



Tai, Callum –  
1604179 –  
[callumtai.com](http://callumtai.com)  
Advanced 3D for  
Games

# WRITTEN REPORT

GAD6001

# Contents

- Initial Planning ..... 1
- Blockout ..... 2
- Modelling ..... 3
- Texturing ..... 4
- References ..... 5
- Images Used in Project..... 5

## Initial Planning



Figure 1. Scott's Apartment (Scott Pilgrim's Precious Little Life)

The designer drew inspiration for the gameplay plan from games like Persona 5 (Persona 5, 2017), which featured a similar room layout as a base of operations that the player could regularly return to, and personalise, making it their own. This seemed a good fit, and helped keep the project grounded into something achievable. Planning however, did fall behind after multiple software and hardware failures, as well as poor time estimates.

The brief for the module was two connected interior rooms, with a focus on modularity. The designer was able to realise this by drawing inspiration from the Scott Pilgrim series (O'Malley, 2004-2010) and Scott Pilgrim vs. the World (Scott Pilgrim vs. the World, 2010), and using these as reference for the rooms, recreating the living space for the protagonist, seen in detail in Figure 1. Following this, a project plan was made, including an asset list and gameplay design plan. The designer was shocked by how many assets were required and felt unsure about the gameplay design for the level they had chosen, as they were attempting to make such a relatively small space feel like a hub that the player would regularly spend time in. To ensure that the project remained on theme, the designer made a small mood board which delved into minor colour theory that they could refer to at any time, as seen in Figure 2.

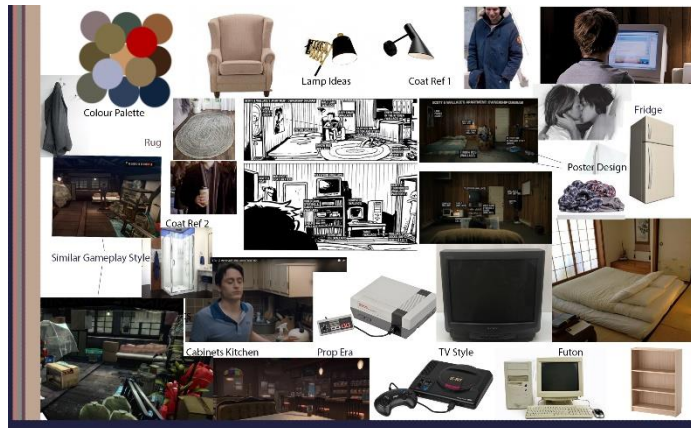


Figure 2. Mood board used by the designer throughout the project.

## Blockout

Working in a blockout in Maya (Autodesk, 2018) allowed the designer to ensure their sense of scale was correct before going any further; this was also the first step in ensuring that the principles of modularity were followed. The CAD plan (Figure 3) developed in the planning stage was used to ensure that the level fit that scale also. The designer was also able to see how their gameplay plan would fit within the level they had, and could then begin visualising the details and minutia.

The designer then imported the blockout as one full piece into Unreal Engine 4 (Epic Games, 2018), to

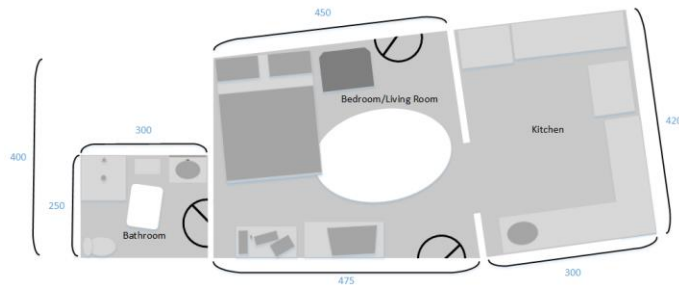


Figure 3. CAD plan used for level layout.

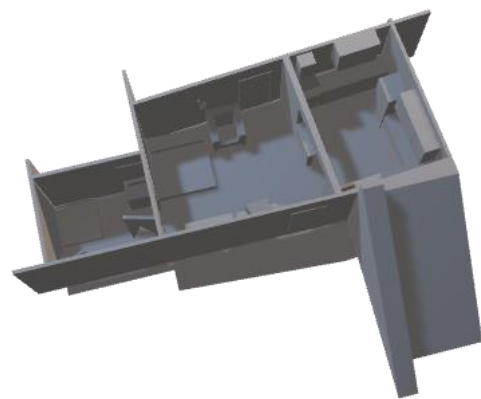
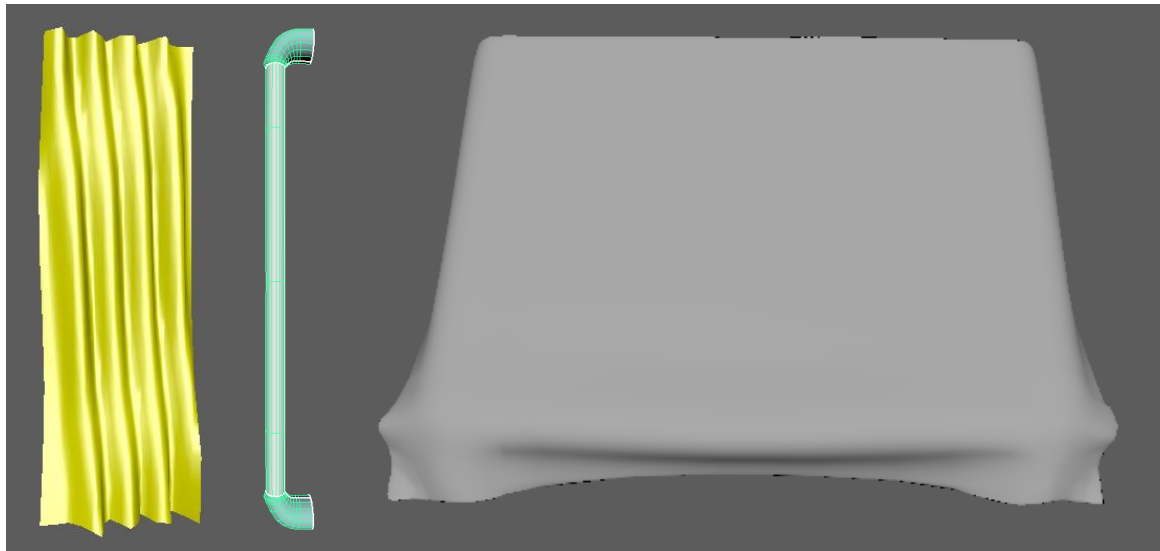


Figure 4. Blockout of level based on CAD plan.

ensure that the level could function in-engine, and looked the correct scale from a player's perspective. This step was vital in ensuring that the project was viable to continue. In Figure 4, this first blockout can be seen. A lot of external detail was changed or removed at this stage, to ensure focus remained on the interior. The exterior was also made tidier (i.e. removed front-facing excess walls) in case it ever needed to be visible. The blockout being one object was a large negative force on the project, as when the individual pieces were imported, small changes to positions needed to be made to ensure no seams were visible, especially between walls and floors.

## Modelling

All the modelling was completed in Maya, continuing the basic versions of any meshes produced for the blockout stage. This meant that minimal time was lost in the transition between workflows and that the modular assets like the kitchen cabinets and counters would remain the same dimensions, preventing any breaks in the modularity for what was already present. For example, the sink and corner variants of the counters had to fit in the space between walls and other counters, continuing the bevel from those adjacent, which required checks in both Maya as well as in engine.



*Figure 4. Shower Curtain showing sine deform, Shower Handle showing non-linear bend deform, Blanket showing results of nCloth use.*

Within Maya, a wide variety of techniques were used, often revolving around extrusion, mirroring, and bevels. However, for many of the models, other processes had to be used, like the nonlinear deforms sine and bend, as well as nCloth, which can be seen in Figure 5. The sine deform didn't achieve the intended look with one modifier, so multiple deforms were used in conjunction to make the deformation seem more realistic, and like the curtain had been pulled to one side. nCloth worked perfectly with the bed, allowing for a realistic drape. However, the high poly count of the material in this form required reduction and optimisation before it went into engine, which slowed down other asset development.

Many of the smaller pieces of modelling, such as taps, handles and dials were used on multiple meshes to help save time when the designer realised that they had fallen behind schedule. Although this makes many of the models less unique, it does still fit in with the tone of a cheap apartment that was the original intention.

To achieve the look for the walls, cuboid meshes were used, with high poly wood panels modelled and then baked onto the simpler models. This technique also allowed for the walls to seamlessly blend into each other, as natural seams already existed in the panels. Difficulty arose when the door frame pieces would have shadows baked into the frame itself when performing the same process. Disconnecting this piece of the mesh for the baking allowed for a solution to the issue.



*Figure 5. Result of high poly baking of wood panelling texture.*

## Texturing

A large proportion of the meshes were textured using Substance Painter (Allegorithmic, 2018), which allowed for these props to have realistic textures and high level of detail. The main walls were textured using the high poly baking technique mentioned earlier, with a wooden texture then being modified to match the intended colour, which can be seen in Figure 5. Simpler models, like the extractor fan, benefitted greatly from the use of higher quality textures, allowing edges to have more depth with welded material, as well as darkened patches on the exterior showing damage over time. The exterior door utilised a hand-painted wear, localised to the edges, to show where it rubbed against the carpet and door frame.

Bitmap2Material (Allegorithmic, 2018) was used for the simpler materials, such as the bathroom wall tiling, the kitchen floor linoleum and wall tiles. The kitchen linoleum was reused for the bathroom floor, but as the texture tiled, its scale could be reduced, and its colours changed to add variety to the floors. Using B2M allowed for quick materials that had a sense of depth, as well as the occasional grunge map to make the apartment feel more lived in.

Substance Designer (Allegorithmic, 2018) was used for textures that were moderate in complexity, but still needed to tile, like the countertops, blanket, and ceramic sink. The countertop texture was used on multiple meshes, but never tiled in the way it was supposed to, providing a lot of difficulty for the designer, as each counter had very visible seams.

Lots of materials throughout the level were reused, to make sure everything was fully textured, and some were modified to mask the similarities. All the materials can be seen in Figure 6.

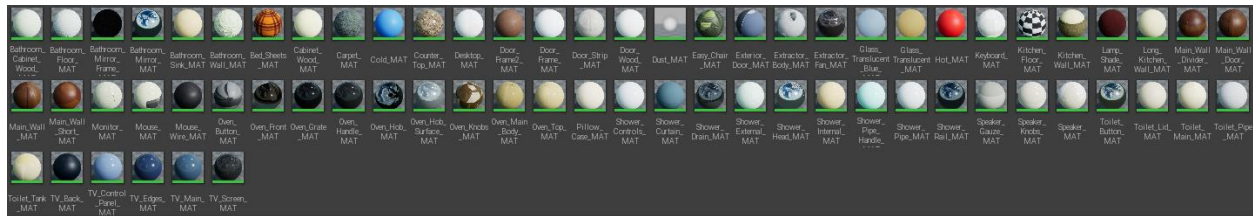


Figure 6. All materials used in the final renders made by the designer.

## References

*Allegorithmic, 2018. Bitmap2Material [Software]. Clermont-Ferrand: Allegorithmic.*

*Allegorithmic, 2018. Substance Designer [Software]. Clermont-Ferrand: Allegorithmic.*

*Allegorithmic, 2018. Substance Painter [Software]. Clermont-Ferrand: Allegorithmic.*

*Autodesk, 2018. Autodesk Maya 2018 [Software]. San Rafael, CA: Autodesk.*

*Epic Games, 2018. Unreal Engine 4 [Software]. Cary, North Carolina: Epic Games.*

*O'Malley, B. L., 2004-2010. Scott Pilgrim. Portland, OR, USA: Oni Press.*

*P-Studio, 2017. Persona 5 [Game]. Tokyo: Atlus.*

*Wright, E., 2010. Scott Pilgrim vs. the World [Film]. United Kingdom: Marc Platt Productions.*

## Images Used in Project

*Bed Sheet Texture:*

<https://www.stockvault.net/photo/134774/green-and-white-tablecloth-pattern>

*Books Image:*

<http://www.ripricepoint.org/library-book-wallpaper/wallpapers-library-wallpaper-cave-interesting-ideas-design/>

*Carpet Texture:*

<https://primogamestudio.com/textures/carpet/Albedo.png>

*Comics Image:*

[https://keenlypeaches.files.wordpress.com/2015/06/img\\_4987.jpg](https://keenlypeaches.files.wordpress.com/2015/06/img_4987.jpg)

*Counter Top Texture:*

<https://i.pinimg.com/originals/8b/78/03/8b7803e75343a3ff629f9ebcd361f515.jpg>

*Green Tiles Texture:*

<https://www.tileideaz.com/wp-content/uploads/2015/08/1354.jpg>