

CGI Tools Maya Animation and Modelling Assignment Report

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1 Influences

To design the impossible staircase I began by researching M.C. Escher's illusions. Upon viewing Escher's illusions I discovered that I prefered the Belvedere tower and the Waterfall prints(See Figure 1). Escher's use of lithograph produces striking images with high contrast and I feel this results in an impossible staircase which feels cluttered. I decided that the style I would like to achieve would be something much more clean and minimal.

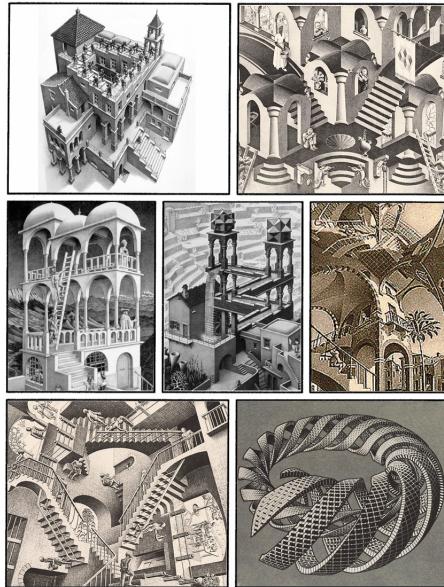


Figure 1: From Left to Right: Ascending and Descending, Convex and Concave, Belvedere, Waterfall, Up and Down, Relativity, Spirals [3]

Whilst researching impossible objects I came across some artwork from a game called Monument Valley. I was instantly inspired by the images, so I downloaded and completed it. I enjoyed how central the style was in the development of the game. One of the creators, Ken Wong, states that when designing the game they tried different styles and adding more detail but continually came back to something minimal and clean. The aesthetic experience really drives the game and every screenshot could be printed and hung on a wall. The creators also said that they felt very lucky to have both artists interested in programming and programmers interested in creating beautiful visuals.[4] I felt that the goals set by the creators of Monument Valley reflected the goals I set myself for modeling the impossible staircase. I approached the model with the intent of creating a model using a similar style to that of Monument Valley. I wanted the colours to be vivid and rich, but keep the lines of the model very simple and defined.

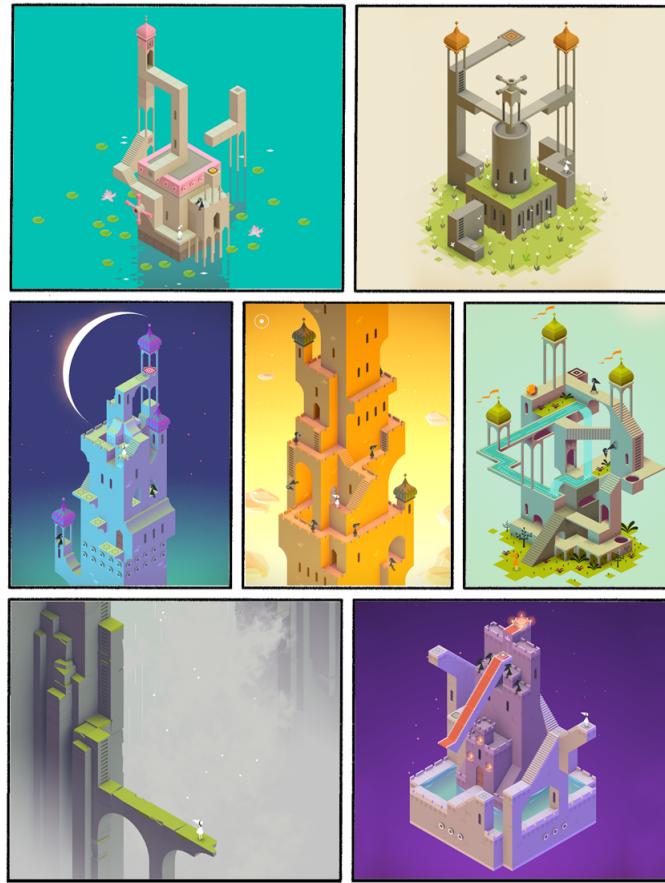


Figure 2: A Selection of Screenshots from Monument Valley [5]

Once I had settled on the look I was trying to achieve, I started trying to come up with some shapes which could contain the staircase. I decided very early that the typical penrose staircase was too thick to be a good fit. I started researching other impossible objects to try and find a variation I liked. I was reminded of the ingenuity of the ambigrams in Angels and Demons. I appreciated the complexity involved in creating an image which reads the same word when flipped. I came across a staircase by Andreas Aronsson which I thought was a very slim and modern take on the traditional penrose style that Escher used. I decided that this staircase would fit with the style of buildings from Monument Valley.

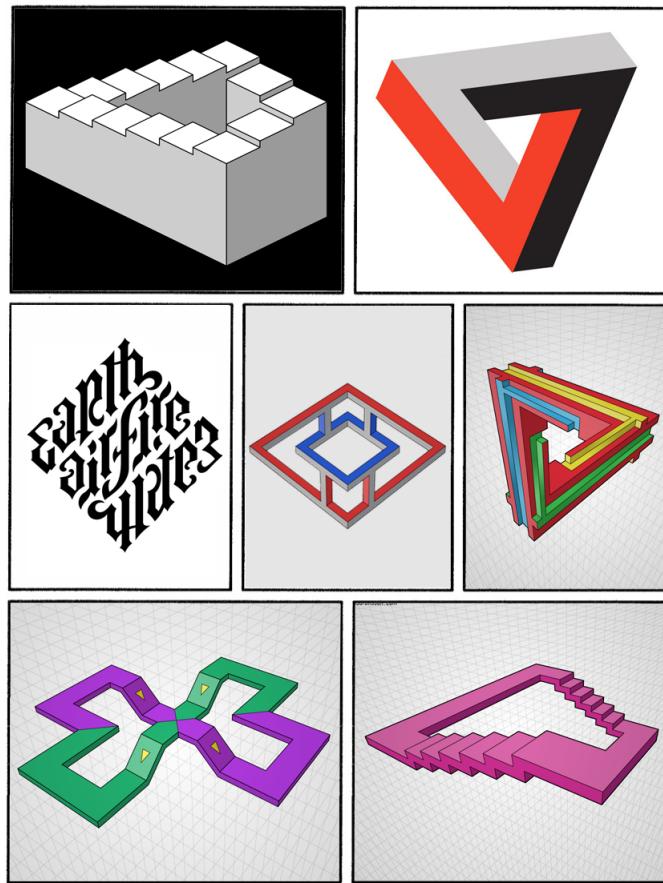


Figure 3: A Selection of Impossible Objects[6][1]

2 Development

I made some small sketches to try and figure out which shapes I found most pleasing. I felt that having the staircase on a raised platform would help me to achieve the smooth lines in the model and ensure the staircase had reason to be center frame. I had enjoyed the look of the island levels in Monument Valley, and particularly the use of low poly rocks and water to fit with asthetic, so I tested these styles with a platform leading to the staircase. However I felt that the water was key to the contruction of this image and I was unsure how to recreate that in Maya. I thought about the levels which contained seemingly infinite buildings and this gave me the idea to produce a building raised high in the sky, resting on many support beams. I made a test model to try out making something impossible and the style of Monument Valley(See Figure 5).

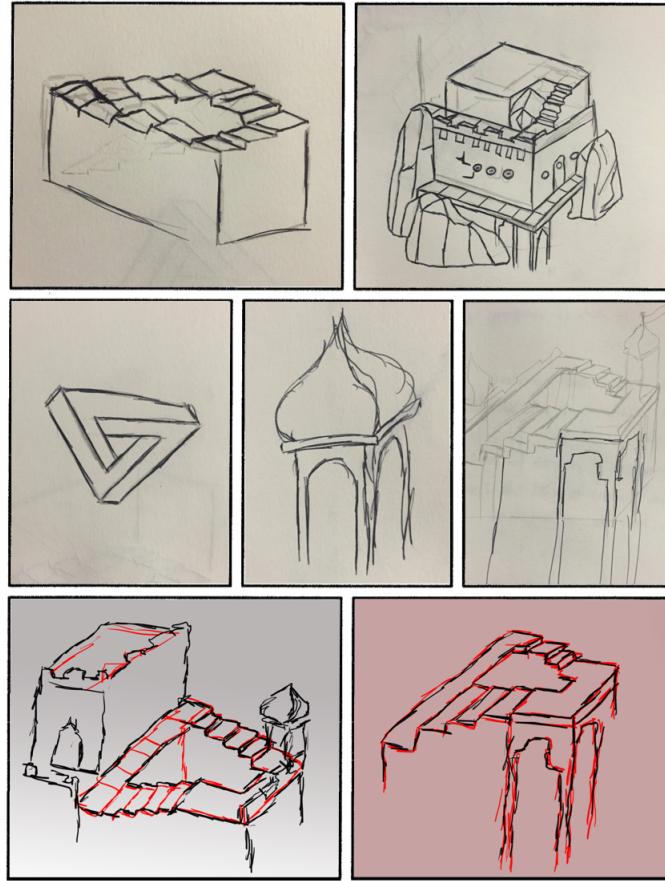


Figure 4: Concept Art

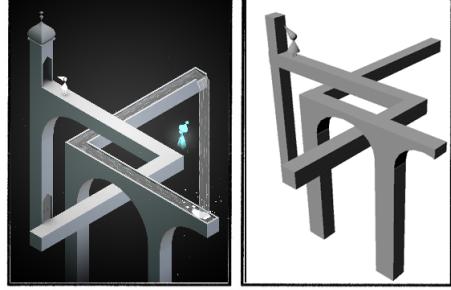


Figure 5: Test Model

When I began the modelling process I decided to start with the staircase as it would be the focal point of the scene. I found it useful to have reference images from both Monument Valley and Escher. I laid out the building in a similar way to Escher in order to add more detail to the model but it was difficult to strike the right balance between the two styles. I ended up omitting a lot of Escher's structure, but kept two of the visible rooms. Even though I used references to make the roof of the barracks I found the pyramid to be too distracting and sharp in the frame(See Figure 6). I swapped this out for the same curved tiles I used for the tower. I feel this gave the building an unintentional Arabian feel that I liked. When shading the model I decided to keep it very simple, only using one texture for a few tiles of the staircase to reinforce the idea that it is one cohesive object. I inserted a skybox and initially assigned it a ramp material to obtain a slight gradient for the colour of the sky. However I felt I could do more to achieve the idea that this building existed above clouds, so I added fog to the scenes and placed the support beams inside. I made changes in the colours of the sky and fog to limit the range of my colour palette. I felt this gave the scene a more believable feel, yet the vividness of the chosen colours still provided a feeling of fantasy. Initially the walls of the building where a single colour affected by two lights. I darkened the colour of the sections of walls that would be in shadow, to facilitate the idea that the scene is set at dusk.

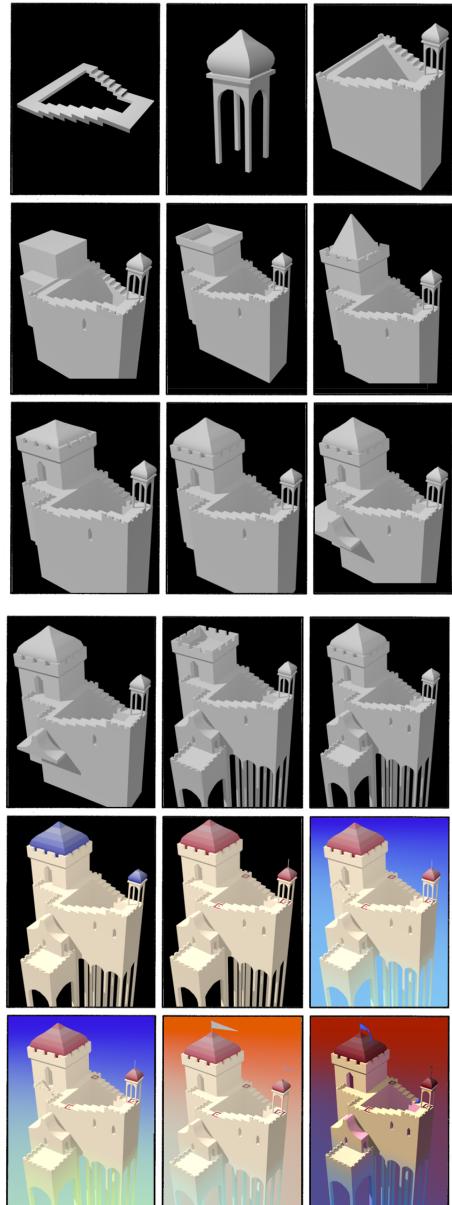


Figure 6: Modelling Development

Figure 7 shows a compilation of images which influenced the design of the model. I believe I have achieved my goal with regard to a clean, minimal design inspired by Monument Valley.

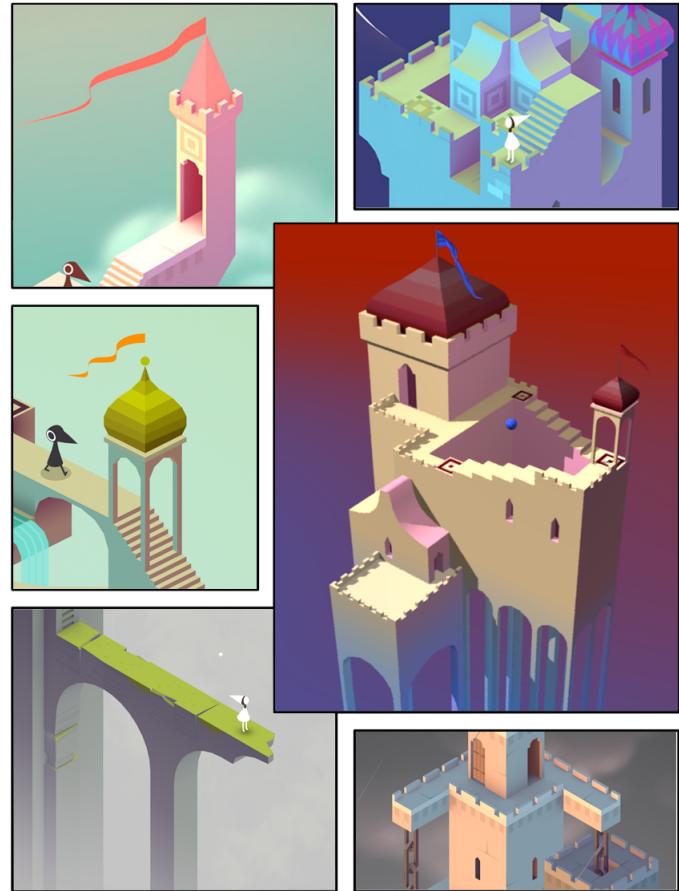


Figure 7: Reference Images[5]

I researched the theory of how to animate a bouncing ball and discovered some key principles to keep in mind. From these tutorials I learned what an ideal motion trail should resemble and used this to animate each bounce. The graph editor in Maya allowed me to edit the initial keys to achieve more believable velocity.

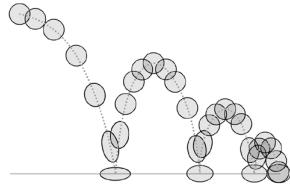
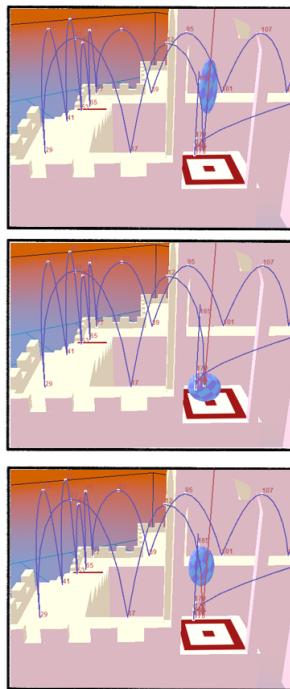


Figure 8: Motion Trail Reference[2]



References

- [1] Andreas Aronsson. Stairs2. <http://andreasarons-son.com/2008/03/20/impossible-figure-2007-02-10/>, February 2007.
- [2] Dermot O Connor. Bouncing ball. <http://www.angryanimator.com/word/2010/11/26/animation-tutorial-1-bouncing-ball/>, November 2010.
- [3] M.C. Escher. Impossible constructions. <http://www.mcescher.com/gallery/impossible-cons>, 1947-61.
- [4] UsTwo Games. Behind the scenes-monument valley. <http://blog.monument-valleygame.com/blog/2014/12>, 2014.
- [5] UsTwo Games. Monument valley, April 2014.
- [6] John Langdon. Angels and demons. <http://www.johnlangdon.net/works/angels-demons/>, 2000.