

Production Support Material
CGI Tools: Maya Project

04/01/2021

1 Introduction

Since I first encountered Escher's impossible structures, I have been mystified and intrigued by optical illusions. When tasked with creating an impossible structure in Maya I was thrilled, and drafted many ideas for how to achieve a satisfactory final piece based on the specification.

In the following pages, the ideas I had will be discussed, some sketches and photos displayed, and existing art and film critiqued, which all influenced my impossible castle animation (seen in fig. 14 and the accompanying video).

2 Art Direction and Style

2.1 Artistic and Filmic Influence



Figure 1: Weathertop from *The Lord of the Rings*, Jackson (2001).



Figure 2: Nunney Castle, Exmoor, Visit Exmoor (2008).



Figure 3: Ruin on the Mendip Hills, Somerset, National Trust (2012).



Figure 4: Glastonbury Tor, Somerset, National Trust (2012).

After re-watching *The Lord of the Ring* (LotR) films (Jackson (2001)), and playing Ubisoft's *Assassin's Creed Valhalla* (ACV) based in dark-age Britain (Ubisoft (2020)), I

knew I wanted to create a medieval-themed piece for this assignment. Living in Somerset, I see many relics of the past in the beautiful, scenic countryside that I took significant inspiration from for this piece.

To get reference shots and art to base my piece on, screenshots from *LotR: The Fellowship of the Ring* of a ruined castle called “Weathertop” were taken (see fig. 1), photos of old castles and scenery from the National Trust website (fig. 2 & 3) - particularly Glastonbury Tor which can be seen in the distance from my house (fig. 4) - were found, and after visiting the Museum of Somerset in Taunton, some artists’ works of the local area were downloaded (fig. 5 & 6).



Figure 5: “*Glastonbury Tor Moonlight*”, Langley (n.d.).

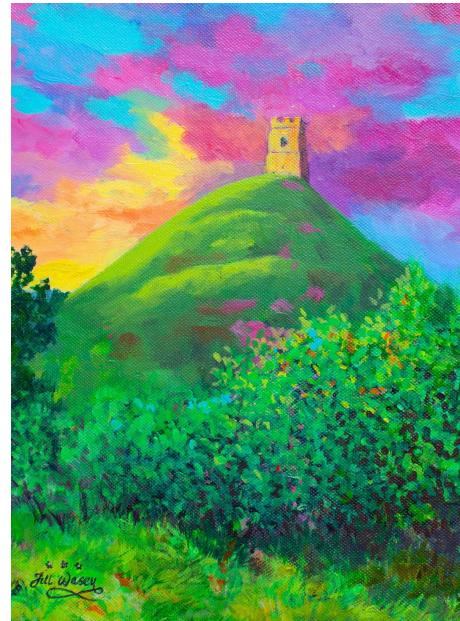


Figure 6: “*Glastonbury Tor*”, Wasey (n.d.).

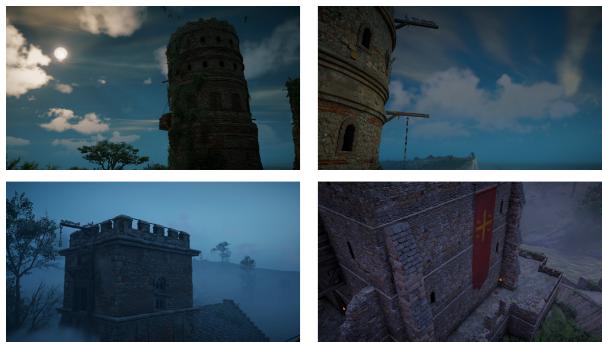


Figure 7: Reference images from *Assassin’s Creed Valhalla*, Ubisoft (2020).



Figure 8: Reference images taken by me atop Crook Peak on the Mendips, Somerset.

After compiling this set of images I arrived at the idea to create a medieval tower atop a hill with a sunset behind.

The simplistic look of Langley's artwork is both calming and invigorating, with the reds and purples giving the viewer feelings of heat and passion. Moreover, the work is easy-on-the-eyes and pleasing to look at; trying to keep my work simple, with only minor detail and straight long lines would help deliver this effect.

Conversely, the colourful, bushy painting by Wasey helps to inspire awe, warmth, and reminders of childhood, whilst having enough appealing shapes to keep the viewer interested for longer. Taking forward ideas from both these artists will provide a good final piece.

To get suitable reference images for a sunset, I hiked up a local high point named "Crook Peak" to get some beautiful images that contain the colours of Langley and Wasey's artwork that were needed in my final piece (see fig. 8).

2.2 Initial Ideas

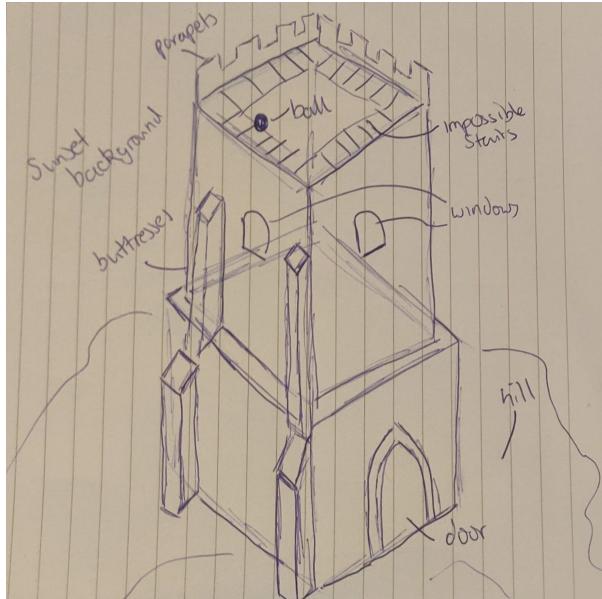


Figure 9: Idea 1 - sketch of a tower based on Glastonbury Tor.

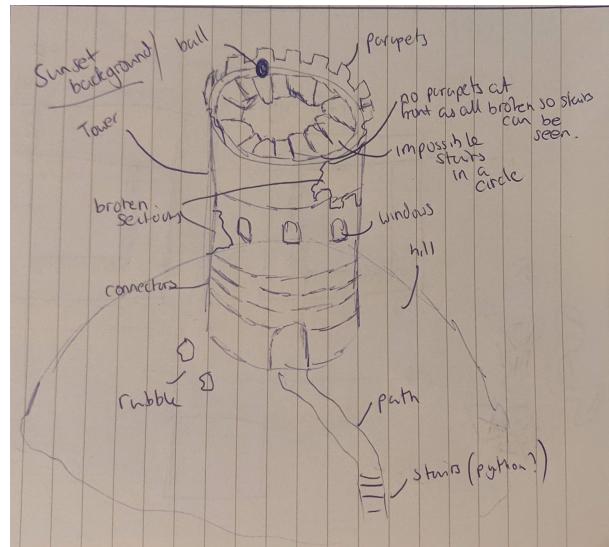


Figure 10: Idea 2 - sketch of a circular tower based on fig. 7.

Using the art and filmic references stated above, I sketched my initial ideas.

In my first sketch (fig. 9), I drew a tower based on Glastonbury Tor and the ACV reference shots. Buttresses and parapets were used to give the tower a definitive medieval look, providing the long, straight lines mentioned above. The impossible staircase was placed atop the tower at two-thirds the height taking into account the rule of thirds. The long lines would direct the eye towards the staircase which was crucial as the staircase is the main part of the model.

This sketch was a good starting point but was too akin to Glastonbury Tor. In the next sketch, I opted for a circular tower instead.

In the second sketch (fig. 10), a circular tower based on many seen in ACV was drawn. This tower was in ruin with parts of the tower broken to reveal the impossible staircase at

the top of the tower. Inspired by fig. 15, I felt a circular impossible staircase could result in a fascinating and original final piece.

However, this proved both complicated to draw, and gave an unimpressive effect compared to the traditional “square” impossible staircase. The broken edges also added more complexity - unlike the simple effect desired - so was removed from the final piece.

2.3 Final Idea

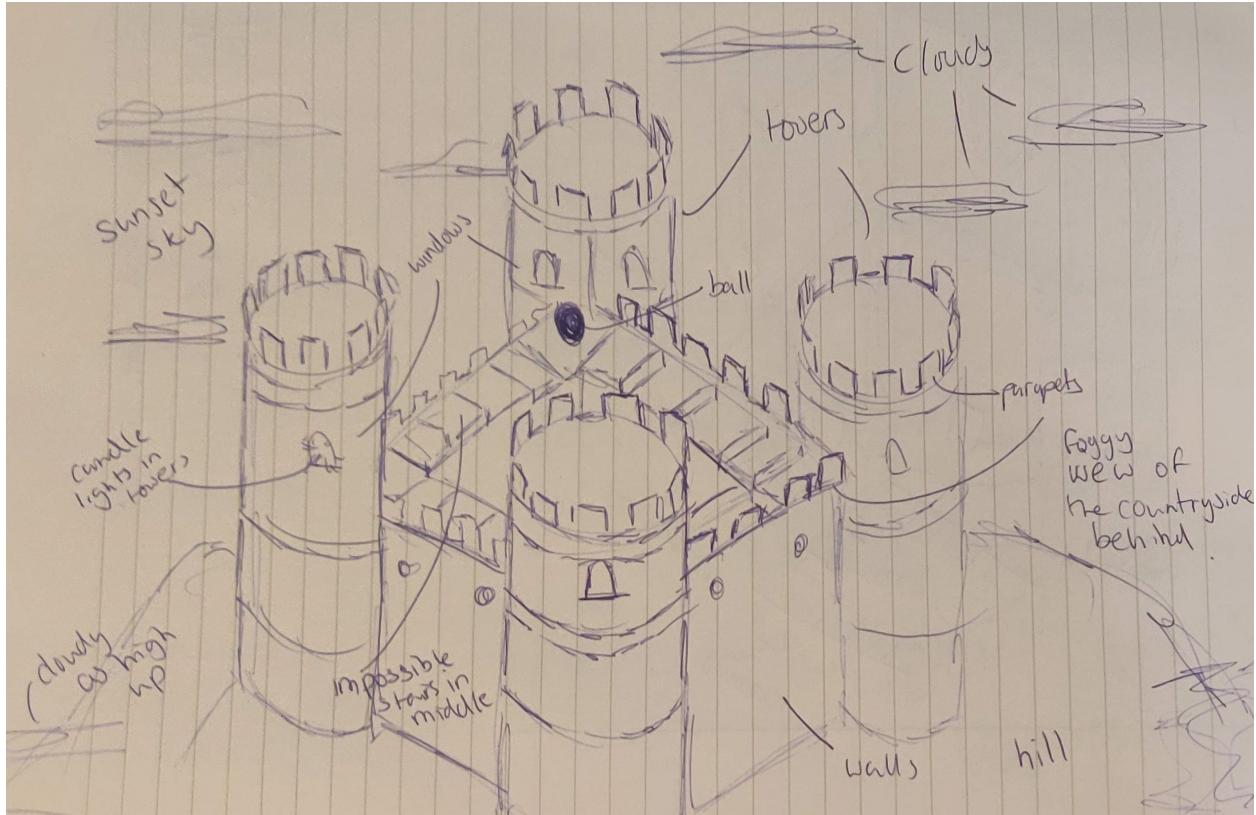


Figure 11: Final idea - sketch of a castle with an impossible staircase along the ramparts.

In my final sketch, I drew a castle with four towers and ramparts between them encircling the impossible staircase. The castle sat atop a cloudy hill overlooking the twilit, picturesque countryside behind.

3 Technical Design

When pondering which parts of the model could be made using automation, careful consideration into what an artist would find useful was taken. Having subcomponents of the scene Python-generated would provide a modeller with a good starting point for making manual modifications.

Based on my final sketch, automatically generating the four towers seemed sensible; each of the towers were mostly alike but varied in height and radius. Therefore, the tool required

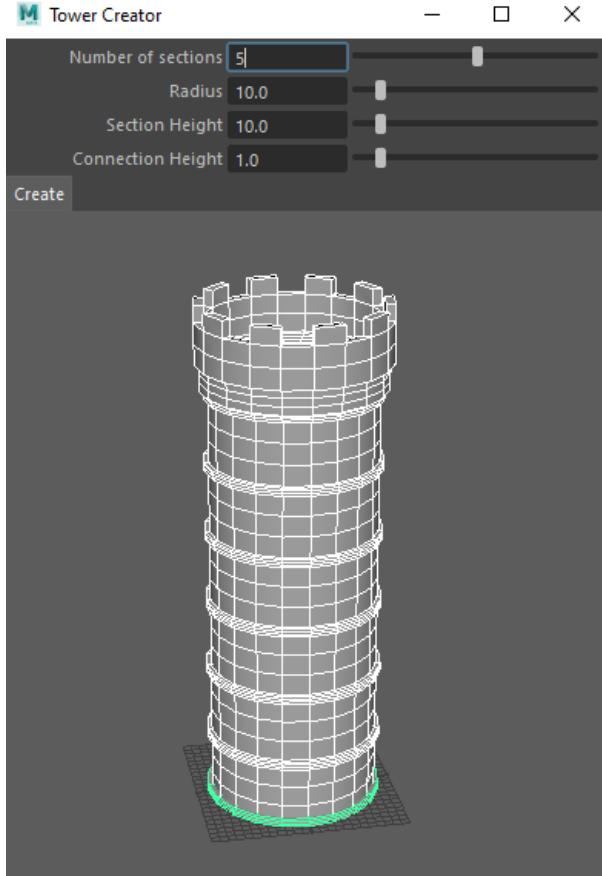


Figure 12: UI and an example tower using my tower creator.

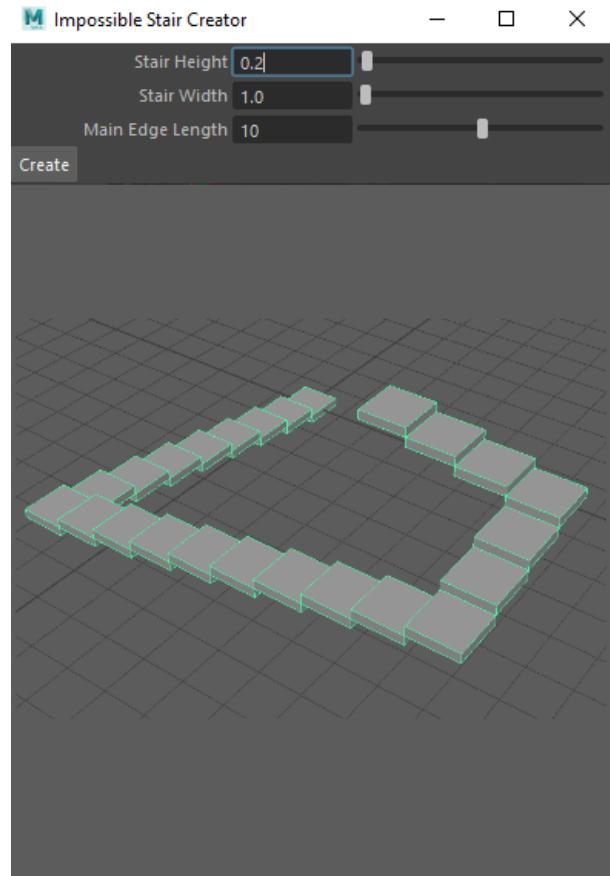


Figure 13: UI and an example staircase using my impossible stair creator.

options to modify these parameters. Furthermore, the artist may want to adjust the number of sections of a tower so this was included too.

An example tower and user interface (UI) can be seen in fig. 12. In the final piece, this tool was used to create an initial tower, then some hand-modelling done to arrive at the model used.

Next, I envisaged a tool that could create an impossible staircase as it was the main component of the project.

However, making a realistic-looking impossible staircase programmatically would require lots of complex calculations of the correct stair lengths. Instead, the tool creates a templated staircase that can be placed in the scene, and modified by hand to make the illusion work (for example, in the final piece the highest stairs were narrowed and the first stair enlarged so from the correct perspective, the illusion could be seen).

Having the options to modify the stair widths and heights, and the number of stairs was included in the tool as can be seen in fig. 13 along with the created staircase in the same figure.

4 Conclusion



Figure 14: Final piece based on fig. 11.

The resulting final piece was both satisfying and matched the designs and inspirations I researched. I am happy with the result and the illusion of an “impossible staircase” has been achieved (see fig. 16 for how the illusion worked).

My piece took the simplicity of Langley’s moonlit-landscape (fig. 5), the pinky-orange colour palette of Wasey’s floral sunset (fig. 6), the ancient feel of The Lord of the Rings, and my own reference images from ACV and atop Crook Peak to create an original and visually-appealing animation that I am satisfied with.

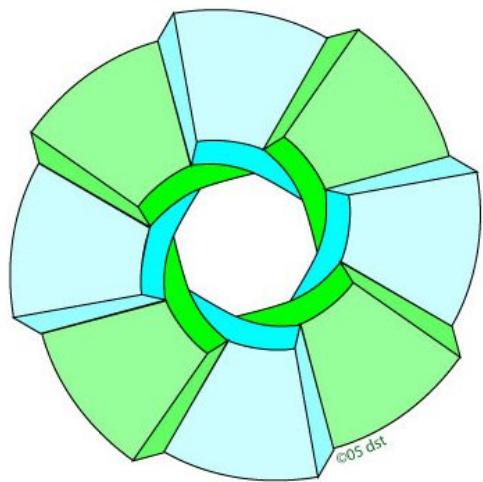


Figure 15: A circular version of the impossible stairs by Daryl Toops, Dean (2009).

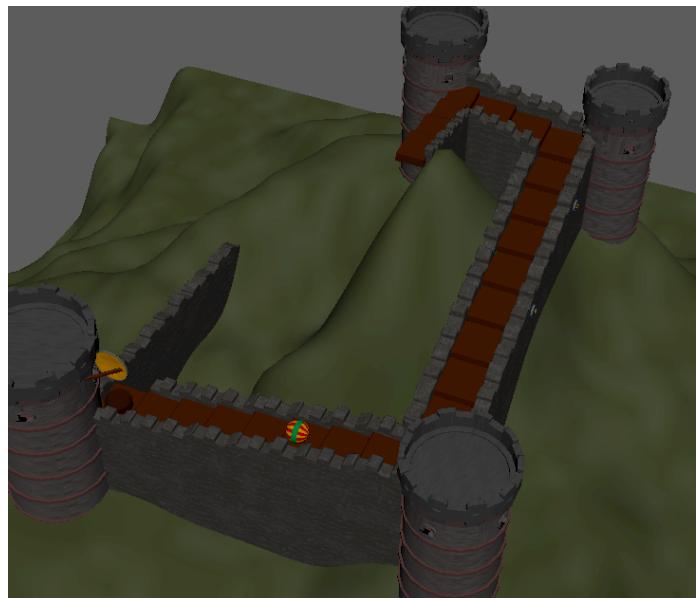


Figure 16: *Breaking the illusion* - the castle scene from another angle showing how the illusion works.

References

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URL: <https://www.moillusions.com/circular-endless-staircase-illusion/>
- Jackson, P. (2001), ‘The lord of the rings: The fellowship of the ring’, [Film].
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