

COMS31000 Character and Set Design 2018

Interior Reconstruction Report

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This report explains the entire design process of my interior reconstruction model that I created on Autodesk Maya 2018, from pre-production to my final model.

1 Pre-production and Planning

For this interior reconstruction assignment, I have selected the lounge area of the Everyman Cinema on White-ladies Road [1]. I chose this interior because it is a beautifully designed space with a wide variety of contemporary furnishings that I thought would be interesting to model in Autodesk Maya. It is a space that I was already familiar with after going to films and using the lounge area at the Everyman Cinema on a number of occasions. It is a complex interior, but it is made up of largely geometric objects so I thought it would be a suitable, yet challenging choice for this assignment.



Figure 1: Professional photograph of the Everyman Cinema lounge area [2].

To begin the design process, I visited the Everyman Cinema to study my chosen interior and take photographs and measurements that could help me while modelling in Autodesk Maya. I took zoomed-out photographs of large areas of the interior to help me to understand the layout of the room and I took close-up photographs and measurements of each individual piece of furniture to help me to model these objects accurately. Figure 2 shows a selection of these photographs.

In addition to this, I found professional photographs of the interior and some pieces of the furniture on the websites of the interior designers and furniture suppliers used by Everyman Cinema in Bristol [2-4]. Figure 1 shows one of these professional photographs.

Using all of the images that I collected, I drew a floor plan of the interior to show me the scale and layout of the room while I was modelling. I also did orthographic drawings of many of the items of furniture in the room, as it is much easier to model from orthographic images than photographs with perspective. Using the measurements I took while at the Everyman Cinema, I made sure that all of these drawings were to scale so that my scene would have the correct proportions. A selection of these drawings can be seen in Figure 3.

Now that I understood my chosen interior and had these drawings and photographs to assist me, I was able to begin modelling.



(a)

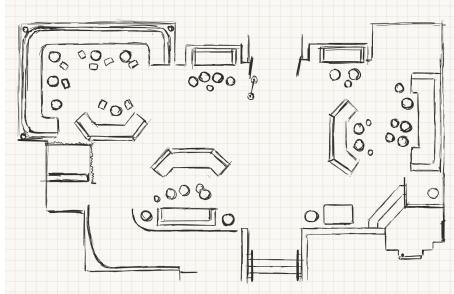


(b)

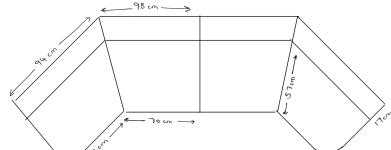


(c)

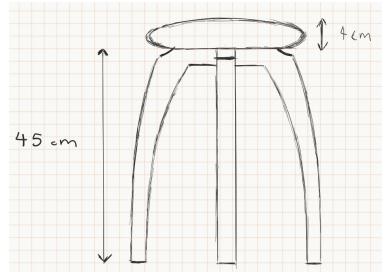
Figure 2: A selection of photographs I took while studying the Everyman Cinema lounge interior.



(a) Floor plan drawing



(b) Top view orthographic drawing of an angular sofa



(c) Side view orthographic drawing of stool

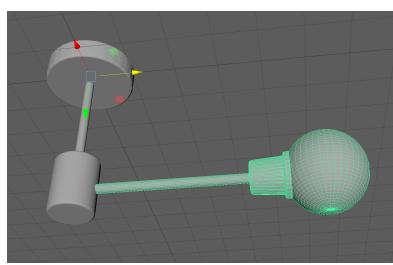
Figure 3: A selection of sketches I drew to help while modelling my chosen interior.

2 Techniques and Surfaces

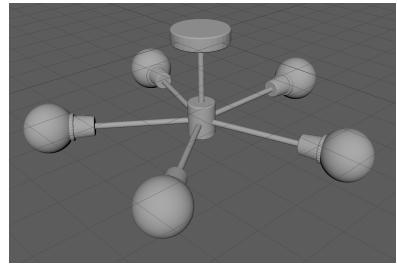
This section lists and explains the modelling techniques I used while creating my interior reconstruction in Autodesk Maya.

2.1 Combining Basic Polygons

I was able to make some objects in my scene by simply scaling, rotating and overlapping polygon primitives such as spheres, cubes and cylinders. I used this modelling technique to model the lights hanging from the ceiling, the wall lamps by the bookshelves and the books on the bookshelves.



(a)

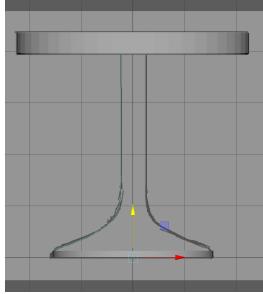


(b)

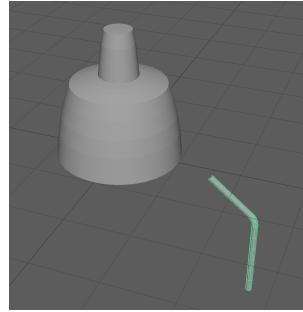
Figure 4: Ceiling light fixture made up of spheres and cylinders.

2.2 Revolve

For some of the round objects in my scene, I traced a profile curve from one of my orthographic drawings using the CV Curve Tool or the EP Curve Tool then revolved this curve around an axis to create a 3-dimensional object. I used this technique to model the coffee tables, the vases on the bookshelves, the cylindrical stools (labelled 'LowStool') and the lamps on one of the walls (labelled 'WallLamp').



(a) Profile curve of table leg before revolving around y-axis.



(b) Wall lamp modelled by revolving a profile curve.

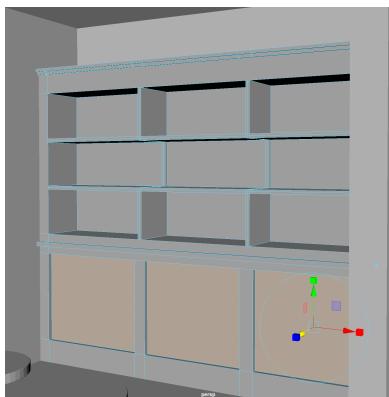
Figure 5: Revolved objects in my scene.

2.3 Extrude

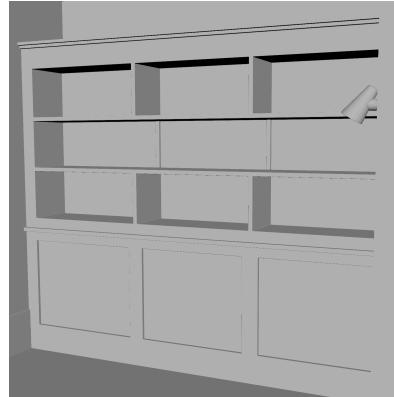
For the objects in my scene with indents, hollows or protruding faces, I added edge loops or subdivided the object and then extruded a face. I used this technique to model the bookshelves, the ceiling, the picture frames, the skirting boards, the indents on the walls, and the doors.

2.4 Bevel

For the majority of the objects in my scene that I made using polygon primitives and extrusions, I bevelled the edges to give the objects more realistic, smooth edges rather than perfectly pointed edges.



(a) Added edge loops and extruded faces.

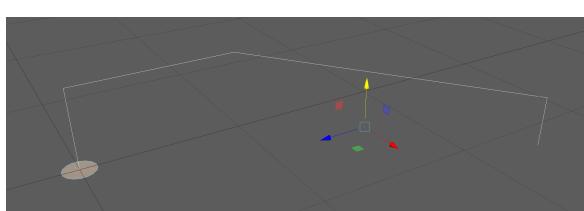


(b) Beveled object to give more realistic appearance.

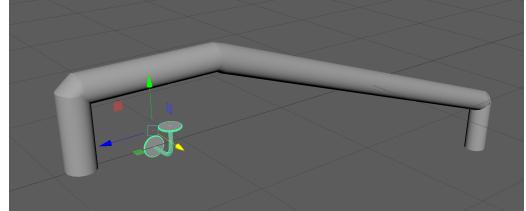
Figure 6: Bookshelf modelled from a cube polygon primitive.

2.5 Extrude Along a Curve

For the long, curved objects in my scene I drew a NURBS curve and created a surface. I then extruded the surface along the curve and added divisions to create a smooth object. I used this technique to model the hand rails by the stairs and ramp, and the curved backrest of one of the sofas (labelled 'MyntaSofa').



(a)



(b)

Figure 7: Stair hand-rail modelled by extruding a disc along a curve.

2.6 Bevel Plus

For the legs of two types of stool in my scene (labelled 'Stool' and 'MorphStool'), I traced curves from orthographic drawings to generate a 2-dimensional outline of the legs. I then used Bevel Plus to create 3-dimensional legs with width and bevelled edges.

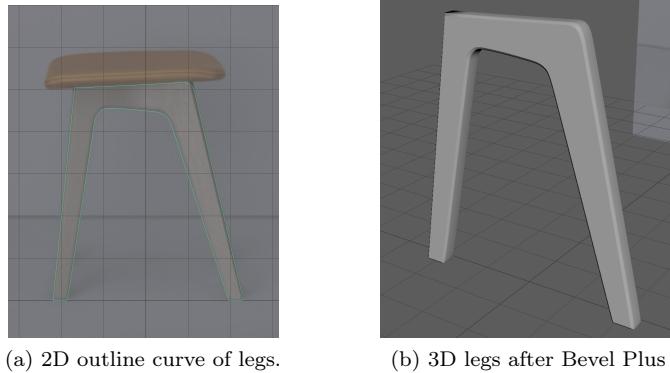


Figure 8: Stool legs modelled using Bevel Plus.

2.7 Polygonal Sculpting and Subdiv Proxy Smoothing

For the more complex, organic shapes in my scene I started with polygon primitives, subdivided the polygons and then moved the faces, edges and vertices to sculpt the objects. I used the '123' smooth mesh preview while I did this to sculpt each object into the correct shape. Once I was happy with the preview, I performed subdiv proxy smoothing on the object to give it a smooth, non-geometric shape. I used this technique to model the cushions of the sofas and the top of the stool labelled 'MorphStool'.

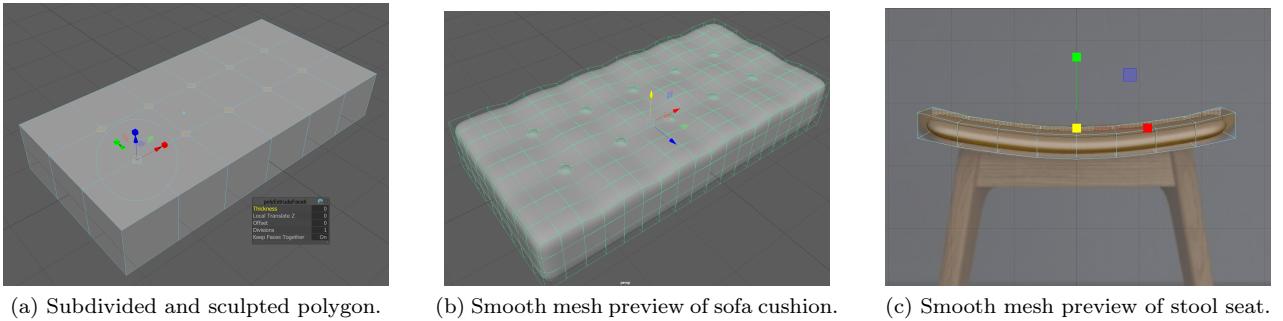


Figure 9: Objects modelled using polygonal sculpting and subdiv proxy smoothing.

2.8 Bend

For the objects in my scene that are curved or flow around corners I modelled a flat version of the object and then used the Bend tool, adjusting the parameters until I achieved the correct curvature. I used this technique to model the corner piece of the sofa labelled 'CornerSofa', the backrests of the sofas labelled 'RedSofa' and 'LongSofa', the door handles and the ramp railings.

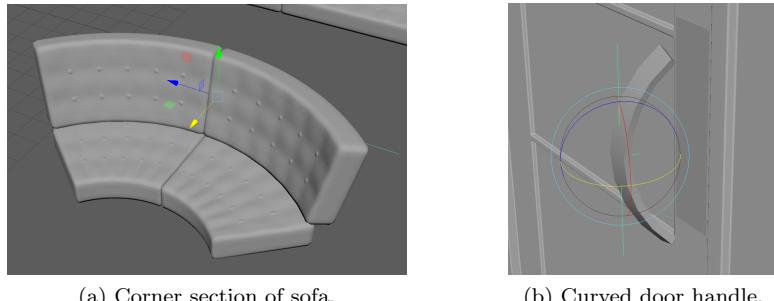


Figure 10: Objects modelled using the Bend tool.

3 Process and Discussion

3.1 Modelling Process

I began the process of modelling the Everyman Cinema lounge interior by importing my floor plan drawing as an image plane in the top-view window. I used this to create the floor and walls of my room with the correct scale. I then blocked out my scene by placing polygon primitives roughly where each piece of furniture would go. This allowed me to see the basic layout of my scene and make sure that each object had the correct proportions relative to the rest of the scene as I modelled them.

I chose to first model the stools as these seemed to be the easiest items of furniture to model while I was new to the Autodesk Maya software and learning how to use each tool. I wanted to experiment by modelling the first stool (labelled 'LowStool') using the Loft tool and the Revolve tool to see which tool produced the best result. I created a number of circles and placed them over my orthographic drawing and used loft over these circles, and then I traced a profile curve from my orthographic drawing and revolved this curve around the y-axis. Both of these modelling techniques produced similar results, but I found that the revolved surface looked smoother than the lofted surface so I decided to use the revolved surface to model the top of the stool. For smooth surfaces, it seems easier to create a smooth profile curve than to perfectly align circles into the correct shape. I originally tried to model the legs of this stool by tracing the profile of the legs, using the Planar tool to create a surface and extruding this surface, but this took a long time and did not look accurate. Instead, I started with a polygon primitive cube and created the legs by dividing and extruding the faces. This modelling technique was much faster and produced a more realistic model of the stool legs. This taught me to look for opportunities to model objects starting with polygon primitives rather than always trying to create objects from scratch using curves.

The sofas in my scene were some of the hardest objects to model. I initially attempted to model the smooth sofa cushions by creating polygon primitive cubes, manually trying to curve the faces and then beveling the edges. However, this did not produce realistic results. Instead, I tried using polygonal sculpting and subdiv proxy smoothing. This was a much faster modelling technique, which produced more accurate results. To create a smooth, rounded cushion, I simply had to extrude the central area of a face, then the subdiv proxy smoothing would convert this into a smooth bulge. This technique also allowed me to easily add the appearance of buttons to some of the sofas by using the Chamfer Vertices tool on the central vertices and then extruding these new created faces inwards slightly (shown in Figure 9(a-b)). I found polygonal sculpting and subdiv proxy smoothing to be a very effective modelling technique and I am very pleased with the realistic shape of the sofa cushions in my scene.

I used two different modelling techniques to create the curved backrest of some of the sofas in my scene. For the first technique, I created a flat surface in the shape of the front of the armrest and traced the path of the backrest using the CV Curve Tool, then I extruded this surface along the curve (used for the sofa labelled 'MyntaSofa'). For the second technique, I created a flat version of the backrest, then used the Bend tool to curve the backrest into the correct shape (used for the sofas labelled 'RedSofa' and 'LongSofa'). Both of these techniques produced very similar, realistic-looking results, but I found that using the Bend tool gave me more flexibility during construction. If I needed to change or adjust the shape of the backrest, I found it easier and more accurate to slightly adjust the parameters of the Bend tool rather than edit the control vertices of the path curve. This showed me that creating flat surfaces and using the Bend tool can be a very effective modelling technique for modelling curved objects, as it can be faster and more flexible than trying to create curved surfaces by drawing curves.

3.2 Thoughts on my Final Model

I am very happy with the quality of my final model. I believe that I accurately captured the design and layout of the Everyman Cinema lounge interior. Each furniture object looks similar to its real-life counterpart and all of the objects seem to have the correct proportions. I am pleased with the level of detail I included in the scene, modelling elements such as the indents on the walls, the buttons on the sofas, the lights on the ceiling and the books on the bookshelves. Adding these details greatly increased the realism of my scene.

If I had more time to spend on this model, I would try to model the curtains and small cushions that are in the interior. These are more irregular, complex objects than the other furnishings in the scene so I was not able to include them in this model. I would also try to model the Chesterfield-style sofas with their true textured pattern (shown in Figure 2(a)) as I simplified these sofas in my model by making them smooth.

I thoroughly enjoyed this interior reconstruction project. I hope I can continue to improve my 3D modelling skills and work on more projects using Autodesk Maya in the future.

4 Renders of Final Model

Figures 11-15 show Ambient Occlusion pass renders of my final model from different angles.



Figure 11



Figure 12



Figure 13



Figure 14



Figure 15

References

- [1] Bristol, *Everyman Cinema*, <https://www.everymancinema.com/bristol>
- [2] Everyman Cinema - Bristol, *The Contract Chair Company*,
<https://www.thecontractchair.co.uk/projects/everyman-cinema-bristol>.
- [3] Everyman Cinema - Bristol, *JD Electrical*, <https://www.jdelectrical.co.uk/case-studies/everyman-cinema-bristol>.
- [4] Morph Stool, *Zeitraum*, <https://www.zeitraum-moebel.de/morph-stool/>.