



Breakfast in the Dining Room

Created in March-May 2023

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Overview

Created from scratch a **3D scene** with **Blender** software. My 3D scene presents a realistic depiction of a breakfast in the dining room, inside a house. The scene includes objects with basic materials such as:

- Displacement mapping
- Bump mapping
- Transparency
- High reflectivity

Furthermore, my scene includes fog, background image and features such as:

- Rendering
- Lighting
- Animations:

- o Keyframes animation
- o Physics animation
- o Shape Key animation

3D Objects and Materials

I created **5 objects**. Each object with its corresponding **material** is:

1. Donuts → Displacement mapping
2. Basketball → Bump mapping
3. Glass → Transparency
4. Mirror → High reflectivity
5. Glass of coffee → Combination of: Displacement mapping and Transparency

In addition to my objects above, my 3D scene also includes ready-made 3D Assets downloaded exclusively from the [Free3D](#) website.

To facilitate the creation of my 5 objects, I created a separate .blender file for each one and then imported them into my final 3D scene. The creation of my 5 objects is described in detailed steps below.

Objects rendering/appearance:

Image 1.1: Donuts

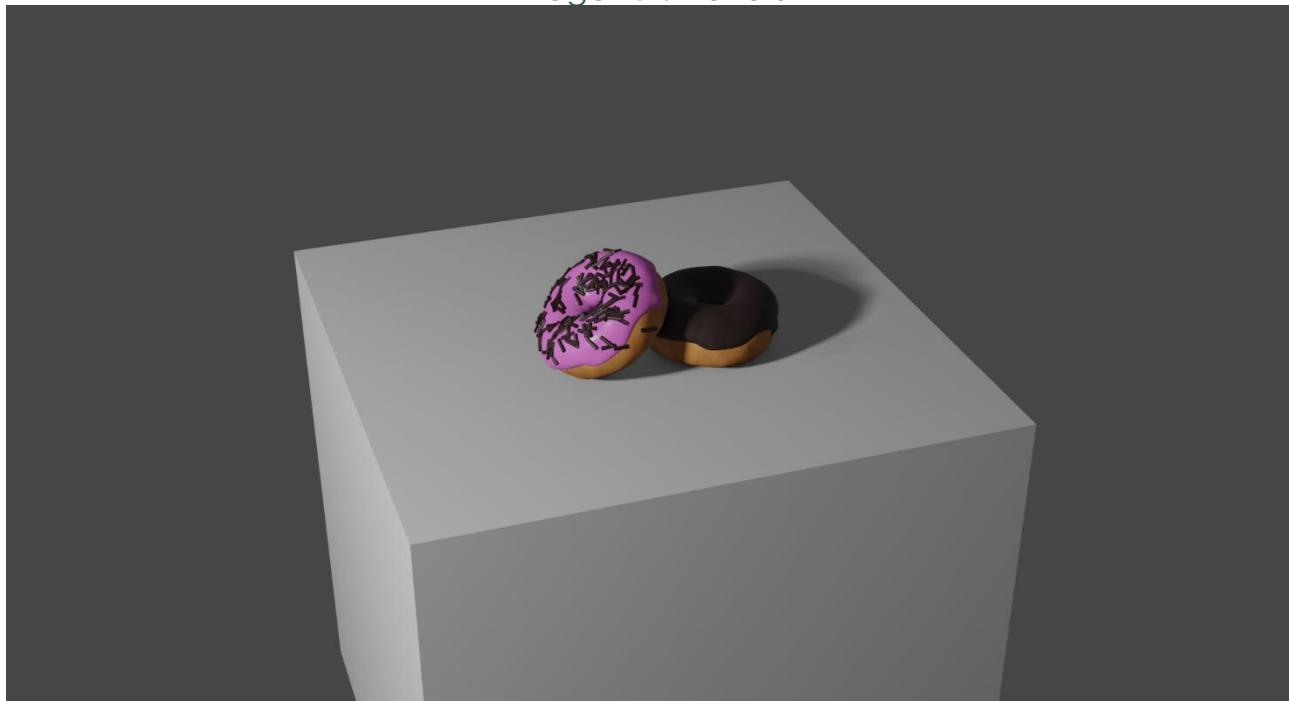


Image 1.2: Basketball



Image 1.3: Glass



Image 1.4: Mirror

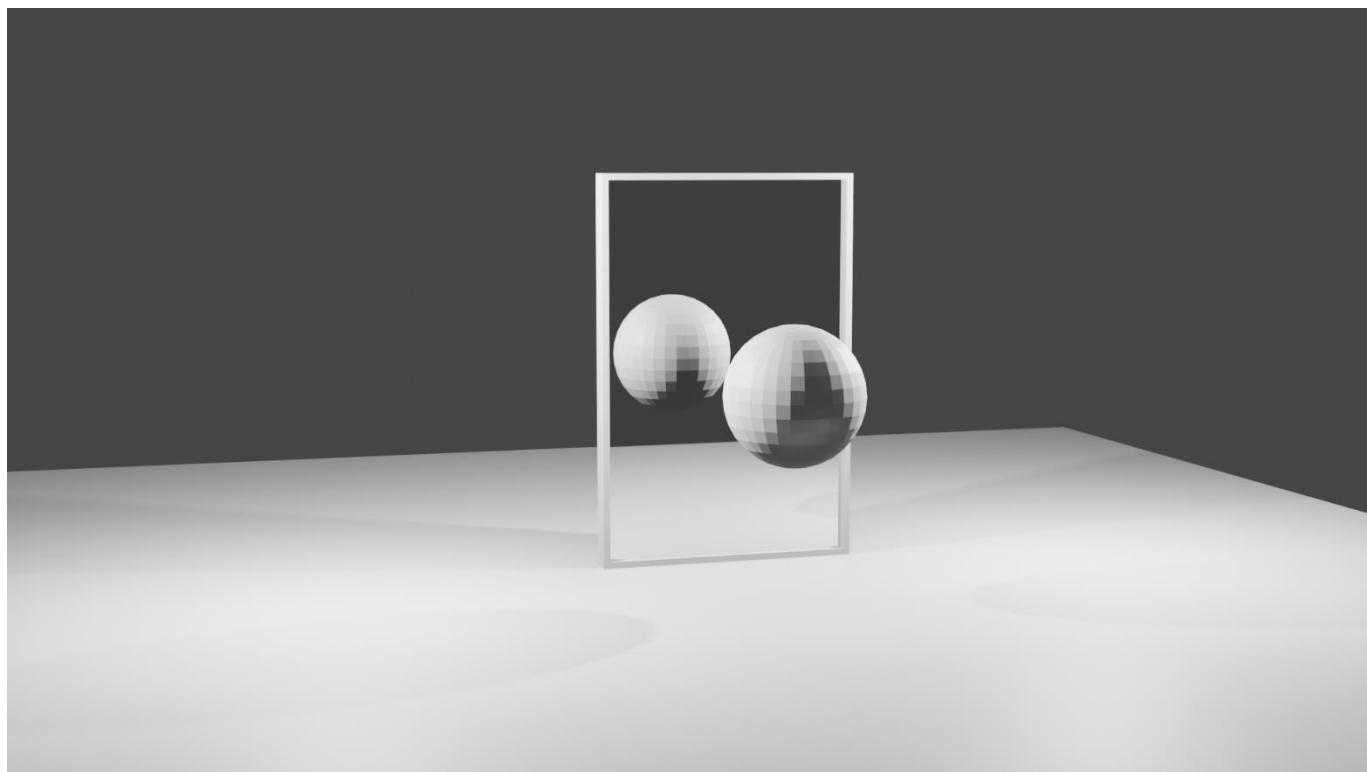
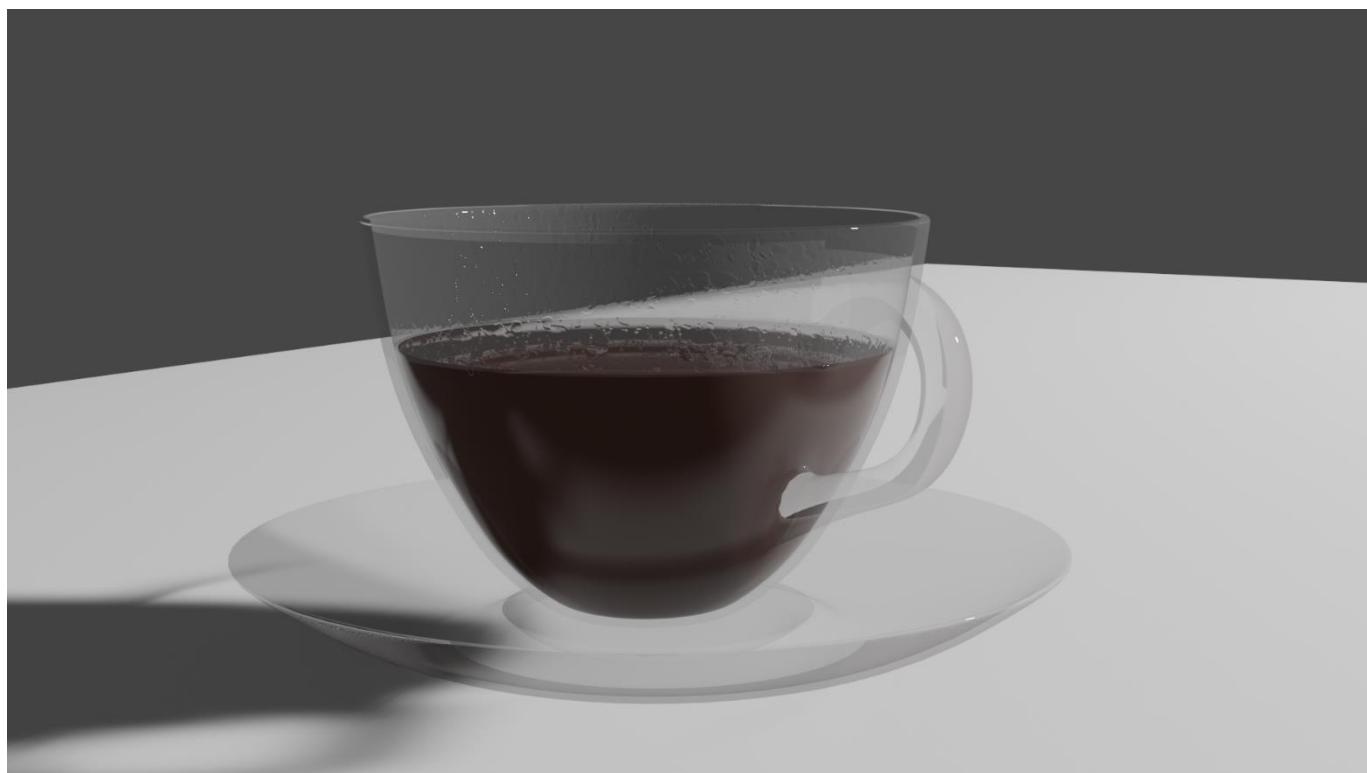


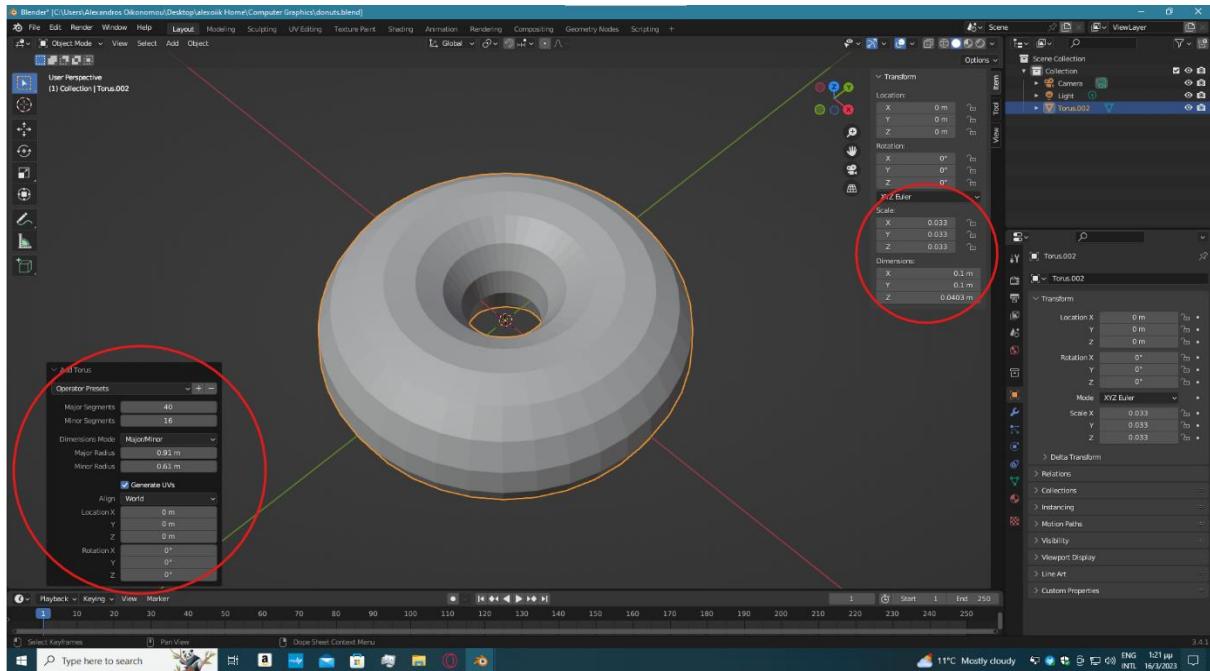
Image 1.5: Glass of coffee



Step by step implementation:

Donuts

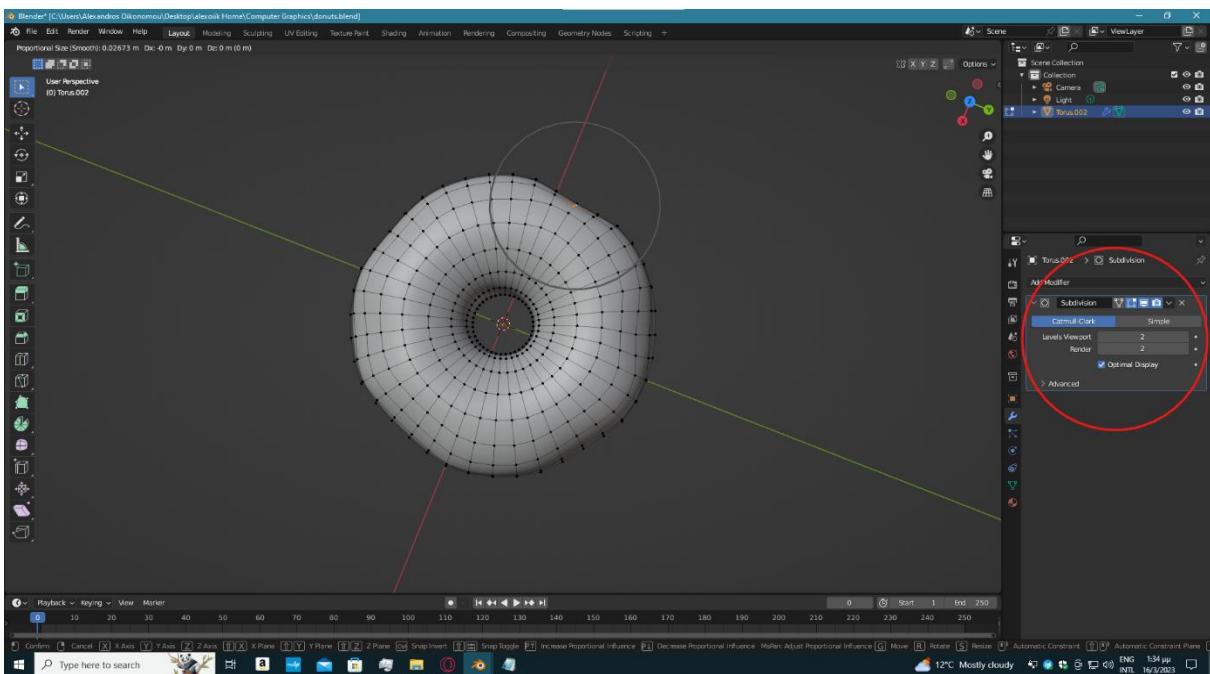
Image 2.0: Torus addition



Step 1:

- Torus addition for donut base.
- Adjusting Add Torus settings.
- Adjusting Scale, Dimension.

Image 2.1: Editing torus

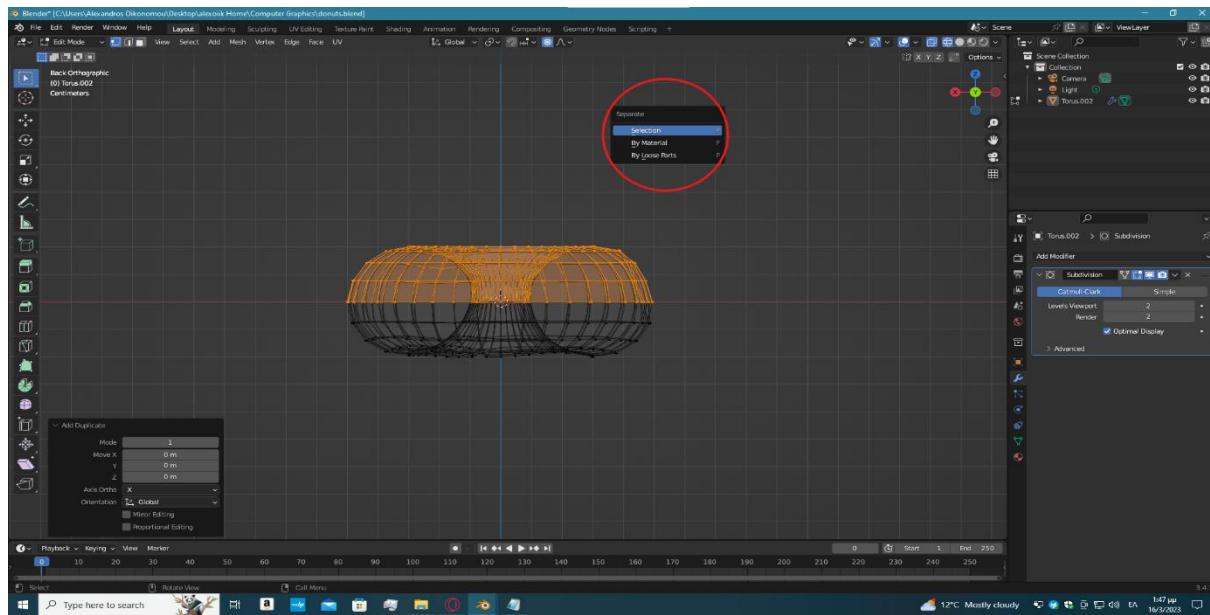


Step 2:

- Making it Shade Smooth.
- Adding Subdivision Surface Modifier.
- Using Proportional Editing (type: smooth):

→ For creating compressions. Aim: realistic donut shape.

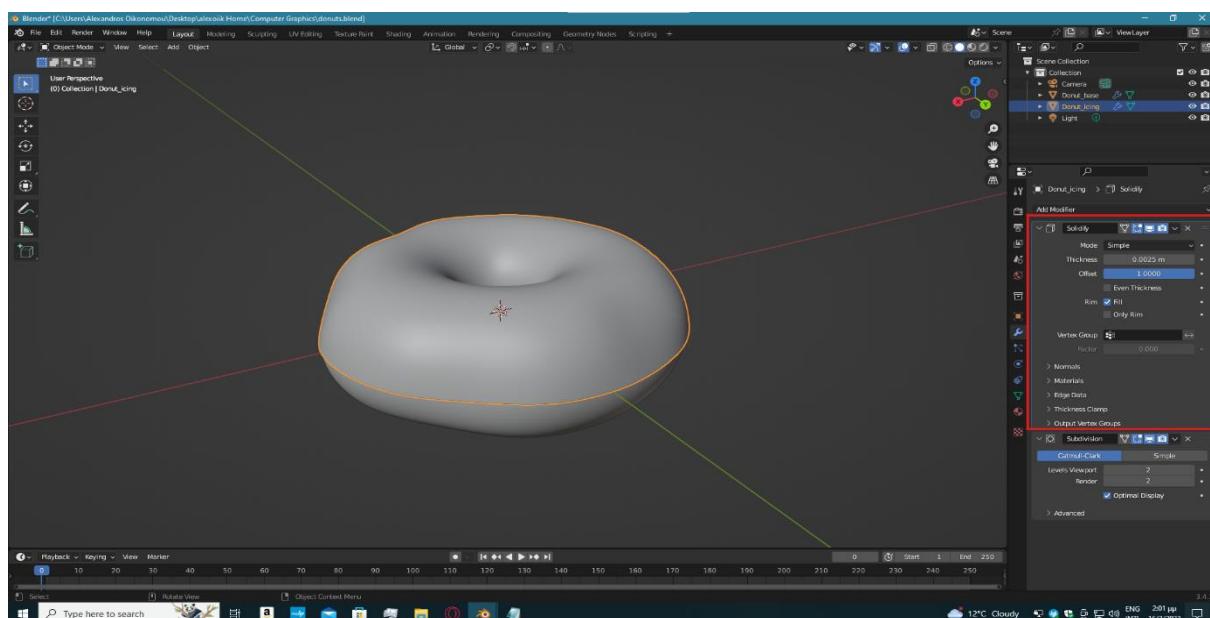
Image 2.2: Icing creation



Step 3:

- Duplicating top of object for icing creation.
- Separating it from base ($P \rightarrow$ Separate: Selection).

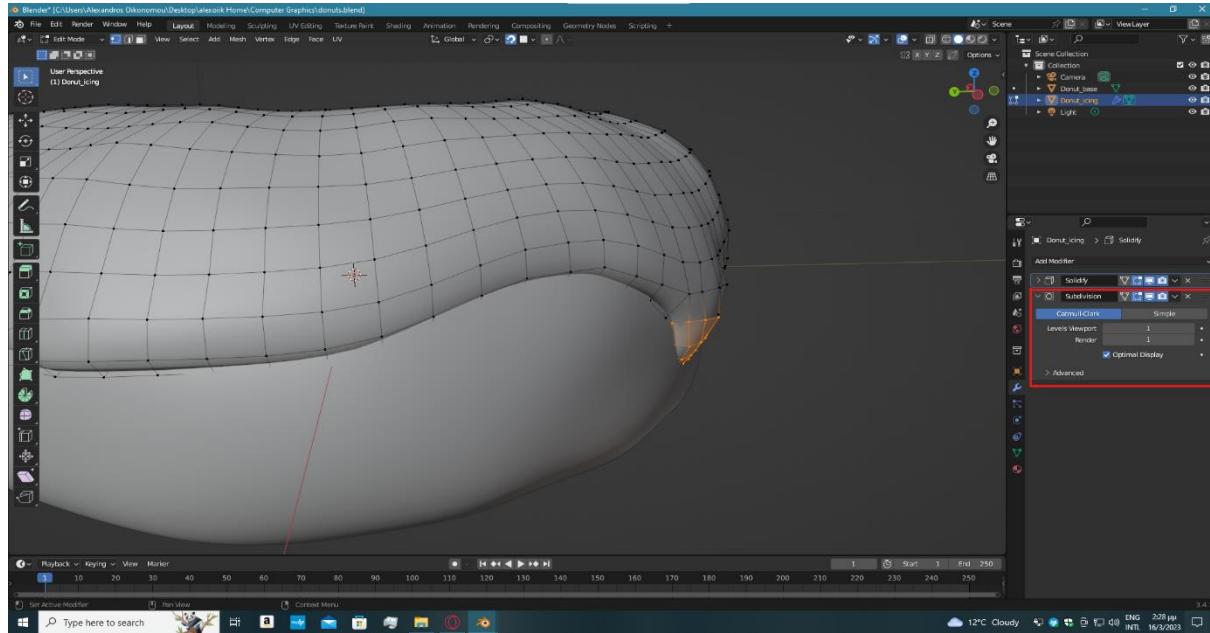
Image 2.3: Modifiers



Step 4:

- Except Subdivision, adding Solidify Modifier.
- Applying Subdivision Surface.

Image 2.4: Editing icing

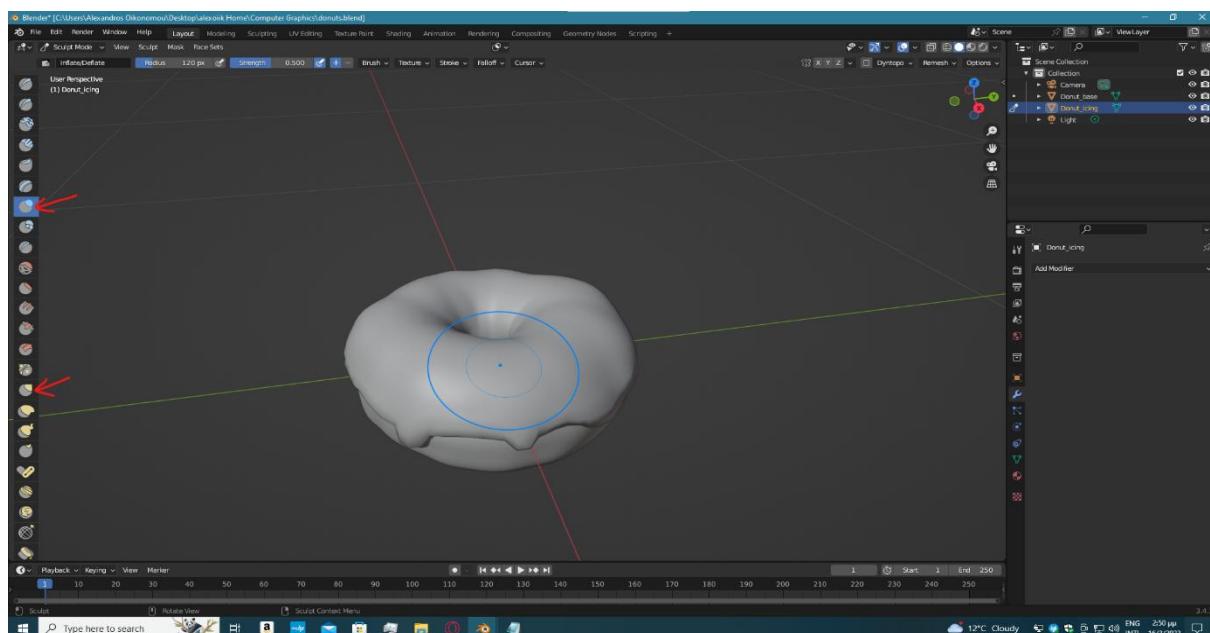


Step 5:

- Adding one more Subdivision Surface Modifier in both icing and base.
- Enabling Snap using transform > Snap to face project:

→ Grapping up and down parts of icing.

Image 2.5: Sculpting



Step 6:

- Sculpting donut.
- Used the following Sculpting Tools:
 - Grab: for extra grabbing of various points in the icing.
 - Inflate: to inflate object's parts and to give gloss to base and icing.

Image 2.6: Chocolate material

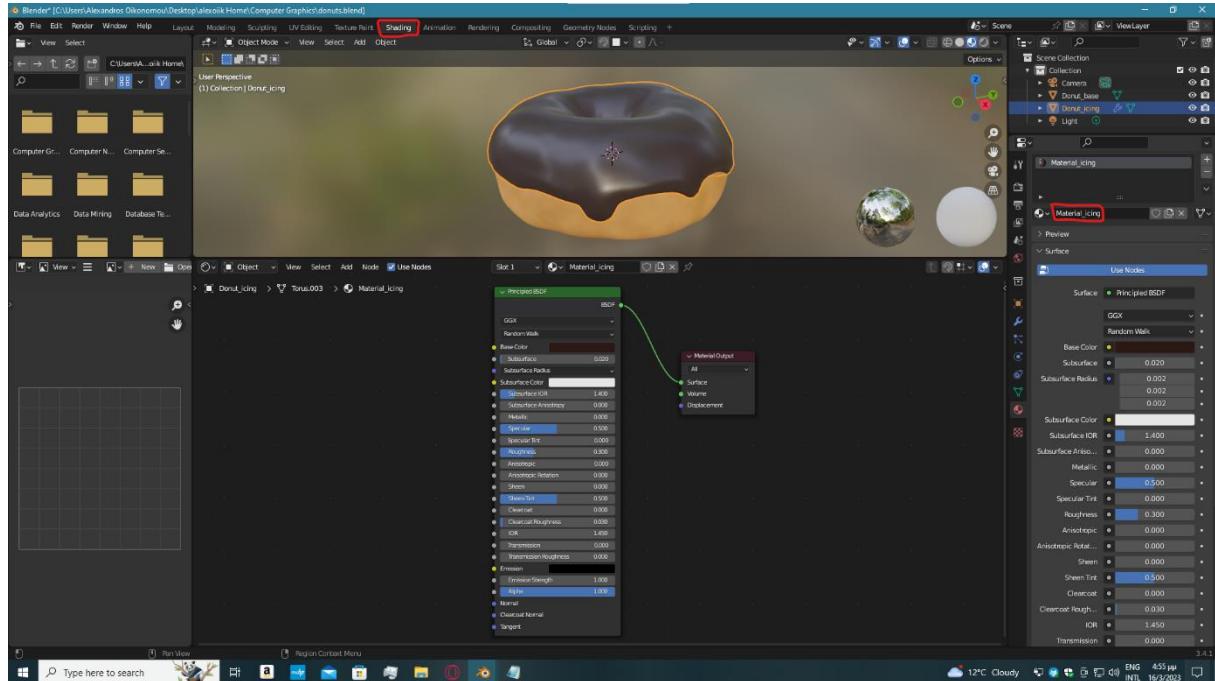
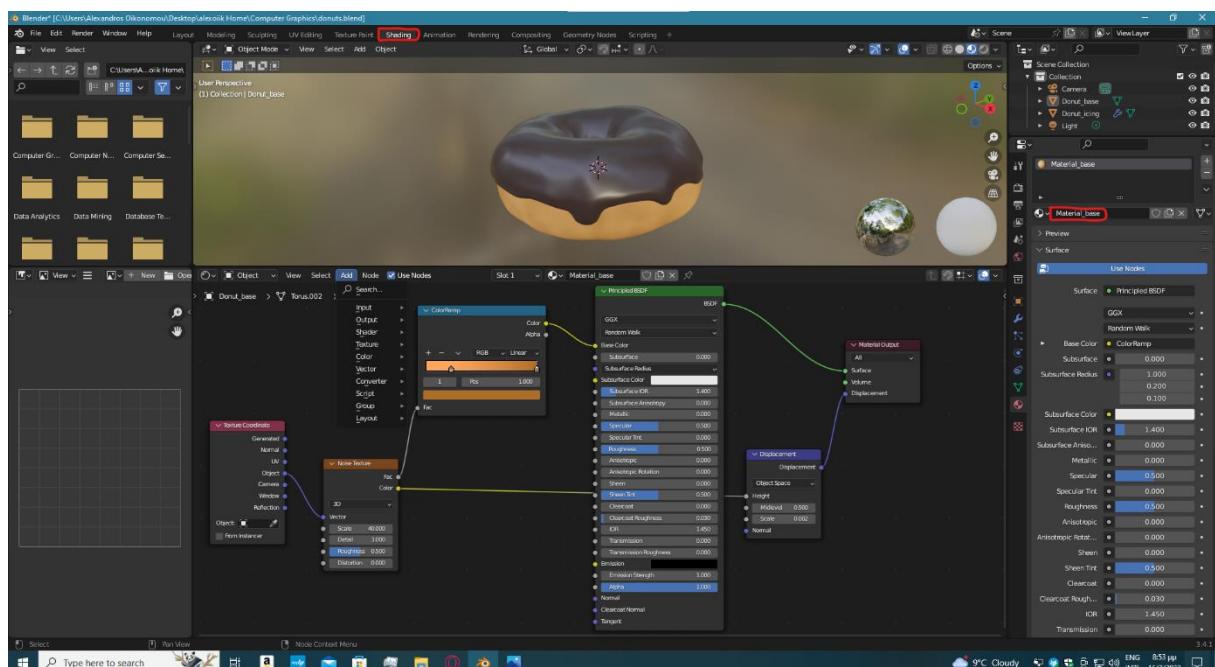


Image 2.7: Displacement mapping > donut's base



Step 7:

- Creating Chocolate material.
- Creating Displacement mapping:

→ 1 Converter: [ColorRamp](#)

→ 1 Vector: [Displacement](#)

→ 1 Texture: [Noise Texture](#)

→ 1 Input Texture: [Texture Coordinate](#)

Image 2.8: Strawberry material

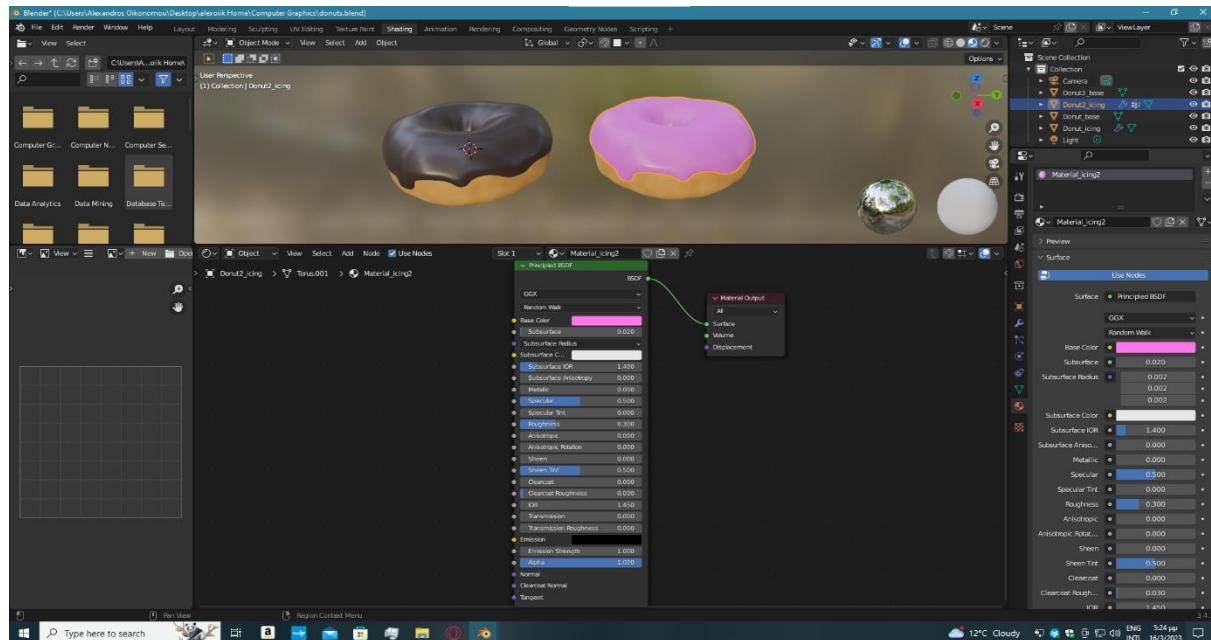
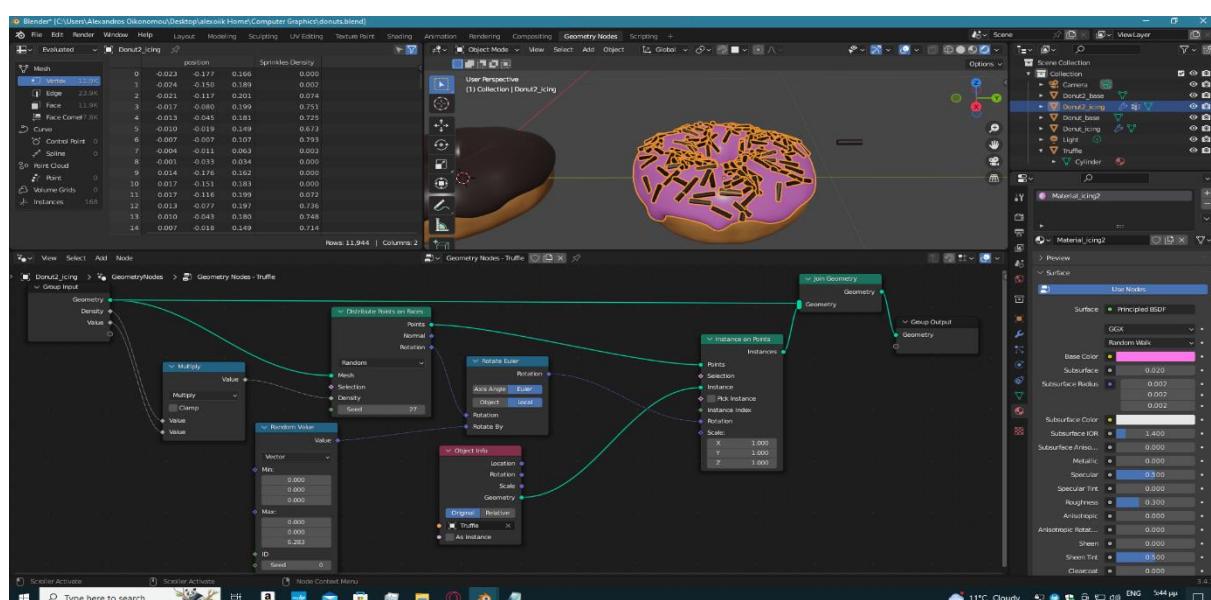


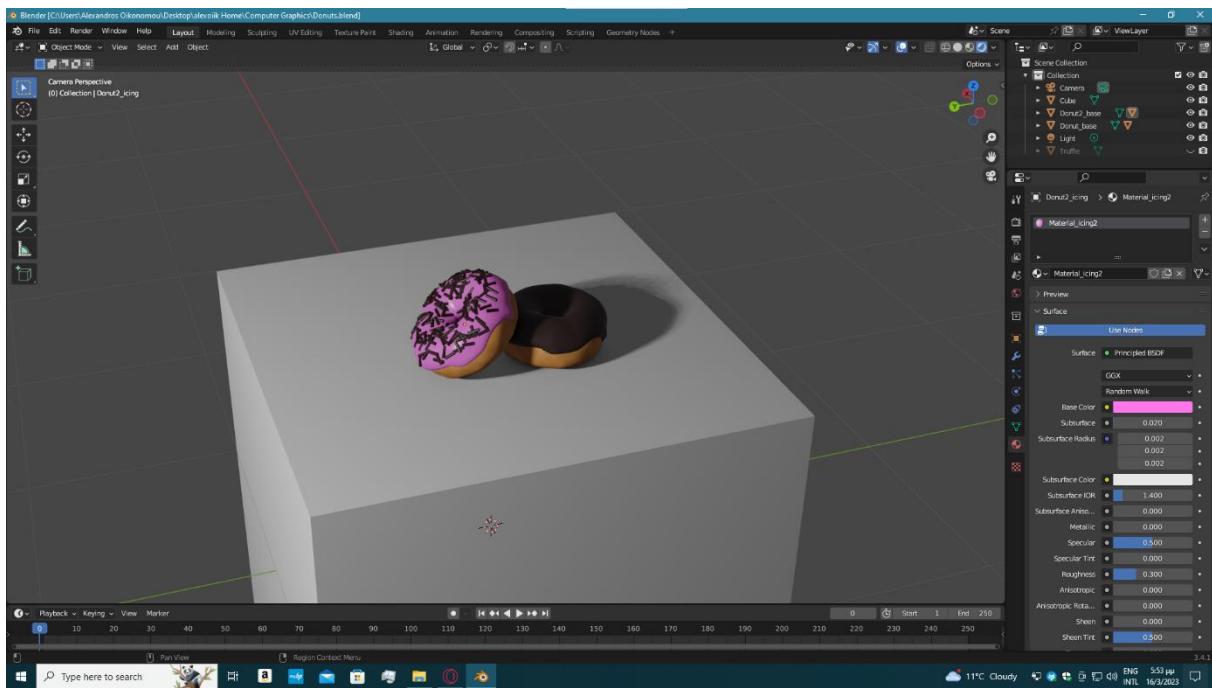
Image 2.9: Geometry nodes > truffles



Step 8:

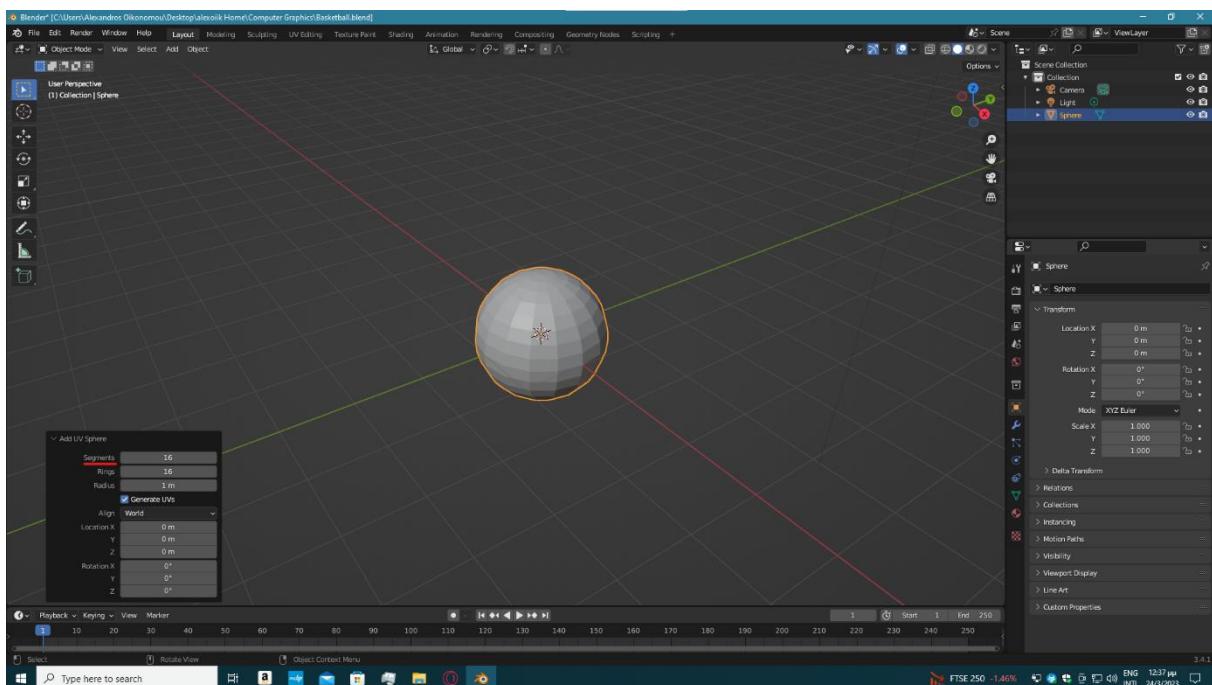
- Creating Strawberry material.
- Creating truffles, using Geometry Nodes.

Image 2.10: Final result



Basketball

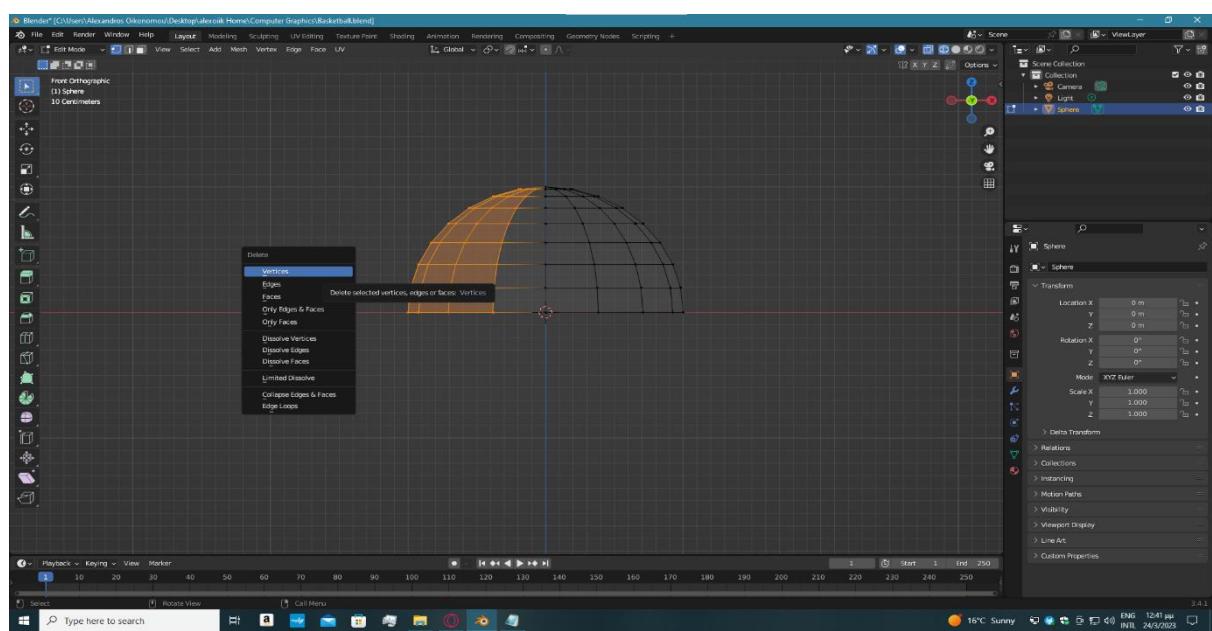
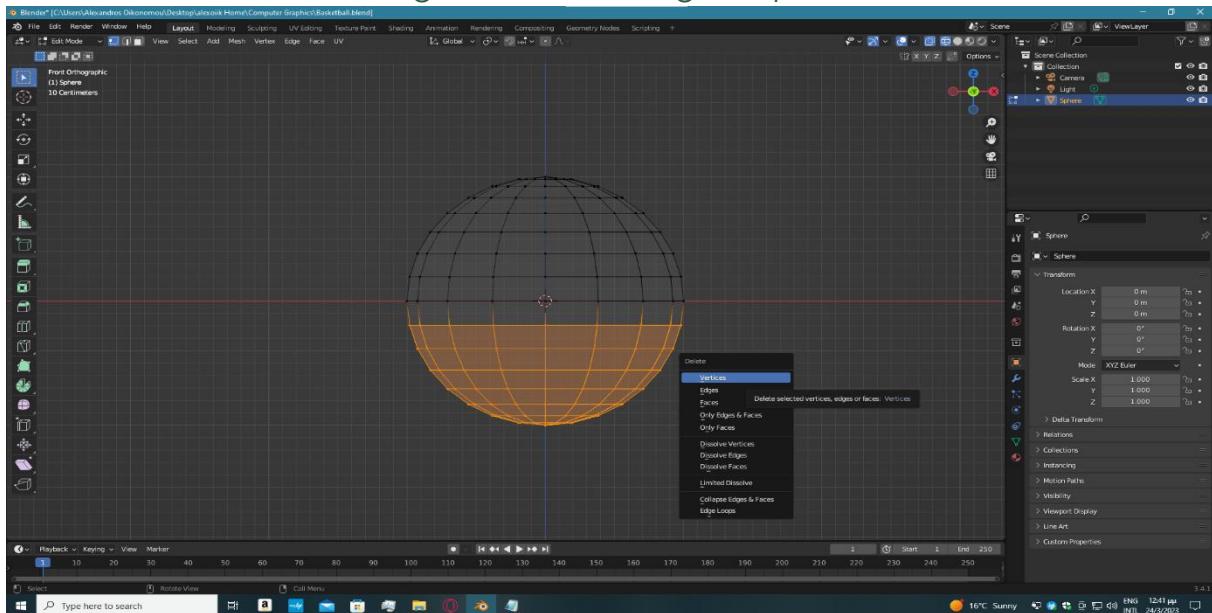
Image 3.0: UV Sphere addition

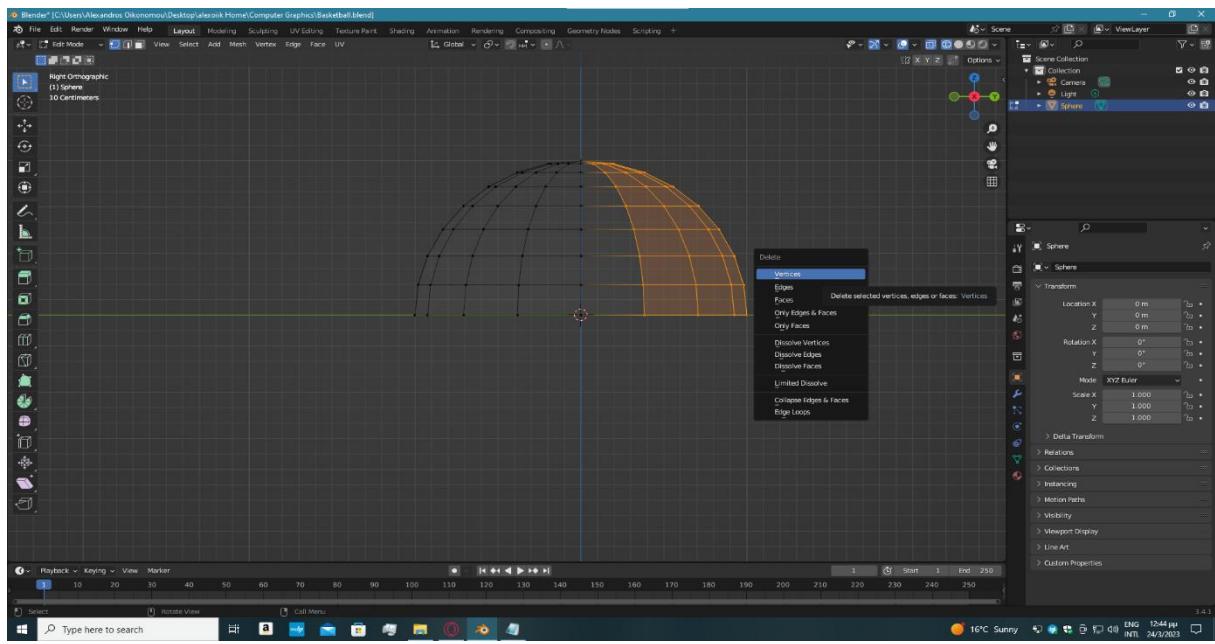


Step 1:

- UV Sphere addition for basketball.
- Adjusting Add UV Sphere settings.

Images 3.1-3.3: Editing UV Sphere

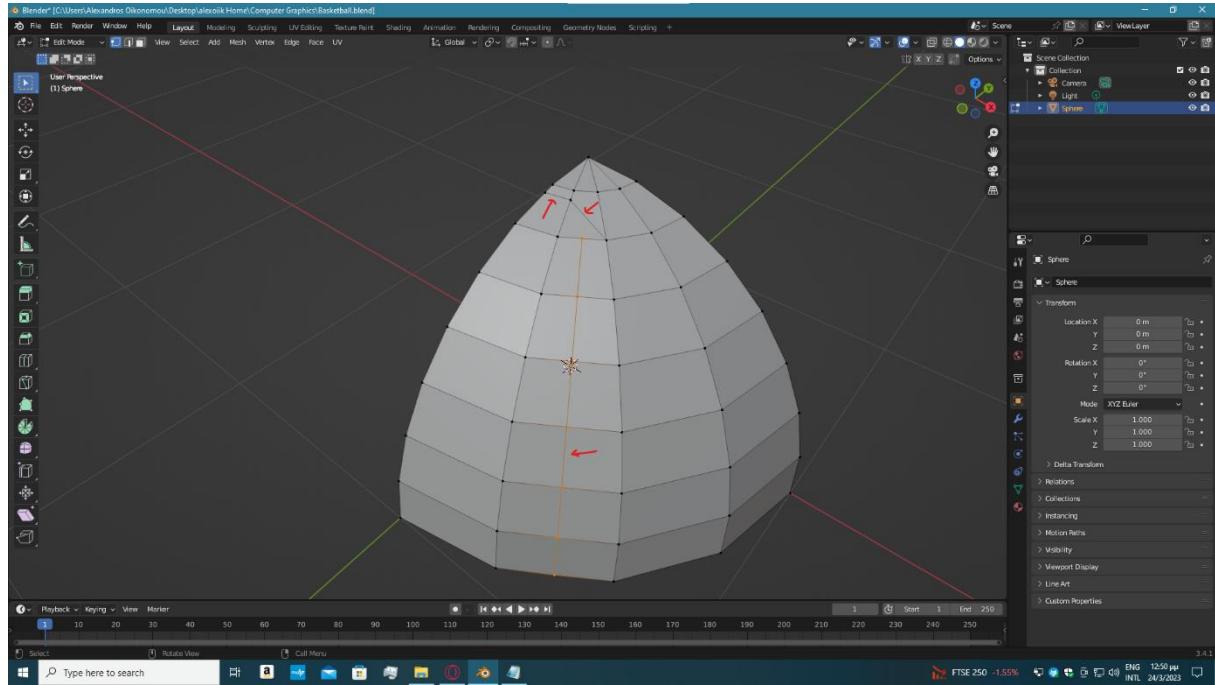




Step 2:

- Changing to Wireframe View.
- Deleting appropriate vertices.

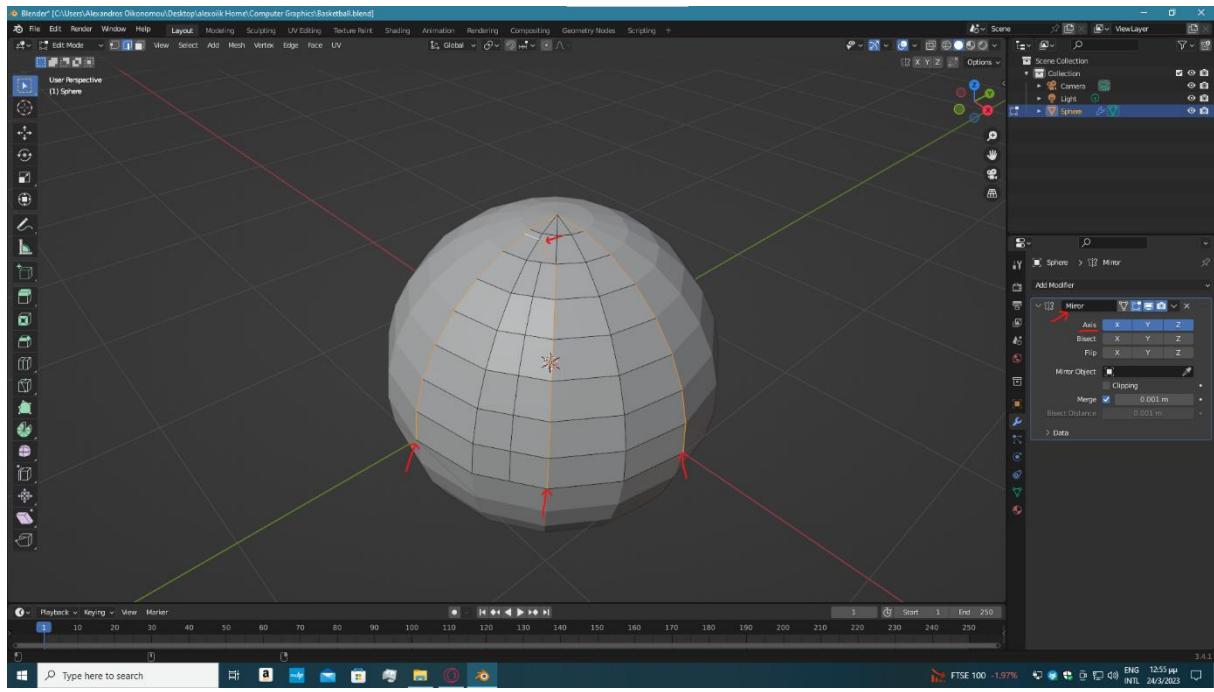
Image 3.4: Cuts



Step 3:

- Using Knife (K) for cutting two parts.
- Adding 1 Loop Cut (ctrl + R).

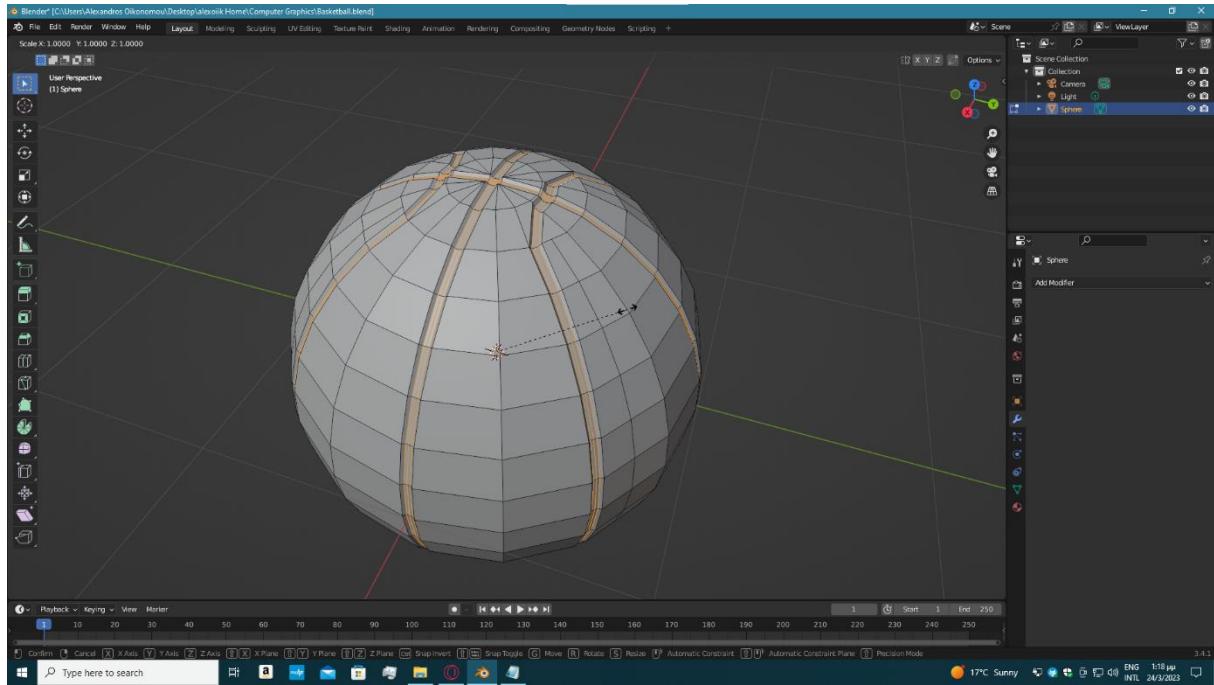
Image 3.5: Modifier



Step 4:

- Adding Mirror Modifier to X, Y, Z axis.
- Selecting appropriate edges.
- Applying Mirror Modifier.

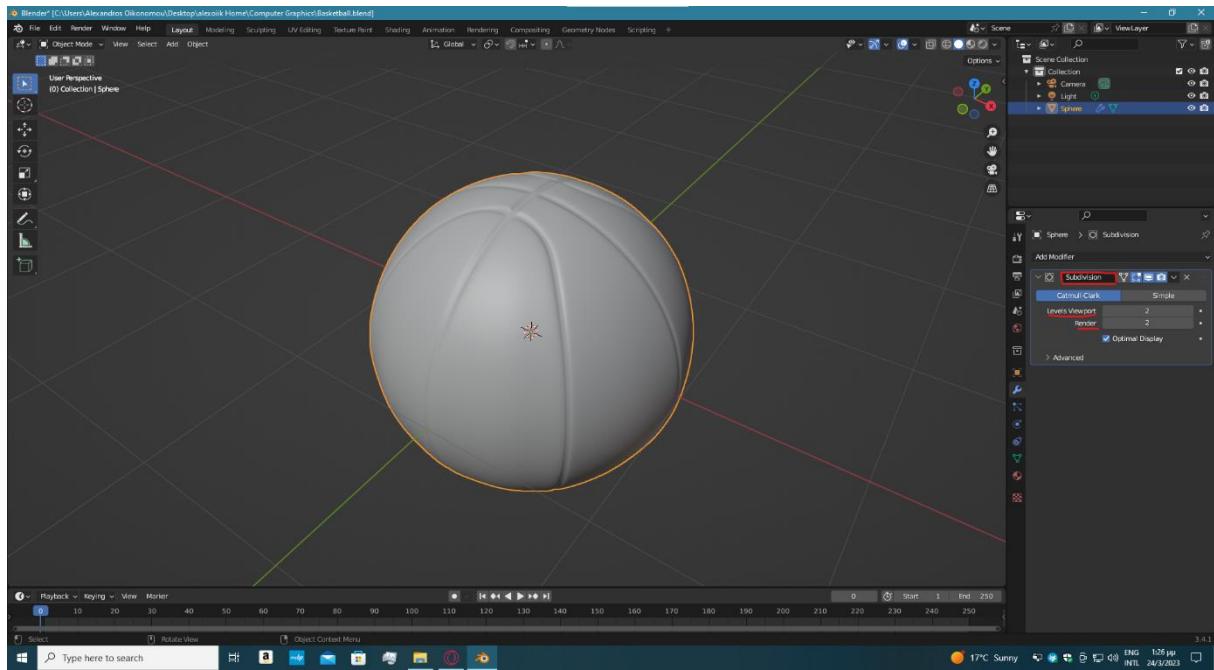
Image 3.6: Creating ball's edges



Step 5:

- Adding Bevels with 3 Loops inside selected vertices (ctrl + D).
- Selecting middle edges.
- Scaling (S) them inside.

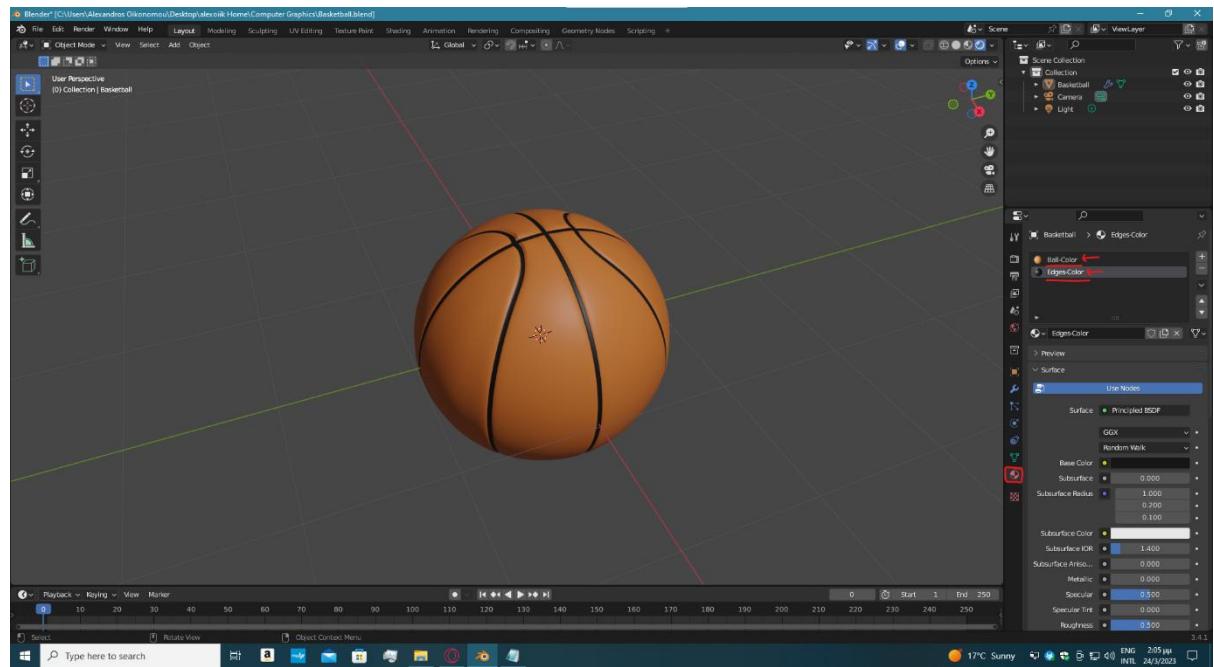
Image 3.7: Extra modifier



Step 6:

- Making it Shade Smooth.
- Adding Subdivision Surface Modifier.

Image 3.8: Basketball materials



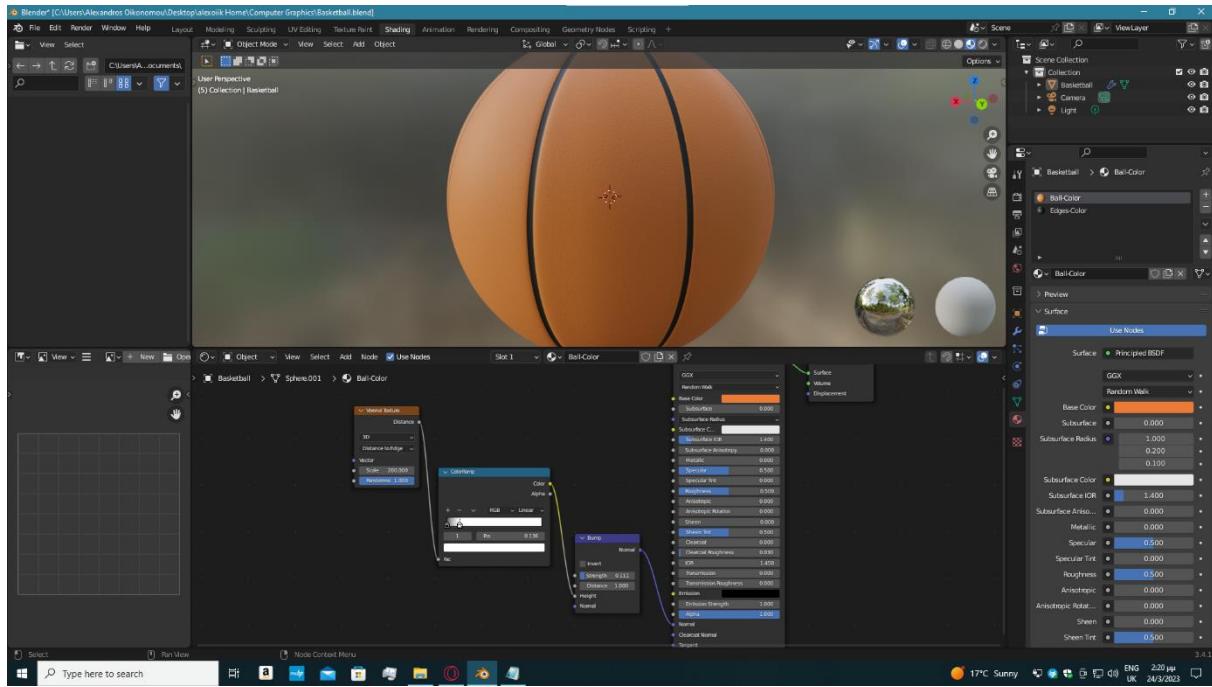
Step 7:

- Adding 2 Materials, and giving them colors:

→ name: Ball-Color > **Orange color**

→ name: Edges-Color > **Black color**

Image 3.9: Bump mapping



Step 8:

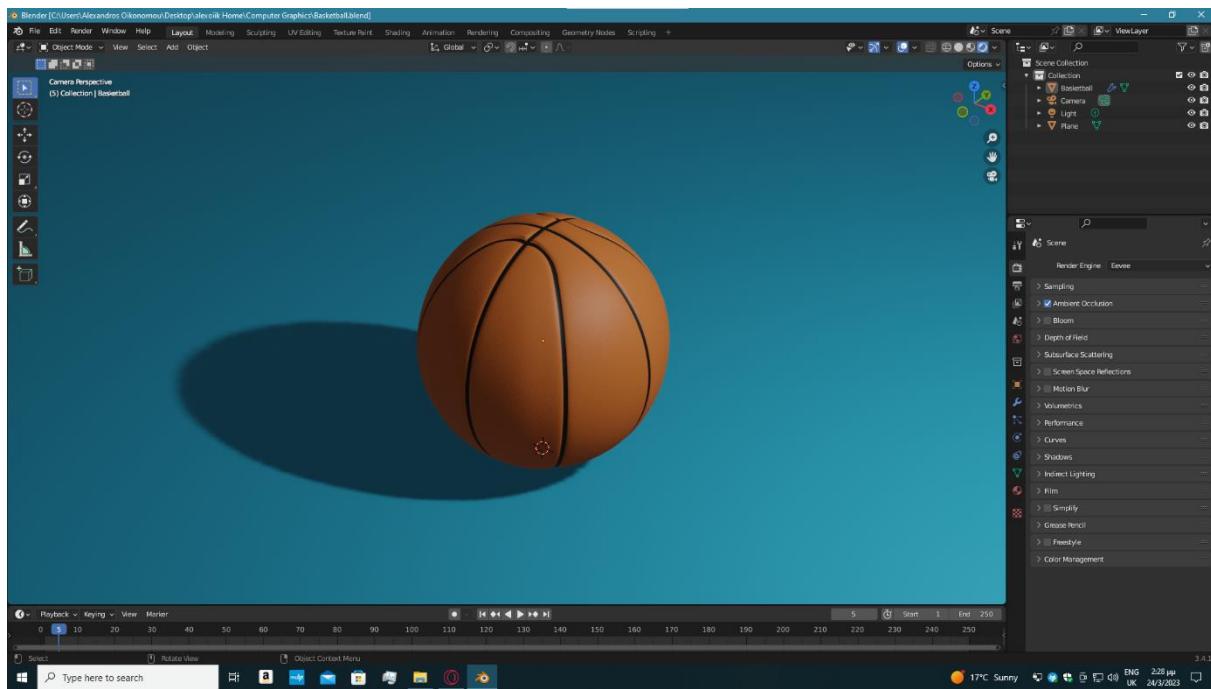
- Creating Bump mapping:

→ 1 Texture: **Voronoi Texture**

→ 1 Converter: **ColorRamp**

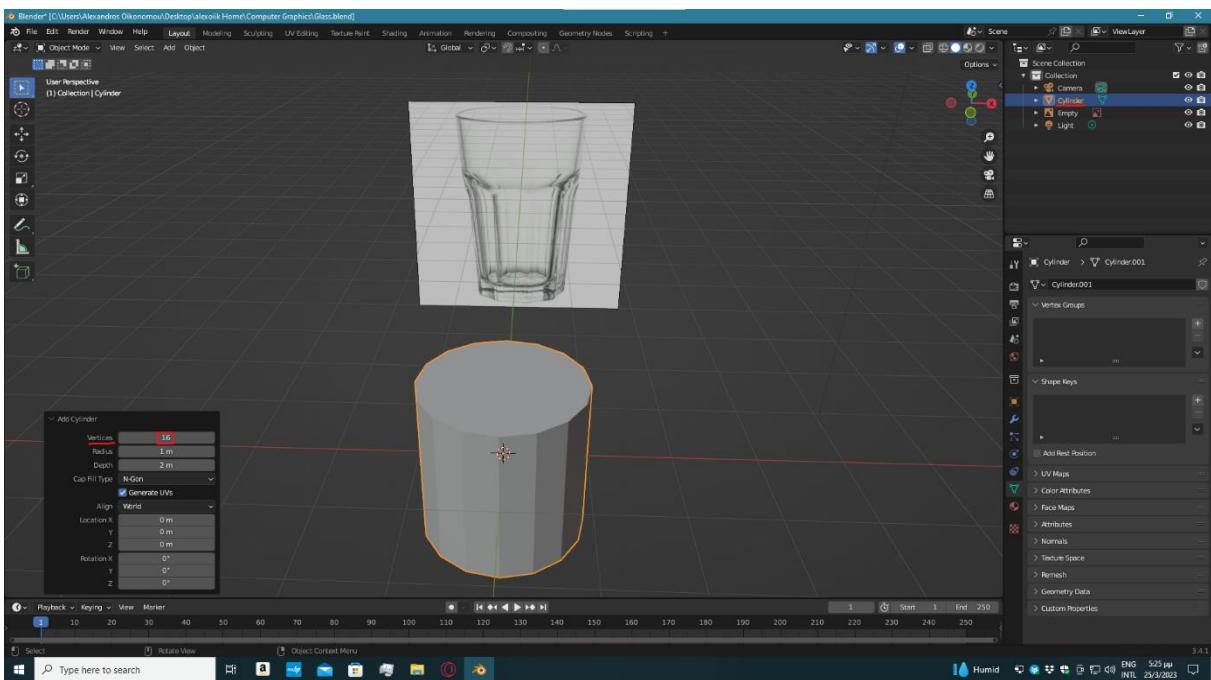
→ 1 Vector: **Bump**

Image 3.10: Final Result



Glass

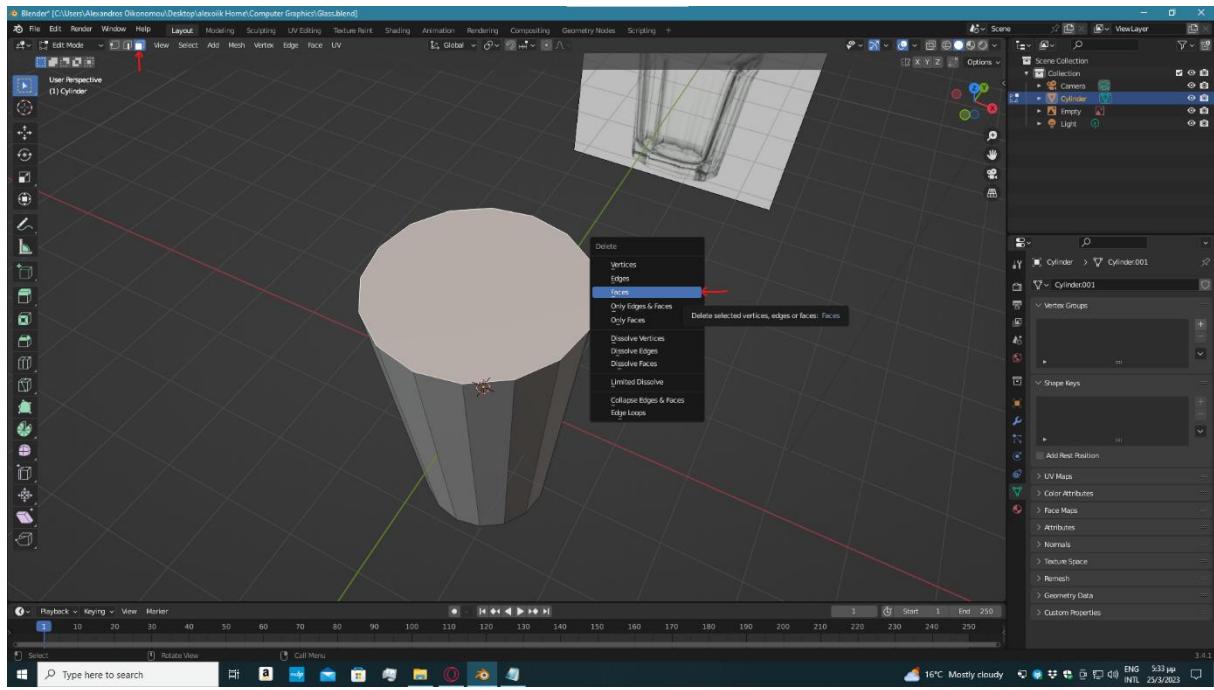
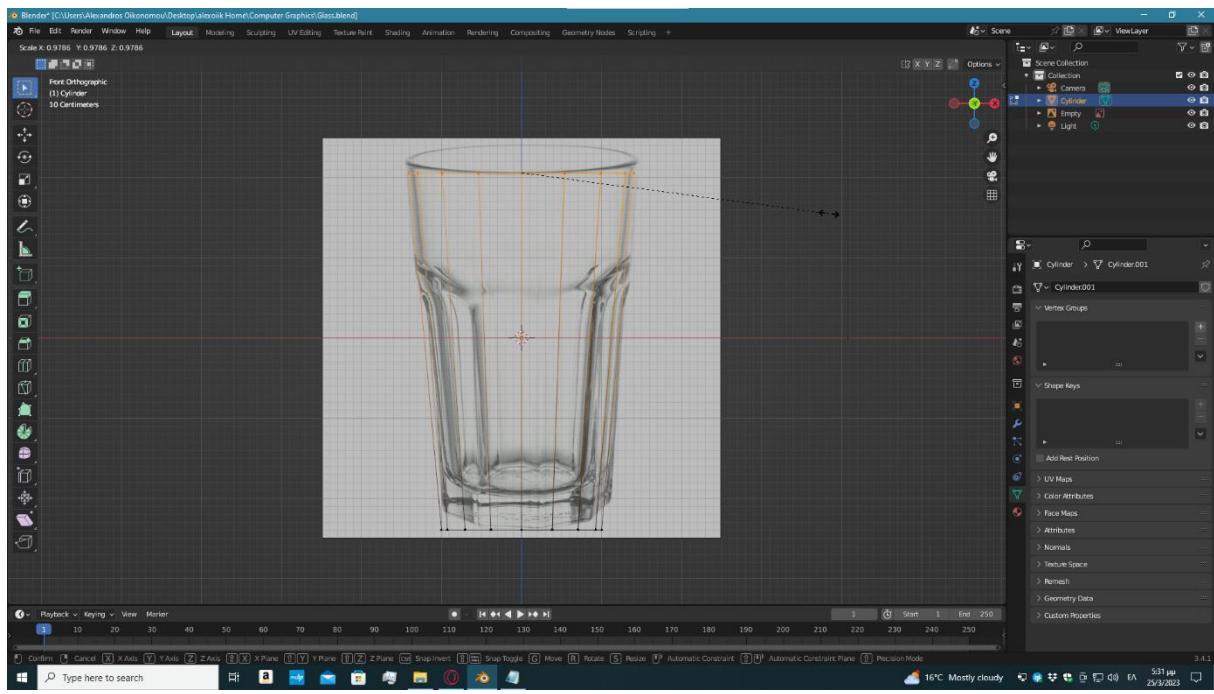
Image 4.0: Cylinder addition

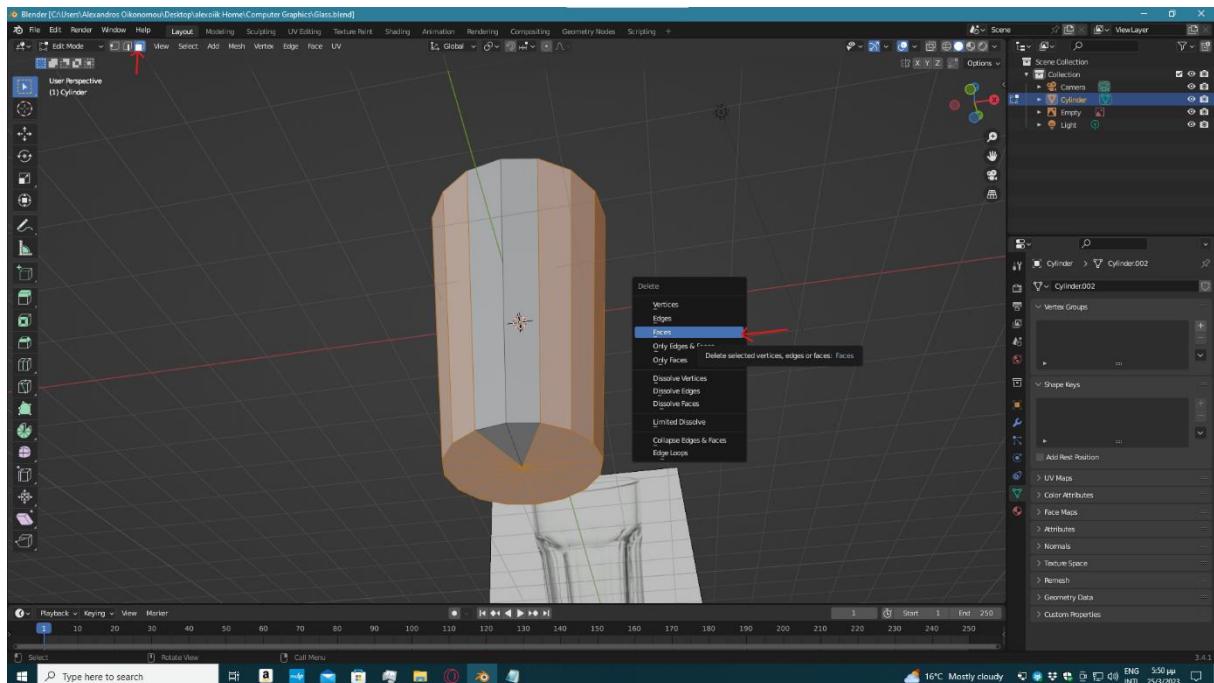
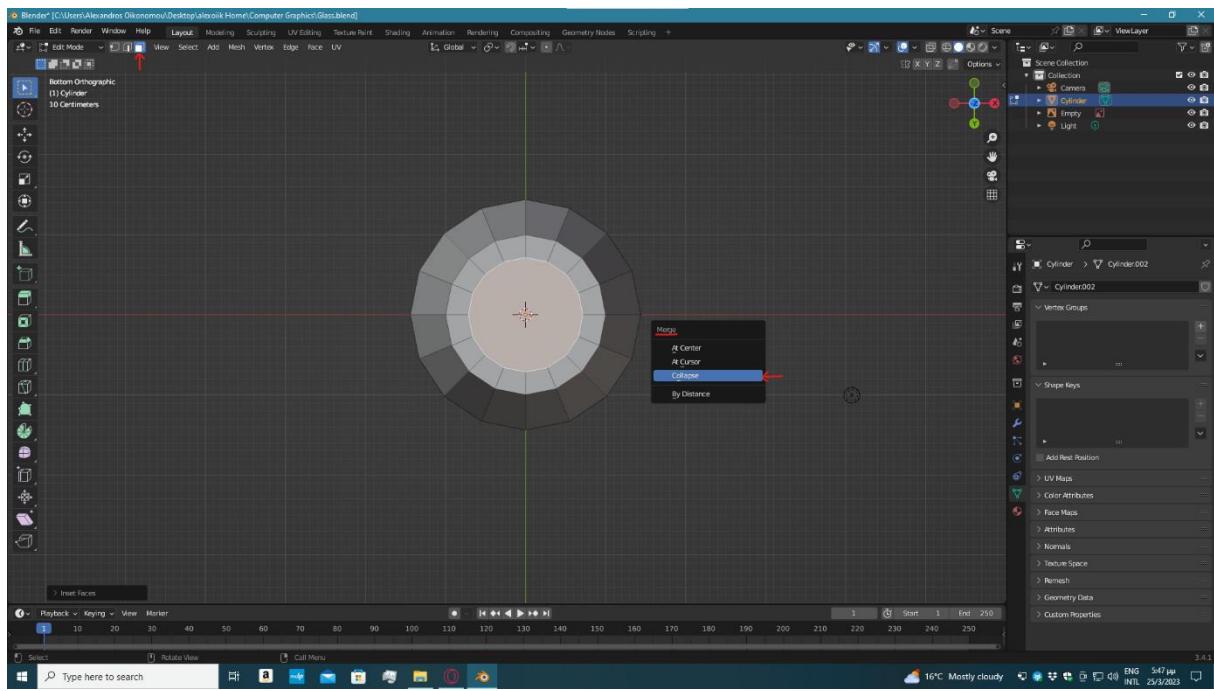


Step 1:

- Reference image addition for my convenience.
- Cylinder addition for glass.
- Adjusting Add Cylinder settings.

Image 4.1-4.4: Editing cylinder

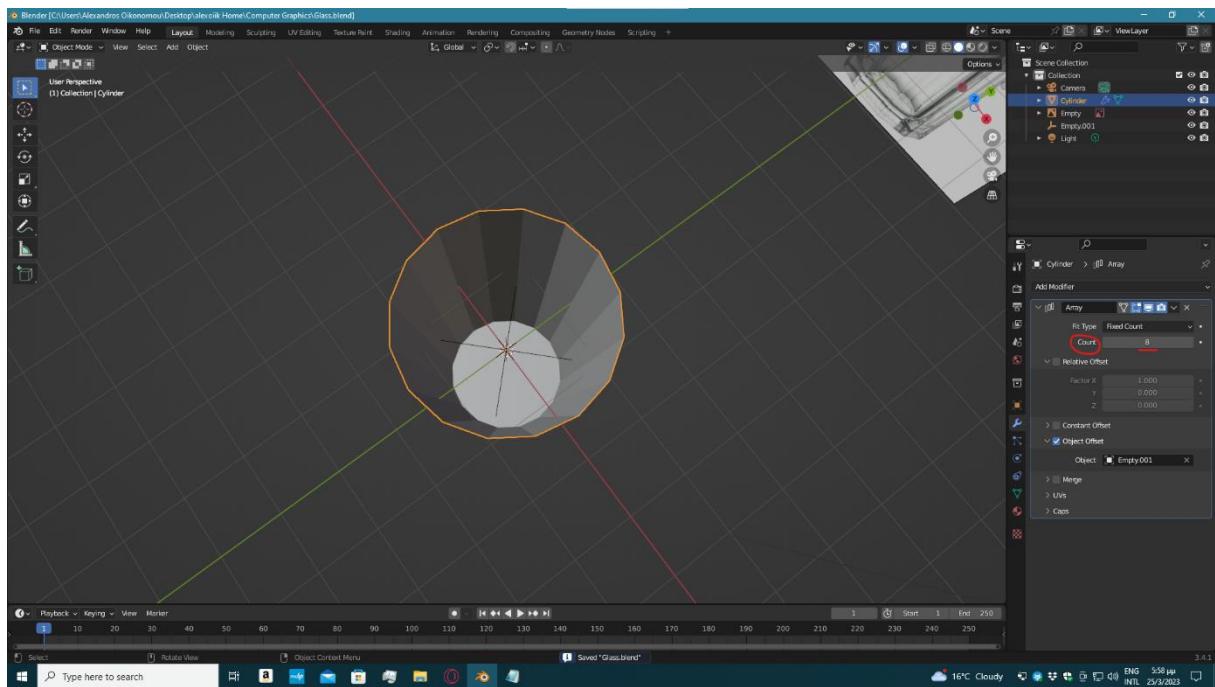
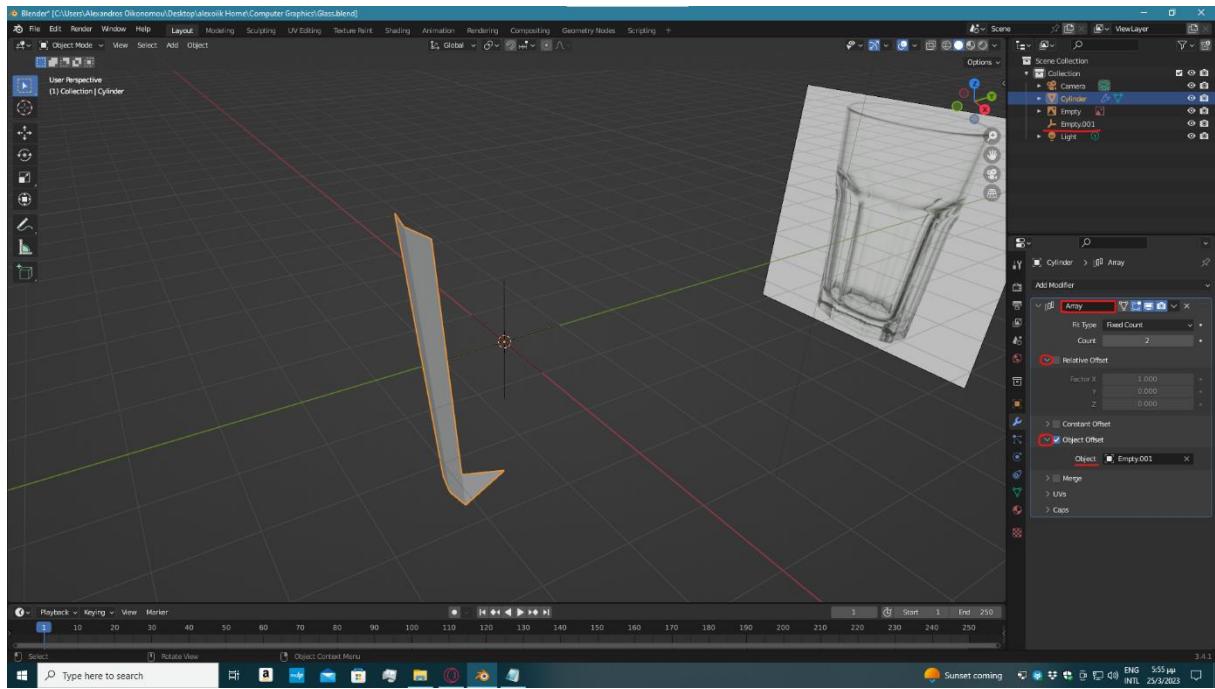




Step 2:

- Grapping (G) and Scaling (S) top vertices, to adjust right shape of object as background image.
- Selecting and Deleting top face.
- Adding one face to the bottom and Merging (M) it: Merge → Collapse
- Selecting and Deleting appropriate faces.

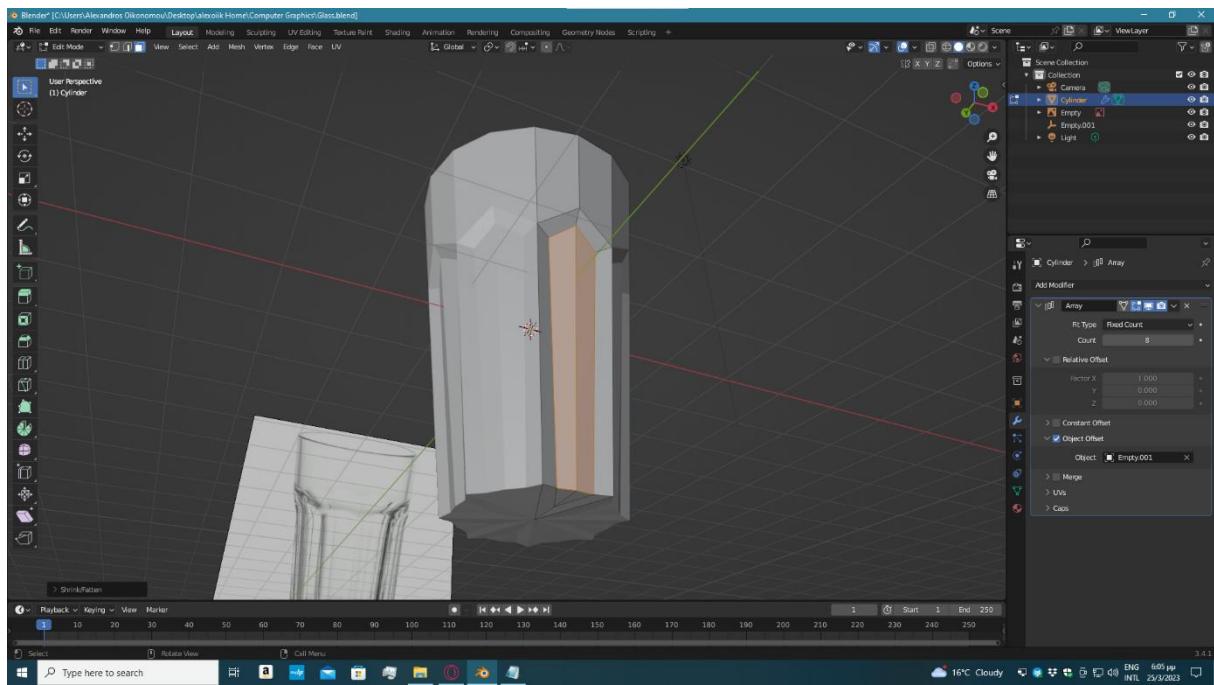
Image 4.5-4.6: Modifier, Plain Axis rotation



Step 3:

- Adding Plain Axis (Add > Empty > Plain Axis).
- Adding Array Modifier.
- Rotating (R) the object at:
→ Z-axis and 45 degrees.

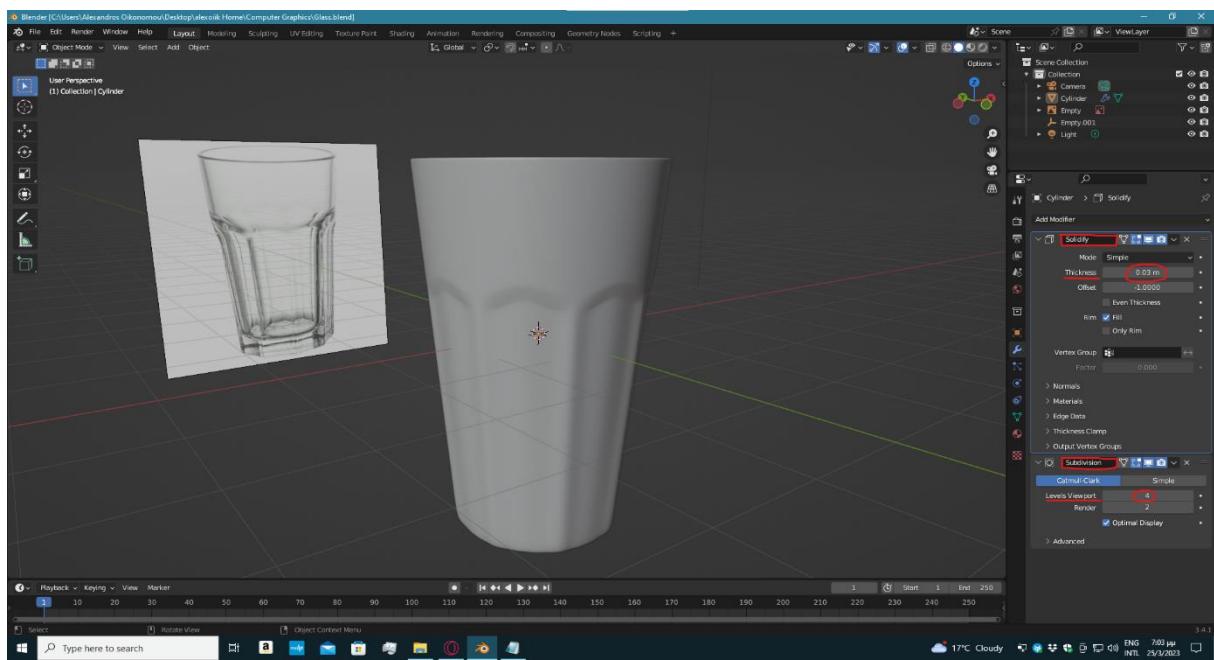
Image 4.7: Glass design



Step 4:

- Adding 1 Loop Cut (ctrl + R) and Grapping (G) middle edge to pull it outside.
- Inserting new faces (I).
- Using alt + S to push inside faces.
- Applying Array Modifier.

Image 4.8: Extra modifiers



Step 5:

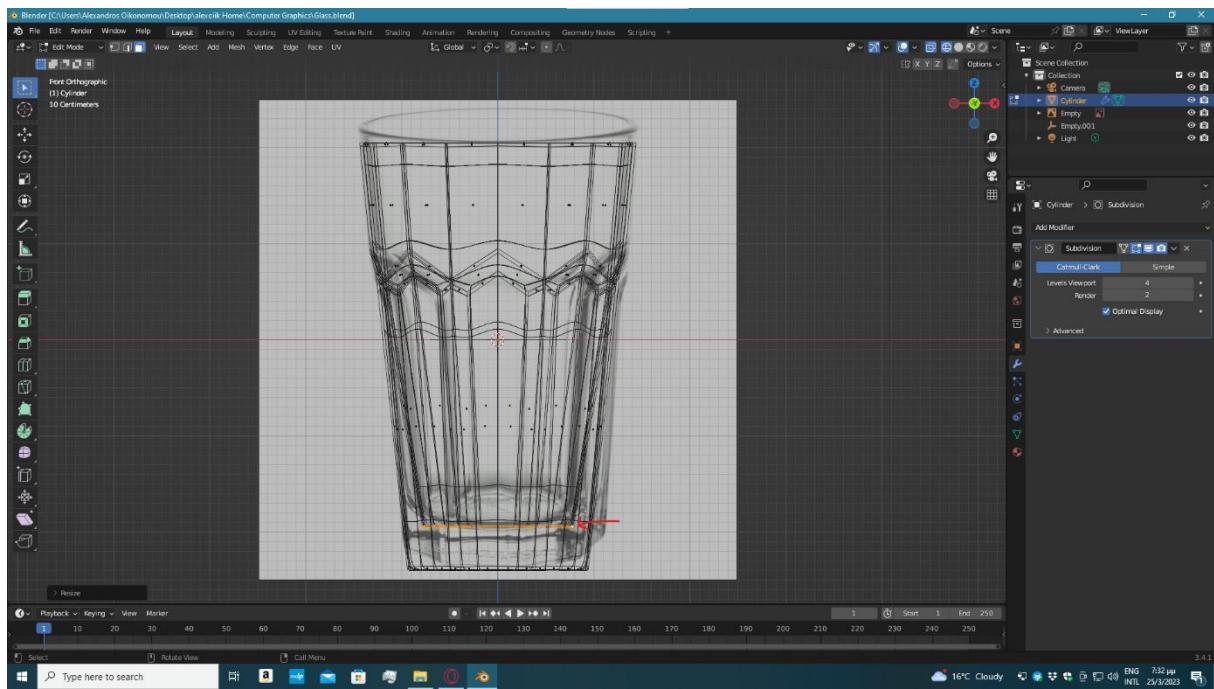
- Making it Shade Smooth.
- Adding two Modifiers:

→ Solidify

→ Subdivision Surface

- Applying Solidify Modifier.

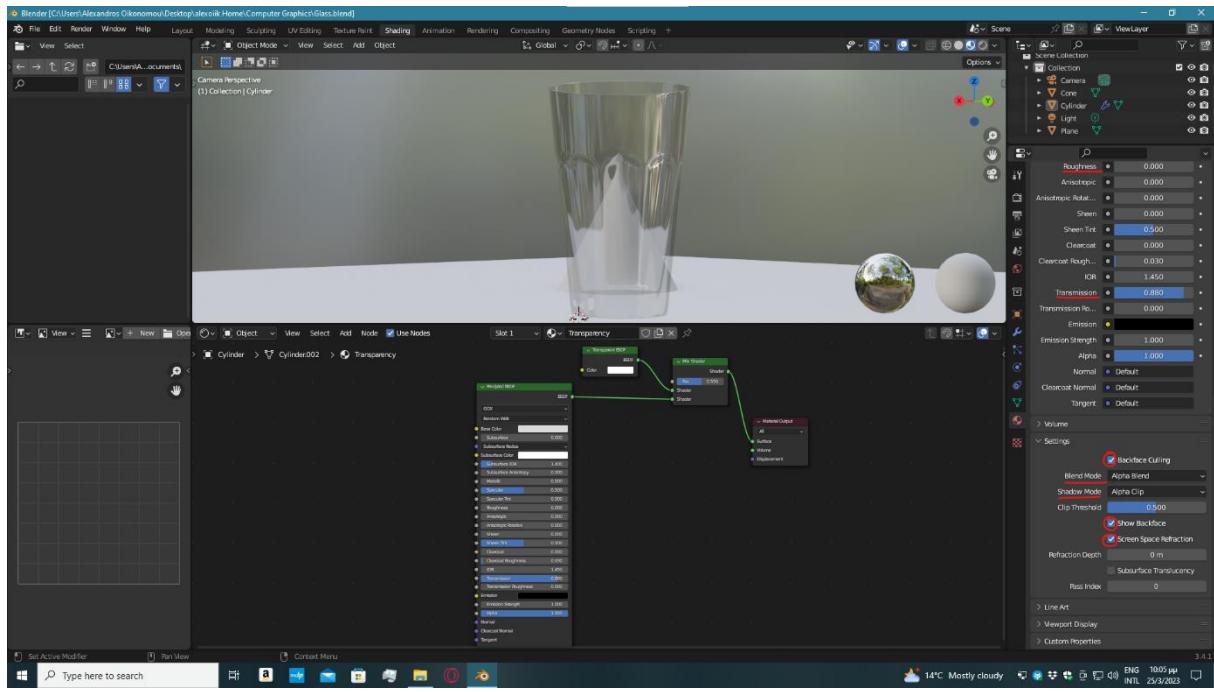
Image 4.9: Finishing details



Step 6:

- Selecting bottom faces.
- Appropriate Grapping (G) and Scaling (S) for finishing glass shape details.

Image 4.10: Transparency



Step 7:

- Adding Cone to check transparency.
- Adding Material > name: Transparency
- Creating Transparency:

→2 Shaders: Transparent BSDF

Mix Shader

- Transparency Settings:

```

Fac → 0.55
Color → Value - 1
Base Color → Value - 0.7
Subsurface Color → Value - 1

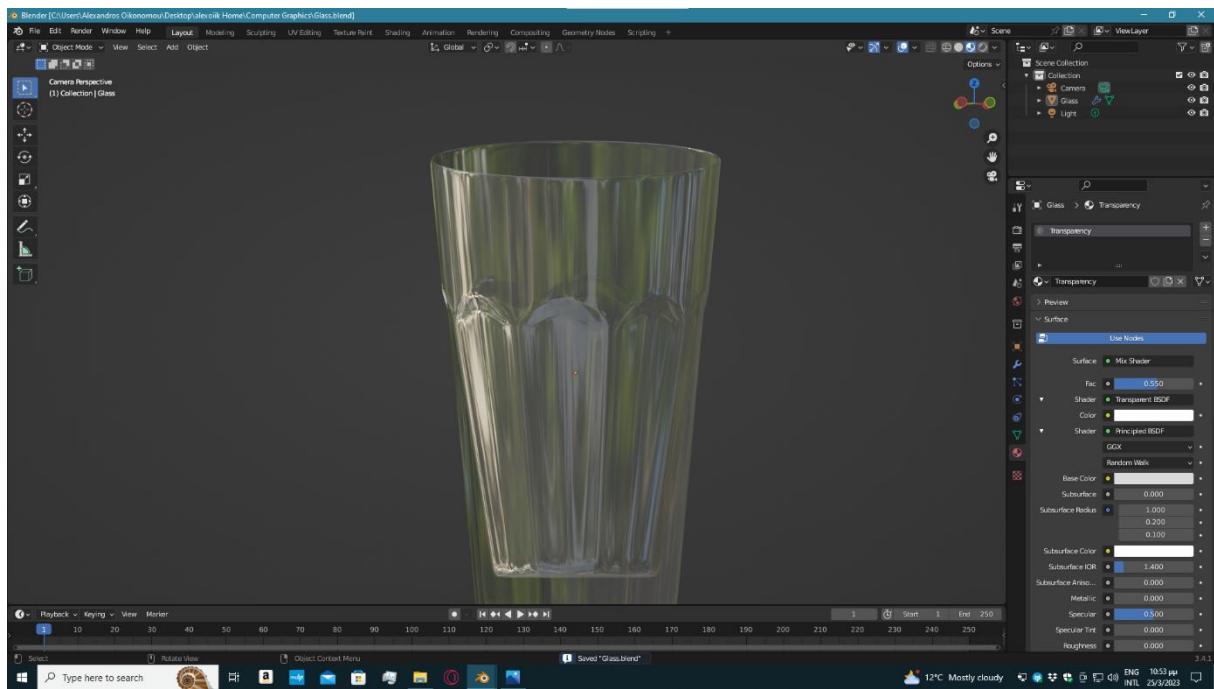
```

```

Render → Screen Space Reflections - On
Render → Screen Space Reflections → Refraction - On
Material → Surface → Principled BSDF → Roughness - 0
Material → Surface → Principled BSDF → Transmission - 0.88
Material → Settings → Backface Culling - On
Material → Settings → Blend Mode - Alpha Blend
Material → Settings → Shadow Mode - Alpha Clip
Material → Settings → Show Backface - On
Material → Settings → Screen Space Refraction - ON
Material → Settings → Refraction Depth - 0 m

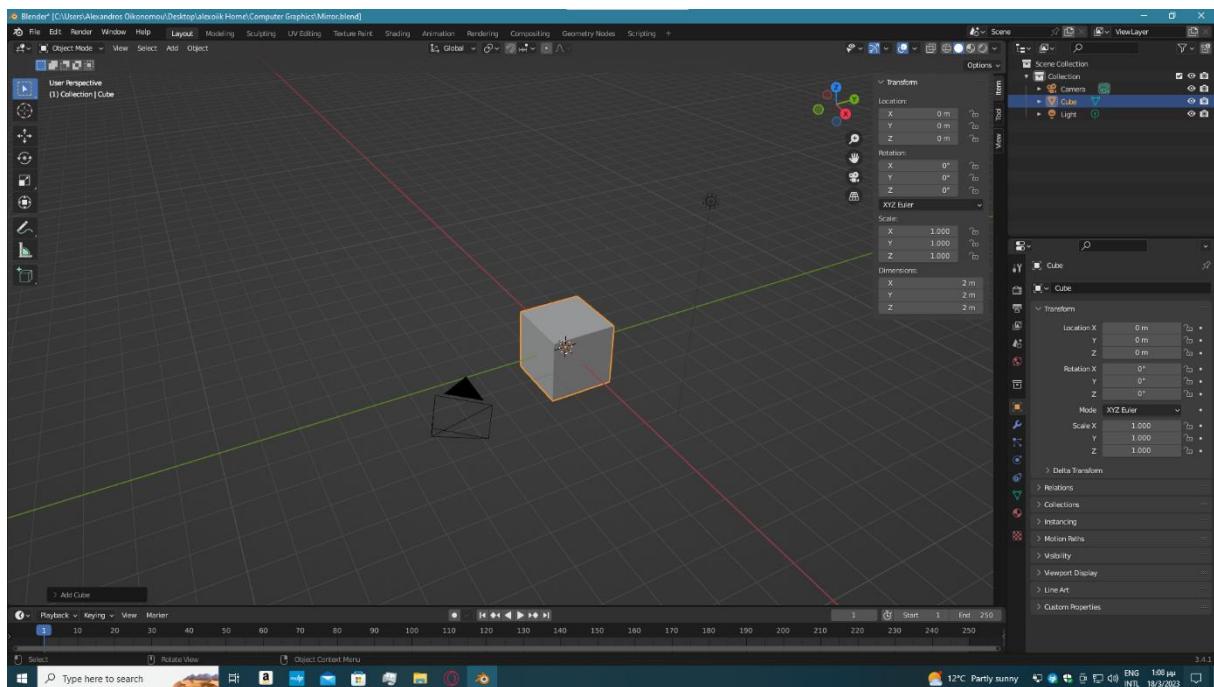
```

Image 4.11: Final Result



Mirror

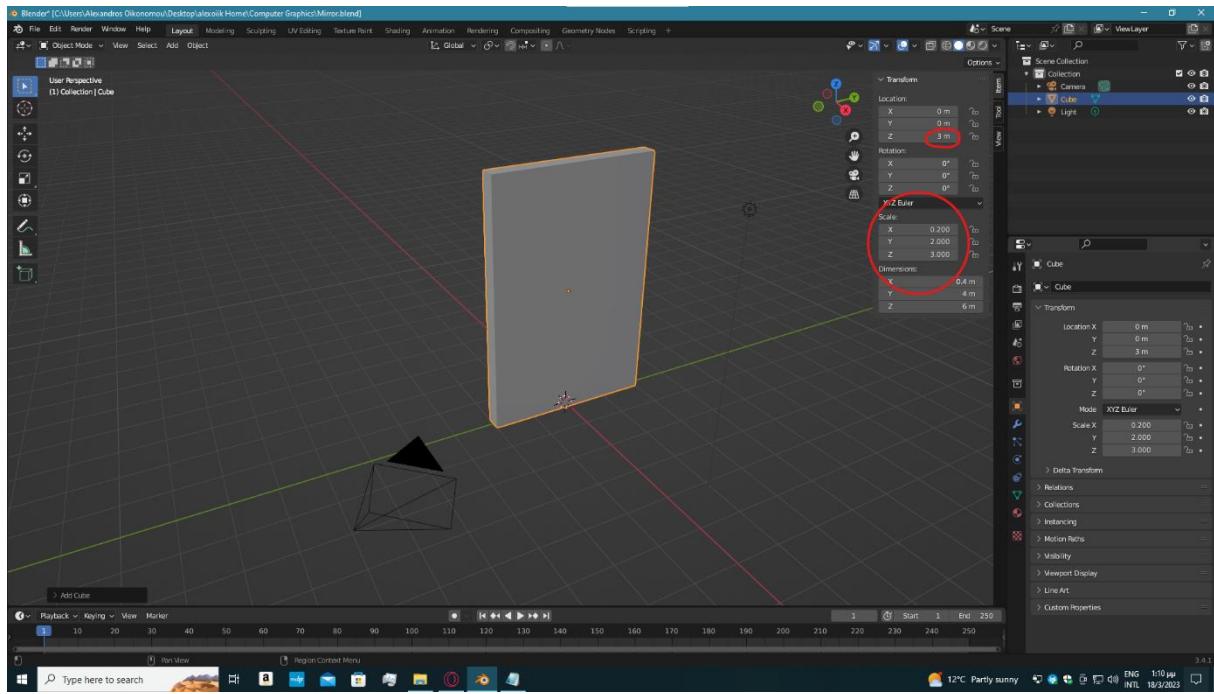
Image 5.0: Cube addition



Step 1:

- Cube addition for mirror's frame.

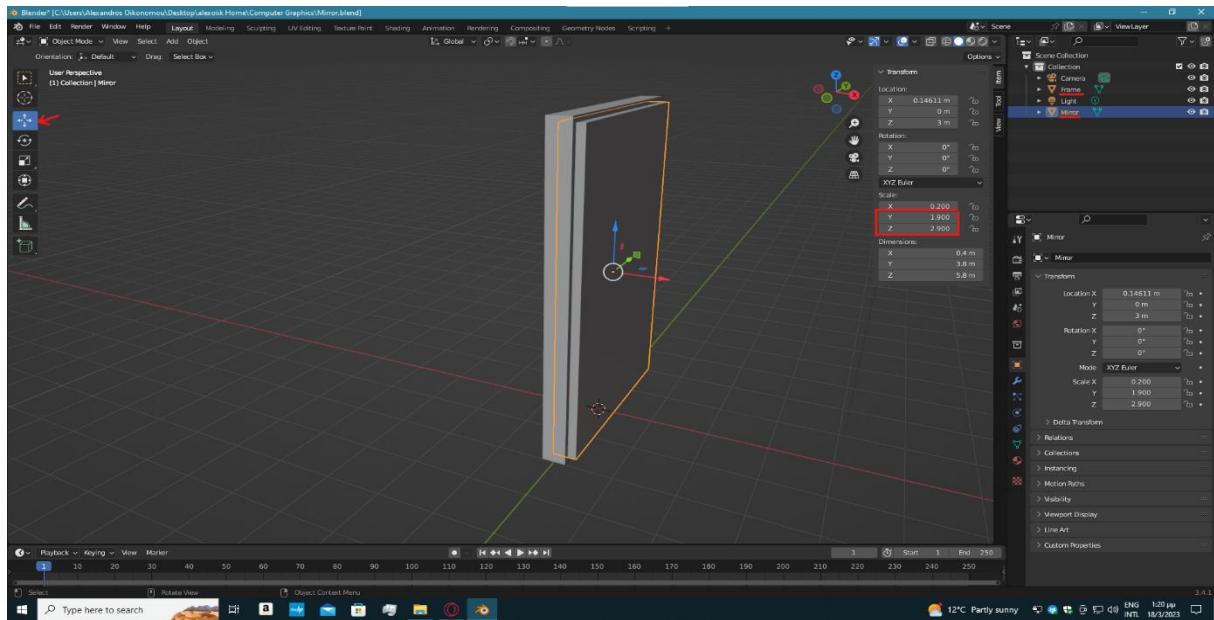
Image 5.1: Changing Location, Scale



Step 2:

- Changing location and scale.

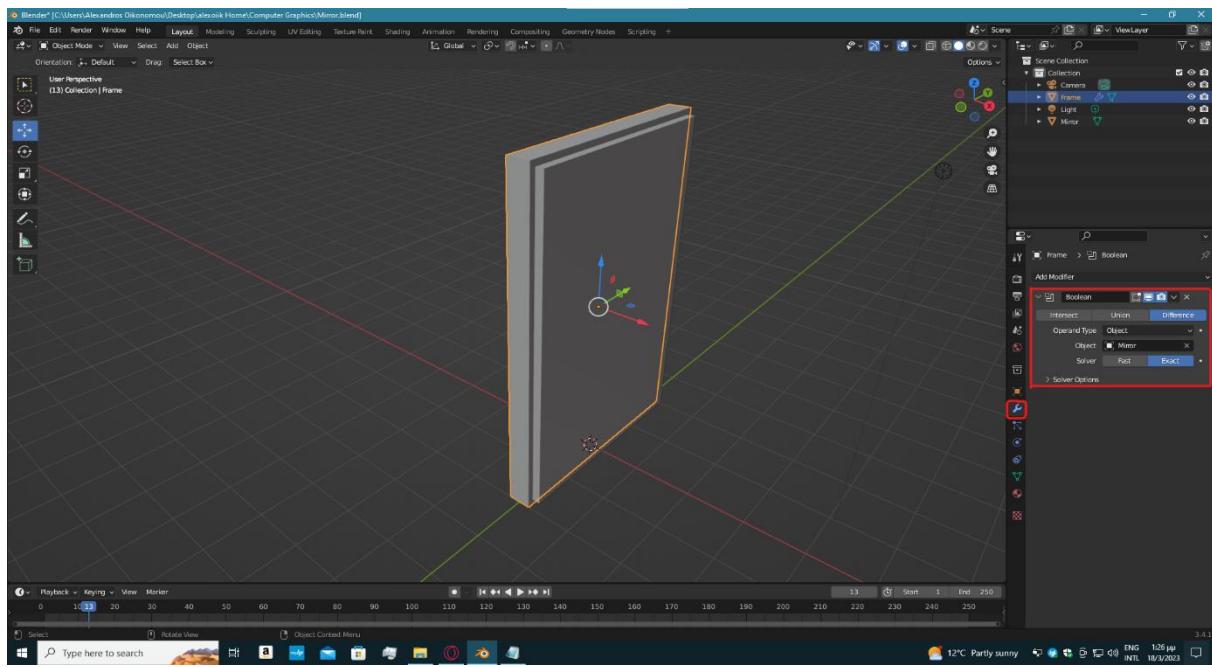
Image 5.2: Mirror creation



Step 3:

- Duplicating (shift + D) cube.
- Graping (G) new cube and placing it in front of old one.
- Adjusting it's scale.
- Renaming objects: Mirror, Frame.

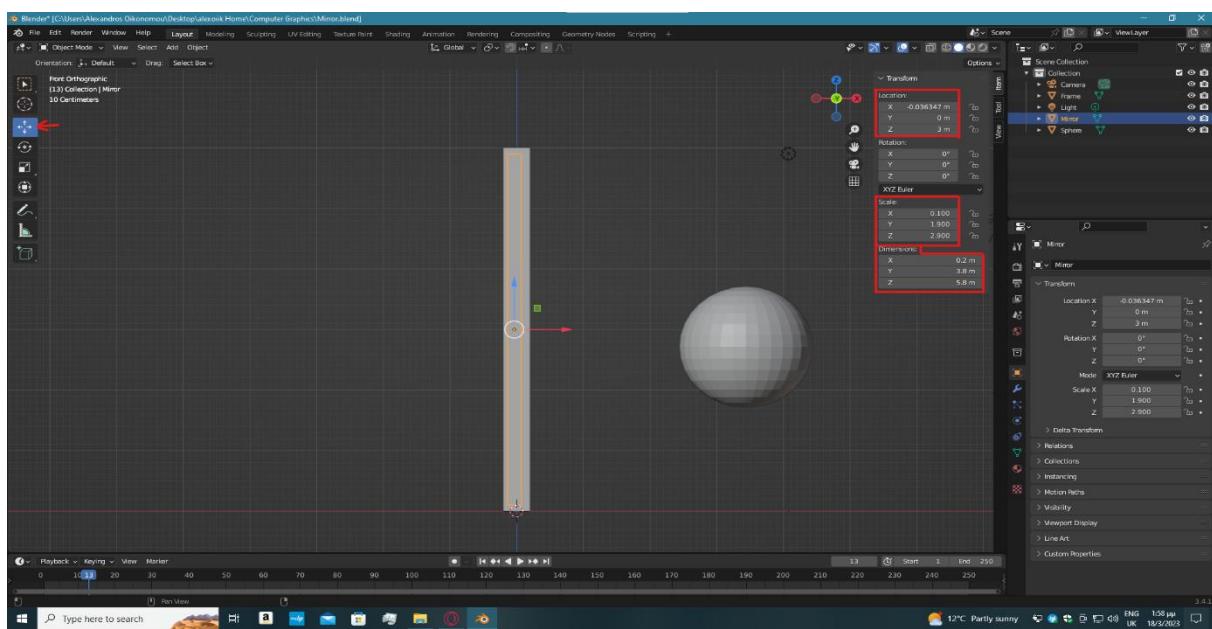
Image 5.3: Modifier



Step 4:

- Adding Boolean Modifier.
- Applying Boolean Modifier.

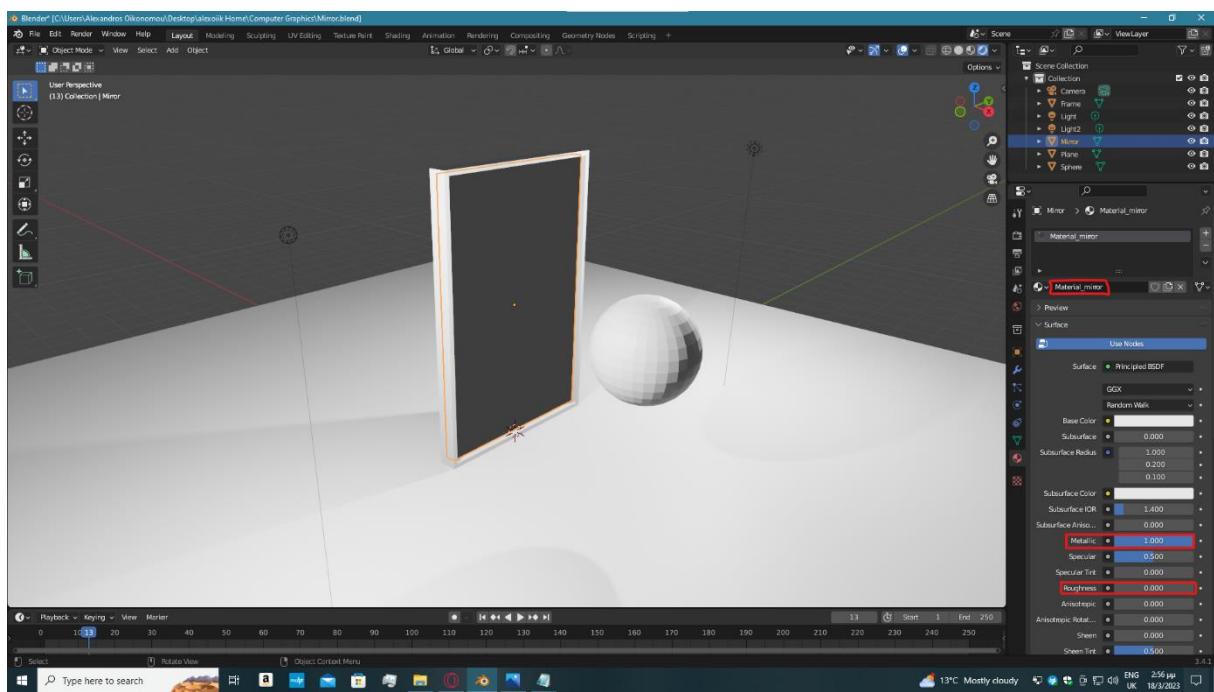
Image 5.4: Mirror Transform settings



Step 5:

- Adding UV Shpere to check high reflectivity.
- Finishing with Mirror Transform settings (Location, Scale, Dimension).

Image 5.5: High reflectivity



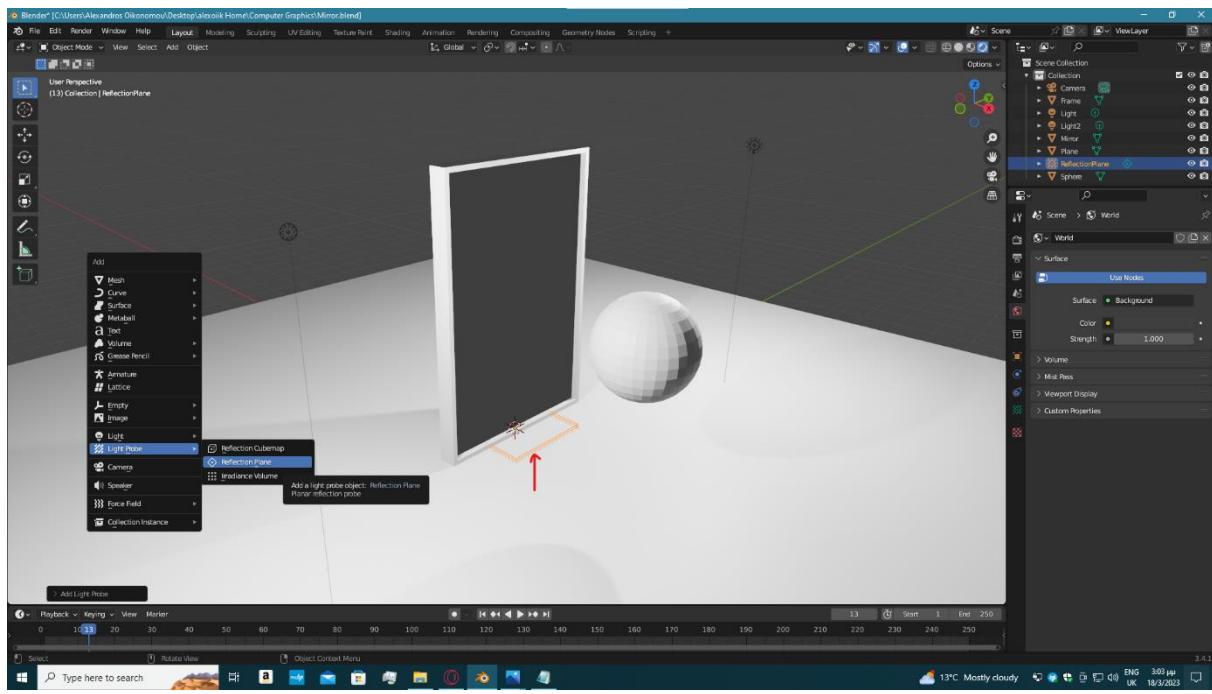
Step 6:

- Adding Material > name: Material-mirror
- High reflectivity Settings:

Render → Screen Space Reflections - On
Render → Screen Space Reflections → Refraction - On

Material → Surface → Principled BSDF → Metallic - 1
Material → Surface → Principled BSDF → Roughness - 0
Material → Settings → Blend Mode - Alpha Blend
Material → Settings → Shadow Mode - Alpha Hashed
Material → Settings → Screen Space Refraction - ON

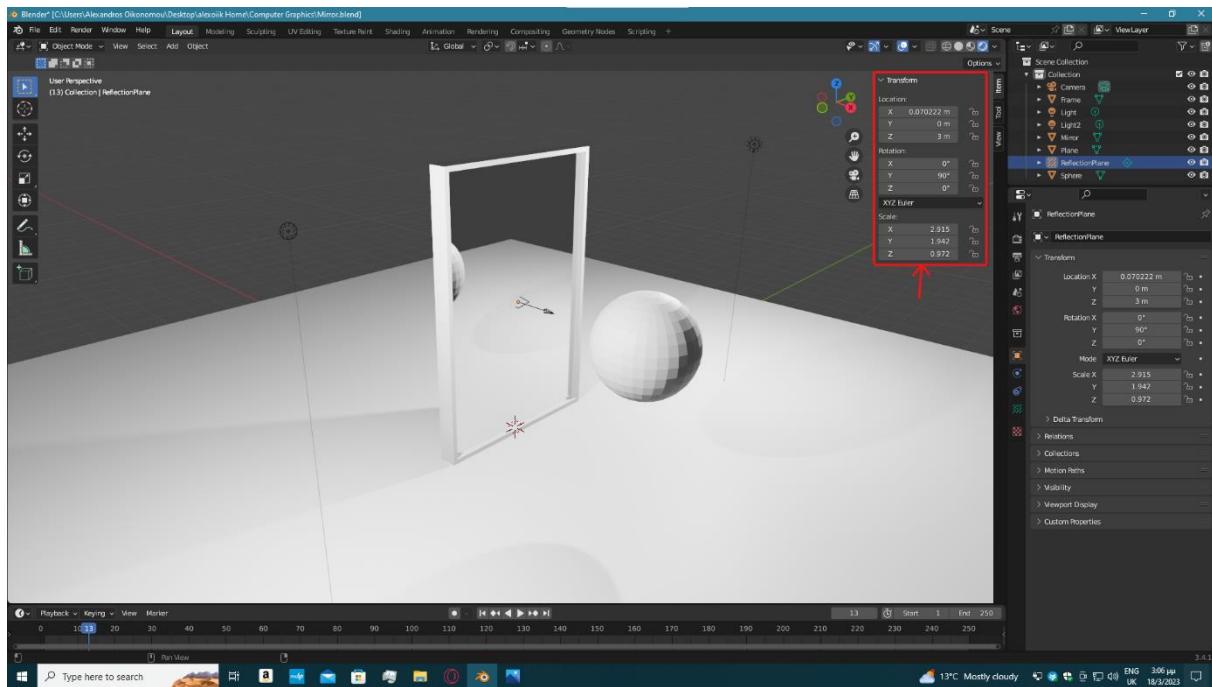
Image 5.6: Reflection Plane



Step 7:

- Adding Reflection Plane for successful High reflectivity (Add > Light Probe > Reflection Plane).

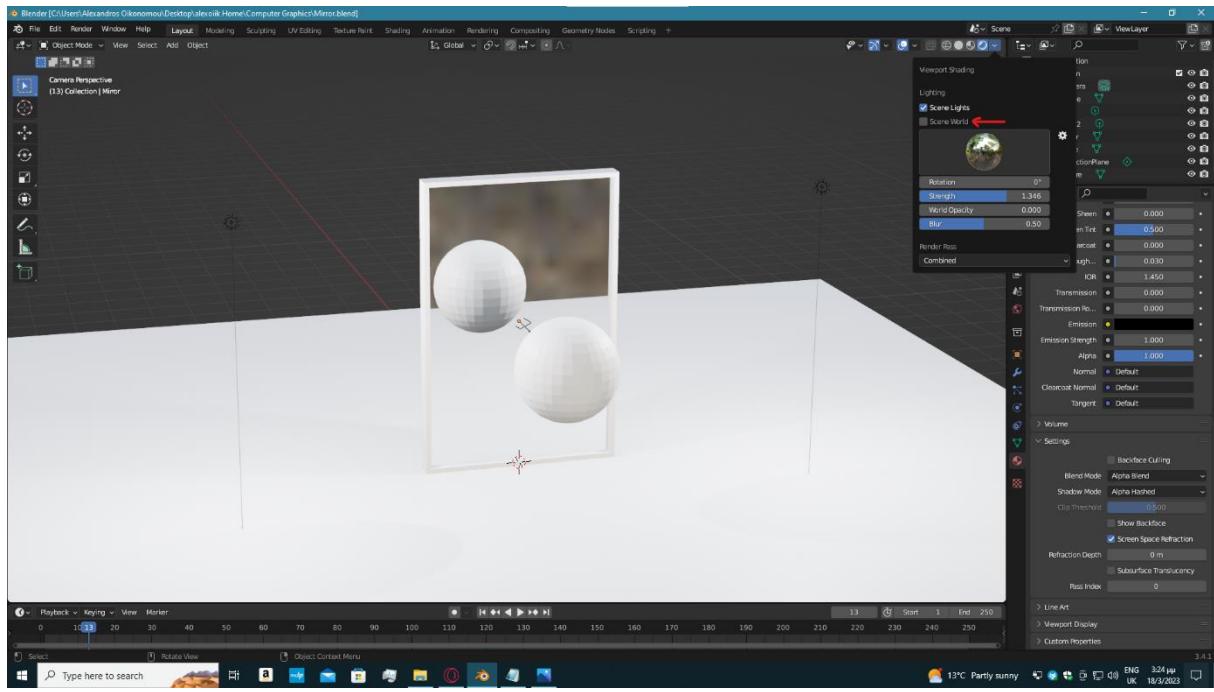
Image 5.7: Reflection Plane Transform settings



Step 8:

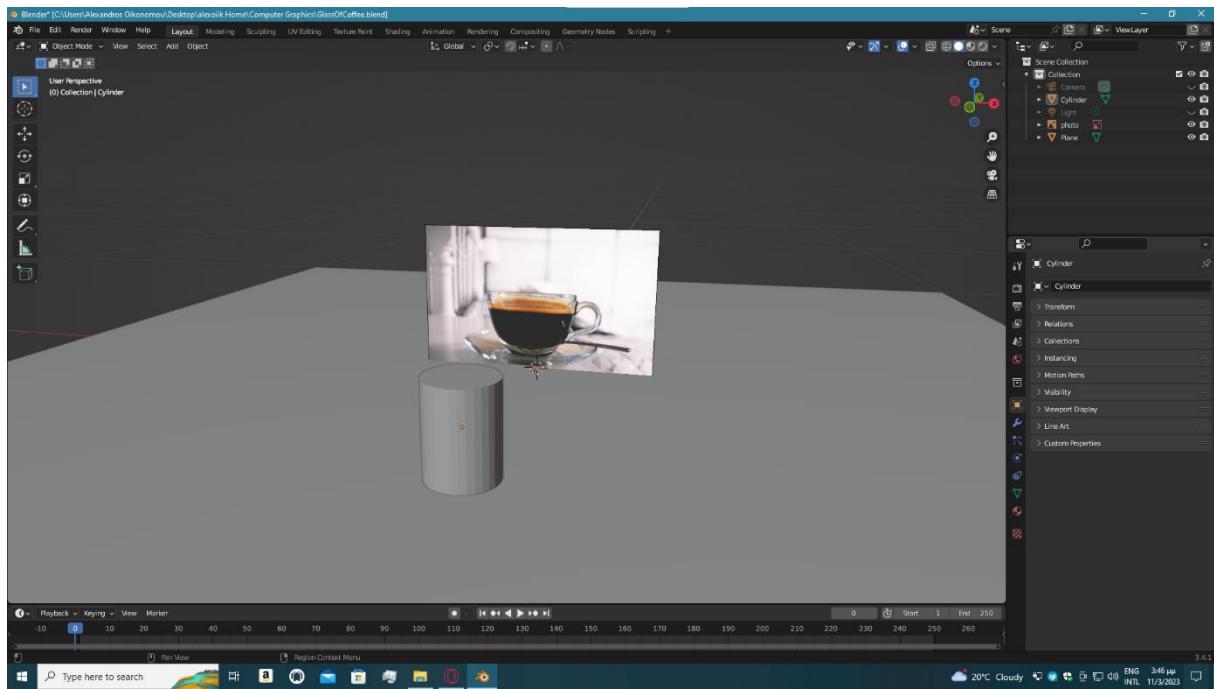
- Adjusting Reflection Plane settings (Location, Scale, Dimension).

Image 5.8: Final Result



Glass of coffee

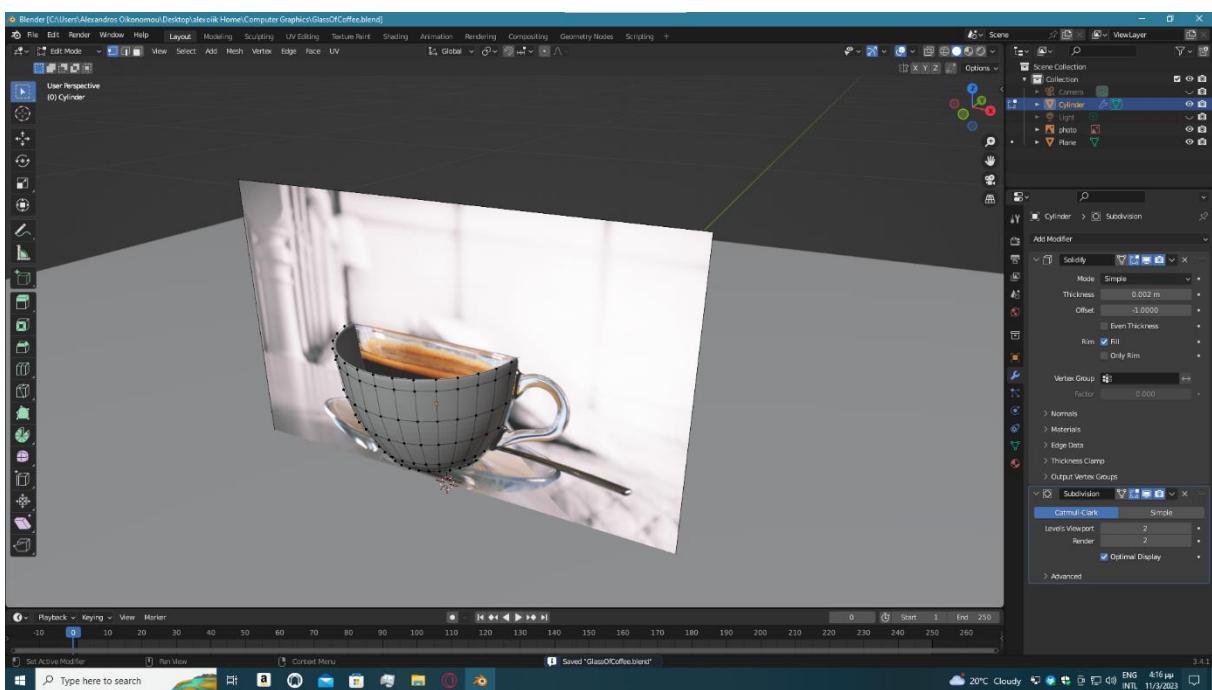
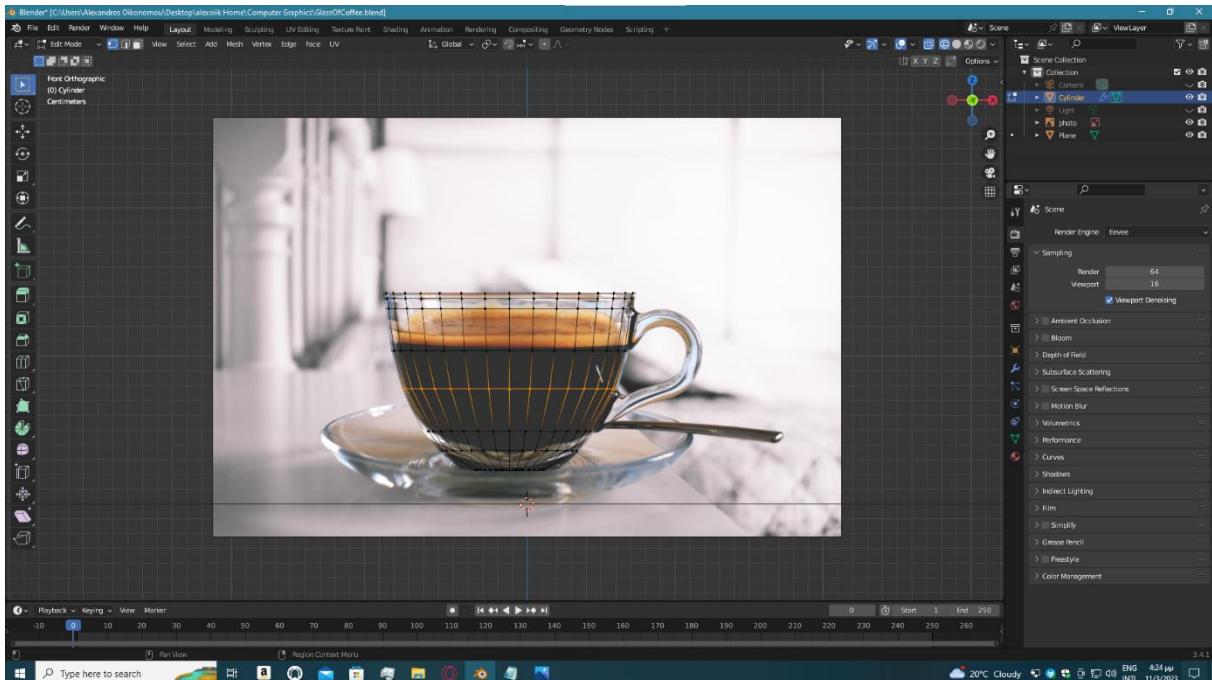
Image 6.0: Cylinder addition



Step 1:

- Reference image addition for my convenience.
- Cylinder addition for glass of coffee.

Image 6.1-6.2: Glass shape creation, Modifiers



Step 2:

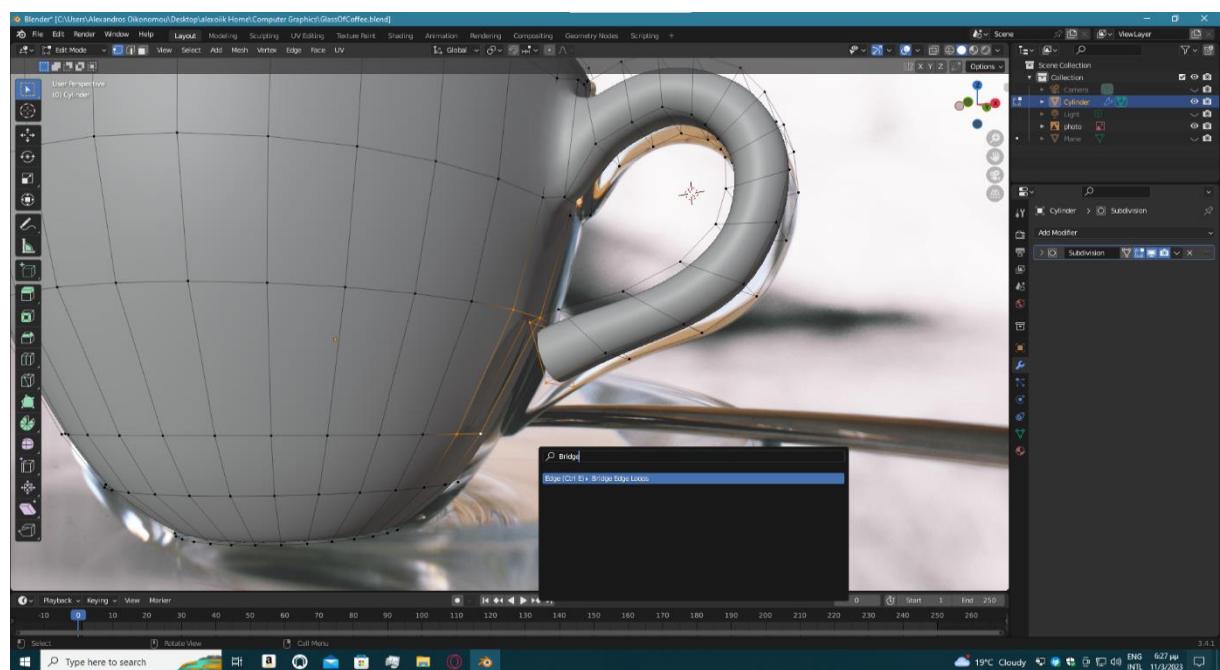
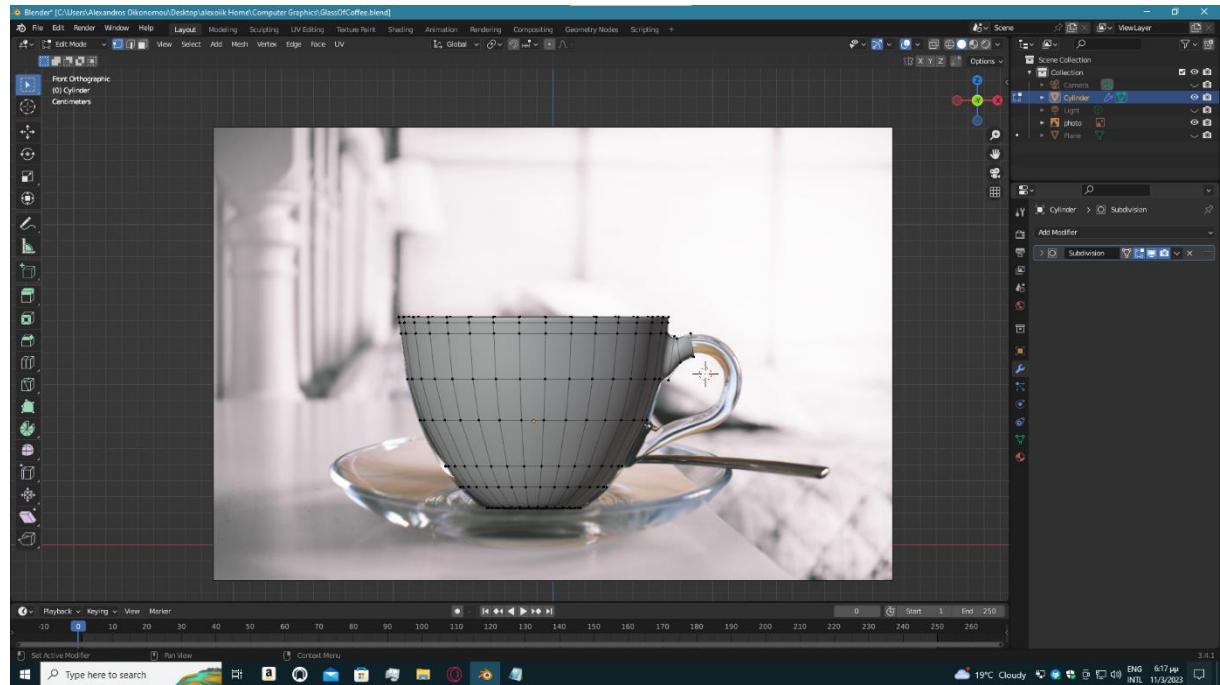
- Editing cylinder to create glass shape.
- Using Graph (G) and Scale (S) for the creation.
- Adding 6 Loop Cuts (ctrl + R).
- Deleting top vertices, to create a gap on top of the glass.
- Adding two Modifiers:

→ Solidify

→ Subdivision Surface

- Applying Solidify Modifier.

Image 6.3-6.4: Handle creation

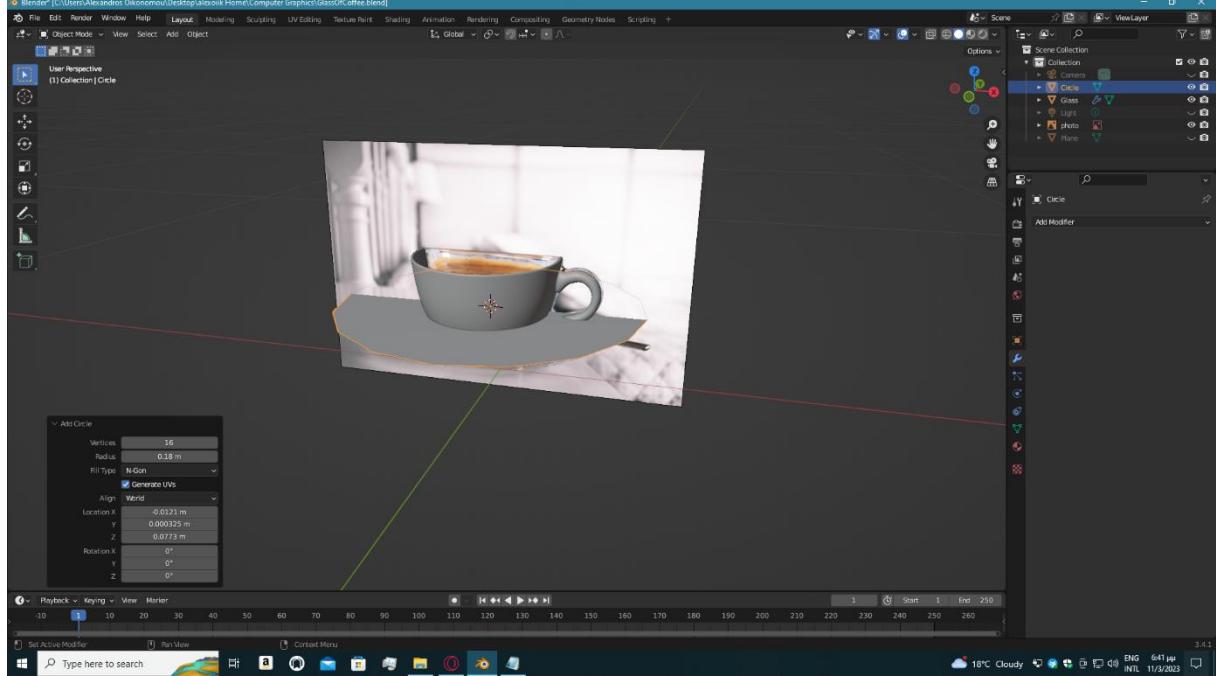


Step 3:

- Selecting right face to create handle.
- Using Extrude (E), Grab (G) and Scale (S) for the creation.
- Deleting the 2 faces between glass-handle.
- Selecting the 8 vertices between glass-handle.
- Finally, adding Bridge Edge Loop (f3 > Bridge Edge Loops).

→ To merge both sides.

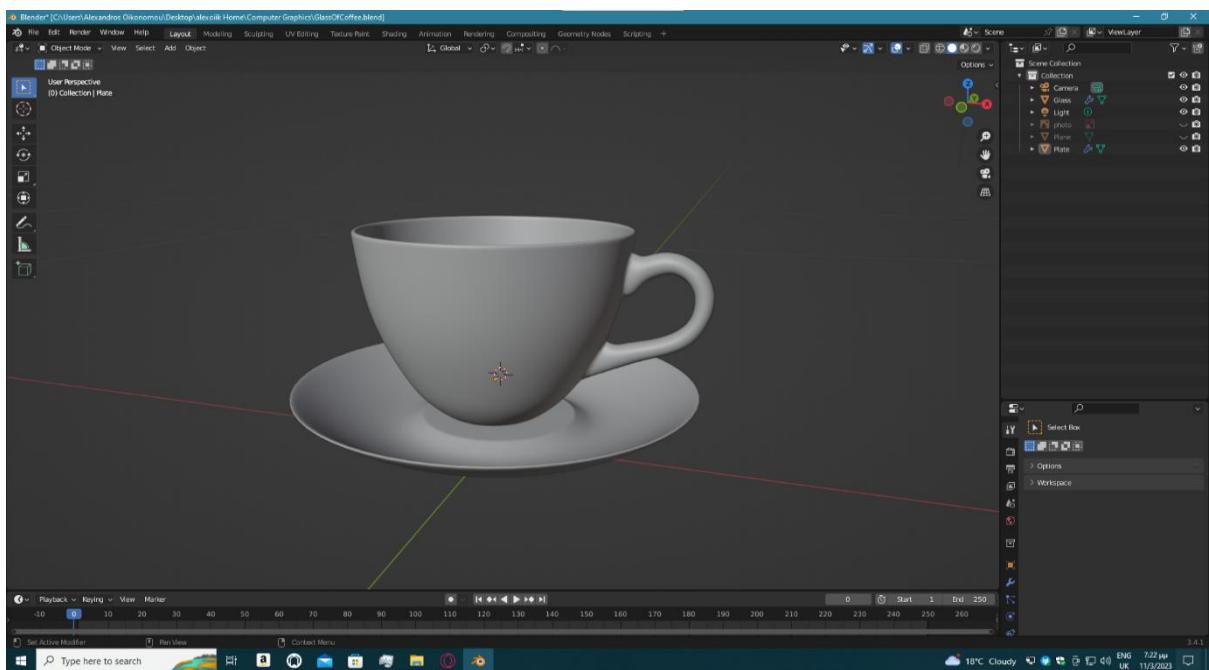
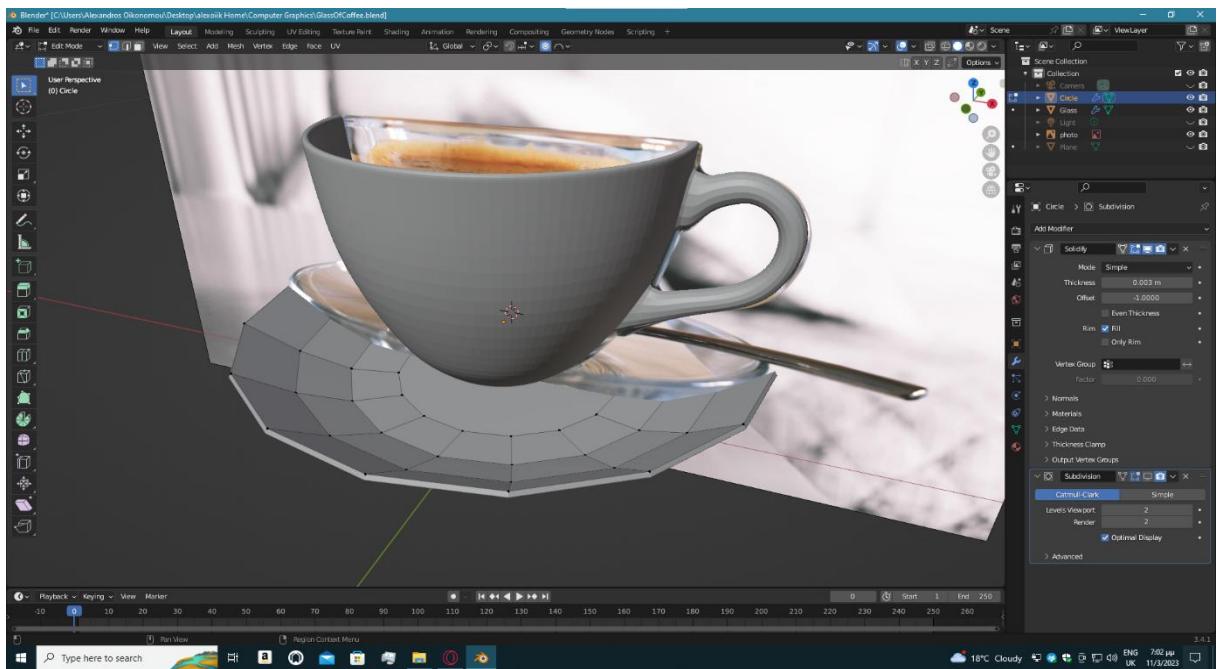
Image 6.5: Circle addition



Step 4:

- Circle addition for plate.
- Adjusting Add Circle settings.

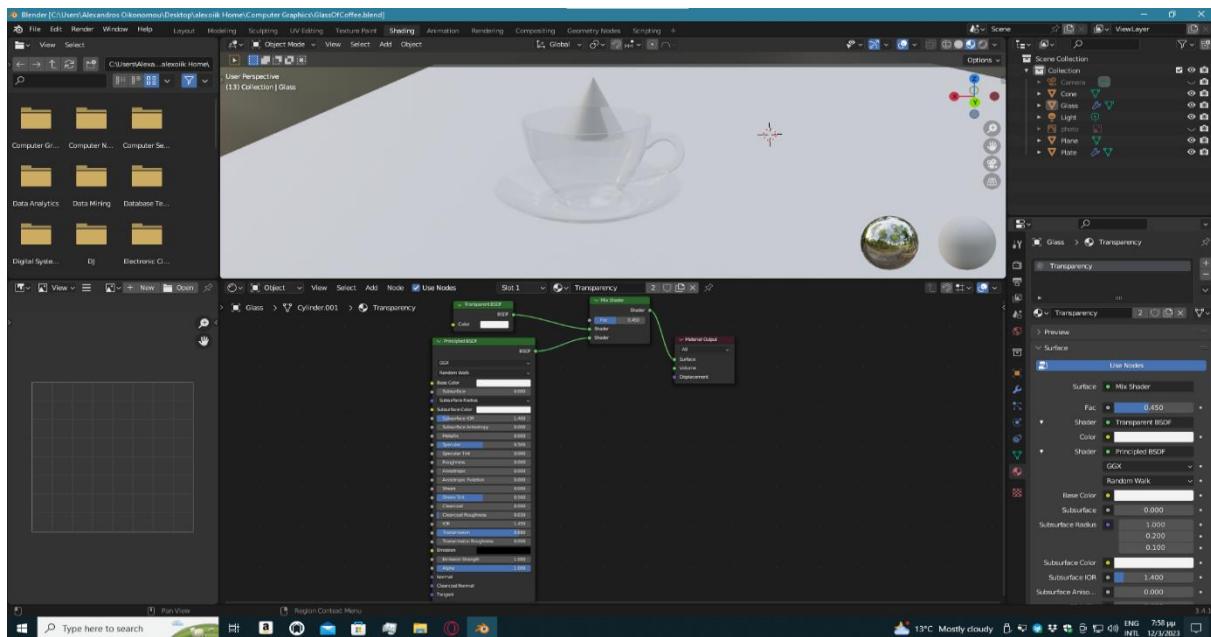
Image 6.6-6.7: Plate creation, Modifiers



Step 5:

- Adding Loop Cuts (ctrl + R).
- Using Proportional editing > type: sphere, in order to schematically create the plate.
- Adding two Modifiers:
 - Solidify
 - Subdivision Surface
- Applying Solidify Modifier.
- Making it Shade Smooth.

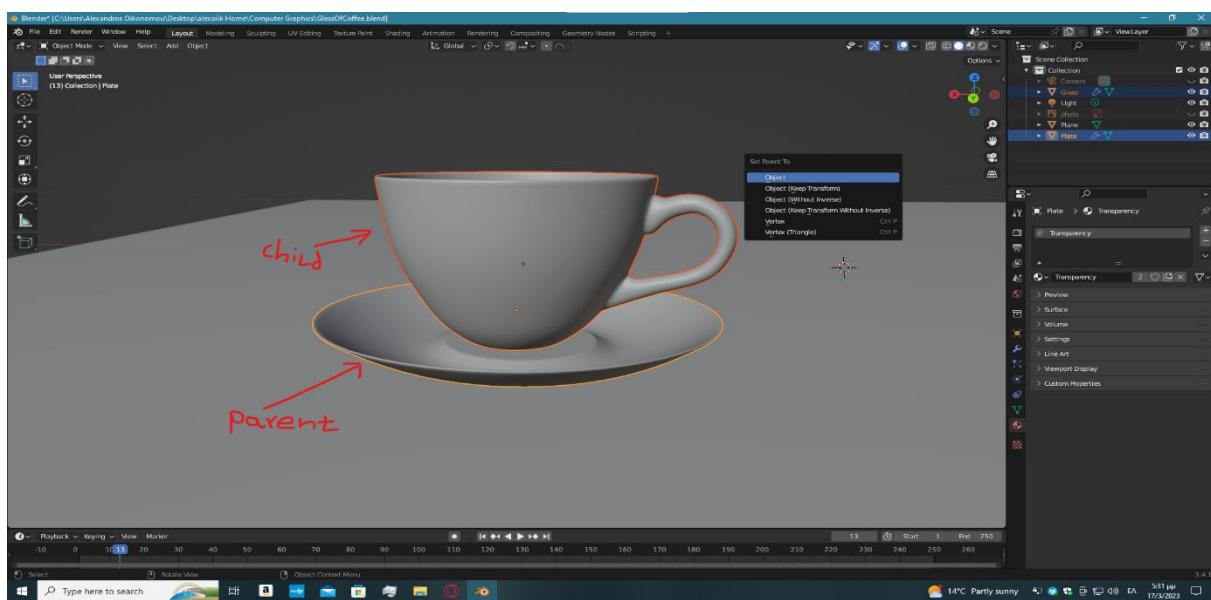
Image 6.8: Transparency



Step 6:

- Adding Cone to check transparency.
- Adding Material > name: Transparency.
- Creating Transparency and adjusting Transparency Settings.

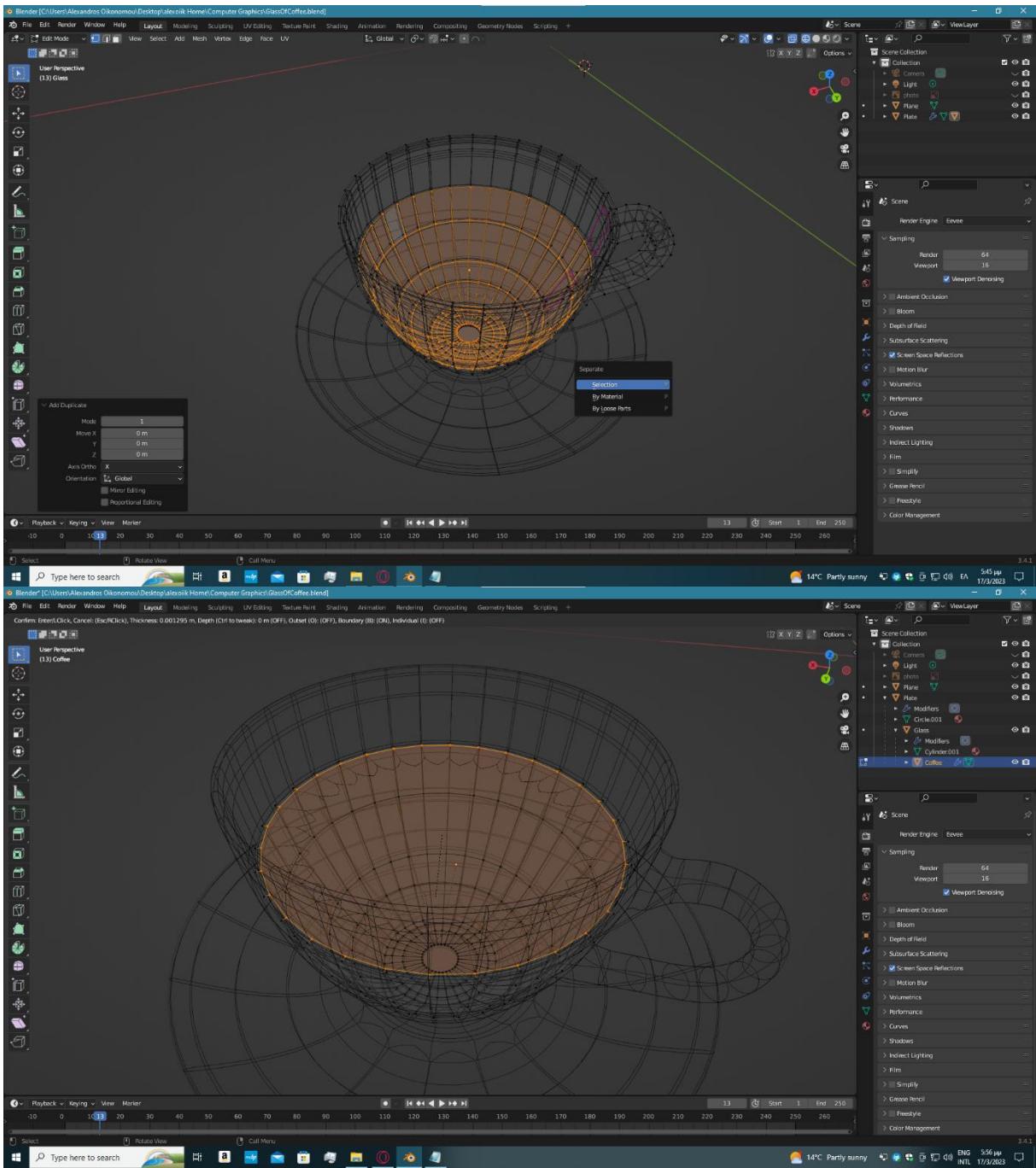
Image 6.9: Setting parent



Step 7:

- **Ctrl + P** → Set Parent To: Object for plate and glass.
→ Parent: plate
→ Child: glass

Image 6.10: Coffee creation



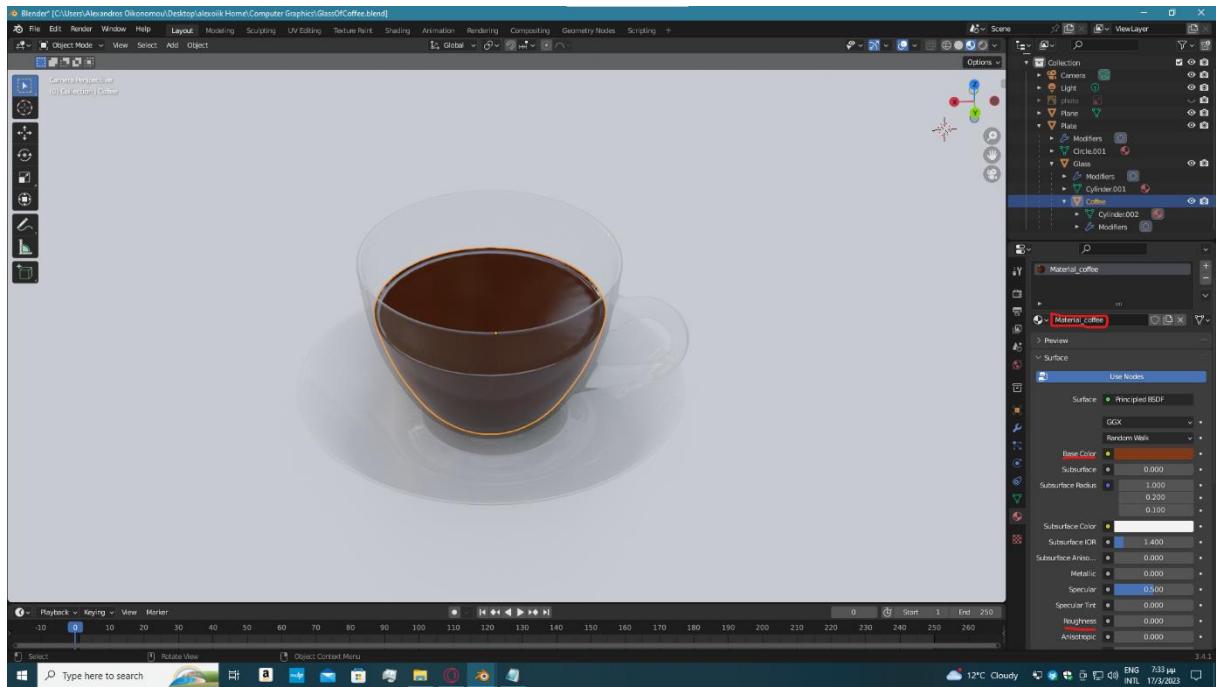
Step 8:

- Selecting (S) and Duplicating (D) inside vertices for coffee creation.
- Separating it from glass (P → Separate: Selection).
- Typing F and then I, to create an internal fill for the coffee.
- Ctrl + P → Set Parent To: Object for glass and coffee.

→ Parent: glass

→ Child: coffee

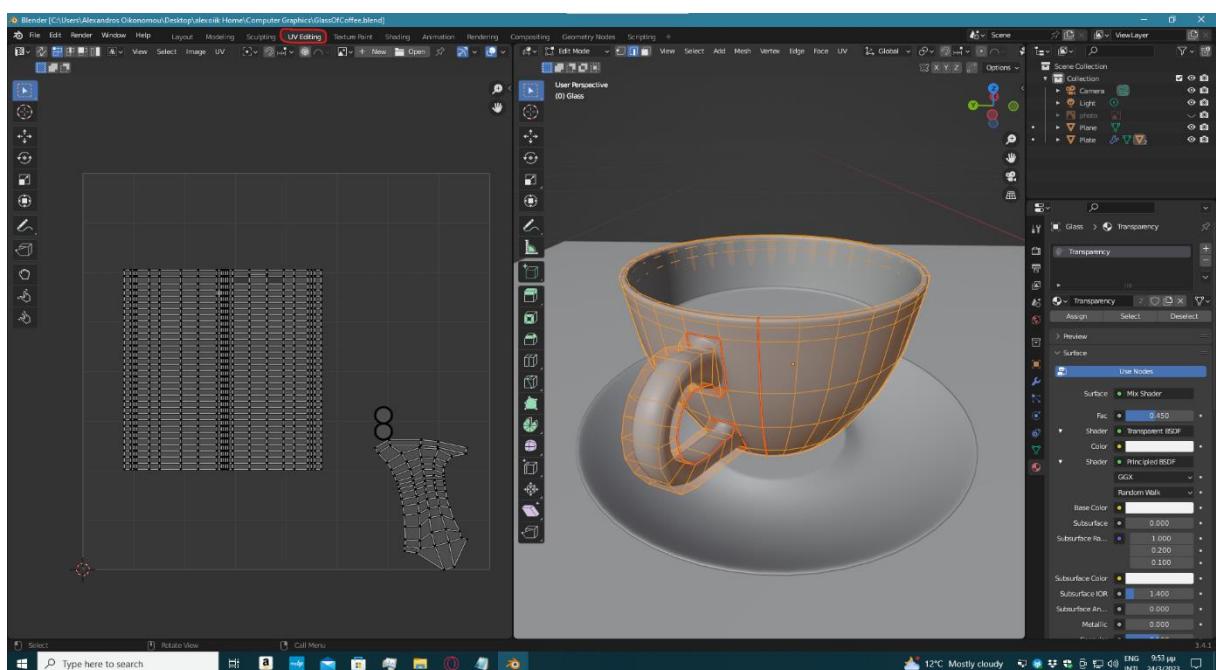
Image 6.11: Coffee Material



Step 9:

- Adding Material > name: Material_coffee.
- Giving it a dark brown color, like a coffee.

Image 6.12: UV Editing

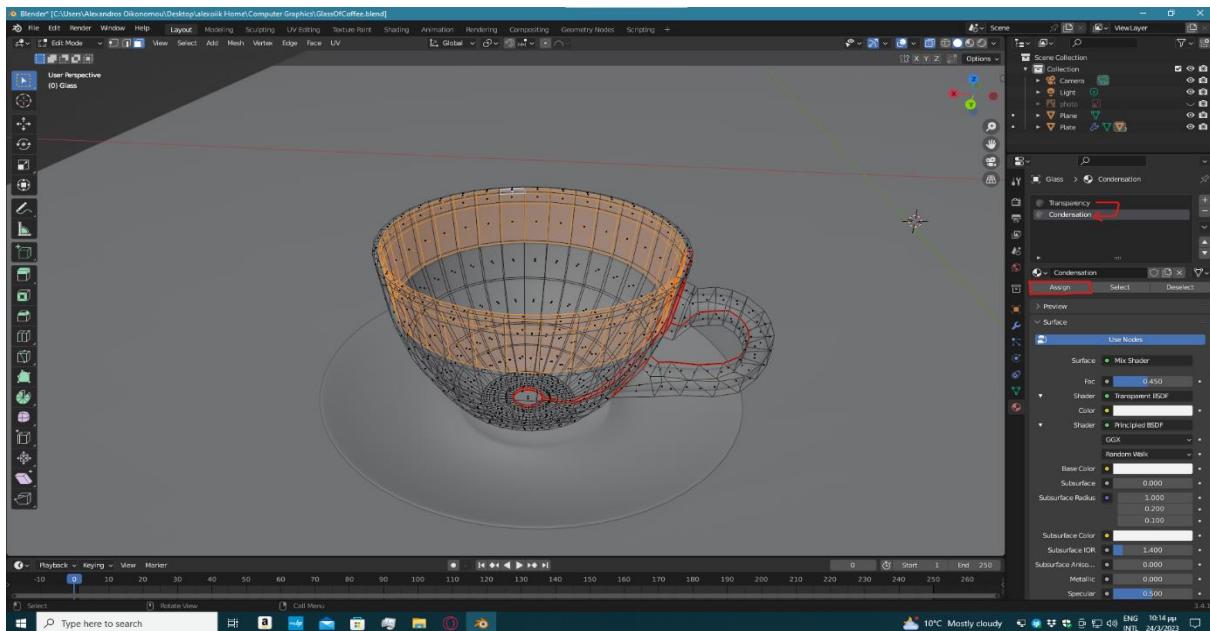


Step 10:

- Going to UV Editing Window, to process image later on.
- Selecting specific edges for marks ($\text{ctrl} + \text{E} \rightarrow \text{Mark Seam}$).

- After every Mark Seam, creating Unwraps for assigning parts to UV Editing ($U \rightarrow$ Unwrap)

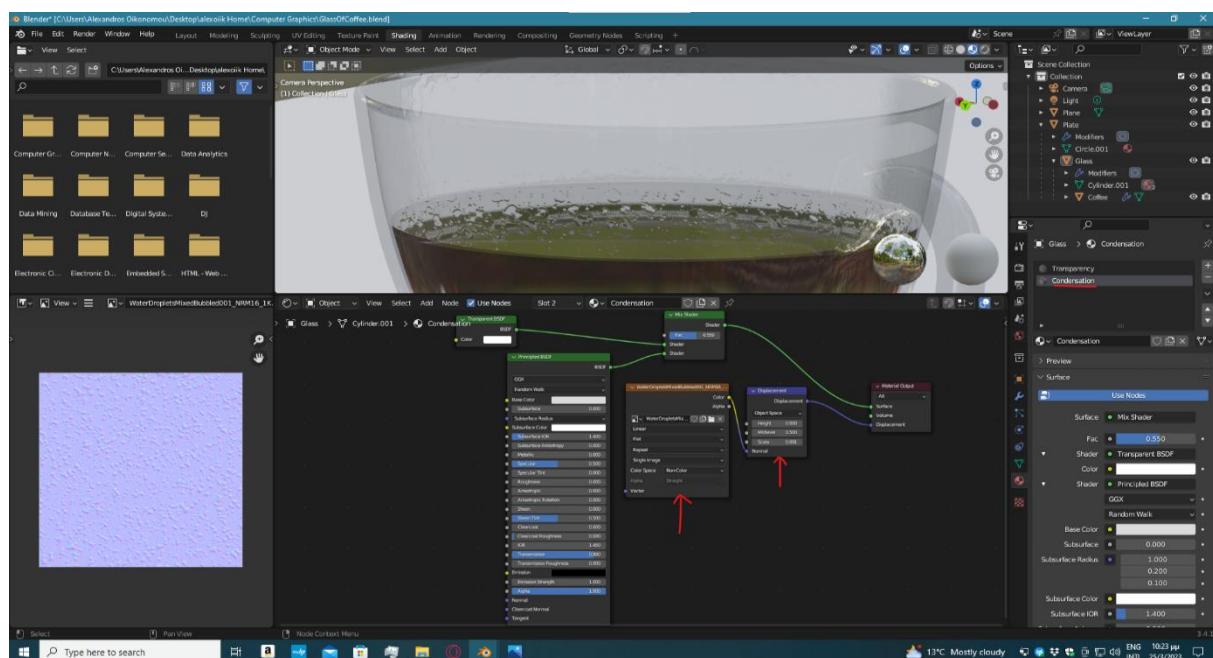
Image 6.13: Droplets material



Step 11:

- Adding Material > name: Condensation, from already existed Transparency.
- Applying it to the above selected faces, in order create the droplets.

Image 6.14: Displacement mapping > Droplets



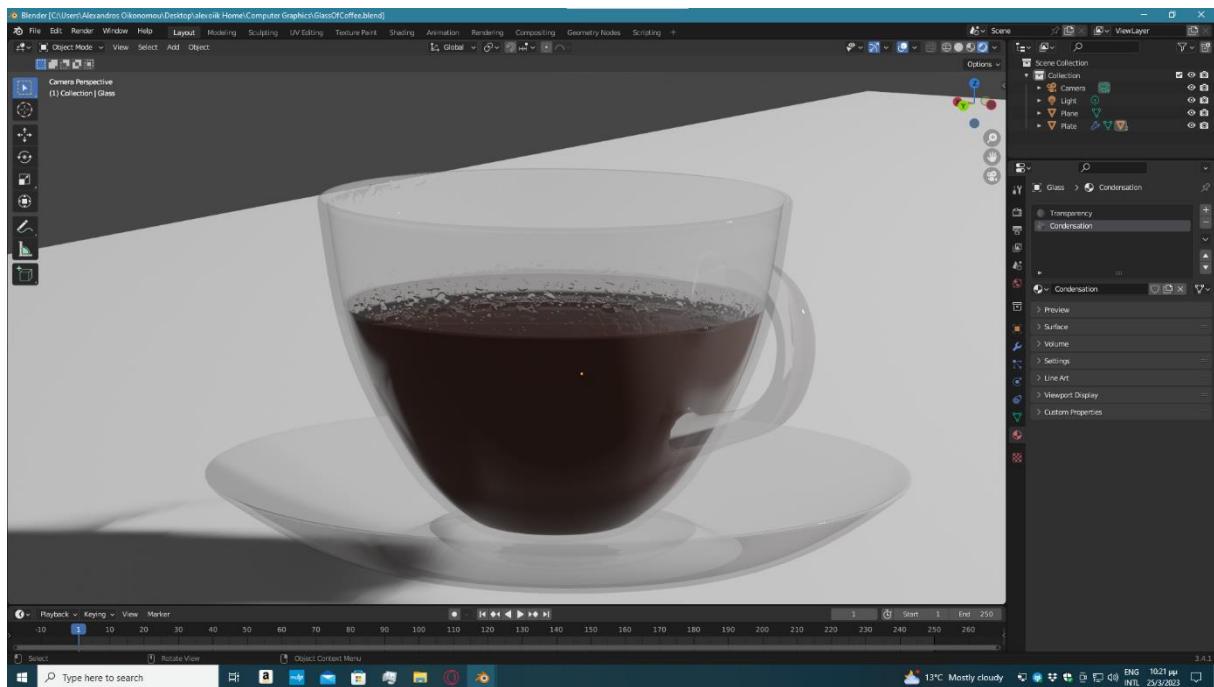
Step 12:

- Creating Displacement mapping:

→ 1 Vector: **Displacement**

→ 1 Texture: **Image Textur**

Image 6.15: Final Result



3D Scene and animations

To successfully create my **3D scene**, I did the following 6 steps:

1. Created the **walls** and **floor** of my scene.
2. Inserted and placed all **3D objects**.
3. Adjusted right **Lighting**.
4. Placed the **Camera** correctly, for a perfect view.
5. Created **Fog** and added **Background image**.
6. Rendered the result!

Finally, created **3 animations** to 3 objects of my scene. Specifically, i created the following **3 different ways of animation**, using **4 different transformations**.

Ways of animation and aim:

- Keyframes animation → Realistic representation of cutting the donut!
- Physics animation → Realistic fork drop representation!
- Shape Key animation → Realistic basketball deflation!

Transformations by:

- Location
- Rotation
- Location & Rotation
- Scale

Lighting sources:

- 4 areas
- 3 lights
- 1 Sun

Step by step implementation:

3D scene

Image 7.1: Walls and floor

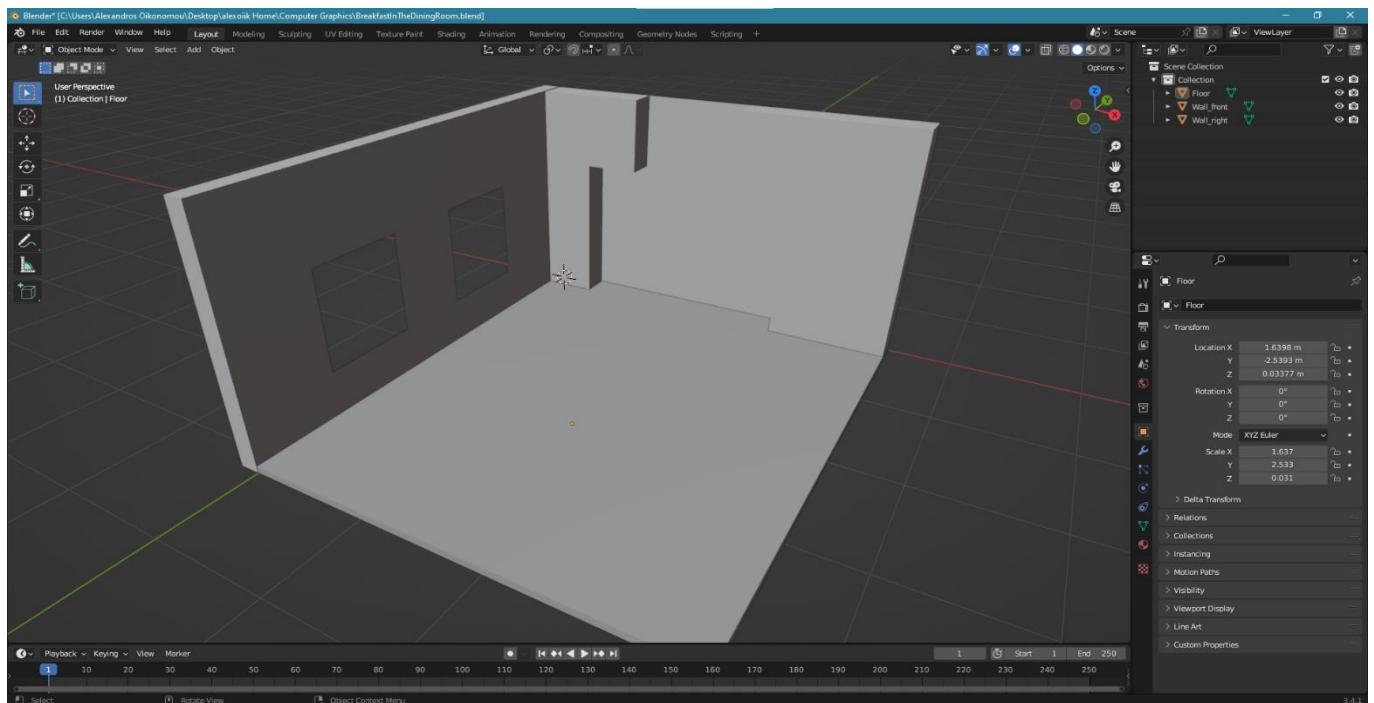
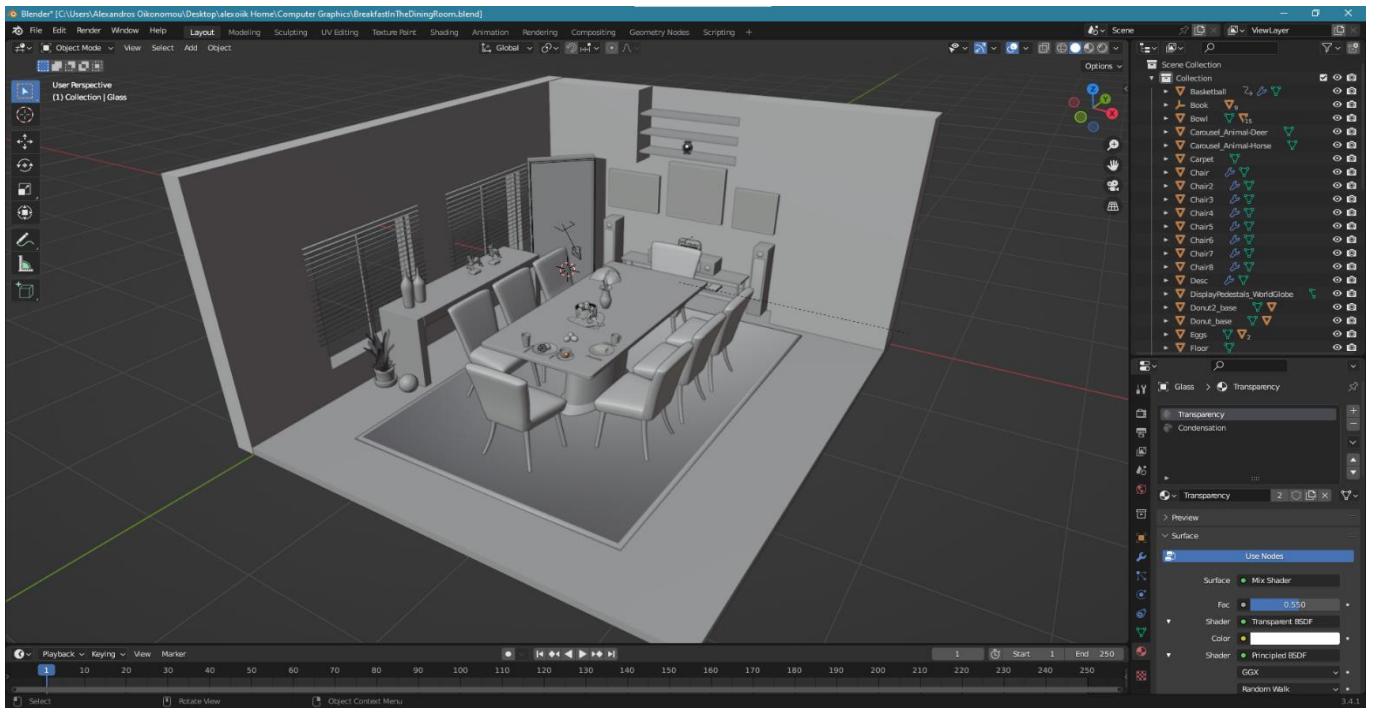


Image 7.2: Placing objects



Lighting

Image 8.1: Areas

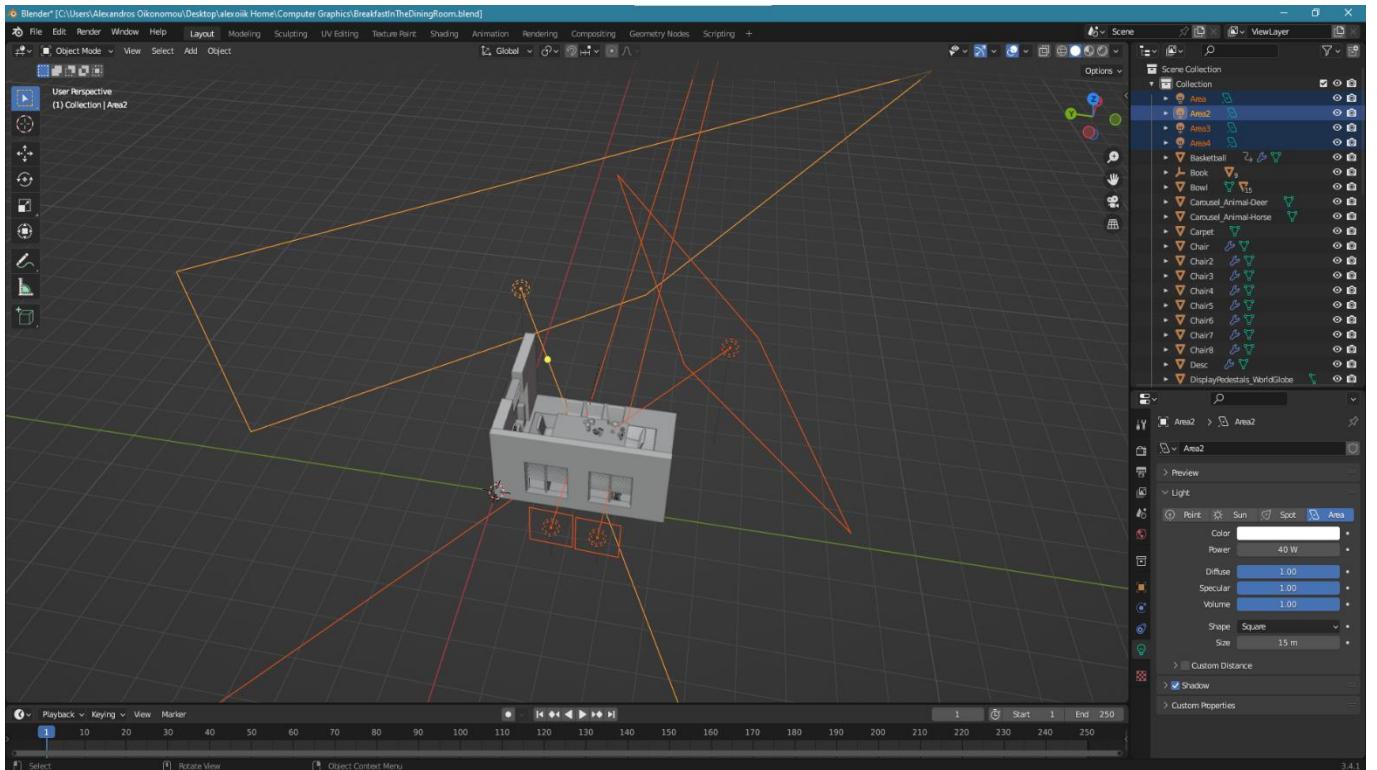


Image 8.2: Light

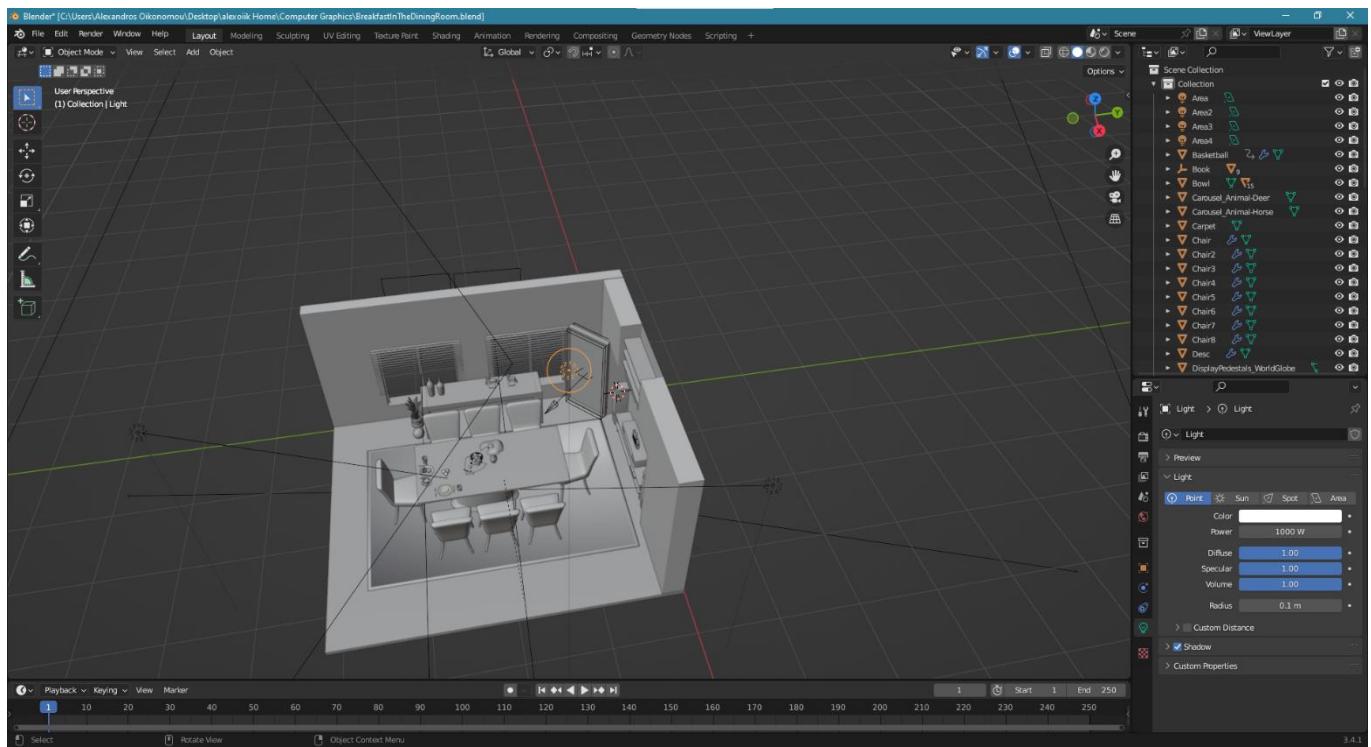
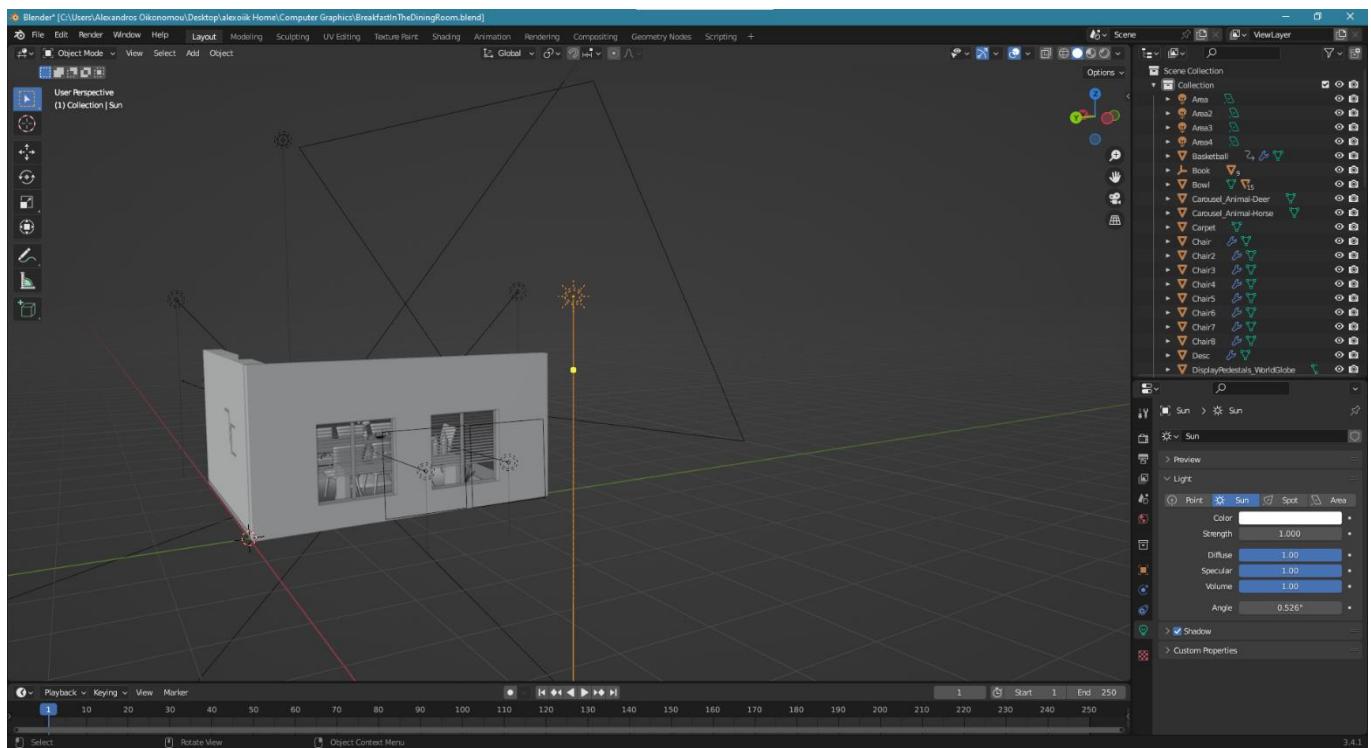


Image 8.3: Sun



Camera

Image 9.1: Camera view (Material)

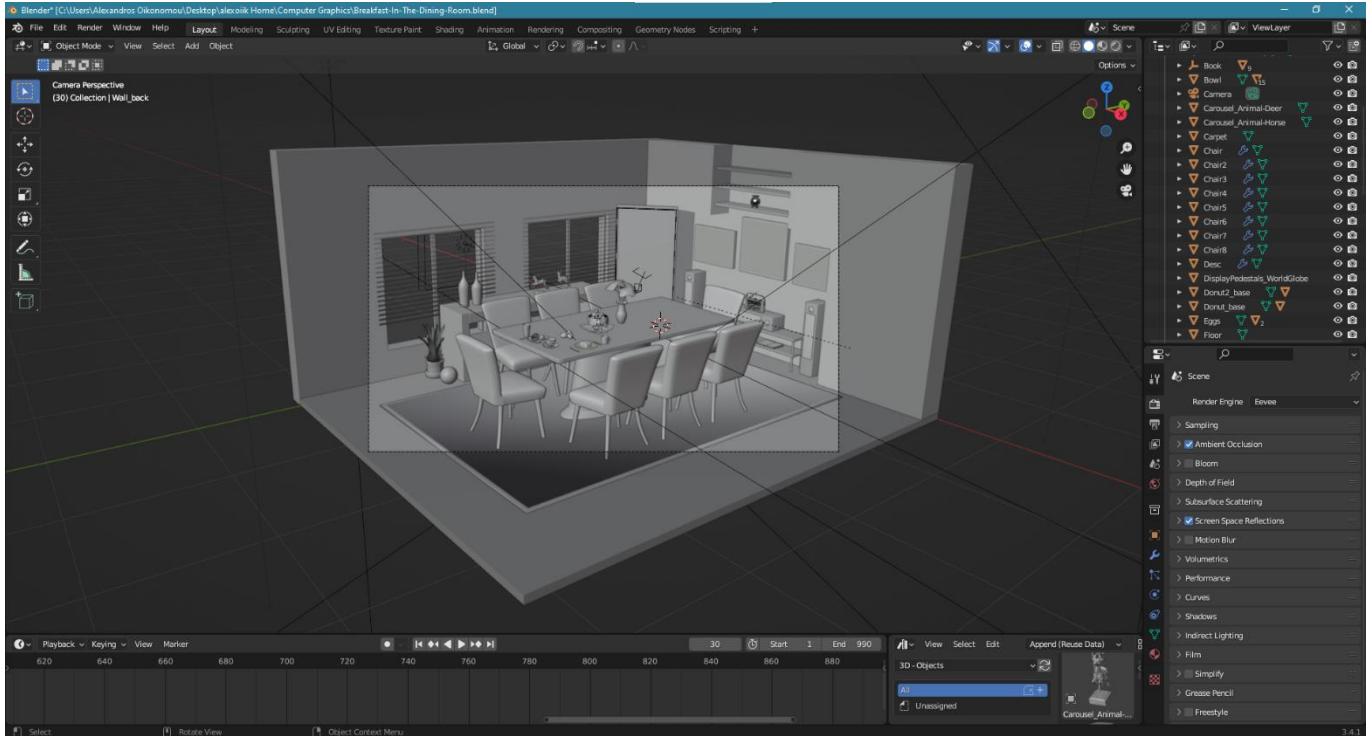
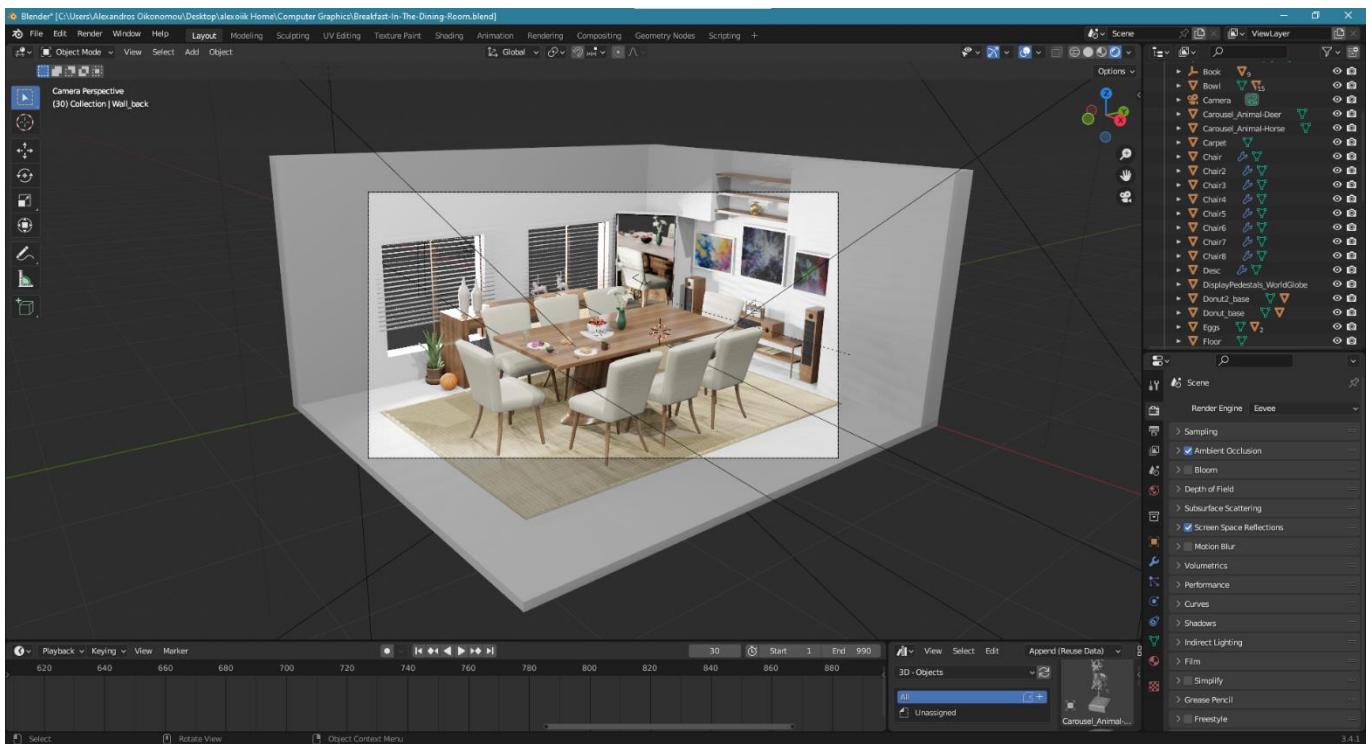


Image 9.2: Camera view (Render)



Background Image

Image 10.1: Background image

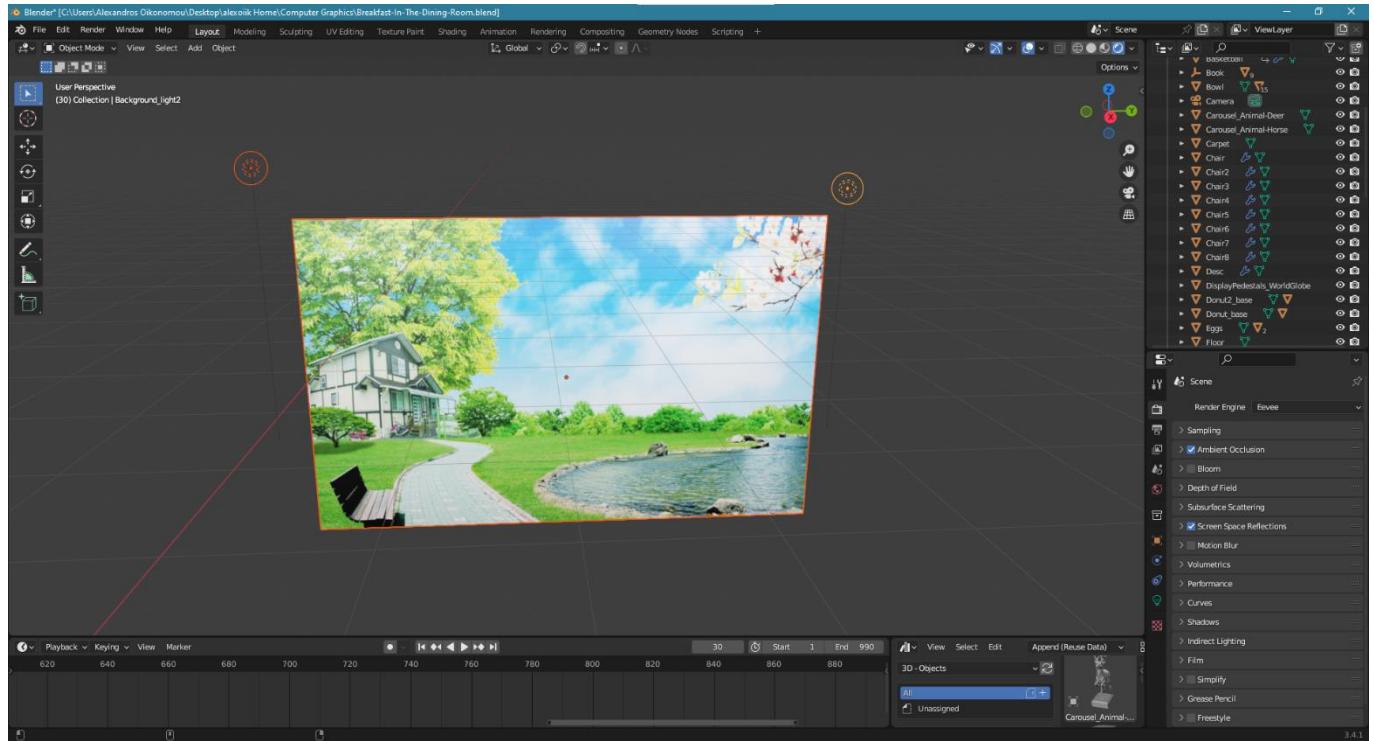


Image 10.2: Camera view w/ Background image



Fog

Image 11.1: Cube addition

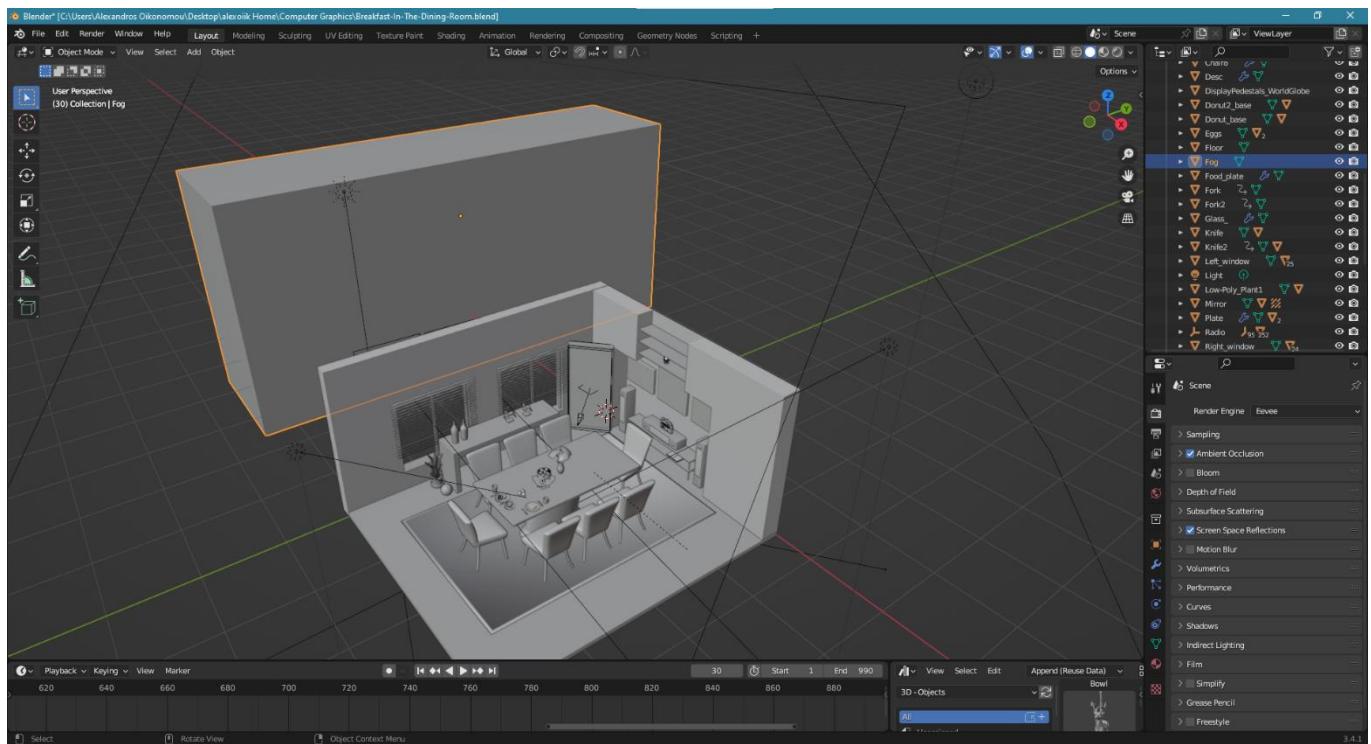


Image 11.2: Fog creation

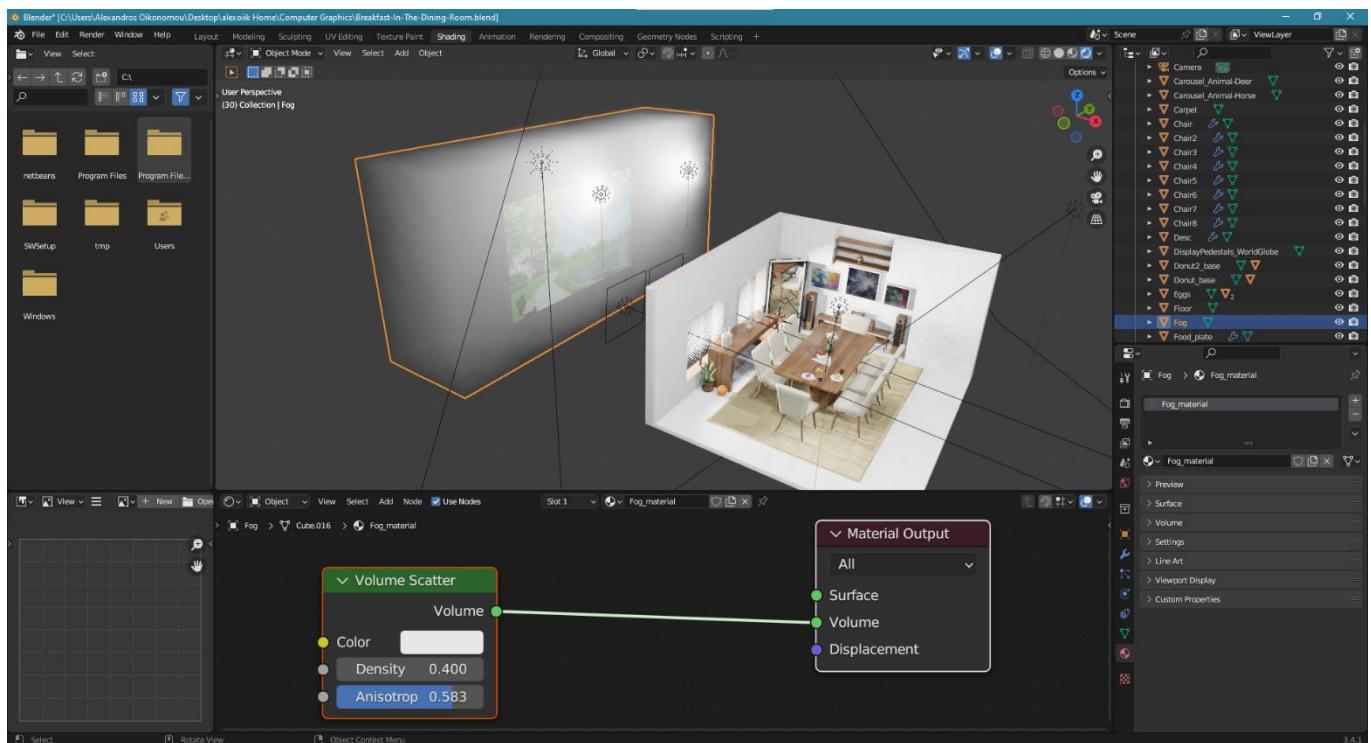
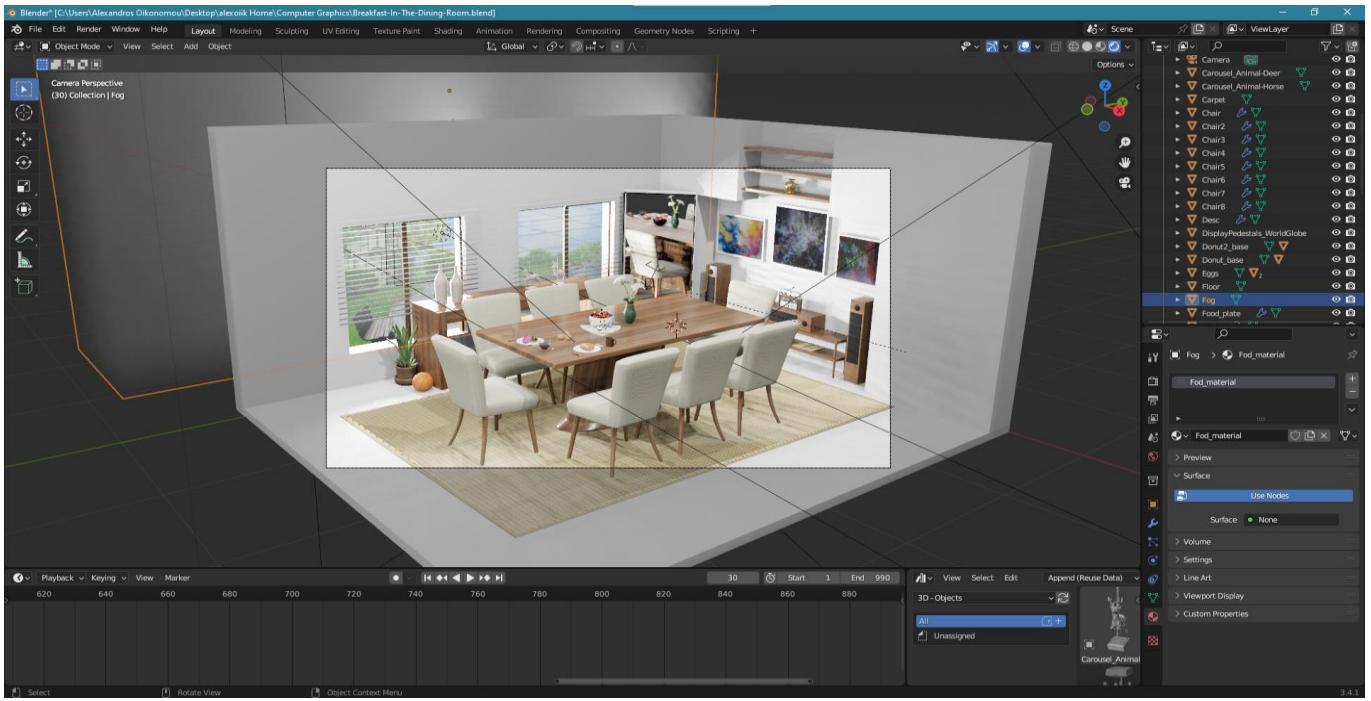


Image 11.3: Camera view w/ fog

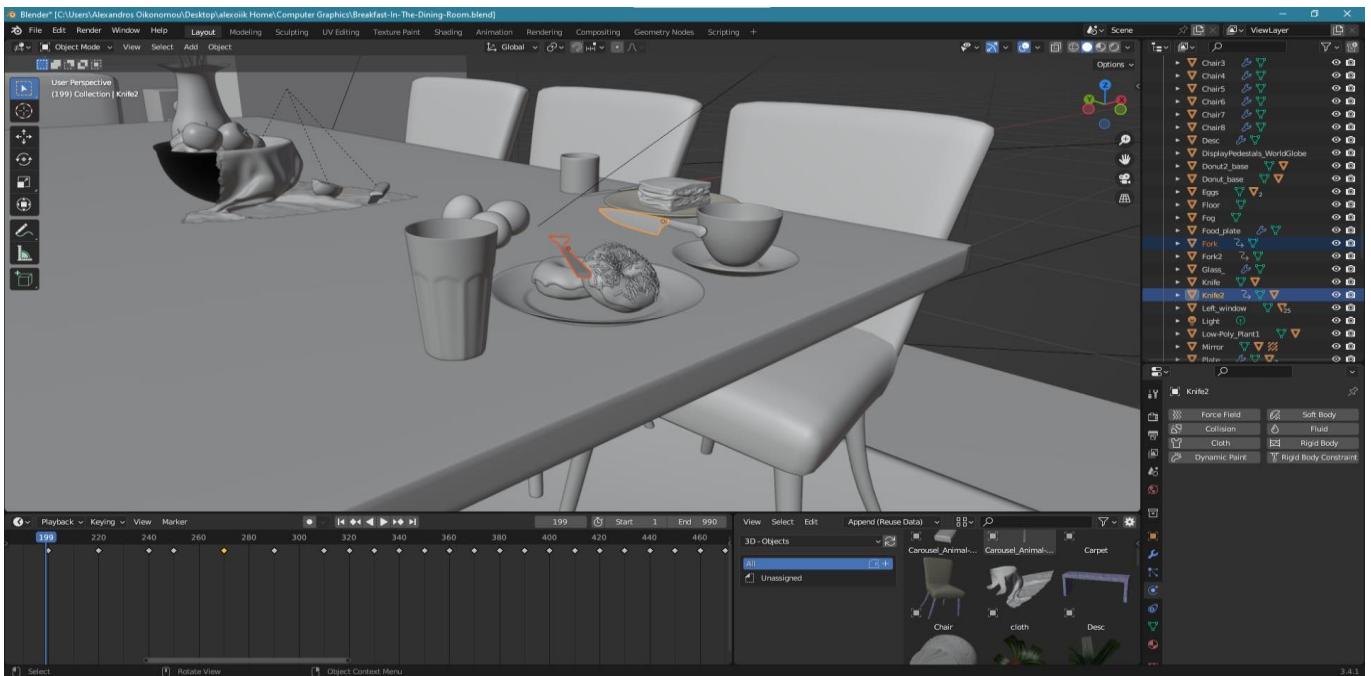


Animations

Render Properties > Frame Rate: 30 fps

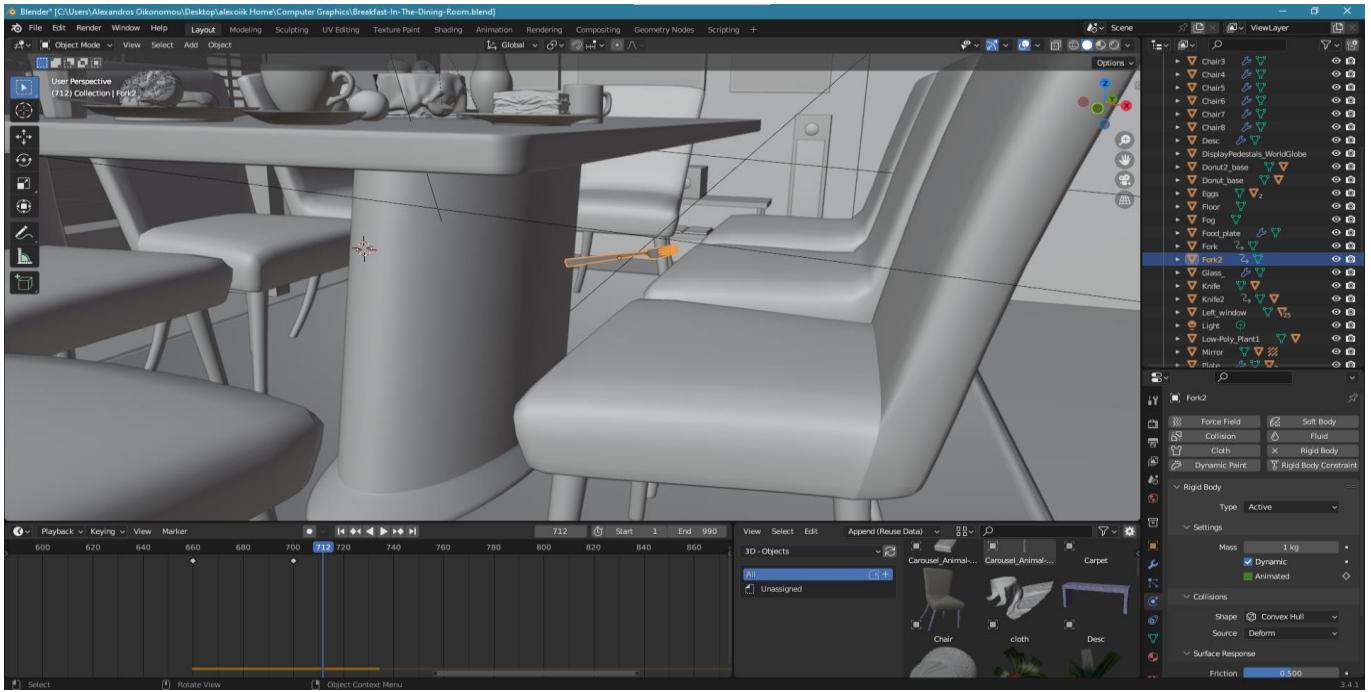
- Used 33'' (seconds): $30 \text{ fps} \times 33'' = 990 \text{ frames}$
- Frames Start: 1 frame
- Frames End: 990 frames

Image 12.1: Keyframes animation



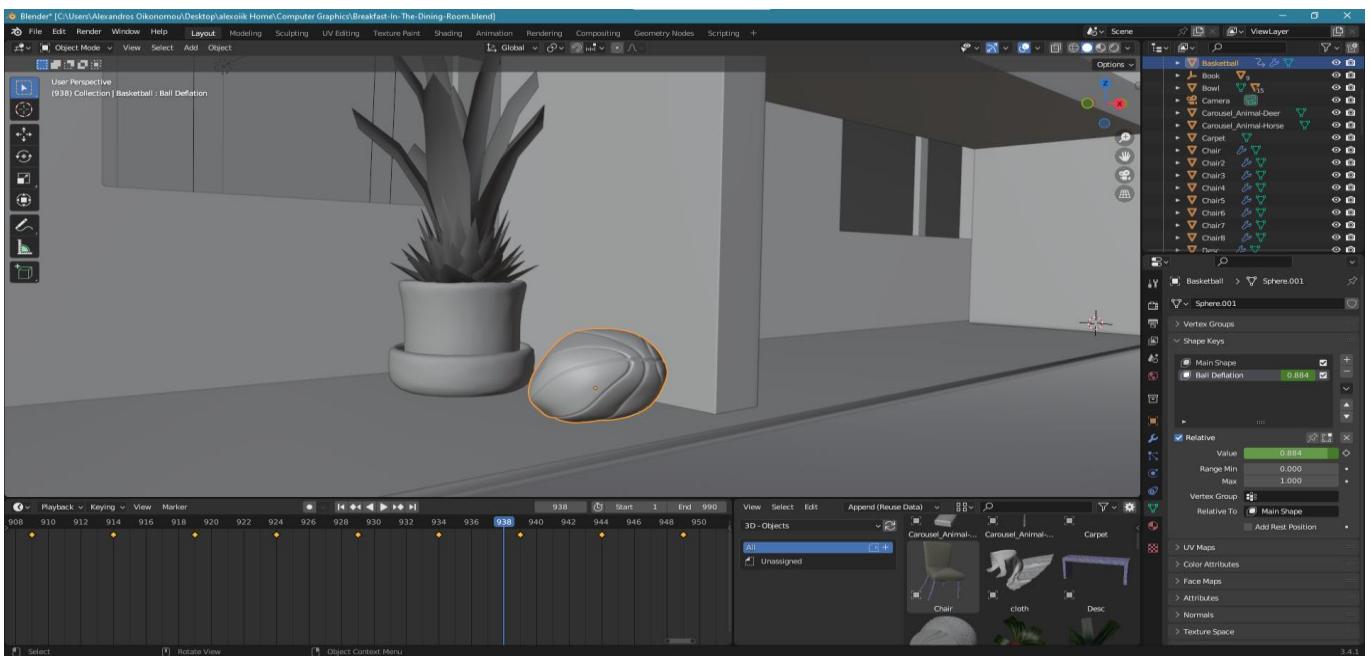
- Added keyframes.
- Used transformations by Location, Rotation, Location & Rotation.

Image 12.2: Physics animation



- Physics Properties > Rigid Body > Type: Active → Knife
Type: Passive → Chair
Type: Passive → Carpet
- Used transformation by Location.

Image 12.3: Shape Key animation



- Object Data Properties > Shape Keys > Add Shape Key
 > names: Main Shape, Ball Deflation.
- Used transformations by Location, Scale, Location & Rotation.

Helpful References

YouTube Channels

- [Blender Guru](#)
- [Olav3D Tutorials](#)
- [5 Minutes Blender](#)

Background Image

- [Wallpaper Safari](#)

Ready 3D Assets

- [Free3D](#)