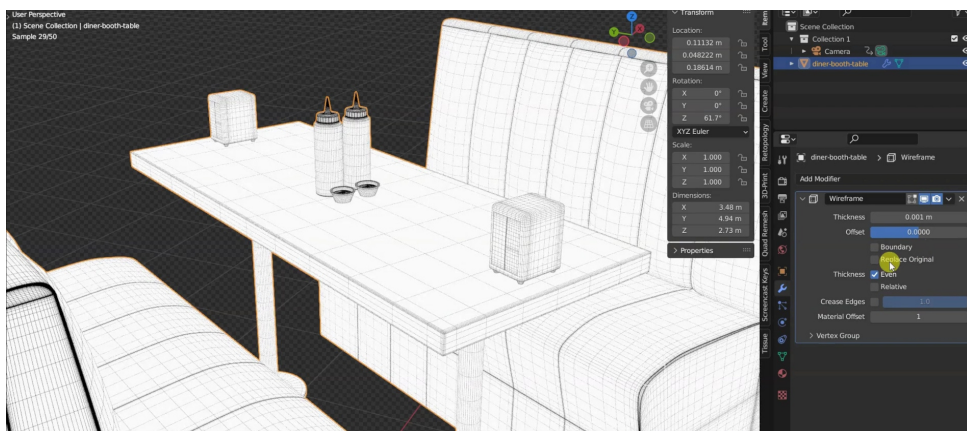


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Hello everyone!

In this tutorial, we'll look at how to set up materials and modifiers to achieve **wireframe renderings** of 3D models in Blender.

These renderings are useful for showcasing your 3D models in online stores. In fact, in some cases, a couple of renderings of this type are explicitly required to demonstrate **the topology and structure** of your 3D models. The method shown in this tutorial is applicable to virtually all types of 3D models to be presented.

This tutorial is a basic one and was created using **Blender 3.3**, but the modifiers and methods shown here have been available in several previous versions of Blender, and likely, will be in the future as well.

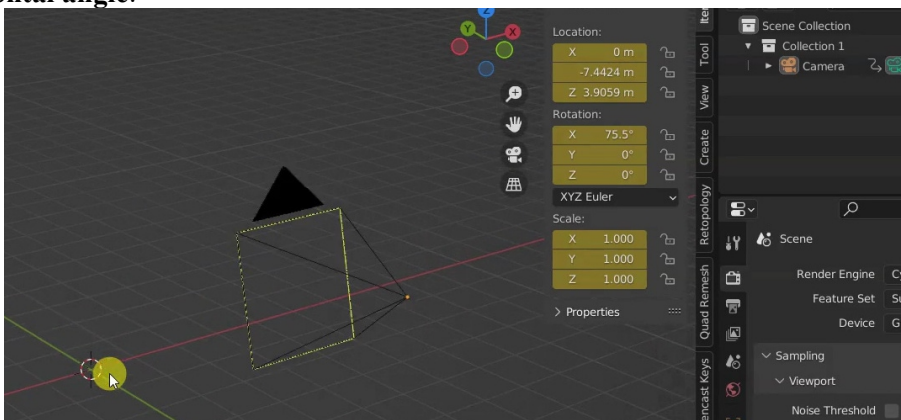
To provide a practical example, I'll be using a 3D model called **Diner booth set 2**. In particular, I'm using this 3D model because it contains **several objects**, with different vertex and edge densities, to be merged into a single object.

Anyway, it is not necessary for you to have this 3D model: you can read this tutorial and learn without having to download this 3D model!



Okay, with the introduction out of the way, let's get started!

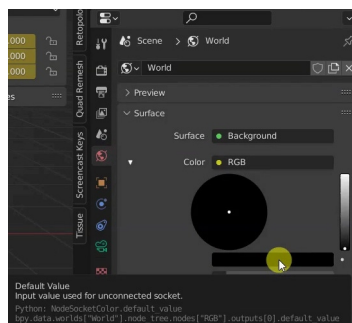
The starting scene is actually quite simple: the only object initially inside it is the **Camera**, which I've positioned to **face the center of the scene** from a **high frontal angle**.



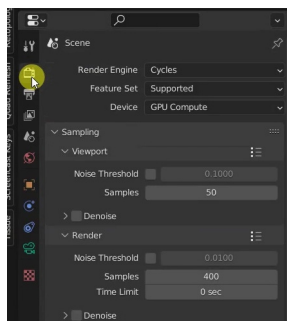
This view is not mandatory, but it generally works well, as 3D models are usually imported into the center of the scene, so a **top-frontal view** allows, in most cases, to visualize different features of the models from the beginning.

As for the **Output Properties parameters**, they heavily depend on the requirements of various online stores, so the resolution should be set according to the provided specifications.

The **virtual universe's background** can be conveniently set to **black** in the **World Properties tab**; moreover, there are **no light sources** because we will actually use two light-emitting materials to render our objects.



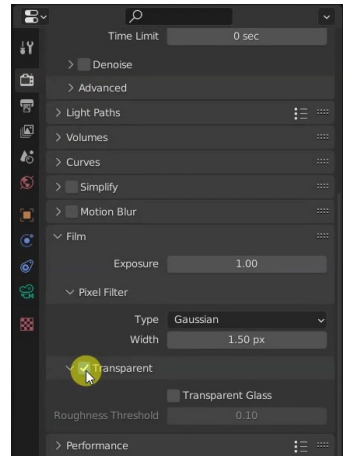
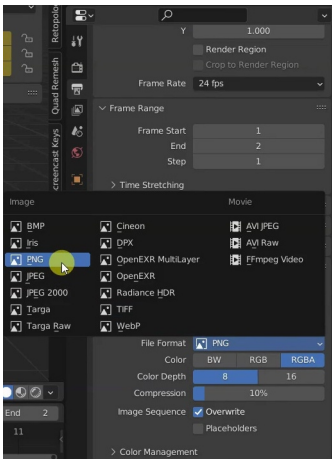
For this reason, there's no need for a high number of **Samples** for rendering in the **Render Properties tab**, nor to activate the **Denoise** after rendering.



I recommend creating **images with transparency**, using for instance the **PNG RGBA format**, so you can set the background as you wish at a later time: for this aspect too, different online stores may require different specifications.

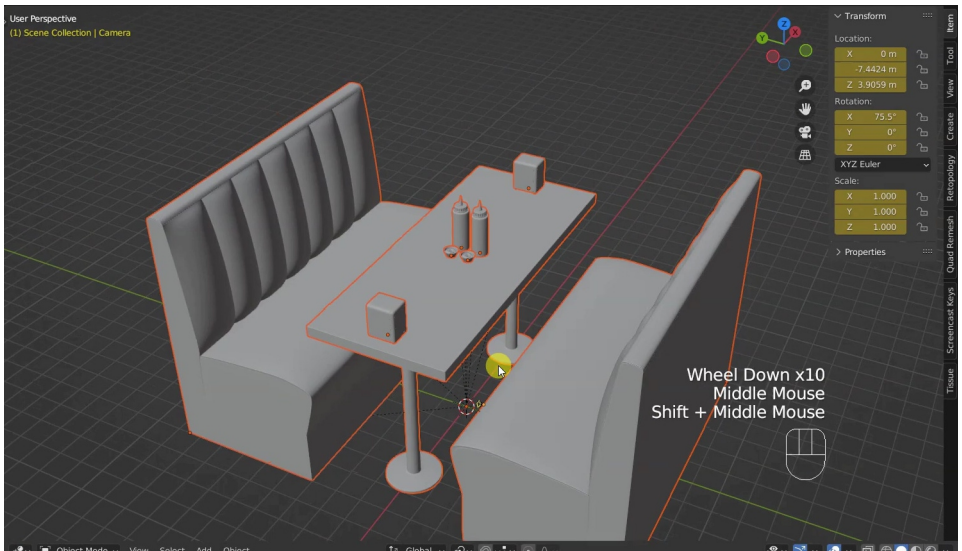
To prevent the **background** of Blender's virtual universe from being saved in the images produced by the rendering, open the **Render Properties tab** and select the **Transparent** option in the **Film** section.

Blender tutorial (BASIC) - How to make wireframe renderings
www.francescomilanese.com --- 2024 --- video version: <https://youtu.be/TQwxSicUO5s>



These are the starting scene settings, suitable for the vast majority of 3D models that you will need to render.

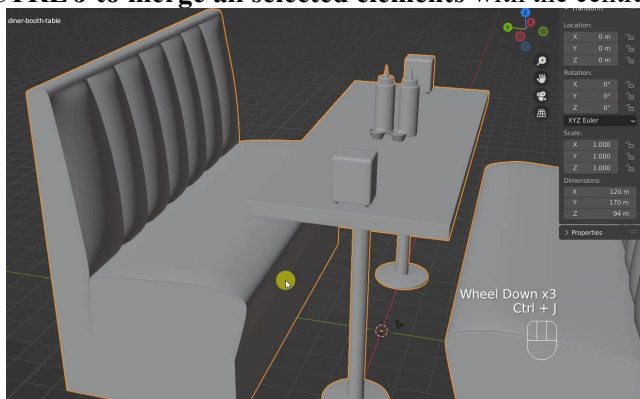
Then import a 3D model into the scene, using **File Append** or **Asset Browser**, according to your preferences.



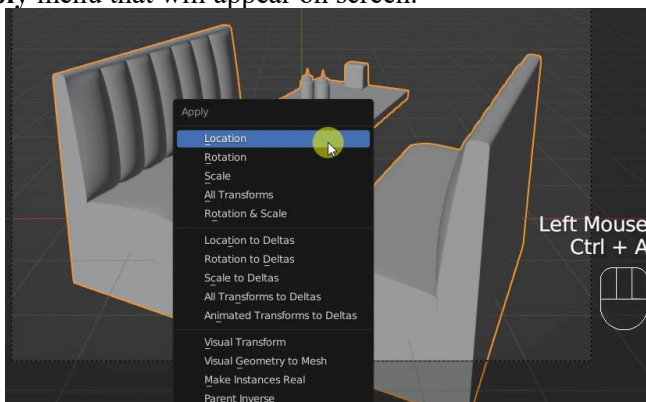
As soon as it is imported, the **Diner booth set 2** model is very large and does not fit within the frame; before resizing it, however, **I merge it into a single object with Join**. Now, all the individual objects making up the set are selected, but there is **no active object**, so **Join** cannot be performed correctly.

To solve this issue, I press **SHIFT** and the **left mouse button on an object**, such as the central table, whose outline will change color to indicate that this is now **the active object**.

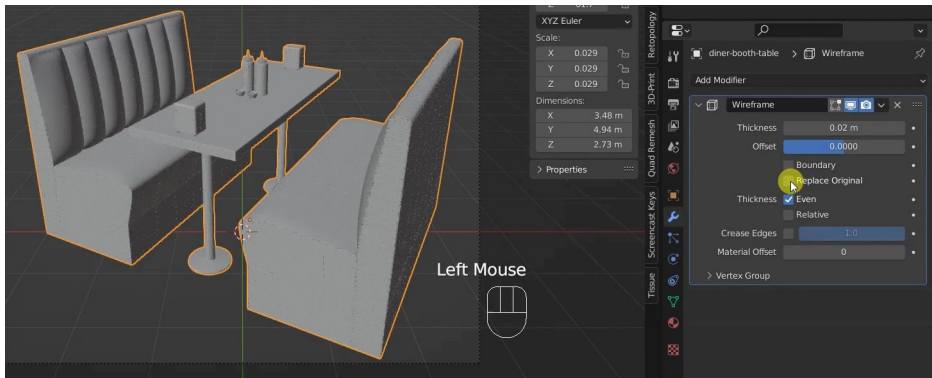
I then press **CTRL J** to merge all selected elements with the central table.



I chose the central table as the object of joining because its Origin coincides with the center of the virtual universe, making it easy to rotate or resize within the frame. **If the model's Origin does not coincide with the center of the virtual universe**, you can still make it so by pressing **CTRL A** and choosing **Location** from the **Apply** menu that will appear on screen.

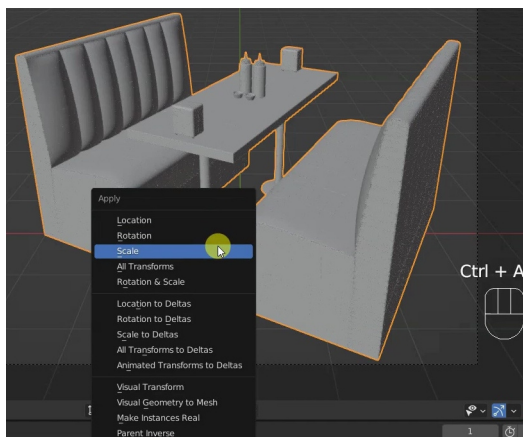


Now, I can resize, move, and rotate the model within the scene to achieve a good framing. To display the model's structure, we need to **add a Wireframe modifier**, which initially makes the **model's faces disappear** to show only the structure, but we can solve this problem simply by **deselecting the Replace Original** box in the modifier tab.

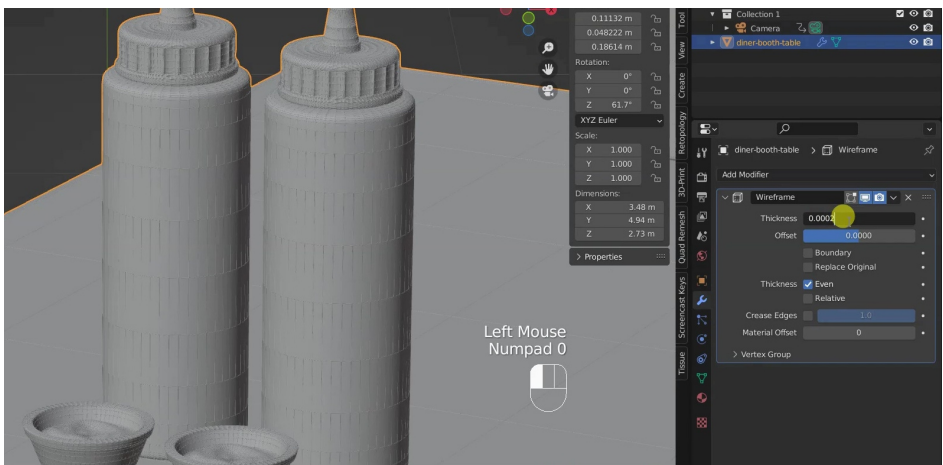
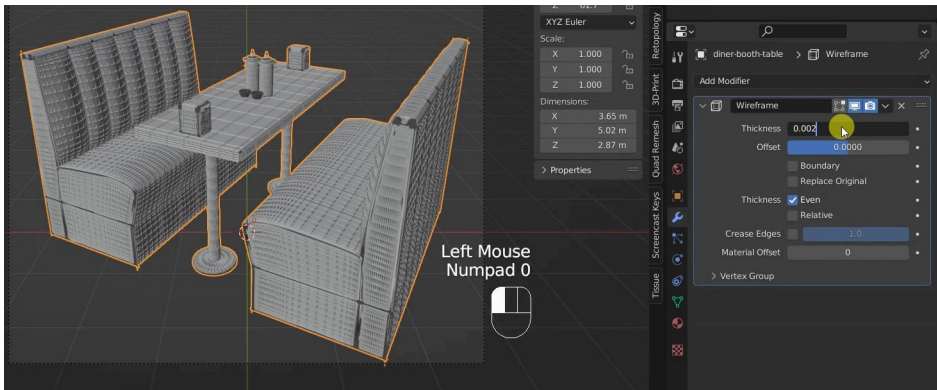


Before trying to set the **Thickness** value, i.e., the thickness of the lines representing the structure, we must perform an important operation: **apply the scale transformations** to the model, so that the **thickness of the structure's lines is consistent** with the units of measure of the virtual scene.

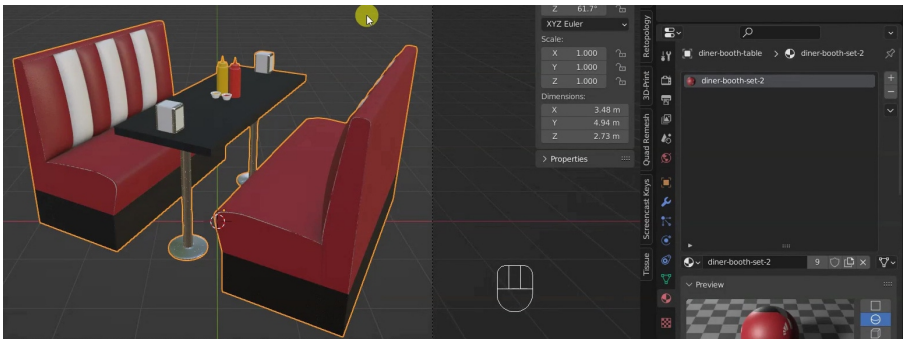
To **apply scale transformations**, we select the 3D model, then press **CTRL A** and choose **Scale** from the **Apply** menu that will appear on screen.



Now we can adjust the **Thickness** value to our liking, examining the preview in the 3D Viewport, possibly zooming in on details to make sure we don't create lines that are too dense.

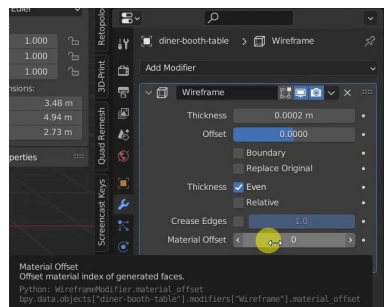


We're not done yet, though: at this point, in fact, the 3D model still has its **original materials and textures**, as we can see by pressing the **Z** key and switching to **Material Preview** mode.



In the **Wireframe modifier** tab, we notice an interesting parameter: **Material Offset**. This parameter allows us to specify which material to use from an object's material list to color or texture the edges generated by the Wireframe modifier.

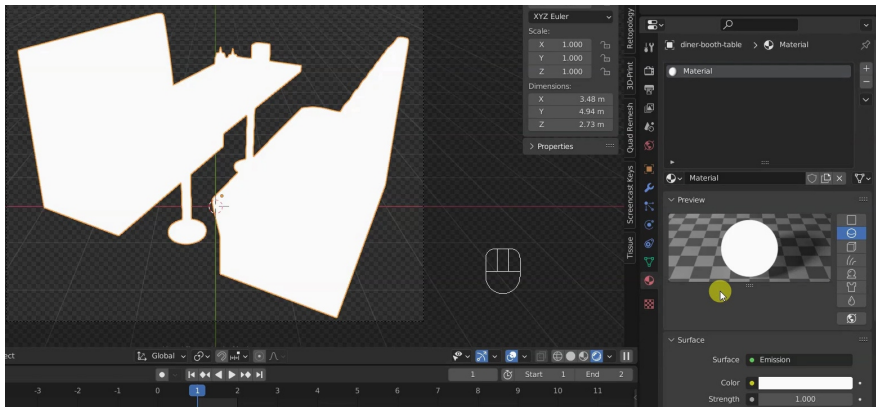
This means that we can provide a **white material for the entire object** and then specify a **second, black material** to be used exclusively with the **Wireframe** modifier, specifying **1 in the Material Offset parameter**: the material will indeed be the second, but **Offset** indicates the value to add to the first material index to get to the desired one, and that's why we need to specify 1.



To show how this happens, I am changing the display mode of the 3D Viewport to **Rendered**: you will notice that, even though the object still has its original material, it will appear black, since the virtual universe of the scene is completely dark.

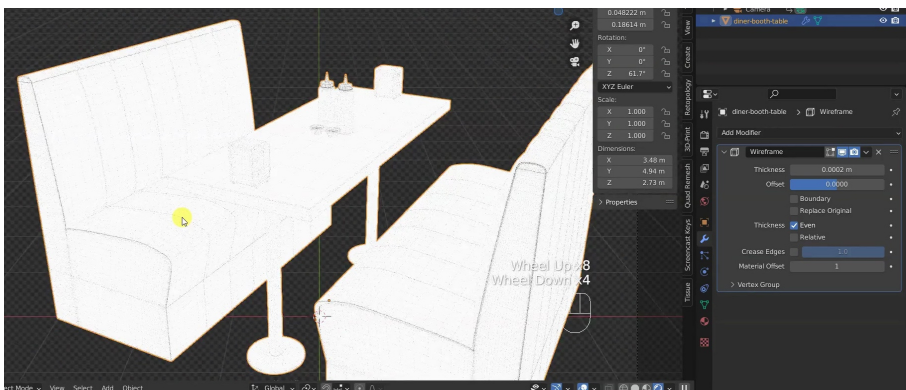
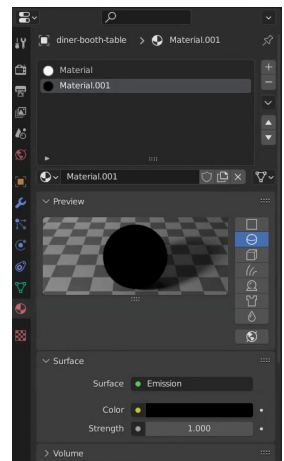
Let's then move to the **Materials** tab of the object and remove all the materials there: in this case there's only one, shared by all objects, but with other objects there might be several, depending on how many materials the imported and then merged objects had in the scene.

Then let's add a new **Emission** type material with pure white color and **Strength equal to 1**, which will be provided to the entire object making it **white and clearly visible**, in all its parts, from any angle, even if the scene is dark.

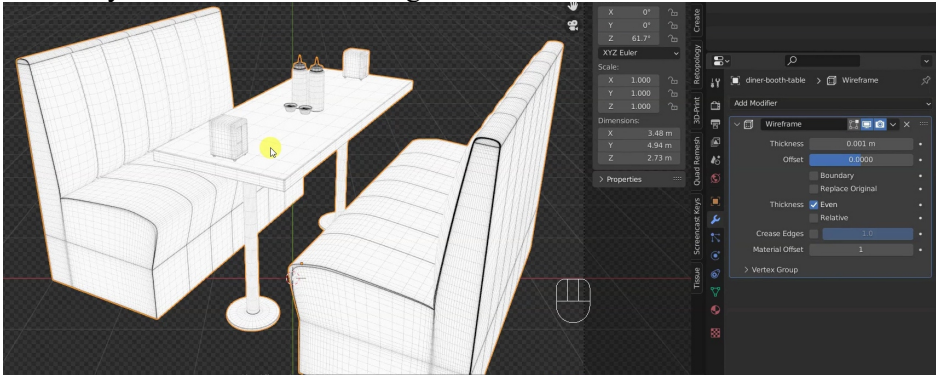


Then let's add a **second material**, again of **Emissive** type with **Strength** equal to **1**, but this time of **black color**: in this way, we will get a material that will always be black with the same intensity, regardless of the angle of the shot or edges.

To apply this second material to the geometries generated by the Wireframe modifier, we **go back to the modifier tab** and set **1** in the **Material Offset** field, as mentioned earlier.

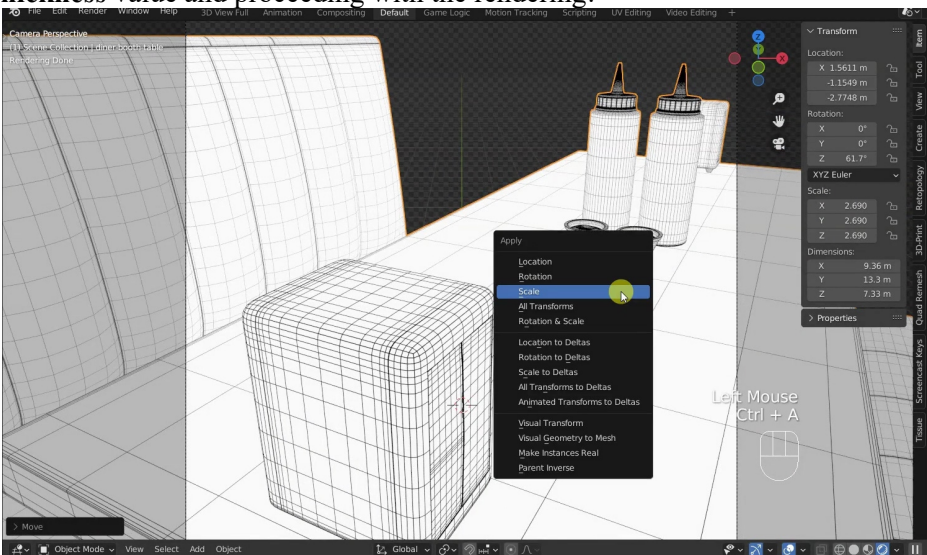


In the 3D Viewport window, we can now examine **the rendering preview** and accordingly **adjust the Thickness parameter value**, until we achieve a satisfactory result and start rendering.



Once the first rendering is done, we could move the virtual camera in such a way to frame the model from other points of view or, as in the case of the model examined in this tutorial, to frame the details, like the objects on the table, thus creating further renderings of the structure of the objects.

If, instead of moving the camera, you decide to move, rotate and resize the object, **always remember to apply the scale transformations**, before modifying the **Thickness** value and proceeding with the rendering!



RECAP

In this tutorial, we've seen how to set up a simple Blender scene into which to import the 3D model of which we want to render the structure, known as the "wireframe".

We then saw **how to merge several objects into a single object**, so as to be able to transform and frame them more easily.

We then looked at how to set up the only elements we need for rendering the structure, namely **the Wireframe modifier** and the **two emitting materials**.

Remember to apply the scale transformations to the model, to get correct results with the Wireframe modifier!

I hope this simple tutorial was helpful to you! See you soon!
