3D MODELS

Maria Santos (10183375)

UNIT 41 – 3D MODELLING

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Reflection on finished product

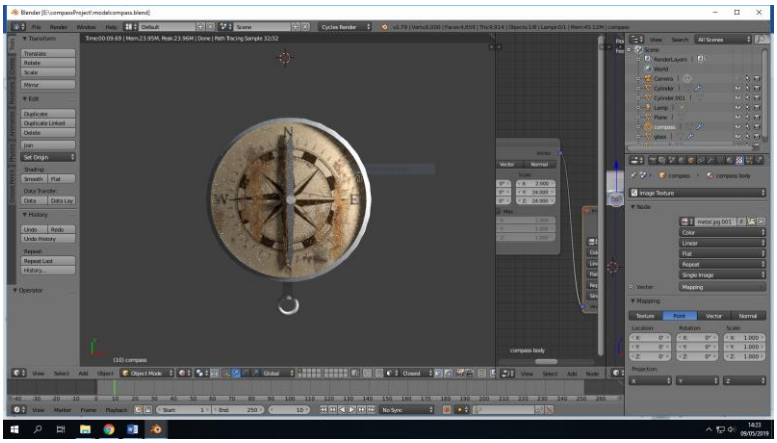


Figure 1. Compass.

This is the first model I have created. This object tries to replicate an ordinary **compass**, with the needle always pointing North. I have added an image to wrap the inner base with the cardinal directions to achieve the utmost realistic appearance. On top of it, I have added a rusted image material for a fashionably attractive look and a glass cap. To facilitate texturing, I have separated the compass in three different objects: the body, wrap and the glass.

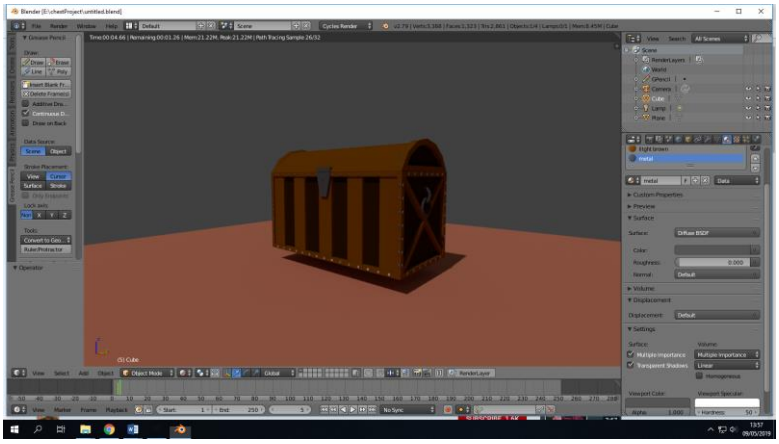
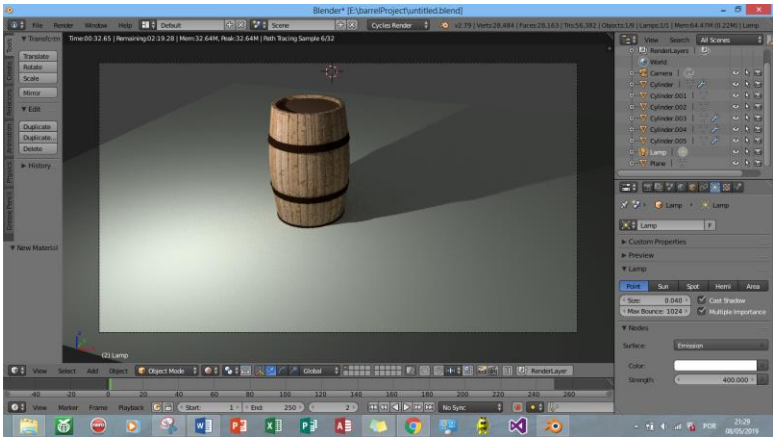


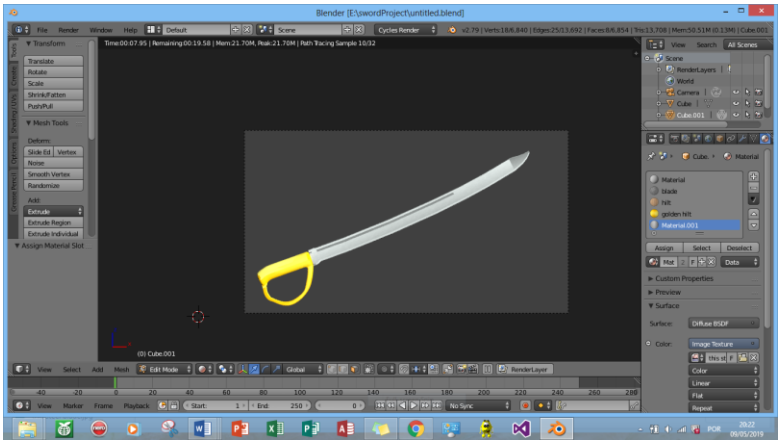
Figure 2. Treasure Chest.

This is the rendered view of the model of a **treasure chest** – shown in *Figure 2*. The trunk has a low-poly count, scaled out from a cube mesh. It has nails placed around its surface and lid, with metal rings, handles and a lock. It has many insets carving the frontal and lateral faces.



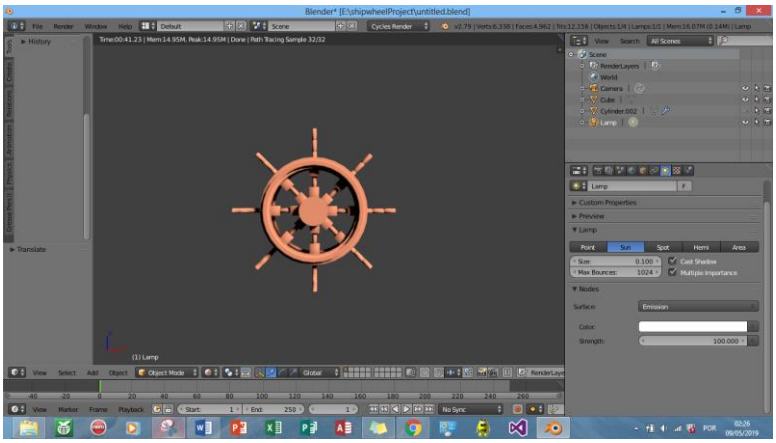
This is the third model. Its design follows the classic oak whisky casks: dark brown hoops with a wooden image texture for its body. To make the texture look even, I have smoothed out the object. Nevertheless, I have added a bump mapping node to make the wood look at little rough.

Figure 3. Oak barrel.



The simplest model took only one hour to complete. It is a low-poly count sword, modelled from two basic primitives cube and cylinder. The blade and hilt, both generated from face extrusions, were added an image texture for a shiny and golden look respectively.

Figure 4. Sword.



This is the model for the wheel that steers the ship. Its handles were mirrored along an axis, rotated by 45 degrees. The helm is a cylinder with a cropped inset face; the spokes are joint cube and cylinder meshes projecting out of the ship's wheel, connecting to the rod; its surface was smoothed out by adding a Subdivisions Surface modifier.

Figure 5. Ship steering wheel.

Figure 6. Logo.

The game logo is quite simple as it consists of 3D text. As the sword resembles the letter "P", I have imported the object into the scene to complete the word. There are no image textures, the letters just as the blade; the background is a plane mesh, black behind the text.

Original intention comparison

Compass

Originally, I wanted to create a flat foundation for the compass, and a solid texture to cover the body. However, as the model began to gain shape, the flatness at bottom of the object looked rather unrealistic. The colours would be dull and it would be a very simplistic model. Moreover, I intended to create a glass cap so I could display the content inside the compass. This would be achieved by separating the compass into different objects so that I could apply a glass node to generate transparency. I laid a rusted material over the wallpaper for the cardinal directions for a worn-out look (a png. file, so that it wouldn't cover the wallpaper completely). Finally, the pointer was mirrored so I did not have to model it twice, making both needles look symmetric.

Treasure chest

At first, I intended to model the trunk with the lid open, and create metal studs to be placed in the corners. I also tried to add a skin to the surface of the treasure chest, and long straps that would stretch half way through the front and hind faces. As I began modelling it, I decided I could add duplicated nails and place them around the edges of the chest for decoration. I also added metal crossing rings for each lateral. As previously sketched, I have added a lock in front of the chest, but I needed a keyhole. In order to achieve this, I have created it separately then moved to the face where the lock began. I wanted to carve it to the lock so I added a Boolean modifier (and chose the option *Difference*) to make the keyhole. Lastly, I assigned the solid coloured materials I initially had stated.

Barrel

Comparing the model of the oak barrel to the original intention there isn't much difference. The starting point for the cask was a cylinder mesh. I added a horizontal edge loop in the middle of the mesh and scaled the edges so the object would take the shape of barrel. Following the sketches, I have added the hoops around the cask and a wooden texture to cover its body. The wood looked rather smooth, hence I added a bump mapping node to make it look a little uneven.

Sword

It was the easiest object to model as it is merely resultant of face extrusions. A cube mesh was extruded to shape the blade. For better accuracy, its peak was scaled down and moved upwards to create a curve-edged sword. As the blade didn't look sharp, I have selected the edges and scaled them out to achieve the look. The hilt was extruded from a cylinder, smoothed down with a Subdivision Surface modifier, and assigned a shiny yellow golden texture. A metal material was applied to the blade for a shiny look.

Ship's helm

The helm is a joint object. The wheel is a cylinder, with its front and hind faces deleted to create an empty space for the spindle. The handles are grouped objects – two cubes and three duplicated cylinders – spaced out between each other by a 45-degree angle. The rod, located at the very center of the wheel, is the foundation for the handles, which are projecting outwards the wheel. Finally, I have joined the entire model and applied a wooden image texture. In the end, I have used *Smooth* shading to smooth down the helm for it looked quite sharp.

Logo

The logo was just 3D text with the game name *Pirates Ship*. The letter "P" was replaced by the model of the sword which quite oddly resembles it almost perfectly – the model had to be converted as a Wavefront obj. file before exporting -. Lastly, I have added a plane, placing it behind the logo and applying a solid black colour material to contrast with the white-coloured text.

Fitness for purpose

The player will use the navigational **compass** to search for clues, following cardinal directions. This model will be animated to react to player movement. Since it is a haunted ship, most objects will look rusty. Thus, I have applied a rusted material over it for a worn-out appearance to match the dull and eerie cabin.

The **treasure chest** had been rigged so the lid could open. The game asset will house other several objects inside, among them relevant clues. I was planning on adding a skin and other details but there won't be much light in the cabin for the player to pay attention.

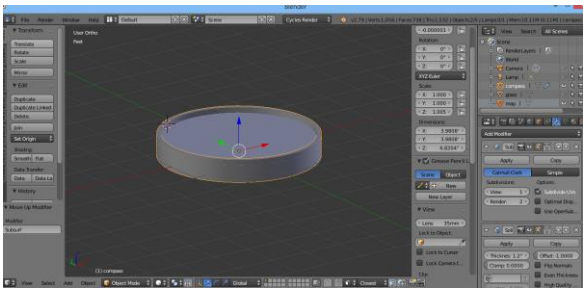
Mainly for aesthetics, the **barrel** will have painted a message in its head. The player will stumble upon it in a partition that stores whiskey and wine oak barrels. Pirates often brought wine and whisky on board, hence the oak barrel is rich with symbolism.

One of the last objects for the player to find is the **ship's helm**. This wheel is detached from its pedestal and platform, hence the player will need to bring it up and reassemble it to sail the ship and escape the remote island.

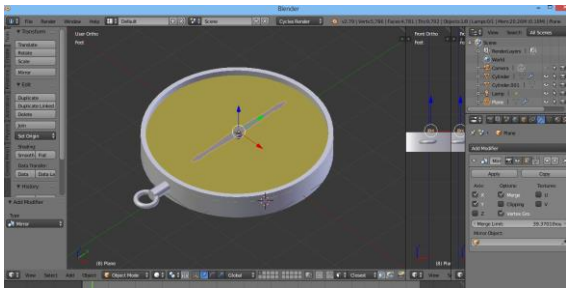
The **pirate sword** will serve as a weapon for the playing character to defend himself during a melee combat. The player will have to use the sword to protect himself and knock the creatures down until the wave ends. This sword is the **logo** symbol. I have taken advantage of its resemblance to the letter "P" and added it to the text. In order not to upset children, I have discarded the original idea of adding skulls.

Age groups over 12 will not find the game objects upsetting. The player is bound to fight and will need this for defence. The blade is not bloody, which some players would find somewhat disturbing. Additionally, users will be knocking fictional creatures down and not actual humans, thus it is not promoting violence nor crime, but simply complying with the pirates culture from that era. The nature of this game is nothing new nowadays – the content is probably not considered as sensitive as it was before - and players seem to have gone numb over weapons in-game.

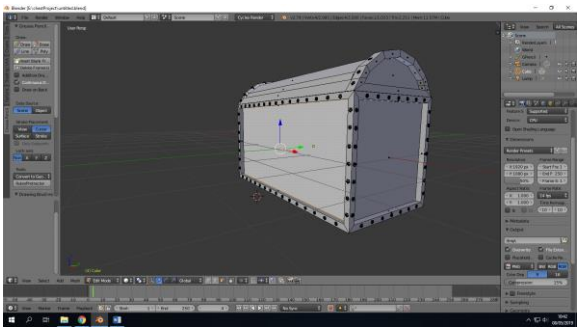
Technical qualities



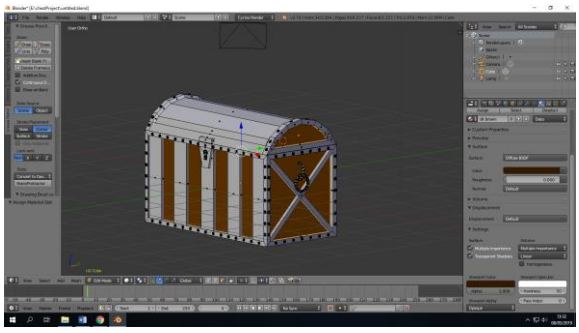
I have **separated** the compass by selection (*shortcut "P"*) into three separate ones: the body, the wallpaper and the glass. To make the shape look thicker, I have added a **Solid modifier**. I have also applied the **smooth shading** option under the Shading panel to finalise the object before applying **texture**.



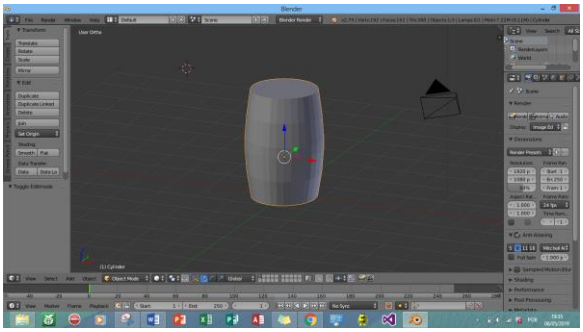
I have used a **Mirror modifier** to avoid producing the pointer twice. Note that the two needles are exactly symmetrical. While I was modelling this, I used the "H" key to hide the glass and facilitate editing. I have also added modifiers to the glass (**solidifiers, subdivision surface, edge splits and smooth shading** to this mesh for the exact same reasons as the other parts of the compass). This is what it is looking like in wireframe mode. I have also entered the node editor and added a glass node to make the latter transparent.



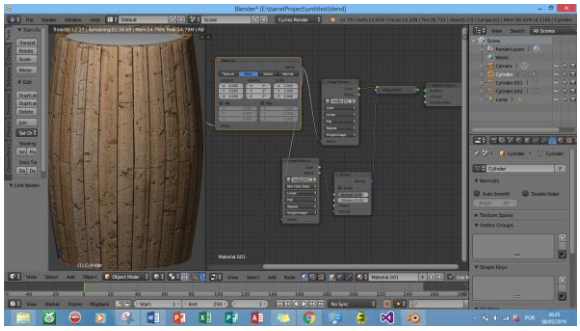
Modelling the treasure chest started with a simple cube mesh – **box modelling**. Scaling it out had given it the rectangular shape I was aiming for. The lid of the trunk is a cylinder, whose faces were cut from its bottom half. Note that the faces have been **inset** and **extruded** inside the chest. To create the nails, I have added a cylinder with 16 vertices and **duplicated** it, placing them around the chest.



I have added a keyhole for the lock by adding a **Boolean modifier** and chose the *Difference* of these shapes. This picture shows the chest with a new **material** assigned to it: a solid brown colour.



I have used a cylinder for the model of the cask. I have **inserted edge loops** in its surface and scaled them out so the mesh would take shape of a barrel.
I used the "P" key often when creating my models. It is good to separate models by selection, for it makes texturing easier. I wanted to smooth out the jagged edges so I used **Smooth shading**.



I wanted to manipulate the image texture I added, so I used the node editor. I wanted to intensify the look of the wooden texture, so I added non coloured data image texture and a **Bump mapping node**. With this node, I could adjust the strength of the wooden image. This would make the surface of the barrel look thicker and, therefore, more realistic.

Aesthetic quality

Most models have turned out the way I aimed for. However, with issues ranging from texturing, the level of detail and rendering, some have not quite met my expectations.

The ship helm

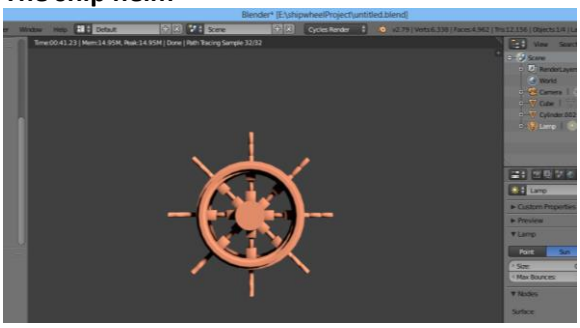


Figure 7. Ships helm.

Figure 8. Ships helm professional 3D model.

Even though it was a simple model, I have just seen a broken impersonation of an actual wheel. I evaluate this by looking at the handles and the spindle these are projecting from. The handles were not supposed to look as sharp as the rod. The spokes look basic with not much detail at all. This would mean **adding more loop cuts** and **scaling them up/down**. Furthermore, the handles look flat and boxy. This could be resolved through **smooth shading**.
Although I have applied an image texture to the wheel, it looks like I have only added colour to it.

I used a wooden texture but the wooden look is not so noticeable, as fig. 7 demonstrates. **I should have used** the **UV editor** to scale this appropriately and added a **Bump mapping node** to enhance the wood in the image texture. Figure 8 shows an example of a professional ship helm 3D model. In this example, both handles and spokes have the necessary level of detail. Note that the spokes have loop cuts, and the handles are round and smooth, for easy manoeuvring. In rendered view, the quality of the texture is still intact. The modeller has used **appropriate lighting** techniques to enhance the texture.

The treasure chest

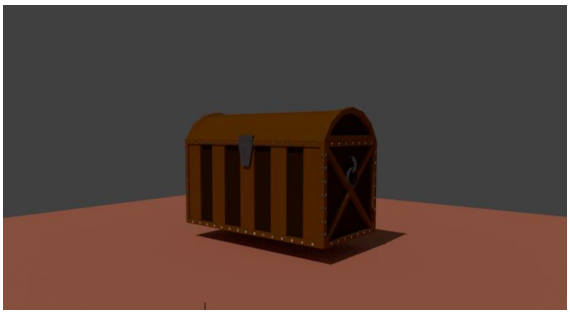


Figure 9. Treasure Chest.

Figure 10. Treasure chest 3D professional model.

Most trunks have a wooden texture. This would give a more appealing look to the treasure chest. Instead, I have added a basic colour material, and the surface ended up with no shine, lustreless. This is easily mendable by replacing this with an image texture.
Secondly, there was an issue while duplicating the nails. I have not selected them correctly. When I addeda new material, I noticed I had only selected the front face. This resulted in nails with texture applied to the front and this is evident in rendered view. The lateral faces with no texture are white coloured, ruining the consistency and general look of the trunk.
The keyhole is also hardly noticeable in this view. I should have gone deeper into the lock and then apply the Boolean modifier, for a less shallow hole.

Even though the style is rather different, one can easily tell why Figure 10 looks more professional. The surface of the chest is mapped with a wooden texture, with descriptive details. However, I would recommend adding a Bump mapping node to fix the unrealistic smoothness of the wood, and if already added, could have increased the strength of the bump. My treasure chest looks matted compared to this one. This is because of the lustreless colour standing before the nails. I could have added straps contouring the chest and assign a new material: a metal texture.
With the use of the lamp in Spot mode, I would have made my chest look brighter. Finally, note that the keyhole in fig. 10 is cut deeper into the lock, hence more noticeable.

The sword

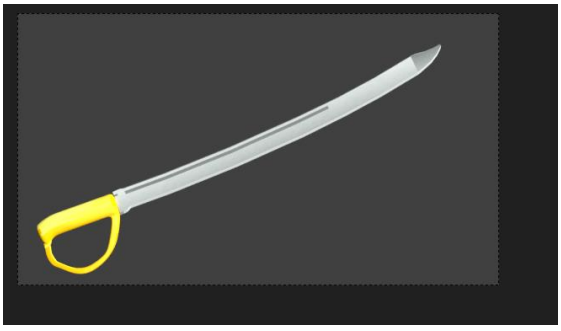


Figure 11. Sword model.

Figure 12. Professional sword 3D model.

The sword was particularly easy to model, however, the blade looked very basic. Most swords have their blades with their edges sticking out. I could have inserted a loop cut and scaled out the edges to create this effect, for both sides of the blade. There is a rupture crawling from the hilt to half way up the sword. This rift looks rather shallow when the model is in rendered view. I could have increased the gap between the loop cut, extruded that face down a litle deeper and scale it slightly. This would create the effect I was aiming for and make it look more aesthetically appealing. Even though I have already determined how the hilt should be textured, I am not satisfied with the final look. Moreover, the pommel looks so uneven and distorted. There had been too many face extrusions that had cleared caused

it. The model to the right has its lateral edges extruded, making the blade look sharp. Even though it is not shiny, the lighting technique used in Figure 12 quite honestly favours the textures applied to the very model. I should have chosen the Lamp type for this, to appropriately display details of the blade I wanted to be better accentuated.

Production skills

Ideas generation

Fiaure 13. Silent Marv.

The game – *Pirates' Ship* – records the journey of a man who is trapped inside a mysterious ship. This scenario was based upon the film series *Pirates of the Caribbean*.

Silent Mary was the most feared pirate-hunting ship that sailed the Caribbean during the Golden Age of Piracy. Her corroded appearance is similar to the haunted ship in the game, as well as what inspired me to create models that could match this setting. I had based my models on this movie, as they all represent the objects or accessories that one would most likely find inside a pirates' ship. Even though I most certainly looked back to my sketches and occasionally used them as a guide, the *Pirates of the Caribbean* film series has been a constant reference throughout the entire production process.

Figure 14. Sailing Queen Anne.

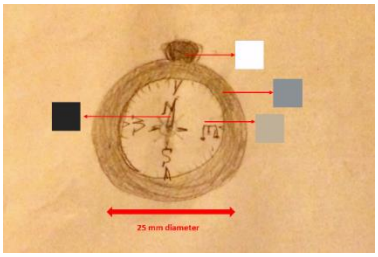
Figure 15. Fighting at World's End (movie scene).

According to the project brief, I was required to design and model 3D objects, which would be used as game assets. The models, just as the logo, had to be representative of the game's theme. Thus, I thought of the most predictable objects: the player would need a **ship helm** to sail the ship. Its design and dimension would aim to look like the *Queen Anne's* steering wheel (fig.14), the infamous vessel commanded by Captain Hector Barbossa, her first appearance on one of the movies from the *Pirates of the Caribbean* sequel.
Unexpected yet exciting sword fights were part of a pirate's life. Gold, survival, leadership or unresolved disputes were mainly the cause for battles and fights, as it shows in Figure 15. As a response to this, I modelled a **sword** with details characteristic of that thrilling era.

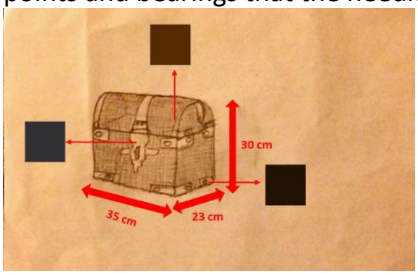
The remaining models are accessories - some enriched with symbolism - oftentimes seen on the films. Jack Sparrow's had a rather unusual navigational instrument that wouldn't point North, "but to the thing you want most in the world". The **compass** I modelled follows the same conduct. Unlike an ordinary compass, it will point to the direction of the next clue. Lastly, the **treasure chest** and the **barrel** are just for decoration.

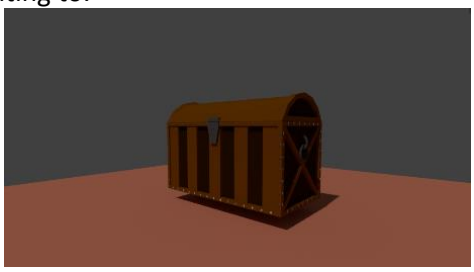
Modelling specification

Most products meet the original specifications: colour themes, dimensions and shape. However, some models have drifted away from their design sketches, some more than others.

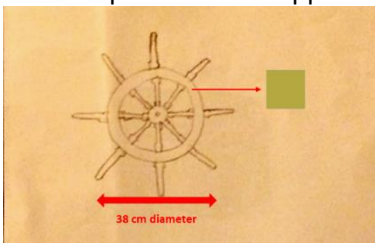


Even though the colour attribution is not that imperfect, the ring looks thicker and narrows the view around the wallpaper. The final product had resolved this by thinning the ring to allow for more display room than what the sketch demonstrates. I had not planned on adding another material or texture, but I opted for a rusty look when modelling the navigational instrument. The pointer is larger than sketched. The reason for this is that it would be much easier to identify the points and bearings that the needle would be pointing to.





The treasure chest is, by far, the model I chose to change almost completely. Some aspects highlighted on the design had not been achieved. It was easier to replace the metal straps for duplicated nails. The locking mechanism is very different from the original sketches. Rather than producing a metal band and securing it with a lock, there is a keyhole instead. Nevertheless, the colours specified were applied as intended.



The sketch to the left indicates that the helm would have a solid colour paint. However, I have used a wooden texture instead, which still ended up not so noticeable regardless. The drawing demonstrates a higher level of detail in comparision to the final product. Even though this object would have low polygon count, the skethes suggest otherwise. To achieve the shape of the spokes and handles illustrated in the draft, I would have to add a good amount of loop cuts. However, the final model does not have as many as needed to achieve the initial designs.

Workflow and time management

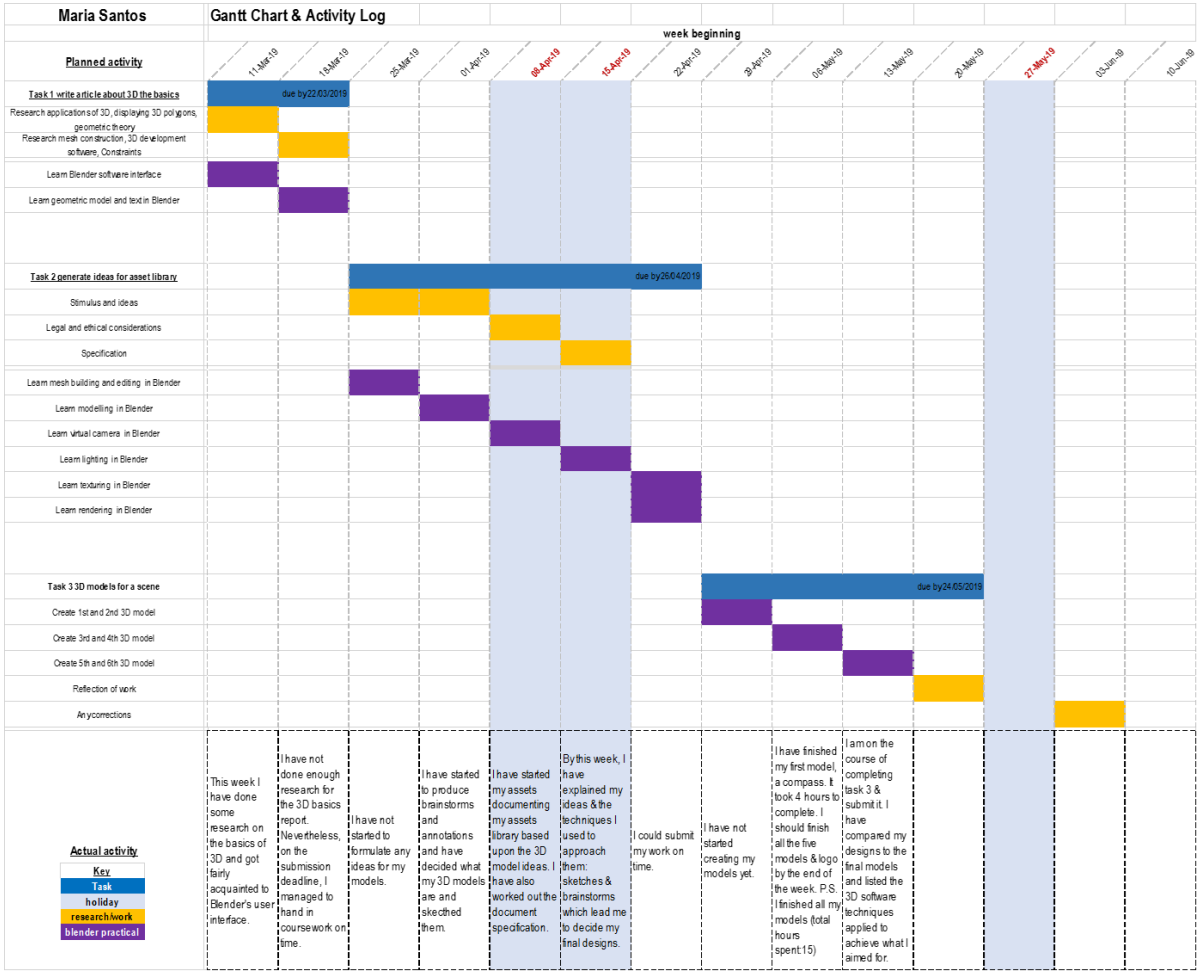


Figure 16. Up-to-date Gantt chart.

According to what I have recorded in the first two weeks from the unit's issue date, I found myself short on time to get acquainted to the Blender's software interface and carry necessary research for the first task. The following four weeks were meant to be dedicated to learning how to use Blender and the basic 3D modelling techniques. However, I only managed to generate ideas for my models, find inspiration and other sources in which I would use to base my sketches upon.

This would affect the weeks that followed. My first two models should have been created by the beginning of the month.
Overall, I managed to adapt my chart and log my activity accordingly as planned.

Technical competence & Teamwork

Although I was getting familiarised with Blender's user interface and basic geometric/text modelling, I had trouble using shortcuts correctly as well as applying some techniques.
In order to achieve what I was aiming for, I watched tutorials/browsed on the Web how to apply certain blender techniques when creating my models.
(Cont. next page)

Figure 17. Using the UV editor.

After applying the wallpaper to the compass - the paper with the cardinal directions – the image didn't lay out properly. I had to manipulate the image texture I added in order to adjust to the compass circular foundation. After watching a tutorial on YouTube, I figured out how to UV wrap my object. I have also learnt to drag out another view area so that I could edit the texture and have my object on rendered view simultaneously. In fig. 17 I'm using the UV editor to scale the wrap so that the letters do not stick outside the circle. The right-hand side is what model looks like when rendered.

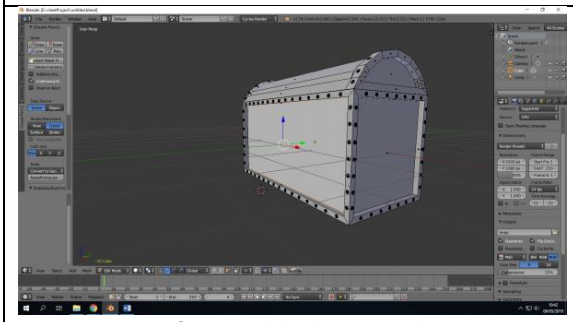


Figure 18. Inset faces and duplicating nails.

The treasure chest is out to be the most detailed model. The picture shows the object on Edit Mode, in perspective view. To achieve this level of detail, I wanted to extrude the faces of the trunk. I watched a tutorial on how to create an inset of currently selected faces and adjust the thickness and depth. At first I confused this as adding an edge loop, but it wouldn't work out. The major problem I found when creating this model was when I was selecting the nails to duplicate them. The reason for this is that there is a proper sequence of key strokes that allows one to select all the nails and making sure they all faces have been targeted. It took me some time to get it right:

- Left-click+ L (selecting the first nail and all its faces)
- + SHIFT+Left-click+ L (holding shift when selecting another nail and all its faces)
- SHIFT+ D +ENTER (duplicating the nails)

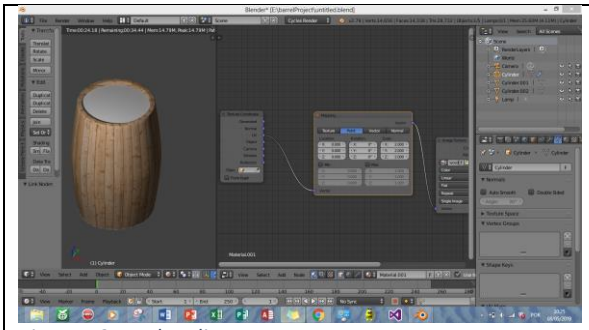


Figure 19. Node editor.

As the sketches illustrated, most models had different parts with different textures. This procedure is much easier when one separates the entire object into multiple ones. I have searched how to do it. By separating the object by selection, shortcut P key, I could hide some parts of the object to ease texture manipulation. Even though I could use the UV editor to change how I wanted the image to be placed on the surface, I needed to completely change the image itself and add roughness to it. Hence, I had to learn how to use the Node editor. It took some time to understand how I would connect my nodes to the image texture node, but eventually I got the hang of it.
With nodes, I could add filters to images, make them transparent, sharpen/soften them, change the colour, brightness and so forth.
In this case, I wanted to strengthen the wood texture to make the surface look realistically rough. In the node editor, I have added a Bump mapping node and increased the strength of the texture for this effect.

Teamwork

As this document demonstrates, I have provided visual and written evidence of my knowledge on Blender and the techniques I have applied. I have also explained how I have encountered issues – when my models did not meet my expectations - and how I overcame this by learning how to fix them. With that said, I have not been assisted at any time, having worked independently during the entire production process.