

Microscopic Mike:

Post-Mortem Documentation

The Original Idea

I had this idea in the back of my head for some time about making a game that looped in on itself after you beat, where each loop would contain the exact same enemies and level design, but your tools would change. This change in tools - not necessarily more powerful tools, just different ones - would lead to a different way of experiencing the game and exploiting the levels to your advantage: seeing the same thing from a perspective, and thus interacting with it differently.

This had been inspired in one part by a music record - *Nonagon Infinity* by King Gizzard & The Lizard Wizard - in which every song transitions seamlessly into the next, and the final song transitions perfectly into the first: creating a self-contained never-ending loop. The other inspiration came from a Quake level that I designed myself for a BSP Level Design course during Profil Week at CGL. This level was about an abstract farm/watchtower in the middle of the woods, whose gravity shifted at the press of a button, with three possible gravity inversions. This meant that I had to design a self-contained level that could be traversed and playable normally, upside-down, and sideways. Not only playable, but each different inversion should feel different and have its own challenges, even though the level itself remained the exact same. While the level had a small scope, I nonetheless had a lot of fun designing it, and became really fascinated about the topic of using the same level layout in unexpected and exciting ways, simply by switching a single variable.

In that level's case, that variable was the gravity. In the case of Microscopic Mike, it was the weapon.

I figured that this concept for a game would be right at home in a project whose theme was experimentality and metamorphosis, so I was deadest on trying it out!

Dithematic Game – Mutation with Impact Games

I shared my idea with Theodore, who is currently in BA6, and he thought it was interesting and wanted to team up. Given that he was in a different semester, he had his own theme for the project: impact games. Now, our task was to take this concept and make it fit these two themes at the same time. Luckily, Theodore already had something in mind: he immediately pitched the idea of having the game be set inside a human body afflicted by COVID-19. Once this idea was on the table, it was natural that we'd also base the player's arsenal of unique weapons based on the different ways we had of combating the spread of the virus: social distancing, wearing masks, and the ultimate weapon against the virus – a vaccine. We were taking elements that people had become accustomed with, and putting them in a more literal and impactful context by using masks and social distancing to directly and literally fight against the virus.

(Micro)Scope

In terms of scope, we were both on the same page. We had a very solid and in-synch idea of what we wanted the game to be. Additionally, we both wanted to expand our skillset as game developers. Therefore, even though we are both specialised in game design, we decided that the two of us would be enough of a team to make this work. Theodore wanted to develop his art skills, and I wanted to have a more hands-on approach on the programming and focus on the music later on.

As such, we both figured that we should aim for a small scope. We wanted it to be a fun learning experience, not a stressful nightmare like other projects were. Having decided that, we set about figuring out how many enemies, weapons, and levels we could have to make the game interesting and deep, but keeping it simple We ended up on:

- three weapons (and therefore three loops),
- four enemy types, twelve levels,
- our general traps.

Initially, we wanted each weapon to have a trap counterpart that it could exploit to make each loop feel even more diverse (for example, a turret that could be converted to aid you, but only if you had the syringe). Also discussed was a big final boss fight, where all the white blood cells that we awakened would come to your aid. However, it was clear that these were outside the scope, and were quickly scrapped. We also figured that the lack of a boss fight is more in-tune with the theme, as a virus cannot be destroyed by simply curing one person, and in real life the fight against COVID is still ongoing.

Weapon Design – Weaponising preventative measures

As stated previously, the three weapons we came up were based on the measures that health organisations around the world recommend people take to slow the spread of the virus: wearing masks and social distancing. The third and more powerful weapon we decided should be a vaccine, because it's the ultimate weapon in fighting a virus and the only way to really eradicate it. While in real life it might not be apparent right in the moment how wearing a mask or standing away from others might help fight a disease, in this game we showcase in an abstract form that these measures really do help to fight against the virus. It should also be fun for young kids, who might think that masks are scary or who miss playing with their friends, to turn these fears into superpowers.

From a gameplay standpoint, we had to make sure that each was truly unique and allowed players to manipulate and view levels differently. Not only that, but each new weapon should build upon the skills gained by using the previous one.

The first weapon used is the Mask Launcher 800. It's the most recognisable and easy to learn, since it basically is just a gun that shoots projectiles: masks. These masks don't actually kill the virus though, they just stun them and put them out of work. However, the slow speed of the projectiles forces players to get used to and predict enemy patterns, which will be very useful later on.

The Social Distance 2020 is a short-ranged weapon that pushes enemies away, meaning it also non-lethal like the MD-800. By itself, it's not much help, as enemies can always come closer to you again. This is why having traps in the game that damage both the player and enemies is vital. When using the SD-2020, players use the traps that once were scary to them to their advantage, by pushing the enemies into them. This forces them to interpret the levels differently, and interact with them more creatively.

The final weapon is the Vaccine (it's more of a syringe, really, but whatever). This is a melee weapon, and forces players to get right up close to enemies. Hopefully by this time they are used to this, as the SD-2020 had a short range. We wanted this weapon to be hard and risky to use, but also make the player feel really powerful, to reward them for getting this far. When the syringe stabs an enemy, it activates the White Blood Cell that is present in every level, and they turn into your ally, killing all the enemies marked by you ferociously! Additionally, the Bull enemies, which are corrupted WBCs, can be converted to your side and fight with you. This is to simulate how a vaccine can "wake up" your immune system and alert them that a virus is present.

Level Design – Back to Biology class

Keeping up with the human body and virus theme, we reckoned that the progression of the levels should follow the progression of the real virus inside the human body. Theodore did a lot of research on this, and came up with a five stage plan for the level structure on a macro level: starting at the nasal cavity where the virus is most likely to enter the body from, and ending in the alveoli sacs in the lungs, which is the virus' ultimate target.

From a design point of view, we were aware that creating and balancing the levels was going to be the most challenging aspect – but also the most rewarding! We had to ensure that each level could be beaten using all three different weapons. Not only beaten, but viewed differently depending on your current tool. I think we succeed in this part, as every level has to be tackled differently for each weapon – no strategy works for every weapon.

Some levels were especially hard to balance, as they were really easy with some weapons, and too hard with others. This caused some difficulty progression problems at first, but we managed to balance it out. We also learnt that the mere placement of one trap could radically alter the difficulty of the level. At first, level 10 was much harder than level 12, even though level 12 had more enemies and more traps. We were perplexed at first why this was the case, but then realised it was simply because of the positioning of a hole trap in level 10. Fascinating stuff!

Sound Effects – Wah Wah...

One of the aspects that contributes to game feel are the sound effects. We wanted the game to feel really responsive to your actions, and constantly remind you that you were playing a video game. All the sound effects (except the enemy “voice lines”) were made using a synthesiser with a triangle wave, pulse wave, and/or noise generator. This is because I wanted to give it a very retro and video game feel to go along with the pixel art, so I was inspired by the kind of technology that people had when they made sound effects for NES games. I also experimented heavily with echo delays, some bit crushing to give it a more 8bit feel, and wah pedals (this made me realise how I desperately need to buy a real wah pedal to use with my guitar; they're so much fun!).

Every weapon has distinct sound effects, and several variations of that same sound effect to ensure they all feel unique and never get repetitive. The door that unlocks when you clear a level has a satisfying fwoop sound to match its ring animation, and a rising triumphant synth to signify victory; meanwhile, the trap doors that open up from unexpected locations to reveal enemies have a strident tri-tone alarm like sound, to get the player's attention and make them feel on edge.

As for the enemies, I actually recorded some voice lines, mostly things like “wah! >:(“, “weh :(“, or “AAAHH D:“. Then I pitched them up and bit crushed them a bit, and added echo on the sad “weh” that plays when an enemy die. This was to give the enemies a lot of personality, so you feel like they’re actually creatures and not just pixels on the screen. When they see you, they are angry and excited at the same time, but when they are attacked and hurt, they are sad and cry :(. When you get close to the Sneezer (ranged enemy type), they get scared and scream AAAH and run away. We think that this adds a lot of character to the game.

Music – Polymeters and Repeating Motifs

The part you were all waiting for! At least I was, the music was my favourite part of this project :)

As I have mentioned before, my original concept had been in part inspired by the album *Nonagon Infinity*, so naturally the music was as well. In this record, each song transitions seamlessly into the next, and many of them have shared motifs and reference previous songs, or allude to future incoming songs. This is something that I aimed for as well.

Like for the sound effects, I stuck to using only synths for the instruments. Every guitar and bass is a synth with a pulse or triangle wave, and the drum kit is a synth with a noise generator. Low-pass and band-pass filters with resonance are used to make each one more unique.

I made three songs, each around 4-5 minutes. It was originally going to be one for each loop, but after having them I realised it was much better if I just merged them together into one 15-minute track that was constantly looping, much like the game.

My over-arching aim was to have a cohesive universe of music, where each song all fits together, references each other, and transitions into each other, while still ensuring each track was unique and had its own style. I also wanted the songs to feel exciting and action-packed. Something that would drive players forward and keep immersed in the game, but simultaneously something that wasn’t glued to the game, and could be still listened to and enjoyed outside of the game world.

Some common themes exist between all of the tracks that make feel related, such as, keeping in with the experimental theme:

Weird and uncommon time signatures that switch all the time. I used stuff like 7/8, 12/8, 9/4, 6/4, 5/4, 3/4, etc... I wanted these songs to feel different, and so unusual grooves and ways to feel the beat were a perfect fit. I feel like the odd signature, like 7/8, are good at inspiring driving action and adrenaline. Additionally, these time

signatures switching frequently, so the song is never stuck in the same place for too long and is very dynamic; much like the game.

Going hand in hand with this, is my use of polymeters (I think I referred to these as polyrhythms in the video presentation, that was a mistake). A polymeter is when a song has instruments playing in different time signatures at the same time, which desynchronises them, but is very satisfying once they land on a beat in synch again. I used this sparingly (as it can make the song feel too deranged and chaotic to listen to) to really emphasise the odd time signatures. I experimented with this idea particularly in the first song in the game (*Missed A Beat In Your Mind*). For example, it has two main riffs: one in 4/4 and the second in 7/8 (same as 4/4 but missing the last eighth note), and has a constant bassline in 4/4. The riff in 7/8 against the 4/4 bassline makes it feel like the guitarist is missing a beat in an interesting way. Then at the end the 4/4 riff returns, but in 3/4, missing the last beat, still against the 4/4 bass.

Repeating motifs are also a big part of these three songs, to make all connected. Every song plays a riff or chord progression from a different song, but in their own style. For example, *Missed A Beat In Your Mind* plays the main riffs from the two other songs, but with its own style (missing a beat); *Bugleborg* plays the main riff of *Crocodile* but using heavy power chords as opposed to single notes, and *Crocodile* plays a shortened version of the chord progression from *Missed A Beat*. All these references make the songs intrinsically connected and allows them to transition well into each other, and build on each other, while being able to loop forever and still remain interesting; just like the game!

These songs were all made in less the week, as we were running out of time towards the end; it was a real lesson in just taking some simple ideas and running with them and mutating them in many ways until I have a song. This was also my first time using Logic Pro X, so I had to learn to how to use it from scratch while writing these songs. My only regret is that I didn't enough time to mix them really well, but it was also a good thing because it meant I had to write tracks that were already balanced and focus entirely on the song-writing and sound design. The real regret is that I only had enough time to use a Wah pedal and Fuzz pedal on one song. But hey, that just ensured the song was even more unique!

To conclude the music section, I had an absolute ton making these songs and while some might be a bit too weird, I love them. I will definitely be revisiting these as soon as I can and flesh them out a bit, add another couple songs, and have an EP I can release!
:D

FINAL CONCLUSION

Overall, I'm really happy with how the game turned out. It's fun to play, takes a while to beat, has a fair amount of variety and replayability, and I think that the concept is quite unique and interesting. We also achieved our goals without over-working ourselves or any major problems; the Unity physics engine was the biggest annoyance, along with some random bugs. Theodore and I worked pretty well together, and were on the same page about what we wanted the game to be and how big the scope should be. Designing the levels for very different playstyles was a challenge, but definitely a very fun and educational experience. And of course, making the music and sound effects was awesome.