

**Foundation in 3D Modeling and
Animation - Coursework**

(FUMAN)

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My artefact, for my project I chose to develop a 3D model and animation of the 'Eldon Building Extension' the build is scheduled to be finished by early 2012.



Planning

The Eldon building extension is slightly different to planning a current building. This is down to that you cannot physically go and see the building, take photos, touch and get perspective from your eyes. This is because the building is still in the development stage before construction.

To get hold of Information and plans regarding the building development of the "Eldon Extension", I had to contact numerous people. I was put in contact with David Goodman, he provided me with a copy of sketch up views, along with a couple of reports containing information regarding floor plans, heights and proposals for the different materials to be used for the build.

Determining the best way to design and construct my artefact took time; I had to take into consideration many different variables. This part of the planning stage is important as the potential for mistake is high.

I'm designing the building to a scale of 1:1; I think this is important to know when designing a number of object and implementing them in a project together as you have the possibility to have objects at different sizes, from one to another. This is important to know now at the beginning before you hit the next stage of development and realise a mistake has occurred.

Creating the entire outer of the building is going to be my first challenge; I plan to develop each floor of the building around spines. The reason I chose this method is that I have a hollow interior, that I can develop each room on each floor. With this one object I will have created the walls the floor and the ceiling, and don't have to spend time developing those features at a later time.

For each floor of the building I will implement planes and add the texture of the floor plan from the report, this is so I can accurately create the spine for the next floor around that plan.

When it comes to producing the outside supports of the first floor I will be creating a spine and loft it, to symbolise a realistic building support.

Inside the building I have a number of different curved walls; I will be using *Non-Uniform Rational B-Spline (nurbs)* to create any wall with a hint of a curve. The reason for this is *nurbs* automatically produce a smooth curve effectively and at a low poly count as it possibly can, using any other technique would have to use a really high poly count to come out with the same effect.

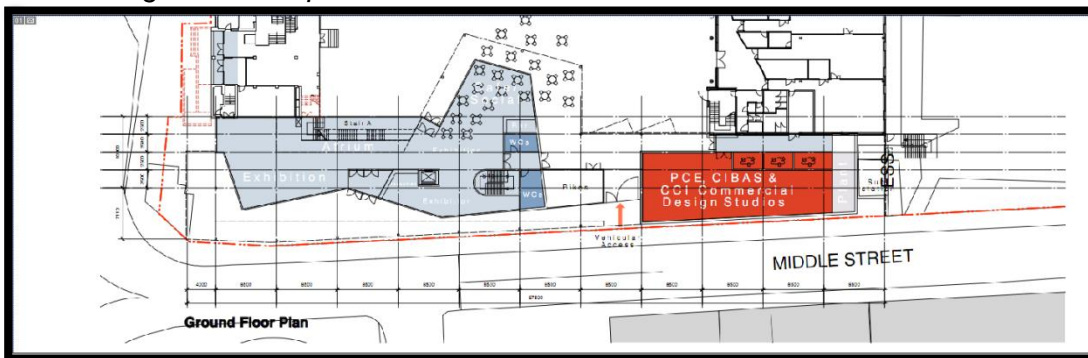
For the animation of the building I'm going to have a camera move around the outside of the building, go through the front door, up the stairs and out through a window, then zoom out and away from the building.

Implementation

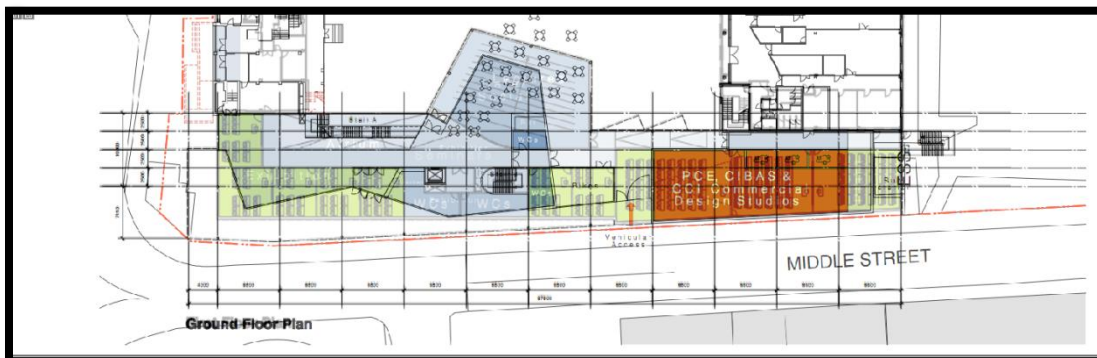
I used planes to create each floor of the building, on each plane I needed to apply the image of the floor plan for each level. I used 5 Planes in total from the ground floor to the roof.

I imported each floor plan as an image into 3D studio max and applied the image to a plane. To make sure each level of the building would align with the previous level. I made sure the building's floor plans would align on each level first. I did this by importing them into Adobe Photoshop. I overlaid two floor plans at a time and reduced the opacity of the plan of the floor above so I could align it with the floor plan below.

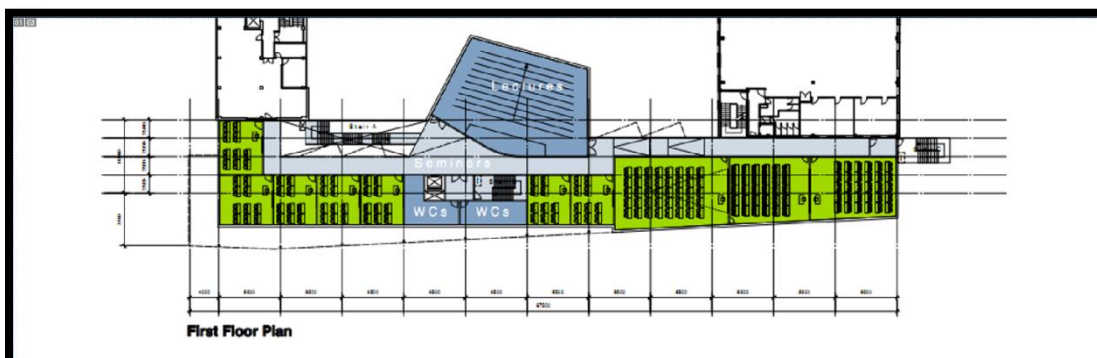
This is the ground floor plan:



This is the ground floor plan with the first floor plan overlaid on top at opacity of 30.

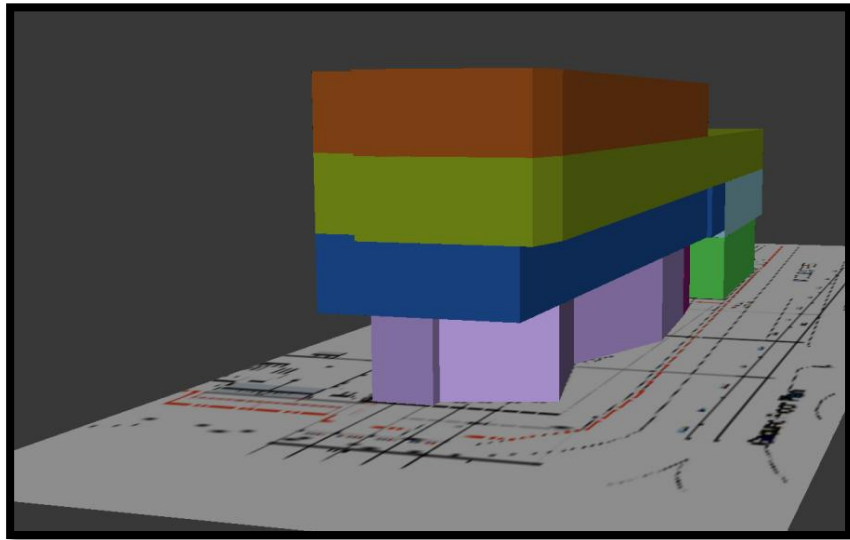


Once I was happy the first floor was aligned with ground floor I would increase the opacity.



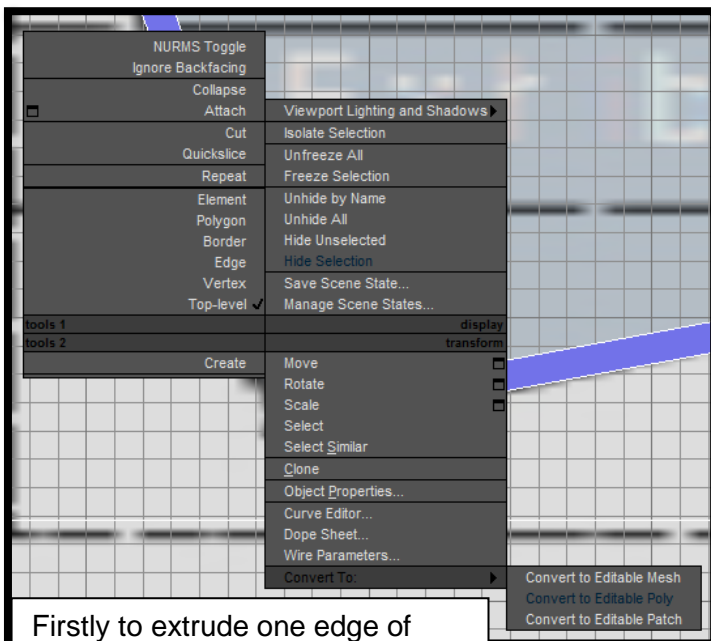
Originally when I started my project I decided to develop each floor of the building around spines. This threw me into difficulty as soon as I completed and aligned all 4 floors of the building. I realised that I will have massive problem implementing and developing the rooms, and objects on each level of the building.

The reason for this is that I've extruded a hollow box effectively this method would have been ideal if I was just going to be developing the outside of the building.

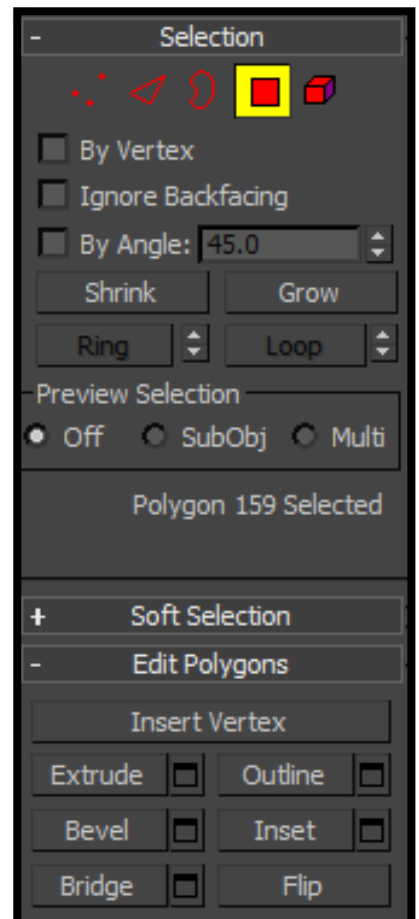


But the walls have no thickness no depth and as a result I had to scrap my initial plan for developing the outside of the building. This meant I had to scrap the entirety of the work I had completed so far on my artefact.

For creating the outer walls I've changed to using the "edit mesh" method. I started off with creating a box, assigning what I know to be the height of the wall; the height of walls does vary throughout my artefact depending on the floor of the building. I know the width of the outer wall I is going to be a constant 30cm.



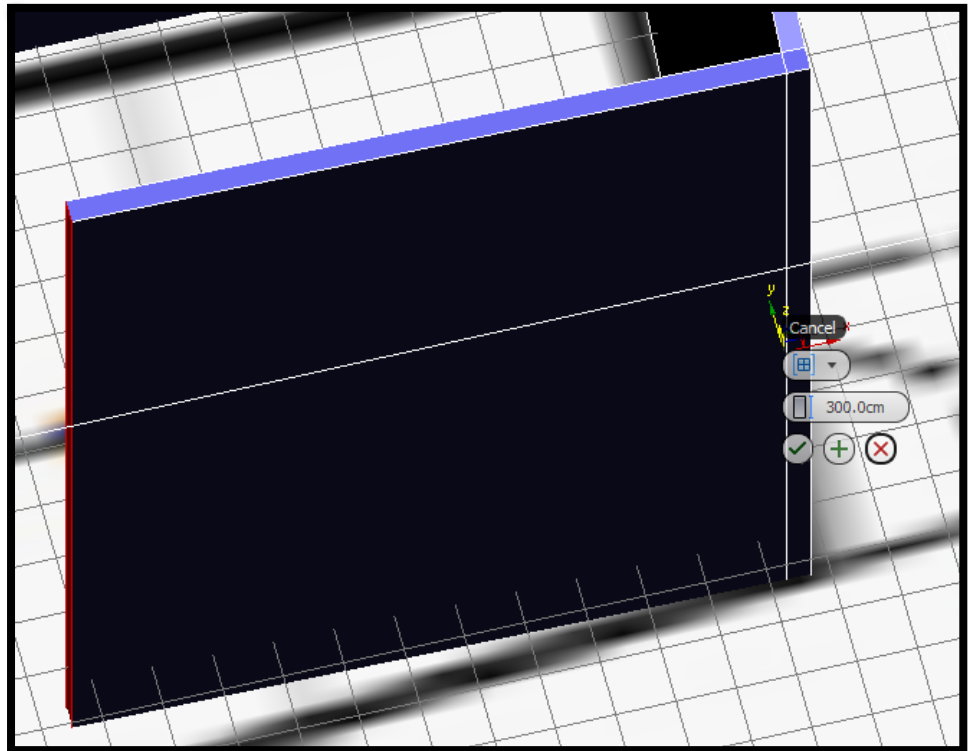
Starting with one box I would then *extrude* from one edge in relation to the floor plan I had on the plane below. The length of the extrusion would vary depending if I had an intercepting join from an inside wall, or when hitting a corner.



Firstly to extrude one edge of your object you have to convert it to an editable poly.

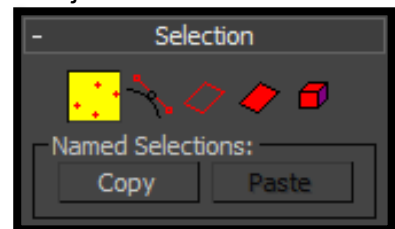
Secondly in the *selection* panel select the *poly*. Select a face on the object that you want to edit, then under *edit polygons* panel select *extrude*. Then your asked how far you want to extrude the face by, it will extrude by the value the use enters.

The wall is then shown at the extrusion length that you previously entered. This is effectively a preview it gives you the option to update and change the length before confirming the extrusion.



Once I had created every level of the building using this method and now every room, floor and ceiling of the building using a similar method. It came down to aligning the building more specifically than just by eye.

Making sure the ceilings, walls and the floor meet in the same point to create a seamless fusion is important, as I don't want to end up having gaps between objects as it would make my artefact look unrealistic, won't be aseptically pleasing along with looking unprofessional. I converted the view of the artefact to *wire frame*, this is so I can clearly see the points I'm aligning from each object. I choose the *vertex* tool from the selection panel; this allows me to select an exact point on any object. In this case I want to know what the exact position of the corner of the wall, I select the point and in the 'X', 'Y' and 'Z' coordinate the exact location is displayed. In aligning the floor with this vertex point the 'Z' value (height) is not

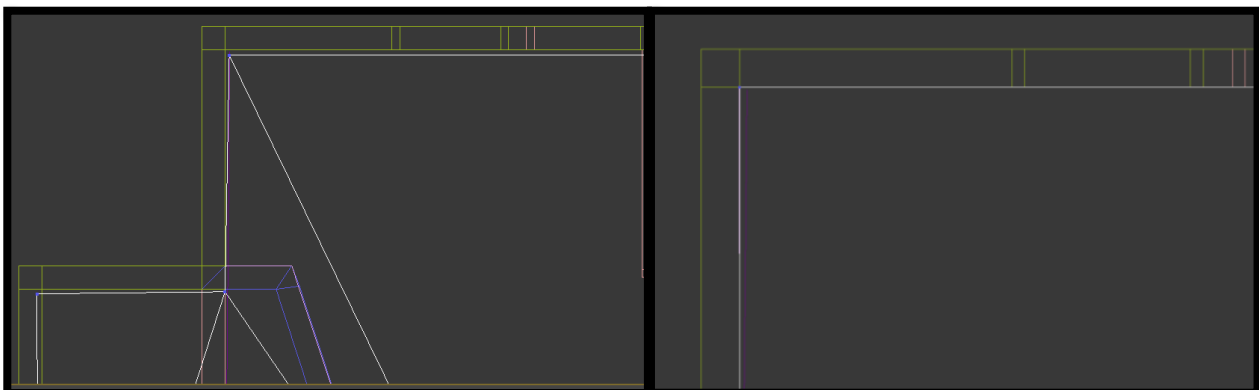


X: -8447.74 Y: 2747.932 Z: 1139.869

needed. 'X' is the horizontal value and 'Y' is the vertical value.


Before Alignment

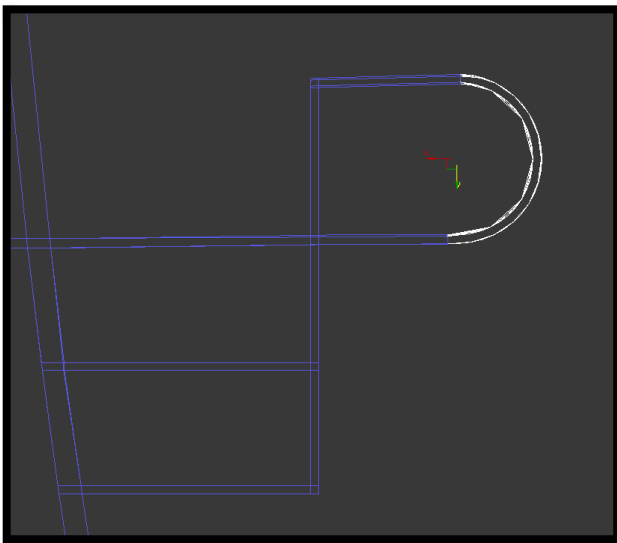
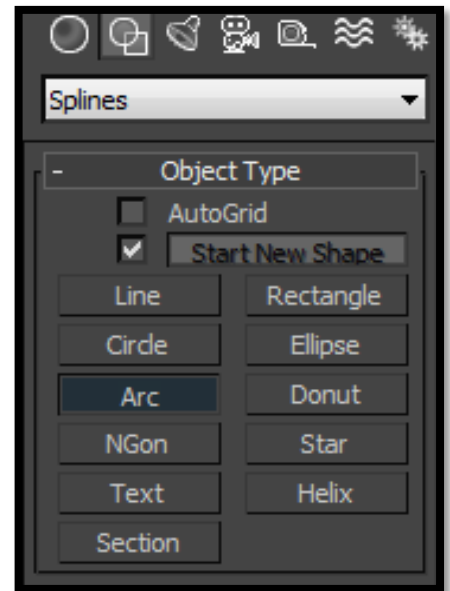
After Alignment



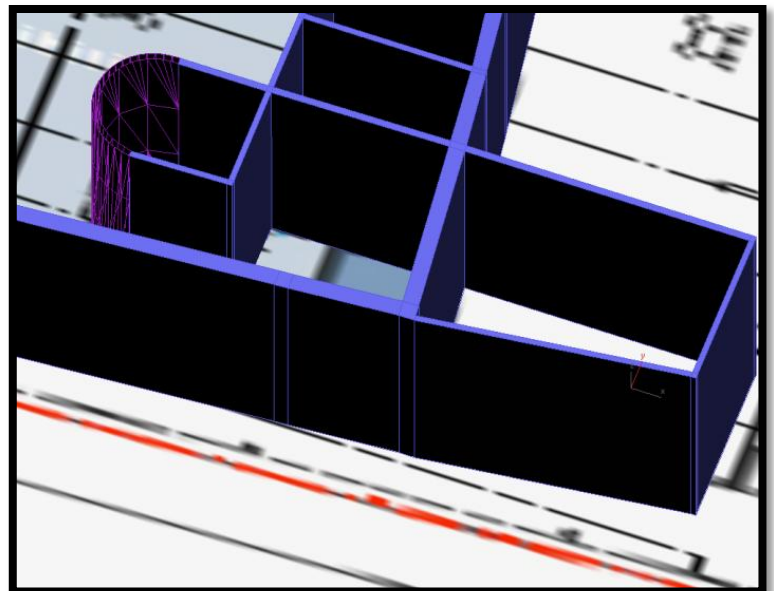
For creating the inside wall with curves I used “**splines and surface nurbs**”. I started off by creating an *arc* object from the *splines* list in the “objects tab”.

I then extruded the object and created a second instance of the arc 10cm away from the first copy, this remains as one object. The reason for implementing a gap of 10cm is because that’s the thickness of the wall on the inside of the building.

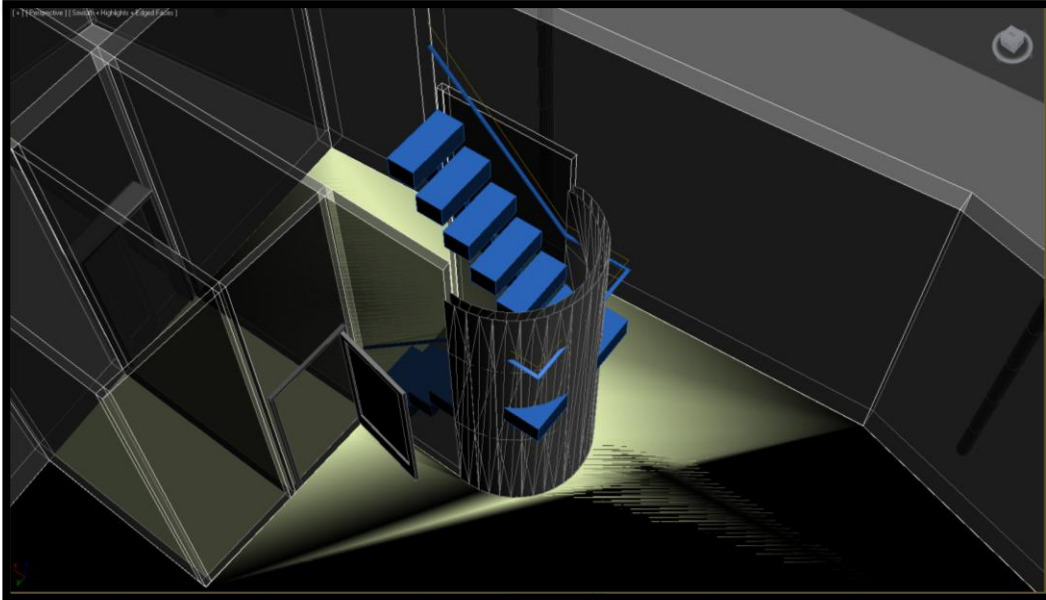
Once I had the arc in roughly the right position, I used the “*snaps toggle tool*”  to connect the vertex points of the arc object to the vertex points of the box object to create the wall.



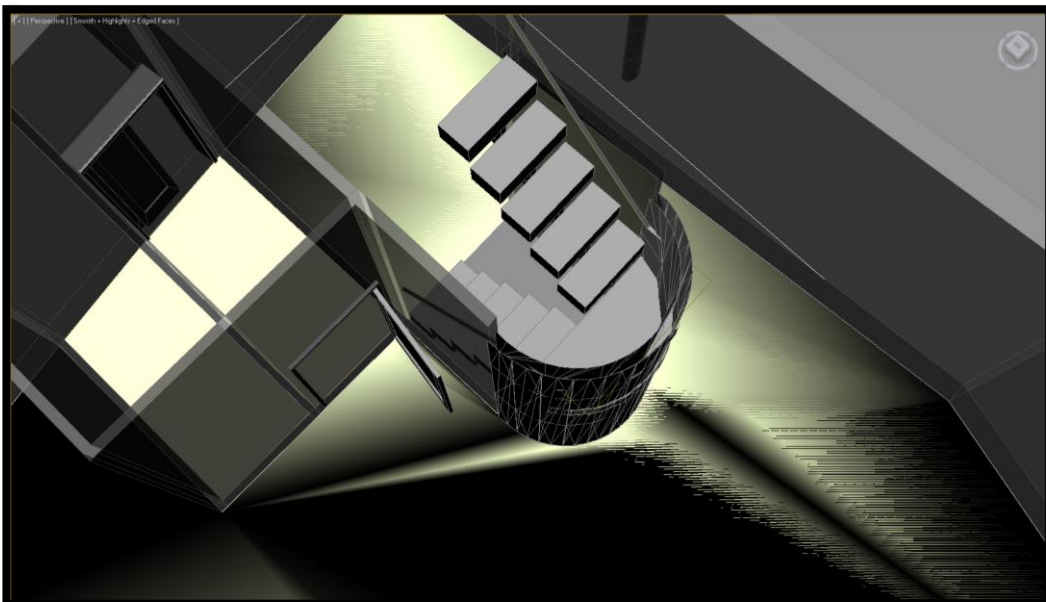
I did encounter a few problems when implementing *nurbs*, as there functionality within 3Ds Max isn’t brilliant. I spent a lot of time tweaking the surface of the wall to make sure the curve fit well with the rest of my walls, and make it look like it belonged.



Inside the arc I created with *splines and surface nurbs* is where the stair well to climb up to the first floor. I encountered a problem when I was implementing the stairs in my artefact, I used the stairs tool to implement them, using the *LTypeStair* this worked well and I was quickly able to create the stairs leading up to the next floor. However I encountered a small problem regarding the stairs are in a L formation and getting them to go round a curved wall would be difficult.

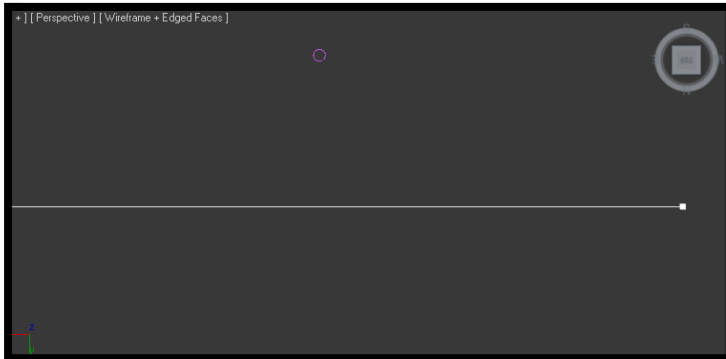


I solved the Issue of the stair case extruding through the curved wall by performing a Boolean cut. This cut allows you to cut one object from another.

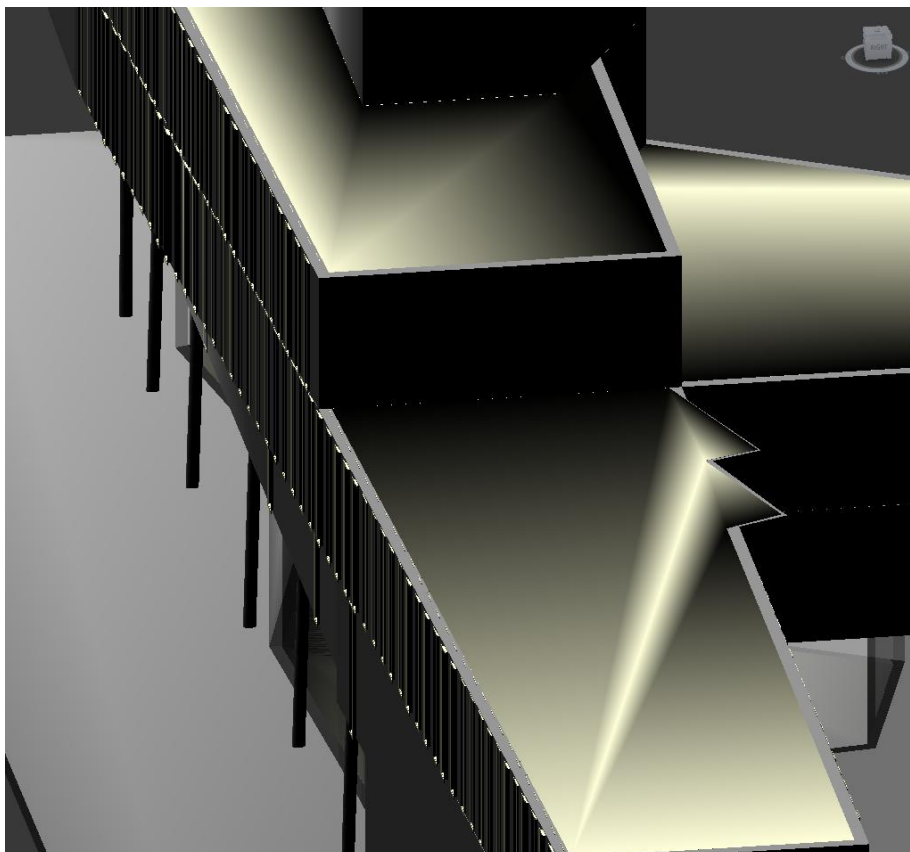


I realised once I solved the issue, if I Implemented an *UTypeStair* this would have worked better around my wall curved wall.

For creating the first floor supports I used the “lofting” technique. I started off by creating a 2d circle object from the *splines* list in the “objects tab” I set the radius to 25cm. I then created a line; I lofted the circle along the line to create the support, this gives the appearance of a solid support.



Once I created one instance of the support I duplicated it and placed the supports in position, this was one of the last stages I implemented on the outside of my building. I felt this just completed it.



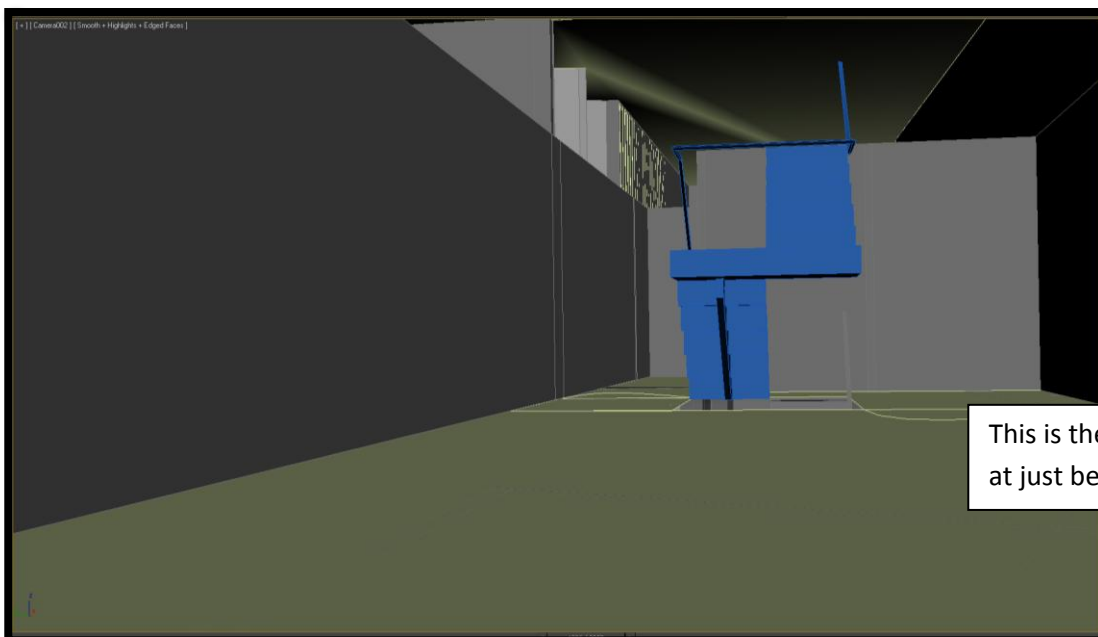
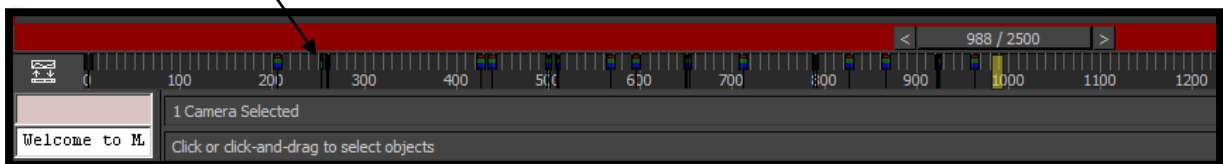
With this technique I had no major issue implementing, there is one notable inconsistency that I had trouble with; this was the true straightness of the supports I lofted.

Animation

I animated my artefact, by using a camera walk through, creating certain key frame throughout different point. Using this method I found to be more effective than creating a camera path, as I was able to slowly make my way around the artefact capturing the views from the angles that I wanted.

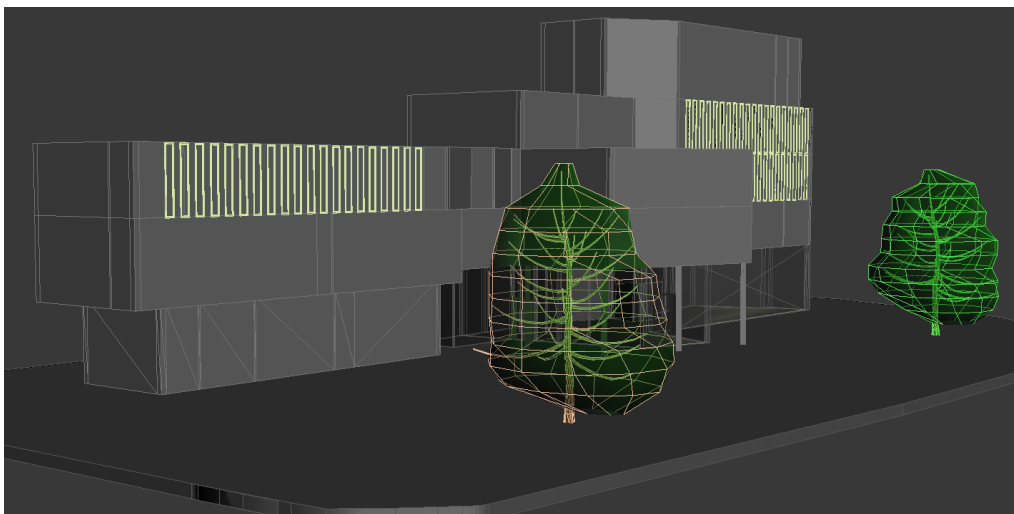
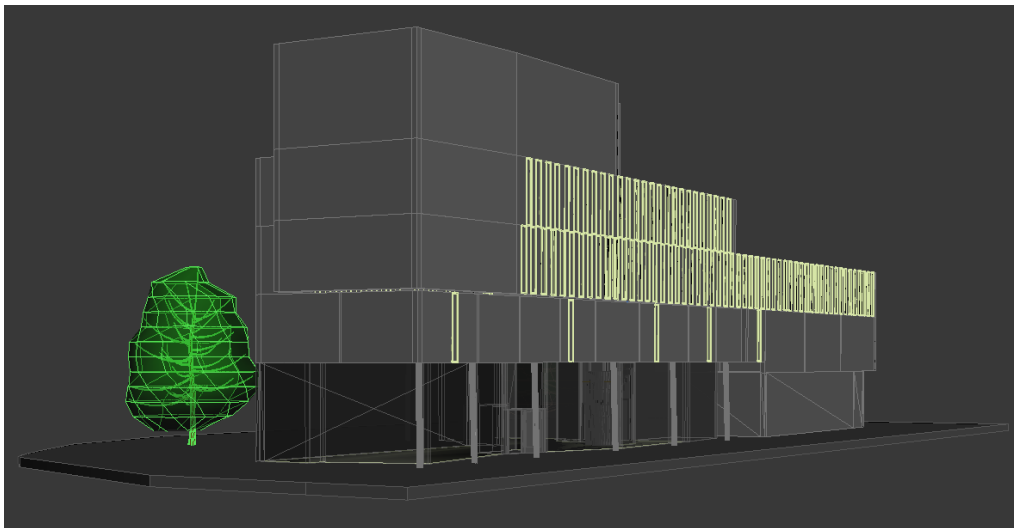
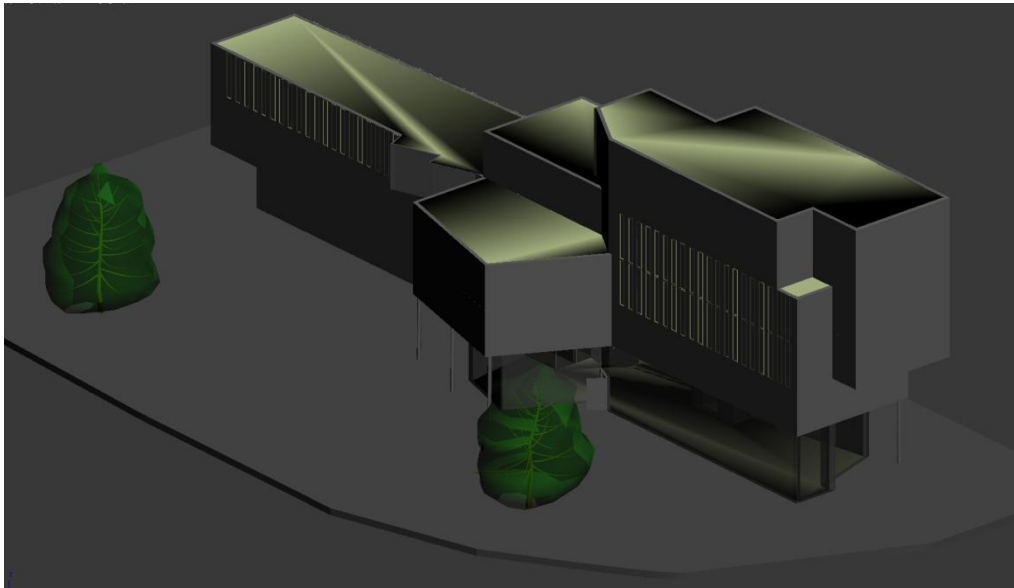
I would only choose to implement a camera path if I was to be creating a large walk through scene, or wanting to capture a very specific view on a specific line, the method I used creating key frame is largely time consuming, along with having limited control, of the tweens between each key frame as the computer generates the path itself and doesn't follow one you create.

Key frame

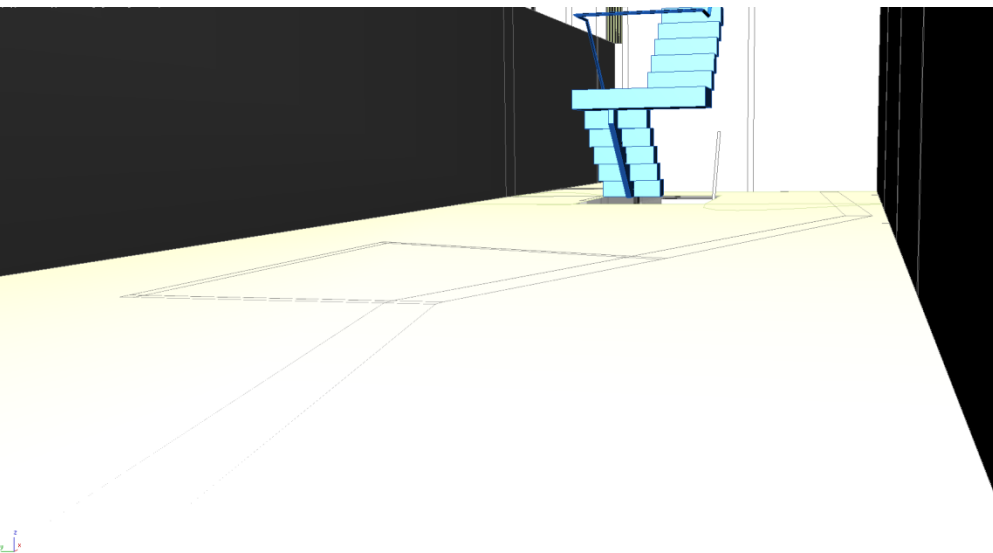
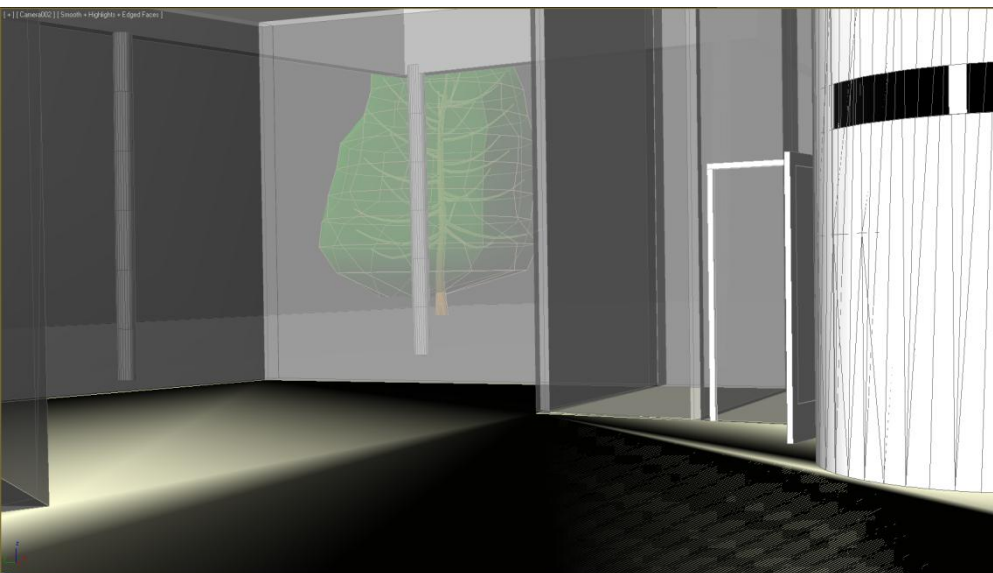
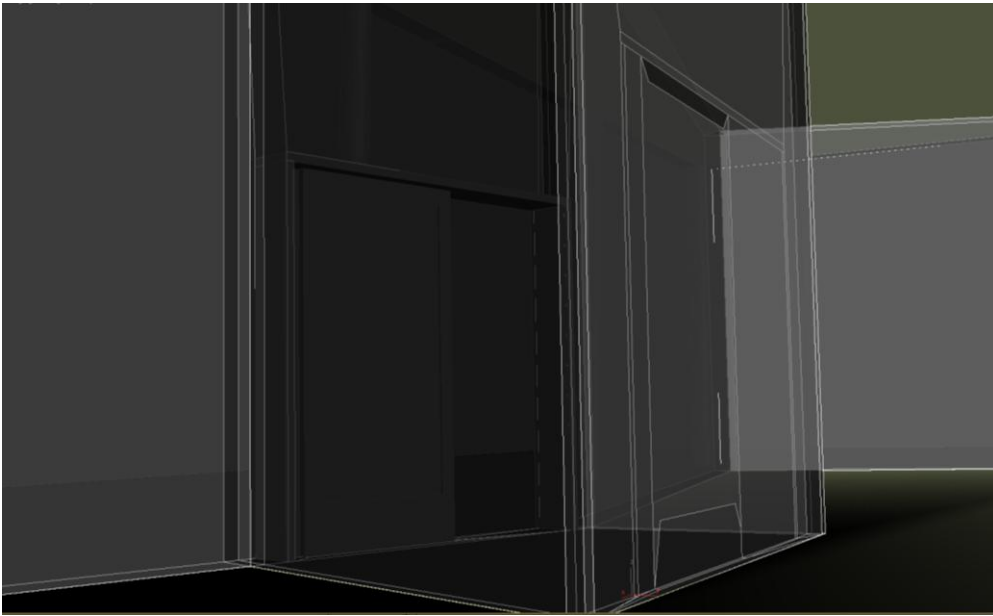


I kept my animation at the standard 30 fps, as I found if I reduced the speed it slowed the animation to a degree that is felt slow, and sometimes occasionally jumpy. I captured my animation in just over 2000 frames; this gave me enough time to create a good solid walk through of my building at a smooth pace.

Final Views – Out Side



Final Views – Inside



Appraises / Reflection

On reflection, choosing to push the boundaries by modelling and animating the Eldon extension was risky. This is down to the fact that previously I've never used 3D Studio Max. This project made me pick up the skills needed for different areas of the modelling very quickly.

Texture

The texture of the building has not been implemented as of yet, If I had more time to implement different texture, to the walls, doors, windows, floors and other parts of the building I think this would have made my building really stand out particularly when it came to render.

Rendering

I wasn't overly happy with the final result, of my rendered product as I lost the opacity I set to the ground floor walls. The lighting on the rendered piece wasn't as I expected I tried numerous different lighting methods to create realistic shadow, I don't believe I managed to achieve this.

However I was pleased at the overall look and feel of my building on the final render. It turned out to be good quality, the timing was well set and it had an overall professional feel around it. I exported my render as an .avi for maximum compatibility.

Animation

The animation I created for the building looks effective, as it's clear and concise, which helps it look professional. If I was to reanimate my artefact, rather than creating key frame at certain points and tweening in between I would create a camera path like I previously did. I would choose to implement a camera path; the reason is with a camera path I will be able to have more control over the view and the movement of the camera. As with between each key frame the computer animates the tween, this could lead the camera moving in a way that you didn't foresee.

Overall Model The overall look and feel of the model is good, it matches the plans, and everything looks in proportion with the rest of the model.

I would have liked to implement a few more objects within my artefact, as my building is open and I have my camera path running through it. Inserting seating, chairs, tables, and other object that would make the building looked furnished would have added to the final result. As the final result looks good but there's something missing.

If I was going to implement this building into a game the poly count of the model is far too high, there isn't an average poly count for building in games, but usually they range between 200 to 10000 as there are too many different variables to be more specific. However none the less the poly count for my building is 33000, my artefact would certainly need some work on reducing the poly count before implementing into a game.

The method I used for creating the main outer walls of my building was the poly **Mesh Edit**, I used this to extrude an object along each side of the plans to create the walls I found this technique was very simple and easy to implement in this way. However if I had the chance to redo this artefact and didn't necessarily have to implement the methods from the brief, I would create the exterior wall using the create wall tool within 3Ds Max.

The use of Nurbs within 3Ds Max currently doesn't play apart in industry as they use different techniques to get the same result, as this method is increasingly being discarded. If in industry the use of Nurbs was necessary then they would more than likely implement that technique using software with better quality and control such as Maya. As when you compare the use of nurbs in 3Ds Max, Maya beats them hands down.