Tileyard Education / University of Wales Trinity St. David

MA Commercial Music Producer

Development – Element 2b

Author: Iain Sumner

Student Code: 2018939

Submission Code: CPO0121

Submission Date: 09/07/2021

Word count: 3,737

I hereby declare that this my own work and does not use any materials other than the cited sources and tools. All explanations that I copied directly or in essence are marked as such. This work has not been previously submitted.

Signed:



Iain Sumner

Table of Contents

Introduction to Concept 3

Market Comparison 7

Creative Approach 9

Functionality Overview 10

Theme/Title Track Composition 12

Development Obstacles & Solutions 13

Reflective Analysis 14

Further Development Points 15

User Feedback 16

Bibliography 17

Table of Figures

Figure 1: Lotus Esprit Turbo Challenge Screenshot (Channell 2020) 3

Figure 2: Screamer 2 for PC (Thorn 2020) 4

Figure 3: Live for Speed for PC (screenshot) 6

Figure 4: Personal Sim-racing Setup December 2020 7

Figure 5: iRacing Championship Winner Certificate 7

Figure 6: Personal Sim-racing Setup May 2021 External view 7

Figure 7: Personal Sim-racing Setup May 2021 Internal view 7

Figure 9: Need for Speed: Heat promotional graphics (Electronic Arts 2021) 8

Figure 10: Automobilista 2 promotional graphics (Reiza Studios 2021) 8

Figure 8: 'Beat the Street' Screenshot 10

Figure 11: 'Beat the Street' in-car view on triple-screens 12

Introduction to Concept

My personal relationship with computer games dates back to sharing an Amiga 500 and SEGA Master System II with my brother back in the 1990's. While also an avid first-person "shoot- 'em-up" player, driving games have been among my favourite titles dating back to 'Lotus Esprit Turbo Challenge' (1990), a game designed to arcade sensibilities but which also includes features bordering on realistic (Channell 2020). It is possible that this sub-consciously influenced the purchase of a 1979 Lotus Eclat in British racing green, back in the 'naughties', when many interesting cars were worth significantly less than they are now. One thing that was particularly memorable about this game was its unique and exciting intro music, which was of a very modern style at the time.



Figure 1: Lotus Esprit Turbo Challenge Screenshot (Channell 2020)

In the late 1990's and early 2000's, my own gaming time was dominated by 'Quake' and 'Quake III' on the PC, which was developed by John Carmack and iD Software. This game was not only a revolution in first-person shooter titles, it's widely regarded as one of the most influential games of all time, pioneering modelling entire environments in 3D (Davidson 2016). The excellent multiplayer functionality of the game dictated that, even in those early days of the Internet, the online community surrounding the game was highly

active, and the ability to modify all elements of the game or utilise the game engine for something entirely new. This has meant that the community still remains very much alive today (Tarason 2017). The soundtrack for the first Quake game also featured all original industrial material by Nine Inch Nails/Trent Reznor, which provided the correct atmosphere, excitement and overall gritty sonic aesthetic in droves, and is a notable example of a great soundtrack being perfectly matched with a great game.

In terms of early driving/racing game titles for the PC, the one which stands out most in my memory is 'Screamer 2', an action-packed bright and colourful arcade racer (Thorn 2020). The basic premise for the gameplay in 'Screamer 2' undoubtably laid the foundation for the enduringly successful 'Need for Speed' series of games, with both series sharing many of the same notable traits. What stands out most in my memory in this game was a cheat code which enabled the user to drive a jet powered land-speed-style car which reached insane speeds.



Figure 2: Screamer 2 for PC (Thorn 2020)

It is in the early 2000's when three distinct types of racing/driving game titles clearly began to emerge; arcade, sim-cade, and simulator. Arcade racing can be defined as being easy to pick up and play, with defining titles of this sub-genre including 'Need for Speed', ''Burnout,

and ‘Ridge Racer’, with the common trait amongst these being no attention paid to true-to-life vehicle physics. Sim-cade racing games are defined as those which attempt to find the sweet spot between arcade and simulator games, providing the user with a sense of realism while also offering a playable, less challenging and stimulating experience. Examples of titles in the sim-cade category include ‘Forza Motorsport’ and ‘Project Cars’. Racing simulators go to great lengths to provide an (often painful) virtual recreation of motorsport environments, with huge attention paid to vehicle physics, and a significant amount of practice required to become a capable driver (Grolleman 2016).

In the year 2006 came my introduction to an independently developed racing simulator called ‘Live for Speed’, the purchase of USB wheel & pedal controller, and the near-obsessive chasing of lap-times ensued. Incredibly, owing to its incredible attention to realism, many years later this game still has a very active community and receives updates, including features such as virtual reality support (lfs.net 2021). However, my band-mates at that time convinced me that ‘sim-racing’ (a concept still in its infancy) was a large waste of time, which was a difficult point to argue against. For almost 15 years that was the end of ‘sim-racing’ for me, only occasionally playing console arcade driving titles in that time.



Figure 3: Live for Speed for PC (screenshot)

In December 2020, in the middle of winter and the COVID-19 pandemic, my previous studio computer was repurposed as a gaming PC system, and an old console steering wheel and pedal setup purchased and used over Christmas 2016 was dug out of a cupboard. This soon led to the discovery of the iRacing community, widely regarded to be the most competitive online motorsport simulator and is governed by a detailed and strict sporting code (Curmei 2021). It wasn't just myself who became deeply immersed in sim-racing during the pandemic; with everyone stuck home, and real racing cancelled for a short period, motorsports broadcasters replaced the cancelled races with sim races, and the participation of real-life racing drivers ensured huge amounts of public interest (Nytimes.com 2021). This slow but certain obsession led to a gradual but significant change in my virtual racing equipment, as displayed in the images below. It's my pleasure to also state that the author was Formula-iR01 Division Champion for last season in iRacing, considered one of the most difficult to control cars in that simulator.



Figure 4: Personal Sim-racing Setup December 2020



Figure 5: iRacing Championship Winner Certificate



Figure 6: Personal Sim-racing Setup May 2021 External view



Figure 7: Personal Sim-racing Setup May 2021 Internal view

Market Comparison

While researching my game, the discovery was made of an independent Japanese game in development called ‘Night Runners’, also created in the Unity engine, which describes itself as “a PC street racing game heavily influenced by 90’s – 00’s car culture” (Night Runners 2021). The gameplay videos certainly show a lot of synth-wave-style influences, too, so in terms of theme and style intentions ‘Night Runners’ is what ‘Beat the Street’ aspires to become. Prominent AAA titles falling under the same ‘sim-cade’ racing game banner as ‘Beat the Street’ include the ‘Project Cars’ series of games, and ‘Forza Horizon’. They differ significantly in that ‘Project Cars’ is based on circuit layouts, while ‘Forza Horizon’ is very much based on an ‘open world’ format.

'Open world' games are defined as a type of video game where a player can roam freely through a virtual world, and is given considerable freedom in choosing how or when to approach objectives (Sefton 2008). 'Beat the Street' could be considered an 'open world' game in its present state; therefore, any future development of the game would continue to be in this direction. 'Project Cars' has been described as "the world's most attractive racing game" (Neltz 2014), however it could be argued that it lacks the "beautiful scenery" (Turn 10 Studios 2021) of 'Forza Horizon'.



Figure 8: Need for Speed: Heat promotional graphics (Electronic Arts 2021)



Figure 9: Automobilista 2 promotional graphics (Reiza Studios 2021)

Two titles which perfectly define each end of the sub-spectrum between 'arcade' and 'simulator' driving games are 'Need for Speed: Heat' and 'Automobilista 2'. The characteristics in the way these games appear visually and are promoted reflects the kind of games that they are, and the audiences they are intended for. While 'Need for Speed: Heat' features bright, cartoonish and full 'bells and whistles' promotional materials, reflecting its 'arcade'-style gameplay; 'Automobilista 2' demonstrates a significant contrast in style, presenting a crisp and raw motorsport-based appearance, which also reflects the 'simulation'-style gameplay of this title. The way in which these games are promoted clearly shows the vast differences between marketing a racing game product to younger fans of the

'Fast & Furious' movies, relative to reaching more mature motoring enthusiasts, fans of motorsport and Formula 1 followers.

The global gaming market was valued at US$162.3 billion in 2020 and is expected to reach a value of US$295.63 billion by 2026 (Globalnewswire 2021), with the global racing game market projected to grow from US$1.4billion in 2020 to US$2.8billion by 2027 (MarketWatch 2021). The current market and widely accepted projections of growth are clear signs that the driving game market is a lucrative and sustainable sector of the industry to consider venturing into, and it's important to note that this is a market which is not solely dominated by a small number of large corporations. There are many cases where independent game developers have generated significant revenue in this market sector, making the prospect of independent game development a viable possibility.

Creative Approach

My creative muse in the creation of 'Beat the Street' was the legend of the highly exclusive and secretive 1980's and 1990's Japanese street racing crew known as 'Midnight Club', known for racing at speeds of 200mph or more on Tokyo's public highways (Drivetribe 2017). It is this theme of driving at high speed on open roads at the dead of night that is the most prominent premise for 'Beat the Street'. Today, Midnight Club and the cars associated with that time can easily be linked to the synth-wave cultural aesthetic, which is another angle that was used for stylising my game theme, albeit with modern models of cars. It had been my original intent to use 'Club Midnight' as the title of the game, however it came to my attention that a series of driving-only versions of 'Grand Theft Auto' had been released by RockStar games from years 2000 to 2009, with plans for a 5th title axed in 2010 (Lost Media Archive 2012). In homage to this era, it is also my intention to utilise synth-wave styling cues in a modern context, both for the game, promotional materials, and most importantly the music.

It was my intention to make a 'sim-cade'-style driving game in the Unity engine, with elements of both arcade and simulation gameplay. The modern take on the synth-wave

aesthetic was very much at the forefront of my musical composition for the theme track. Additionally, it was also key for the player car to sound exciting and realistic in order to maintain player interest and maximise enjoyment. For this feature in particular, the deep rawness of the engine sounds from the legendary 'Bullit' (1968) movie car chase, and the excitement they evoked, were considered the benchmark. Two words which repeatedly appear in discussion within 'sim-racing' circles online are 'immersion' and 'realism', which are commonly applied to both which driving game titles are desirable, and simulator equipment and design. It is with these two concepts and guiding principles in mind that both the game and sound environment features would be created.

Functionality Overview



Figure 10: 'Beat the Street' Screenshot

'Beat the Street' is a driving video game of the 'sim-cade' sub-genre for Windows and macOS. Set at night, the player evades police in a Ferrari 458 while chasing down a Lamborghini, on highways, twisty mountain roads, and through a city. Obviously, the

primary task in creating a driving game is to build a world for the car to drive around in, which needs to consist of road networks, background landscape and features such as trees and buildings. The basis for this was generated within the fantastic 'EasyRoads3D' asset (Unity Asset Store 2021).

While this easily created a great combination of highway, mountain pass and coastal roads, features such as trees and buildings were completely absent. Standard Unity assets were used for trees, long grasses, etc; and building prefabs from an asset pack named 'Modern City' were used to create a cityscape on the coast, and obstacles within the course. Each stage of the course presents a different set of challenges; high-speed on the highway, tight turns through the mountains, and obstacles in the city.

The second most important feature requiring attention is having a car to drive around this world, and realistic car physics were provided by 'NWH Vehicle Physics' asset (Unity Asset Store 2021), which features a significant amount of scripting to provide an immersive driving experience. However, the sounds of the player car engine and exhaust pops are field recordings of my own Subaru Impreza WRX, which has a Prodrive designed exhaust system, giving it a slightly sportier sound than the standard car. These recordings were then edited and processed in order to achieve the desired result.

These two primary assets of 'Easyroads3D' and 'NWH Vehicle Physics' did not instantly marry; initially the car drove as if it were off-road and did not detect a change in surface, which took some time to get right. The bundled 'tyre squeal' sound was also quite fake sounding, so this was replaced with a sample of someone driving a car round a field recorder obtained from freesound.org (freesound 2021) and processed, giving a much more realistic sound. While this asset allowed for the user to switch of cameras between 'cockpit' and 'chase' points of view, the decision was made to fix the view to the 'chase' camera, as the effect of the headlights on the environment was more prominent and the 'in car' camera applied a low-pass filter to all sounds in the environment (to simulate being inside the car in an auditory sense). Allowing users to switch between cameras in the future would be very easy to re-implement.

Police and opponent car models were obtained from a developer named 'GameReady3DModels', and these are controlled by a complex script named 'Any Car AI' (Unity Asset Store 2021). Due to how much testing it requires to get the AI car paths correct, in this version of the game the AI drivers will crash at the end of the highway. The sample for the Police siren was also obtained from the online community audio resource freesound.org (freesound 2021), and processed accordingly. Bundled crashing sounds were layered with my own field recordings of broken glass. A starry night-time skybox was edited to give a purple tint, in accordance with the desired synth-wave aesthetic, and the game world lighting settings changed to also give the sense of driving at night. With the consideration that most driving simulator cockpit designs feature three screens in mind, the in-car view of the game was tested on a triple-screen setup powered by AMD 'Eyefinity', and the result was exactly as desired and in line with how other popular driving games display.



Figure 11: 'Beat the Street' in-car view on triple-screens

Theme/Title Track Composition

One of the most enduringly popular types of music for driving and racing game titles to feature is Drum & Bass, which also happens to be my main passion in music today. One prominent example of this is the 'Hospital Records Radio' on 'Forza Horizon' editions 2, 3 and 4 (Hospital Records 2016). While the added excitement of fast breakbeats is a proven

feature of popular racing games past and present, it was my intention to create something a little more unique to the genre for this game, with retro-gaming and synth-wave influences. The atmospheric pads which give the track so much character were created in both Native Instruments Massive X, and Steinberg Padshop software synthesizers. The phase distorted bassline, typical of the genre, was created in Xfer Serum wavetable synthesizer, and much of the distortion and filtering applied in iZotope Trash and KiloHearts Multipass, respectively.

Drums were recorded on an electronic Roland drumkit triggering Steinberg Groove Agent, then layered in with a suitable sampled 'Amen' break. Electric guitar was recorded using a Line6 POD Pro, played by myself, 8-bit sounding lead synthesizers were created in the 'Chiptune' software synthesizer, which emulates the character of classic computer and gaming console sound chips. All MIDI notation was played on guitar into a Roland GR-55 guitar-to-MIDI interface. Tape emulation utilised to smooth high frequencies on some channels also adds to the classic yet modern character of this track's sound. It's my feeling that the end result is a track that's driving, evocative, and that the overall desired sonic aesthetic was achieved.

Development Obstacles & Solutions

Many things did not function as desired immediately. The AI car settings specifically were difficult to configure correctly; initial settings caused the tunnel to register as an obstacle, and both AI cars would reverse at the start line. This was discovered after some trial and error in order to apply the correct mesh structures to the 'rigid body' parameter initially caused some highly unusual and glitchy results.

There was also the issue of opponent car sounds playing on the player camera at all times, however this was solved by the '3D' dial being turned to full, which ensured their auditory relationship matched that of the vehicle location within the physical environment. Initial plans for the interactive element of the music, was the concept of incrementally introducing instruments in stem format as the car sped up, however FMOD would simply start a new loop at a new point when the speed was achieved. With more advanced knowledge, experience, and deadline it may be possible to achieve that desired result with Unity and

FMOD. However, I found that for the car speed to control the music's pitch of a -12 to 0 semitone range, between 0-40kph, then play normally at any speed above this, resulted in a much more playable and desirable result. The net result of this being that if pace is lost due to a crash or spin, this is expressed by the relative slowing of the music, encouraging the driver to maintain momentum.

It had originally been my intention to use a video created Adobe After Effects for the loading screen, however a simpler static splash screen was much easier to implement. Also, trickier than expected was to make the police car lights flash, so these were just left switched on permanently. When initially imported, background prefabs such as buildings were not 'solid', and it was therefore possible to just drive through them, so these had to be defined correctly for the car to crash into them and for them to be effective as driving obstacles. Ideas for 'power-up' collection and scoring based gameplay were scrapped in favour of AI opponents, due to being too gimmicky, with this only really being seen at the far end of the 'arcade' spectrum of driving games in titles such as 'Mario Kart'.

All field recordings were obtained by utilising a Shure MV-88 stereo condenser microphone addon for iPhone. Both the broken glass and car sounds were obtained on an industrial estate in the middle of a still (low wind speed) night. For exhaust note sounds, the mic was placed at a 90degree axis to the car exhaust tip. For broken glass sounds, the mic was positioned on the floor and pointing at the area of impact. These were recorded in the Shure MOTIV app, then processed in Steinberg Cubase, utilising third party plugin processing where required.

Reflective Analysis

The biggest constraint on this product reaching its full potential is without doubt the restriction on time management of of one individual, working to a short deadline window. However, it's my feeling that in its present state this game at least demonstrates some game development and sound design skill reasonably effectively. While the implementation of interactive music was not the result originally intended, this format ended up working really well from a player-perspective in the way it was eventually implemented.

As a first-time user of the Unity engine, I found it most pleasing to work with and get satisfying results from, mostly thanks to the vast availability of high-quality assets. While some of the scripting seemed a little daunting at first, it soon made logical sense. A wealth of tutorials and forum posts available online helped me to achieve what was intended. Developing music and audio for the game industry is most certainly a career path that I am keen to pursue, and it has been a really enjoyable experience to get creative in a game environment and to create something that's at least part-way towards a game that I would enjoy playing.

Further Development Points

'Beat The Street' would benefit from significant development in many areas; starting with fixing glitches like brake lights not functioning on export, and basic functionality such as pause menu for exit and restart. The game would also benefit from greater single player gameplay functionality like a TV-style replay system, full AI opponent paths, timing system, traffic, more opponents & Police, and a variety of single player challenges. Other desirable future features include user car customisation and selection, defined circuit boundaries (with automatic reset), 'wrong way' enforcement, more levels with bespoke themes, and full external controller support so the game can be played with modern steering wheel and pedal controllers.

A significant feature that would make this racing game unique, and stand out from the rest, would be the ability to race in different decades; complete with period correct environments, featuring street racing and car culture aesthetics from the 1980's, 1990's, early 2000's and present day. This would also ensure that 'Beat the Street' appealed to a much wider age demographic, too. Further desirable features include 'drift' and 'gymkhana' game modes. The term 'gymkhana' is an umbrella term for a timed event on a small course, typically including obstacles such as cones, barrels, barriers, puddles and sandy sections (Baxter 2021).

Last but not least, multiplayer support and how well it is implemented can make or break a game in today's market, so multiplayer support, online lap time leader boards, with an emphasis on multiplayer functionality having the capacity facilitate building an active online community for the game. Greater attention to visual style would also be a fundamental point of future development.

User Feedback

'Beat the Street' was tested by third-party gamers across macOS, Windows and Linux systems, with no major bugs or performance issues reported, and received generally positive feedback. Most players who are not well practiced at driving games, reported crashing at the end of the tunnel at the start. This is likely owing to the realistic therefore challenging vehicle physics, but also possibly to there being no clear references for speed within the tunnel, akin to that of the city phase of the course, and therefore causing them to carry too much speed. Nearly all players expressed the desire for a reset/restart button.

The general consensus appears to be that it's a great starting point for a very playable and enjoyable racing game. Responses to the theme track were also overall positive, too, with many stating it matched the game experience very well. Without the simulated traction control and anti-lock brake driver aids enabled, users found the car difficult to control, so it would perhaps be wise for these to be enabled by default in the future.

Bibliography

Baxter, E., 2021. *How Gymkhana Works*. [online] HowStuffWorks. Available at: <https://auto.howstuffworks.com/auto-racing/motorsports/gymkhana.htm> [Accessed 9 July 2021].

Bullit. 1968. [film].

Channell, M., 2020. *Remembering classic games: Lotus Esprit Turbo Challenge (1990)*. [online] BBC Top Gear. Available at: <https://www.topgear.com/car-news/gaming/remembering-classic-games-lotus-esprit-turbo-challenge-1990> [Accessed 5 July 2021].

Davidson, J., 2016. *How 'Quake' Changed Video Games Forever*. [online] RollingStone. Available at: <https://www.rollingstone.com/culture/culture-news/how-quake-changed-video-games-forever-187984/> [Accessed 5 July 2021].

DriveTribe. 2021. *Midnight Club: Inside Japan's most infamous illegal street racing gang*. [online] Available at: <https://drivetribe.com/p/midnight-club-inside-japans-most-CaSHzqugT2q3S8z2iZk7dg?iid=H7voCYakTtuYL1xiXXrCmw> [Accessed 5 July 2021].

Electronic Arts, 2021. *Need for Speed™ Heat – Street Racing Video Game – Official EA Site*. [online] EA Sports. Available at: <https://www.ea.com/games/need-for-speed/need-for-speed-heat> [Accessed 6 July 2021].

Freesound, 2021. *Freesound - Freesound*. [online] Freesound.org. Available at: <https://freesound.org/> [Accessed 6 July 2021].

GlobeNewswire, 2021. *Gaming Market - Growth, Trends, COVID-19 Impact, and Forecasts (2021 - 2026)*. [online] GlobeNewswire News Room. Available at: <https://www.globenewswire.com/news-release/2021/05/06/2224267/0/en/Gaming-Market-Growth-Trends-COVID-19-Impact-and-Forecasts-2021-2026.html> [Accessed 6 July 2021].

Grolleman, J., 2016. *1.2: Arcade vs. simcade vs. simulators - Virtual Racing School (VRS)*. [online] Virtual Racing School (VRS). Available at: <https://virtualracingschool.com/academy/iracing-career-guide/before-you-get-started/arcade-vs-simcade-vs-simulators/> [Accessed 5 July 2021].

Hospital Records, 2016. *Hospital Records – Hospital Records Radio returns for Forza Horizon 3*. [online] Hospitalrecords.com. Available at: <https://www.hospitalrecords.com/news/hospital-records-radio-returns-for-forza-horizon-3/> [Accessed 9 July 2021].

Lfs.net, 2021. *Online Racing Simulator - Live for Speed*. [online] Online Racing Simulator - Live for Speed. Available at: <https://www.lfs.net/> [Accessed 5 July 2021].

Lost Media Archive, 2012. *Midnight Club 5 (Unnanounced Cancelled X360 - PS3 game) | Lost Media Archive | Fandom*. [online] Lost Media Archive. Available at: <https://lostmediaarchive.fandom.com/wiki/Midnight_Club_5_(Unnanounced_Cancelled_X360_-_PS3_game)> [Accessed 5 July 2021].

MarketWatch, 2021. *Racing Games Market Size 2021 Industry Recent Developments and Latest Technology, Size, Trends, Global Growth, Supply Demand Scenario, and Forecast Research Report 2027*. [online] MarketWatch. Available at: <https://www.marketwatch.com/press-release/racing-games-market-size-2021-industry-recent-developments-and-latest-technology-size-trends-global-growth-supply-demand-scenario-and-forecast-research-report-2027-2021-05-07> [Accessed 6 July 2021].

Neltz, A., 2014. *Yup, This Is Still The World's Most Attractive Racing Game*. [online] Kotaku Australia. Available at: <https://www.kotaku.com.au/2014/01/ridiculously-gorgeous-racing-game-gets-ridiculously-gorgeous-new-shots/> [Accessed 6 July 2021].

Night Runners, 2021. *Night Runners Twitter*. [online] Twitter.com. Available at: <https://twitter.com/nightrunners_jp> [Accessed 6 July 2021].

Nytimes.com, 2021. *Pandemic Paved the Way for Sim Racing, but Will It Last?*. [online] Nytimes.com. Available at: <https://www.nytimes.com/2021/01/18/business/sim-racing-enascar.html> [Accessed 5 July 2021].

Reiza Studios, 2021. *Automobilista 2*. [online] Game-automobilista2.com. Available at: <https://www.game-automobilista2.com/> [Accessed 6 July 2021].

Sefton, J., 2008. *The roots of open-world games | GamesRadar+*. [online] Gamesradar.com. Available at: <https://www.gamesradar.com/the-roots-of-open-world-games/> [Accessed 6 July 2021].

Tarason, D., 2017. *The Mods That Are Keeping Quake Alive In 2017*. [online] Kotaku. Available at: <https://kotaku.com/the-mods-that-are-keeping-quake-alive-in-2017-1792040503> [Accessed 5 July 2021].

Thorn, E., 2021. *Have You Played... Screamer 2?*. [online] Rock Paper Shotgun. Available at: <https://www.rockpapershotgun.com/have-you-played-screamer-2> [Accessed 5 July 2021].

Turn 10 Studios, 2021. *Forza Horizon 4*. [online] Forzamotorsport.net. Available at: <https://forzamotorsport.net/en-US/games/fh4> [Accessed 6 July 2021].

Unity Asset Store, 2021. [online] Unity Asset Store. Available at: <https://assetstore.unity.com/> [Accessed 6 July 2021].