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### Intent & Purpose

To learn about the industry standard methods of production on projects like spider-verse, through a stylistic 2 minute animation rotoscope of a real world skate video, with freehand animation additions. Such as new and realistically impossible scenes, and simple animated additions to real world scenes. The animation will focus on the cool factor of skating, with no dialogue or overarching story, taking notes and paying homage to the skate video genre

**Why THIS idea:** For the medium of animation, that I want to develop my portfolio upon, this idea allows the most room for creativity, improvisation, and compromise.

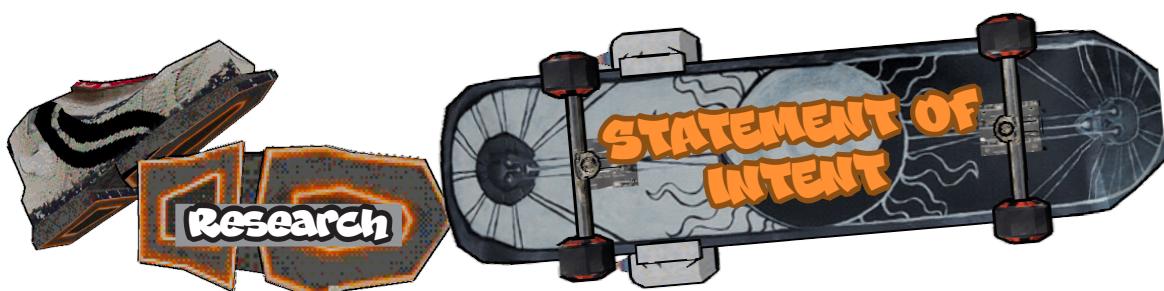
**Skate videos are typically pretty free form, featuring little to no segways or continuity between scenes,** instead focusing on the tricks within a setting, or the style of boarding like street or bowl. This allows for me to basically go from idea to idea freely, including many effects and techniques within each scene with it still making sense.

**My ideas basically include creating impact frames, animated additions and freeze frames to accentuate cool moments,** additionally I would like to adapt the stylisations used in Spiderverse like modeled and animated smear and stretch effects, as this skill would make me much more proficient and creative in Maya. And this skate idea allows me to express this in a modular fashion, with each scene able to be the last

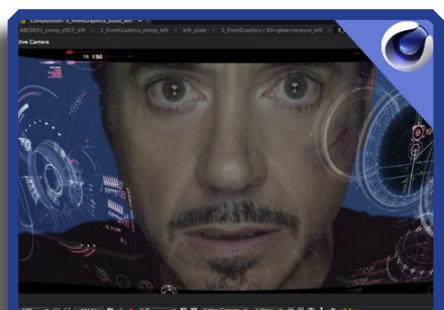


**What I intend to publish with:** In terms of publishing, this idea feels slightly more worthy of an actual full scale publication. But because of the content of the product, this is something that will gain traction on something like YouTube, with a high quality audio and video file capability, about as high as I am able to render anyway, making YouTube a preferable and easy platform to use. Additionally YouTube will actually recommend my video to those who will actually like it.

**Alternatives like Vimeo** are also compatible in terms of actually hosting and publishing the content, **with a higher level of professionalism**, but I still feel like YouTube. With a larger viewer base, and recommendation algorithm, **likes and dislikes and commenting features will provide the best platform for my video to get viewed, and interacted with for constructive criticism.**



**What I intend to create:** A full model with peripherals such as glasses, a skateboard, and maybe masks and a drone, to skate about in replica map models, and custom made maps of a retro future city. I want to create some punchy skate clips with some funky music to match, rotoscoping and animating extra effects over real world animation. I also want the character to have magnet boots and rocket thrusters to do some realistically impossible moves like wallrides and barrel rolls over the city, this will add a nother layer of animating skill and cool factor to the project. Aswell I could use After Effects or Premiere Pro for post production filters, effects and sound effect applications. Especially I want to include a wide range of freeze frames and impact frames with 2D hand animation / image effects. The degree of which that I implement this is uncertain, because I am not very good with 2D animation, but as long as this takes place after animation, it should be a matter of tracing images and applying colours, and including some basic graffiti text style onomatopia inclusions. Of course this takes heavy inspiration from spiderverse, but generally I want to use this style for the content of Bombrush Cyberfunk.



### Strengths:

Style incorporation: Stylised materials and lighting, outlines etc are pretty easy to incorporate into my project now, that i'm not using unity. Maya animation also allows for you to see the path of objects. The nature of the project allows for a high level of style incorporation, with many shots and effect being able to be utilised. I like this idea! I really want to start doing animation in a more stylised manner, rotoscoping will additionally be super easy now!

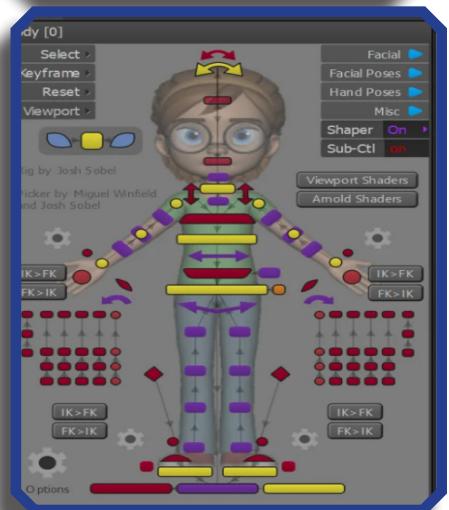


### Weaknesses:

Animation techniques: I have not yet done “high level” stylised animation, such as stretch and squeeze, smear marks, and anticipation, preparation, and causation animation style, this is something I will have to learn in good depth.

Learning on the job: Maya could prove difficult while learning these techniques, and is sometimes described as old compared to the new super easy modelling and animation softwares..

Time management/ development time: My last animation was a whopping 15 seconds long, this project will have to be upwards of at least a minute long, meeting this timeframe will require not only more time, but more dedication.





**Existing Product:** Dead Space Series, mobile and PC | EA Games, Iron Monkey studios, Directed by Glen Schofield, Michael Condre and many others over EA history 2008-2023



**Synopsis:** Dead space is a series created by EA Games for the Playstation, XBox 360 and Microsoft stores made with Unreal Engine or Havok, pioneering modelling techniques. This game also made breakthroughs in the survival horror industry, creating precedents that other games would follow. Using environmental storytelling, minimal/ "diagnostic hud", and schizophrenia aspects to create un-ease as Clarke attempts to stop the marker from infecting more planets, while it roots in his mind through visions.

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| Example 1 | Environmental storytelling is a very strong part of dead space, maps are often littered with "obvious" calls to action to the main character. <b>Interactable items are lit up or painted white, and this is something I can use to make the animation more readable.</b>  |
| Example 2 | <ol style="list-style-type: none"><li>1. The monsters in Dead Space are based off of Japanese and general horror body gore with sci-fi alien aspects. <b>Their silhouettes are intentionally made to be distinct and scary, so that the audience can instantly recognise them in the dark.</b></li><li>2. In the games Issak is constantly fighting for his life and mental wellbeing. During these moments they use great voice acting, and body language in animations to convey desperation and struggle. <b>Almost all actions follow animation principals such as follow through and pose-to-pose to emphasise weighty armour, struggle, and anger</b> These design choices can be used to great effect to make animations and character designs feel more relatable/outstanding.</li></ol> |



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| Example 3 | The Dead space mobile series (Dead Space:Sabotage, Dead Space IoS, Dead Space:Chapters) are lower scale versions of Dead Space 1 and 2 with development from EA and their subsidiaries, so the art style and aesthetic is the same. <b>The lower poly designs and flat textures with lower polish are things that I can aim to replicate for my project.</b> The textures are also just very simple compressed images. |
| Example 4 | I really like this idea of a skeleton exo-skeleton that both acts as a protection armour that looks like a human skeleton, with aspects made to inflict fear. Character modelling and design plays a part in the emotions and ideas portrayed by the character.  |

**Implementation:** Environmental storytelling and low poly models with a sharp silhouette, along with effects and composing of scenes that leads viewers to the focal points of the animation. With Dead Space mobile games having a lower poly nature I can aspire to use this low-poly and texturing approach to lessen workload and curate a more mellow aesthetic. I can create models and ideas that replicate this in pre-production and use them in the development of my animation to express emotion and animation skill in character movements as seen in the game via its utilisation of animation principals like pose-to-pose

**Existing Product:** Metal Gear Solid (PlayStation1) | SONY, Konami studios produced by *Hideo Kojima*



**Synopsis:** Metal gear solid follows the protagonist of "Solid Snake" who infiltrates the terrorist "foxhound" group's nuclear weapons bunker. Snake liberates the hostages and sabotages the nuclear defense systems. Metal gear Solid was the first entry in a now very long series that portrays and criticises war, often being praised for its "artistic" side, but in these initial games, the modelling and texturing was heavily limited by the hardware limitations of the time, but still this game won many awards for its utilisation of the hardware at hand.



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| <b>Example 1</b> | PlayStation 1's coordinate positioning code only worked on integer numbers, and therefore when vertices had float points, they were rounded up or down to the nearest integer, meaning that in scenes like this where there is a moving character, or the camera is moving, <b>their vertices will “wiggle”</b> . This is a massive piece of the “ps1 aesthetic” now, and should be something that I reflect in my rendering.  |
| <b>Example 2</b> | The poly limits for characters made it very hard to apply details, <b>but basic silhouettes and textures do alot of the heavy lifting</b> . While the face shape in reality is just a oblong bean, the <b>hair texture gives the illusion of hair shape</b> , this can be seen on the <b>knee pads, tactical vest, belt, etc etc</b> .   |
| <b>Example 3</b> | Lighting in these older games had hardware limitations, while the ps1 was capable of rendering real time lighting, to cut “graphic budget costs” baked lighting was used on static objects. This was achieved through light map baking. Also, to avoid the usage of complex texture shaders, <b>the ps1 used vertex lighting, which required objects to have their vertices changed with the shape preserved so that the shadow colouring can be applied realistically</b> . |

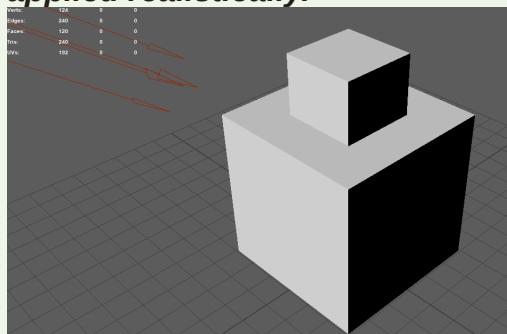


fig 1

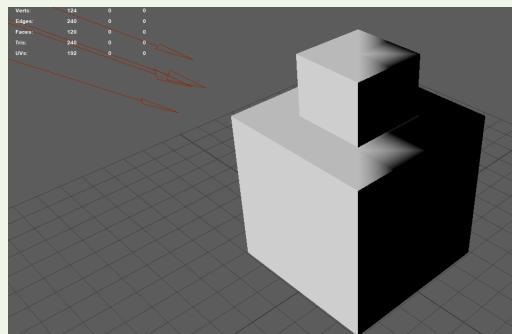


fig 2

This is shown in the difference between fig 1 and 2, 1 being what a typical ps1 real time face shadow would look like, versus with vertex colouring to create shadows.

**Implementation:** Implementation of the low poly, and low res texturing and modelling techniques, will give great effect to the animation in the ways of retro design. **Vertex lightmap baking although is something particularly used to cut corners on processing, and is something I thankfully will not have to do**, and I can instead use shaded brightness two tones to replicate the effect of the light angles, without the frivolous hand painted shading and lighting.



## *Existing Product: Bomb Rush: Cyberfunk | Made by Team Reptile with Dion Kosher*



**Synopsis:** Bomb Rush:Cyberfunk is a skate style artisitc game building on its predecessor Jet Set Radio, a PlayStation 1 classic that played into the y2k future funk style. Team Reptile has adapted this style into the modern era with unity and apparently multiple modelling softwares, through a story of 'bombers' trying to go 'all-city' by fighting police to create police tags and mark territory in spots accessible through movement tricks.

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| <b>Example 1</b> | Establishing shot; showing the police bureau where our protagonist is being held. Already showing off their modelling and aethetic choice within every model. notice aswell the shading, the lighting is very flat, but the areas that are shaded are sharp lines, this is acheived through texture two tones, and cel shading.  |
| <b>Example 2</b> | An alarm goes off and we are introduced to a estabilishing action shot; showing the booths of the armed gaurds rushing to the scene of the break-in to the police bureau. You can see they have very basic model's with very one-toned textures for the boots. This is the main aesthetic of Bomb Rush:Cyberfunk as it is based off of older Playstation 1 games and is done very intentionally, but with much higher feideltiy.   |
| <b>Example 3</b> | Then cutting to inside the Police bureau, we can see the "cheif" with the typical police enemies. You can see in this shot they have a pretty bland, unpronounced map background, and very jutting, unique-sillhouette caricatures for the models. They did this using low poly expressive shapes in modelling, and post processing effects to create outlines on some models.<br><br>You can see aswell there is text at the bottom, similar to a silent film, and this is accompanied by a grunt sound effect, this is meant to be a reflection of the games older PS1 Origins with limited storage space. Using this "retro storytelling" somewhat slow and limited cutscene goofyness in my project will prove useful and is done easily in unity's animation script and cutscene editor |



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| Example 4 | We are introduced to The cause of the break-in, and our main companion of the game, Tryce. Pay attention to his model, consisting of large boxes for his dreads, beatbox backpack, and triangles for his puffer. These exaggerated shapes and high contrast clothing are modelled and textured very intentionally to fit within the style uniquely, and set out Tyrce as a main character.  |
| Example 5 | After getting to the roof of the police bureau, Tyrce and our main character (Faux) are confronted by Iren Reitfeild, the riot police chief in charge of suppressing the 'Bombers', challenges Faux and Irene, teaching the player how to move and fight within the game. This cutscene consists of one main shot, going between the characters as they talk, switching between face textures, but not much else, leaning into the retro limited movement of the cutscenes that is made up of text, sound effects and triggered animations before cutting to gameplay. This is achieved through Unity's scene scripter with texture changes and animation sequences with triggers. As well, the lighting and textures play a critical role in the aesthetics of the characters, the flat darkness applied to Reitfeilds face is a shaded angle brightness shader. |

**Implementation:** Using a similar process and pipeline as Bomb Rush will prove both effective, easy, and substantial to the aesthetic of the project. Low poly models with cel shaded textures, and two tone angle/brightness materials will replicate the lighting and style of the BRC characters. Additionally the methodology of using low poly that was originally used to save resources, but also adding extra flair in the form of headphones, pant loops, chains, geometric clothing, etc is a cool aesthetic choice that I can reflect.

#### *Existing Product: SpiderMan: Into The Spiderverse | Made by Sony Production Pictures in association with Marvel*

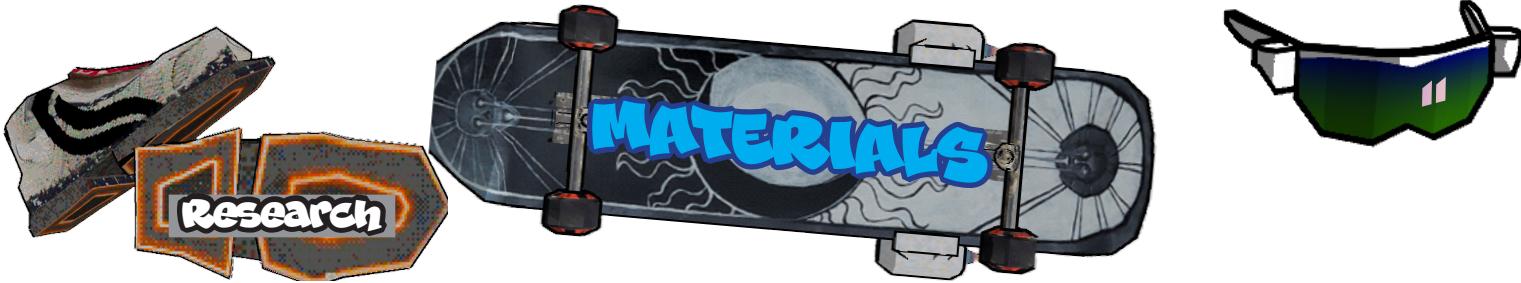




**Synopsis:** Into the Spiderverse was the first entry in the series of the spider verse multiverse, it utilises hybrid animation and special compositing techniques to closely mimic comic book styles. Spiderverse broke profit records for the animated movie industry, its unique animation techniques, intense attention to detail and challenging story stayed with viewers, making many people watch multiple times (such as myself).

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| <b>Example 1</b> | This is a behind the scenes of Spiderverse, to show the smear lines and effects that are often shown in the movie. But to make these look better, each one is mostly hand added and adjusted, these smears appear for like one - two frames. This one is added with a Maya plug in that automatically creates and rigs smear planes, some of these are also completely hand made.  |
| <b>Example 2</b> | They also used intense reference to rotoscope, recording themselves doing a wide variety of the scenes in the movie, such as the famous fingers in mouth scene, and almost every other close up scene. The people who do this acting are not paid actors, but are instead just literal animators, rehearsing in their homes, or work spaces. But also you can see there is still differences in how they rotoscope the video, adding stylisations or different angles to make it more appealing to the viewer. |
| <b>Example 3</b> | To emphasize the movements of characters within their low frame rates, they use another old cartoon method of smear lines, a "after image" is drawn from a fast movement, which makes it look faster and cooler. This is sometimes done within the 3D animation, but also I've noticed that 2D animation is also used. Such as in the first figure, and 3D after images are used in the second figure.   |
| <b>Example 4</b> | Hand-drawn 2D freeze frames were also implemented to accentuate big moments, sometimes these were held for about 3-4 frames, and switched colours, other times they would only hold for 1-2 frames, breaking up combat or movement scenes. Most of these are just frames with filters and hand drawn effects like onomatopoeia, but some of them are fully hand drawn impact frames that trace the original scene.   |

**Implementation:** during production, I can implement the frame rate differences, and the update rates. And during the after-production, I can implement the usage of hand drawn smears, freeze frames, and hybrid effect implementation. I can't find any examples online on how \*they\* used 3D smear effects, but I can see that the methods do exist on Maya without the plug in. But honestly, for the pipeline of production in this project, it's probably best that I animate, and then worry about after-effects to make it look Spiderverse in the post-production phase.



## Distribution

| Product   | Positives   | Negatives  | Filetypes   |
|---|---|--|---|
| Youtube<br> | <ul style="list-style-type: none"> <li>-15 minutes or less, of 60fps with up to 8k resolution. <b>With Maya and Cinema4D typically outputting either .MOV, .MPEG1-3 or .mp3</b></li> <li>- Can recommend to people interested in 3D animation, my target audience is already the indie animation scene, something that mainly proliferates on YouTube's platform.</li> <li>- Provides a free distribution platform</li> </ul> | <ul style="list-style-type: none"> <li>- Youtube often either compresses or converts unfamiliar files such as .vp8 to mp3</li> <li>- Youtube controls uploads with size limits and upload limits per day depending on whether or not your account has been "verified"</li> <li>- YouTube's recommendation algorithm will show this product to a wide variety of audiences, and may not receive good statistics due to YouTube's bias to viral results or consistent results</li> </ul> | .MOV,<br>.MPEG-1,<br>.MPEG-2,<br>.MPEG4,<br>.MP4, .MPG,<br>.AVI, .WMV,<br>.MPEGPS,<br>.FLV<br>3GPP,<br>WebM,<br>DNxHR,<br>(and etc) |
| Vimeo<br> | <ul style="list-style-type: none"> <li>- More professional, and geared towards short film releases.</li> <li>- Maximum file size of 250GB and duration of 24 hours, with support for 48kHz sample rates or below.</li> </ul>  | <ul style="list-style-type: none"> <li>- Meant for full releases, not drafts or project WIP's.</li> <li>- Files must be in their small list of file types to be uploaded.</li> </ul>   | MP4, MOV,<br>WMV, AVI,<br>FLV.  |

**Justification:** I have chosen YouTube for its compatibility with all of C4D, Maya, and Premiere Pro default outputting formats (.MOV, .MP4), and its support of recommendation. Additionally, I am more familiar with YouTube and already have an account, meaning my account is verified and my videos are therefore unlimited in quality.

## Storage

| Product  | Positives   | Negatives   | Filetypes  |
|--|---|---|--|
| OneDrive<br> | <ul style="list-style-type: none"> <li>- More professional, industry standard among corporate entities.</li> <li>- <b>Can be automated to save progressively.</b></li> <li>- My family already has a life-time unlimited subscription, meaning I can back up instantaneously and automatically without worrying about storage.</li> </ul> | <ul style="list-style-type: none"> <li>- Annoying to use.</li> <li>- Compatibility issues with live files.</li> <li>- handles 3D objects and .ANIM ZIPs like they are viruses and could possibly delete files.</li> <li>- Limited support of 3D object file types.</li> </ul> | Any,<br>handles<br>and<br>attempts<br>to read 3D<br>objects and<br>ZIP's |



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| <b>Google Drive</b><br> | <ul style="list-style-type: none"> <li>- Support for Google Classroom, the platform I will be working from.</li> <li>- Generally doesn't interfere with files unless allowed.</li> <li>- Infinite storage capacity with a school account.</li> <li>- Can create comments and publish annotations for documentation.</li> </ul>   | <ul style="list-style-type: none"> <li>- Transfer throttle on browser.</li> <li>- Not automatic</li> <li>- <b>CAN change/remove unfamiliar files for security, but will ask.</b></li> </ul>  | Any, does not handle 3D objects or ZIP's |
| <b>GitHub</b><br>       | <ul style="list-style-type: none"> <li>- Quick, concise and recorded version control.</li> <li>- Only saves changes to files, and less of a throttle on download or upload.</li> <li>- Does not have any effect on the integrity of files</li> <li>- In depth and commentable version descriptions and visualisations</li> </ul> | <ul style="list-style-type: none"> <li>- <b>Changes can be "smeared" if you do not separate repositories.</b></li> <li>- <b>A little bit more code focused than file focused.</b></li> </ul>   | Any, even has previews.                  |
| <b>Personal hard drive</b>  | <ul style="list-style-type: none"> <li>- Literally full control over file location and safety.</li> <li>- Maya and unity back-ups and crashlogs are saved locally already.</li> <li>- No chance for any loss in translation.</li> </ul>  | <ul style="list-style-type: none"> <li>- <b>Hard drive wipes are possible, losing all progress would be devastating and irreplaceable.</b></li> <li>- <b>Viruses may infect files.</b></li> <li>- <b>Incompetent handling of files may corrupt files.</b></li> </ul> | Any                                      |

**Storage Justification:** With my personal hard drive that already contains work files, and updates with progress, I will create back-ups for emergency restoration then, for school and home work I will use GitHub to easily update working documents. In addition uploading copies to Google drive intermittently between large steps to ensure there is a backup of my local storage.

## Softwares

| Product  | Positives  | Negatives  | Filetypes  |
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| <b>3D Modelling, rigging, and Animation software</b>   |  |  |  |
| <b>Blender</b><br> | <ul style="list-style-type: none"> <li>- Free and open-source, meaning there is a vast library of support and FAQ troubleshooting.</li> <li>- Definitely adept enough to handle the plans for this project.</li> <li>- Can handle modelling, rigging and animation.</li> </ul> | <ul style="list-style-type: none"> <li>- Plug-ins required to work with anything else.</li> <li>- Not as professional.</li> <li>- I have never used it, and wouldn't want to risk learning it for this project.</li> </ul> | Modelling, rigging, animation, shading and lighting. |



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| <b>Maya</b><br>                  | <ul style="list-style-type: none"> <li>- Maya works well with creating "lower poly" meshes with accuracy, an effect I'm looking to replicate.</li> <li>- Maya has a built in pipeline to work with Unity, with rigging and animation files being transferable.</li> <li>- It also is the industry standard, and something I have more experience with.</li> <li>- Storage space and workload efficient</li> </ul>                                   | <ul style="list-style-type: none"> <li>- Paid service, on free trial for 30 days. *free for students</li> <li>- More professional, meaning troubleshooting is typically at a higher level.</li> </ul>  | Could do all, for this; modeling, rigging, animation.  |
| <b>Cinema4D</b><br>              | <ul style="list-style-type: none"> <li>- simplistic and scalable tools, typically recommended as the best beginner friendly modeling and animation software.</li> <li>- redshift extensions/ real-time renders.</li> <li>- large sample file libraries</li> <li>- HDRi maps, lighting and rendering shader graphs</li> <li>- composites into after effects</li> <li>- displacement and noise effects that replicate ps1 vertex snapping.</li> </ul> | <ul style="list-style-type: none"> <li>- New software, new problems, would take time to learn.</li> <li>- Cinema4d can be very expensive on the rendering side.</li> <li>- paid only. Can be accessed with the maxon educational licence for about 20\$</li> <li>- default cinema4d does not work great with fluid animation and liquid sims.</li> </ul> | Primarily composition, lighting, post-process.         |
| <b>Unreal Engine 5.2/4</b><br> | <ul style="list-style-type: none"> <li>- Extremely high detail node based rendering and map modelling</li> <li>- Lots of free resources for modelling</li> <li>- I have used this product before for this purpose for a school project.</li> <li>- Lots of scriptability for animation, and animation triggering.</li> </ul>  | <ul style="list-style-type: none"> <li>- Meant for realistic and fully packaged objects.</li> <li>- 5.2 is very new and bugs are being found.</li> <li>- Cutscene composing is structured differently than my desired pipeline.</li> </ul>   | Primarily composition, lighting and limited modelling. |

**Software Justification:** For the actual production of this project; I plan to use Maya for creating models, textures, and animations. And then compiling/rendering with Cinema4D. This is because Maya for me is the best animation software for production, with its better rig and topology creation, and accessibility on lower-end devices such as laptops. Cinema4D however has the ability to apply noise to objects, which is similar to the ps1 vertex snapping effect, and is therefore needed to achieve this effect.

## Video and Audio composure software

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| <b>Adobe Premire Pro</b><br> | <ul style="list-style-type: none"> <li>- Has abilities for codecs, video and audio.</li> <li>- Audio and video layers.</li> <li>- Post processing effects (ontop of the Maya video baked in effects)</li> <li>- Used in professional contexts.</li> </ul> | <ul style="list-style-type: none"> <li>- Complex and made up of lots of mysterious tools.</li> <li>- Confusing troubleshooting.</li> <li>- I have never used it.</li> </ul> | Post-processing audio and video composition, effect production. |
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| <b>Adobe After-Effects</b><br>  | <ul style="list-style-type: none"> <li>- Has abilities for codecs, video and audio.</li> <li>- Audio and video layers.</li> <li>- much greater post processing effects (ontop of Unity baked in effects)</li> <li>- Used in professional contexts.</li> <li>- Ability to implement 3D effects.</li> </ul> | <ul style="list-style-type: none"> <li>- Complex and made up of lots of mysterious tools.</li> <li>- Confusing troubleshooting.</li> <li>- I have never used it.</li> </ul>                          | Post-processing audio and video composition, effect production. |
| <b>Microsoft Clip Champ</b><br> | <ul style="list-style-type: none"> <li>- Can edit video and audio composition easily.</li> <li>- limited effects and audio editing.</li> </ul>  | <ul style="list-style-type: none"> <li>- very unprofessional, limited range and function as a software.</li> <li>- No codec, required vetted files.</li> <li>- Only works with 1080p max.</li> </ul> | video audio composition.  |
| <b>DaVinci Resolve</b><br>     | <ul style="list-style-type: none"> <li>- Free and opensource, with a active support community</li> <li>- Audio and video layers.</li> <li>- limited range of preset effects and transitions</li> <li>- Used in personal project settings.</li> </ul>  | <ul style="list-style-type: none"> <li>- Bad default presets, limited import effects capabilities.</li> <li>- Keyframes problematic.</li> <li>- Freemium model.</li> </ul>                           | Post-processing audio and video composition.                    |

**Software Justification:** Premier Pro with its superior audio and video Composition, and After Effects with its highly modular and expansive library of effect production and implementation will allow me to implement all my desired camera tracking and styleised effects. Additionally, I have expereince with Premiere Pro, and learning After Effects will help further my understanding of the applications in use within the 3D animation industry.

## Documentation

| Product  | Positives   | Negatives   | Function  |
|--|---|---|---|
| <b>Google Docs</b><br> | <ul style="list-style-type: none"> <li>- Insert text, images and tables with specific formatting options with ease.</li> <li>- Capabilities for conversion between pdf, word, and docx formats</li> <li>- Easy to use and understand.</li> <li>- Comparable with the classroom directly.</li> </ul> | <ul style="list-style-type: none"> <li>- Not a proffessional program.</li> <li>- Not expandable or customisable past default layout options.</li> <li>- Generally basic.</li> </ul>                     | Documentation and formatting files with limited decoration. |
| <b>Canva</b><br>       | <ul style="list-style-type: none"> <li>- Insert images with frames and borders with interesting designs.</li> <li>- Formats and Layouts, and elements provided to add flair.</li> </ul>   | <ul style="list-style-type: none"> <li>- Unprofessional sometimes.</li> <li>- Can be very finicky if you're designing outside a format.</li> <li>- Only .PNG and .PDF on educational access.</li> </ul> | Documentation and formating files, with decoration.         |



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| <b>InDesign</b><br> | <ul style="list-style-type: none"> <li>- Professional, would be good to learn for the future</li> <li>- Insert images, text, tables, graphics with adjustments</li> <li>- Exports to .pdf, .indd, .Rich Text File, .TXT, .High Efficiency Image Format</li> </ul> | <ul style="list-style-type: none"> <li>- Lots of tools and abilities.</li> <li>- Lots of errors are possible</li> <li>- Patches and lots of updates required.</li> <li>- I don't like Adobe.</li> </ul> | Documentation and formatting files with professional decoration |
|---|---|---|---|

**Justification:** Google docs is a documentation tool I am very familiar with, and it will serve good purpose in writing my research and documentation to then port the text to InDesign, this has the advantage of real-time grammar and spelling checks that are far more functional and faster than InDesign's spell checks. It is worth mentioning that I have chosen Premiere Pro for its ability to edit audio with a vast and professional audio effects library. Because I will have to record my own audio, editing and mastering will be required to make it sound professional and not like my smacking rocks and metal together in a library.

## Exportation filetype

| Product                  | Positives   | Negatives   | Function  |
|--------------------------|---|---|---|
| .MOV                     | <ul style="list-style-type: none"> <li>- Lossy or loss-less</li> <li>- Video uncompressed</li> <li>- Cinema4D, Maya and adobe Premiere Pro can output as .MOV</li> </ul>  | <ul style="list-style-type: none"> <li>- Not available to be played on some devices</li> </ul>  | Moving files, production, audio and video         |
| .MP4<br>.WAV audio files | <ul style="list-style-type: none"> <li>- Larger uncompressed audio and video</li> <li>- Little to no upper limit on resolution going up to 8K</li> <li>- Audio sampling of 48-96kHz</li> <li>- Cinema4D, maya preferred output type and adobe Premiere Pro can output as .MP4 with default presets</li> </ul> | <ul style="list-style-type: none"> <li>- Very large file size.</li> <li>- Typically used for compressed files (can have very, very little compression)</li> </ul> | Transferring audio and video files.               |
| .MPEG3-4                 | <ul style="list-style-type: none"> <li>- Larger uncompressed audio and video file than .mp3/4.</li> <li>- Maya and Adobe Premiere Pro can output as .mpeg-4 .</li> <li>- Lossy or lossless.</li> <li>- Does not compress.</li> <li>- Industry standard.</li> </ul>  | <ul style="list-style-type: none"> <li>- Very large file size.</li> <li>- Can compress and reformat files with settings (kind of a positive).</li> </ul>          | Transferring and exporting audio and video files. |

**Justification:** .MP3 and .MPEG offer the most audio sampling, video quality and compression compatibility if I choose to compress. For this project storage isn't really an issue as I will be using my personal storage of 1 TB and google drive that can contain an infinite amount of files indefinitely. Additionally Maya, C4D and Premiere Pro have codecs for these file types, allowing transfer and decryption without conversion and compression.



|                 |  |  |  |
|-----------------|--|--|--|
| <b>.OBJ</b><br> | <ul style="list-style-type: none"> <li>- Vertex coordinate map.</li> <li>- Very precise.</li> <li>- The most universal 3D format</li> </ul>  | <ul style="list-style-type: none"> <li>- Cannot contain rigging or animation handles capabilities across platforms.</li> <li>- very big!</li> </ul>  | High feidelity 3D models                   |
| <b>.STL</b><br> | <ul style="list-style-type: none"> <li>- Sterolithography file contains some very smart mathematical mapping of very detailed models.</li> <li>- Contains alot of data for a simple 3D model</li> </ul>  | <ul style="list-style-type: none"> <li>- Very large file size.</li> <li>- Typically used for compressed files (can have very, very little compression)</li> <li>- No rigging or texturing</li> </ul>   | 3D printing.                               |
| <b>.FBX</b><br> | <ul style="list-style-type: none"> <li>- The most universal 3D animation format, contains geometry, rigging, animation, camera, and lighting information across platforms.</li> <li>- An exportation and import setting of pretty much every platform</li> </ul> | <ul style="list-style-type: none"> <li>- Looses accuracy or complexities of the original platform, this can be accounted by importation techniques, but inherently the animation has to be baked into its exact vertex simulations.</li> </ul> | Transferring files across platforms.       |
| <b>.ABC</b><br> | <ul style="list-style-type: none"> <li>- Alembic Caches are Mayas inhouse "highly portable and application independant" file type.</li> <li>- Stores geometry and vertex movements.</li> </ul>   | <ul style="list-style-type: none"> <li>- Stores all movements as hardest vertex positions, making it impossible to edit.</li> </ul>  | Transferring animtion data (mainly to C4D) |

### 3D software modelling and animation file types Justification:

To utilize this workflow, I will need to have compatible file types and methods of smooth transfer, here are many choices for 3D object and animation storage that Maya uses; but only a few of them fit the criteria of this project.

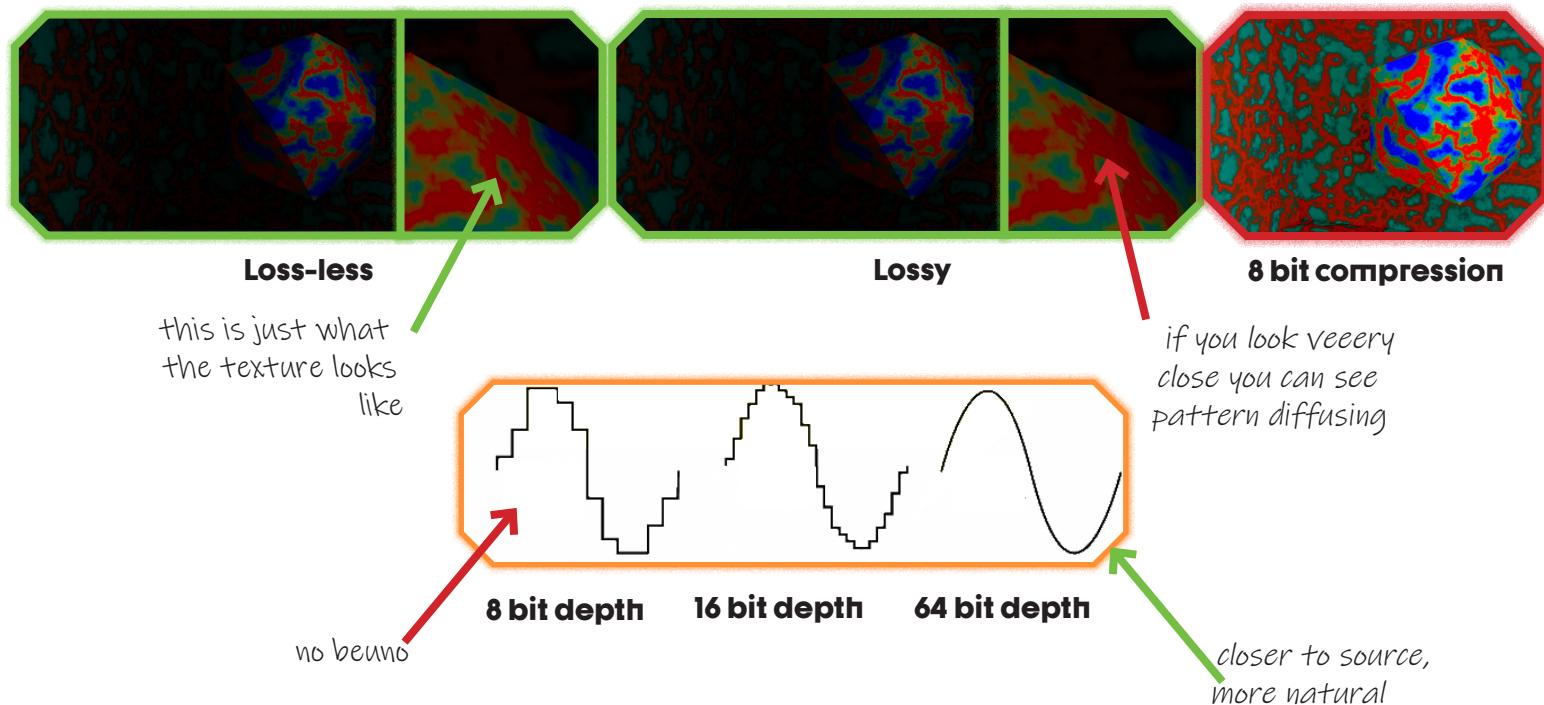
Because I am working with both Maya for modelling, rigging and animation, and Cinema4D for compositing and rendering, I will use these filetypes to bake and store my final animations in maya, and port them to cinema4D for "high-level" rendering. .FBX's and .ABC's will store the baked animation data and the map models and lighting compositions. This will allow me to port animations to C4D, with varying use cases.

But for the meanwhile, I will use **.ma(Maya ASCII)** and **.mb(Maya Binary)** files for local storage of my maya files, as they store maya files in their base form, using maya methods, meaning their file interpretations of the data is most accurate to how it looks in the development environment.



## Compression methods, video, image and audio

| Method                      | Positives  | Negatives  |
|-----------------------------|--|--|
| <b>Lossy</b>                | - Barely recogniseable compression from distance<br>- based on the level of compression, it is barely noticeable, especially under consistent lighting | - does not fully capture dynamic range of audio or pixels<br>- noticeable when looking<br>- Lossy uses compression algorithms to flatten and average colours, creating noticeable contrasts between colours. |
| <b>Loss-less</b>            | - Maintains full dynamic range<br>- only removes non-visible meta data   | - large files reduce sharing speed   |
| <b>16 bit audio</b>         | - Smaller storage space<br>- Efficient dynamic range   | - lower bit rate and bit depth means that the bits that are captured are generalised to a simpler rounded form   |
| <b>32-64 bit audio</b>      | - Little to no recognisable compression.<br>- 64 bit being the maximum possible, no compression.   | - Much larger file sizes<br>- Some devices cannot render x64 bits and will reduce audio.   |
| <b>8-32 bit depth image</b> | - reduces file size significantly<br>- if done right, this is un-noticable<br>- exportation setting for photoshop                                      | - most settings have some major flaw with conversion.<br>- not really necessary  |



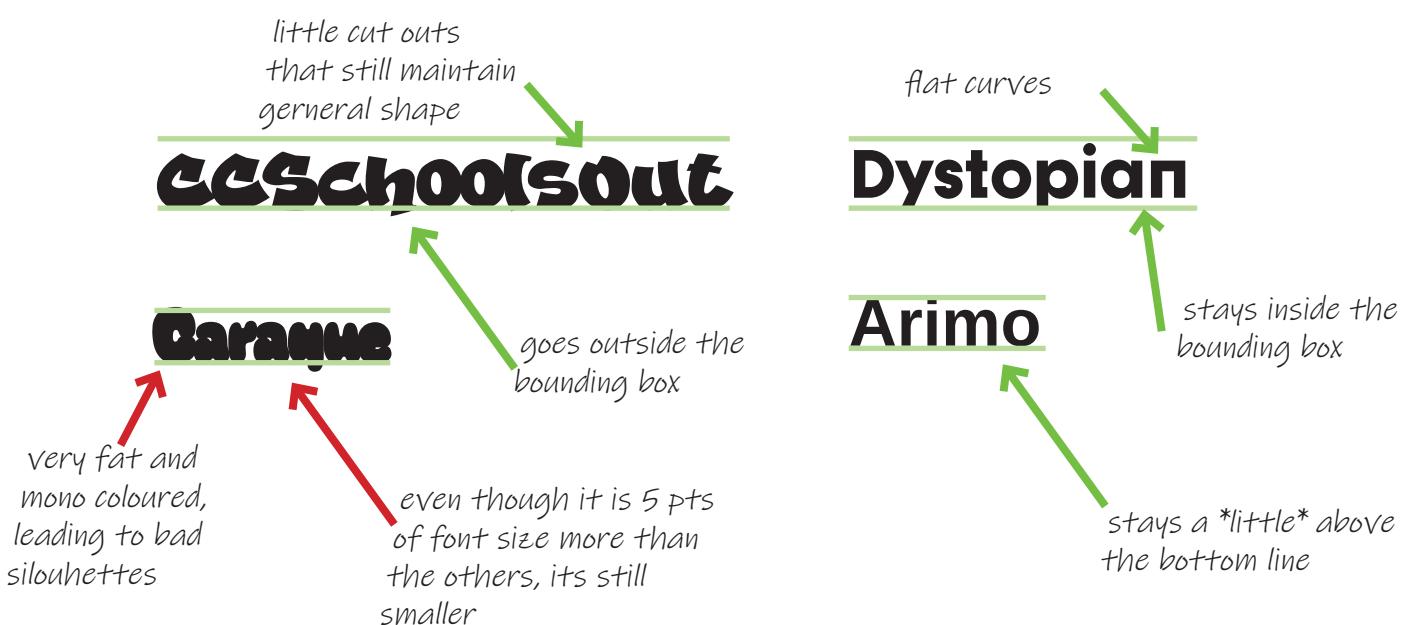


## Typography

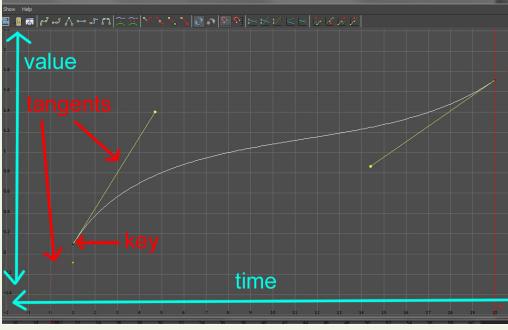
| Font pair  | Positives   | Negatives  |
|--|---|--|
| Dystopian<br>Arimo                                   | - Stylistic with matching serif style<br>- Still readable and clear, even when bold and packed.                                     | - Too much style looks unprofessional<br>- Less readable than just normal boring fonts                                   |
| Interstate<br>Mono<br>Joly display                   | - Very readable<br>- Readable title font, and readable and compact paragraph font.  | - Interstate mono looks bland<br>- Joly display looks a bit tight and thin to be legible and easy to read for long times |
| <b>ccschools<br/>out</b><br><br><b>Caraque</b>       | - Dynamic style that matches with the aesthetic of the project.<br>- lots of character with minimal effort<br>- Very technical font | - The paragraph style is almost completely unreadable.<br>- Title font is somewhat unreadable                            |
| <b>News<br/>Gothic Std</b><br><br><b>New science</b> | - Font pair I used in my last project, and it carries style and readability.<br>- professional looking                              | - A bit sciency, not fitting the style of this project.<br>- Paragraph font is a bit spaced out                          |

**Justification:** The style and readability of Dystopian and Arimo as a font pair for the page contents will allow for readability while conveying the vibe of the project. Additionally using CCSchoolsOut for the titles but not Caraque will provide extra style and flair/ differentiation.

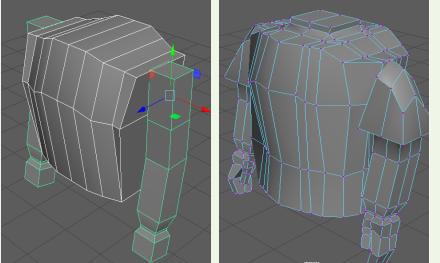
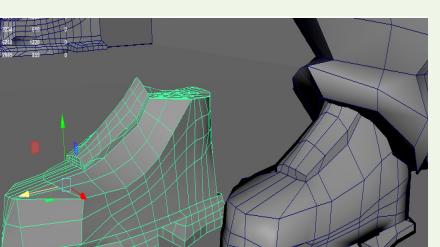
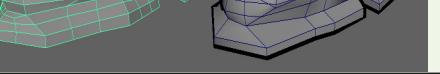
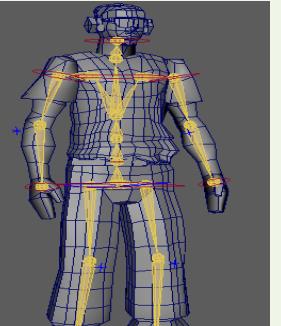
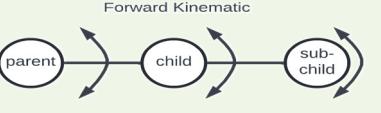
Overall Dystopian, Arimo, and CCSchoolsOut convey the tone of this project as a “style exploration” and their pairings allow for clear differentiation between texts without being disoriented.





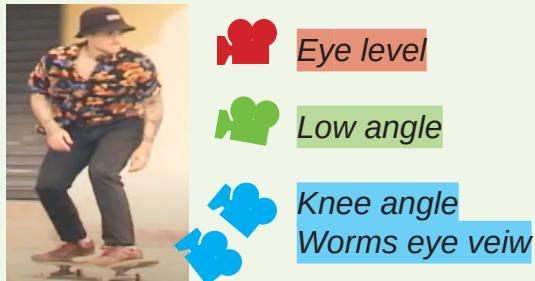
| Technique                  | Explanation   | Example diagrams  |
|----------------------------|---|---|
| Sequencing/ Compositioning | The composure of video and audio clips with comprehensive connected arcs or links. Such as the scene to scene tone in subject matter or audio tonality matching the previous.   |  <p>PLACEHOLDER FOR AUDIO MIXING OF EACH SCENE</p>  |
| Transitioning              | Adjacent to composition is the implementation of transitions between each clip is important to the cohesive product.  |   |
| Animation                  | <p>Whether its changing up rotoscoped scenes, or freehand animation, they key to good animation is the 12 animation principals;</p> <ol style="list-style-type: none"> <li>1. Squash and stretch</li> <li>2. Anticipation</li> <li>3. Pose-to-pose</li> <li>4. Overlapping action</li> <li>5. Slow in and slow out</li> <li>6. Secondary action</li> <li>7. Exaggeration</li> </ol> <p>8-12 are about solid drawings, appeal, arcs, etc that don't really apply to 3D animation<br/> <i>But these principals will be paramount in the production of this product.</i></p>   |     |
| Skate video recording      | <p>The recording of skate videos is a very long standing traditional subgenre. It is hard to put into words, but the shots and camera techniques in use have a specific code.</p> <ul style="list-style-type: none"> <li>• They typically contain some 'candid' outtakes at the start and end that expose the authors and actors within the product.</li> <li>• Depending on the subject matter or location, there are also establishing shots</li> <li>• Outtakes are left in intentionally.</li> <li>• And scenes are typically done with wide angle lenses, and on a board with the recorder down low and stabilising the camera.</li> </ul> |  <p>Establishing shot</p>  <p>POV shot (low angle)</p> |



|           |  |   |
|-----------|--|---|
| Modelling | <p>The act of 3D modelling is the creation of objects in a 3D modelling software, which is then molded through a variety of techniques into a final form. But to ensure the model is of professional standard, and to inform of how this process is completed, there are some “principals of modelling” aswell;</p> <ol style="list-style-type: none"> <li>1. Block out with the primitives, having a shape is better than none</li> <li>2. Topology should be intergrated early, meaning models shouldnt have un-uniform or manifold geometry.</li> <li>3. The above step also includes the intergration of loops.</li> <li>4. Stick to one type of shape for uniformity</li> </ol>   | <p><i>Starting with blocks</i></p>  <p><i>Extruding Subdividing</i></p>  <p><i>Improved uniformity</i></p>  <p><i>Cleaner loops</i></p>  <p><i>Maintained shape</i></p>  |
| Rigging   | <p>Rigging is the intergration of a skeletal control system to a 3D model. The main distinctive attributes of rigging are;</p> <ul style="list-style-type: none"> <li>• Inverse Kinematics, the kinematic control structure that has at least 3 joints, with the 3rd joint being the independant variable that the other 2 joints will move in relation too, like a hand to the sholder.</li> <li>• Inverse kinmatics requires the inclusion of multilpe constraints between the parent and subchild, and the child will typically have a pole vector constraint aswell to complement natural skeletal movement, but is not explicitly necesary.</li> <li>• And Forward Kinematics which is most simply put as each joint has a parent, and they share rotation.</li> </ul> <p>This allows for the least pose ability, as to reach each pose you have to move each limb, but because of how simple it is, this could be preferable for simple/rigid objects, such as chains, fingers, etc.</p> | <p><i>General rig skeleton. Each joint connects to the movement of the mesh to a set of movements</i></p>  <p><i>Forward kinematic each joint has parent rotation</i></p>  <p><i>Inverse kinematic the parent and the child have constraints to move to “fit” sub childs position</i></p>   |

**Discussion/Justification of selected researched methodologies:** throughout this project i will need to follow the techniques mentioned in this table. Some preliminary research about skate video formating, composition, transitions and modelling, animation and rigging principals will be very usefull down the line. Additionally, the exploration of how animation and rotoscoping can work together has changed my pipeline production.



| SHOT              | Explanation  | Example diagrams   |
|-------------------|--|--|
| Shot Sizes        | <p>All shot sizes describe how much of the character is in view of the scene.</p> <ul style="list-style-type: none"> <li>Close ups are from the face to the shoulders.</li> <li>Medium shots are torso and below to the knees.</li> <li>Full shots describe below the knees. These shots define the "intimacy"</li> </ul>  |  <p>Extreme - Full Close up shot<br/>Close - Full medium shot<br/>Cowboy/Medium full<br/>Full shot</p> |
| Shot Angles       | <p>All shot angles describe the angle the camera is in relation to the character or subject within the shot.</p> <ul style="list-style-type: none"> <li>Eye level shots are level with the character's eyes, and are typically close ups</li> <li>Low angles are level with the torso</li> <li>Knee and worm eye views are below the character looking up</li> </ul> |  <p>Eye level<br/>Low angle<br/>Knee angle<br/>Worms eye view</p>                                     |
| POV shot          | <p>POV shots include camera that contains some form of perspective in the form of field of view, at a close up to medium distance that closely represents a perspective of the human eye.</p> <p>These are common place in skate videos as representations of the author journey.</p>  |  <p>POV ECU      POV low angle MCU</p>   |
| Establishing shot | <p>The technique of using a shot to establish the location or subject matter of the sequential scenes.</p>   |  <p>Establishing shot shows the location</p>   |

## Camera Movement

|               |   |   |
|---------------|---|---|
| Tracking shot | <p>The technique of using a shot to follow a character throughout a scene. In this example the recorder is following the actor at a low angle.</p>                              |  <p>This is typically achieved via another skater with a camera</p> |
| Whip shot     | <p>The technique of using a very quick camera pan to switch between two subjects in one scene. In this example it's going from establishing shot with a whip to the action.</p> |  <p>The camera quickly whips to the</p>                             |
| Static shot   | <p>Contrary to the previous camera movements, this one simply has none. This helpfully portrays the "real" speed.</p>   |  <p>The skater goes very fast compared to the camera.</p>           |



| Function  | Considerations  | Materials And diagrams  |
|---|---|---|
| <b>Pre-Production:</b><br>• Initial Idea • Story boarding • Sketching • Proof modelling • basic shading and textures  |   |   |
| <ul style="list-style-type: none"> <li>Create ideas for production, create plans for animation and visualise ideas for projects.</li> <li>Generate basic models, and prepare models for rigging and stretches.</li> <li>(include images)</li> </ul> <p>This will give me a better view and idea of how to animate and produce the later parts of the project, while providing the materials in use.</p>   | <ul style="list-style-type: none"> <li>Long process if not stopped.</li> <li>Ideas can get lost or detrimental altered.</li> <li>Drawing is hard.</li> <li>models may need to be changed for the final rig.</li> <li>texturing and UV mapping is time consuming.</li> </ul>   | <ul style="list-style-type: none"> <li>Drawing paper converted to png for documentation.</li> <li>Maya for modelling</li> <li>Photoshop for texture production</li> </ul> |
| <b>Modelling, sketching</b>   |   |   |
| <p>To create a PS1 style aesthetic, with the enhancements of modern technology, such as the inspirations listed from bombrush cyberpunk; the process I used is as follows:</p> <ol style="list-style-type: none"> <li>1. Create a low poly human (main first commit)</li> <li>2. Draw an outline of him and then add stylisations etc, until the design is complete.</li> <li>3. Model the sketched ideas.</li> </ol> <p>To generate storyboards, I take inspiration from the skateboard video, and original scene ideas such as the billboard scene, with refinements based on preliminary models and map designs.</p> | <p>Drawings and models are not final at this stage, the model may need to be changed for rigging, or rendering purposes.</p> <p>This also goes for the storyboards, as with the productions of the maps, models, and animation, the storyboards may be changed to allow for better or worse compatibility to the original idea.</p> | <ul style="list-style-type: none"> <li>Maya for modelling</li> <li>Paper and pencil, then pen for sketches</li> </ul>   |
| <b>Rigging</b>  |   |   |

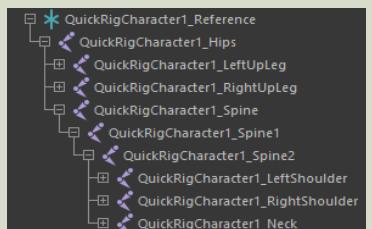


Because this model is pretty far away from the camera most the time, and the model is very low poly, this means that **weights cannot be as fine tuned, as they are applied by verticie**, and this impacts the rigging process, which is as follows;

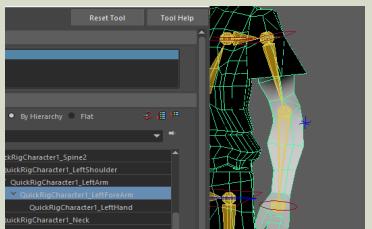
1. Once model is completed, remove all transform, history, and all meta data from every object that creates it.
2. Using the auto humanoid maya rig-er generate the basic skeleton of the model, this will be the 'OG' rig.
3. Create two instances of the model, one will be 'FK rig', another will be 'IK rig', and seperate them by layer groups.
4. The 'IK rig' works via inverse Kinematics, and a different constraint heirarchy to the 'FK rig', see *processes, rigging IK v FK for more detail.*
5. Add control NURB's that are parented to the rotational and positioal parts of the rig.
6. In the connection editor, connect all IK parts for each limb to be connected and based on the inverse boolean solution of if the FK is on or off, and vise versa for the FK
7. In the attribute editor enable this boolean solution to be chosen in the OG rigs attributes.
8. Once all of these steps are complete for all limbs, bind the OG rig to the model, now each limb should have an IK/FK switch that is accesable via the OG rig.

- Rigging is very very time consuming and erroruous.
- Lots of tutorials and time spent on this step, so it should be completed early before animation.
- As stated, the low poly nature of especially the arms, mean that the weights for moving them will be choppy no matter what, so they will just be dealt with as disconnected from the body.
- placeholder for arm image
- Making the constraint nurbs should be done with as much future proofing as possible, such as making sure control nodes are placed at 0\* rotations, and are oriented all the same plane from the body.
- Thankfully, the only rigging that needs to be done is limbs, but not anything for the face, which is typically the most technical process.
- This also needs to be done with the skateboard, making the trucks and wheels move with turns and movement.

- **Maya for modelling and rigging.**



*Charecter joint heirarchy  
(children inherit movement from parent)*



*Joint movement weights  
(the closer to white the vert is, the more that mesh moves with the joint (yellow))*

## Texture Production



24

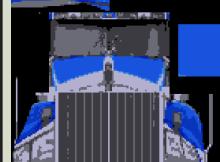
To make PS1 style textures

1. Creating and generating the UV maps into the desired splits, with all faces from each plane organised by materials
2. Importing reference images, for example:
3. Editing it to fit within maya UV map (insert a image here)
4. Shrinking the image to 256x256 or 128x128
5. Exporting it with save for web legacy with pattern dithering with 32, 16, or 8 colour swatches.

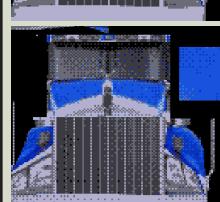
Additionally I could use pixel art software or photoshop with a pixel brush to hand paint each texture, but to save time, the usage of the pattern dithering reflects this aesthetic with minimal work (The exportation process should only happen once, the pattern dithering effect will compound and look really bad)

- UV map should be the basis of design, it's easier to make images for the UV map rather than the other way around

- **Maya for UV map editing**
- **Photoshop for production and exportation effects.**



No dither



Pattern

## Production

### • Animation production • Background production

- Use storyboarding to create a basic map made up of viewable parts of the map.
- Basic animations and keyframing with models, for script and scene layouts, then filling in inbetweens etc etc
- Going back and forth to generate good models for final animation and rigging.

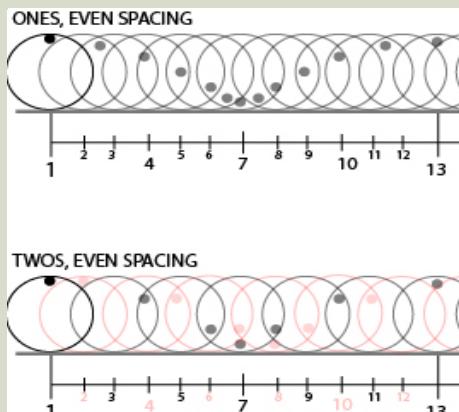
- Intensive animations at this stage could be detrimental to the time efficiency and overall production of the project as I will have to remake these.
- This is a major part of the production pipeline.

- Maya for modelling, animation and rigging
- Cinema4D for basic composition of keyframes.
- Drawing paper for more scripts.
- Docs for written scripts?

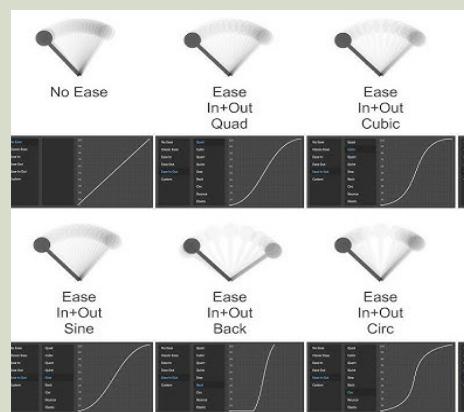
## Animation methods



|   |   |   |
|---|---|---|
| <p>SpiderMan: Into The SpiderVerse uses a mixture of 24 with a change on every frame and 24 with a change on every second frame ( or 12 fps). This creates a choppy effect or a more “crisp” movement outline.</p> <p>Implementation of this includes creating animation rules keyframes that change on every second frame.</p> | <ul style="list-style-type: none"> <li>To create animations with fluidity, I will probably switch to 24 FPS on 1's for long distance shots, and 12 FPS on 2's for close ups.</li> <li>SpiderVerse had characters with individual frame rates, this require alot of consideration to properly implement.</li> <li>Because this is rotoscoped animation, interpolation methods will come into play from 60 to 24 fps changes</li> </ul> | <ul style="list-style-type: none"> <li>Maya for modelling, rigging, animation.</li> <li>Cinema4D for composing scripting and lighting</li> <li>Premiere Pro for audio, post-process effects.</li> </ul> |
|---|---|---|



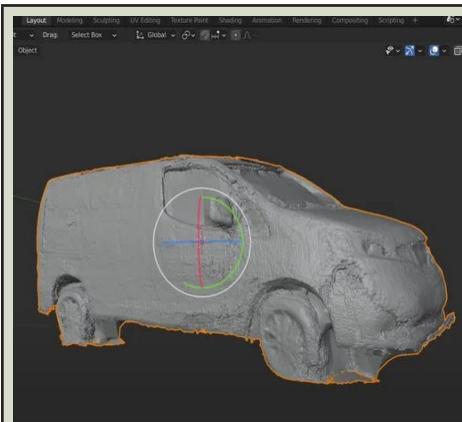
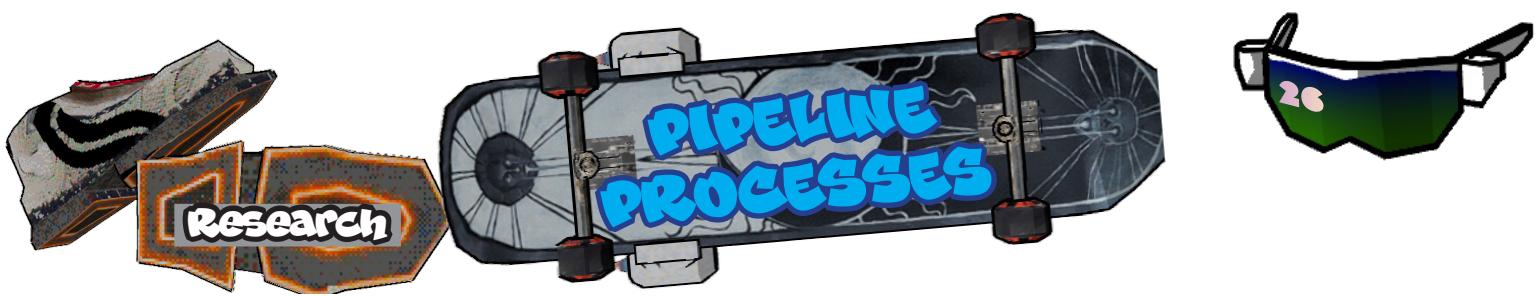
Difference between on ones & twos



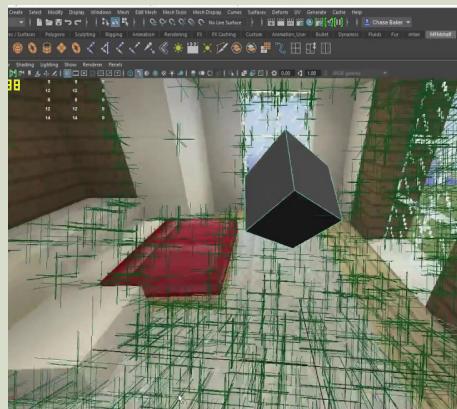
tween versus no interpolation

## Background production

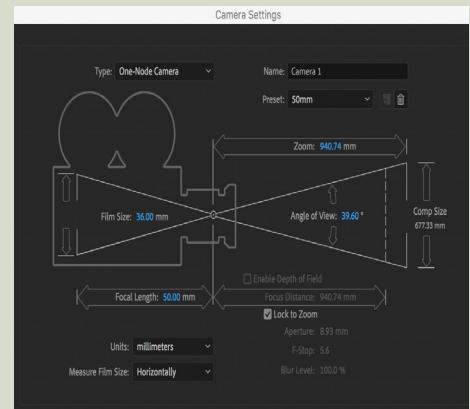
|  |  |  |
|--|--|--|
| <p>As mentioned before this includes using the storyboards to create the basic parts of the map, but aswell for consistency across scenes, I will re-use “set pieces” of things like the road and sidewalk, which is already made up out of segments.</p> <p>And to create the skyboxes and generally un see-able stuff, I will use an AI skybox generator to save time</p> <p>Additionally, to create the obstacles in use by the rotoscope clips, I will use images and general scaling to recreate their shapes within my maps.</p> | <ul style="list-style-type: none"> <li>the segments cannot be completely modular due to the UV mapping limitations.</li> <li>I will have to make maps that reflect that of the rotoscoped video for good rotoscoping scenes.</li> <li>The skyboxes need to be tailored and processed to match the scene</li> </ul> | <ul style="list-style-type: none"> <li>Maya for modelling, UV mapping</li> <li>Photoshop texture image production.</li> <li>skybox AI's such as some claude and openAI models</li> </ul> |
|--|--|--|



The innaccuracy of Lidar scans



After effects camera mapping in maya



After effects 2D to 3D camera

## Animation production

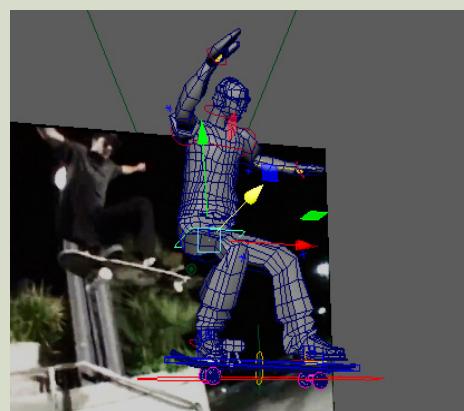
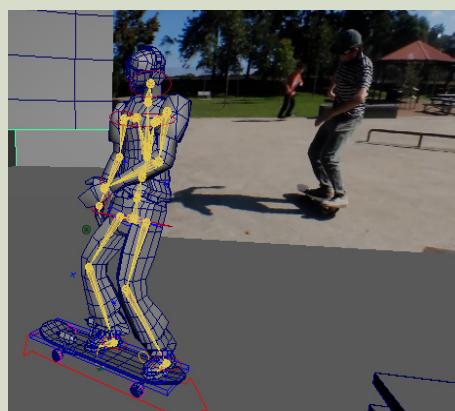
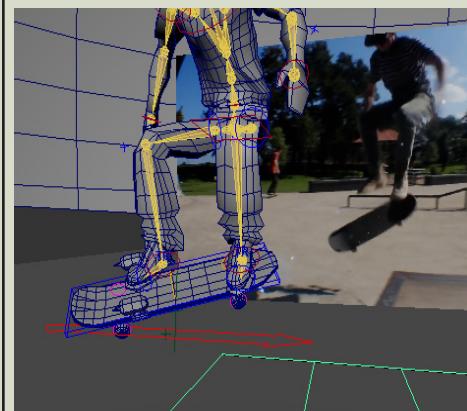
Once backgrounds, and storyboards have been composed, if they are rotoscope scenes;

1. Import the reference video to Maya
2. Create a projection plane and reference points with After Effects projection mapping features
3. Create rough blocks of every second where the character should be.
4. Then animate specifics such as speed or tricks on the inbetweens.  
see *rotoscoping process* for more

meanwhile, some scenes are completely freehand and follow a similar process, just without the literal video reference

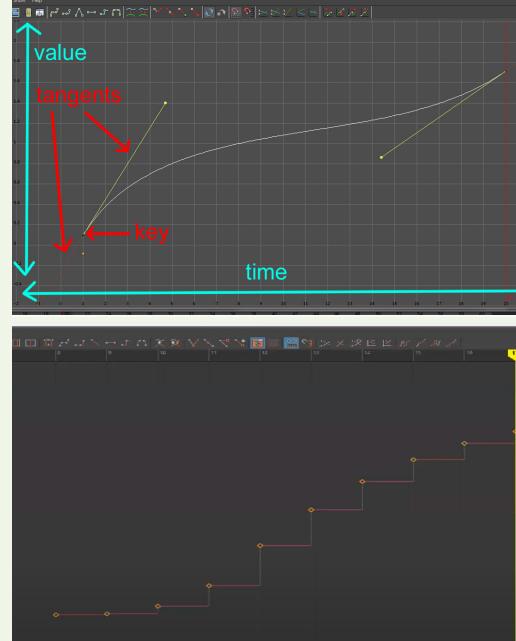
- Could just rotoscope whole scenes, but implementation of rockets or new tricks will have to be new and freehand
- After effects projection mapping and camera tracking features are new to me
- Freehand animation is something that is very hard to do for skateboarding, as the physical realism of the pushing and kicking is hard to replicate without reference.

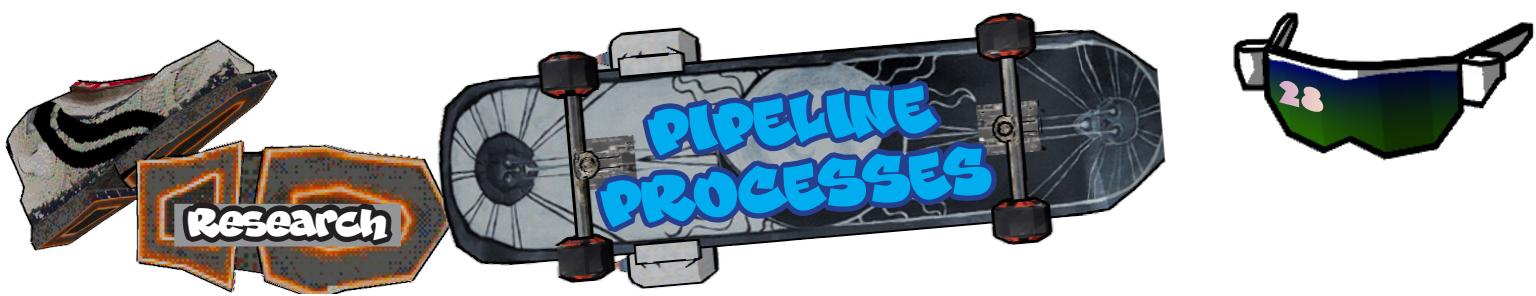
- Maya for modelling, animation
- After Effects for projection, camera and scene mapping

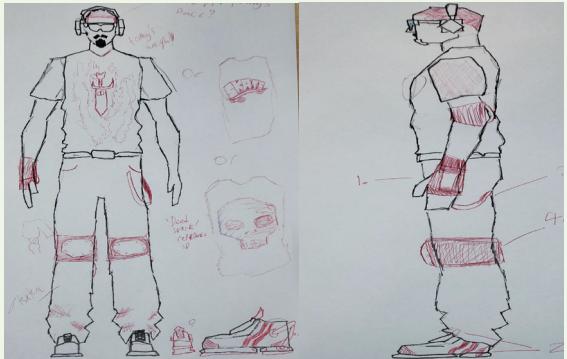
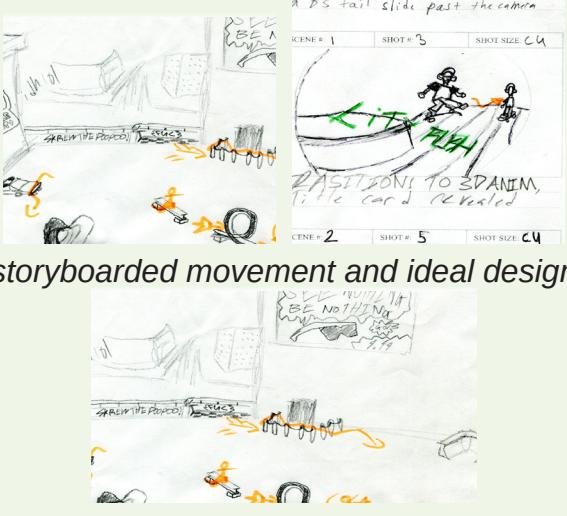


**Place holders for rotoscoped v blocked out scenes.....sorry!**



| Process          | How it is utilised   | Materials And diagrams   |
|------------------|--|--|
| Animating on 2's | <p>Typically, 3D animations have a frame rate, which dictates the refreshrate of the models movement. Because I want to animate on twos how-ever, this meanst that the animation will be created on 24 fps, and then only updated every 2 frames or so, this means that I will have to follow the steps below;</p> <ol style="list-style-type: none"> <li>1. Create the animation, decide which parts are on 2's and which aren't</li> <li>2. Bake the animated sequences on 2's with the dedicated maya settings</li> <li>3. Apply the zero tanget settings.</li> </ol> |   |
| Rotoscoping      | <ol style="list-style-type: none"> <li>1. Take footage of your desired scene, typically composed with the idea of animation in mind.</li> <li>2. Create the map of the world the rotoscope takes place.</li> <li>3. insert the models for the charecter.</li> <li>4. Then, going frame by frame, match the animation to the live action video.</li> <li>5. Revise the animation to be more fluid or more appealing with small tweaks to posture.</li> </ol>  |  <p>Seen here, they use the video as reference, but ham up the comical / expressive parts of the animation</p> |



|   |  |  |
|---|--|--|
| Rotoscope mapping   | <p>There are many methods to do this part. Some are LiDar scans or depth mapping with after effects etc etc, this typically ends up with stuff like missing faces, high face counts, or just generally bumpy and inaccurate maps. There is longer more manual methods such as camera and object projection, which involves a few basic steps:</p> <ol style="list-style-type: none"> <li>1. Create a projection plane camera.</li> <li>2. Block out the basic shapes and dynamic interactables</li> </ol>  |  <p><i>After applying a projector plane, all materials are projected onto, lining up the vertexes and faces is all that's needed.</i></p>                      |
| Story board, and character design<br>- sketching<br>- modelling | <p>For the production of storyboards, for the most part, I used free hand drawing, but as the first model prototype was developed, I could utilise it as a pose reference, so my process changed to the following;</p> <ol style="list-style-type: none"> <li>1. Create the desired sketch on paper</li> <li>2. Pose the 3D maya model into the sketched pose, and then Trace the model.</li> <li>3. Then trace or draw out the peripherals of the scene dependant on map progress in production.</li> </ol> <p>And for the Character designs, I used the methodology of the following;</p> <ol style="list-style-type: none"> <li>1. Trace the model with pencil then black pen, then rub out pencil for clean lines.</li> <li>2. Add desired additions to the character in red pen.</li> </ol> |  <p><i>Storyboard diagram</i></p>  <p><i>Character design diagram</i></p> |
| map prototyping<br>-sketching<br>-modelling<br>-quality control | <p>After creating the storyboards or planning scenes with a rotoscope clip in mind; the map needs to be created around the rotoscope or storyboard.</p> <p>This involves;</p> <ol style="list-style-type: none"> <li>1. Sketching the full view of the map including all visible parts in the storyboard.</li> <li>2. Editing geometry and scale to match reference</li> <li>3. Adding sufficient background props and folly.</li> <li>4. Then animating and scrutinising map details and fixing them accordingly</li> </ol>   |  <p><i>storyboarded movement and ideal design</i></p>  |



|                   |  |                                       |  |
|-------------------|--|---------------------------------------|--|
| Shader production | <p>Maya offers a multitude of toon shading options, these include;</p> <ul style="list-style-type: none"> <li>• Shaded Brightness ramp shaders ( with linear cut offs for light and dark regions)</li> <li>• Light angle tones</li> <li>• Circle highlights ( that are modified ramp shaders with normal based calculations for each object it is applied to)</li> <li>• Solid colours</li> </ul> <p>To pick between these different shader options, we need to weigh in the usability of each within the use cases of this model.</p> <p>Shaded Brightness three tones, are by far the simplest, and easiest to apply. On the sometimes sharp geometry of this mesh, the middle gradient option makes it smoother.</p> <p>Light angle tones have similar colouring effects of brightness ramp shaders, but because of the low poly nature of this project, the sharp edges look weird under angular lighting.</p> <p>Circular Highlights and Solid Colour shaders have their niche use cases, such as shiny materials, like eyes, sunglasses, some glossy materials like glass in buildings, but aside from this they should not be used on complex models, because the circle will be applied to each part, and the solid colour will stand out in the other shaded objects.</p> <p>But all of these ONLY work with maya software; which only utilises memory and CPU for rendering. Instead I used kamone416 's custom dx11shader "MayaHardwareToonOutline". <b>This was a form of outsourcing, but a necessary one;</b> as creating these material shader graphs would be time consuming ( as I would need specialty software to compile into a .fx file) and unoptimised, as I would be compiling and restructuring each time. This produced magnificent and efficient results.</p> |                                       | <p>Seen above is the different settings of the shaded brightness ramp shaders</p>            |
|                   |  |                                       | <p>And how they render</p>   |
|                   |  | <p>Angle two tone shader settings</p> |  |
|                   |  |                                       | <p>The highlighted areas are unwanted artifacts, or unshaded areas that should be shaded</p> |
|                   |  | <p>Maya Toon Outline</p>              |  |



## Post-production

- Final compositing
- Final rendering
- Post animation effects
- Hand-drawn impact frames

|   |   |   |
|---|---|---|
| <ul style="list-style-type: none"> <li>• At this point all animations and models are finished.</li> <li>• Composition with completed animations.</li> <li>• Adding audio sound effects to match.</li> <li>• Creating and including impact frames, 2D effects, and filters.</li> </ul> | <ul style="list-style-type: none"> <li>• Even larger part of the production process with lots of polish to animation and models.</li> <li>• Technical skill for looking good</li> </ul> | <ul style="list-style-type: none"> <li>• Maya for modelling, rigging, animation.</li> <li>• Cinema4D for composing scripting and lighting</li> <li>• Premiere Pro for audio, post-process effects.</li> </ul> |
|---|---|---|

## Final rendering

|  |   |  |
|--|---|--|
| <ol style="list-style-type: none"> <li>1. Baking the model and rig, and then baking the vertex animation into a cache file for transport into Cinema4D.</li> <li>2. Applying a animated noise map to the objects will make the vertices “wobble” when the camera moves relative to the object</li> </ol> | <p>This could not be done in maya to my knowledge, but in Cinema4D is easy to do this, but; Porting an animation means it will almost always lose a little bit of quality. If this loss is too much, I will reconsider the implementation of this step.</p> | <ul style="list-style-type: none"> <li>• Maya for the content</li> <li>• Cinema4D for the rendering processor</li> </ul> |
|--|---|--|

## Post animation effects, impact Frames and Final composition

|  |  |  |
|--|--|--|
| <p>To immerse the viewer more in the style, I will use filters such as analog/digitise effects that show all of the “data” behind the drone, and then the effect will fade out as the shot becomes bigger/ in focus.</p> <p>//depending on time, I will use premiere pro to create impact frames of the video of the animation, and add onomatopia “3D” text over top the image for extra “style points”</p> | <p>Porting an animation means it will almost always lose a little bit of quality, if this loss is too much, I will reconsider the implementation of this step.</p> <p>I also need to actually do it...</p> | <ul style="list-style-type: none"> <li>• Maya for the content</li> <li>• Cinema4D for the rendering processor</li> </ul> |
|--|--|--|

another place holder for when i actually do this step cus like seriously!



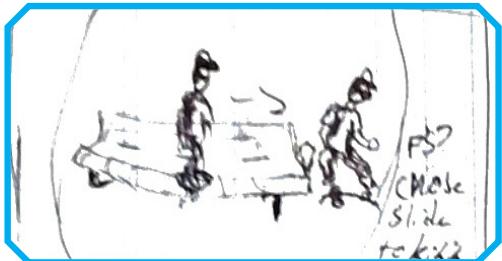
## Research



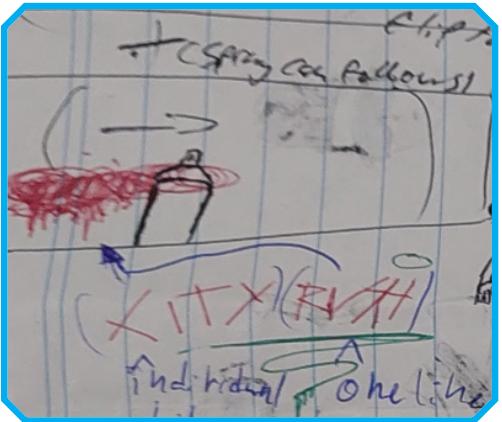
This was my first brain storm for the character outline and animation key points. I made this idea of a little guy inspired by Marty McFly from Back to The Future. And Tyrce from BombRush-Cyberfunk. I also expand upon the peripherals of the character, as I would have to end up modelling these. But the idea of the character wasn't really complete to me.



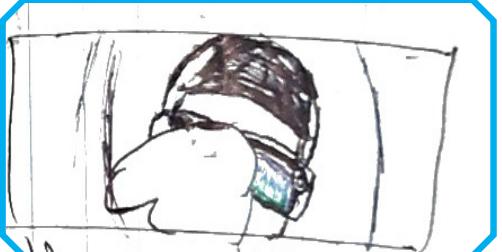
So I created some more initial sketches to get some new ideas for the character's shape, with different components etc etc. I kept some of the old components, and I wanted to do a robot design, that would stay stabilised during movement, which would be easy for me to animate. But cool skater man is cool.



With this original idea I wanted to draw out my original ideas of a storyboard, mainly for the intro transition. From a real life clip, to a spray paint transition to the animated world with a drone establishing shot.



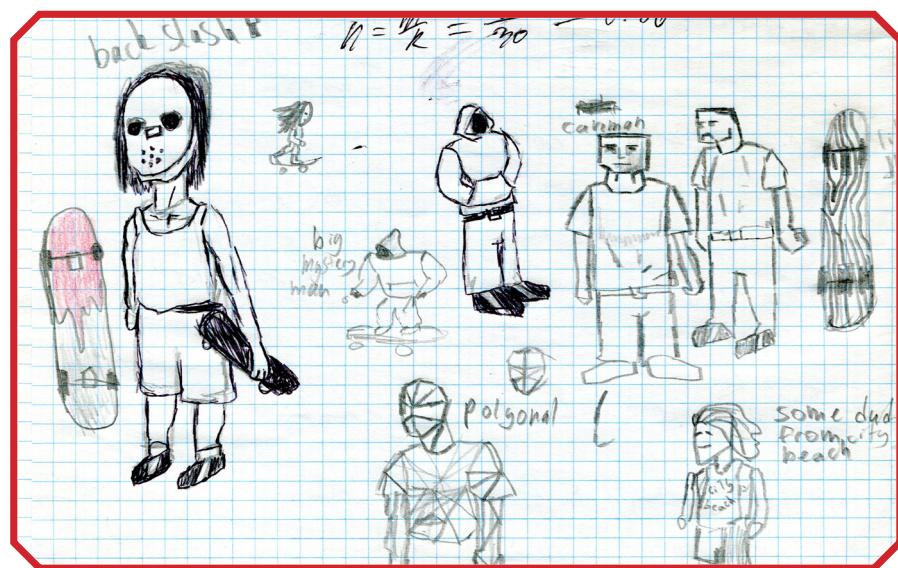
With this original idea I wanted to draw out my original ideas of a storyboard, mainly for the intro transition. From a real life clip, to a spray paint transition to the animated world with a drone establishing shot.





Then with some general concepts and themes decided on, I branched out into multiple character prototypes. Each character would have a different skating style, such as the hooded character being very low to the ground and menacing, or the caveman skating very simplisitically with very gruntish movements. While overall I wouldn't end up using these characters, the ideologies of board expression became more obviously important to me.

Additionally I worked on character design styles, like board, shirts etc, battling with ideas for camera FOV from the sunglasses, batteries on the board, or sticker or graphic centric style.



Then I went on and developed the ideas for the two main characters that I thought had the most promise as fully modeled and animated characters.



these are the “signature” moves for the character designs.

The hoodie guy was “going” to have his own animation...





10  
Research



Fig 1

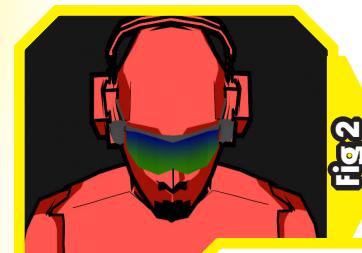


Fig 2



Fig 4



Fig 5



Fig 6



Fig 7



Fig 8



Fig 10

After creating my initial 3D model (fig 1), I could use tracing to develop my ideas for additions and storyboarding.

This assisted in the development of production, and revisions of model to be closer to what I originally wanted to create, as some parts are easier to critique and point out when looking at on paper compared to my original ideas.

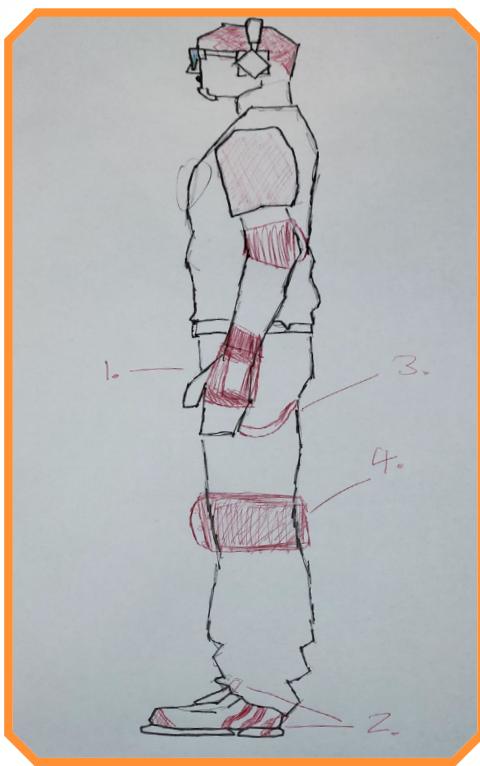


Fig 9

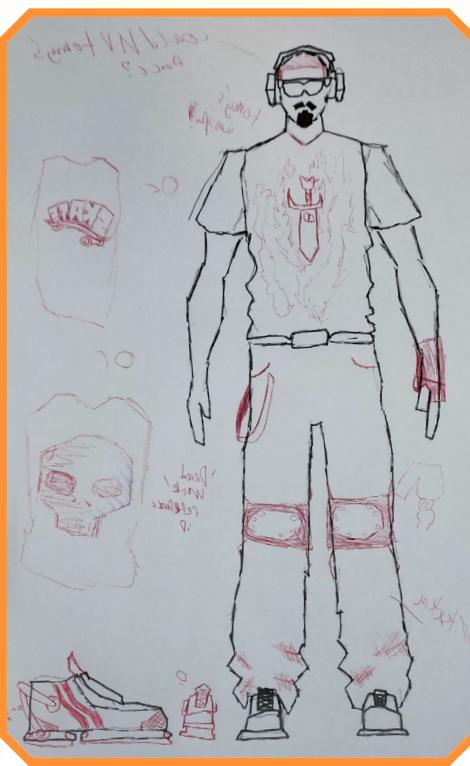
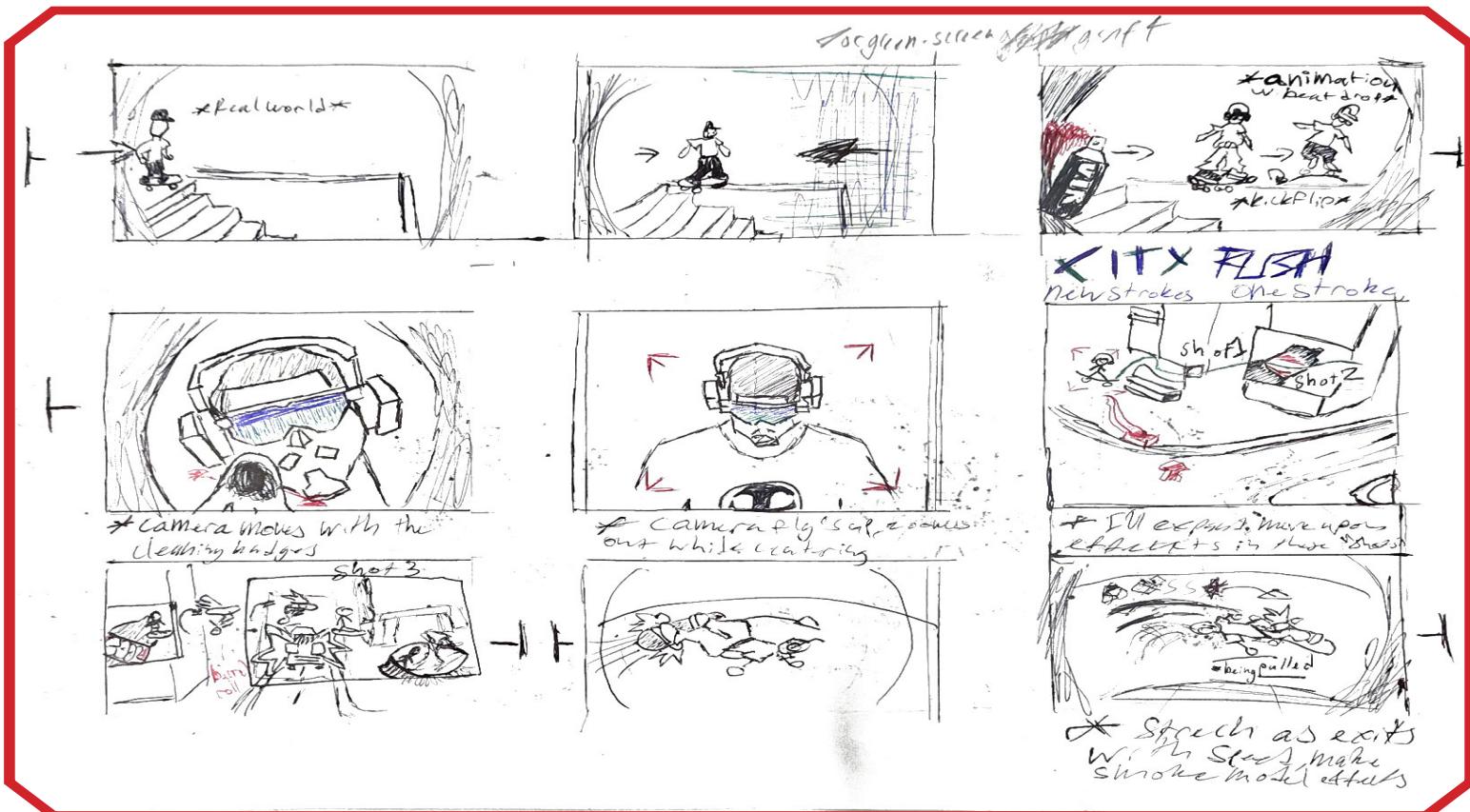


Fig 8



**Fig1**

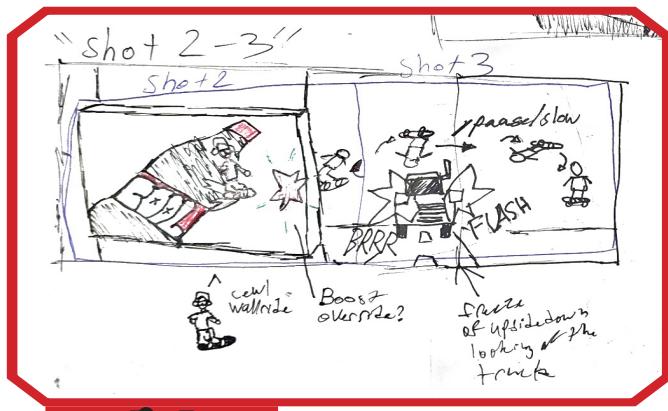
After the Final character sheet was created, and the additions were made, I moved on to the creation of the “main storyboard”, A collection of shots that I definitely wanted to be within the final production, and if I didn't end up getting enough rotoscope footage done, I would definitely put these scenes in.

in the 6th and 7th shots,(fig 1) I wanted to expand upon my vision for these scenes more, so I created separate panels for each significant shot. (fig 2-3)



**Fig2**

In this shot, the green arrow represents when the magnet boots initiate and the effect for the boots takes place, and then at the red arrows, the rocket boosts take place and the board spins into a straight trajectory



**Fig3**

In these shots, the blue boxes represent the different significant moments, of which I will develop modularly, so that if time crunches happen it can end at each shot. Also, I like the idea of this truck creating a flash frame with onomatopea, very Spider-Verse-like! (cewl is a intentional miss-spelling of cool)



## Resources

| Resource  | What it is   | How I used it  | Product     |
|---|--|--|-------------|
| <b>Easy 3D Character Modeling in Maya - Alex Cheparev:</b>  | A 5 part tutorial to the industry standard method regarding the modeling and futurproofing methods of creating a character based on a drawing.   | I used its basic methods to create a outline humanoid body and head to build my character aspects onto.  | Maya        |
| <b>How to model a Low Poly Character in Autodesk Maya.- Hassaan Owaisi</b>                                    | a basic tutorial on some basic extruding and symmetry methods to create a low poly humanoid character.   | To make the rough cut of my character, which I then later added heavy refinement too with reference to the next resource.  | Maya        |
| <b>Male Character PS1-Style - vinrax</b>  | A 3d model of a basic human with some pattern diffused textures, (inspired my initial texture style!). It is distributed under the CC license.   | As a reference to make the model look more detailed. Which I then further added to the silhouette and model attributes.  | Maya        |
| <b>Across the Spider-Verse: How Autodesk Maya is Used for Animation   Behind the Scenes - Class Creatives</b> | An analysis of the maya implementation of animation techniques. Basically he says that Maya is modular enough to use plug-ins to do work that other softwares can't and they used rough-cuts before finalising animations. | To create and understand a pipeline of production. Adapting the methods of creating rough cuts, render time frames, and smear, outline, and freeze frame techniques. | Maya        |
| <b>How 'Spider-Man: Into The Spider-Verse' Was Animated   Movies Insider - Insider</b>                        | A behind the scenes with the animators on how long the production took, why and how. Including the frame rate differences, smear techniques, and hybrid animation.   | To develop my process production.  | Maya        |
| <b>How to Make 100% Accurate PS1 Graphics in Modern Software - pwnisher</b>                                   | A pretty indepth analysis of how to create ps1 graphics, it covers texturing, lighting methods, and vertex snapping.   | To fully develop, create and define my texture process, and my future plans for vertex snapping.   | Maya<br>C4D |
| <b>projection mapping in Maya - @the3rdplace</b>  | A 3 part series about how to create maps from images. this would be my perfered method of creating maps from videos. I'll take some basic scene photos before every film session.  | To create my scene maps for my rotoscoped scenes.  | Maya        |



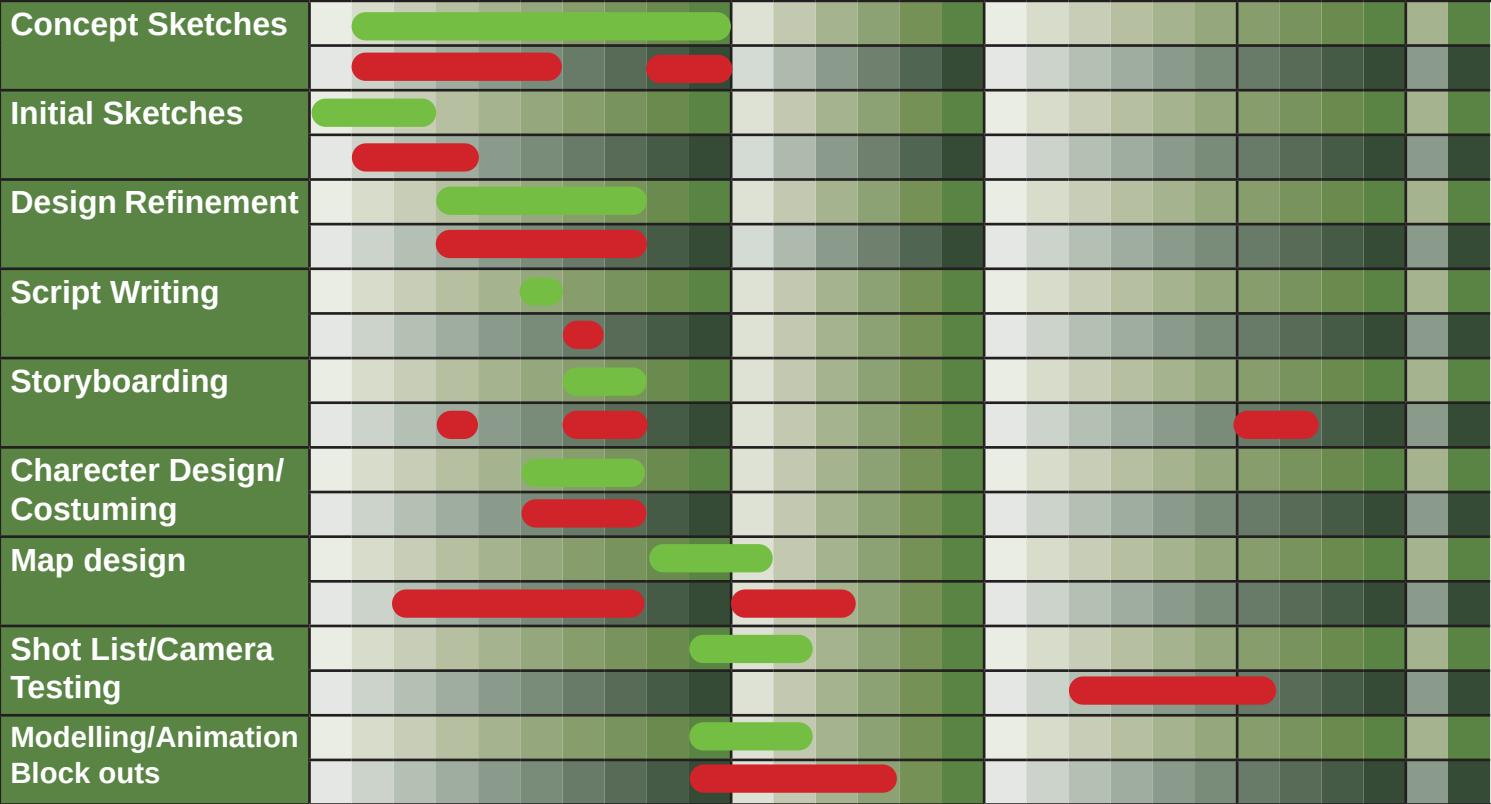
|   |  |  |               |
|---|--|--|---------------|
| <b>Creating an “Into the Spider-Verse” Style Freeze Frame Effect   After Effects Tutorial - DmanFilms</b> | A pretty quick effect run down on how to create the masking, filters, and animations included with spiderverse style freeze frames, along with my onomatopia and half tone effects this will be perfect. | To brainstorm and thematically apply spiderverse freeze frames. Additionally this served as proof a lot of the “style” could be added post production; meaning I shaped my pipeline around this assumption.    | After Effects |
| <b>skateboard maya rig - dmitrii kildiushov</b>   | A tutorial and demonstration of how to rig and control a skateboard, with directional and rotational constraints that match the movement of a skateboard.  | To rig and set up my skateboard. Also this helped understand some fundamentals of rigging and IK expressions, etc.   | Maya          |
| <b>MayaToonOutline-Shader (github project) - kamone416</b>  | A custom toon shader that takes a UV map, and has settings for the light angle shaders, highlights, rim lights, and outlines. Works only with the DX11 viewport, and maya hardware render.               | To apply toon shading materials with images, and additionally manage outlines and priority rendering statistics.   | Maya          |
| <b>Maya tutorial MASH + particles Portal effect - Maya Guy</b>  | A step by step tutorial to create a marvel style cobweb mesh network of particles on a oscillating circle. This is achieved through nParticle emmission, and a MASH trials network with connect nearest. | I followed these steps to set up the “outline” of the portal, and then I set up a similar set up for the “body” of the portal to lead backwards and inwards, to create a sparky outline and a swirling inside. | Maya          |



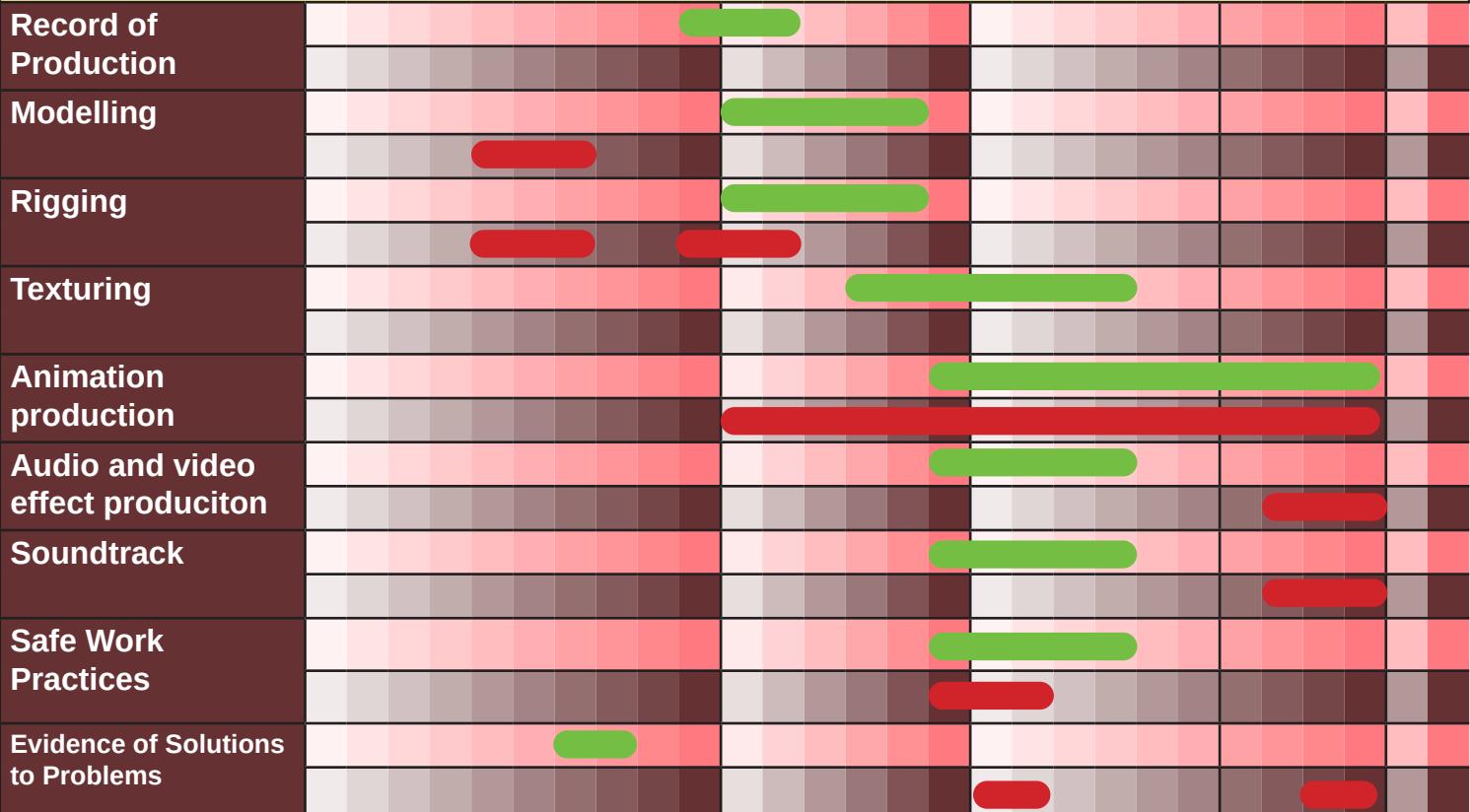
**ਪ੍ਰਾਤਿਜ਼ਿਵਾਨ ਮੁਸਲਿਮ**



## Design Development:

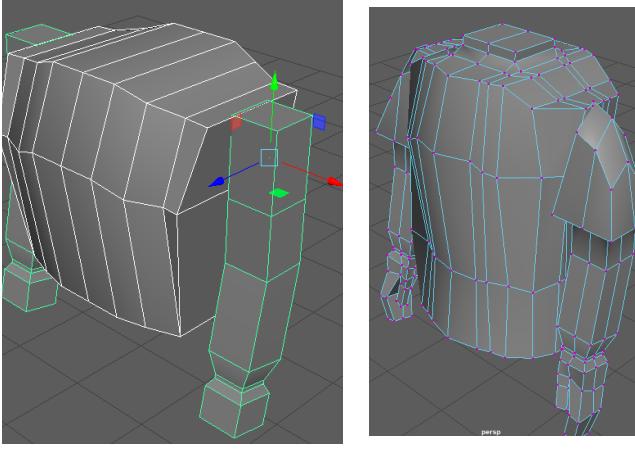
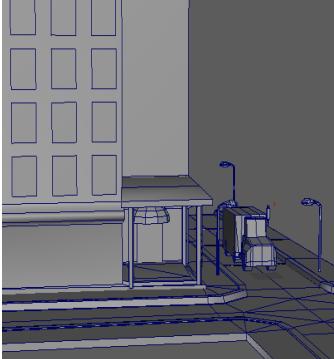
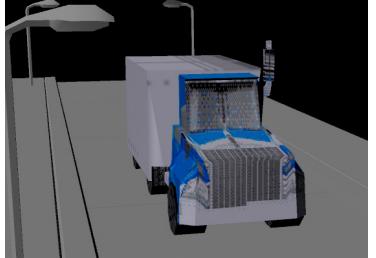
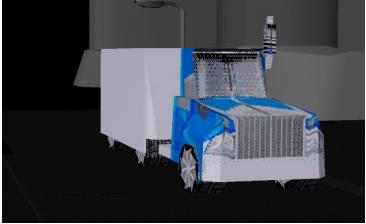


## Production:



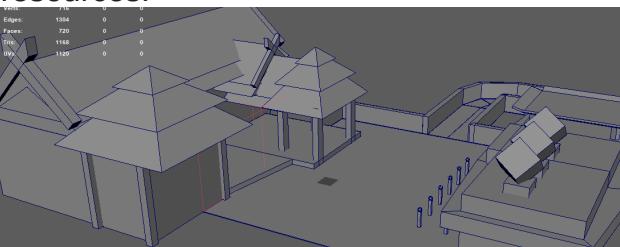
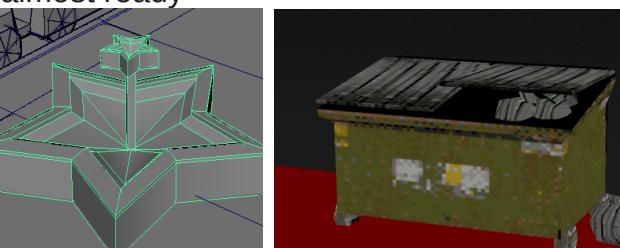
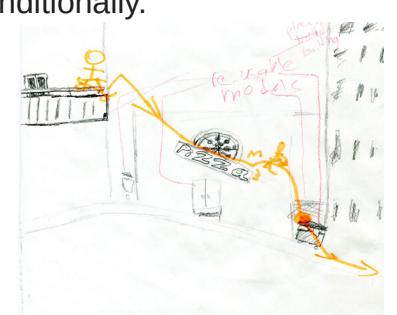
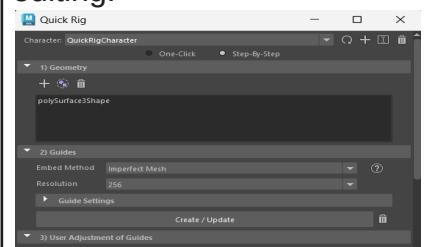
Production



| Week | Difficulty/5 | Work   | Notes/diagrams   |
|------|--------------|--|--|
| 1    | ★★           | <p>Starting with the basic outline of the character, experimenting with poly modeling and creating a basis for a human body to project my character design onto, I followed the modelling tutorial by Alex Cheparev.</p>  <p>Alex Cheparevs tutorial follows the industry standard process for developing</p> | <p>This model has its flaws but it serves as a starting point to allow me to add the actual characterisation of the model in the clothes and accessories. You can see that the model is very simple, and triangular at places, this is intentional, and meant I had to avoid the "normal" steps to producing a model like this, such as subdividing to maintain my low poly design</p> |
| 2    | ★★           | <p>Created the rough maps for the “truckmap”, including the center piece of the truck.</p>  <p>This gave me the basis of a map to work with, giving me basic road, and scale for the whole map.<br/>Originally this was meant to be used as a document background.</p>  | <p>I also went straight into creating a UV map texturing for the truck to try and flesh out the scene;</p>    |
| 3    | ★            | <p>After texturing I realised I had messed up the topology, and therefore creating a UV map for the model wouldn't be as effective, so I restarted the model and retextured.</p>   | <p>This changed my perspective on maintaining good topology and my future modeling workflows.</p>   |

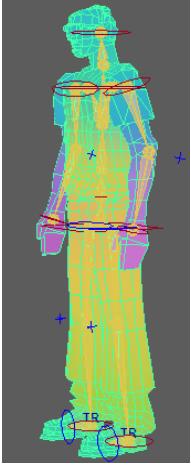
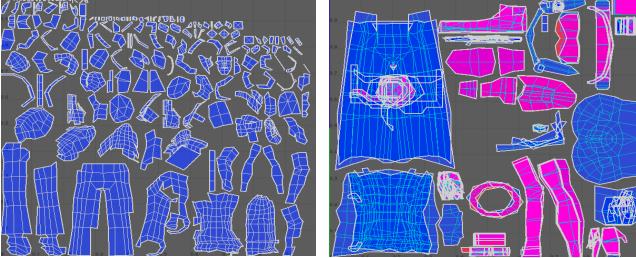
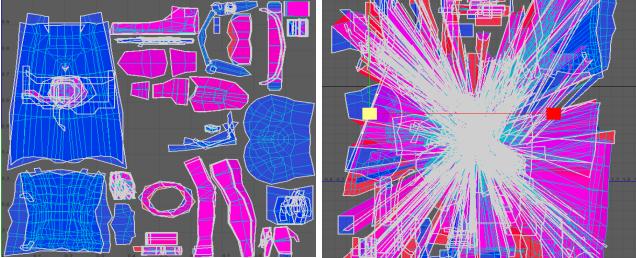
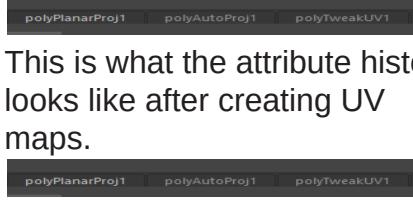
# Term 1

# Holidays 1

|  |     |   |  |
|--|-----|---|--|
| 4  | ★★  | <p>Started creating the second map, based off the initial sketches and selected rotoscope resources.</p>    | <p>This map had a higher emphasis on buildings. And also proply mirroring the rotoscope videos with ledges and stairs, but this served as some nice backgrounds. Left building is based on thailand buildings. :P</p>          |
| 5  | ★★  | <p>Started polishing the truck map, added a meuseum, water fountain and some trees and dumpsters. at this point, the map was almost ready</p>    | <p>I added some colours for contrast. The trees and dumpsters became universal props for filler for all maps</p>                           |
| 6  | ★★★ | <p>Modeled and textured some apartment buildings for an alternate future animation. It was at this point I started to understand UV mapping more and the importance of topology.</p>    | <p>These buildings were based on a sketches scene that was planned to only be done conditionally.</p>                                     |
| 1  | ★★★ | <p>started rigging the "guy" model. This proved difficult as the controls were not working as intended. To fix this I needed to go through a process of applying constraints and rules for IK and FK heirarchies so animation would be easy. Additionally I needed to paint the skin weights to dictate which parts of the skin would move when the rig moved</p>  | <p>To save time, i used a new tool; Maya QuickRig. Very useful and accurate, while having the downside of reduced attribute editing.</p>  |

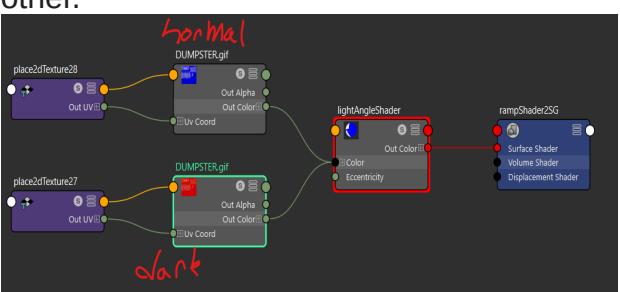


# Term 1

|   |       |   |   |
|---|-------|---|---|
|   |       |   |   |
| 2 | ★★    |  <p>started rigging the “guy” model. This proved difficult as the controls were not working as intended. To fix this I needed to go through a process of applying constraints and rules for IK and FK heirarchies so animation would be easy. Additionally I needed to paint the skin weights to dictate which parts of the skin would move when the rig moved</p> | <p>This step involved a lot of tutorials as mentioned in my resources sections. Additionally I experienced a lot of errors and problems at this stage, and I was becoming more familiar with handling, and forum usage. Autodesk’s maya forum date back to 2001, so they served as a good resource.</p> |
| 3 | ★★★★★ | <p>I started on the texturing of the guy, but this required that I format guys “UV maps” as mentioned, this includes formatting and assigning the placement of the faces onto a image map.</p>    | <p>UV mapping for this character was made easy because of its low poly topology. I took a lot of methods from retro textures.</p>   |
| 4 | ★★★★  | <p>When I opened up the project the next day, I was met with some bad exploded UV’s.</p>  <p>To fix this, I needed to manage my UV map history. Additionally this meant I needed to remake UV maps as progress was destroyed because of this.</p>   | <p>This is what the attribute history looks like after creating UV maps.</p>  <p>After deleting history and the UV map is the same, there is no chance that this history can artifact and create “explosions”.</p> |



# Term 1

|   |      |   |
|---|------|---|
|   |      |   |
| 5 | ★★★★ | <p><b>Ongoing evaluation:</b><br/>Maya software light angle mat:</p> <p>While this produced the correct visual effect; Using software when rendering was expensive on CPU; and this needed to be fixed later</p> <p>Set up basic shaders and materials, lighting and camera settings for the toon aesthetic. This was achieved with a maya inbuilt “toon two shader” which uses a ramp shader that changes between colours based on light angle, to achieve a shader with a UV map, both colours were connected to a file node, with one having a lower exposure than the other.</p>  <p>I set this up just to see if it “worked” and if it achieved the desired effect. At the time I was using maya software so i could use rampshaders and maya toon outlines. I would later find out that this was a bad idea, as maya only uses CPU not GPU.</p>  <p>blue for light, red for dark.</p>  |
| 6 | ★★★  | <p>Once I had decided to use this as my primary material shader, I developed a Maya Embedded Language script that converted my lambert + file node files into a light angle shader that inherits the file node file destination into a file and file dark node with -1 exposure.</p> <p>This was done with 2 main scripts; for brevity this will be shown in excerpts, but the full scripts can be found in my repos README.md.</p> <pre>string \$fileNodes[] = `ls -type "file"`;  string \$texturePath = `getAttr (\$node + ".fileTextureName")`;  string \$colorSpace = `getAttr (\$node + ".colorSpace")`;  string \$connections[] = `listConnections -d true -s false \$node`;</pre> <p>This gave some basic information on how the connections and attributes of our materials worked.</p> <p>This allowed us to create a light angle shader;</p> <pre>for (\$mat in \$lamberts) {     string \$tex[] = `listConnections -source true -destination false -type "file" \$mat`;     if (\$size(\$tex) &gt; 0) {         makeToon(\$mat);     } }  global proc makeToon(string \$lambert) {     ...     setAttr (\$light + ".fileTextureName") -type "string" \$path;     setAttr (\$dark + ".fileTextureName") -type "string" \$path; }</pre> |



# Term 1

7



This allowed me to have a smooth and easy way to preview how my models would look with a toon shade when I clicked on the render current view button; which would give me a snapshot of the “render view”. But I then had to run some inline scripts to fix the colour assignments, as I had selected the wrong “sides” of the light and dark file on the shader graph.

Here is the most important part of that script;

```
global proc fixToonColour() {
    string $toonMats[] = `ls -materials "*toon*`;

    for($mat in $toonMats) {
        if(`nodeType $mat` != "rampShader") continue;

        print("\nchecking: " + $mat + "\n");

        // get connected textures
        string $texs[] = `listConnections -type file $mat`;

        if(size($texs) < 2) continue;

        // check if dark texture is first
        string $tex1 = `getAttr ($texs[0] + ".fileTextureName")`;
        string $tex2 = `getAttr ($texs[1] + ".fileTextureName")`;
        float $exp1 = `getAttr ($texs[0] + ".exposure")`;
        float $exp2 = `getAttr ($texs[1] + ".exposure")`;

        if($exp1 > -0.4) {
            // swap em
            disconnectAttr ($texs[0] + ".outColor") ($mat +
            ".color[0].color_Color");
            disconnectAttr ($texs[1] + ".outColor") ($mat +
            ".color[1].color_Color");

            connectAttr -f ($texs[1] + ".outColor") ($mat +
            ".color[0].color_Color");
            connectAttr -f ($texs[0] + ".outColor") ($mat +
            ".color[1].color_Color");

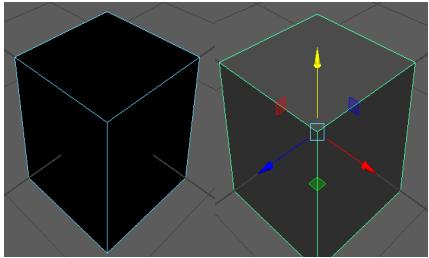
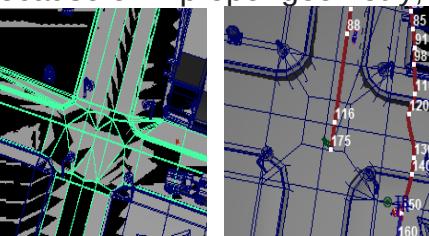
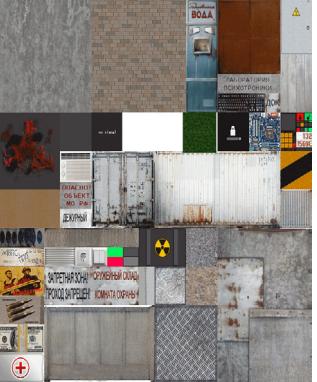
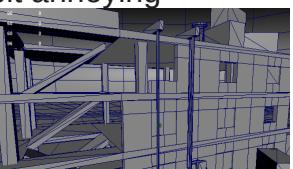
            print("fixed texture order for " + $mat + "\n");
        } else {
            print("textures already good for " + $mat + "\n");
        }
    }
}
```

After running this I had nice toon shaders for maya software render. Here are some updated objects with the toon materials;





# Term 1

|   |      |   |   |   |
|---|------|---|---|---|
|   |      |   |   |   |
| 7 | ★★★  | <p>I then decided to fix up some map details, and patch some errors with rendering. For example; Some objects have normals that are opposite thier outside face. So when render viewing we see the wrong side of the face. The only way to fix this really is to go object by object and fix the sides, there are scripts to do this, but its probably scope creep to be doing this.</p> <p>There are additionally geometry errors to be fixed to ensure we dont get bad renders; Like having too many lines and faces versus the amount of verts, we need to have loops of lines going through verts to not get errors. Overall, I was just looking around my maps at this stage and ensuring UV maps and geometry lined up correctly.</p> |  <p>wrong normal   "good" normal</p> <p>Sometimes normal errors occur because of improper geometry;</p>   |   |
| 8 | ★★   | <p><b>Ongoing evaluation:</b><br/><i>Changing development so late:</i></p> <p>This was a more efficient method, if only I had tried this earlier.</p>   | <p>I decided to create a new map at this point with the proper knowledge I had gathered from my production of the previous maps. It was going to be more thought out in terms of texture assignments. I had found this texture file from a PC game in this era where computers shared spec requirements from the ps1/ps2 era, and it shared the dithering low resolution method I had been using.</p> <p>I built the map around the idea of trying to use this as the texture for multiple objects. This proved easier suprisingly.</p> |  <p>This texture file was found from an old doom mod I play.</p> |
| 9 | ★★★★ | <p>Started developing a 3rd (and final map); "ruins" this one used only 2 texture file for all the materials and UV maps.</p>  <p>I decided to do this approach for 2 main reasons; It emulated the storage saving techniques of early ps1/ps2 hardware era, and additionally it made my workflow significantly shorter, having just a single material to create and then connect properly.</p>  |  <p>This did mean that the map had to be made out of blocks, which got a bit annoying</p>   |   |



# Term 1

# Holidays 2

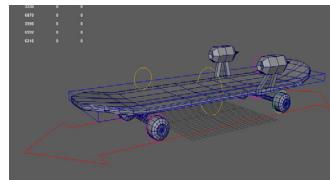
**10** ★★

### Ongoing evaluation: Changing material, again:

This was a more efficient method, and looked better, but I only found it out of frustration and curiosity. This should have been researched

To begin animation with the skateboard, I needed a control structure to manipulate it with. I found a tutorial by Dimitri Kildiushov that details how to construct a rig with directional control, board control, and turning relationship IK; so I began to take inspiration from his work and made my own.

The advantages and main reasons to have a global directional control independant of the actual board is that it dictates the translate origin point, and can influence the wheels to rotate based on a expression attribute connection.



As seen, the red arrow is the global root directional control, pink is for IK controlled parts, and yellow is for editable rotations that influence other parts.

The expression for wheel movement is (- error handling stuff);

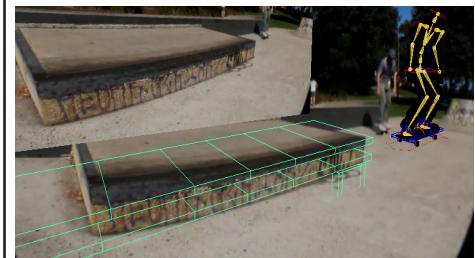
```
skateBoard5:R_wheel_2_
ctrl_offset.rotateX =
(skateBoard5:locator2.
translateZ+(-19.269))/
(2.086*(skateBoard5:root_ctrl.
scaleX*(1/skateBoard5:root_ctrl.
scaleX))*3.14)*180;
```

**1** \*★

### Ongoing evaluation: rotoscope geuss-work over projection mapping:

While less accurate, this was easier and more "artsy". Using a projection map would display a skill, but not worth it.

I began to use projection mapping to line up rotoscope footage to scene geometry. But there is a "black star" here because I did not end up using projection mapping the way I had predicted; the use of projection mapping meant changing materials to be projection material, and this method wouldn't work with moving cameras anyway, even with perfect tracking and geometrical precision; maya's camera attribution system just isn't good enough at perspective. Additionally as mentioned this meant changing materials, so I would have to interchange between projection material and normal materials for render views. What I ended up using was image planes connected to the cameras movement, with supplementary image planes that mimiced the rotoscope footage movement.



As seen the projection material applied to the background objects doesn't really line up because of the fish eye warp; something not replicable with maya hardware render



The set up I went with; image planes

**2** ★★

Using the aforementioned character rigs and maps I then started blocking out animations. This entailed going by 20-40 frames and lining up camera, skateboard and character movement with the rotoscope reference. This was made nice and easy thanks to our control structures and custom constraints I set up to make the character follow the board, and the board to follow the directional control.

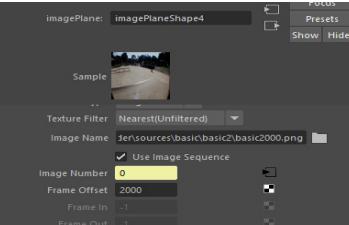
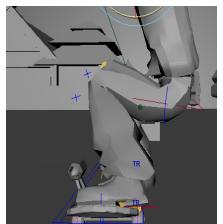
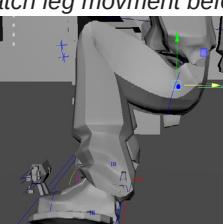
This part of the pipeline is called "blocking" and in the industry is fulfilled by "blockers"

Generally, This was done with geuss work, but I additionally supplemented it with my own experience performing similar actions; providing guidance on little things such as balance, etc.



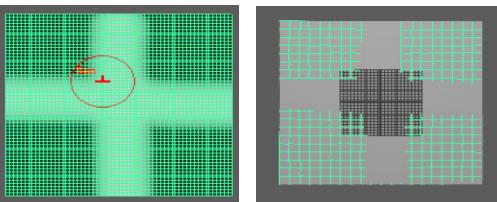
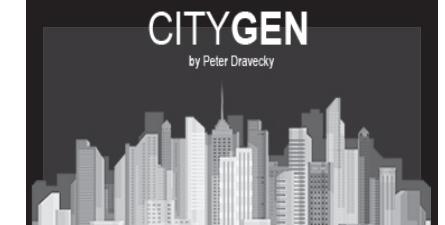
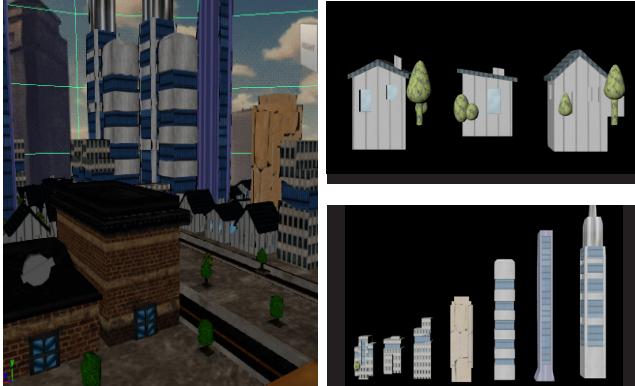
## Holidays 2

## Term 2

|   |     |  |   |
|---|-----|--|---|
|   |     |  |   |
| 3 | ★★★ | <p>Then with the blocked out animation I began working on the inbetweening. This included hip and arm movements being smooth and “human like” in between large movements. This part proved harder than the previous step, and harder the more keys I added, as they began to contradict each other, meaning I had to use the graph editor more often; something I will discuss more on later.</p> <p>I was also making sure to adjust tangent weights and spline attributes as necessary for proper tweening movement between keys.</p>  | <p>There is not much to discuss about this other than it was hard and did not come to me naturally.</p> <p>I do not exactly have a background in animation, so most of this was pretty much like sculpting with a chainsaw. And that is what it looked like at this stage, something I would need to fix with animation principals later on.</p>              |
| 4 | ★★  | <p>After I was happy with the progress of the first animation I focused on the second; and I should mention now the method I am using for importing rotoscoped animation.</p> <p>Using media encoder, I import the mp4, and then using h.264 video encoder settings, convert it to a png sequence; then in maya I connect a image plane to the first image, enable image sequence, and adjust the image offset to match the starting filename extension.</p>   |  <p>This image sequence started at basic2000.png and ended at basic2101.png</p> <p>This was pretty easy to implement across scenes.</p>   |
| 1 | ★   | <p>After revision from teacher, I was informed that while my animation was up to scratch, it was missing some critical features that would make it more “passable”. For example when my character reached the drop of a jump, their knees should more obviously buckle, following general animation principals.</p>  | <p>The principals of animation and their importance are outlined on pg19, Along with more detailed descriptions of my personal production techniques</p>  |
| 2 | ★★★ | <p>After continuously working on the animations; somewhere down the line I had broken the right shoulder controller, and additionally there was skin weighting errors. This meant that at certain points the skin did not have the weight or connections that natural skin movement would.</p> <p>To an extent this is intentional, as seen in the arms that do not contort and such, but it was things like the leg movement making the hips get smaller at large rotations that looked very unnatural/unprofessional.</p> <p>This was rectified by the usage of my independent guy scene being updated and re imported into the scene by simply copying the animation information from old to new rig.</p> |  <p>This is what the skin would do deform the hip area match leg movement before;</p>  <p>And after skin weight adjustment.</p> <p>This is thanks to the weights and poly count</p> |

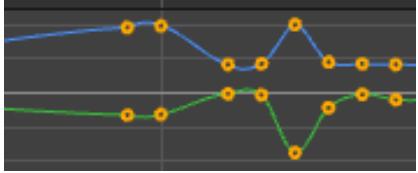


## Term 2

|   |       |  |   |
|---|-------|--|---|
|   |       |  |   |
| 3 | ★     | <p>Some of my maps were completely baron of a background, the truck map for example did not have buildings to obscure the vast emptiness of the scene; So I found a custom maya city generation script online, customised its building settings and density and made some background prop fodder. The script is courtesy of dravec-ky on github, but I had to edit the buildings it uses, and some of the script functionality for it to fit my use case.</p>  <p>Seen here is the "obstructions" of the street, and the generated building locations based on the settings seen to the right</p>   |  <p>The script was written in python, and was meant to be ran within the maya scripts custom folder, but I edited the code for it to run from within my downloads folder.</p> <p>These settings were also impacted by tall, medium, and small building density definitions.</p>  |
| 4 | ★★★★★ | <p>After using the city generation script, I realised applying UV mapping to the objects after generation would prove computationally impractical, as even selecting all buildings would take upwards to 5-10 seconds per command.</p> <p>This meant I had to find a smarter way to assign UV's, so at generation I edited the scripts rules for generation.</p> <p>This meant to open the fbx file of the building information that the script uses, and mapping their UV's and replacing the scripts fbx file to include these UV's.</p>  <p>along with some script editing, this gave me some low poly well-ish mapped buildings to serve as background fodder.</p> | <p>The main reason people say to only use quads is because rendering softwares like unreal engine prefer them, and when rendering triangles and ngons (more than 4 sided faces) tend to produce black faces or buggy shadows.</p> <p>See to the images for before and then after, the model is now much more consistent in shape, and more recognisable as a skull. I added the first gas tubing here, something that would prove hard to weight.</p> <p><i>Additionally the use of basic lambert textures assisted in clarity. Lambert materials are materials with equal luminance across the surface, with a singular flat colour</i></p> <p>After this, creating cities was simple enough I could run it on my school laptop with no GPU.</p> |



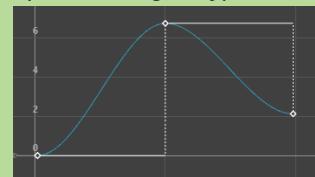
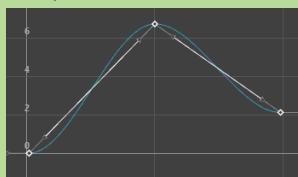
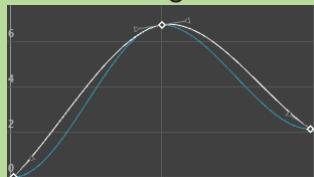
## Term 2

| 5                                 | ★★★★★  | <p>It was at this time I was also animating, and I wanted to create a rendered video preview; But realised the material shading and rendering method I was using would only be rendered with CPU...</p> <p>I then had to find a way to render toon materials, outlines, and shading with GPU hardware render.</p> <p>I did this with kamone416 's "MayaToonOutlineShader" dx11 shader material.</p> <p>This required me to change my viewport settings from "viewport 2.0" to "DX11" and colour management to the legacy mode. While this was more memory intensive on boot, using windows inbuilt "DirectX" API to render and calculate lead to faster computations and renders.</p>                        | <p>This switch to dx11 was also done with python script, found in my scripts. I don't think its important to explain this as its similar to our lambert conversion</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Name</th> <th>Status</th> <th>51% CPU</th> <th>83% Memory</th> </tr> </thead> <tbody> <tr> <td>&gt;  maya</td> <td></td> <td>32.7%</td> <td>2,963.7 MB</td> </tr> <tr> <td>&gt;  Adobe InDesign 2025</td> <td></td> <td>4.4%</td> <td>822.5 MB</td> </tr> </tbody> </table> <p>Maya software render uses a lot of CPU and memory</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Name</th> <th>Status</th> <th>35% CPU</th> <th>65% Memory</th> </tr> </thead> <tbody> <tr> <td>&gt;  maya</td> <td></td> <td>16.9%</td> <td>703.8 MB</td> </tr> <tr> <td>&gt;  Adobe InDesign 2025</td> <td></td> <td>11.9%</td> <td>858.8 MB</td> </tr> <tr> <td>&gt;  Antimalware Service Executable</td> <td></td> <td>1.3%</td> <td>177.4 MB</td> </tr> </tbody> </table> <p>Maya hardware render uses little CPU, and a little memory, leaves the load to GPU.</p> <p>GPU graph with hardware render</p> | Name | Status | 51% CPU | 83% Memory | >  maya |  | 32.7% | 2,963.7 MB | >  Adobe InDesign 2025 |  | 4.4% | 822.5 MB | Name | Status | 35% CPU | 65% Memory | >  maya |  | 16.9% | 703.8 MB | >  Adobe InDesign 2025 |  | 11.9% | 858.8 MB | >  Antimalware Service Executable |  | 1.3% | 177.4 MB |
|-----------------------------------|--------|--|---|------|--------|---------|------------|---------|--|-------|------------|------------------------|--|------|----------|------|--------|---------|------------|---------|--|-------|----------|------------------------|--|-------|----------|-----------------------------------|--|------|----------|
| Name                              | Status | 51% CPU  | 83% Memory  |      |        |         |            |         |  |       |            |                        |  |      |          |      |        |         |            |         |  |       |          |                        |  |       |          |                                   |  |      |          |
| >  maya                           |        | 32.7%  | 2,963.7 MB  |      |        |         |            |         |  |       |            |                        |  |      |          |      |        |         |            |         |  |       |          |                        |  |       |          |                                   |  |      |          |
| >  Adobe InDesign 2025            |        | 4.4%   | 822.5 MB  |      |        |         |            |         |  |       |            |                        |  |      |          |      |        |         |            |         |  |       |          |                        |  |       |          |                                   |  |      |          |
| Name                              | Status | 35% CPU  | 65% Memory  |      |        |         |            |         |  |       |            |                        |  |      |          |      |        |         |            |         |  |       |          |                        |  |       |          |                                   |  |      |          |
| >  maya                           |        | 16.9%  | 703.8 MB  |      |        |         |            |         |  |       |            |                        |  |      |          |      |        |         |            |         |  |       |          |                        |  |       |          |                                   |  |      |          |
| >  Adobe InDesign 2025            |        | 11.9%  | 858.8 MB  |      |        |         |            |         |  |       |            |                        |  |      |          |      |        |         |            |         |  |       |          |                        |  |       |          |                                   |  |      |          |
| >  Antimalware Service Executable |        | 1.3%   | 177.4 MB  |      |        |         |            |         |  |       |            |                        |  |      |          |      |        |         |            |         |  |       |          |                        |  |       |          |                                   |  |      |          |
| 6                                 | ★★★    | <p>The animations production deadline was setting in, and I had 3 scenes with pretty blocky and glitchy animations. This was because of a fundamental error I had made in my animation pipeline.</p> <p>Each keyframe that I set would set a key on ALL attributes and controllers, not just the selected ones, meaning that I would end up with artifacts as seen to the right.</p> <p>This meant I had to use the Graph Editor to analyse and fix these artifacts and smooth out the animations movements and tweening methods. This also let me improve the "human-ness" of the animation movement.</p> <p>The graph editor is an essential skill of an animator, and it was important to understand.</p> |  <p>The compactness of these keys, and their jumpy difference results in choppy movements.</p> <p>Each of these yellow dots represents an attribute value, e.g. a limb's X, Y, Z position and rotation, the lines inbetween are the tweening changes.</p> <p>The difference in tweening methods and movement made a much larger difference to feeling than I thought.</p>  |      |        |         |            |         |  |       |            |                        |  |      |          |      |        |         |            |         |  |       |          |                        |  |       |          |                                   |  |      |          |

### Ongoing evaluation: Late implementation of tangent animation techniques;

Because early on, I did not have knowledge of this method, I had been hand animating things such as stretch and squeeze to try and benefit the 12 animation principals. Doing this now, so late, is integral and should have been done earlier for a smoother final product.

Here are the main tweening methods I used; white for the curve with the specified tangent type, blue for default



**Clamped**; linear but smooth curves    **Linear**; no interpolation at all    **stepped next**; only changes on key  
Together, these provided some naturalness, i.e. clamped tangents mimic "natural" quick movements  
But more "importantly" stepped and linear tangents allow for stylised "punchy" animation



## Term 2

**Ongoing evaluation:** MASH network animation learning.

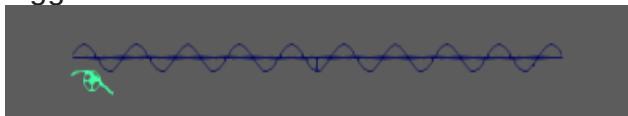
Discovering the capabilities of MASH networks and their utility for easy effects such as skateboard rockets allowed me to do things IN maya rather than after effects, which was planned, but not a good idea.

7

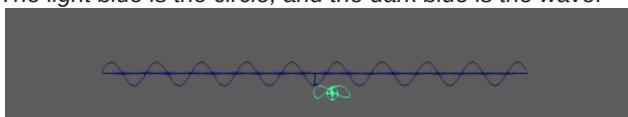
★★★

After creating the animations and getting a thumbs up on quality; I created a separate portal /physics animation on the ruins map portal room. I followed a tutorial by "Maya Guy" - not kidding! go check my resources under pg.NUMBER- and created a MASH network portal.

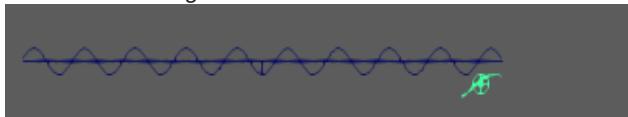
This in its most basic terms involved;  
1. Setting up a circle "object" controlled by a moving sine wave deformer, to make it wiggle.



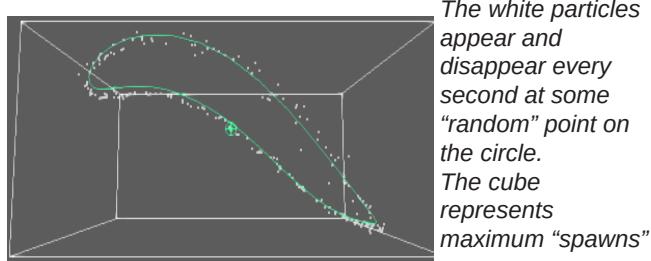
The light blue is the circle, and the dark blue is the wave.



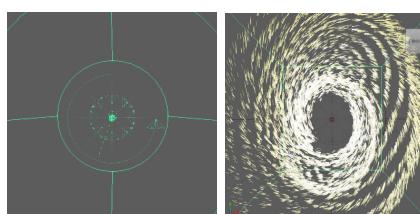
As seen, the circle matches the deformation of the waves movement from right to left.



2. Then assigning particles to emit from the circle, and setting physics rules for it to have particular attributes similar to sparks.



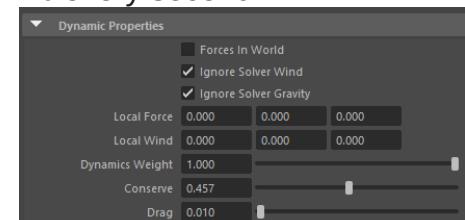
3. Then creating a volume and turbulence field to influence another particle emitting group; making a central "gravity point", while pulling them backwards as well.



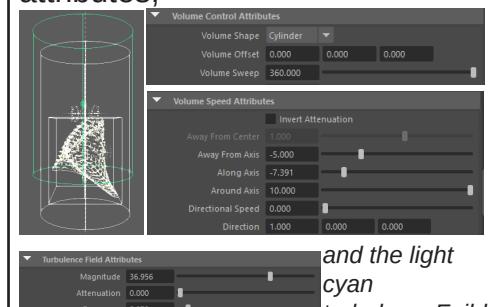
4. Assigning a MASH network on these particles to create meshes at particle locations.

This was influenced by my experimentation with MASH networks for animations earlier.

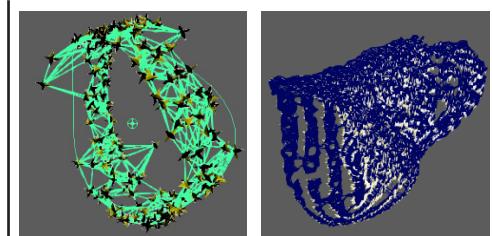
Creating the particle and emitter settings took a lot of guess work and finetuning, for example; The emitter and particles were set to have a constant lifespan of 2 seconds, and to have no influence from wind or gravity, but to conserve a only 45% of their momentum, with a drag of 1% every second.



The particles made to be "portal-y" where assigned to a *volumeAxisField* for the "gravity point" with the following attributes;



and the light cyan turbulenceField



MASH1 has sparks | MASH2 more trails & and limited trail mesh | very small sparks

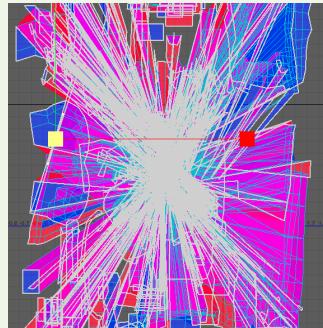
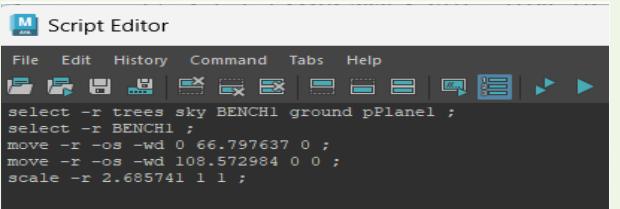


|   |   |  |                       |  |
|---|---|--|-----------------------|--|
|   | 8 |  | W<br>W<br>W<br>W<br>W |  |
|   | 9 |  |                       |  |
| 1 |   |  |                       |  |







| Problem                             | Cause & How I Fixed it   | Explainations/ diagrams   |
|-------------------------------------|--|---|
| Exploding UV's                      | <p>Because maya treats 3d modeling like a base object and then a set of assembly instructions; such as pcube1 with attributes polyTweak1 and polySubDivide as you transform it; It treats UV mapping the same; and if the history is not managed, it leads to exploding and artifacting UV maps when reopened, and certain attributes cannot be re created.</p> <p>I fixed this by properly going<br/>Edit &gt; Delete all by type &gt;<br/>Non-Deformer History</p>   |  <p>The aftermath of opening an unmanaged history model.</p>   |
| Creating materials with MEL scripts | <p>By this being a 'problem' I am referring to the criminal under documentation of this; Autodesk's MEL documentation is from 2014 and does not have any direct documentation of anything new. The best I could achieve was using</p> <p>Echo commands --all and just manually doing the material creation I wanted, and then trying to create a script based on the inputs, but this was slow, archaic and inconvenient as some commands didn't work in script form.</p> <p>To "fix" this I used a combination of example scripts from a Autodesk forum post about restoring a broken project by using MEL to edit "swatches" and instead porting it to logically find all lamberts and their file nodes, and then create a light angle shader with the colour inputs from the lambert.</p> |  <p>Seen above is the maya MEL documentation</p>  <p>Seen above is the typical output of echoing commands</p> <p>Using this allowed me to see how commands were structured when setting things like material attributes, file node setups, etc.</p> <p>This works because Maya GUI is just a front for a bunch of scripts and commands.</p> |



|  |   |   |
|--|---|---|
| Sound / foley work.                      | <p>When I agreed to use the footage of some skater's they sent me clips that had very noisy and un-useable audio.</p> <p>To fix this initially I tried to use outsourced materials such as free online sound effects, video to audio generators, audio noise removers etc.. but none of them worked...</p> <p>So I decided to go filming again with the Cannon XA70 with a RODE VideoMic NTG with a deadcat dampner on the end. I then got on my dads old cruiser with quiet wheels, went out to fernside skatepark, and asked my skaters to recreate movements and sounds in my clips.</p> |  <p><i>The aforementioned setup</i></p> <p>This set up helped remove unwanted sounds, easy recording while skating, gimbal stabilisaiton, etc all leading to better audio for my clips</p> |
| Green screen tracking, and matte masking | <p>When I recorded my intro, my dastardly curly hair was all infront of the screen, and my hair being so curly and frayed meant the greenscreen would be artifacted around the hair. Additionally my screen is curved ( pg57 ) meaning the tracking would be additionally difficult.</p> <p>I resolved this through my usage of adobe after effects plug ins such as Mocha pro, of which I needed to use a free trial for, and in tandem with camera point tracking, rotoscope bushing and specialised effect parameters, I matte masked out my hair, and properly used my screen .</p>     |  <p>(PLACEHOLDER, PROJECT FILES AT HOME)</p> <p>GREENSCREEN REPLACED</p>   |



The following is a risk assesment on the of the on-site shooting of fernside skatepark: waterloo.



Fernside skatepark (or waterloo skatepark) is a nearly 20 year old skatepark, with many features mainly centered around training lines, and fundamental structures.

What drags down this parks value to most skaters is that it is located right int he middle of sydneys largest housing districts, and right next to the skatepark is one of the housing department offices. This objectivley raises stakes:

- Increased traffic
- Increased amount of beginers and young people
- Unfortunatley, there is also a higher likelihood of theft and violence in this area

need to get picture at home

To ensure safety at this location, **special approaches had to be made;**

- Safe skating practises on a cruiser board provide stability and safety from damage to the camera.
- Bringing a first aid kit and water to proactivley prepare for and minimise harm.
- Taking the camera in a unmarked bag reduced suspision and the risk of loosing school property.





Work Health and Safety practices are important to the well-being, Health and Safety of workers. These practices include; ergonomics, work hours, environment and plant maintenance, safe use and safe usage techniques.

### Legislative Foundations

The WHS Act 2011, enforced by Safe Work Australia and state/territory regulators (e.g., WorkSafe NSW or WorkSafe Victoria), outlines the responsibilities of business owners and workers to follow these "rules":

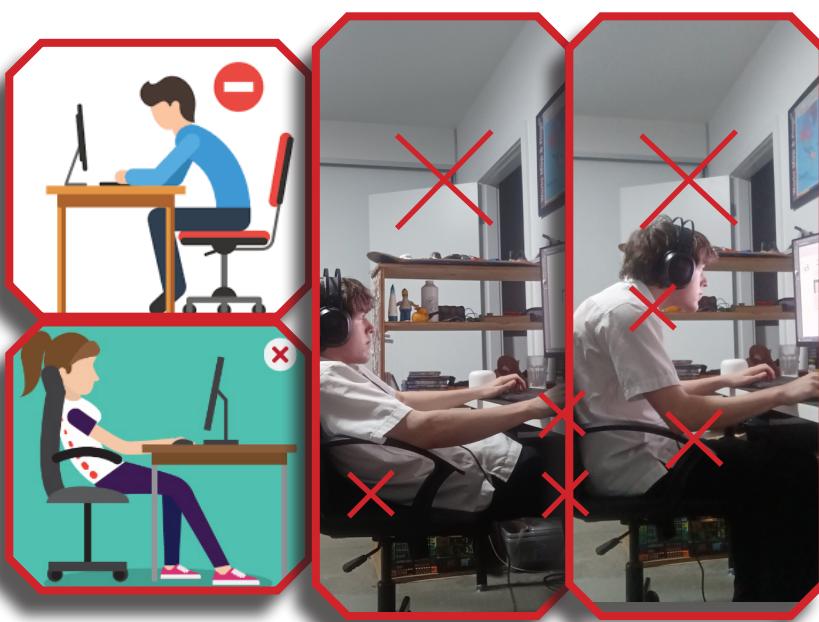
- Risk management and reduction (ergonomics, fire readiness, slip hazard, etc)
- Safe equipment and work practices
- Emergency preparedness
- WHS training

*These initiatives are enforced to be undertaken by multimedia companies within office settings, and are to be reflected in my work as a multimedia student taking on the practises of the buissness.*

Seen here is BAD ergonomics, and BAD ergonomics in action. The signs of bad ergonomics are;

- Slouched spines and shoulders
- Little to no spinal support
- Arched necks due to monitor and peripheral placement
- Uneven and not grounded foot placement

Extended times in these positions can cause spinal injury and strain, leading to scoliosis, muscle cramps, and even lowered productivity! Avoiding these positions is all in the placement of the desk, chair, and monitor, and the preference of the user. Some of these may be comfortable in the short period, but will be punishing in the long run.



Seen here is GOOD ergonomics, characterised by

- Proper usage of back support with a straight spine
- Adjusted chair height and monitor position to encourage proper neck and spine formation
- Feet placed properly on the floor at a 90° angle
- Arm rests in proper usage
- Hands in proper position to use peripherals

Using these techniques encourages proper posture and productive healthy plant equipment usage.

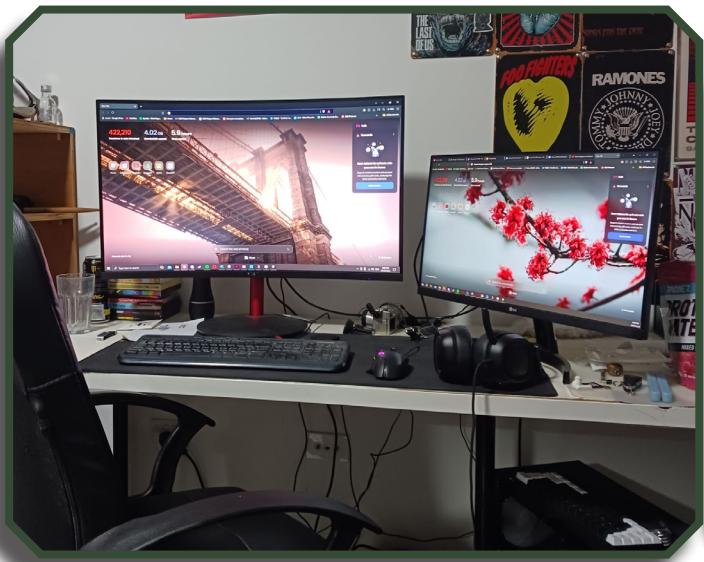


Plant equipment maintenance is important, a clean, sterile work environment is imperative to health and safety over long periods of time. Seen here is my computer after cleaning of dust to prevent fires, air pollution, and over heating.

Plant equipment placement is also very important to correctly implementing WHS. The PC being on the floor could raise fire hazards, but thanks to PC stands, voltage regulators and a FIRE NSW certification of fire safety from esteemed haz-chem chief dispatcher Rob Conlon (my step-father), this can be deemed safe.



**RETAKE THIS PHOTO AFTER PC UPGRADE, CLEAR DESK ETC  
PUT THE DRAWING TABLET TO THE RIGHT**



Plant equipment can aid in ergonomics and safety in extended use. Monitors, mice, keyboards, chairs etc play a major role in the correct ergonomic usage.  
The desktop peripherals I use are:  

- Logitech hero g520
- Tt eSPORTS Shock Pro RGB Gaming Headset

These peripherals to the desktop are used and engineered with ergonomics in mind, the keyboard has inbuilt palm rests, and the logitech mouse supports the palm to rest upon it correctly with the thumb hold.





**Acer Nitro XV252Q  
31.5" 120hz, 1080p**

curved at 1500R

Adjustable height



**LG 27ML600M  
27" 60hz, 1080p**

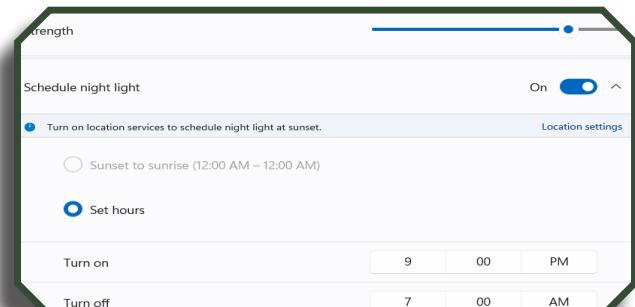
These pieces of plant equipment adequately complete the tasks of displaying and rendering work, and allowing me to ergonomically use equipment with ease.

Over the course of this project I endured many long hours, with long hours comes its own health and safety hazards, to prevent Health and safety detriment, I used the following risks and reductions I implemented over this project.

- Eye strain comes into play with large bright screens.
- R.S.I, When using computers for long hours the muscles and tendons in your body become fatigued from repetitive strain.
- Breaks to prevent cognitive and physical strain from working and sitting too much.

To reduce these risks, the employment of the WHS practises came into play, such as;

- Night lights after 9PM will reduce eye strain and strain on psychological and physical strain on the circadian rhythm.
- Stretches and breaks from work every 1-3 hours realistically prevent RSI and muscle strain.
- As well breaks are required by WHS and will help improve efficiency and creativity.





Research

(And if this was a real Multimedia buissness)  
Legislation in the WHS Work Health and Safety act of 2011 states that there must be proper danger and equipment signage, in my case such as;

Electrical fire danger



Electrical Fire equipment



No running!



But because this is an individual, home environment, legislation does not state that proper signage must be in all households. With that being said, the "Australian Standard (AS) 2700" does require that IF you do have fire extinguishers, 'signage must be provided above or adjacent to an extinguisher even if indicating the location of multiple or a mixed group of extinguishers. The extinguisher and fire point location signs shall have a symbol, border and letters in white on a red field', which is an instruction dutifully followed in our household.



GET A PIC

Overall, the implementation of business level Work Health & Safety Legislation at an individual level has been achieved through the aforementioned methods, and this means a greater education and understanding of the legislations and methodologies behind WHS within NSW and the wider world.

Precautions such as proper ergonomics, night lights, etc will also help improve my personal health and safety while working.

