Multiplayer arcade racing game  
**Target Audience:** Casual gamers, families (ages 7+)

“Back to the Future™: Hoverboard” game is a 3D single-player or multiplayer arcade racing game. Game is inspired by the iconic hoverboard scenes from Back to the Future II™. Aim of the game is to blend the incredible physics of the hoverboard, which is not even present at this day, with the fun side of a casual racing atmosphere with awesome power-ups and gadgets, and game modes. Currently there are 4 different game modes for both single and multiplayer, 21 power-ups, and 7 race tracks which will be explained in detail in a later section.

## HIGH CONCEPT

Would you like to play in the atmosphere in Iconic Back to the future™ Trilogy, hop on your very own hoverboard, to become the champion in the plutonium cup, battle against time, chase a bunch of kids on your hoverboards as a bully, or vice versa, or just simply play your casual racing game on a hoverboard, and maybe more who knows? Back to the future®: hoverboard, will be your ultimate gaming experience with your friends and family.

## UNIQUE SELLING POINTS

- Incredible physics
- Awesome power ups and game mechanics including time alteration
- Easy and fun to play with friends and family
- Cartoonish graphics which we all admire

## MINIMUM REQUIREMENTS

OS: Windows 10  
Graphics Card: Anything after 2009

## SYNOPSIS

Back to the future™ Trilogy, tells the chains of events from different branches in time of a teenager named Marty McFly and Dr. Emmett Lathrop Brown after they managed to travel time with a DeLorean. The story takes place in 4 different eras, 1885, 1955, 1985 and 2015 in timely order. You can choose one of the many characters including their parallel universe versions in the game and experience the 4 different time eras in an arcade and fun environment.

## GAME OBJECTIVES AND RULES

Objective of the overall game is to be the first to cross the finish line, just like any other racing game. However, the rules and objectives differ for each different game modes. Currently there are 4 game modes. Skirmish, Time battle, Bully battle and The Plutonium cup. In this section all will be explained in detail.

### SKIRMISH

In this mode there are up to 20 players, and all tracks will be available. Main objective of this track is to cross the finish line as the first person. Tracks will be full of power-ups and obstacles that may either be in your favor or not.

### TIME BATTLE

Traditional time trial game mode. There will be leaderboards for this game mode, and you challenge yourself to become better.

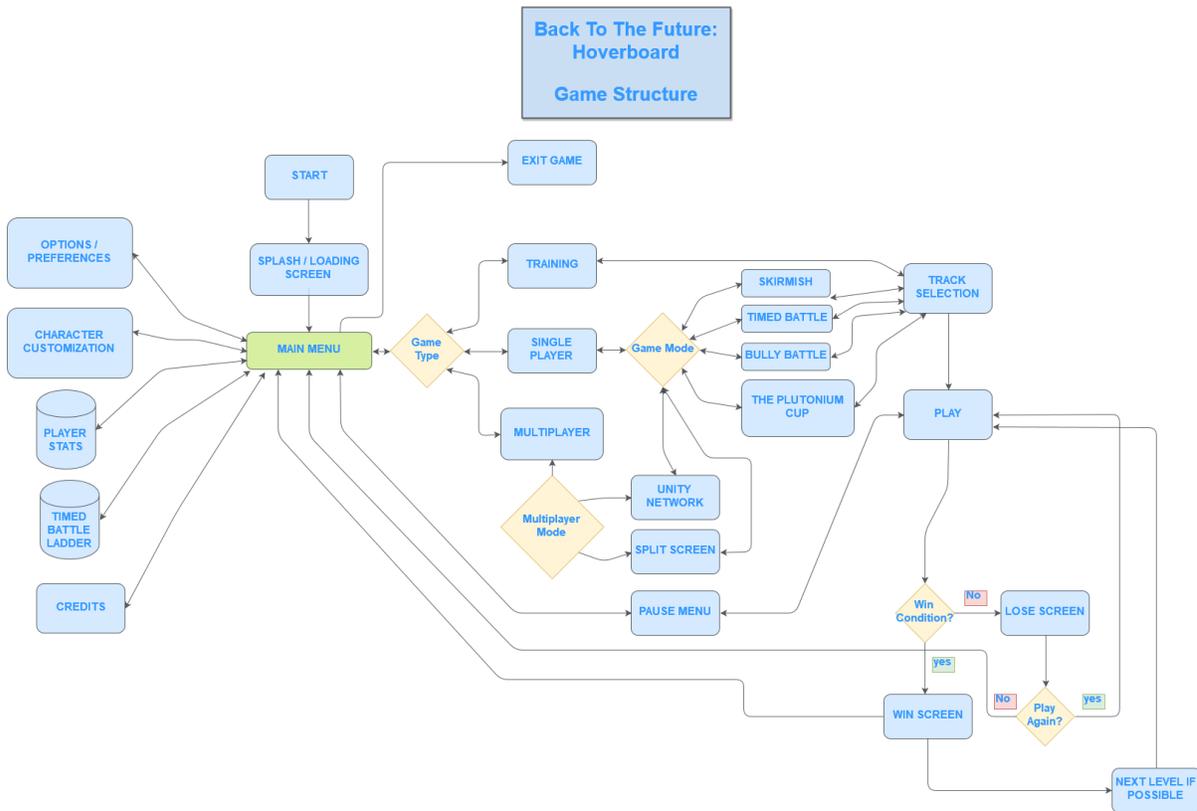
### BULLY BATTLE

Do you remember the awesome scene from the Back to the Future II™ where Marty McFly got chased by Griff? This is the exact same scene in different places and with a lot more action. In this mode there will be 2 teams, which consists of 5 per each team. Currently the teams are named as “Griff’s” and “McFly’s”. Objective for Griff’s is to catch McFly’s, whereas McFly’s need to survive until the time limit. And there will be multiple rounds in this game which is selected on game menu. Players also will be scored individually on how many times they catch and get caught. The map will be open world, but number and effects of power-ups will be limited in this mode.

### THE PLUTONIUM CUP

The ultimate championship, this is grand prix(GP) influenced racing mode on 3 tracks. Just like GP players need to earn points depending on their standing at each track. Whoever collects the most points at the end of the cup, will win the game.

# GAME STRUCTURE



# GAMEPLAY AND CONTROLS

You will choose 1 character and 1 type of hoverboard. You will control your character on the hoverboard on a 3<sup>rd</sup> person controller view. Controls are simple, and fully customizable. a split screen 2Player can be played on the same keyboard. Moreover, game can be played with gamepads and support up to 4 different players on same PC, aiming to give the old but gold 4 player console experience. A Sample Controls on Keyboard for 2 players can be:

Player 1	Player 2	Action
W	Up	Go forward
S	Down	Go backward
A	Left	Turn Left
D	Right	Turn Right
Left Ctrl	Right Ctrl	Crouch
Space	Numpad 0	Jump
E	Numpad 3	Rear View
1	Numpad 1	Action Item 1
2	Numpad 2	Action Item 2
Left Shift	Right Shift	88 Mph Boost
ESC	-	Menu

## GAME MECHANIS

The game mechanics are the strongest aspect of this game. In this section the mechanics of the game will be explained.

### PHYSICS

Physics in the hoverboard is an implementation of floating objects. There are 4 force points beneath hoverboards. These points apply force to hoverboard keep it at a distance above the surface. Rays are cast from each point to the surface, and force is applied with respect to the ratio of ray distance to the predetermined hoverboard lift distance. For rotation torques are applied to the hoverboard directly depending on the steering capabilities of the hoverboard. You can see a prototype video on the prototype videos section in the entry.

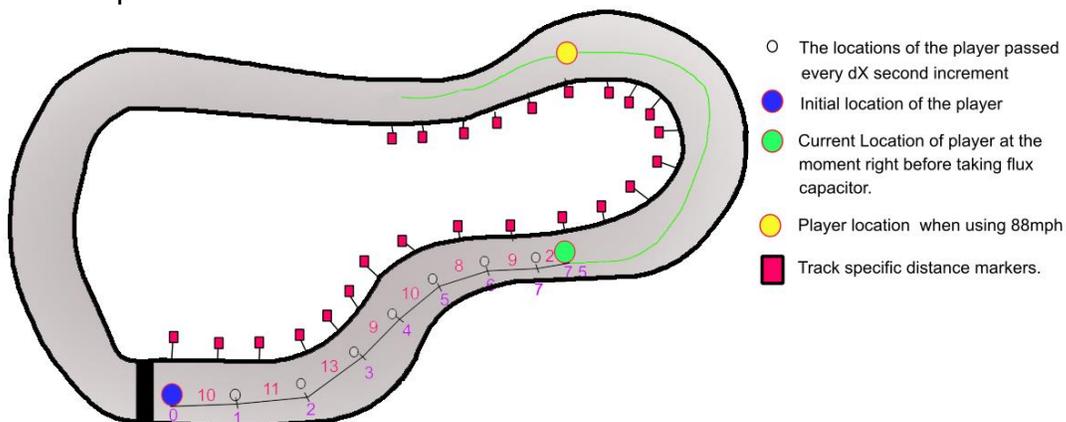
### PICKING UP OBJECTS AND USING THEM

There are 2 main objects to collect in the game. Plutonium coin and time is relative boxes (explained in next section). Objects are taken directly passing through them. Objects you collect from time is relative boxes are usable. If the power-up in the pack is something to be thrown on an enemy, you throw it directly in front of you or behind on rear view by holding the relevant action key and releasing.

### ITEMS AND POWER UPS

This is probably the most diverse section of the game. Currently there are 21 power-ups designed, and more may be included in future revisions. Here is the brief explanation of each power up.

- 1) **88 mph:** This is a default power up that allows player to jump forward in time 8 secs ahead in the track after collecting 8 plutonium coins. This will be based on the time key points on the track under regular travel. If I may explain better:



Above is a simple track illustration. Text in pink represents the time and red represents the distance traveled at each 1 sec interval for player. Let's assume the Player uses the "88mph" power-up at 7.5 second mark. (distance between markers are roughly 10 units here) Until that moment player moved in total of 72 units if we add each distance he travels every second. Meaning that the player moves around  $72 / 7.5 = 9.6$  units / sec average speed (not velocity). If we rate this speed for 8 seconds this gives us roughly ~77 units distance to travel when using this power up. Then the final location of player after using 88mph will be calculated distance to travel when using this power up. Finally, the final location of player after using 88mph will be calculated adding the above calculated distance to track marker at where the power up is used, and player will be moved to that calculated track marker facing forward on track. Other time related effects are going to be applied in a similar manner. A simple very tiny early stage demo video is prepared for this cause, you can view it in prototype videos section

- 2) **Flux Capacitor:** Upon Usage Send an enemy 3 secs before in time
- 3) **Mind Reader:** If you hit an opponent with this you remove their power ups.
- 4) **Mr. Fusion:** Makes your player immune to negative time related events.
- 5) **Bag of Manure:** Throw a big pile of manure to the ground to create obstacle for rivals. Whoever passes from the manure pile, will be slowed by 50% for 1 seconds.
- 6) **Sleep-Induced Alpha Rhythm Generator:** When used on an opponent, it freezes time for them for 2 seconds, when affect wears off, opponents will continue as if nothing happened.
- 7) **Size-Adjusting Outfit:** Makes your player immune to any kind of stun, slow effects
- 8) **Self-Tying Shoelaces:** Greatly increases the steering of your hoverboard for a duration.
- 9) **This is Heavy:** Shoot an opponent to hop their 30 years later self on their hoverboard to shock them and lose control for 1 seconds.
- 10) **Super Binocular:** When used drop 1 power up of all players within its range.
- 11) **Expendable baseball bat:** An enormously long baseball bat that you can swing to hit the closest enemy within its range to stun them for 1 sec.

- 12) **Wild Gunman:** when you use this power up, it hits the player on first place with a random negative effect.
- 13) **The Almanac:** reveal all power ups inside time is relative boxes.
- 14) **Double Wax:** Upon usage flashes the eyes of all players within its range to obscure their view.
- 15) **The Hydrator:** Creates a pool on the ground, that increases size in time. If players get through that, their hoverboard will be disabled until it disappears. (lasts 3 seconds)
- 16) **Nobody Calls Me Chicken:** Upon activation immediately remove all crowd controls on you
- 17) **POWER:** Mount a turbo boost that ignores the slow effects and increases your speed slightly.
- 18) **Plutonium Coin:** Collect 8 of them to activate 88mph
- 19) **Time is Relative:** Box that drops power ups in the game randomly.
- 20) **Time is of the essence:** Makes you fade in time, turn you into a ghost and make you unhittable for a duration.
- 21) **Hook on:** Makes you hook to the player that you hit for a period.

## VEHICLES

Vehicles have 3 stats overall:

- Speed: The maximum speed you can achieve
- Acceleration: Reduces the time to reach to the top speed.
- Balance: How sharp you can turn a corner without leaving the track

Vehicles are presented below, but the stats will be tweaked in the future revisions. For more detailed images, please see appendix.

### 1) 2015 Marty

- Speed: 8
- Acceleration: 7
- Balance: 8



## 2) Pitbull

Speed: 9  
Acceleration: 9  
Balance: 5



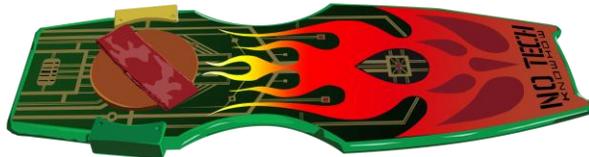
## 3) Odd Man Out

Speed: 6  
Acceleration: 7  
Balance: 8



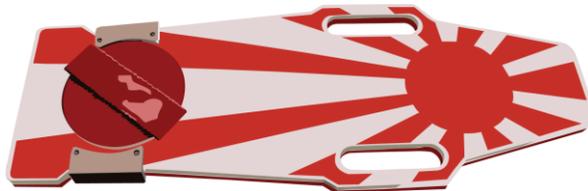
## 4) No Tech

Speed: 9  
Acceleration: 5  
Balance: 8



## 5) Rising Sun

Speed: 6  
Acceleration: 9  
Balance: 7



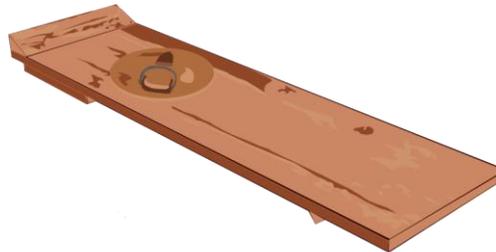
## 6) 1985 skateboard

Speed: 6  
Acceleration: 6  
Balance: 9



## 7) 1955 western hoverboard

Speed: 5  
Acceleration: 8  
Balance: 9



In the future, more hoverboards will be added.

# TRACKS

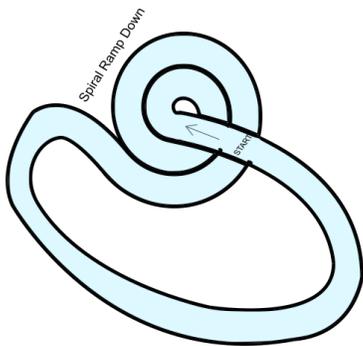
There are going to be many tracks in the game, but for now 5 tracks for race modes, and 2 tracks for Bully battle are available. Many more tracks will be added in future revisions. Since this is a time related game, in future revisions, prehistoric, medieval and many more time eras might be included in the game. Below are representative sketches for some of the tracks.

## Racing tracks:

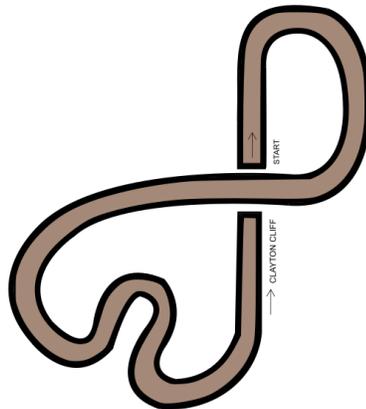
- 1) Air Traffic (2015)
- 2) Clayton jump (1885)
- 3) Hill Valley Center (1985)
- 4) Lyon Estates
- 5) Wild Mines

## Open World tracks:

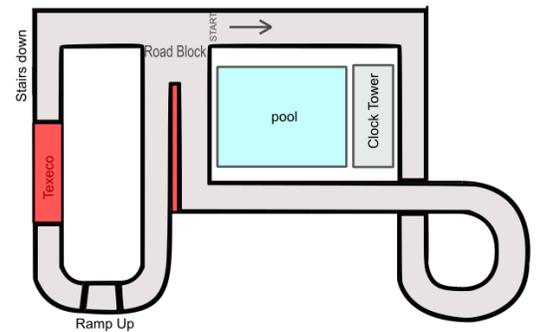
- 1) Hill Valley Main (2015)
- 2) Hill Valley Western (1955)



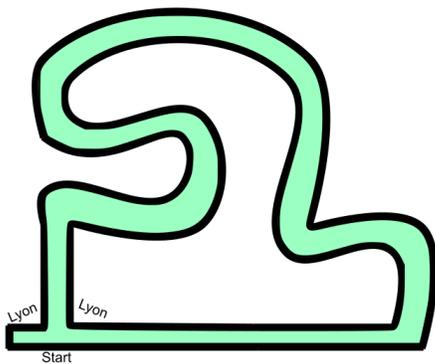
Air Traffic



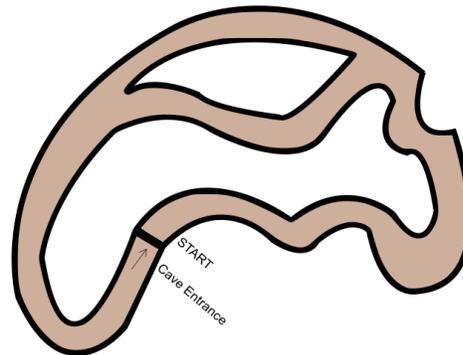
Clayton Jump



Hill Valley Center



Lyon Estates



Wild Caverns

# CHARACTERS

## PLAYABLE INGAME

Playable characters are taken from the Franchise, with their alternatives in different time lines. All character art will be designed in cartoonish work. Here are some of the playable characters in the game. Height and weight affects the characters maneuver for hoverboard, heavy characters will be faster with momentum, but are hard to control, whereas smaller ones have greater grip but slow at max speed.

Character	Height (cm)	Weight (kg)
Marty McFly	164	60
Doc Emmett L. Brown	185	74
Jennifer Parker	163	48
George McFly	178	70
Lorraine Baines	160	50
Red the Bum	183	80
Biff Tannen	189	90
Old Biff Tannen	180	70
Griff Tannen	190	95
Griff's Mates at 2015	180	75
Buford "Mad dog" Tannen	191	100
Mr. Strickland	168	65
Goldie Wilson	175	68
Seamus McFly	164	65
Einstein	80	25

## MIXER INTEGRATED SPECTATORS

There will be spectating characters in game, that can be controlled in a way by mixer viewers to interact with the actual players in-game. These characters will be based on the same art as the playable characters. Please see technical aspects section for further information.

## ENVIRONMENT, OBSTACLES

There are a handful of obstacles in the game. These are as following:

- 1) **Regular traffic:** colliders on ground, cars mainly.
- 2) **Air traffic vehicles:** colliders on mid-air on future tracks
- 3) **Sewer holes:** empty objects on the ground, that players can fall in
- 4) **Water pools:** Disables hoverboards
- 5) **Mud pools:** Slows hoverboards
- 6) **Lightnings:** Stuns players when struck

## INTERFACE

The in-game interface, or the HUD is simple to keep an eye on. Below is an early illustration of the HUD for the game over a very early development version of the game.



- 1) Player
- 2) Standing
- 3) Mini map
- 4) Power-ups (flux capacitor and self-tying shoelaces respectively)
- 5) 88Mph, red marker shows the progress, when the red marker is at the right edge, the power can be activated.
- 6) Time and Lap Counter

## TECHNICAL ASPECTS

### TARGET UNITY VERSION

The game development has started on Unity 2017, but soon Unity 2018 will be released and will continue to develop the game on unity 2018 Because of:

- 1) Unity's brand-new Job system and ECS, which will allow users to develop multi-threaded code. I am highly using multi-threading in my professional life, so will be incredible to implement this on Unity for boosting performance.
- 2) Unity's Scriptable rendering pipeline will give better control to tweak and optimize the game, probably will use LWRP or HDRP.
- 3) Unity's Timeline and Cinemachine for animation and cutscene production. Even though there won't be many cutscene's in this game, grouping animations using timeline is incredible to work with. With mixer integration there will be a huge amount of animations working simultaneously.
- 4) Improved particle systems, the butter and bread of a game.

## INTEGRATION WITH MICROSOFT MIXER

Microsoft Mixer brings a whole new level to both streamers and viewers since it allows viewers to get involved in the game. In this game Mixer will be implemented such that:

- 1) The viewers will represent the actual spectator characters that are watching the race. Each viewer will spawn a command-able spectator in game that can emote with such things as cheer, boo, show a custom texted banner in-game, and can watch the game from different camera angles, including player's eyes. Moreover, they will be able to throw things to the race track to affect the players hit by them, such as bananas on the ground to trip, or some other items to unbalance them.
- 2) Would like to achieve, mixer's co-streaming capabilities on one channel for split screen multiplayer mode from a single PC.
- 3) Mixer integration will be done using free and official Mixer API in Asset Store.

## MULTIPLAYER

Multiplayer for the game will be done on 2 different ways. Split Screen on client, or by Unity Networking. Unity multiplayer API gives an easy and customizable networking capabilities within its engine. For this game UNet matchmaking will be used with unity servers.

## ART

Graphics will be based on Cartoonish artwork to give the feeling to the player that it's a casual arcade game, but with high quality graphics, and animations. The art work will be represented on future revisions.

## AUDIO AND MUSIC

No original score from any of the Back to the Future™ will be used, all music and sound effects will either be independently produced by myself, or commercially usable assets.

## MINIMUM VIABLE PRODUCT

- 1) 1 playable Character, 1 race track, 1 open world track, and 1 vehicle.
- 2) Windows 10 build
- 3) Multiplayer support for both on client, and network.

## WISHLIST

- 1) More characters, custom character creation tool, character skins, more hoverboards and tracks on the following DLC's.