

**FINAL YEAR PROJECT REPORT**  
**INTERNSHIP AT AAVA3D ON 3D ARCHITECTURAL VISUALIZATION**

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This Report Presented in Partial Fulfillment of the Requirements for the Degree of  
Bachelor of Science in Multimedia and Creative Technology

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**DAFFODIL INTERNATIONAL UNIVERSITY**  
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1<sup>st</sup> OCTOBER, 2022

## APPROVAL

This Project titled “**Internship at AAVA 3D on 3D Architectural Visualization**”, submitted by Maymuna Jahan Eshika to the Department of Multimedia and Creative Technology, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Multimedia and Creative Technology and approved as to its style and contents. The presentation has been held on 1<sup>st</sup> October,2022.



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## DECLARATION

I, at this moment, declare that I have done this project under the supervision of **Mr. Arif Ahmed, Associate Professor, Department of MCT**, Daffodil International University. I also declare that neither this project nor any part of this project has been submitted elsewhere to award any degree or diploma.

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I would like to thank my entire course mate in Daffodil International University, who helped me whenever I faced any problem while completing the course work.

Finally, I must acknowledge with due respect the constant support and patients of my parents.



## **ABSTRACT**

3D visualization has become everyday feature of current architectural 3d design process [1]. The aim of using 3D software is to serve as a foundation for the architects and the engineers in the sector of designing.

The manner human being specific their mind is converting day by day. 3D animation is one of the new versions of those mediums. While my passion turned into 3D visualization So, I had been selected by the AAVA 3d institute for my internship work. The entire method from story constructing to modeling, texturing, animation, light setup, rendering, and post-processing had done by myself in the shortest time. The final output of this mission is an animation of architectural visualization has been achieved optimistically.

The mission is ready to create 3D visualization paintings which can be inclusive of Product modeling, furniture modeling, and architecture visualization work. Autodesk Max has been Used to create fashions and animation. V-ray. Autodesk Max Plugin had been used to create the rendering part.

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# CHAPTER 1

## Introduction

A center for Research & Development of 3D Animation, Bangladesh's First Complete 3D Animation & VFX Learning Institute. It is an organization where professionals from both technical and artistic fields group together with an objective of providing appropriate solutions.

3D modelers build 3D characters and environments that are based on the concept art. 3D modeling is a highly specialized field. As such, there is a high demand for 3D Modelers in all industries. According to the Bureau of Labor Statistics (BLS), depending on the specialization, employment in this field had grown by 8-14% by 2018. Modelers also create character skeletons; which animators then control. Modeling is performed using a variety of programs such as Maya, 3DS Max, POV-Ray, and many others [3].

As AAVA3D is a 3D institute, I worked there solo for my internship. They had given me two categories that I had to create as per their requirements. They provided me sample which were furniture modelling and architectural visualization work related. Over almost around hundreds of software I had choose 3dsMax for my project because this software is very easy going software for any architectural modelling [4]. Moreover, I had little experience on this software. I used 3dsMax for my project modelling, texturing, lighting, key frame animation, rendering and for material texture I used V-Ray plug-in in Max. And edited these rendered clip in Adobe Premier Pro and Wondershare filmora software.

Initially it was really hard for me to complete the whole project all by myself, later on I did manage to complete the whole project all alone. I divided the time for my two projects, editing part and for report writing part.

Several 3D software is there like Autodesk Maya, Blender, and Cinema 4D does the same job as Autodesk Max did. But for architectural work, furniture modelling which has hard surface, Autodesk max is easy to create shapes with low to a high polygon whatever scene demands. As plug-in I preferred V-Ray render engine than other render engines like Redshift, Arnold, Corona, Unreal engine and etc. because V-ray contains high resolution images.



## CHAPTER 2

### Background Study

As I was assigned at AAVA3D for my internship, I had to do furniture modelling, furniture showreel, exterior and interior work, I had to research a lot. I had to find out the recent market place to work properly on my project. I was confused about choosing the furniture models. Though my company gave me the furniture samples and it became easier for me to make a good output.

The idea of selecting a pattern and stylizing all the products and decorating the environment according to what the company wanted. As I have done the whole project solo, I had to visit several furniture store and lot of websites to understand and learn how the furnitures are made. I did this to find out the lacking and what type of design is currently hyped in the market place. And what should make this sector more preferable to the consumers. By studying all those existing designers' websites, I tried to make the visualization more effective for the company.

As I worked alone to complete this project, I had to arrange all the segments as per the time limitation. At first created the furniture, then researched on house structure, then made a layout on this, then started working on the house structure. This project has huge architectural visualization on exterior and interior scene.

AAVA 3D provided me various websites links [5] [6]. This also which helped me to organize the art work properly. Moreover, this helped me to get lot of information about color sense, camera angle, lighting and last but not the list modeling with a medium low poly.

# CHAPTER 3

## Details of Software

### 3.1: Autodesk Max

Autodesk 3ds Max, previously 3D Studio and 3D Studio Max, is an expert 3D pc graphics application for making 3D animations, models, games, and images. It is regularly utilized by online game developers, many TV business studios, and architectural visualization studios. For its modeling and animation tools, the brand-new model of 3ds Max additionally capabilities shader (including ambient occlusion and subsurface scattering), dynamic simulation, particle systems, radiosity, everyday map advent and rendering, international illumination, a customizable consumer interface, new icons, and its personal scripting language.

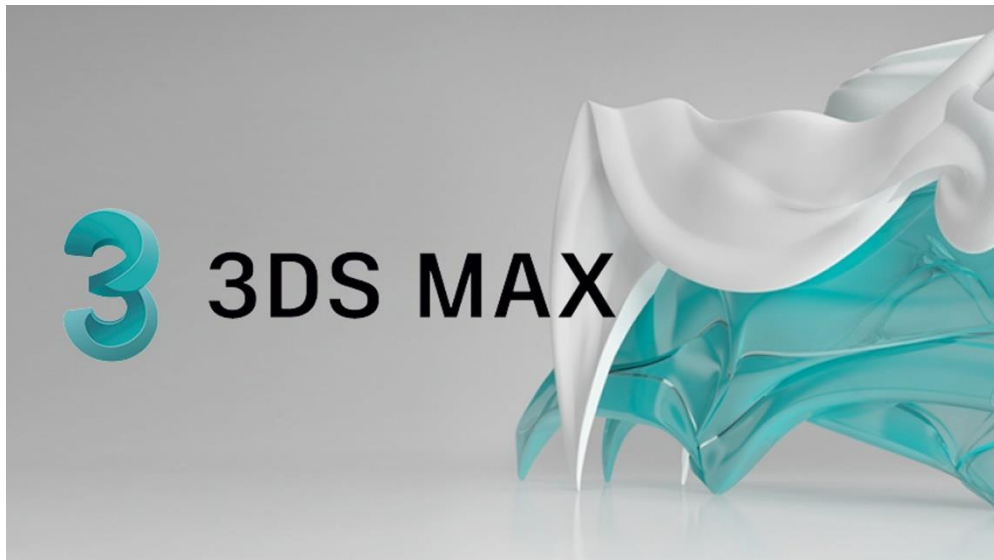


Figure 3.1.1 Autodesk Max

The unique 3D Studio product became created for the DOS platform via way of means of the Yost Group and posted via way of means of Autodesk. After 3D Studio DOS Release 4, the product became rewritten for the Windows NT platform, and renamed "3D Studio MAX". This model became additionally at the start created via way of means of the Yost Group. It became launched via way of means of Kinetics, which became at that point Autodesk's department of media and entertainment.

When it became re-launched (launch 7), the product became once more branded with the Autodesk logo, and the fast call became once more modified to "3ds Max" (top and decrease

case), at the same time as the formal product call have become the current "Autodesk 3ds Max"[7]. Basically, it was the main software where we did our work 3D visualization.

### 3.2: V-Ray

V-Ray is a rendering engine that makes use of worldwide illumination algorithms, consisting of route tracing, photon mapping, irradiance maps, and directly computed worldwide illumination [8].



Figure 3.2.1 V-Ray

Though v-ray requires high end pc to render and it takes too much time to render a frame but the output comes out really nice.

### 3.3: Forest Pack

Forest Pack is the world's most popular scattering plugin for 3ds Max. It provides a complete solution for creating vast areas of objects, from trees and plants to buildings, crowds, aggregates, ground-cover, rocks and more. If you can model it, Forest Pack can scatter it [9].



Figure 3.3.1 Forest Pack

This plugin doesn't make the Max file heavy. And that is the reason max file doesn't crash while working with the Forest Pack.

### 3.4: Premier Pro

Adobe Premiere Pro is a timeline-based and non-linear video editing software application (NLE) developed by Adobe Inc. and published as part of the Adobe Creative Cloud licensing program. First launched in 2003, Adobe Premiere Pro is a successor of Adobe Premiere (first launched in 1991). It is geared towards professional video editing, while its sibling, Adobe Premiere Elements, targets the consumer market.[10]



Figure 3.4.1 Premier Pro

### 3.5: Wondershare Filmora

Filmora is a line of video creation and editing applications developed by Wondershare.



Figure 3.5.1 Wondershare Filmora

The Filmora software library is compatible with Windows and macOS computers. Free trials are available to demo the product before purchasing. Pricing options for the various programs are available on the official Filmora website linked below [11].

It's a simple entry level to industry level video editing software which is really easy to operate.

# CHAPTER 4

## Project Workflow

### 4.1: Modelling

3D is the virtual solid surface form of shapes, object, subject or picture with a three dimensional data value something that has width, height and depth [12].

It's a process of developing a mathematical representation of any shape into three dimensional surface.

3D models can be created by line, cube, sphere, prism or any kind of shape. By manipulating polygons, edges, faces we can give shape differently of any object and can create any 3D object. 3D modeling has a variety of consequences.

In this project, I have chosen Autodesk Max 2021 as my project software as I am working on building a whole house with interior and exterior design. To me, Autodesk Max is the best for architectural visualization. With the use of the boxes, cubes, spheres from standard primitives and lines and other shapes from compound primitives I created all the shapes. To create a model, I needed to adjust some shapes by using modifier such as Extrude, Turbo Smooth, Shell, Chamfer, FFD, Bend and many more as per the model. While designing a model we need to remember one thing that all the model's polygon has to be in quads or in proper poly shape.

#### 4.1.1: Side Board

For all the modeling at first I took the real world measurement to make the models realistic.

For the side board I took a box first. Then converted it to editable poly. Then selected the edges and created more edges for the shape. Selected the option face, then selected the part I want to extrude. Used shell modifier to give a thickness of the side board.

For opening portion of the side board, took two sphere and set it on the box. Then from compound primitives selected the option pro-Boolean. Then select the sphere to make a hole on the box.

For legs portion, took a cylinder and converted to editable poly. Selected the lowest face of the cylinder the scale it down. I did slight bend of the legs.

As I created an animation, I had to keep all the part of the side board separated.

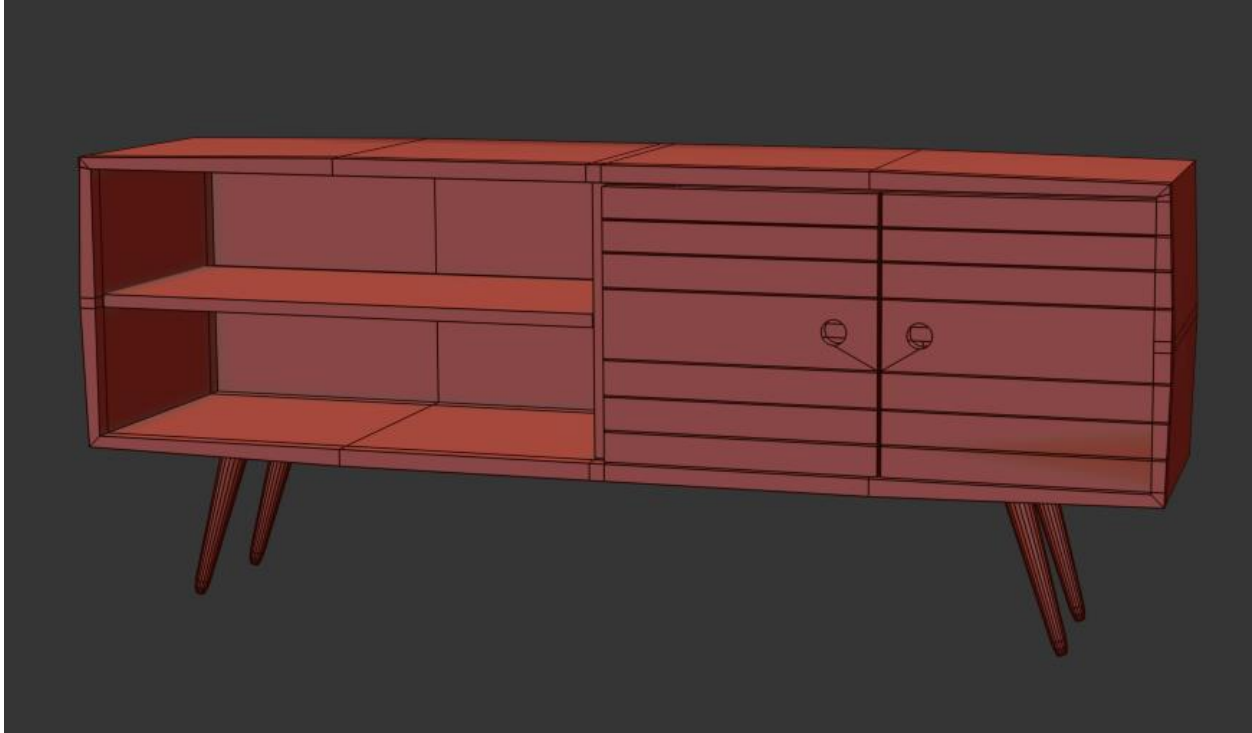


Figure 4.1.1 Side board

#### 4.1.2: Chair

To make a chair firstly I took measurement. As per the measurement select a box shape. Increased edges. Then select the face and select on the box. Selected faces are extruded with the modifier and selected the edge to chamfer the edge of the chair.

For the seat I used FFD modifier. Selected the vertex point of the modifier and then shaped the box as like a seat.

For legs extruded four parts from the box. Did scale of the legs. Chamfered and bevel the legs as per my model requirements.



Figure 4.1.2 Chair

### 4.1.3: Table

Kept the dining table very simple and square in shape.

Standard primitives> box>edit poly>edges>connect>extrude>face>scale>chamfer.

To make the table bit more realistic, I modify the edge of the table and gave it stair shape.





Figure 4.1.3 Table

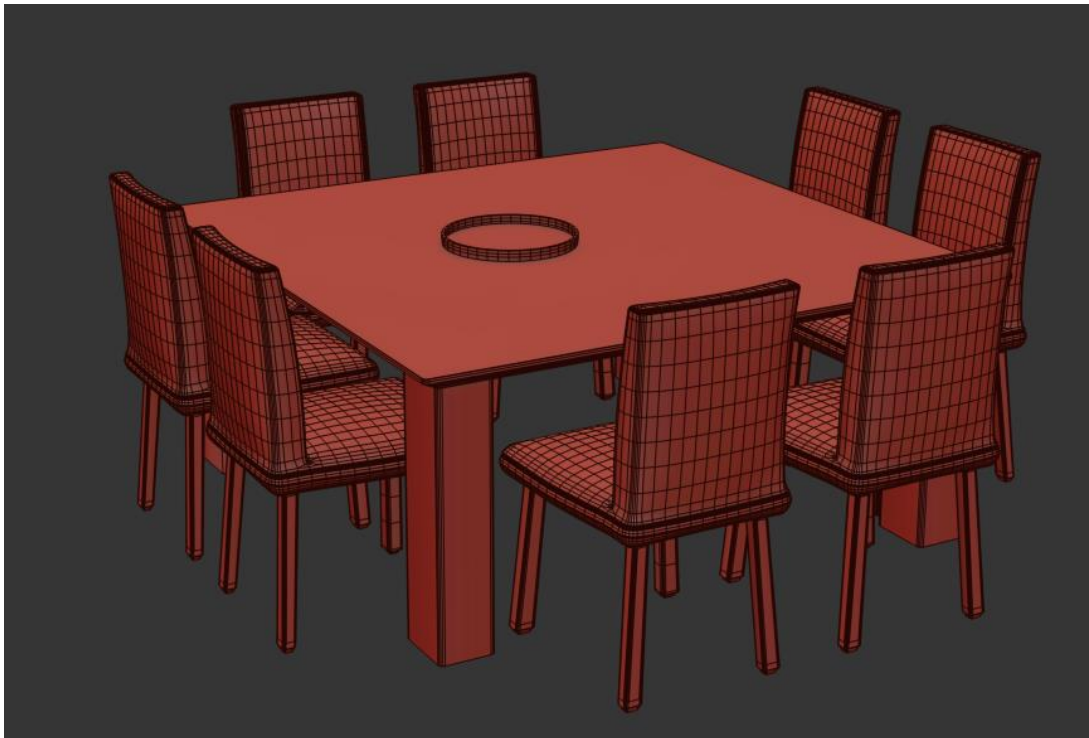


Figure 4.1.4 Dining Table-Chair

#### 4.1.4: Bed

For bed, I decided to make parts separately. For headboard took a box and gave shape to it. For design on headboard took cylinder to make pin on it. Instance that cylinder as required. Extrude the middle part of the box. Used modifier turbosmooth on the box to give it a smooth shape. I had to make sure that the box had enough segments to use turbosmooth modifier. Otherwise box's shape would have been destroyed.

For legs, took cylinder and scale the lower part of it.

For leg board did same as headboard.

Took a box which is thin but long length in size to make it as the support of the bed in the middle of it. Instance that part as much as required.



Figure 4.1.5 Bed

For mattress took a chamfer box as long as the bed size is.

Then for bed sheet took a plane and increased the segments of it. Used cloth modifier on the plane.

For pillow took a box then applied cloth modifier on it.

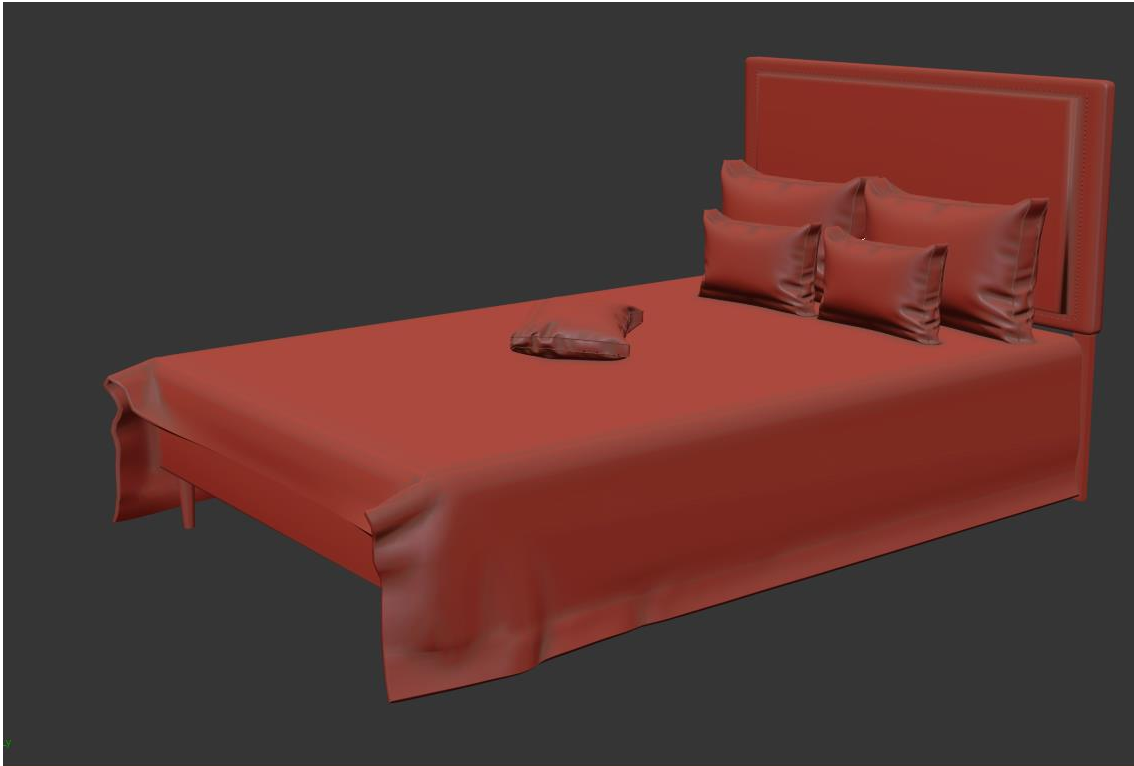


Figure 4.1.6 Bed with pillow

#### 4.1.5: Bed 2

Same as bed 1, I created this bed. Headboard, leg board, side boundaries, middle support, mattress, bed sheet, pillows and comforter.

In this comforter, I took 100/100 segments and applied a shell modifier on it. Then I did apply cloth modifier on it. To make it more realistic I used push/pull modifier which is used on the vertex of the comforter.

This bed bigger in size than the previous one.

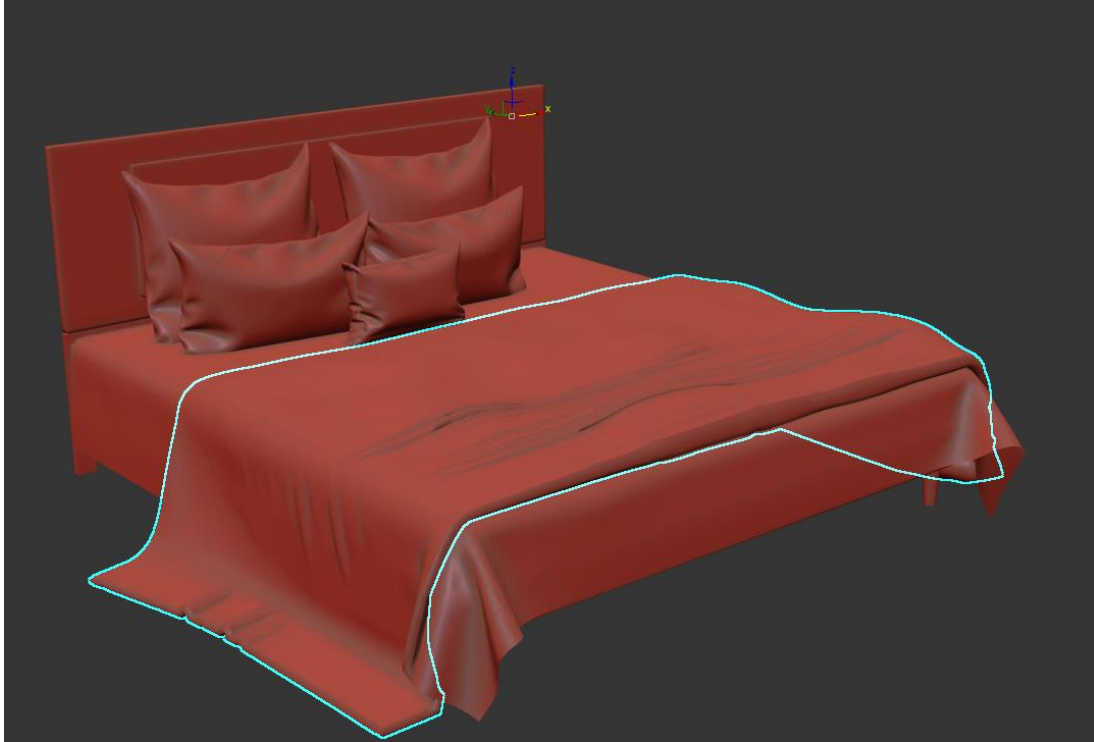


Figure 4.1.7 Bed 2 with pillow

#### 4.1.6: Bed Side Table

I kept the bed side table very minimal. Did not want to complicate the design.

At first I took a box. Converted it to editable poly>select edge>connect>select face>delete as per the design.

For leg, cylinder>editable poly>face>scale (lowest face)>angle the cylinder as per the design.



Figure 4.1.8 bed Side Table

Another side table is designed differently. It was for bedroom 4.

Box>editable poly>edit vertex as per design.

Selected the face which I wanted to extrude to make the corner of the box.

For leg portion, took another box and converted it to editable poly. Then select face and delete the face that is not needed in the design.

For drawer took a box which is long in length. And adjusted it on the main box as in on the side table.



Figure 4.1.9 bed Side Table 2

#### **4.1.7: Dressing Table, Mirror and Tool**

This dressing table is designed for the master bed 1. Kept the design simple and used the mirror different in shape.

Took a line and gave it a shape. Converted that line into editable poly. Then the line would turn into a solid surface. With the vertex edited as I wanted the shape. Made a copy of the mirror and scale it bit larger than the mirror, it's the outer part of the mirror.

For dressing table, took a box as per the measurement. Converted it to editable poly and edited the vertex, gave it a shape of a dressing table.

For further design, I took a long shaped box which is thin in size. Instance this box as much as I needed. All the small boxes were set in front of the dressing table box. Then I attached all the boxes with the dressing table.

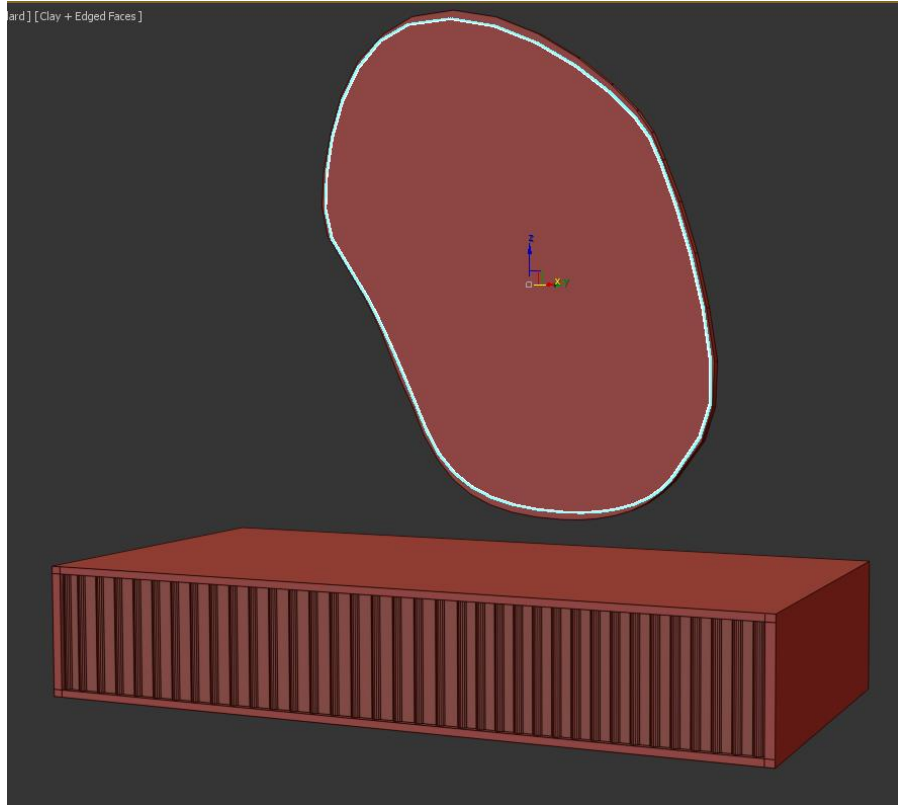


Figure 4.1.10 Dressing Table & Mirror

Set it on the wall, 2.5' higher from the ground.

For tool took a box>edit poly>connect>chamfer>turbosmooth.

Then for seat, select the seat>FFD4 > control point>edited as per demand.

Leg portion of the tool, I made it with the cylinder. And did rotate the legs as I wanted it to be.

Instance three of the quantity of the cylinder.



Figure 4.1.11 Tool

#### **4.1.8: Stand Lamp**

Created a stand lamp for living room and bed room . designed it in a simple way. Did not want to complicate the design.

At first created a base which was by a cylinder. Scaled it as per the measurement.

Cylinder>editable poly>face>extrude>inset> extrude>inset>extrude.

Then created the long stand of the lamp with the cylinder. Again took another cylinder thinner in size. This cylinder I placed it in an angler position on the top of the other cylinder.

Added two sphere for the design which was attached with other cylinder that will be holding the lamp.



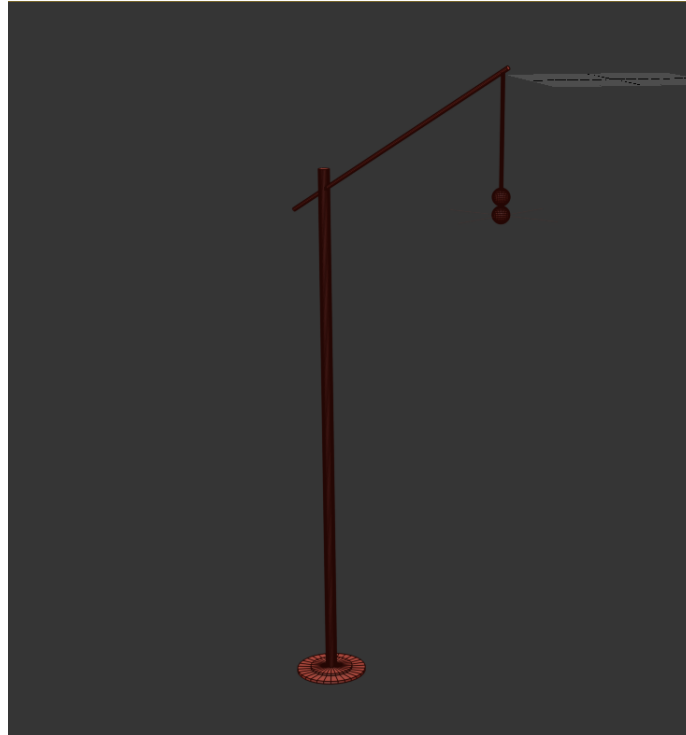


Figure 4.1.12 Lamp Stand

Then for the lamp portion took a cylinder>convert to editable poly>face>scale>face>delete.

Top and lowest face was deleted.

Applied shell and turbosmooth modifier to make it look more natural.

On top of the lamp added two thin cylinder for the support.

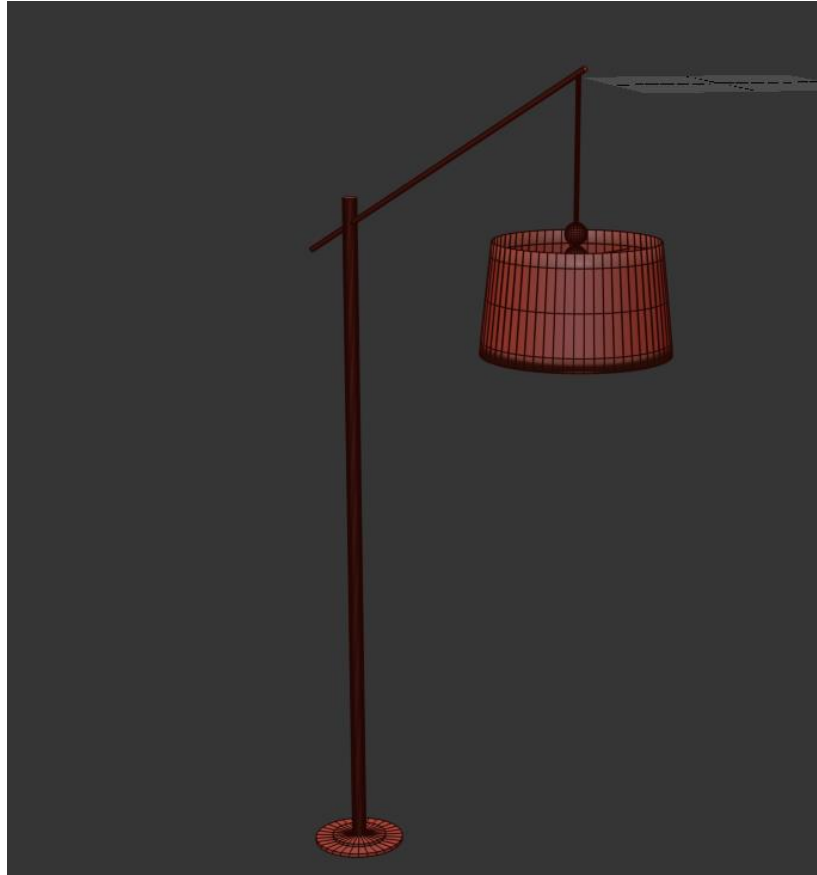


Figure 4.1.13 Lamp

#### 4.1.9: Chair 2

Took a box, converted it to editable poly. Selected faces that I wanted to delete.

Reshape the box by vertex as per the model sample.

Applied the modifier TurboSmooth. Then applied the shell modifier on the box as per the thickness I wanted.

Selected the edges to chamfer and make the stitch of it.

For the seat I made a soft leather sitting pillow.

Took a box>converted to editable poly>applied cloth modifier>pressure>simulate.

After simulating the box we need to convert it to editable poly. So that the shape of the box won't get change. Rescaled the pillow as per the size of the chair.

For leg part, took a cylinder and converted it to editable poly>face>lower face of the cylinder>scale down>deselect the face>rotate the cylinder as per the design.



Figure 4.1.14 Chair 2

#### **4.1.10: Frames**

Took few boxes, as I wanted to make different sizes frames for walls.

Converted the boxes into editable poly. Then modified the vertex. Then selected the face and selected the middle part of the box and extrude it into negative direction. After this I had to detached the part that I made this object a glass.

Took a plane and increased the segments. Converted to editable poly. Detached the middle part of the plane.

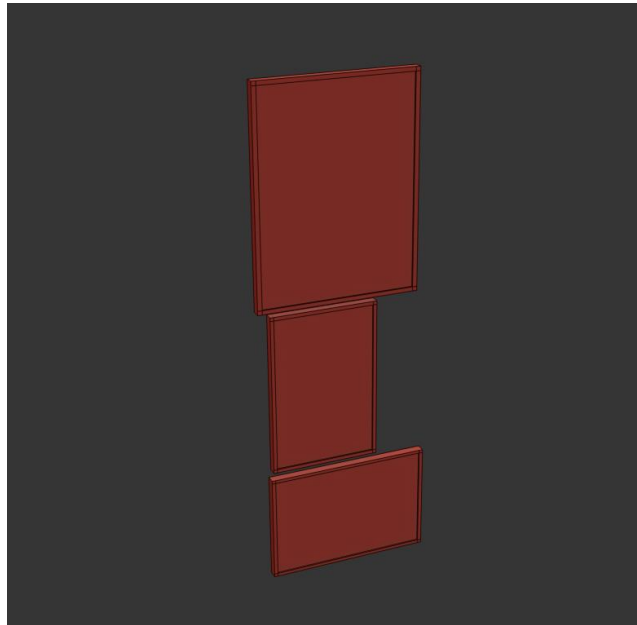


Figure 4.1.15 Frames

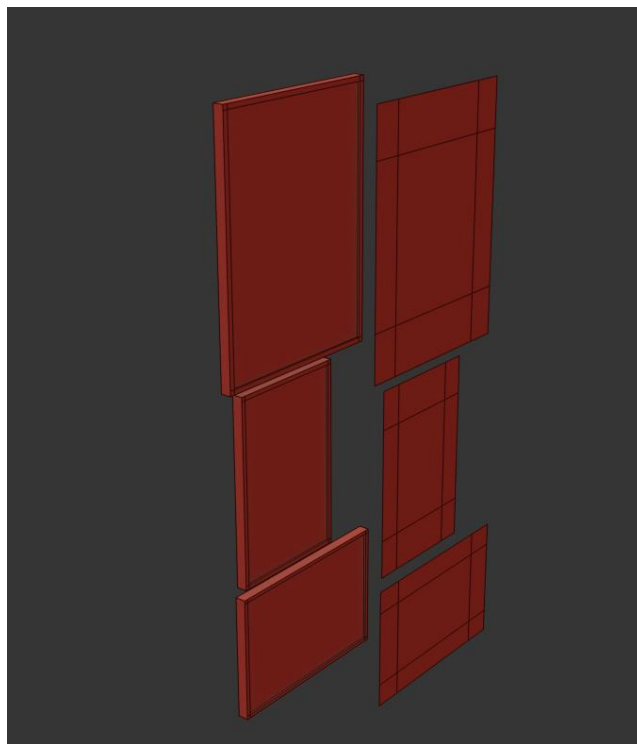


Figure 4.1.16 Frames

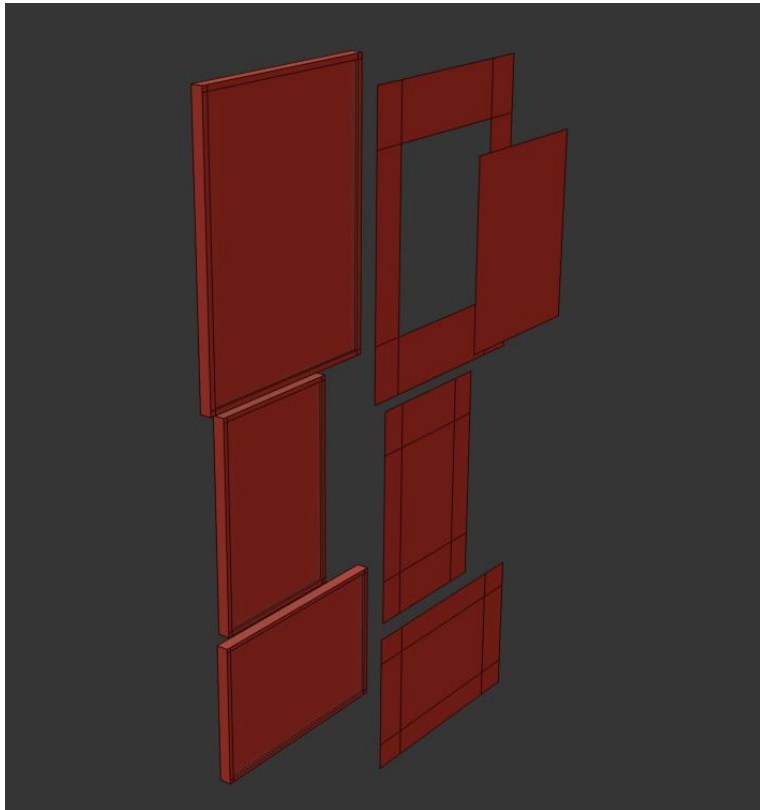


Figure 4.1.17 Frames

After this whole plane was set into the first box which is the frame.

#### **4.1.11: Almira**

This Almira was for bedrooms.

Took a box as per the measurement. Converted it to editable poly. Connected the edges of the boxes.

Selected the front faces of the box and extruded them in positive direction. Detached those faces because that part of the Almira would be the mirror.

This Almira has two part as it's a wall length Almira.

Did the upper part same as the lower part.

For handle, took a box vertically and took another two boxes horizontally and attached them together.

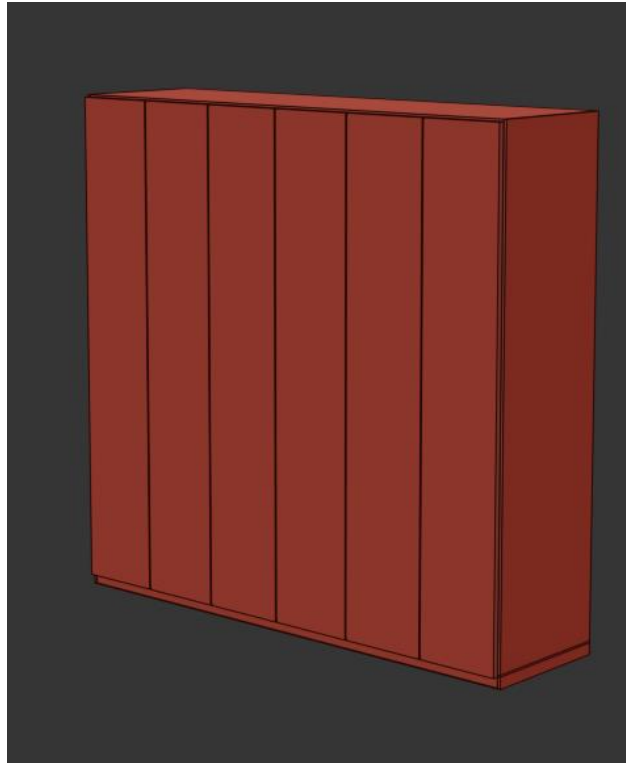


Figure 4.1.18 Almira

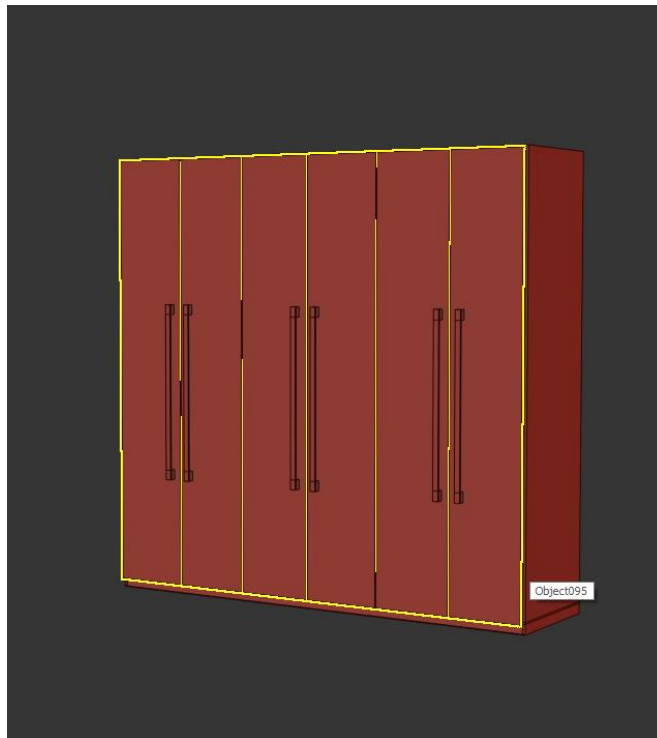


Figure 4.1.19 Almira

Set the handles on the middle of the almira's front part.



Figure 4.1.20 Almira

#### 4.1.12: Study Table

Study table was made for the fourth room. Unlike regular study table, I kept it very simple. Didn't make any branches of the study table.

Took a box. Converted it to editable poly>edit vertex.

This study table has two drawers. To open the drawer, I took a small box in size and scaled it as I wanted the opener to be. Kept this box on the drawer and with the help of pro-boolean, subtract this box from the drawer. it will create a hole on the drawer.

Applied shell modifier to give a thickness in the study table.

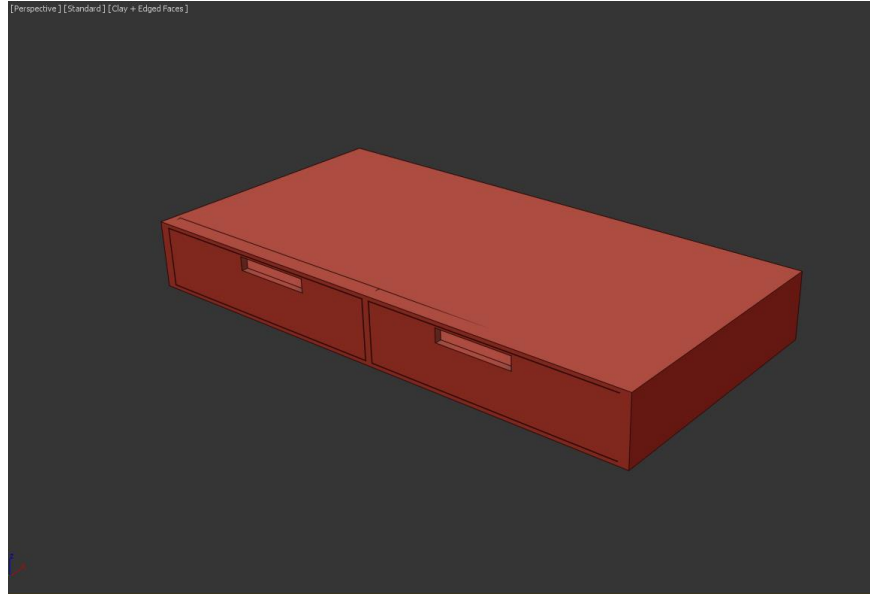


Figure 4.1.21 Study Table

For legs, took cylinder and converted it to editable poly and selected the face of the lower part of the cylinder. Scaled it down and rotated the cylinder as I wanted it to be.



Figure 4.1.22 Study Table



#### 4.1.13: Sofa

This sofa I created for the living area. It's a sectional sofa shaped L.

For this model main primitive was box. Seat, pillow, arm holder everything was created by the box primitive.

Took a long box as per the measurement and converted it to editable poly. Increased the segments and used turbosmooth modifier.

On the previous box took another box and increased segments. Applied cloth modifier, input pressure and simulated. Converted it editable poly then applied turbosmooth on this.

This two boxes were copied and rotated 90degree angle because back portion of the sofa is the same as the front seat. Scaled the back portion as needed.

Took a small box for the arm holder. Applied cloth, turbosmooth and FFD 4 modifier on it.



Figure 4.1.23 Sectional Sofa

For legs took box and converted it to editable poly. Selected the face of the box and scaled it down as it is shown in the photo.

Made a group of this whole thing. Copied the group and rotate as per the design.



Figure 4.1.24 Sectional Sofa

Took a box, applied cloth modifier>pressure>simulate (self-collision). Then applied turbosmooth modifier. Copied the pillow as much as needed.

Selected rectangular edges on the arm holder and extruded it in negative position to make the stitch.



Figure 4.1.25: Sectional Sofa

#### 4.1.14: Center Table

The center table is the modern center table.

It has two part. one is attached to another. One is higher in height than the other one.

Took a cylinder and copied it on the previous cylinder. New cylinder is little bit smaller in radius than the previous one.

Selected a circle line from compound primitives. From the modifier of the circle enabled the render option and selected the rectangular option. Converted to editable poly. Deleted the part that I did not need.



Figure 4.1.26 Center Table

Took a box and made copy of it. Put these boxes on the lower part of the center table and the cylinder of the center table.

Took a cone small in size and used it as the rubber of the center table. Put these underneath the center table as it works like grabber.

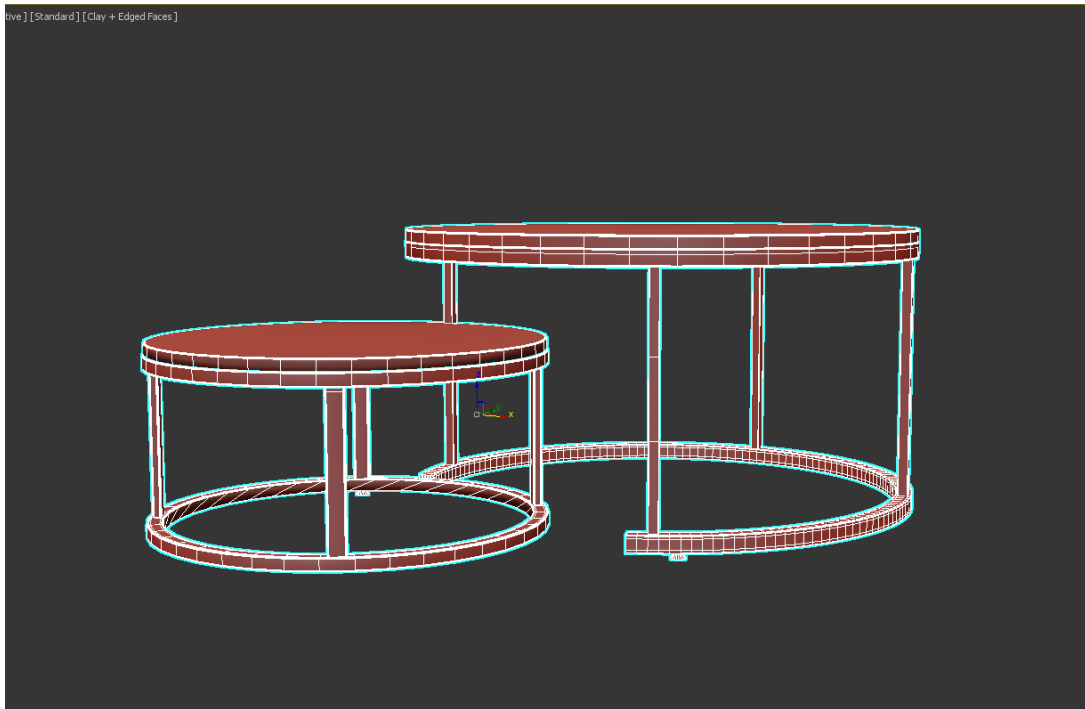


Figure 4.1.27 Center Table

Scaled down the bigger one and recreate the lower part of the center table as it is a solid round shape.

Attached the small one with the bigger one. That made a complete modern center table.

#### 4.1.15: Chandelier

This chandelier was made for the living room. Kept is simple as like the other furniture.

Took five spheres. Few cylinder to connect the spheres. And a small cylinder to make a holder. Added shell modifier on the spheres.

From splines took helix to make the pipe of the chandelier that connects it with the holder.

Converted the whole thing into editable poly. Make group to avoid mess.



Figure 4.1.28 Chandelier

#### 4.1.16: Chandelier 2

Long height chandelier was made for the dining space.

Sphere >editable poly>vertex>select the vertex of the sphere >delete.

Applied shell modifier on the sphere. Took a cylinder, long in height but small in radius. Added this cylinder on the middle of the sphere. Made a group of the whole thing and instance it into another six in quantities.

On top took a cylinder>converted it to editable poly>inset>face>extrude.

This part holds all the piece of the light.

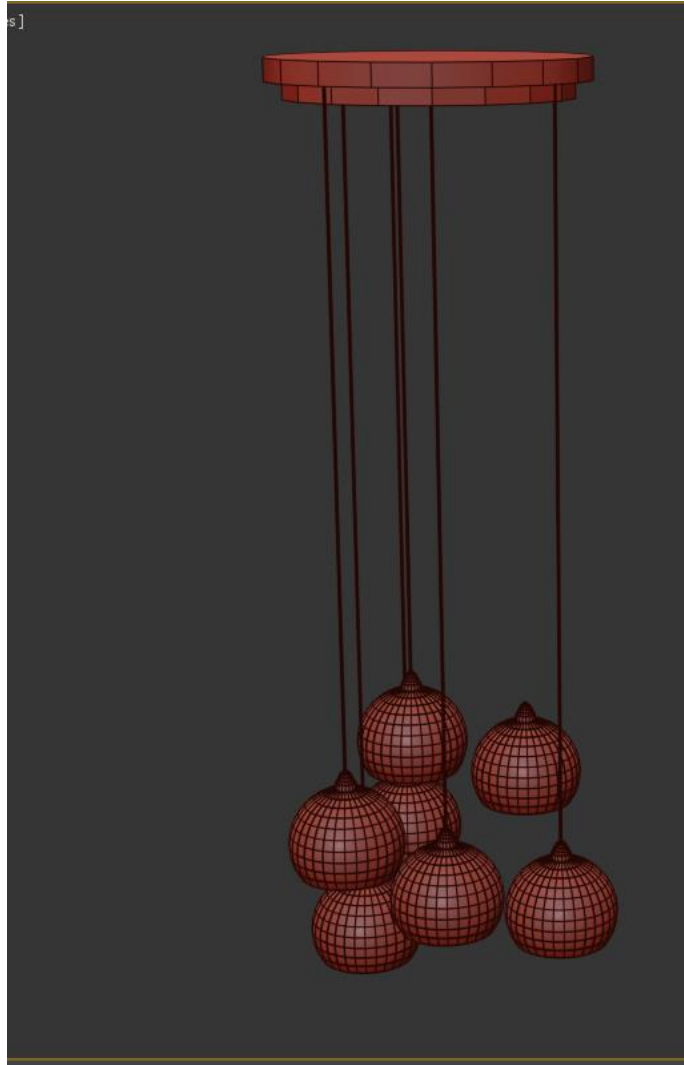


Figure 4.1.29 Chandelier 2

#### 4.1.17: Bottle

From splines, took a line then draw a half of a bottle.

With the vertex modify it as per the design. Applied lathe modifier and selected the option max.

Applied shell modifier to create the thickness of the bottle.

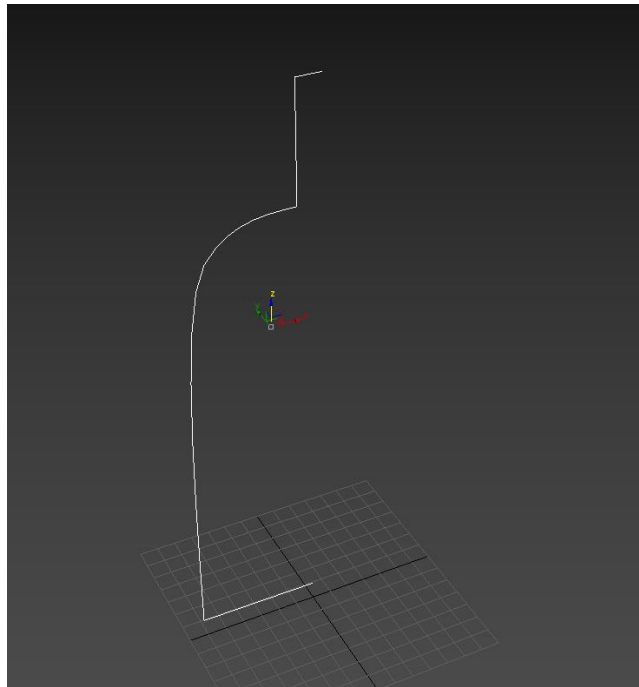


Figure 4.1.30 Bottle

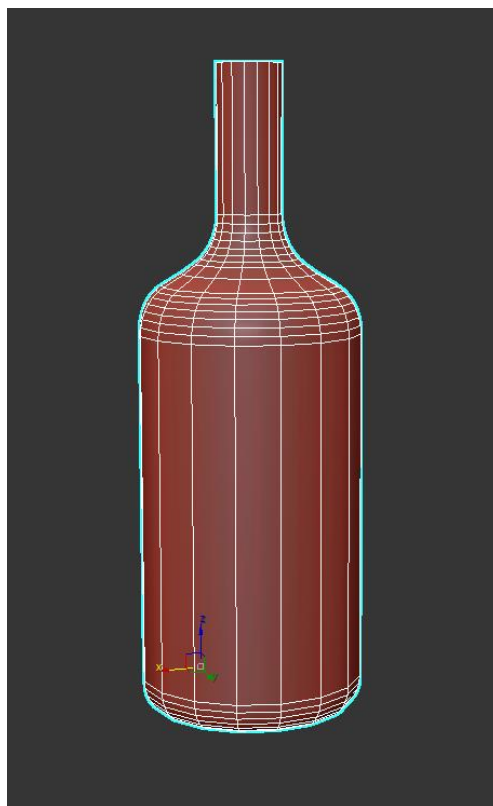


Figure 4.1.31 Bottle

#### 4.1.18: Vases

From splines, took a line then draw a half of a vase.

With the vertex modify it as per the design. Applied lathe modifier and selected the option max.

Applied shell modifier to create the thickness of the vase.

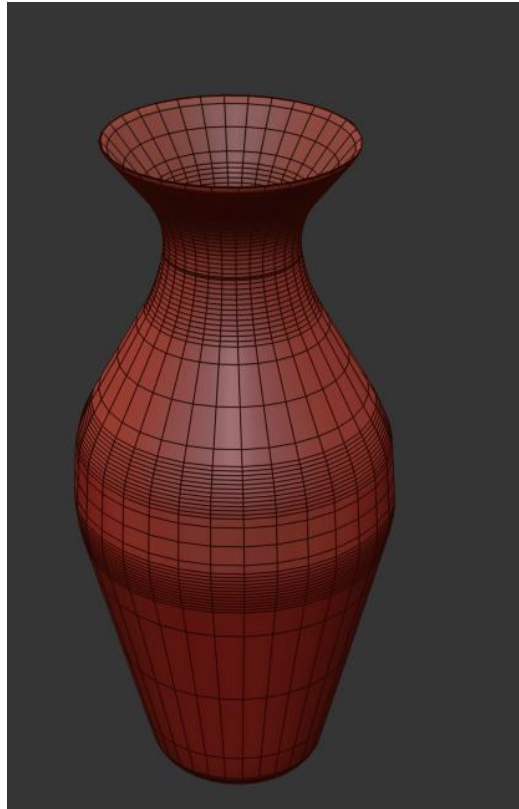


Figure 4.1.32 vase

#### 4.1.19: Curtains

Took a plane and increased the segments of it. The curtain would shape good if the segments of the plane is higher. Converted the plane to the editable poly and applied cloth modifier on the plane. Selected the top vertex of the plane and with a help of a box which was set on the top vertex, it would create the folds of the curtain by scaling the box. Selected the option simulate and selected self-collision to create the curtain on place.



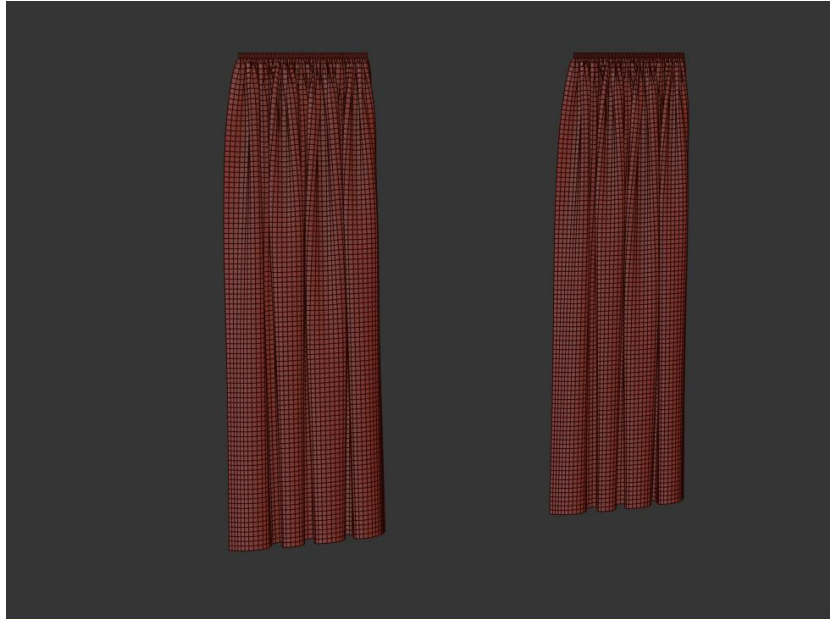


Figure 4.1.33 Curtain

Copied the curtain and drag it to the other side.

#### 4.1.20: Wall Rack

Took a box and made it thin in size. Copied few of this boxes and rotate them as per the design.



Figure 4.1.34 Wall Rack

#### 4.1.21: Side Board with TV

Took a box and increased the segments as needed>converted to editable poly>select face>extrude (negative direction). Made three part of the board. Two of them have push and pull kind of opening system and the other part has three drawer. For leg I created it as square shaped with a thickness.



Figure 4.1.35 Side board and TV

For the tv, took a box and made it thin in size>converted to editable poly>edit vertex>selected face>detached the screen part of the TV.

#### 4.1.22: Corner Tool

Took a cylinder>increased the side segments> converted to editable poly>selected the side face of the cylinder>extrude. Made a copy of that cylinder and placed it down direction of the first cylinder.

Selected the middle face of the cylinder>extrude (down direction).

Took another cylinder which is the connector of the both cylinder. Basically this cylinder worked as leg of it. Copied three of it and set them around the tool.



Figure 4.1.36 Corner tool

#### 4.1.23: Kitchen Cabinet

Down cabinet: Box>editable poly>connect edges>face>extrude (where needed). Created cabinets and drawers of the down cabinet. Made a place for stove and a sink.

Wall cabinet: Took a box >editable poly> connect edges>face> extrude. Detached this part from the box. Took another box to create rack of the wall cabinet. Copied them as per the need. Placed then within the wall cabinet.

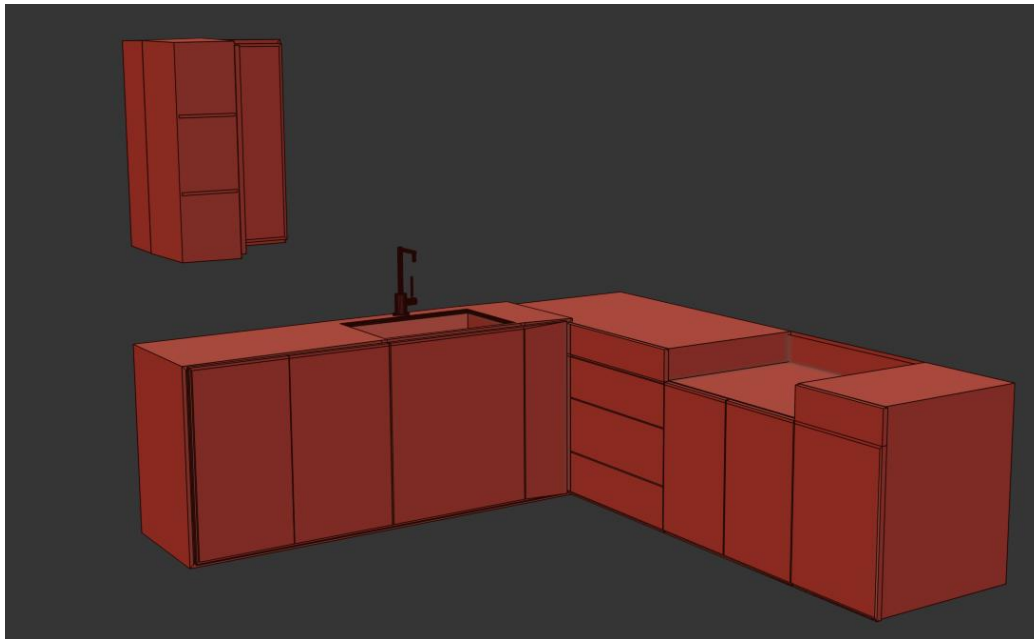


Figure 4.1.37 Kitchen Cabinet

#### 4.1.24: Fridge

Took a box>converted to editable poly>connected the edges>made two parts of the box>face>extrude the faces which is needed.

For cold water and ice made a place on the fridge. Connected the box by edges and selected the face>deleted the face>edge>chamfer.

Took small cylinder in size>copied it> set them on the fridge.

For the handle, took box long in length>converted to editable poly>select face from the both pole of the box. Extrude them. Select edge of the box and chamfer to make it smooth.

Shift and drag to the other side and copy of it. Set these two on the middle of the fridge.

Rotate these two handle 90degree angle and also set them lower portion of the fridge.



Figure 4.1.38 fridge

#### 4.1.25: Stove

Selected a box>converted to editable poly>selected face and angled it.

For burner, took a cylinder>editable poly>extrude>scale>copy>rotate>set it on the other size of the first cylinder. Make copies of it. Then place them where the burner is to be set.

Took a box and copied them into a few pieces as per the design.

Did pro-boolean to cut the iron in shape on the stove.

Took a cylinder and copied them>set them on the front face of the stove as the switch of the stove.

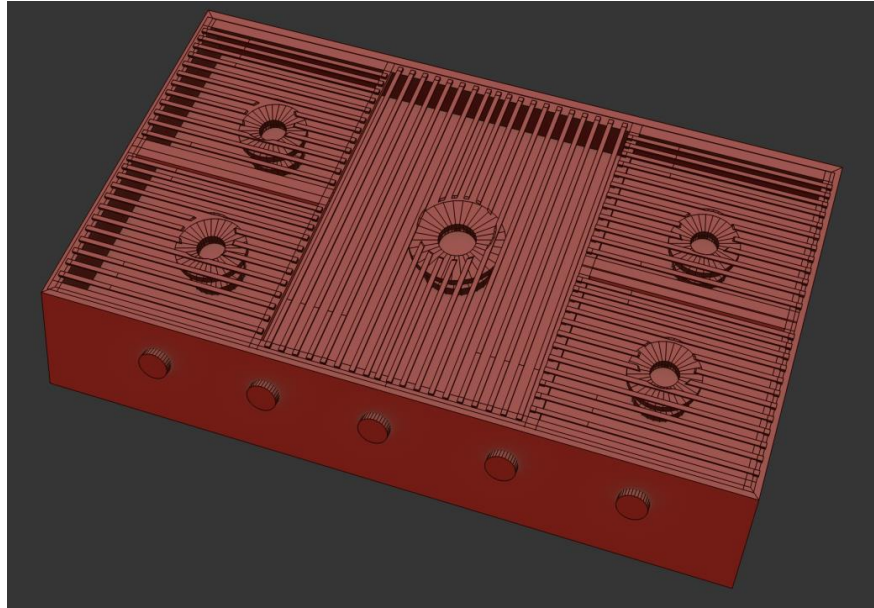


Figure 4.1.39 Stove

#### 4.1.26: Tap & Sink

Sink: Box>editable poly>face>delete>shell modifier.

Tap: cylinder>editable poly>face>extrude>edge>chamfer>face>inset>extrude. Took another cylinder as per size and attached then with the main cylinder.

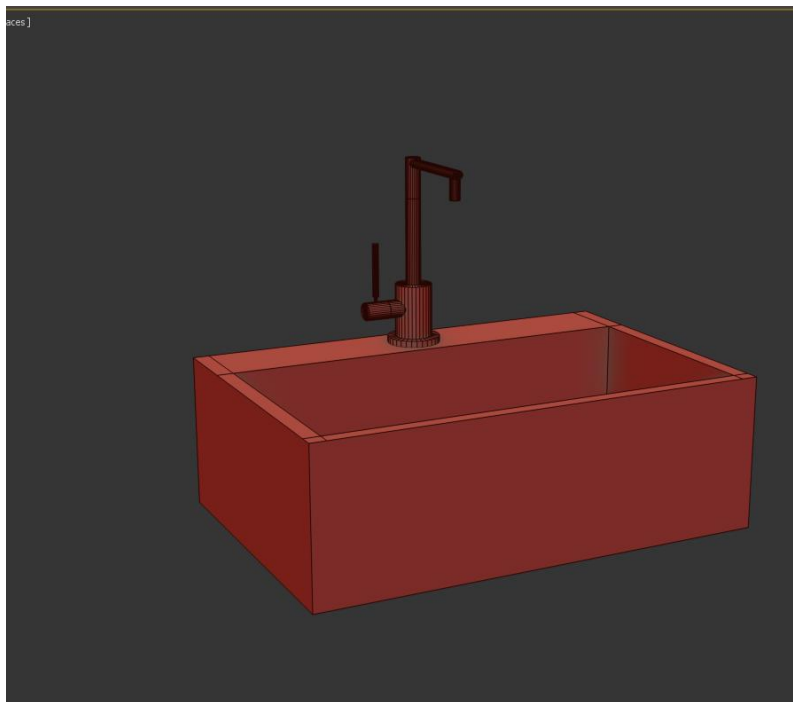


Figure 4.1.40 Tap & Sink

#### 4.1.27: Commode

From spline took egg shape to create the cover of the commode>converted to editable poly>applied shell modifier. Made a copy of the cover and converted to editable poly>face>deleted the middle part of the cover.

Took a box>editable poly>edited by vertex as per the cover's shape. Selected the las face of the commode and extrude it. By vertex, scale them little bigger in shape. Selected the edge and chamfer it.

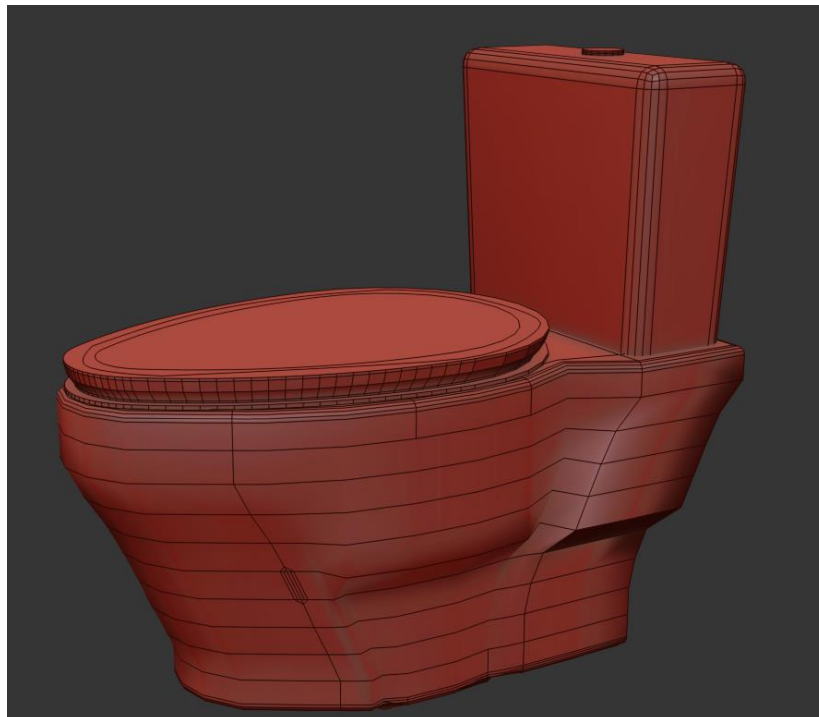


Figure 4.1.41 Commode

To make the flush button, took a cylinder and resized it and set it on the water tank of the commode.

Lastly applied turbo smooth on the commode.

#### 4.1.28: Washroom Rack

Took a box>editable poly>connect edges>edit the edges by vertex.

For door, select the faces>inset> extrude(negative direction). Select the middle face and extrude it in negative direction to make the division of the two doors.

For the lower part selected the face and deleted both of them. Applied shell modifier to create a thickness.

For knob, cylinder>editable poly>face>scale>extrude. Then set them on the rack doors.

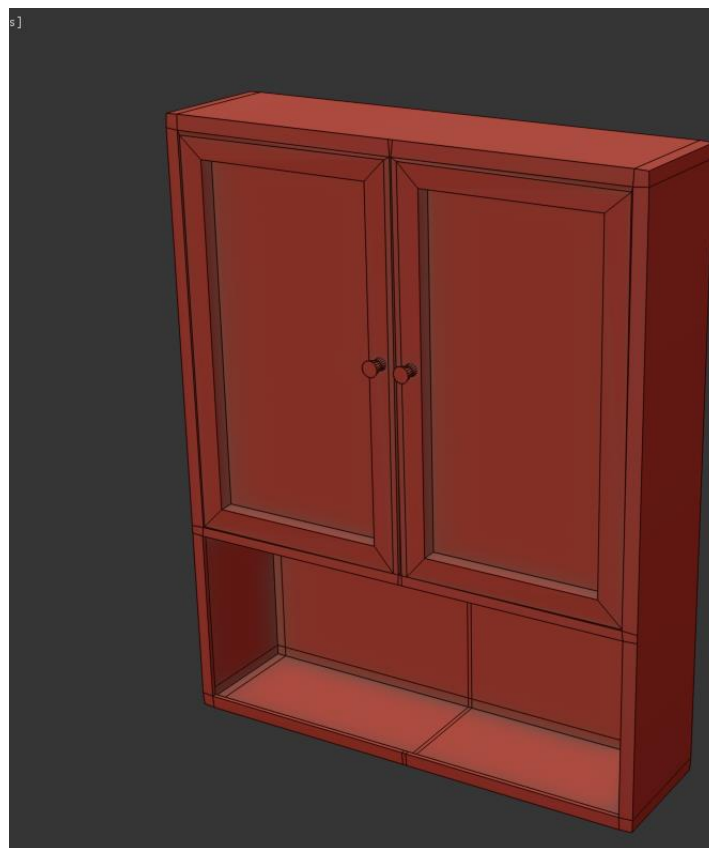


Figure 4.1.42 Washroom Rack

#### 4.1.29: Study Chair

At first took a box for seat>editable poly>vertex>shaped it as per design>FFD 4 modifier>control points>edited as per design.

Took a cylinder for the back leg. This leg is long in length. Converted to editable poly>vertex>selected the middle stage vertex and drag them to made the cylinder little bend.



Copied this cylinder. Took another box and rotate it 30degree angle. Set this on the two cylinder.

Selected an oil tank and copied i. set two of them on the back support of the chair. Selected pro Boolean>subtract(cookie)>pick shape>oil tank. Then it would create a hole like this.



Figure 4.1.43 Study Chair

For front leg took a cylinder and copied it. Set then on place. Made a group of the whole chair.

#### **4.1.30: Book**

Selected a box>editable poly>three side faces>extrude (negative direction).

Edge>chamfer.

For more smoothness applied turbo smooth modifier.

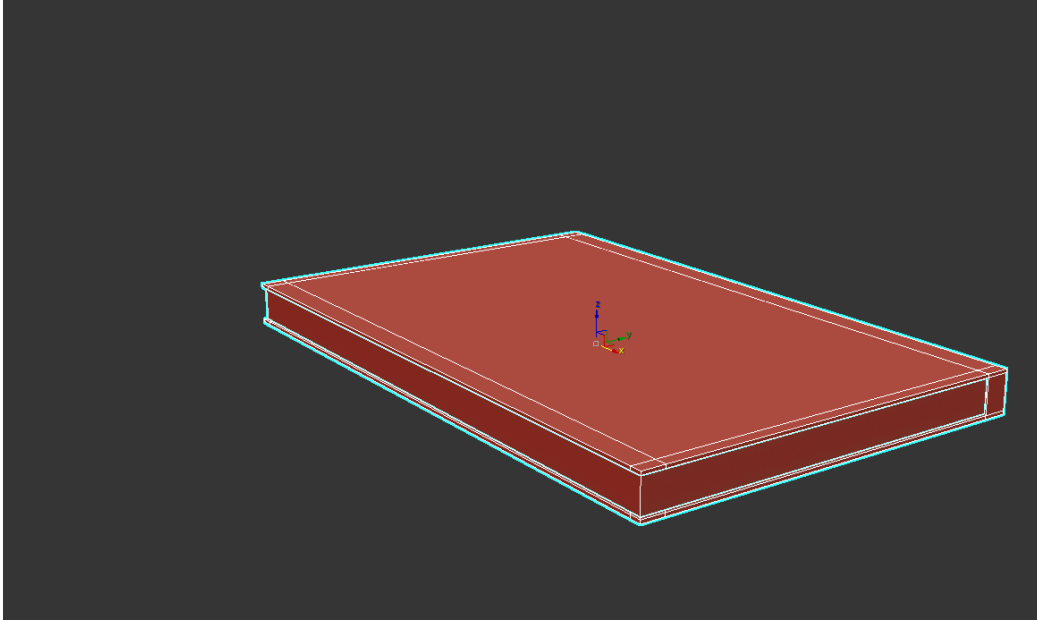


Figure 4.1.44 Book

#### 4.1.31: Doors & Windows

Kept the doors and windows simple. Didn't edit anything advance. Just used the preset models of the doors and windows from max.

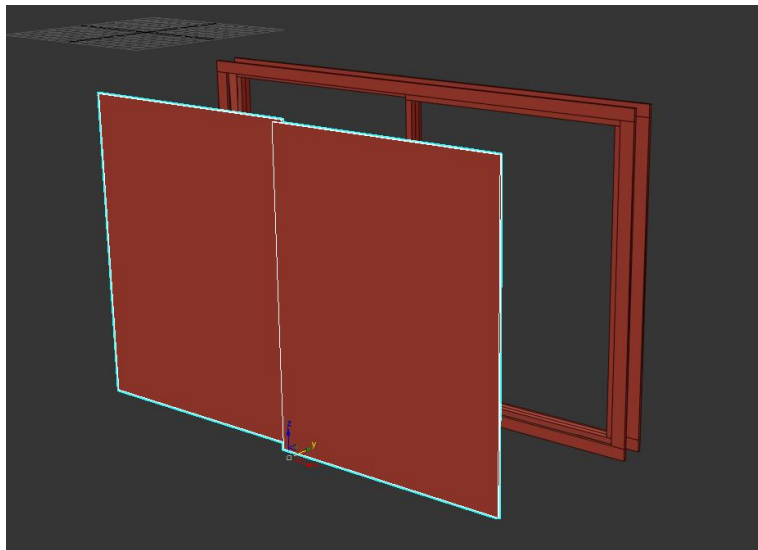


Figure 4.1.45 Windows

Converted it to editable poly so that I could separate the parts of the window which would be helpful while texturing.



Figure 4.1.46 Door

Knob in the door, for knob took a box>editable poly> face> inset> extrude> face> extrude> scale> face>inset. Set the knob at the edge of the door.

#### **4.1.32: Wall decorative piece**

For round shapes, took a circle from spline> modifier> enable render and enable render in viewport> edit the thickness>copied it in four pieces> set them on one another in a messy way.

For the holder took a box> editable poly>edge> connect> edit the vertex> face> extrude in negative direction. Adjusted the holder with the circles. Made a group of the whole thing.

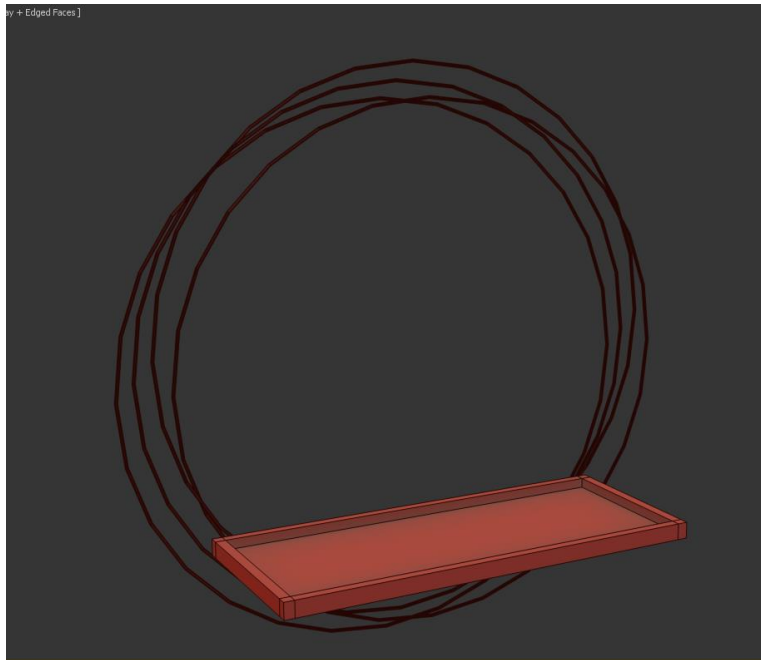


Figure 4.1.47 Wall Decorative Piece

#### 4.1.33: Bedroom Bench

Took a box as per the measurement> converted to editable poly> increased segments into 12> edge> chamfer> again edge> extrude negative direction.

To erase the sharpness of the bench, selected edges of the box> chamfer.



Figure 4.1.48 Bedroom Bench

Applied cloth modifier on the box to make the box looks like a fabric thing. Then again converted it to editable poly. For smoothness applied turbo smooth modifier > editable poly> FFD 4 > control points > edit it to make the bench look more realistic. Lastly converted to editable poly.

For the leg, took a cylinder and converted to editable poly> face> scale> rotate> copied> place them under the seat of the bench.

#### 4.1.34: Simple Dining Bench

Box long in height> editable poly> edge> connect> edit vertex> face > delete (which was not needed).

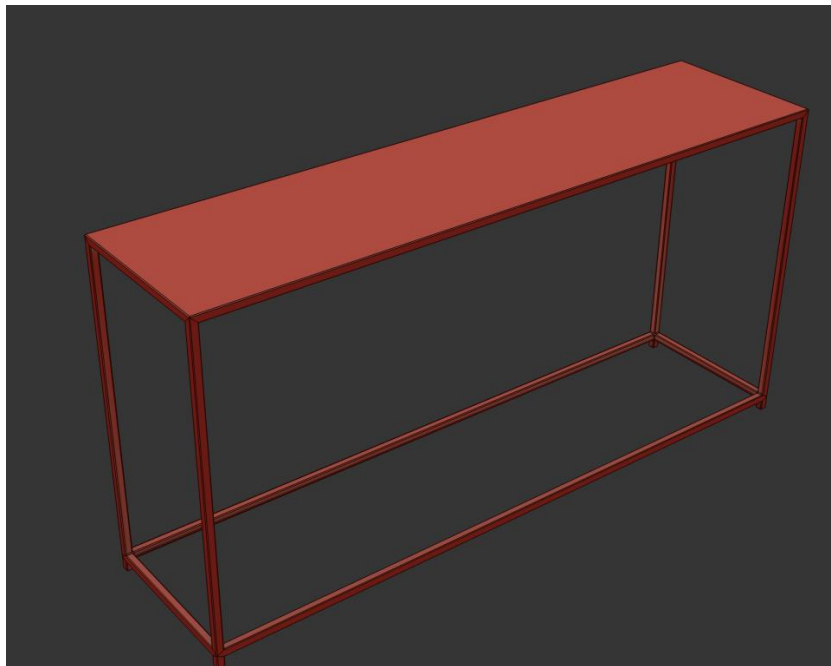


Figure 4.1.49 Simple Dining Bench

## 4.2: Texturing

Basically I had done texturing in two ways. One is with jpg image and the UVW map modifier, which is the simple texturing on any object.

Another one is UV Unwrap. Models like sofa and other complicated which is difficult to do texture, there is where I had to do UV unwrap texture.

Unwrap is one of the popular methods for doing UV of any 3d object. UV means representing a 3d object's face with a flat 2d face. It's used to texture 3d objects smoothly. This process of creating a UV map is called UV unwrapping. Then the U and V represent two axes of the 2d space. And in the 3d space, there are three (X, Y, Z) axes represent 3 different directions.

So for UV unwrap we had to make a jpg image where all the textures were in one picture.

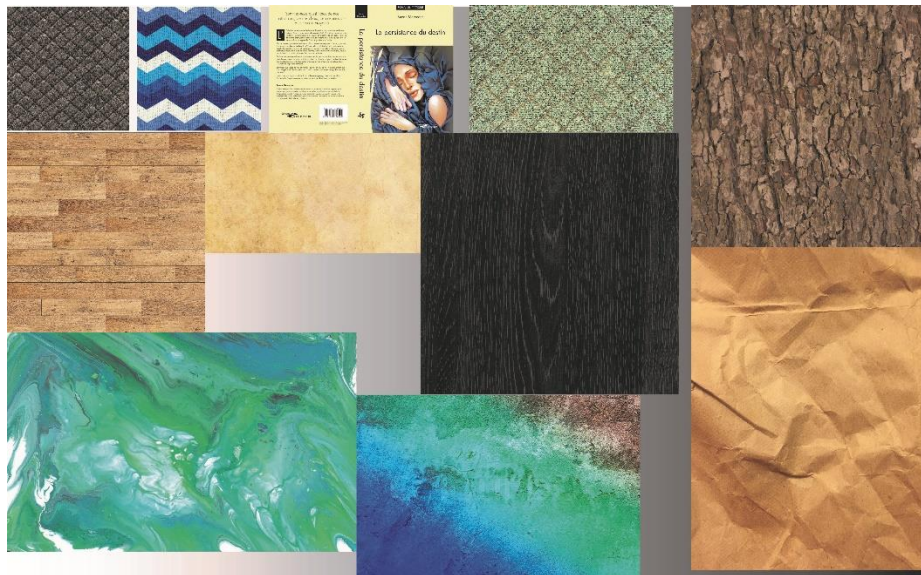


Figure 4.2.1 textures

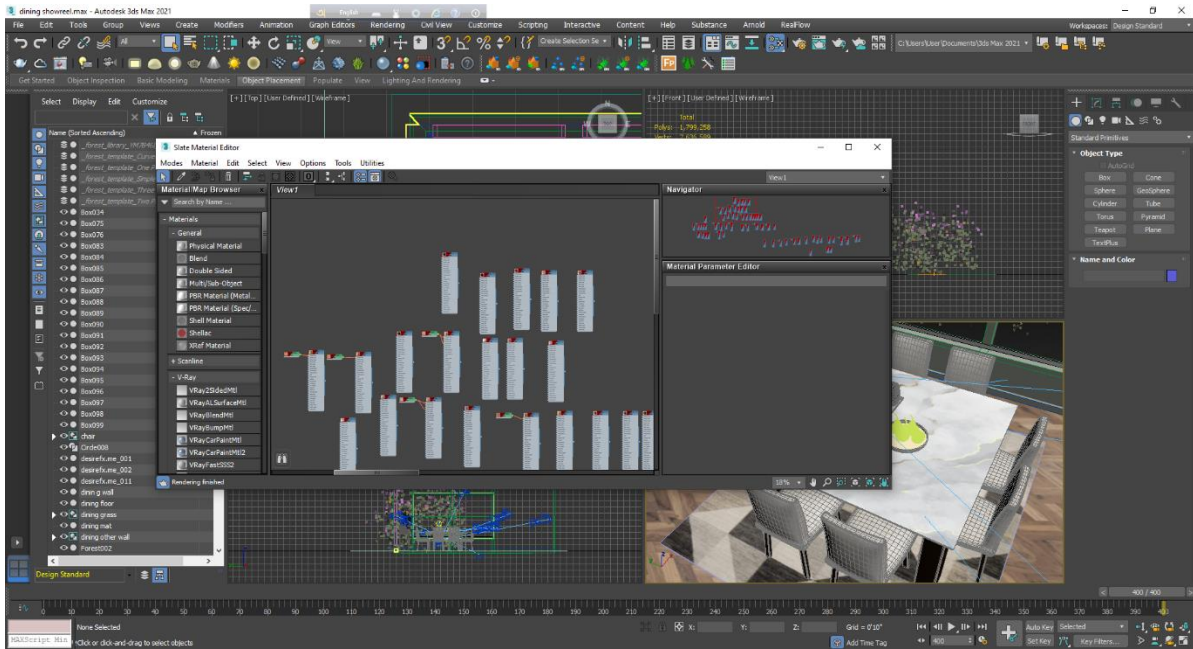


Figure 4.2.2 Slate model texture

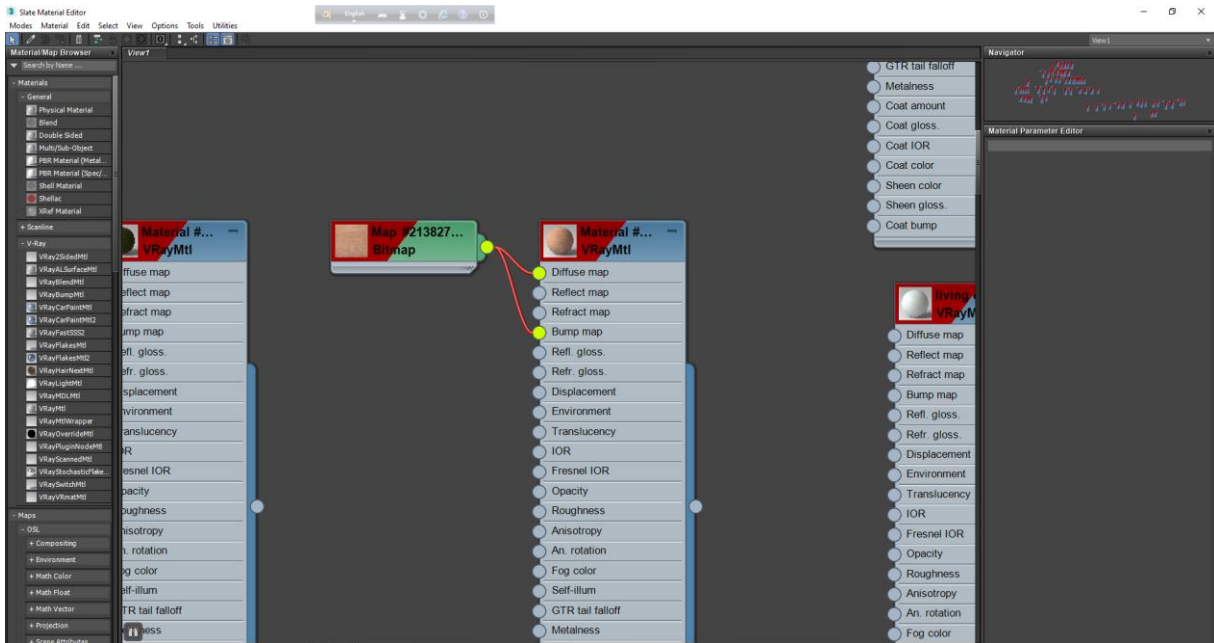


Figure 4.2.3 Applying Texture



### 4.3: Lighting

Like other key things of 3D, lighting is always an important key in terms of 3D architectural visualization. Without setting the light, everything will be dark in render. In two projects, I have set light in different way.

For show reel, I used v-Ray Dome light, v-Ray plane , v-Ray mesh light as per the scene.

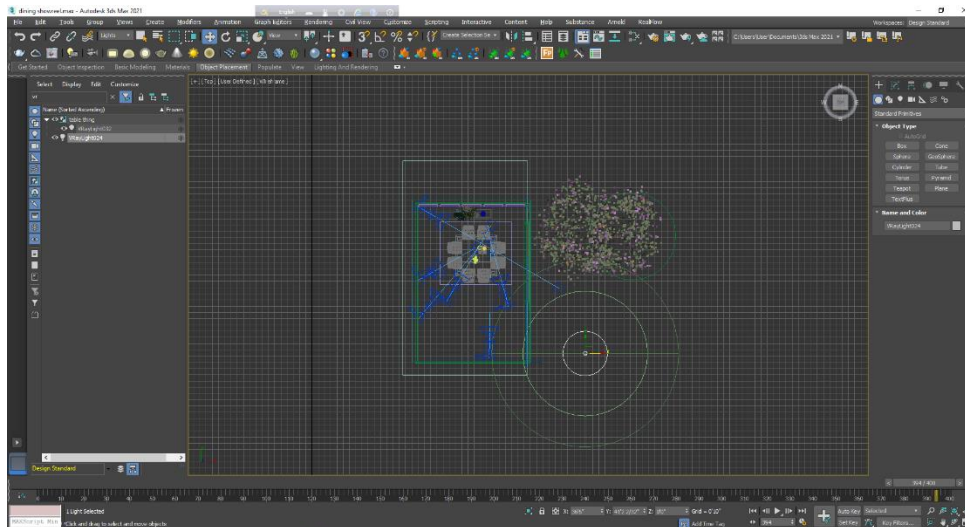


Figure 4.3.1 Dining lighting



Figure 4.3.2 Dining lighting

Above picture is a scene of the day time. In this scene I only used v-ray dome light, where I set the HDRI map to make the light more realistic.



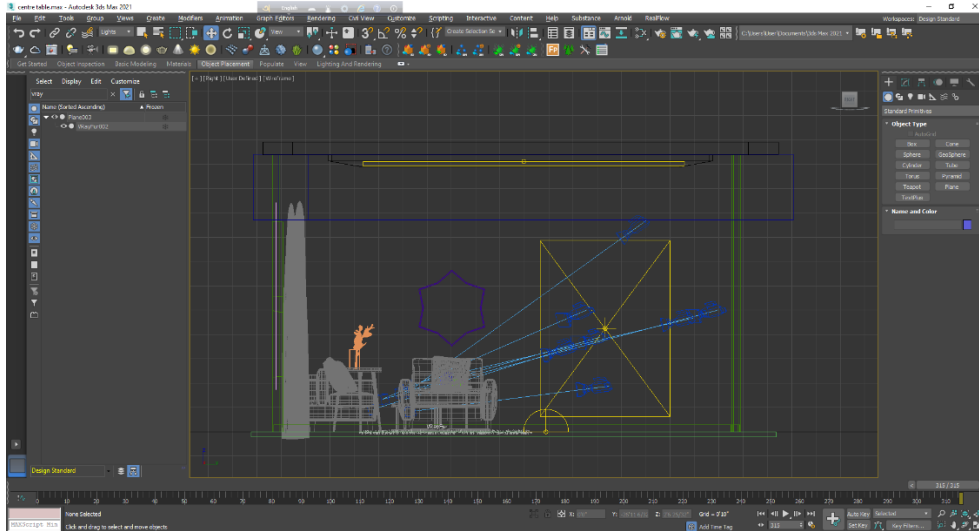


Figure 4.3.3 Living room Lighting



Figure 4.3.4 Living room Lighting

This is a living room scenario. I used v-ray dome light outside of the room to make it look like a day time scene. In the room I added a v-ray plane light to erase the darkness of the room. For candles, simple added v-ray mesh light in the ribbon of the candles. Both of the light's (v-Ray plane and v-Ray mesh) temperature is in between 4500k-5500k to create a warm lighting shade in the room.

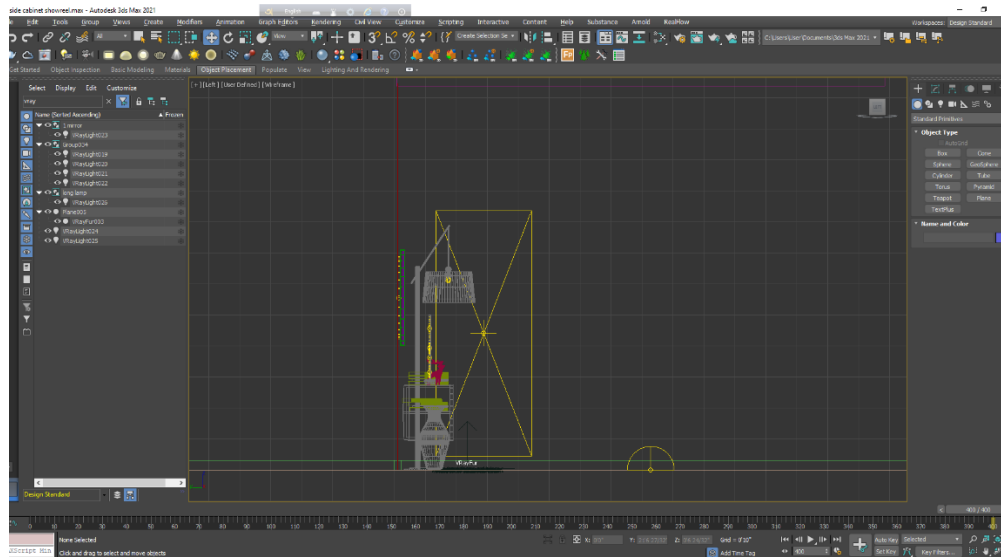


Figure 4.3.5 Side Cabinet Lighting



Figure 4.3.6 Side Cabinet Lighting

This is a side corner scenario in day light. In this scene I have used three kind of lights. one is for the environment which was v-ray dome light. Other one was for the room to erase the darkness which was the v-ray plane light. Another light was for the lamp shade, a small showpiece and the back light of the mirror and that was the v-ray mesh light.

#### 4.4: Interior Plan

I was asked to create a one storied building within 3000sq ft. So I have done a one floor house. At first I did a layout then I created a basic plan in Autodesk Max.

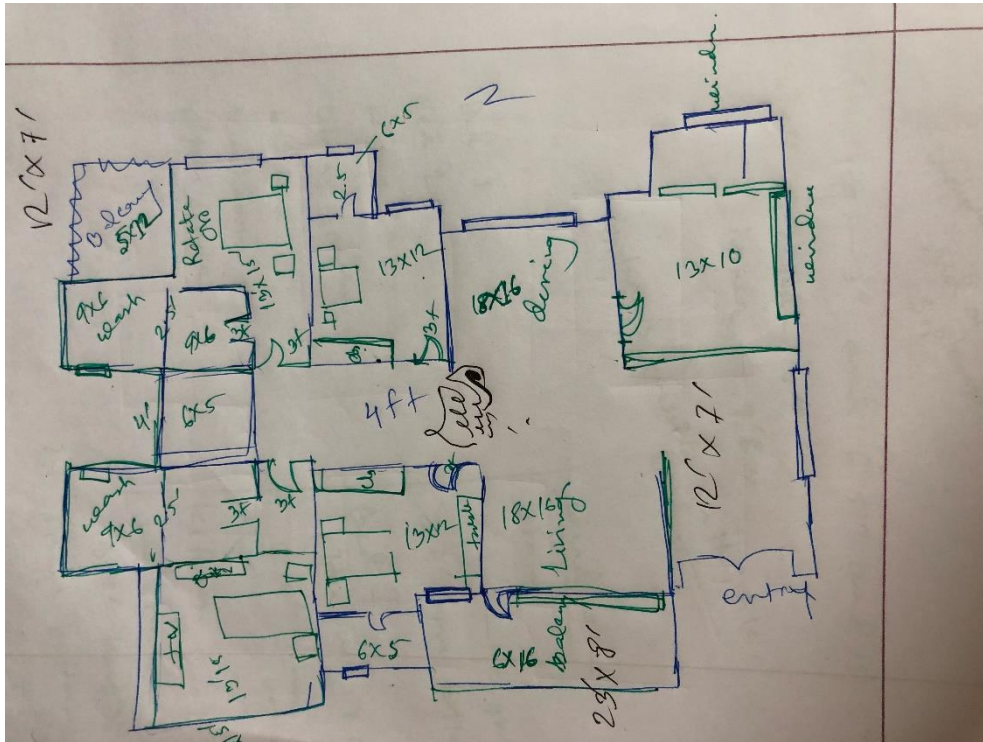


Figure 4.4.1 Interior Plan Layout

It's an around 2500 sqft house plan. This house has four bedrooms: two of them are master bedrooms and the other two are child bedrooms. Every room has an attached washroom and this house has a common washroom. Every room has wide windows so that rooms can get proper and good ventilation system. A living and dining space and a kitchen which is open. Two balcony: one is master bedroom and the other one is just beside the living room which gives a nice front view.

This house's length is 63' and the width is 43'.

Measurement of the rooms:

1. Master bedroom 1: 13' \* 15'
2. Master bedroom 1 closet and washroom: 9' \* 6' & 9' \* 6'
3. Master bed 1 balcony: 5' \* 12'

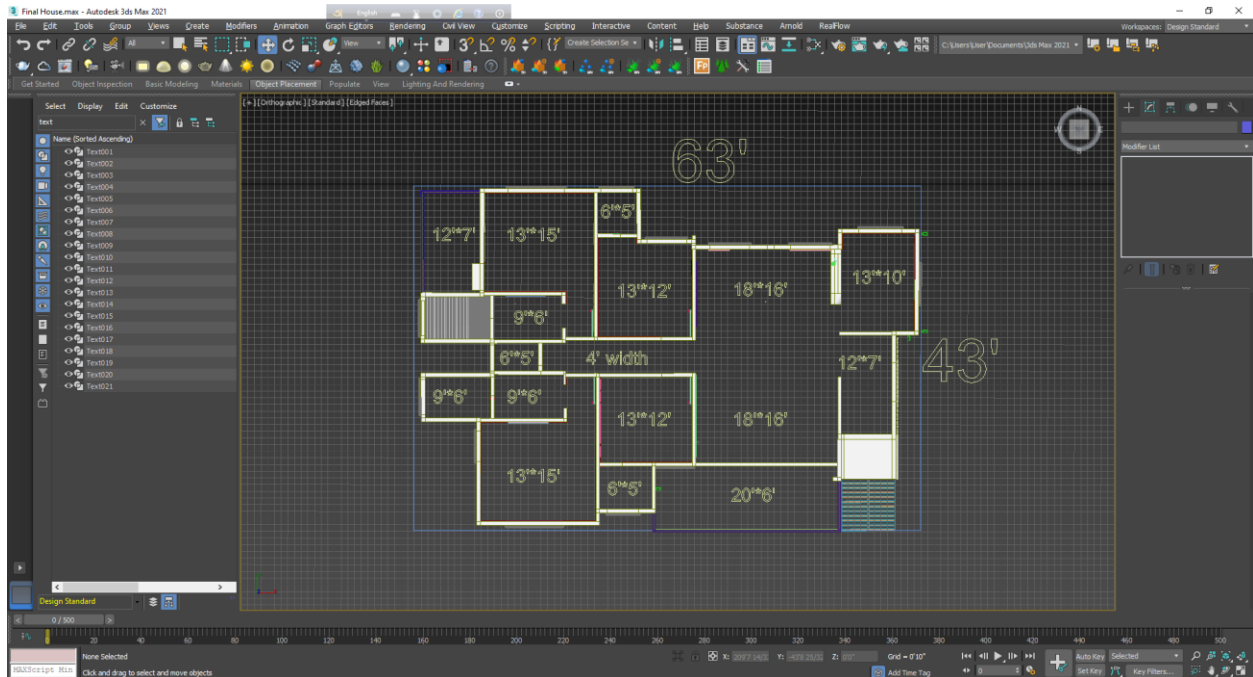


Figure 4.4.2 Interior Plan in Max

4. Master bedroom 2: 13' \* 15'
5. Master bedroom 2 closet and washroom: 9' \* 6' & 9' \* 6'
6. Child bedroom 1: 13' \* 12'
7. Child bedroom 1 washroom: 6' \* 5'
8. Child bedroom 2: 13' \* 12'
9. Child bedroom 2 washroom: 6' \* 5'
10. Common washroom: 6' \* 5'
11. Corridor: 4' width
12. Living room: 18' \* 16'
13. Living room balcony: 6' \* 16'
14. Dining room: 18' \* 16'
15. Kitchen: 13' \* 10'
16. Entrance Corridor: 12' \* 7'

#### 4.5: Exterior Plan

I kept exterior very minimal. The whole house is 2ft higher than the ground. Used a stair to get into the house. Balcony beside the living room which gives a nice view from the front side of the house.

Put a boundary all over the house and tried to give it a yard look. Put few trees in the yard. The yard is full of grasses and flowers.

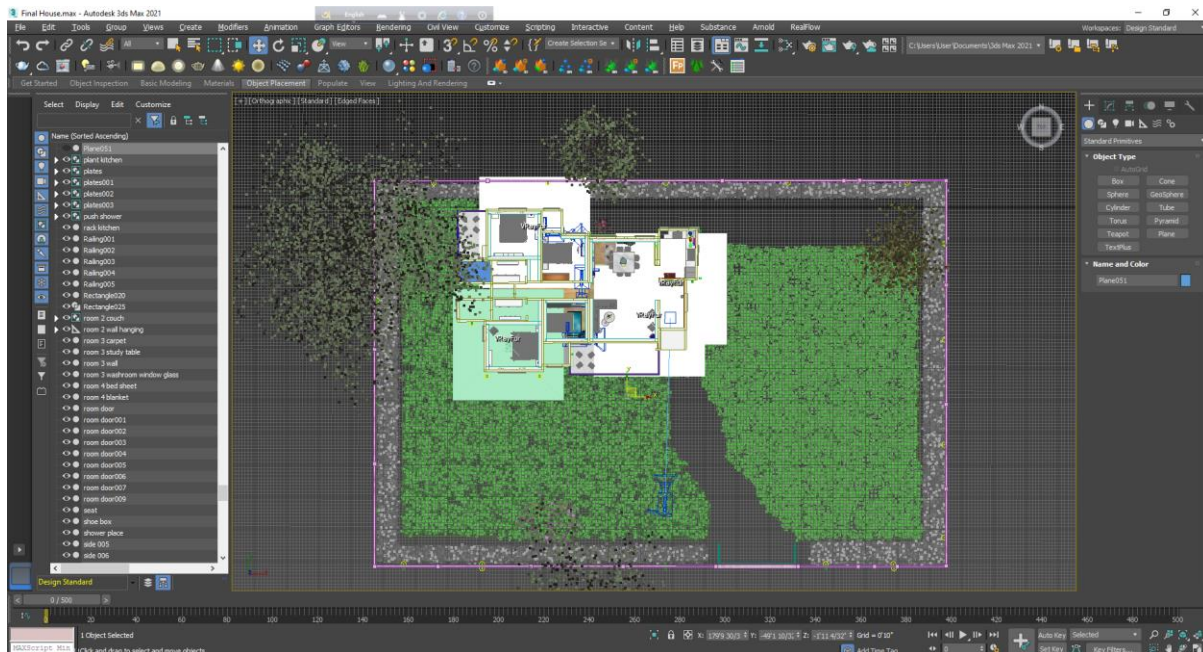


Figure 4.5.1 Exterior Plan

## 4.6: Rendering

In 3-D graphic design, rendering is the process of add shading, color and lamination to a 2-D or 3-D wireframe in order to create life-like images on a screen. Rendering may be done ahead of time (pre-rendering) or it can be done in on-the-fly in real time [2].

Rendering or image synthesis is the process of generating a photorealistic or non-photorealistic image from a 2D or 3D model by means of a computer program. The resulting image is referred to as the render.

I render the furniture and the scene in Autodesk max by V-ray plugin.





Figure 4.6.1 Exterior rendering



Figure 4.6.2 Exterior rendering

For exterior, at first I did not change the dome light intensity and then when I rendered the whole scene burnt out. Then I again changed the intensity, and gave the scene a sunset light.



Figure 4.6.3 Exterior rendering



Figure 4.6.4 Interior rendering (Entrance)



Figure 4.6.5 Interior Rendering (Dining-Living space)



Figure 4.6.6 Interior Rendering (Dining-Kitchen Space)





Figure 4.6.7 Interior rendering (Living Space)

As I could customize the material though the material slot so I was changing some roughness glossiness manually. When everything got set up then I did render. For the render I used v-ray 5 in Autodesk Max.



Figure 4.6.8 Interior rendering (Living Space)



Figure 4.6.9 Interior Rendering (bedroom 4)

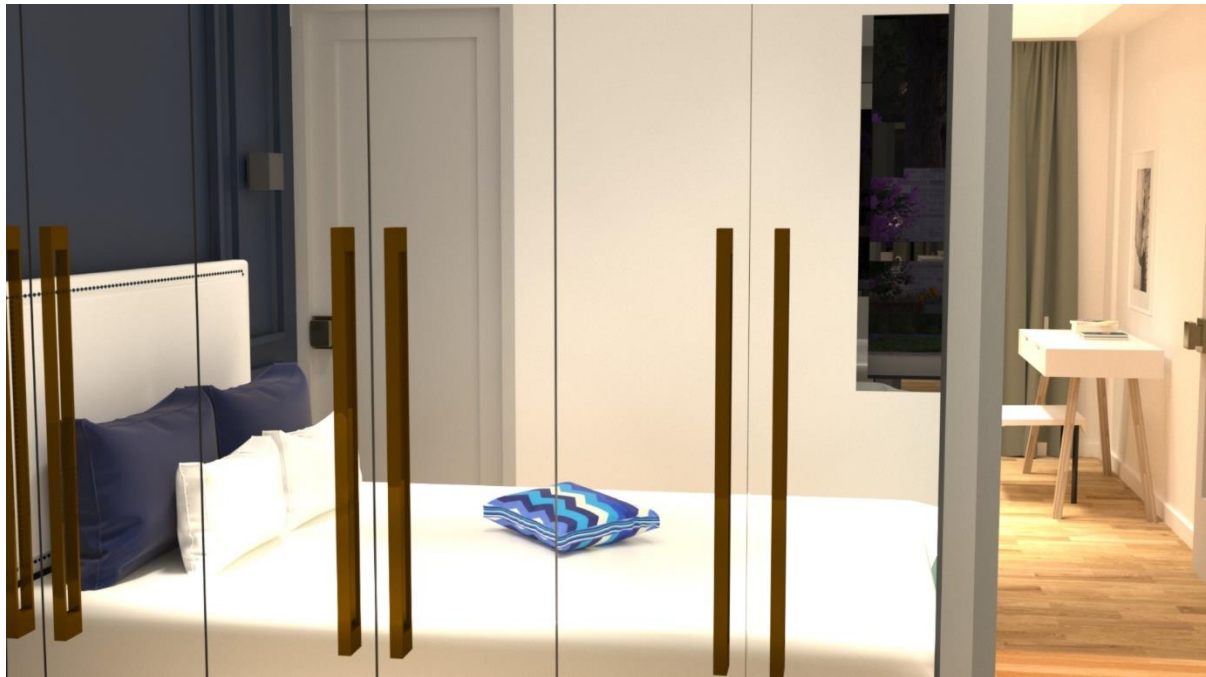


Figure 4.6.10 Interior Rendering (bedroom 3)



Figure 4.6.11 Interior rendering (2<sup>nd</sup> master bedroom)



Figure 4.6.12 Interior Rendering (Master bedroom)



Figure 4.6.13 Interior Rendering (dressing room+ washroom)

#### 4.7: Post Production

As I had done camera animation part by part, so I did render all these animations in jpg file. After that, to attach all the images and make a video cli, I imported all the images in an image sequence in Adobe Premier Pro. Then I exported the mp4 file from premier Pro.

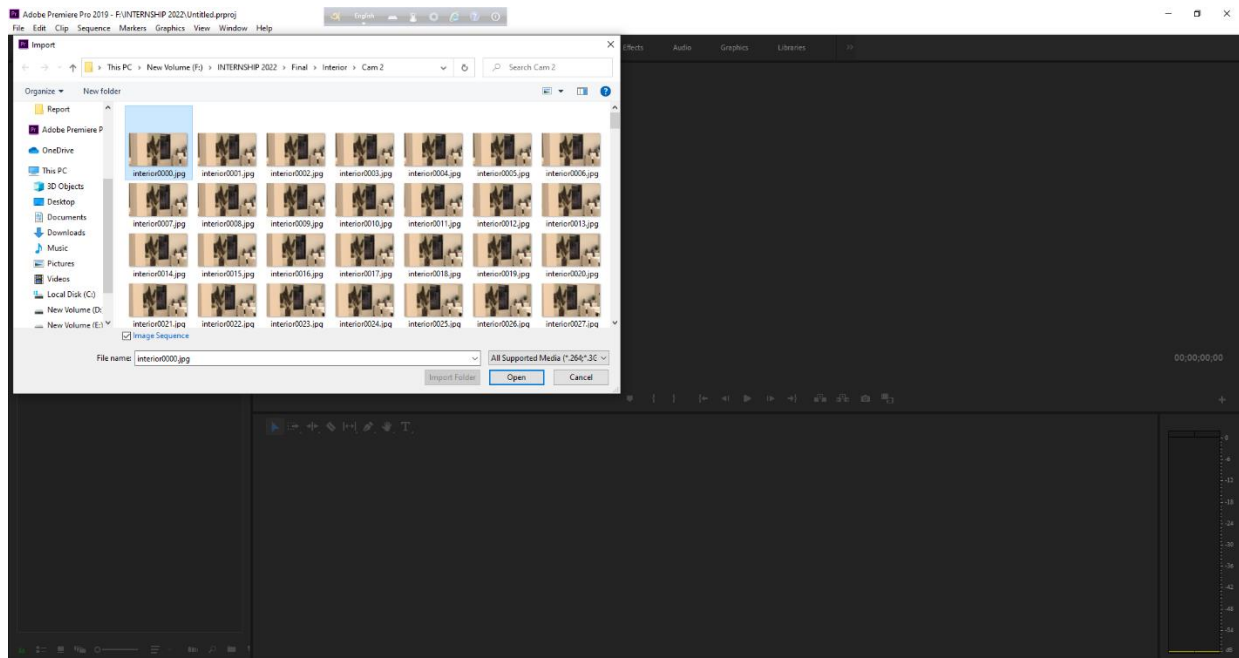


Figure 4.7.1 Post Production (imported images in Pr)



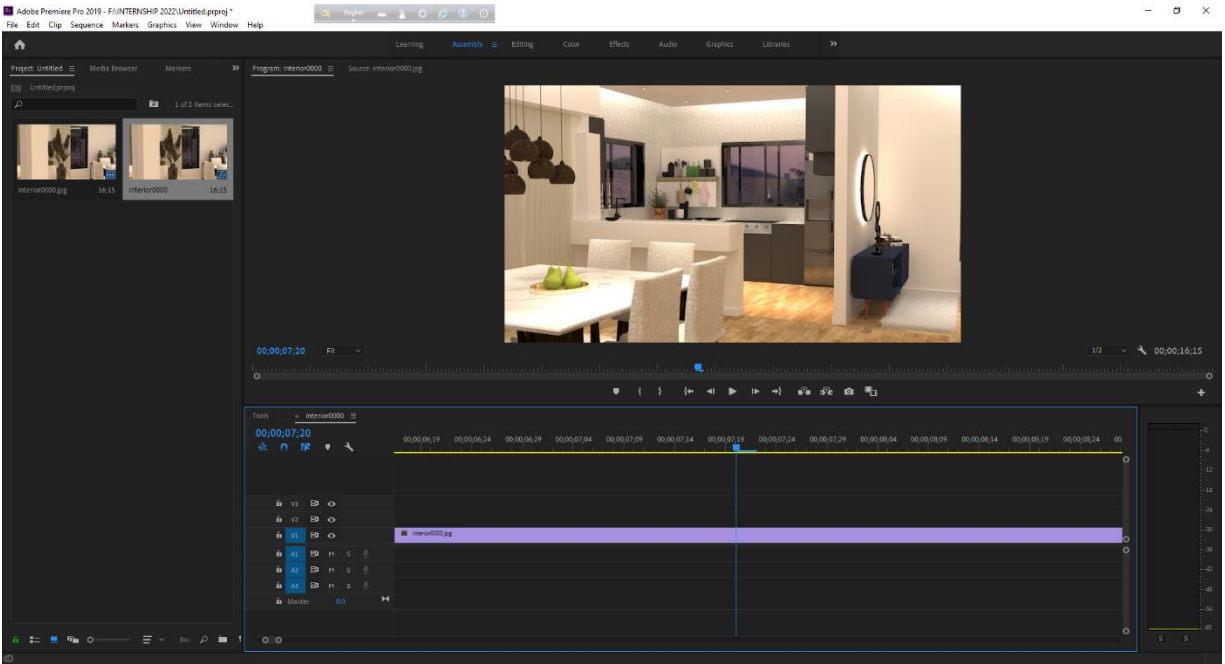


Figure 4.7.2 Post Production

Created new sequence from the imported clip. So that I could edit the clip wherever I needed.

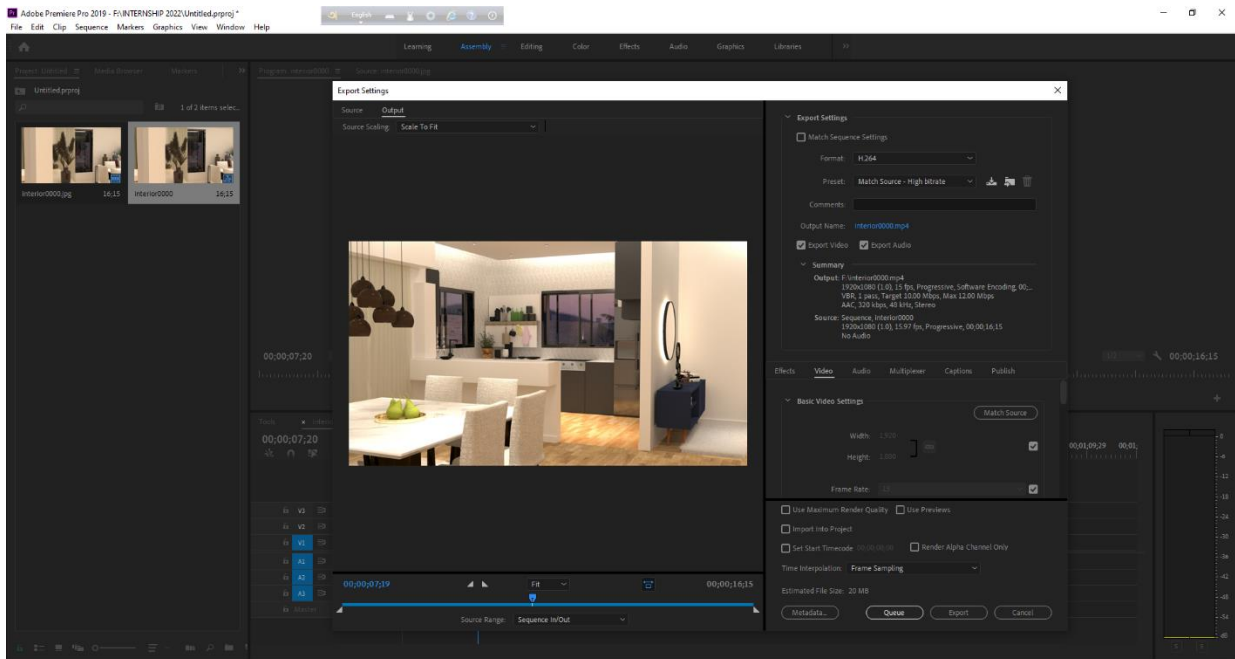


Figure 4.7.3 Post production (export)

I exported this clip into mp4 file in my desired location. I had to change the format of the sequence setting into H.264. As I did render different camera animation in different folder so I created few video clips from premier pro.

Then I again imported these video clips in Wondershare Filmora software.

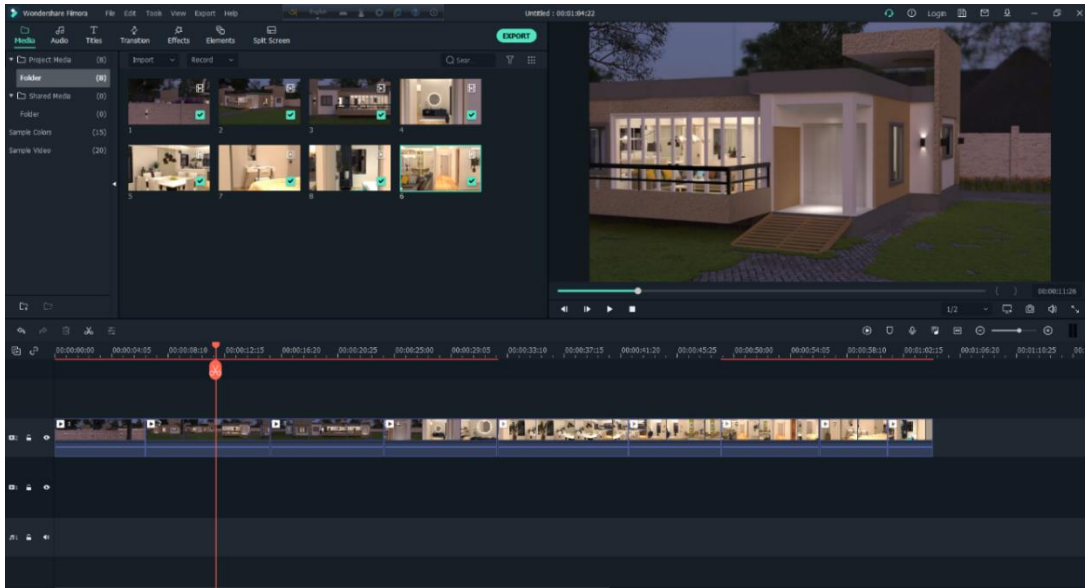


Figure 4.7.4 Post production (Imported clips in Filmora)

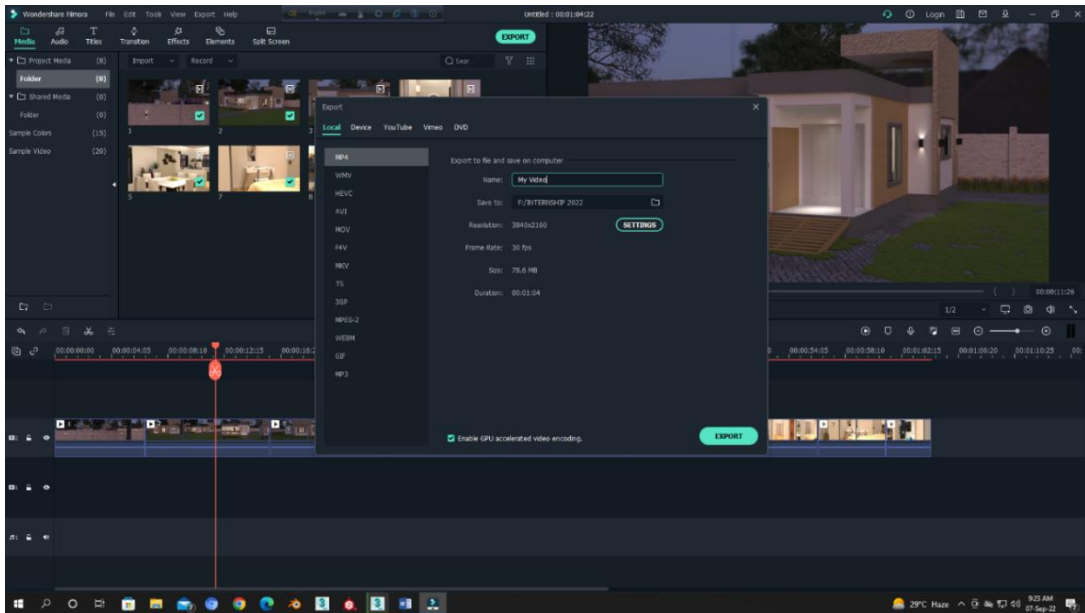


Figure 4.7.5 Post production (exported from filmora)

In Filmora software I attached all the video clips and created a whole new clip. Added an audio to create background music. Added few transition in between the short clips. And exported the mp4 file.

## CHAPTER 5

### Limitations and Challenges

There are always some opportunities when we do mistakes while learning something new. Materializing isn't any idea which works as per planning. Giving a solid form of my idea wasn't that easy. Therefore, I had to face several problems, confusion and error in my design. Though every problem killed my time and energy but I came up with some limitations and challenges that I had faced during the whole project.

#### 5.1: Limitations

As I had done this whole project solo, I had to do all the modellings, texturing, lightings, flowchart, layout, rendering, choosing design and structure of the house and many more, so it required a high end pc which I didn't have initially. Then I added graphics card in it.

As I'm not the master in this sector I had some knowledge limitations which suffered me a lot. Lack of experience while working in this field had killed my time as I had to do one simple thing multiple times.

When I change the texture folder and then every time after opening the max file, texture file shown missing in the max. then again I had to re-texture those models.

Sometimes when I wanted to import file in the existing file of the max that didn't do a great job. Because sometimes I couldn't edit those imported models.

To initiate a design like this a lot of effects from the cultural angle need to be considered. Similar to the color palette of the film, the aesthetics of the models, camera angle, camera movement, a sense of composition, etc.

#### 5.2: Challenges

As I had done the whole project all by myself. It was quite challenging for me to complete the whole project solo. Had to keep my patience throughout the internship.

For texturing part, I had to collect high resolution images from internet. This part was quite challenging because not all the time I got high resolution images as per my requirements.

I had to use V-Ray Fur on few of my models which was needed. Whenever I applied V-Ray fur on my model and did a quick render to it, my pc crashed. This happened so many times.

I couldn't increase density of the fur. If I didn't increase the density my model wouldn't look good.

And I couldn't sort out the problem. With the help of one of my fellow junior I finally sorted out the problem. Then I completely exported this file in FBX form. Then imported this FBX in a new max file. But the saddest part was only models imported properly. I had to do texture and lighting again on the models. Had to fixed the plants again on my scenario.

As I had to do camera animation, I set few cameras as per the animation of the scene. The animation of cameras were around 400 frames each. I had a time limitation on submitting the project. It was quite challenging to complete the whole animation on time because some of the animations were taking so long to be rendered and that was around 40-50 minutes. This thing effected my time as I couldn't edit the whole animation properly.

I had to choose a background music for my animation. I couldn't understand which music could go with my animation. I had to search a lot to get the proper audio file for my animation.

Autodesk max gets crashed so frequently and I faced the same problem as I was doing a heavy project on it.

Managing time and at the same time had to do project properly to submit it on time. I had to maintain good quality render so get a good output.



## **CHAPTER 6**

### **Conclusion**

This task has given me the possibility to take a look at a few software programs, greater and widely the software programs I already knew. While doing texturing I have learnt how to do UV Unwrap. It became so helpful that I could do unwrap texturing in any kind of project in future.

A lot of researches have been centered on the process of creating 3D architectural visualization and the utilization of specific software in the architectural design process. Research and brainstorming are the two most important things for any kind of project. 3D visualization work offers producers sufficient room to innovate and gift to consumers in the space.

The most important general and precis shape up to now for developing consumers with miles better go back on investment. The concept of 3D furniture modeling for commercials is virtually modern in our country. However, developing 3D furniture showreel wasn't an easy task. With the 3D animations, consumers can experience locating products more than the still images. My intention is to offer an entire 3D visualization of hard surface modeling such as furniture modeling, and different architectural artwork on tough floors. As the client requires, I have done my work with maintaining a high quality within a short period of time. As they were satisfied, I'm glad to work with them and also with the AAVA3D Institute.

## REFERENCE

1. Norfadilah Kamaruddin, Muhammad Aliff Azizan.  
Faculty of Art & Design, University Technology MARA Selangor, Malaysia.  
3D Visualization Sympathetic for the development process of Architectural Project  
[https://www.researchgate.net/publication/312522873\\_3D\\_visualization\\_sympathetic\\_for\\_the\\_development\\_process\\_of\\_architectural\\_project](https://www.researchgate.net/publication/312522873_3D_visualization_sympathetic_for_the_development_process_of_architectural_project)  
[08.09.22]
2. Rendering  
[https://en.wikipedia.org/wiki/Rendering\\_\(computer\\_graphics\)](https://en.wikipedia.org/wiki/Rendering_(computer_graphics))  
[20.08.22]  
  
<https://www.google.com/search?q=what+is+rendering&oq=what+is+rendering&aqs=chrome..69i57j0i512i9.5979j0j15&sourceid=chrome&ie=UTF-8>  
[20.08.22]
3. 3D Modeler & Animator  
<https://www.animationcareerreview.com/articles/3d-modeler-career-profile> [09.09.22]
4. List of 3D Modeling Software  
[https://en.wikipedia.org/wiki/List\\_of\\_3D\\_modeling\\_software](https://en.wikipedia.org/wiki/List_of_3D_modeling_software)  
[09.09.22]
5. Furniture Model references  
<https://www.wayfair.com/>  
[20.06.22]
6. Reference animation video  
<https://www.youtube.com/watch?v=pUfaiPhOygA>  
[20.06.22]
7. Autodesk Max  
[Autodesk 3ds Max - Wikipedia](#)

[09.09.22]

8. V-Ray

[V-Ray - Wikipedia](#)

[09.09.22]

9. Forest Pack

[https://www.google.com/search?q=What+is+forest+pack?&source=lmns&bih=750&biw=1536&hl=en&sa=X&ved=2ahUKEwiQv6ed-If6AhUji9gFHa7lBWlQ\\_AUoAHoECAEQAA](https://www.google.com/search?q=What+is+forest+pack?&source=lmns&bih=750&biw=1536&hl=en&sa=X&ved=2ahUKEwiQv6ed-If6AhUji9gFHa7lBWlQ_AUoAHoECAEQAA)

[09.09.22]

10. Adobe Premier Pro

[https://en.wikipedia.org/wiki/Adobe\\_Premiere\\_Pro](https://en.wikipedia.org/wiki/Adobe_Premiere_Pro)

[09.09.22]

11. Wondershare Filmora

<https://www.computerhope.com/jargon/f/filmora.htm>

[09.09.22]

12. What is 3D

<https://www.cuemath.com/geometry/3d-shapes/>

[10.09.22]

