Final Project-Documentation

National Autonomous University of Mexico

Computer Engineer

Ninth Semester

Members:
Amaro Cantoral Edgar

Account Number:
316625368

Subject: Computer Graphics and Human Interaction

Group: 5
Delivery date: 10/01/23

Index

Introduction

For the final project called Computer Graphics and Human Interaction it was considered to create an original house model from modeling software called 3DS MAX. This model consists on a small house with many facades, either posterior and superior that will contain a lot of articles belonging to a house. Unlike the house many of these models will be downloaded on TurboSquid's Site WEB and give credits to the author who realized those models. All these models for the house will have other different textures, for example, primary and secondary colors given that the implemented shaders in this code from the subject of Computer Graphics Laboratory given by the professor Sergio Valencia does not support complex textures as brick and cloth.

Mentioned above, both the code that was used to carry out computer graphics laboratory practices and some implemented models such as the Lamborghini car for animation will be reused. All the models used in this project will be worked with the 3DS Max modeling software to modify their textures and, just in case, their size. The design for the house is as follows:

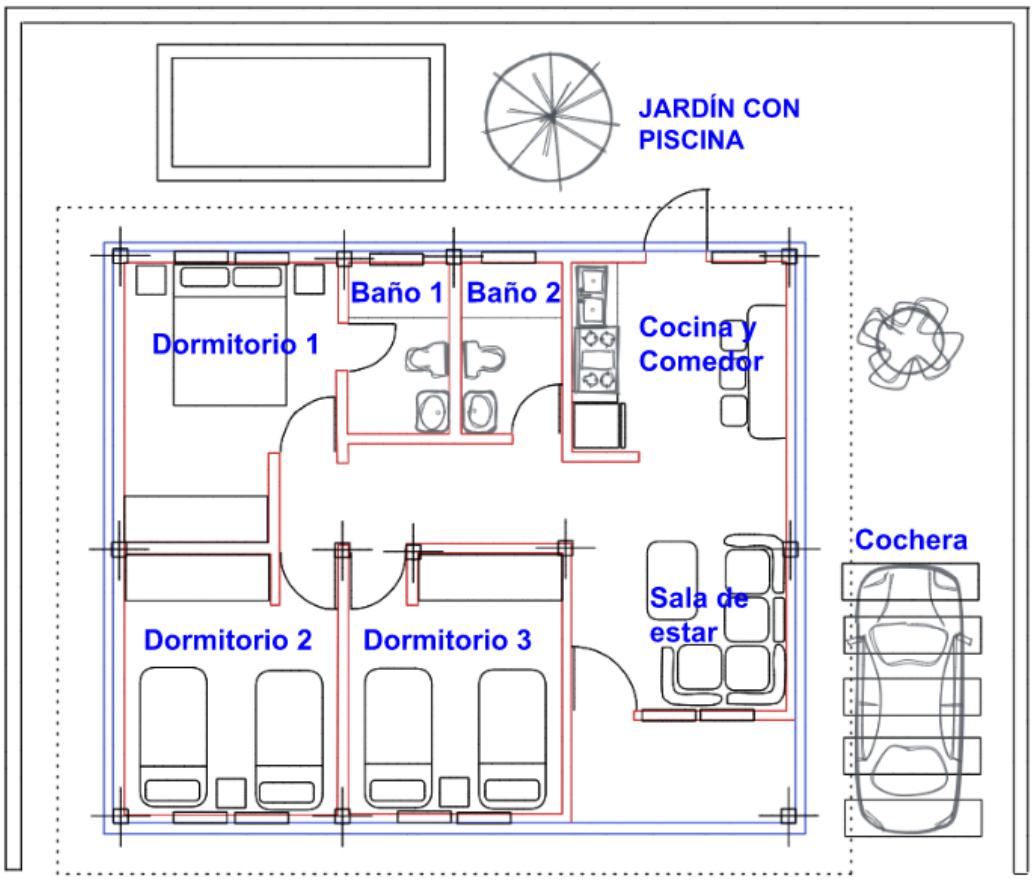


Figure 1.0 House plan

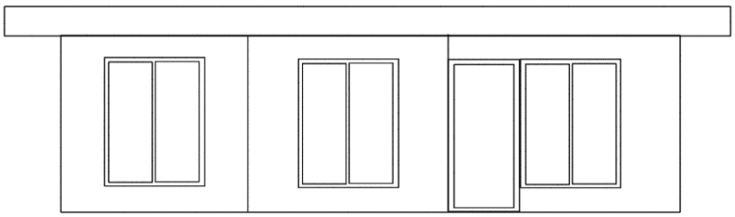


Figure 2.0 Principal Facade

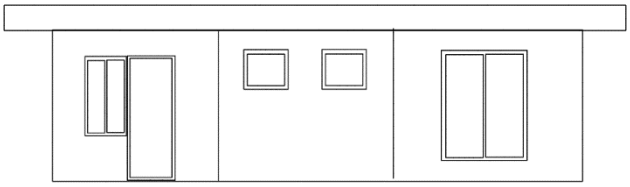


Figure 3.0 Posterior Facade

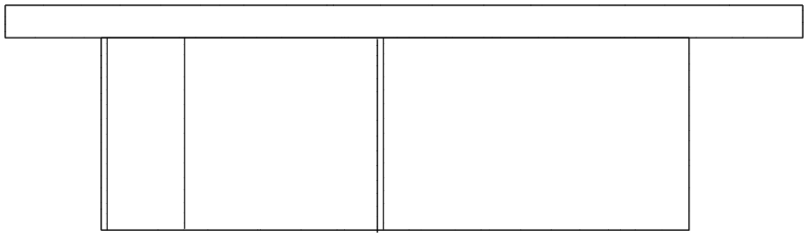


Figure 4.0 Right Side Facade

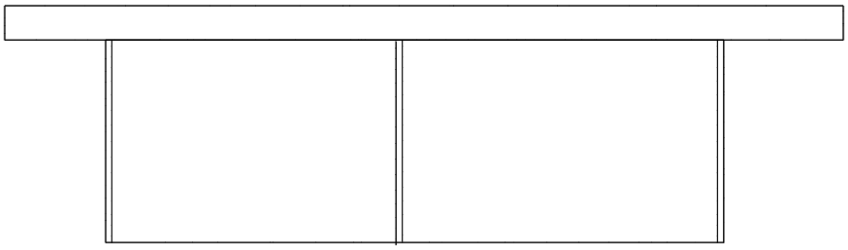


Figure 5.0 Left Side Facade

Upon entering the house there will be the living room, which consists of a sofa and a coffee table. Later we will have the kitchen, which includes a counter embedded in the wall that will function as a daily dining room for the house. In this space, in addition to

the counter, we will have a refrigerator, stove, sink, and chairs. In addition, this kitchen will have a rear exit with which you can access the garden with pool.

The rest of the house are rooms connected by a main corridor. We will have a bedroom in the suite, that is, it has its own bathroom, so the other bathroom will be for general use for the entire house. The other two bedrooms are shared and there will be two beds in each one, in addition to each bedroom having its own closet.

The bathrooms are complete and each one has a sink, toilet, and shower.

Objective

The student will apply all the knowledge acquired in the theory subject called Computer Graphics and Human Interaction through a final project in which he will show an original model of a house created using 3D Max with its properties such as rooms and kitchen together with various objects imported from a page of free 3D models such as sink, sofa, laptop, and desk.

Requirements

1. Integrate synthetic camera
2. It must contain 4 animations
3. The documentation of the project must include reference photos for the modelling house along with 5 elements to do in each room according to a space, whether real or fictitious.
4. The following should be included:
    a. Gantt's Diagram
    b. User Manual: Objectives and interaction of the project are proposed.
    c. Technical Manual
5. Documentation made in both Spanish and English without using 100% Google translator since points are subtracted for the qualification.
6. Carry out a cost analysis of the project (You must include how much it costs you and how much you sell it, arguing said costs and prices).
7. Delivery of documentation made in digital format.
8. An executable file must be delivered (Executable, not the one located in the Debug folder).
9. The realism of the space will be evaluated.
10. The project must be in GitHub.

Development

Model's Information

The following will be details of all the models, both recyclable from the laboratory I studied and downloaded on the Internet, proposed for the recreation of elements necessary for the model of the house proposed in this project.

1-5 elements proposed for quarters

Model: Double Bed

Modeling Software: 3D MAX

Website: cgtrader.com

Figure 6.0 Double Bed

Bibliography:

https://www.cgtrader.com/free-3d-models/interior/bedroom/black-bed

Model: Lamp

Modeling Software: 3D MAX

Website: turboquid.com

Figure 7.0 Lamp

https://www.turbosquid.com/3d-models/3d-table-lamp-lights-v-ray-model-1522080

Model: Desk

Modeling Software: 3D MAX

Website: turboquid.com

Figure 8.0 Desk

https://www.turbosquid.com/3d-models/desk-blender-3d-model-1232007#

Model: Laptop

Modeling Software: 3D MAX

Website: turboquid.com

Figure 9.0 Laptop

https://www.turbosquid.com/3d-models/free-old-notebook-3d-model/575955#

Model: Chair

Modeling Software: 3D MAX

Website: turboquid.com

Figure 10.0 Chair

https://www.turbosquid.com/3d-models/leather-chair-3ds-free/861793#

2-Other elements for the house:

Model: Side table

Modeling Software: 3D MAX

Website: turboquid.com

Figure 11.0 Side Table

https://www.turbosquid.com/3d-models/table-04-model-1578760#

Model: Kitchen

Modeling Software: 3D MAX

Website: turboquid.com

Figure 12.0 Kitchen

https://www.turbosquid.com/3d-models/fitted-kitchen-cooker-3ds-free/740604

Model: Table with chairs

Modeling Software: 3D MAX

Website: turboquid.com

Figure 13.0 Table with chairs

https://www.turbosquid.com/3d-models/free-obj-mode-dining-set-corona-chairs/889123

Model: Couch

Modeling Software: 3D MAX

Website: turboquid.com

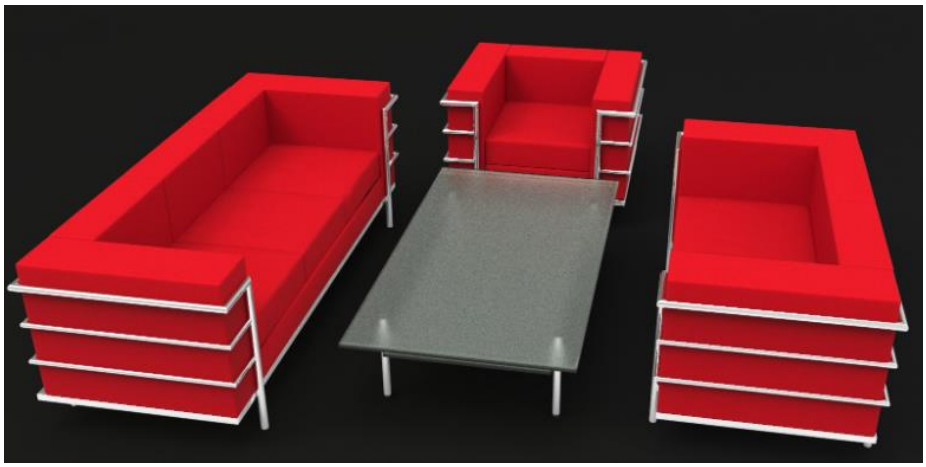


Figure 14.0 Couch

https://www.turbosquid.com/3d-models/sofa-couch-table-obj-free/778930

Model: Piscina

Modeling Software: 3D MAX

Website: turboquid.com

Figure 15.0 Piscina

https://www.turbosquid.com/3d-models/free-swimming-pool-3d-model/824462

Model: Furniture Bathroom

Modeling Software: 3D MAX

Website: turboquid.com

Figure 16.0 Furniture Bathroom

https://www.turbosquid.com/3d-models/3d-bathroom-furniture-model-1402716

Explanation of activities
1-HOUSE:

The first thing I did mainly for the realization of the project was the elaboration of the model of the house that I proposed myself. To achieve this, I am using the modeling software mentioned above, which is 3D MAX of the year 2023.

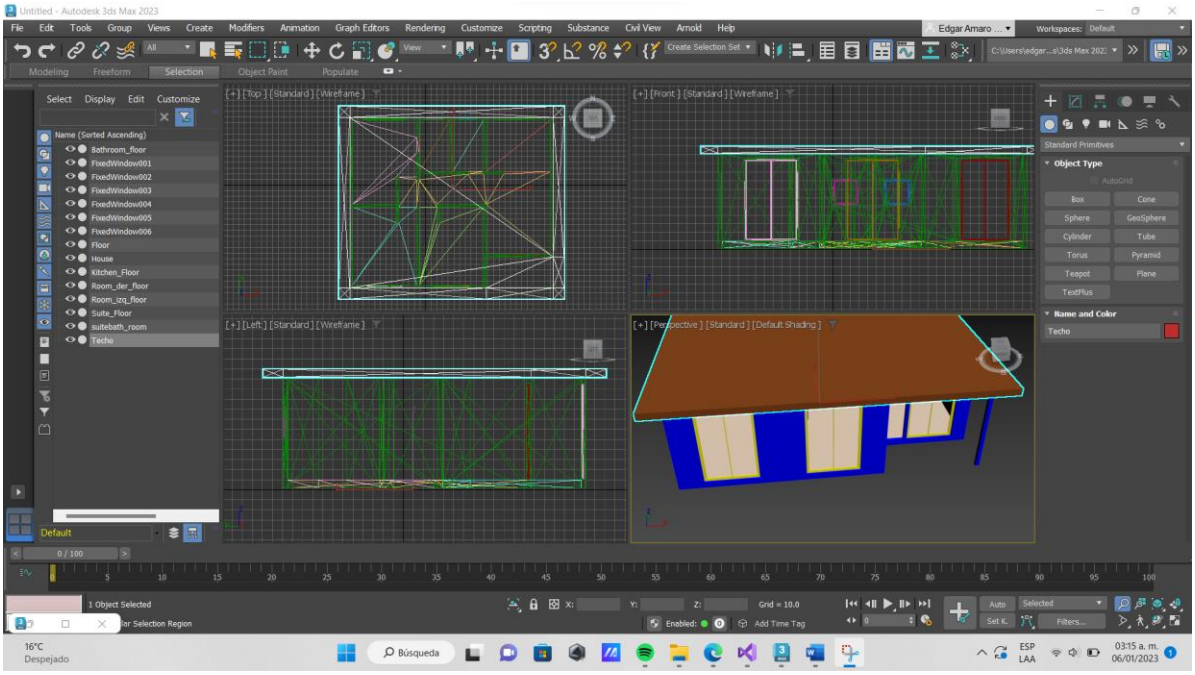


Figure 17.0 House's Model

How can you see in the image, use several rectangles to make and correctly place each component of the house that is the ceiling together with the floor, made the division of the rooms and with the exact measurements so that they are not glued and can be placed without any problem the models that I proposed previously. Once I finished designing and building the house using this modeling software, we proceeded to add the texture to the materials. The textures consist of small images of 20 x 20 colors both primary and secondary. The main colors that abound in the house are the following.

- Brown: Ceiling
- Windows: Yellow
- Blue: House's exterior and walls
- Beige: House's Interior and the floor or floor.

There was no problem building the house but designing it, then exporting its object file and mtl placing it in a resource folder for the project code with its textures and then calling the object in the code while placing its vertices of position, translation, scale, and rotation, giving the following result:

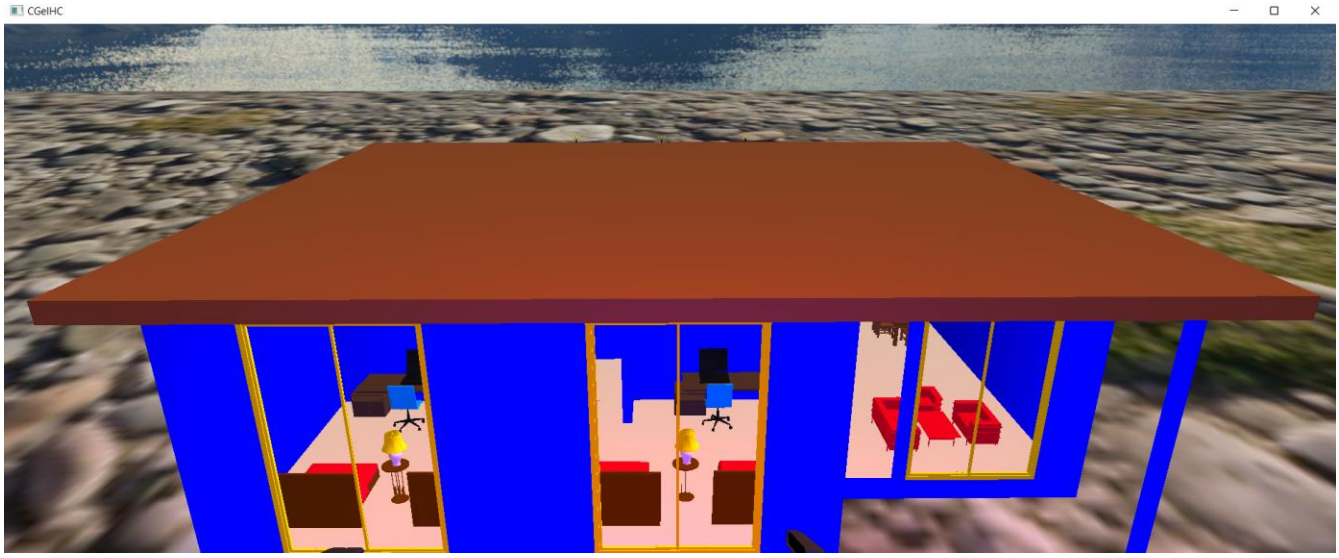


Figure 17.0 Implemented House on Visual Studio

2-3D Models from Internet (Turbosquid, CGtrader)

The procedure was similar with the modeling of the house, with the difference that only the models were downloaded in their corresponding page sources and opened in the 3D Max model software to change and put new textures, this because the originals cannot be implemented by limiting shaders, since only simple textures are accepted as primary and secondary colors.

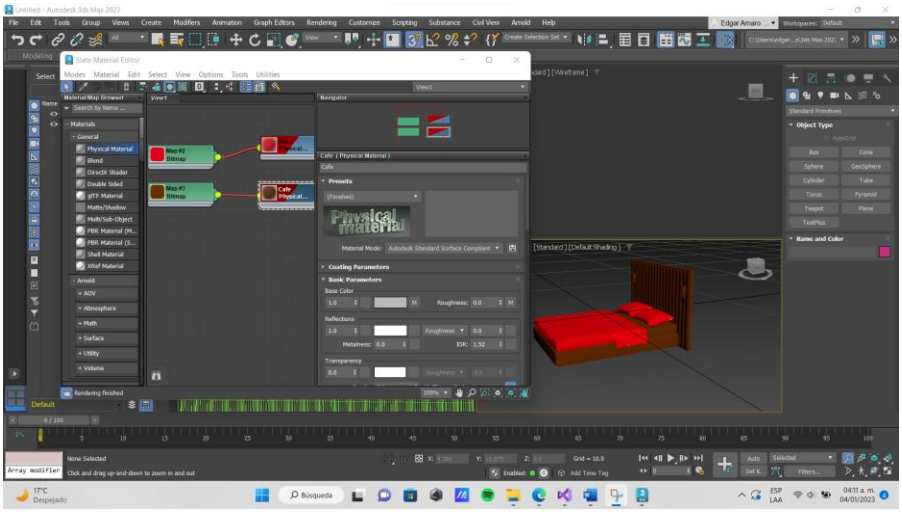


Figure 18.0 Double Bed in 3D MAX

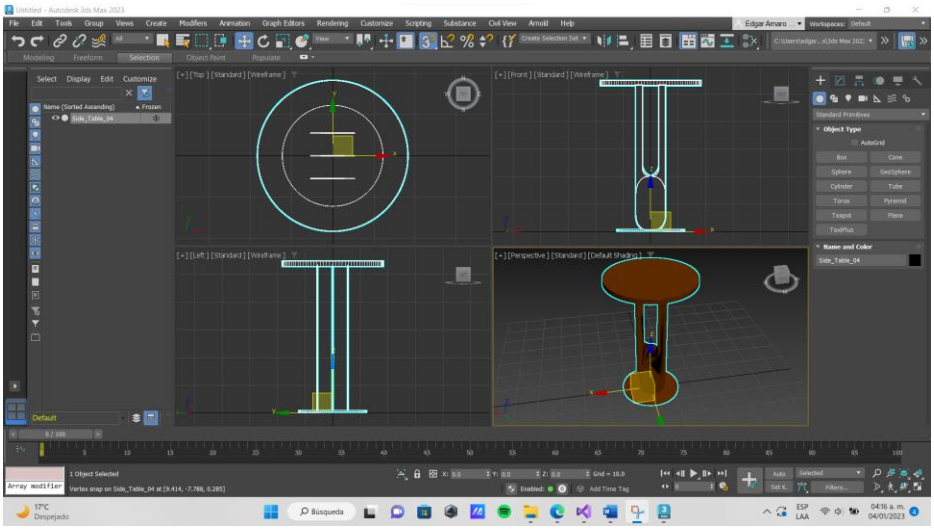


Figure 19.0 Side Table in 3D Max

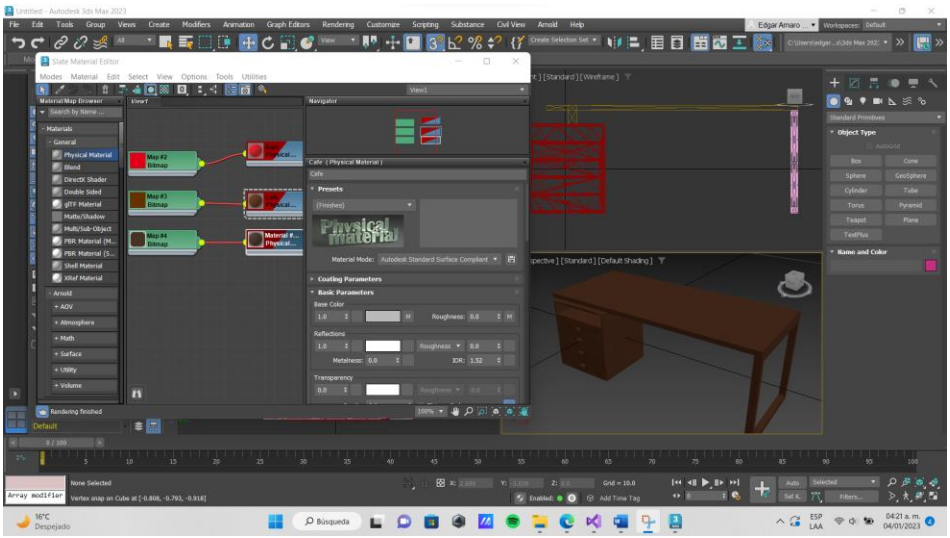


Figure 20.0 Desk in 3D Max

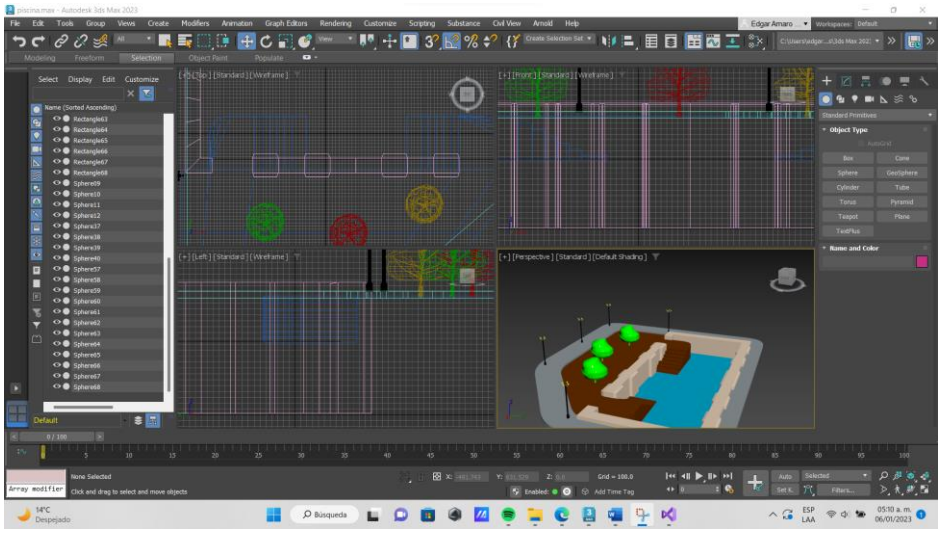


Figure 21.0 Pool with garden in 3D Max

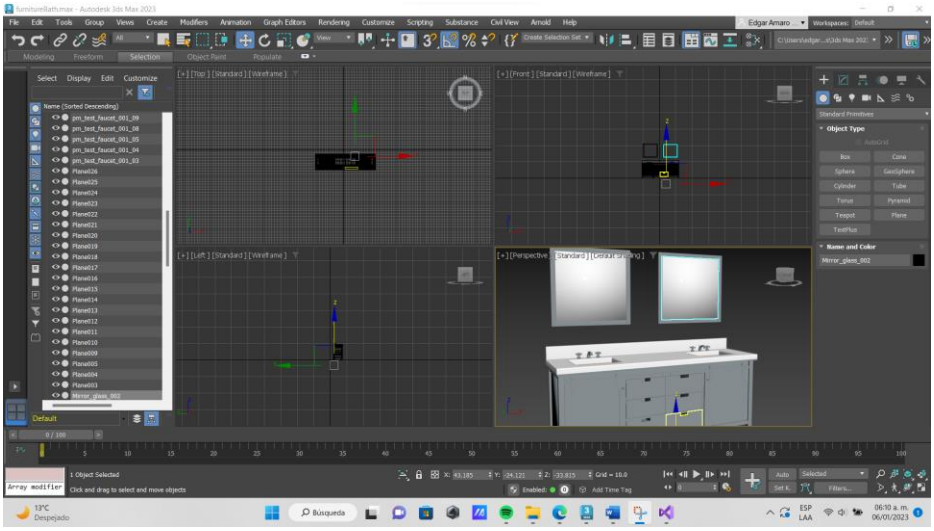


Figure 22.0 Bathroom Sink in 3D Max

How you can see in the images, these are some of the model's 3D downloaded on the internet with which they worked to create new materials with their textures proposed by me and implement them in these objects. They were carefully exported so that by implementing them in the project code you can correctly visualize your own materials.

The other models like Lamborghini and Stewie's character in the Aquaman costume are models from the laboratory professor of Graphic Computing Sergio Valencia that were used to perform the last practices of this matter and those models were used to make the animation.

3-Bedrooms

For all rooms that are Bedroom 1, Bedroom 2, and Bedroom 3 their 5 corresponding elements were placed once we worked them with their textures and exported their files

with an extension until they were placed in their corresponding folders with their textures so that the code finds them and shows the executable with its materials in some error.

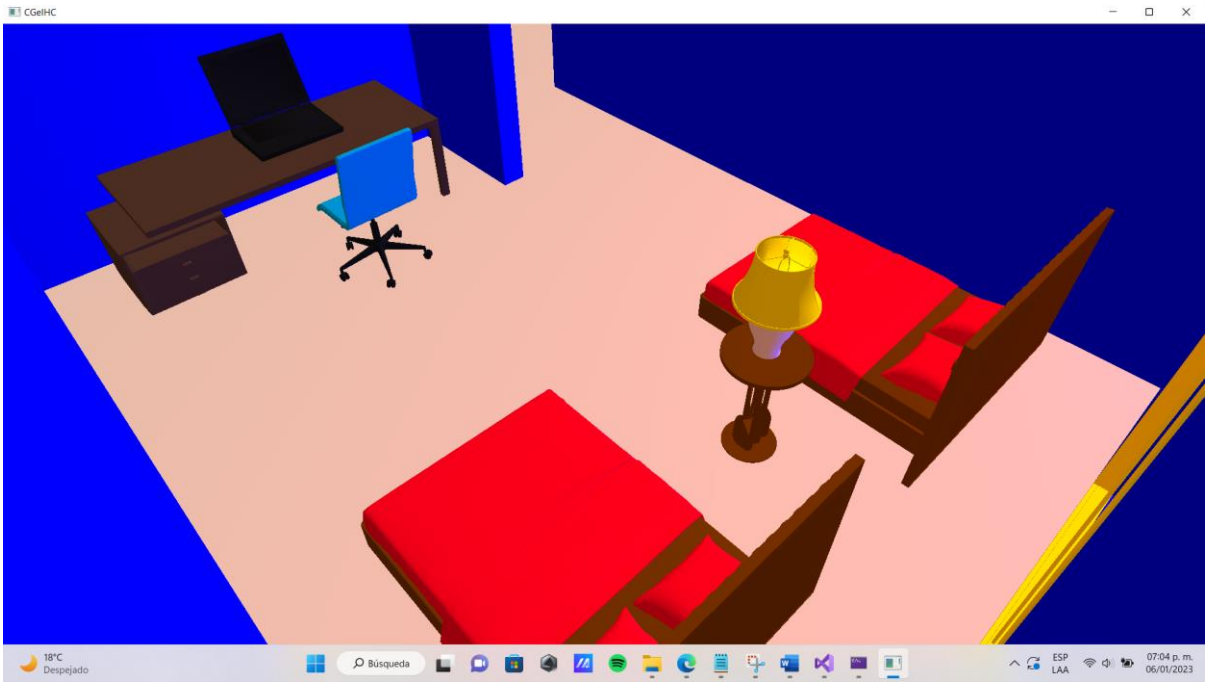


Figure 23.0 Bedroom 1

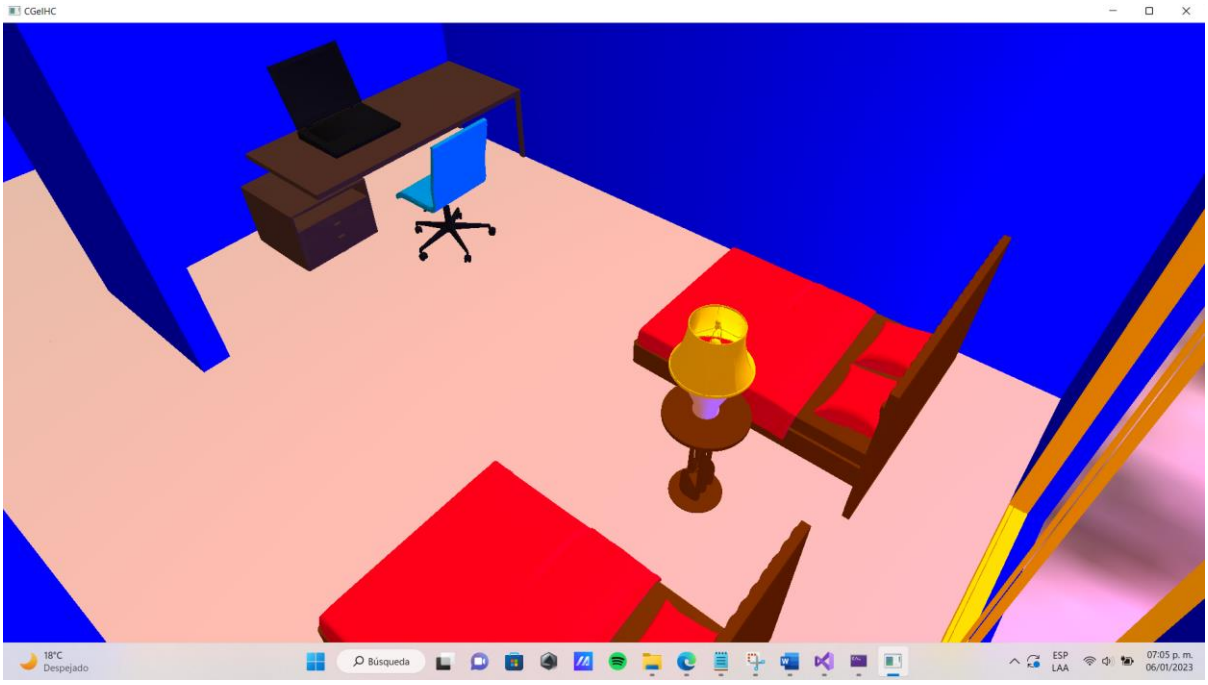


Figure 24.0 Bedroom 2

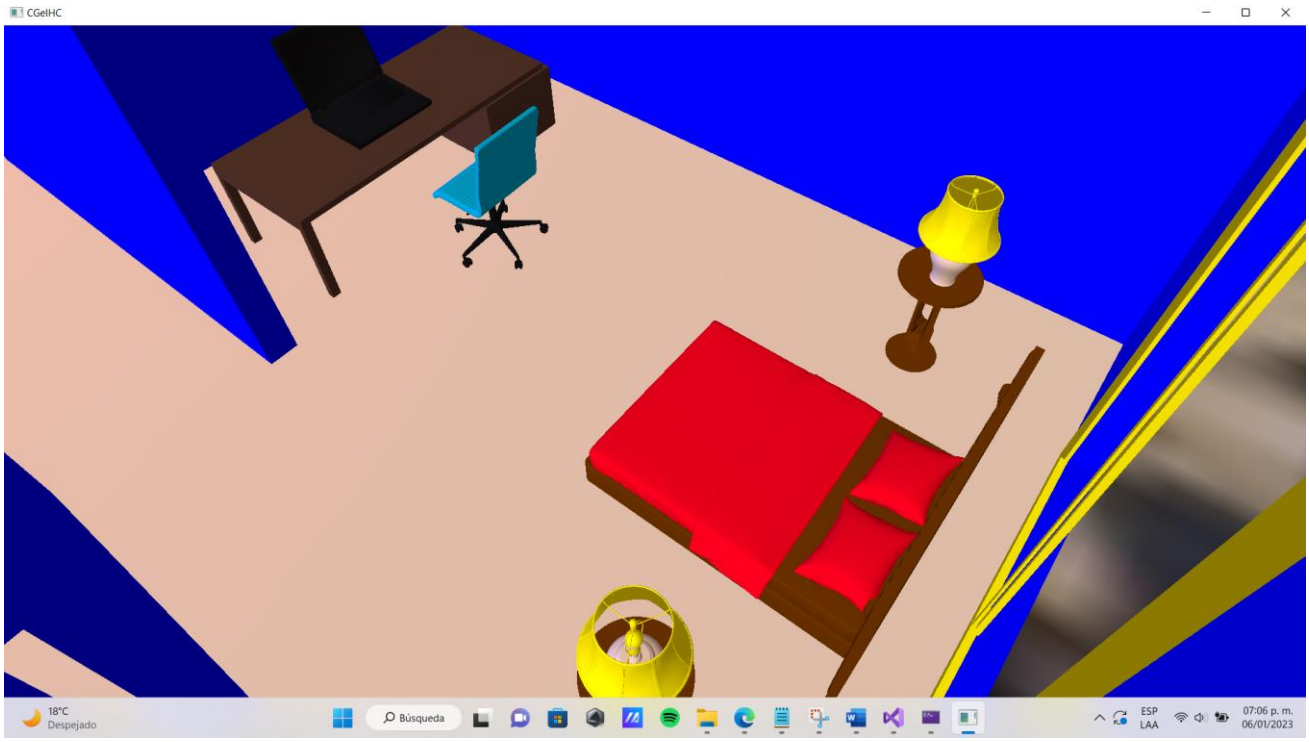


Figure 25.0 Bedroom 3

You can also see in the following image that you could successfully download the 3d model of pool with garden over the internet, put texture and import it to the Visual Studio code.

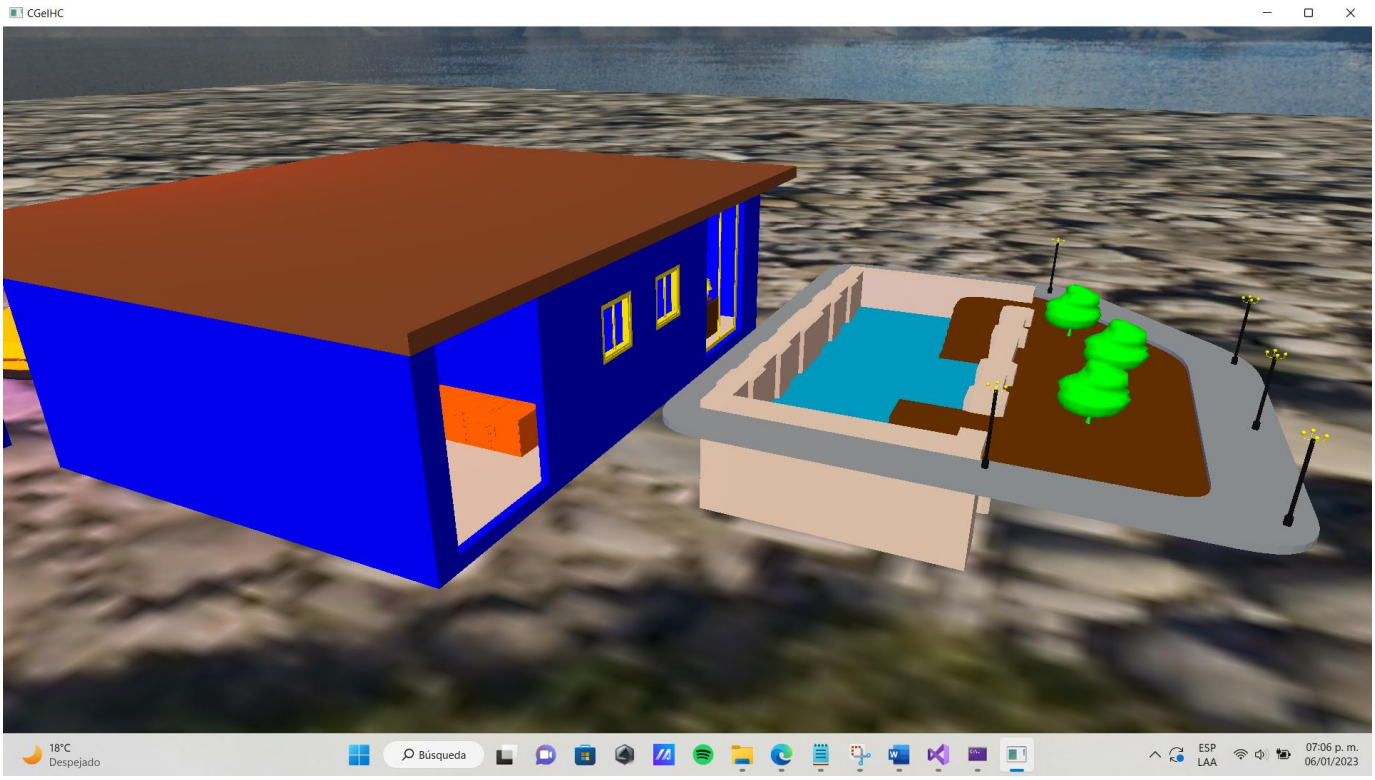


Figure 26.0 Pool with garden

It was lacking to add the sprinkling can because a model was not in 3D adapted to implement it in the house, but it was possible to add other models.

4-Animations

I only did 2 of the 4 animations required in the project, but they work correctly.

The Lamborghini animation is performed in which it moves back and then forward using the space button and with the same button the animation is paused.

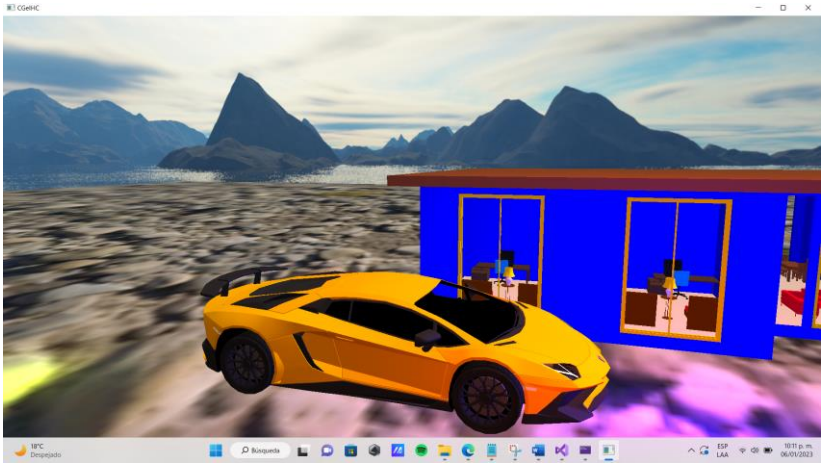


Figure 27.0 Yellow Lamborghini

And the last animation is by keyframes, which allows the user to create the animation they want for Stewie's character and contains buttons that allow them to move some part of their body, save their position and at the end play it to see the result.

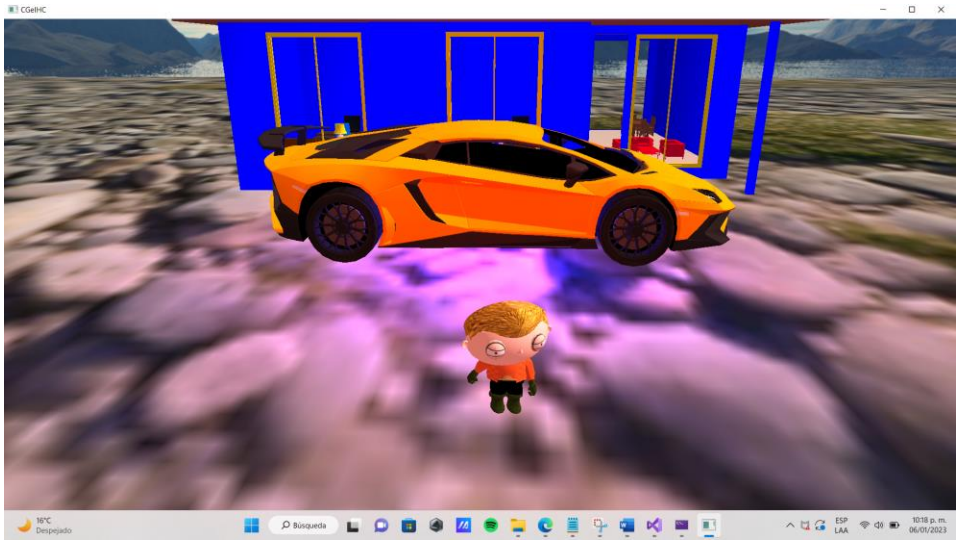
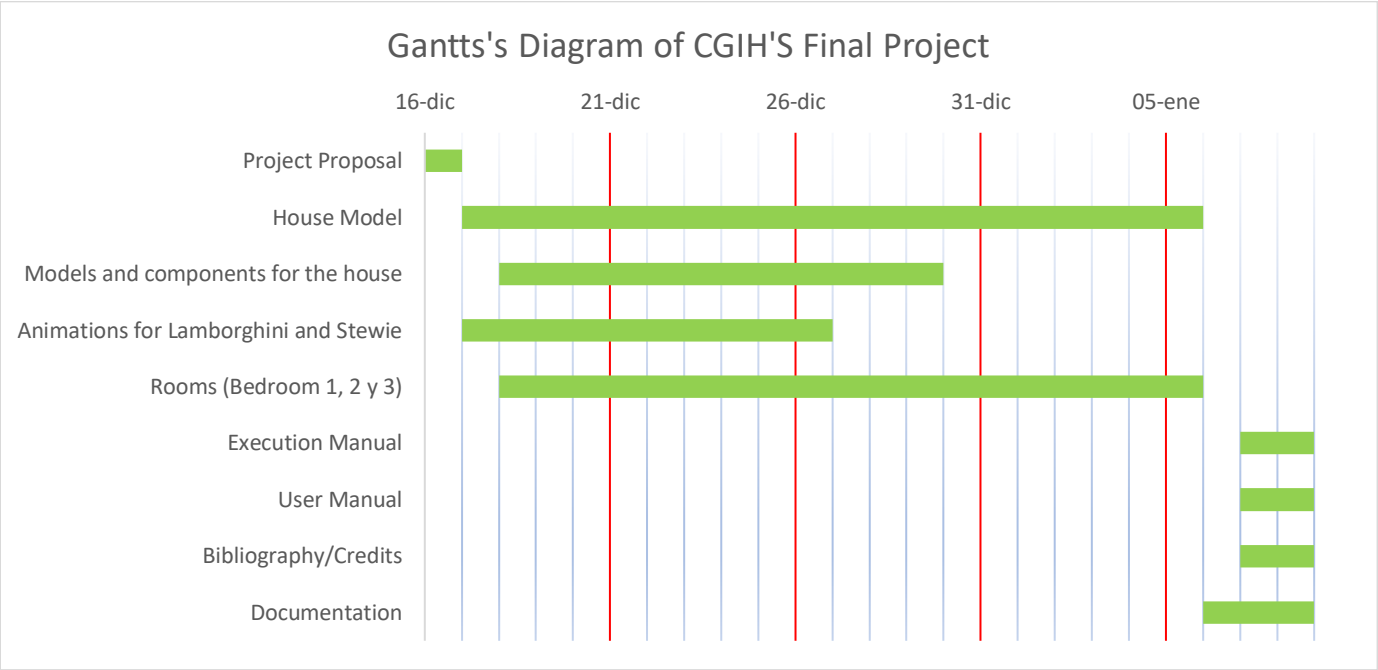


Figure 27.0 Stewie dressed of Aquaman

Gantt’s Diagram



Project Cost and Selling Price Estimate

Based on my work that consists of the realization of the final project of graphical computing and human interaction, my roles that I considered and assigned are the following:

1. Project Manager
2. Designer
3. Programmer

I consider a 6-hour workday.

Position	Salary per day	Working Hours	Working days	Days	Total
Project Manager	$900	6	24	December 16th to January 9th	$27,000
Designer	$250	4	19	December 17th to January 5th	$5,000
Programmer	$300	4	19	December 17th to January 5th	$6,000
Total					$38,000

Humans Resources

Considering 5% slack and 50% utility

Humans Resources = (1.5) (38,000) + (0.05) (38,000) = $58,900

Services

- Internet
  - $600.00 a month
  - $500 for 24 days
- Electric Energy
  - $150 average monthly
  - $125 for 24 days

Services in Total = Internet + Electric Energy = 500 + 125 = $625.00

Support Tools

- Stationery: $50.00
- Support Tools = $100.00

Net Payment

- PN = $58,900 + $625 + $100 = $59,625
- PN = $59,625

Therefore, the final project cost would be in total $59,625 (Mexican pesos) with 24 days to deliver it, so you can pay with 30% advance and 100% once the delivery time has been met in addition to being released and delivered the project.

Conclusions

Although more elements were missing than the other animations, I can conclude that most of this project could be realized. During the realization I understood the workload carried by engineers among other specialists to create models in 3D for any field, whether it be video games, artificial intelligence, animations, etc. With this project, although I did not finish it 100%, I value the subject matter itself for all the topics we have seen and consider that I learned enough to be able to do the project and be aware of what happens around us with the latest technological advances of this world.

Bibliography

- 3D Models for Professionals: (s. f.). TurboSquid. https://www.turbosquid.com/
- CGTrader - 3D Model Store. (s. f.). CGTrader. https://www.cgtrader.com/