

Exploring Architectural Visualization Through AAVA 3D Internship

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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

Daffodil Smart City, Bangladesh

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APPROVAL

The Department of **Multimedia and Creative Technology** at **Daffodil International University** has accepted **Ayub Noman** project, “**Exploring Architectural Visualization Through AAVA 3D Internship**” as meeting the requirements for the **B.Sc.** in Multimedia and Creative Technology. The Project’s style and contents have also been approved. On **August 19th 2023**, the presentation was held.

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DECLARATION

Dr. Md. Samaun Hasan, Assistant Professor in the Department of Multimedia & Creative Technology (MCT) at Daffodil International University, supervised the completion of this study. I also affirm that neither this project nor any portion of this project has been submitted elsewhere to earn a degree or certificate.

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ABSTRACT

A professional learning opportunity termed an internship conveys students the chance to work on projects that are relevant to their studies or career interests. The probability to explore, evolve, and acquire new abilities through an internship is provided to the student. It provides companies with the chance to infuse their workplace with fresh ideas and vigor, to nurture talent, and perhaps even to create a reservoir of potential full-time workers. Throughout my internship, my capacity to be competent in the workplace has grown as a result of the numerous professional experiences I've gathered. I submitted an application for an internship with AAVA 3D, and I was chosen for a position in 3D architectural visualization. I've had the chance to collaborate with a number of 3D experts who are highly qualified and knowledgeable in this area. They assisted me in fusing my academic knowledge with actual professional experience. My internship started with a 3D furniture model, followed by interior visualization, animation, and 3D architecture visualization. All of these jobs offered me a sense of actual work and improved my job abilities, which I can apply in my future professional life.

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CHAPTER 1

Introduction of my Internship

1.1 What is an internship?

An opportunity to work for a company for a set length of time is known as an internship and is provided by employers to potential workers, also known as interns. Most internships span one to four months, and interns are typically undergraduate or graduate students. Internships tend to be offered part-time throughout the academic year and full-time during the holidays. Eight weeks are the typical length of a summer internship.

In exchange for the employer reaping the rewards of your labor, an internship ought to provide you with useful skills, experience, and improved industry knowledge.

Internships, which place a strong focus on training, give students practical job experience in the industries and fields they aspire to pursue.

This not only enables students to build essential professional contacts and decide whether the field they are exploring is suited for them, but it also serves as an indispensable foundation for them to secure employment and move up to the top of the career ladder.

1.2 Why are internships important?

The value of an internship lies in the opportunities and expertise that it can provide that you wouldn't otherwise have. By working closely with experts in the field, interns develop technical proficiency in the area of their choice. By doing so, you can practice any practical skills you may have gained in the classroom while also gaining valuable soft skills like time management, organization, adaptability, problem solving, and teamwork. For those who are new to the workforce or even those wishing to change careers, internships can be a fulfilling experience. Building your CV, learning about the industry, and getting a taste of what it's like to work in a particular job are all things that internships may do for you. A wise option to launch your professional career is with an internship, which often offers professional contacts and remuneration. In comparison to candidates who merely have relevant coursework, individuals with prior work experience have a substantially higher chance of being selected. You get the chance to learn about the sector and develop applicable skills during an internship, as well as to use those talents and business knowledge in the workplace. Real-world experience is incomparable for the majority of employers, even those who are quite skilled at employing recent graduates. In order to

fill their own full-time roles, companies also employ internships as a source of talent. An internship can serve as a training opportunity, a highly sophisticated interview, and (often) a clever technique to fill unfilled positions for employers. In conclusion, internships can assist you in determining your professional goals and subsequently make it simpler for you to obtain your first full-time position in the field. [1]

1.3 Name of the Organization?

“AAVA 3D” is the name of the organization I work for throughout my internship.

1.4 Introduction of the Organization?

AAVA 3D is more than just a teaching and research facility for 3D animation. It also offers mentorship and career counseling. Right now, AAVA3D is the finest option for any creative person looking to advance their career.

In Bangladesh, AAVA 3D was the first to offer instruction in 3D animation. Arif Ahmed, the company's founder and director, began working in the 3D animation industry in 1995. He has gained significant expertise in the creation of 3D animation and visual effects over the course of this considerable period of time. [2]

AAVA3D intends to contribute to creating a thriving Bangladesh and a knowledge society by creating a trained workforce in the multimedia industry. By offering high-quality goods, services, and training at reasonable costs, our objective is to attain 100% client satisfaction. Our long-term goal is to build a tech-based business solutions organization that can demand a 100% response from the niche it is targeting.

1.5 Describe my internship in detail?

I am, first and foremost, truly interested in working with 3D furniture modeling and 3D architectural visualization. Given that I am capable of performing these tasks, I was looking for a company that offers support for tasks similar to those described above so that I may intern there. The major goal of my internship is to hone my talents and land a good career in this relevant field, In Shaa Allah. Later, after submitting an application, I was chosen for a 3D architectural visualization internship at AAVA 3D.

Then the AAVA 3D organization handed me a PDF file for some furniture modeling, which had images of a bed, desktop table, reading table, wardrobe, dining table and chairs, sofa set, TV unit, and bookshelf. I also worked on texturing, interior visualization, and animation after 3D furniture modeling of all of them.

Subsequently, the AAVA 3D organization instructed me to create a full house design and interior visualization in addition to the earlier 3D furniture works. I'll also be placing some of my previous 3D furniture models into this house's interior. We in the 3D industry refer to the complete project as 3D Architectural Visualization. Since I am working on these subjects, my internship is in 3D architectural visualization.

AAVA 3D's CEO is the person I interned under. Twice per week, I would update him on the status of the work, and each week, he would offer me scrutiny.

1.6 Duration of my internship?

January to April 2023 is the time frame for my internship.

CHAPTER 2

Background Study

For the purpose of 3D furniture modeling, interior visualization, and animation, an extensive study was conducted. In order to produce the best results possible, the present market scenario has also been assessed in relation to the current 3D modeling specifications of product variables. In general, the corporation allocates items that require 3D modeling because doing so makes it much simpler to meet market requirements and produce superior products.

The customer's preferences have been taken into consideration when choosing the product's design, style, and functionality. The setting or environment of the place was additionally embellished in accordance with their needs. We visited several architecture studios to get a sense of how product modeling is most commonly used. A helpful way to identify industry gaps and provide clients a better knowledge of what is currently in demand and what actions could be taken was to watch the showreels. Websites of seasoned designers are consulted to produce better company visualizations. To finish the project, our teams have produced a thorough list or checklist that we can use. Furniture modeling was chosen to be done after product modeling. The architecture was thereafter thoroughly visualized from both the inside and the outside.

We discovered a lot of internet links from AAVA 3D that helped us organize how to work with the ark. It gives in-depth details on how colors are perceived, camera angle, illumination, and modeling a number of intermediate low polynomials.[3]

CHAPTER 3

Details of Software

3.1 SketchUp Pro

SketchUp is a 3D modeling software widely used in various industries, including architecture, interior design, engineering, and construction. It is known for its user-friendly interface and versatility, making it accessible to both professionals and beginners. With SketchUp, users can create, modify, and visualize 3D models of objects, buildings, landscapes, and more. The software provides a range of intuitive tools and features that allow users to create complex 3D geometries with ease. It employs a "push-pull" method, where 2D shapes can be extruded and transformed into 3D forms by simply pushing or pulling their faces and edges. SketchUp offers a diverse array of tools for drawing, editing, texturing, and organizing components in the 3D space. Users can apply various materials, textures, and colors to surfaces, simulate lighting and shadows, and generate accurate dimensions and measurements.[4]



Figure 3.1: SketchUp Pro Software

Additionally, SketchUp supports plugins and extensions that extend its functionality and allow users to customize their workflow. These plugins provide additional tools, import and export options for different file formats, and access to pre-built 3D models and libraries.

The software is available in both free and paid versions. SketchUp Free (formerly known as SketchUp Make) offers basic features and is suitable for casual users, while SketchUp Pro provides advanced capabilities, including the ability to create and edit dynamic components, export to CAD formats, and more. Overall, SketchUp is valued for its intuitive interface, powerful features, and wide range of applications. It is frequently used for architectural design, interior visualization, urban planning, product prototyping, and educational purposes.

3.2 Autodesk AutoCAD:

Autodesk AutoCAD is a computer-aided design (CAD) software application that is used to create and edit 2D and 3D drawings. It is one of the most popular CAD software applications in the world, and it is used by a wide range of industries, including architecture, engineering, construction, manufacturing, and product design. AutoCAD is a powerful tool that can be used to create accurate and detailed drawings. It is a valuable tool for anyone who needs to create or edit 2D or 3D drawings.



Figure 3.2: Autodesk AutoCAD Software

These are the several occupations that use AutoCAD:

Architects: AutoCAD is frequently used to produce floor plans and plans for residential and commercial structures. It also has integrated equipment that can detect and repair structural weaknesses in buildings. Interior designers: AutoCAD may also be used to redesign a building's interior. whether it is a living room in a house or a consumption area for a place to eat. Visual artists: Because AutoCAD's possibilities are so extensive, even artists utilize it to create experimental artwork such sculptures, wood carvings, engravings, and engravings. This program is used to draw an architectural visualization outline. where measurements can be simply added.[5]

3.3 V-ray:

In the world of computer graphics, V-Ray is a well-liked and frequently utilized rendering engine. It is a creation of the rendering and simulation software business Chaos Group. V-Ray simulates the behavior of light in a 3D environment to produce realistic and high-quality photographs.



Figure 3.3: V-ray Plugin

Numerous 3D modeling and animation programs, including Autodesk 3ds Max, Maya, SketchUp, Rhino, and others, are compatible with V-Ray. It acts as a plugin or extension that improves these applications' rendering skills. To model the behavior of light, shadows, reflections, refractions, and other visual phenomena, V-Ray makes use of cutting-edge algorithms and techniques. It produces photorealistic renderings by computing how light interacts with the scene's materials, surfaces, and objects. Particularly useful fields for this level of realism include architecture, product design, visual effects, and animation.[6]

3.4 Lumion:

With the aid of the real-time 3D rendering program Lumion, users may turn 3D models into photorealistic pictures, films, and 360-degree panoramas. The versatility and capacity to produce lifelike and immersive visualizations of Lumion are well known.



Figure 3.4: Lumion Software

Users may quickly and simply add flora, people, vehicles, and other items to their models because of the software's many features. A huge library of materials and textures is also provided by Lumion, which can be utilized to build environments that appear realistic. A variety of visualizations can be made using the robust and adaptable tool Lumion. Anyone who needs to generate realistic and eye-catching visualizations will find it to be a useful tool.[7]

3.5 Adobe Photoshop:

Adobe Photoshop is a raster graphics editor for Windows by Adobe Inc. Thomas, and John Knoll were the ones who initially created it in 1987. Since then, the software has become the most popular instrument for raster graphics manipulation in professional digital art. Photoshop can edit and compose raster images in multiple layers, and it supports masks, alpha compositing, and various color models. [8]



Figure 3.5: Adobe Photoshop Software

Photoshop's PSD and PSB file formats are utilized to facilitate these features. Photoshop cannot alter or render text, vector graphics, 3D graphics, or raster graphics.

3.6 Adobe Premiere Pro:

Adobe Premiere Pro is a video editing software program created by Adobe Inc. It is frequently used for making high-quality films by video editors, filmmakers, and content developers. Premiere Pro has a wide range of tools and functions for editing, organizing, and manipulating video and audio files.

You may import video footage, audio files, and other media assets into your project using Adobe Premiere Pro. [9]



Figure 3.6: Adobe Premiere Pro

You may organize and edit your clips, create transitions, apply visual effects, alter colors, and synchronize audio using the software's timeline-based interface. It works with material from a variety of sources and supports a broad range of video formats and resolutions.

3.7 Adobe Media Encoder:

Adobe Premiere Pro, Adobe After Effects, Adobe Media Encoder.as an encoding engine. We used media encoder to render our file from After Effects in a reduced file size and good quality.

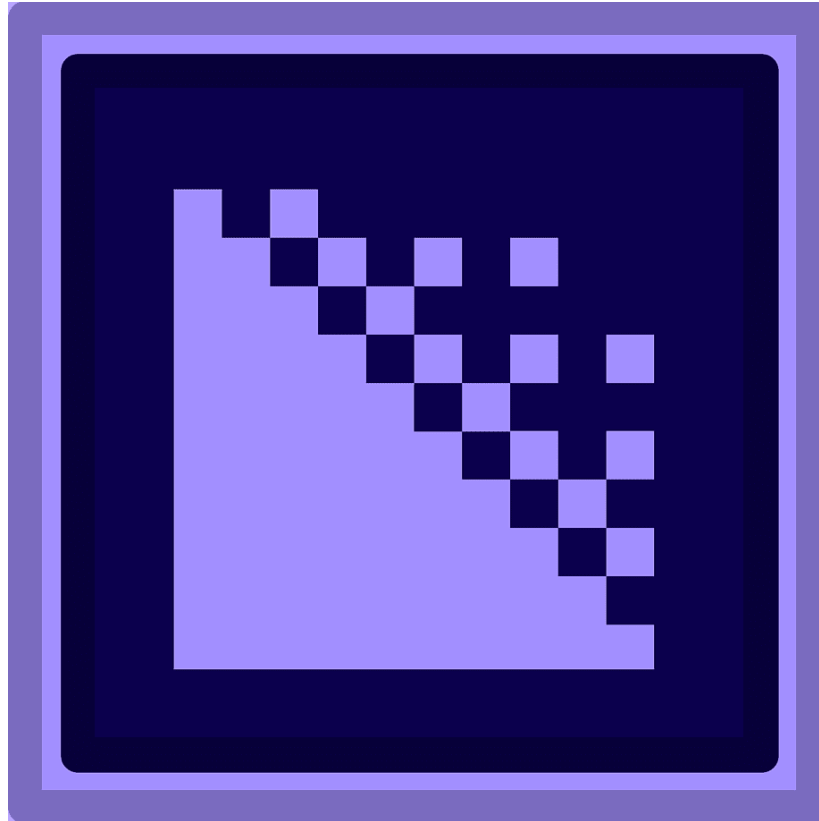


Figure 3.7: Adobe Media Encoder Software

CHAPTER 4

Project Workflow

3D Modeling

The process of generating a three-dimensional depiction of a surface or object involves the manipulation of polygons, edges, and vertices within a simulated three-dimensional environment, commonly referred to as 3D modeling. The outcomes of 3D modeling are observable in various forms of media, such as films, animations, and video games, that are replete with extraordinary and inventive beings and edifices. 3D modeling involves utilizing specialized 3D production software to manually create and manipulate polygonal surfaces or scan the real world. 3D modeling is prevalent across various disciplines, such as engineering, architecture, and interior and exterior design. The architecture software selected for this project is SketchUp Pro 2021. The present study employs standard primitives such as boxes and lines. Alterations have been implemented in this modeling methodology to generate more models. The editing process involves using various tools such as line, push/pull, offset, follow me, arc, bend, grid, and others. Maintaining square polygons is a crucial aspect to consider in the design of all models.[10]

4.1 Desktop Table

The model's name is Desktop Table. To create a table, first go to model info from window and set the unit setting. From the toolbar on the left side of the window, select the Rectangle tool and enter inches and feet. Push/Pull command must be clicked. To give the base of the table, I created a step by clicking on the Line tool and using Arc tool to measure the right and left sides of the table, move that area with the Push/Pull tool to create a section on the right side. Keep the CPU box. Create two drawers on the left side. Create the drawer doors with the rectangle tool. All the parts together form a desktop table. (Figure 4. 1.1).

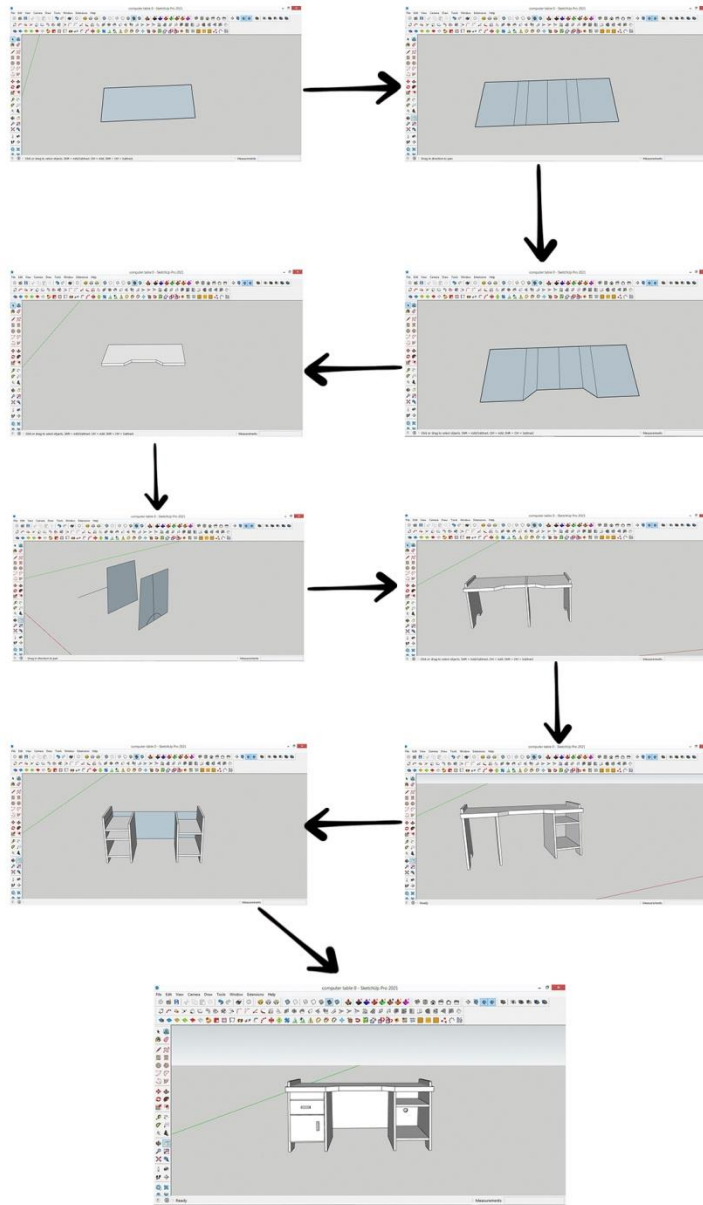


Figure 4. 1.1: Full step by step 3D Desktop table

3D Desktop table model has been created successfully (Figure 4.1.2)

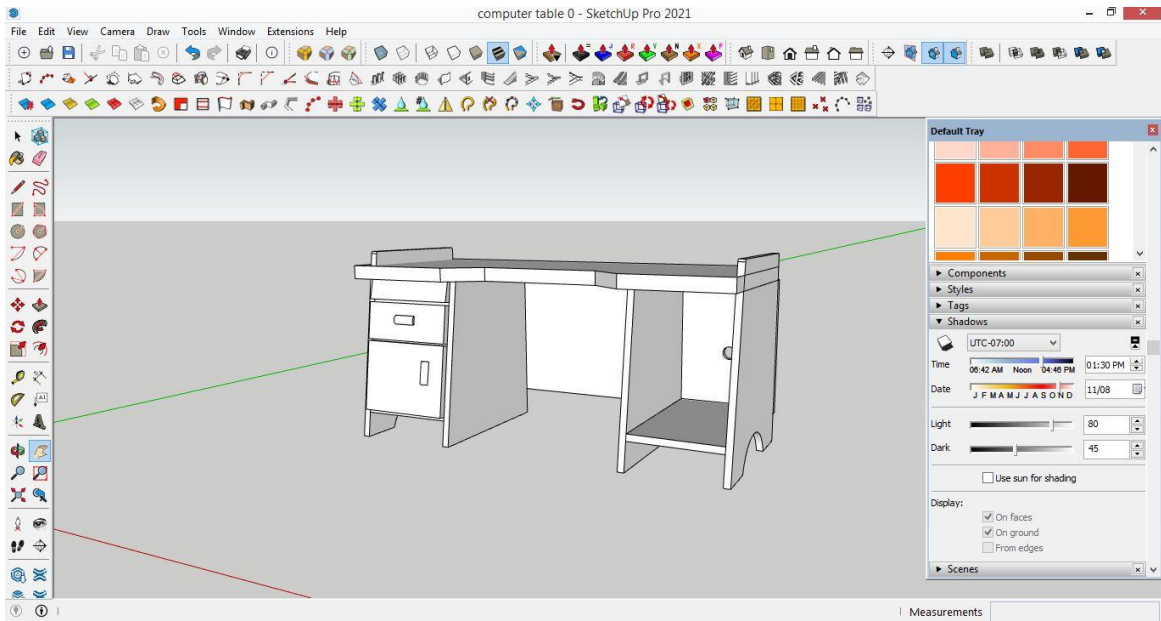


Figure 4.1.2: Complete 3D Desktop table model

Final 3D Desktop table model Rendering successfully (Figure 4.1.3)

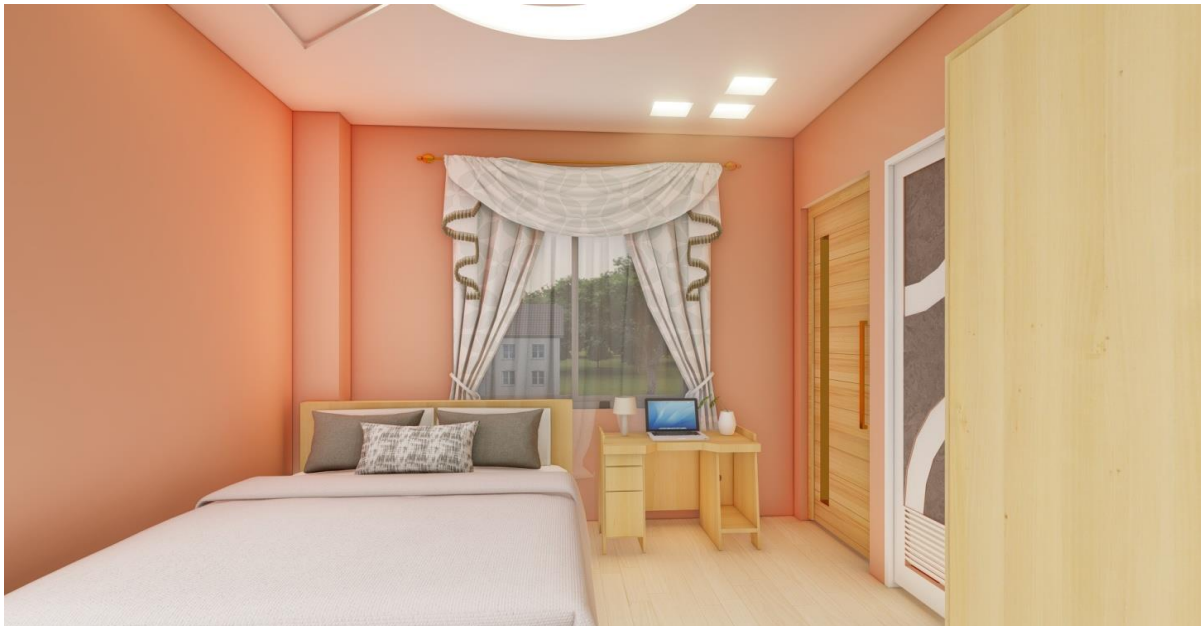


Figure 4.1.3: Final Interior Visualization image of 3D Desktop table Model

4.2 Reading Table:

I select the table first. Then go to Model Info from the window and fix the unit. Start working on the model through Line Tools. It is a modern Reading Table, to make it, we make a frame of one side of the Table with Rectangle Tools. Pull it up using the Push/Pull command. We make the upper part of the Table by using the Push/Pull command with the correct size with the Tape Measure Tool. Create the next part of the table using the same method. Using the Circle Tools, create the supporting part of the Pison of the Table. The model of a Reading table has been created successfully. (Figure 4.2.1)

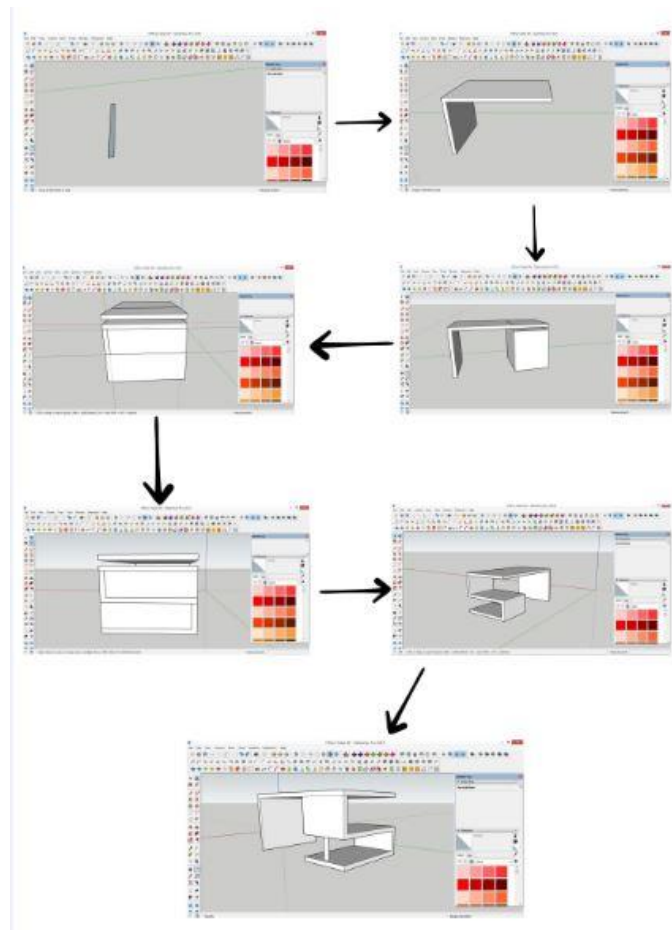


Figure 4.2.1: Full step by step Reading table Modeling Image

3D reading table model has been successfully produced. (Figure 4.2.2)

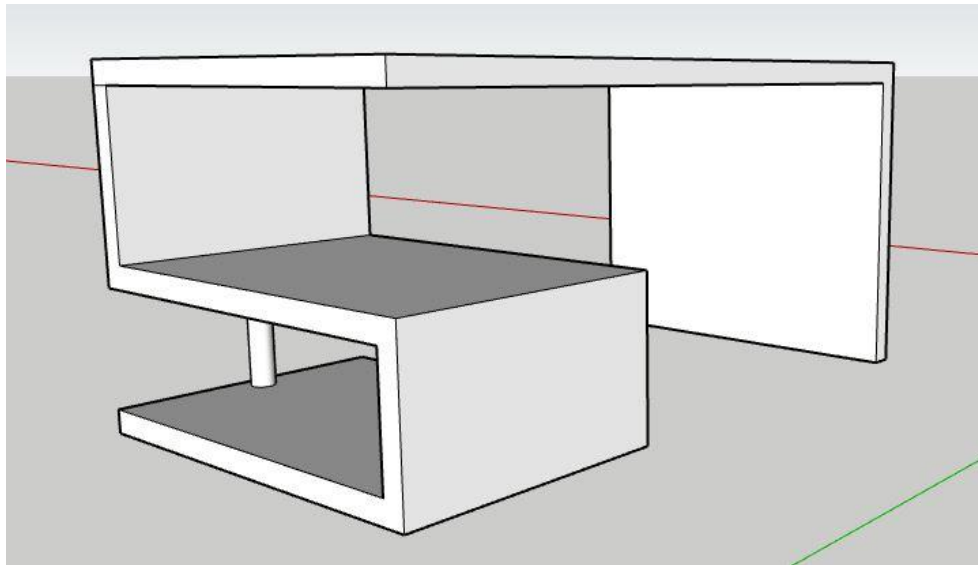


Figure 4.2.2: Complete Reading table Model Image

Model of the final 3D Reading Table The rendering was successful. (Figure 4.2.3)

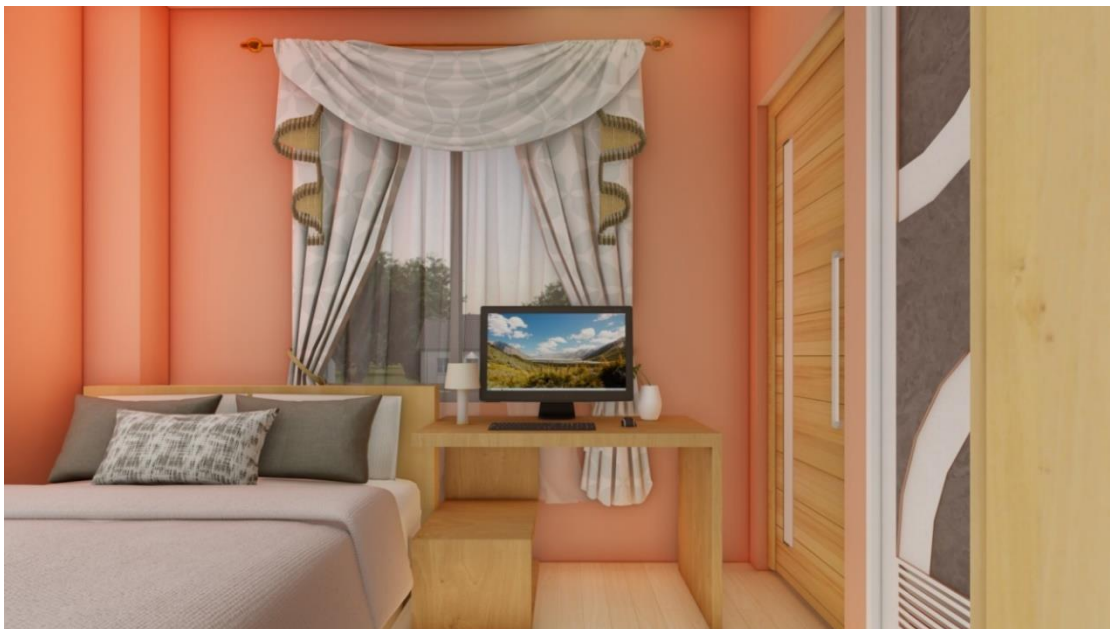


Figure 4.2.3: Final Interior Visualization image of 3D Desktop table Model

4.3 TV Shelving:

Go to Model Info from the window and set the unit. Start modeling with Rectangle Tools. Use Push/Pull command to create main part of Tv Shelving. Make the shelf and cabinet of the lower part of the Tv Shelving with the correct size using the Tap Measure Tool. Let's make a big and small shelf on top. Let's make Tv Shelving by putting all the parts together (Figure 4.3.1)

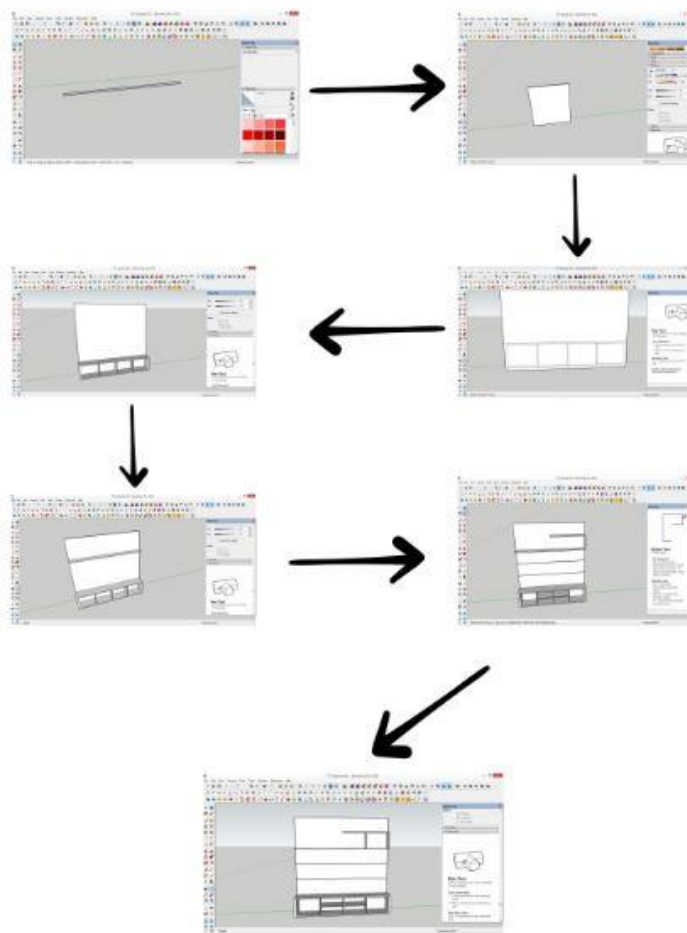


Figure 4.3.1: Full step by step Tv Shelving Modeling Image

The 3D TV Shelving model has been developed successfully (Figure 4.3.2)

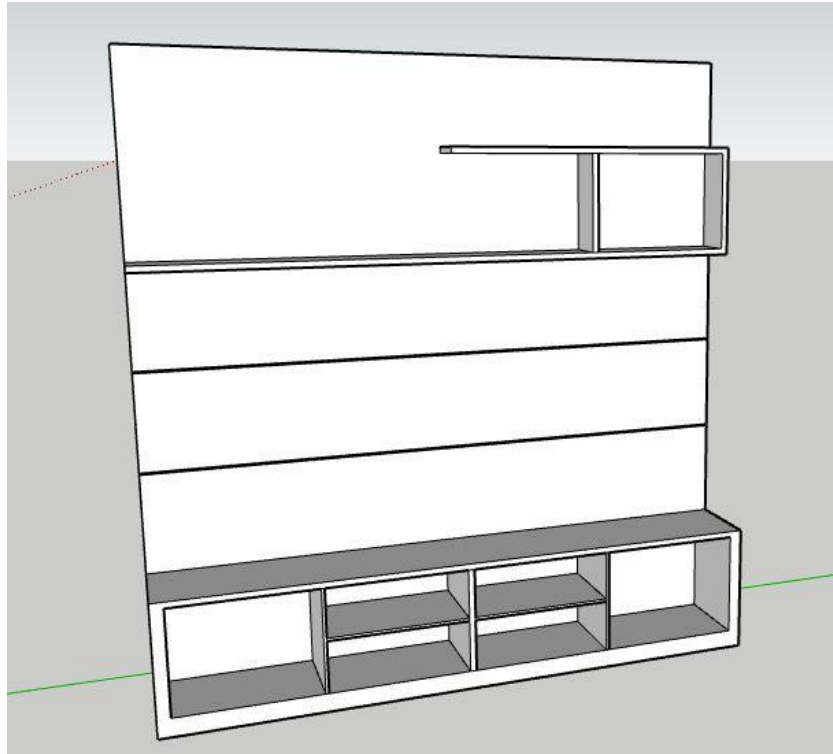


Figure 4.3.2: Complete Tv Shelving Model Image

Model of the finished 3D TV Shelving The rendering was completed successfully (Figure 4.3.3)



Figure 4.3.3: Final Interior Visualization image of 3D Tv Shelving Model

4.4 Wardrobe:

First create a frame using the Rectangle Tool to create a three-part window. Create a three-part window above. Create a Hanger using a Circle Tool to hang clothes. Make three drawers in the middle of the master part and make a box of four parts in the lower part of the left pass. Make three separate doors in front of the wardrobe. Make a long handle to open the door. Put all the pieces together to make a wardrobe (Figure 4.4.1)

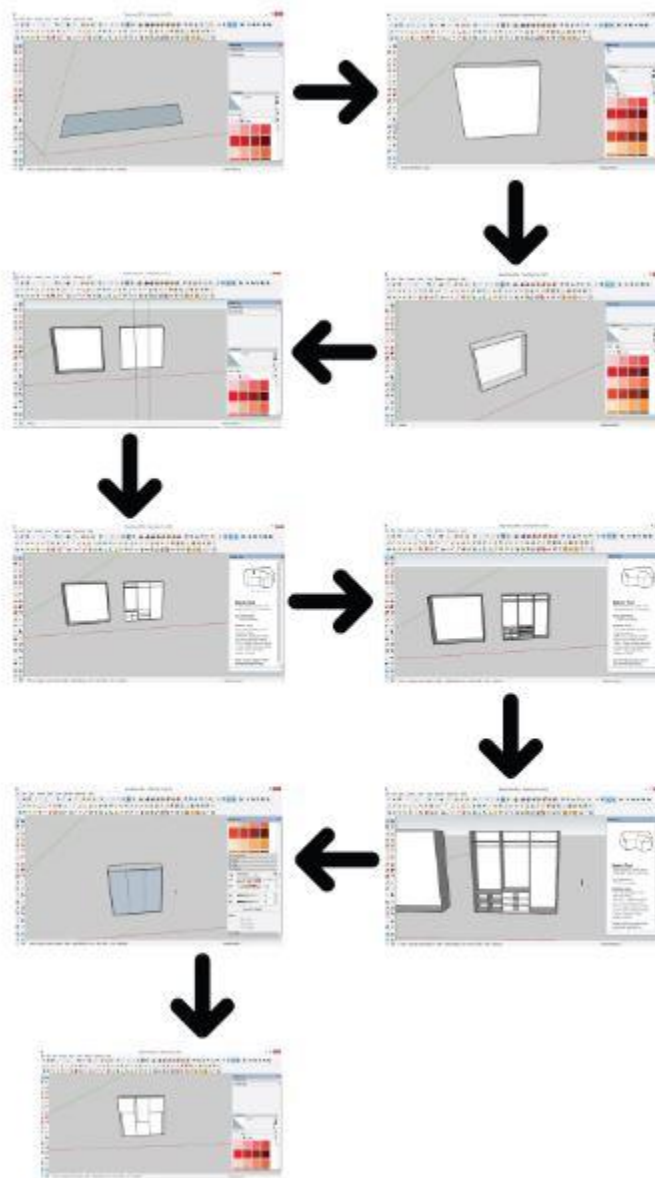


Figure 4.4.1: Full step by step Wardrobe Modeling Image

Eventually, the 3D Wardrobe Model has been created (Figure 4.4.2)

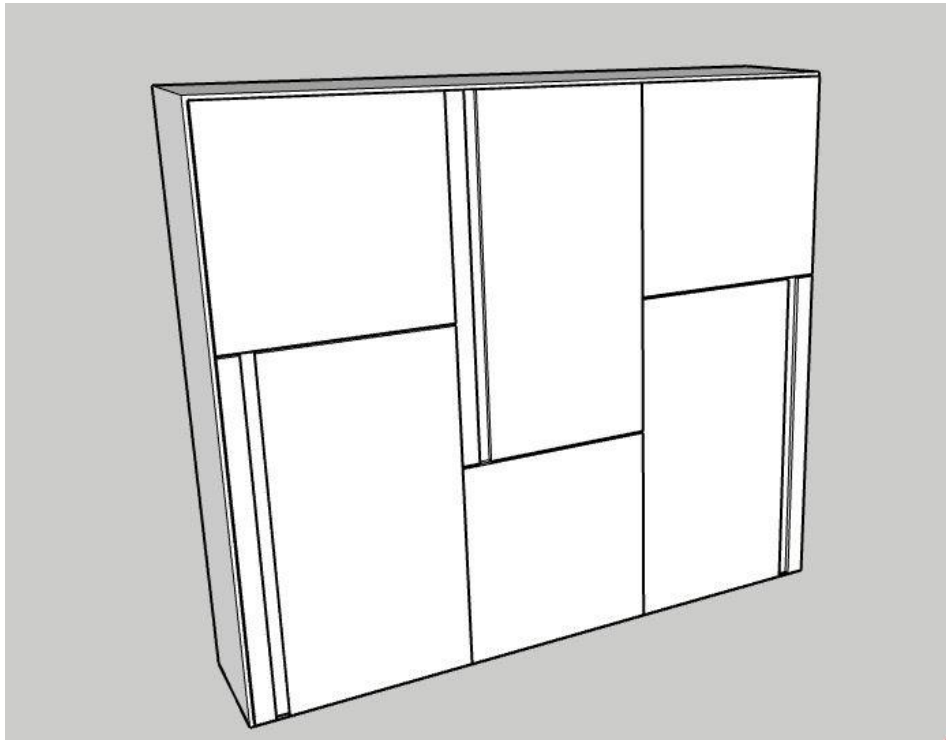


Figure 4.4.2: Complete 3D Wardrobe Model Image

Model of the final 3D Wardrobe The rendering was completed successfully. (Figure 4.4.3)



Figure 4.4.3: Final Interior Visualization image of 3D Desktop table Model

4.5 Shelf:

To create Shelf, first take Rectangle Tool, and according to the size of Shelf, drag and give its size, click Push/Pull Tool and give its Depth. Using Tape Measure Tool, draw two lines in between with Line Tool. Click and take out a part from the middle corner. Take out another part on the right side. Click the Rectangle Tool and add a shelf. Make a Book Shelf model with the parts.

A 3D model of a desktop table has been finished at long last. (Figure 4.5.1)

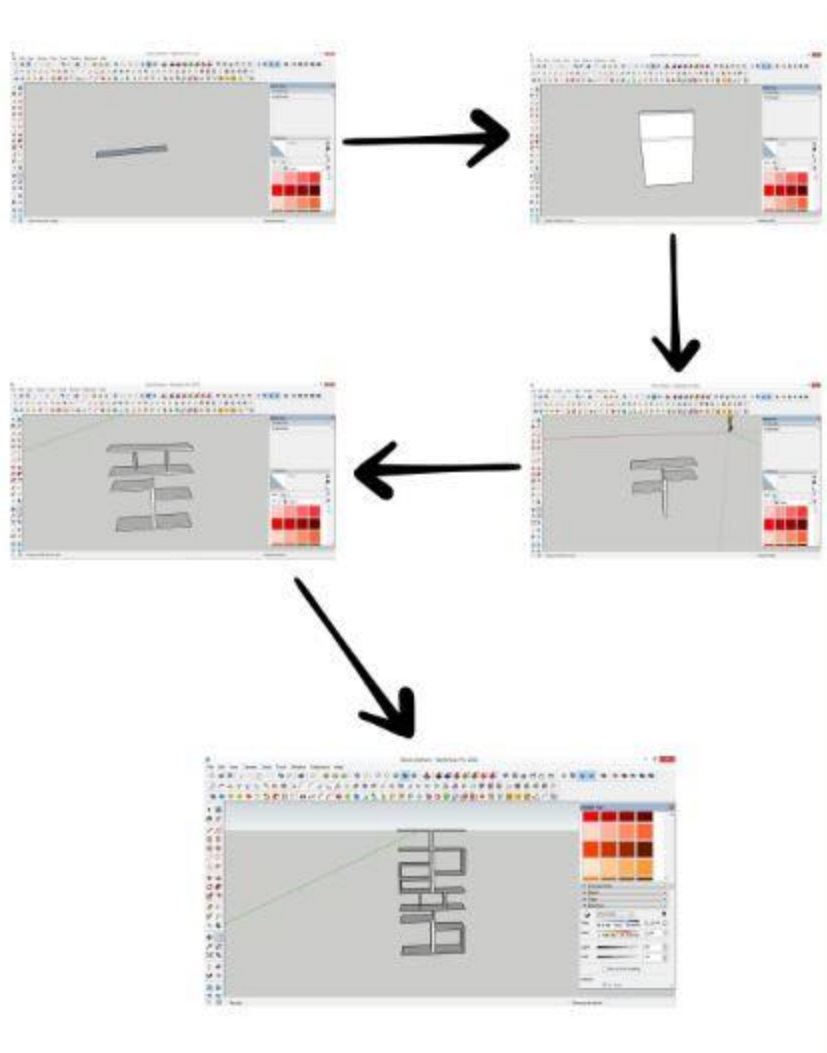


Figure 4.5.1: Full step by step Shelf Modeling Image

A 3D shelf model was successfully produced (Figure 4.5.2)

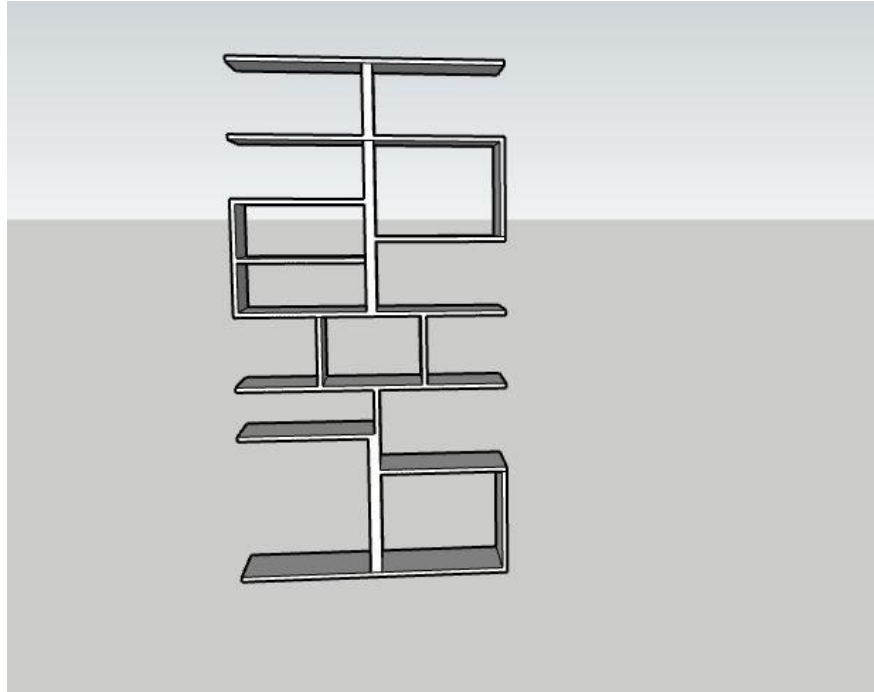


Figure 4.5.2: Complete 3D Shelf Model Image

The ultimate Shelf Model The rendering was completed successfully (Figure 4.5.3)



Figure 4.5.3: Final Interior Visualization image of 3D Shelf Model

4.6 Bed:

The name of the model is Bed. First, I made 2 poles of Bed with Rectangle tool to make Bed. Then I made 2 poles of the other side in the same way. Using the Rectangle and the Push/Pull tool, I created a two-pass structure. Using the same tool, I made a strong partition in the middle. Make a bed by putting all the parts together. (Figure 4.6.1)

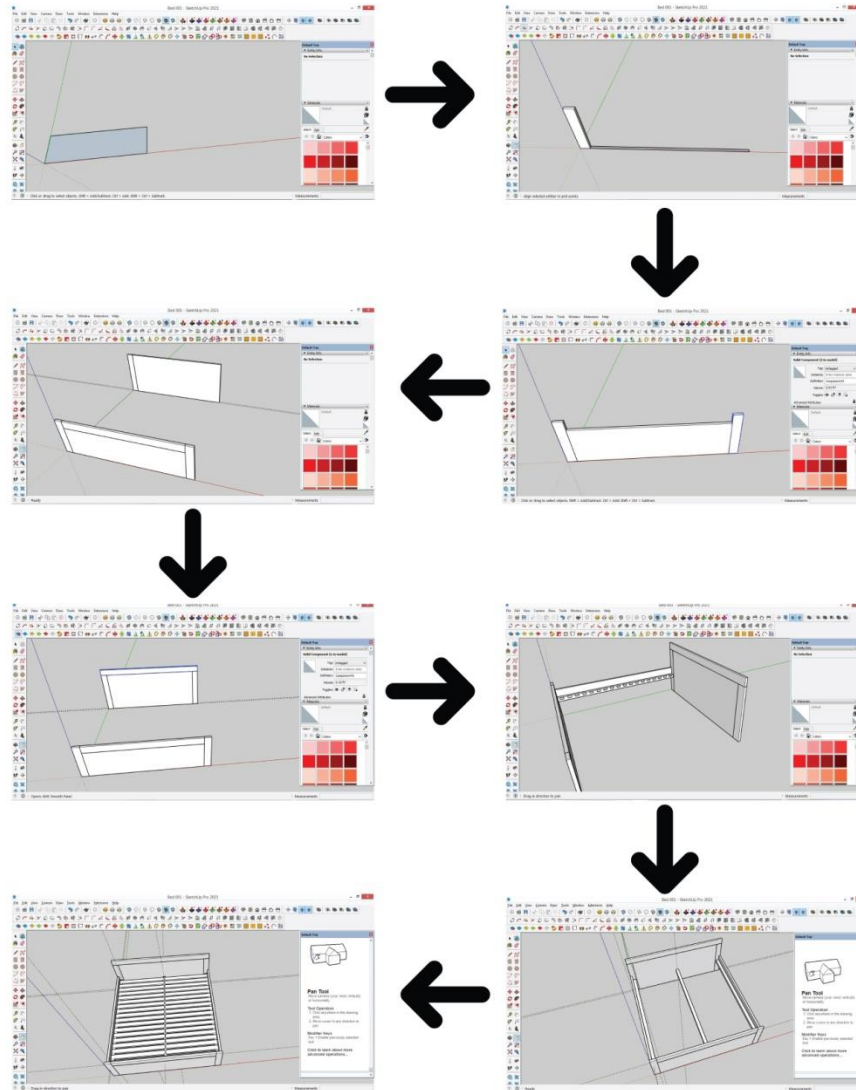


Figure 4.6.1: Full step by step Bed Modeling Image

A 3D model of a bed has been created and the process is finally finished. (Figure 4.6.2)

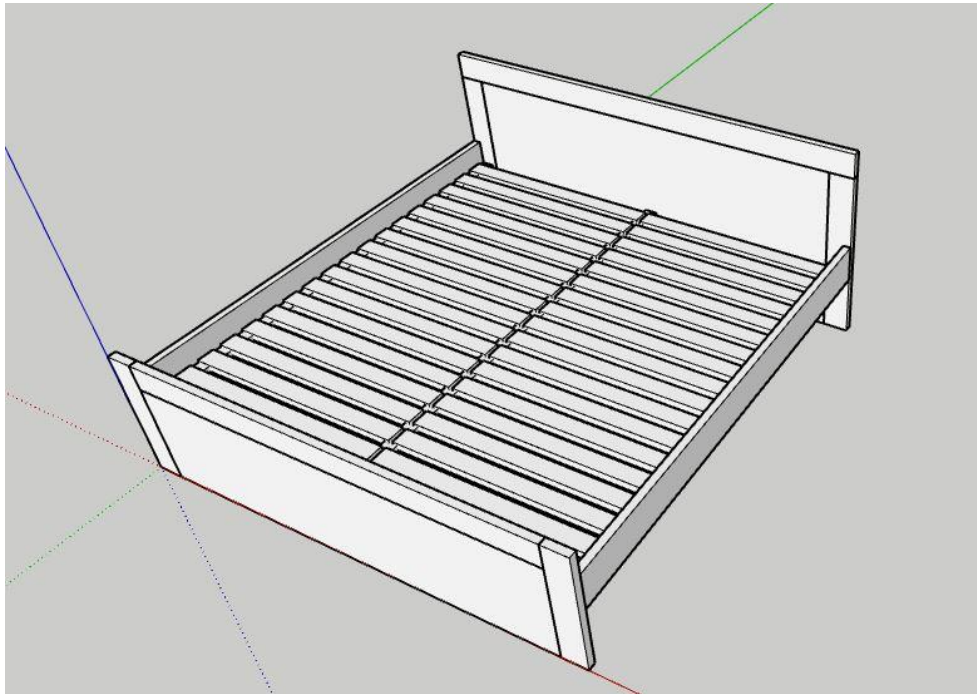


Figure 4.6.2: Complete 3D Bed model Image

The best bed model the rendering was successfully completed. (Figure 4.6.3)



Figure 4.6.3: Final Interior Visualization image of 3D Bed Model

4.7 3D Architectural Visualization workflow:

My first step in the internship was to model furniture from reference photos and create visuals for interiors. I have completed the first step tasks well. Later in the internship I was given a hand drawn floor plan for the building in a notebook and I was told to look at this hand drawn floor plan and create the CAD file as per his instructions to design in AutoCAD software. After showing the cad file he approved the file. Then I was told to create a 3D model of the building using Sketch Up Pro software by looking at the floor plan of the CAD file. Then I make the model of the building by looking at the floor plan that way. Basically, after this building, I make some designs to enhance the beauty of the exterior and then select one design from those designs and finally I work on that design. Then I do texture and lighting on the inside and outside of the building model. After the completion of the building, I was asked to complete the architectural visualization by putting the furniture models that I had previously done into the interior of the building. How I did it step by step is explained below:

I received a hand-drawn notebook with the building's ground floor layout. (Figure 4.7.1)

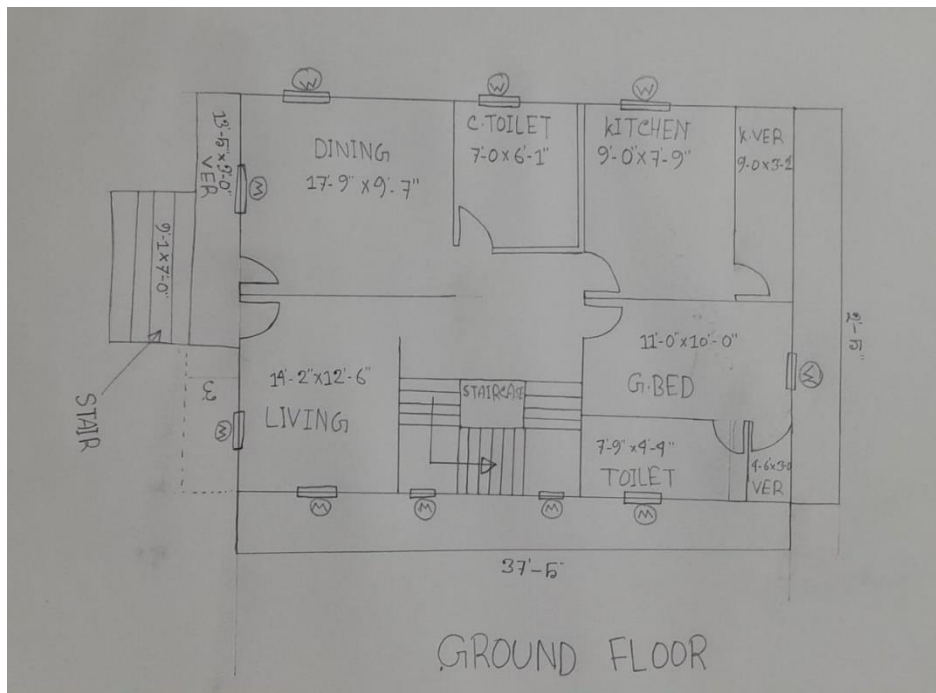


Figure 4.7.1: Hand drawn Ground floor plan

I was given a hand drawn First floor plan for the building in a notebook (Figure 4.7.2)

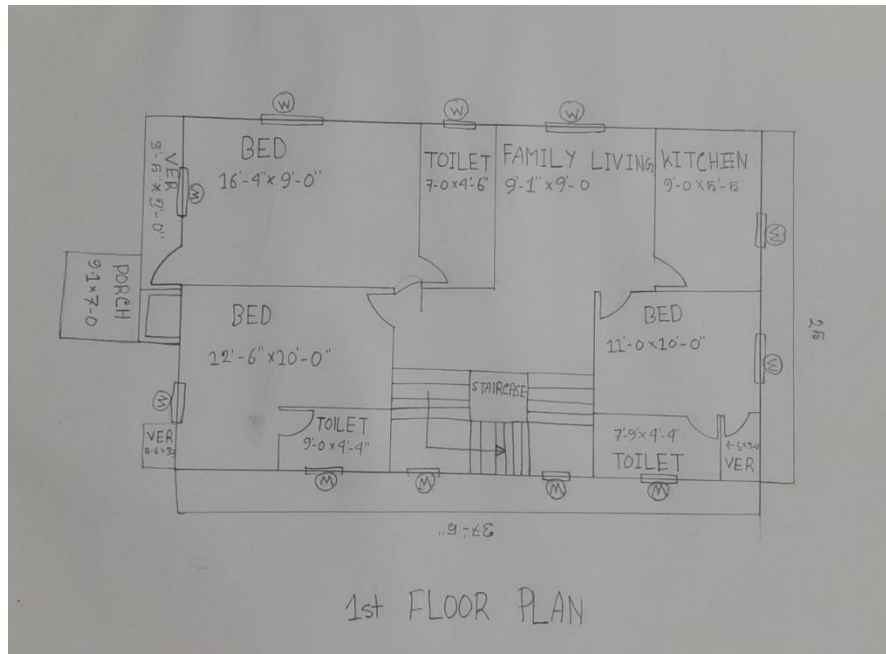


Figure 4.7.2: Hand drawn First floor plan

I was given a hand drawn Rooftop plan for the building in a notebook. (Figure 4.7.3)

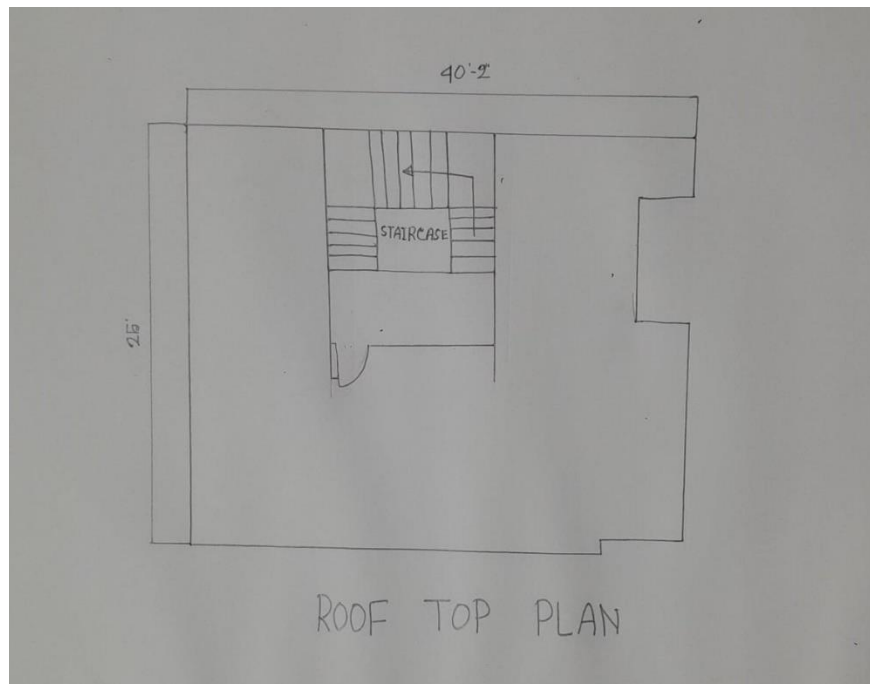


Figure 4.7.3: Hand drawn Rooftop plan

I was told to look at this hand drawn floor plan and create the CAD file as per his instructions to design in AutoCAD software. Then, I created the Ground floor plan (Figure 4.7.4) and add dimensions to it (Figure 4.7.5)



Figure 4.7.4: Create Ground floor plan in AutoCAD Software

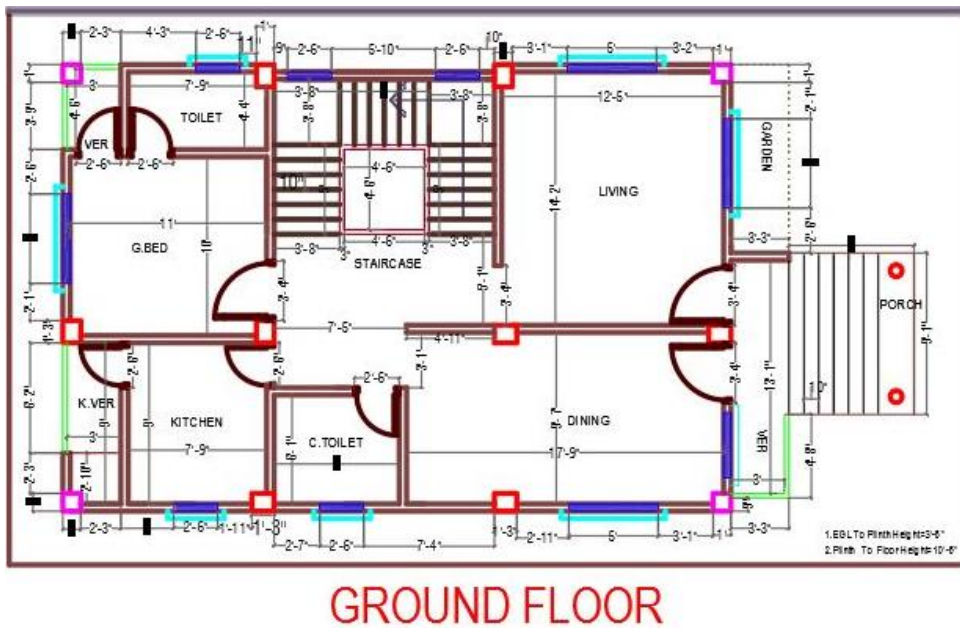


Figure 4.7.5: Create Ground floor plan with Dimensions in AutoCAD

I was told to look at this hand drawn floor plan and create the CAD file as per his instructions to design in AutoCAD software. Then, I created the First-floor plan (Figure 4.7.6) and add dimensions to it (Figure 4.7.7)

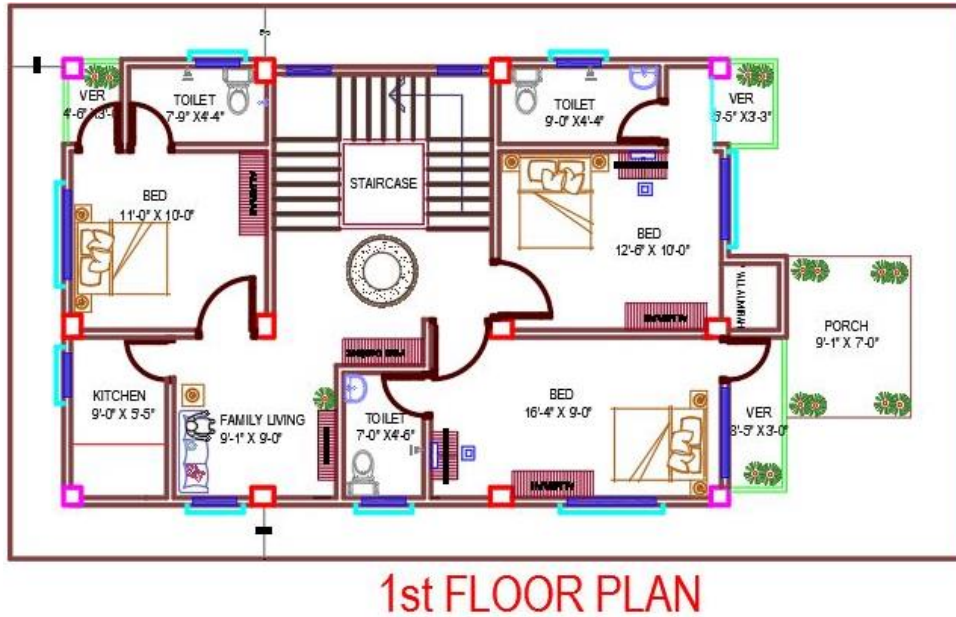


Figure 4.7.6: Create First floor plan in AutoCAD Software

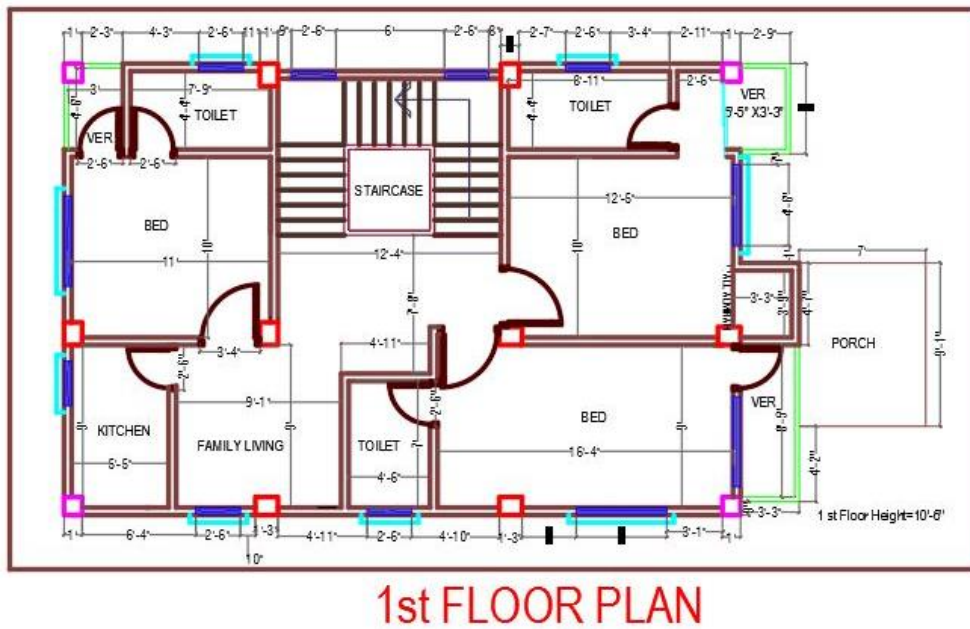
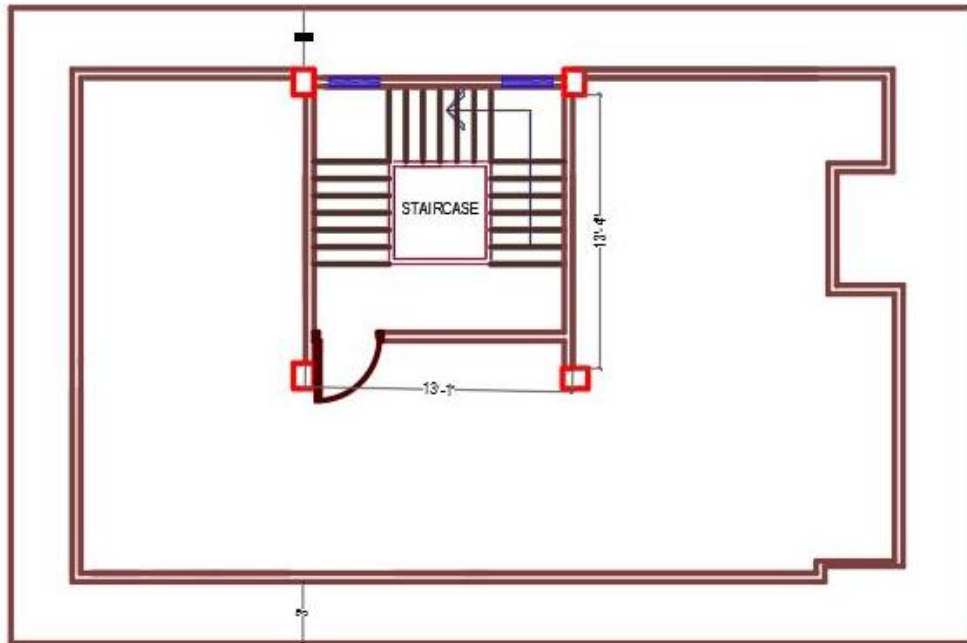


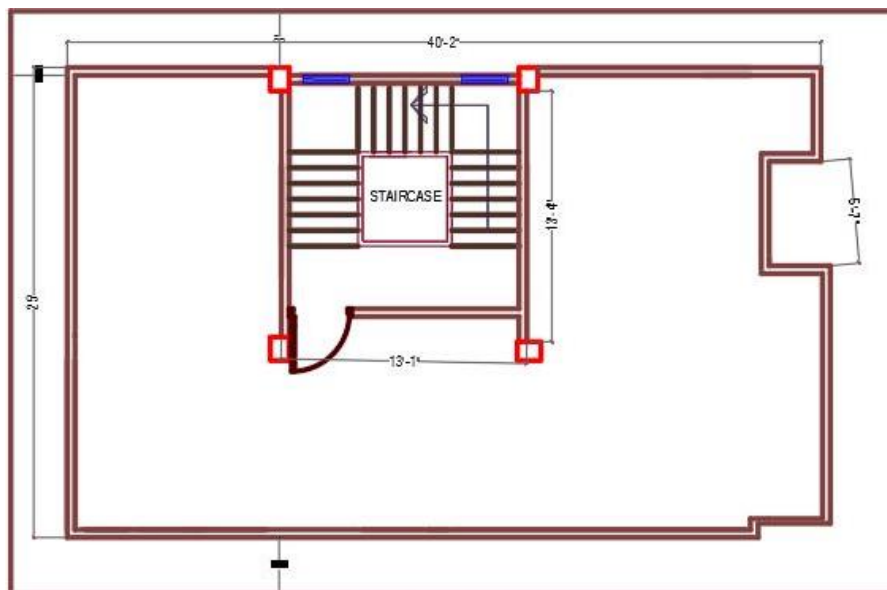
Figure 4.7.7: Create First floor plan with Dimensions in AutoCAD

I was told to look at this hand drawn floor plan and create the CAD file as per his instructions to design in AutoCAD software. Then, I created the Rooftop plan (Figure 4.7.8) and add dimensions to it (Figure 4.7.9)



ROOF TOP PLAN

Figure 4.7.8: Create Rooftop plan in AutoCAD Software



ROOF TOP PLAN

Figure 4.7.9: Create Rooftop plan with Dimensions in AutoCAD

First, I ran the SketchUp software. I went to the file menu and picked the AutoCAD file to import in SketchUp. (Figure 4.7.10)

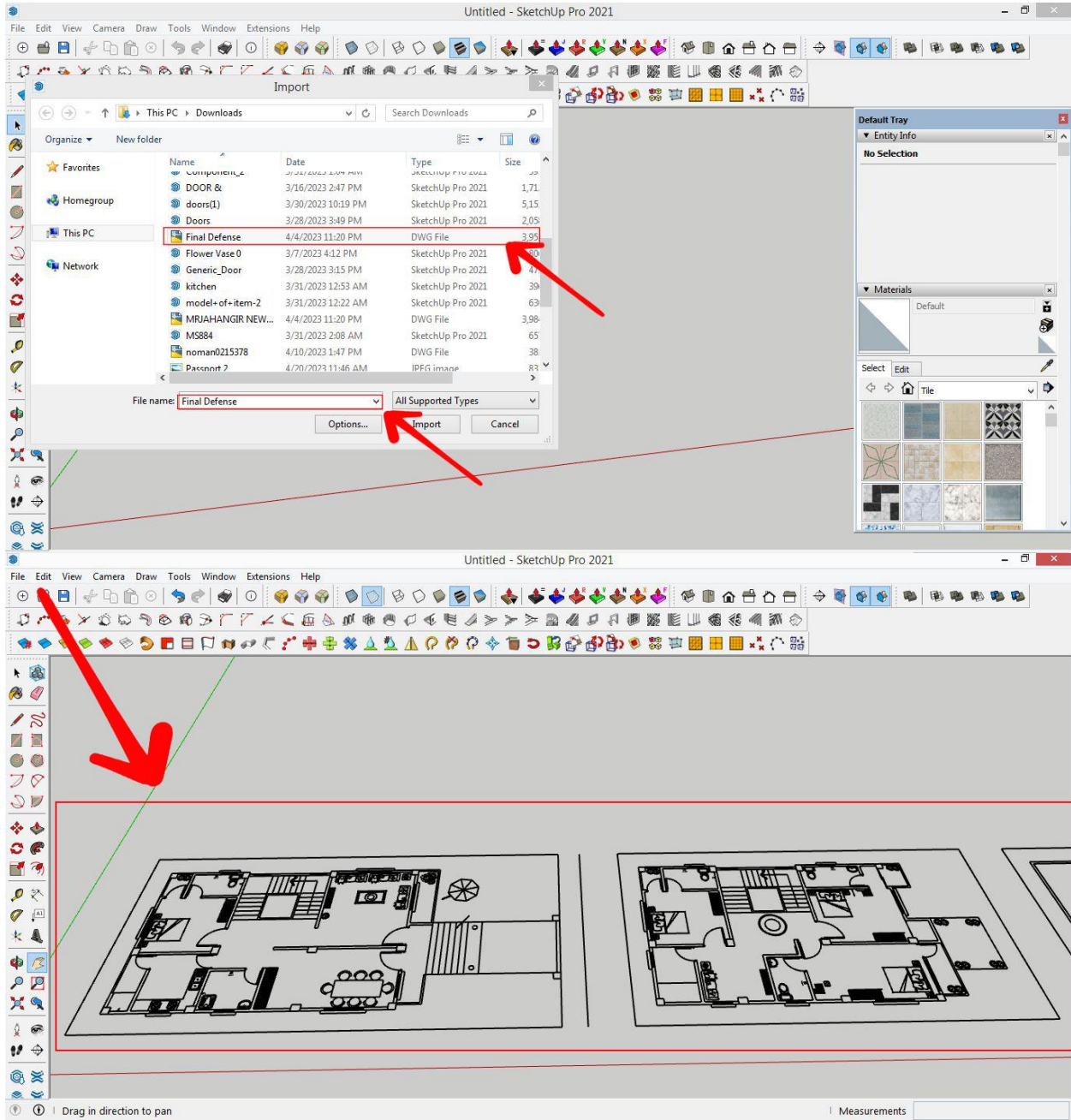


Figure 4.7.10: Open AutoCAD file in SketchUp

After importing, move about the workspace to get a sense of the layout of the imported CAD drawing. Choose the Line tool. Trace the contour of each wall in the floor design, vertically elevating the lines to generate wall height. Extrude the lines upward to the required wall height using the Push/Pull tool. To make outlines for doors and windows, use the Rectangle tool. To indicate the thickness of doors and windows, extrude the outlines with the "Push/Pull" tool. Select and lift floor plan pieces such as furniture, fixtures, or other things. Lift and arrange these pieces at their proper heights using the "Move" tool. To find and import 3D models of furniture and fittings, utilize the "3D Warehouse" tool. Place them in the 3D floor layout where they belong. (Figure 4.7.11)

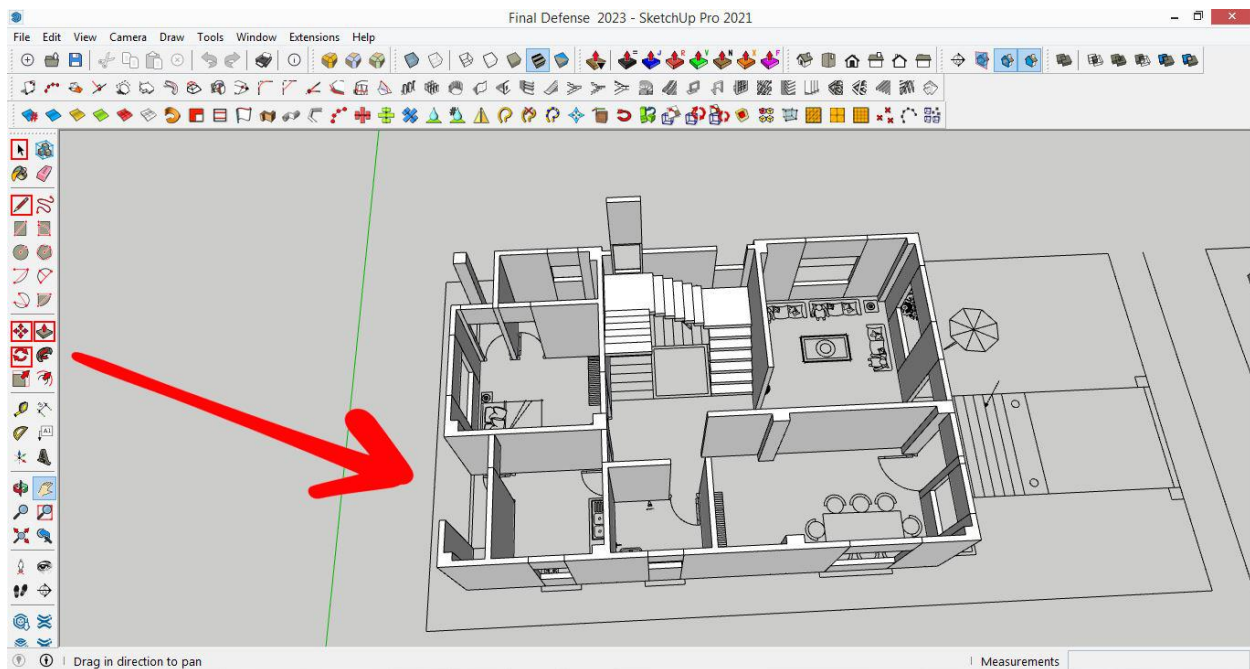


Figure 4.7.11: Create 3D Floor plan in SketchUp

Lumion, create a new project by selecting "New Project" or "Start New Project". In Lumion's project interface, look for the "Import" or "Import Model" button/icon. Browse your computer for the SketchUp file you want to import. Select the file and click "Open" to start the import process. After the import, your SketchUp model will appear in the Lumion workspace. Use Lumion's navigation tools to position the model where you want it in the scene. Adjust the model's scale as needed to fit the scene appropriately. Lumion has its own material and object library. You can apply materials and add objects directly within Lumion to enhance your model's appearance. Browse the Lumion library for materials like grass, water, concrete, etc., and apply them to your model's surfaces. Use Lumion's built-in tools to adjust the lighting conditions, time of day, and weather effects to achieve the desired ambiance. Experiment with different settings to create the atmosphere you envision. (Figure 4.7.12)

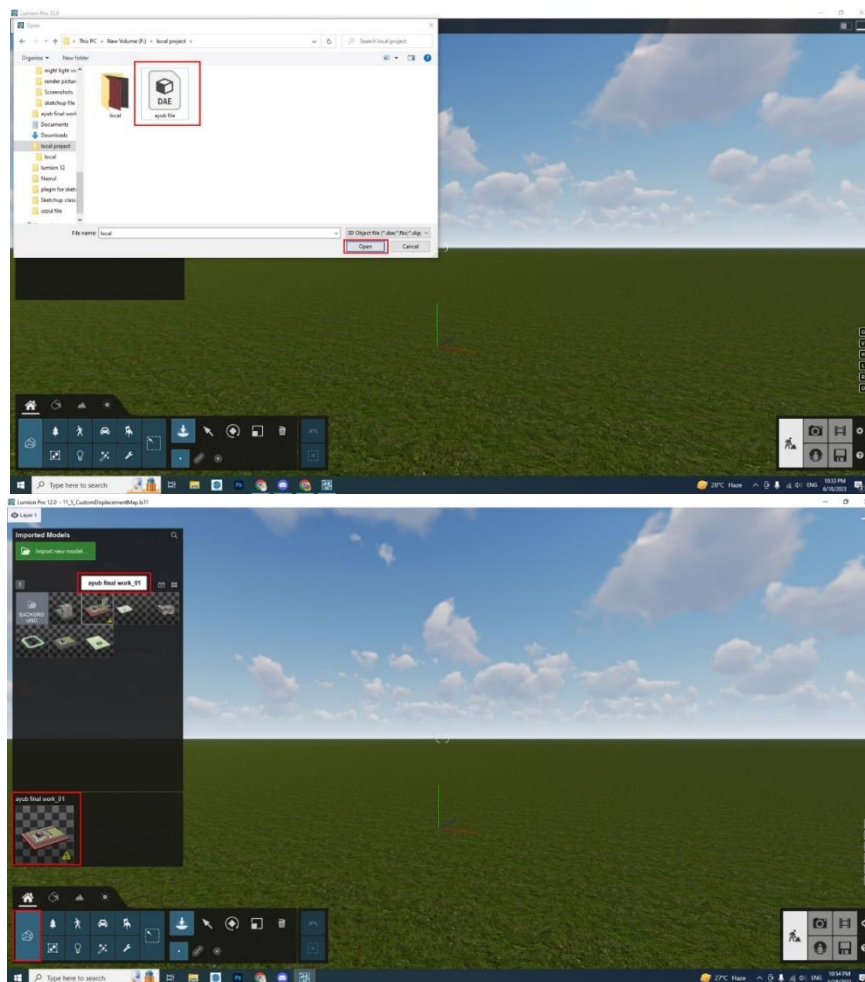


Figure 4.7.12: Open SketchUp file in Lumion

Using the floor layout, I developed a 3D model of the home in Sketch Up and Lumion (Figure 4.7.13)



Figure 4.7.13: complete Exterior Designs in Sketchup and Lumion

CHAPTER 5

Discussion of my internship

Making 3D models was one of my first assignments during my internship. I learned a lot while making those models and made quite a few mistakes. But before starting to build the model, I had to make a plan by studying the reference images since I had to decide step-by-step which component to begin first. This is as a result of some models' lengthy development. I spent a lot of time repairing my errors while modeling because I made so many. Additionally, texturing each model had to be done precisely in accordance with the reference image I was given, which added time to the process. Due to some of the reference photographs' lack of clarity, modeling was a little tricky and challenging. SketchUp Pro is a robust and sophisticated piece of software, and occasionally, multiple model files make it hefty. And the reason I can say this is because I have also had similar experiences that have resulted in tons of work files and lost time. Every week, I delivered an update on my work to my intern, and my employer offered me feedback after reviewing the project. I met the boss I interned under frequently throughout my internship. He gave me a thorough explanation of the assignments, and I completed them as he instructed. He offered favorable feedback and expressed satisfaction with my work.

CHAPTER 6

Conclusion

I had the chance to work with many people and gain knowledge from them thanks to my internship in 3D architectural visualization. Through this internship, I was able to learn how to create 3D models more quickly and more attractively by researching a variety of 3D applications. I also gained new knowledge about high-quality 3D modeling, texturing, and rendering techniques as a result of these experiences. All of the staff members in this place were courteous to me. I also acquired practical experience from them managing a sizable project for a sizable client and learned how to collaborate with other businesses. Along with managing and saving time while developing 3D models, I also learned how to interact with my colleagues. Even though my internship was filled with obstacles and problems, I feel as though I overcame them by the time it was through, and I can now firmly state that, In Shaa Allah, I am capable of drawing out a floor plan for any home and turning it into a 3D depiction. Our nation is still unfamiliar with the idea of 3D modeling, but thanks to organizations like AAVA 3D, it is starting to get more and more traction these days. I'm thrilled to be a part of such a company and hope to earn their satisfaction by doing my internship assignments correctly.

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