

Lab 6 - Rendering with Blender: Digital Art

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0 Assignments

1. Blender
 - (a) render a scene so as to highlight Blender's potential with respect to lights, shading, materials and textures
 - (b) render scene with Eevee and Cycles and confront the two results

1 Blender Rendering

1.1 Scene setup

The scene used for this assignment is a rearranged version of the one used in lab 05. The meshes have been moved around so that the interaction between the materials' properties are put in evidence.

Some of the materials used in this scene have been downloaded from the Blender add-on repository **3D View: BlenderKit Online Asset Library**. All the sources are under the *Assets* folder. Most of these materials are made up of 3 png files representing the base color, the roughness and the normal. Then, a special purpose png can sometimes be found and it represents some specific characteristic of the material, e.g. metallic. They're then used as input for the Principled BSDF in the Shader Editor.

The sources for the custom-made materials and textures are under the *Assets/custom* folder.

1.2 Background

The background images used are two: [1a](#) directly visible as background in the final render and [1b](#), used to complete the scene from a "behind-the-camera" POV. It will be partially visible on the plant's vase as a reflection.

To respect perspective, the two images were bent using the **Cut** and **Move Vertices**.

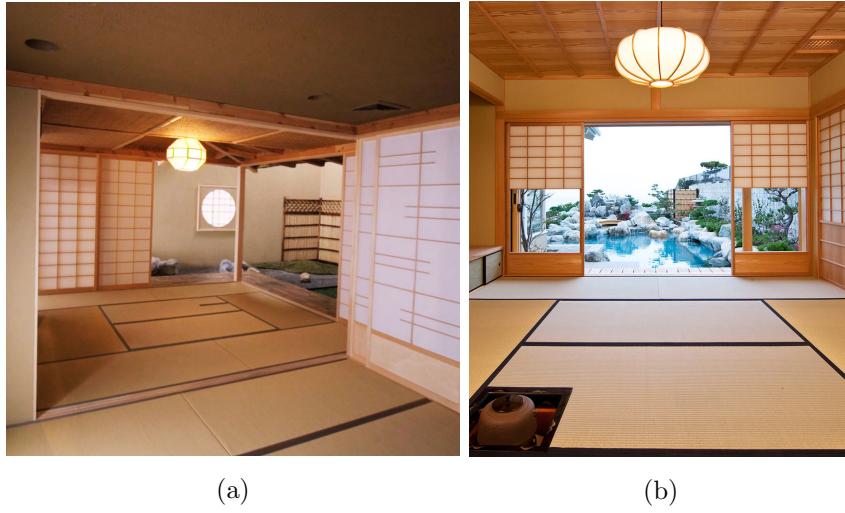


Figure 1: The two images used as backgrounds.

1.3 Table

The table's material has been chosen among the repository's selection and it's **Bamboo fine wood PBR texture seamless**.

1.4 Tray

The tray's material has been chosen from the repository. It's called **Painted Wood** and it's a wood texture to which a Metallic texture was applied. Originally it was red, so to change the color the **Hue/Saturation** node was interposed between the Base Color node and the BaseColor input in the Principled BSDF. The only parameter changed was **Value**, brought to 0.0 to make it black.

1.5 Plant

1.5.1 Vase

The plant's vase's material has been chosen among the repository's selection and it's **Transparent Glass**. It was chosen for its very well balanced transparency and reflection, which made possible to make visible the table and the ground through the vase, but also see the reflection of the "behind-the-camera" background.

1.5.2 Ground

The ground's material has been chosen among the repository's selection and it's **Ground**.

1.5.3 Trunk

The trunk's material has been chosen among the repository's selection and it's **Bark Dry Pine**.

1.5.4 Leaves

The leaves texture was taken from the internet as a png image. After removing the background with Photoshop it was applied to them by creating a new material and using the image as source for the color parameter in the Principled BSDF. Then, to properly set the correspondence between the leaves' mesh and the texture, the **UV Editing menu** was used, adjusting the mesh's unwrap result with respect to the texture's image.

To give the leaves a more realistic reaction to light, the leaf's material roughness was set at about 0.75 and then the texture color output was processed through a **hue/saturation** block to create the **subsurface** input color. To do so, its **hue** was set to 0.48, towards a more yellowish green, and the **Value** parameter to 1.5, to make it brighter. The result was then plugged into the subsurface color input parameter of the Principled BSDF and the subsurface parameter set to 0.122.

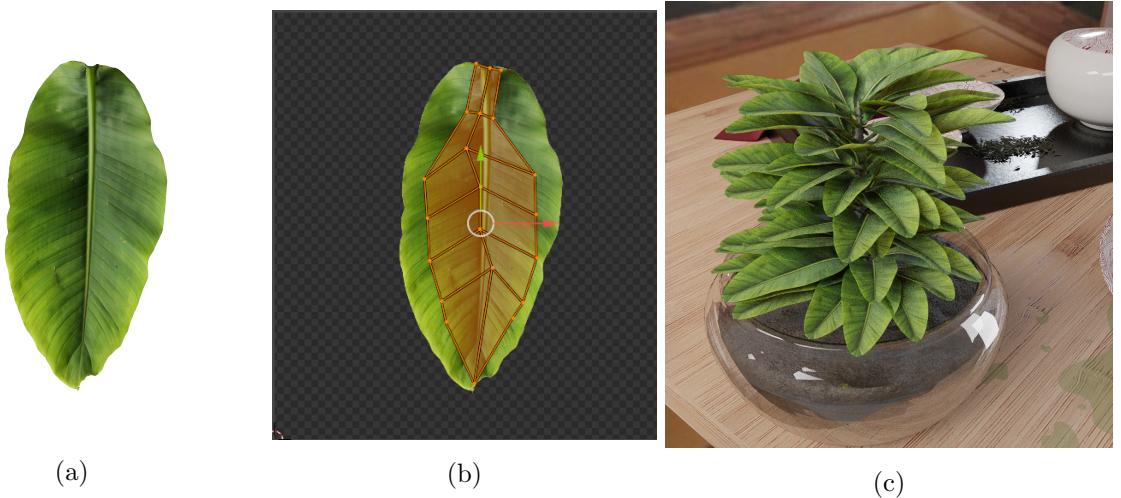


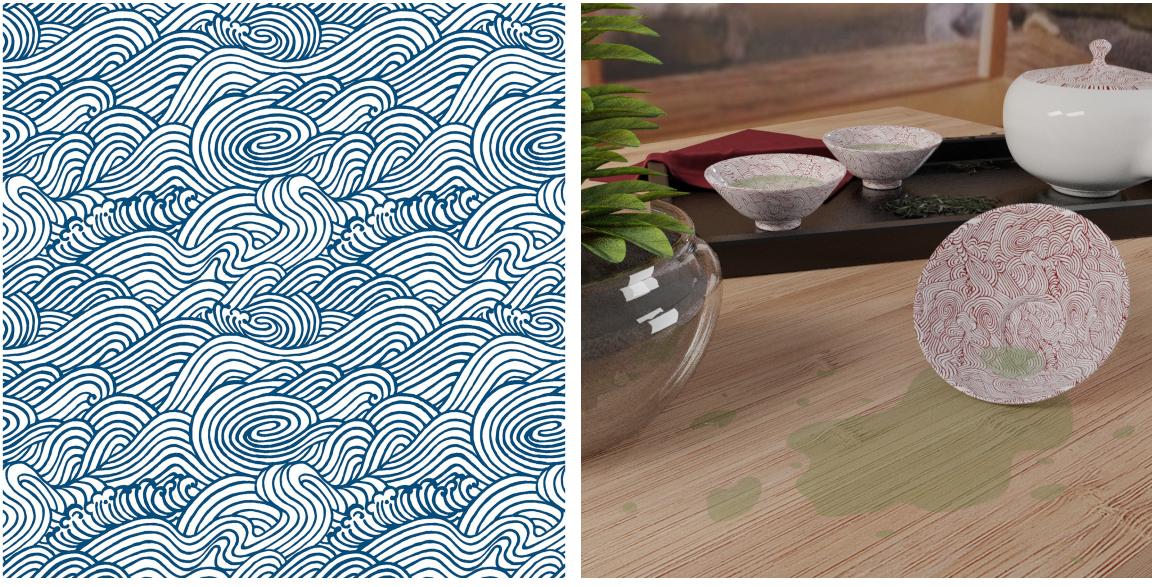
Figure 2: (a) the texture, (b) the UV setup and (c) the rendered result of the leaves.

1.6 Teacup

The teacup's material has been chosen among the repository's selection and it's **Blue Riveted Porcelain**. The material was then modified in texture, changing the provided base color png into [3a](#). Since in the original version it was blue, a **Hue/Saturation** node was applied to the color to turn it into red. The values assigned to the hue and saturation parameters were respectively 0.9 and 1.2.

1.6.1 Tea

To create the material for the tea only a Principled BSDF was used, assigning it the Green Tea (#[8DA86C](#)) color, giving it a roughness of 0.1, and an alpha of 0.318.



(a)

(b)

Figure 3: The texture used and the result on the cups. Also noticeable the tea.

1.7 Teapot

The base of the teapot's material has been chosen among the repository's selection and it's **Porcelain**.

The **lid** has the same material as the Teacups. The straight lines at the border was actually not a planned effect and it's due to the auto-generated UV for the lid, but since it looks good it was kept as is.



Figure 4: A close up of teapot.

1.8 Tea leaves

The tea leaves material was created by using a **Random ColorRamp** and setting the color intervals to different shades of green, brown and grey. To decide on the colors, the palette in [5a](#) was used.

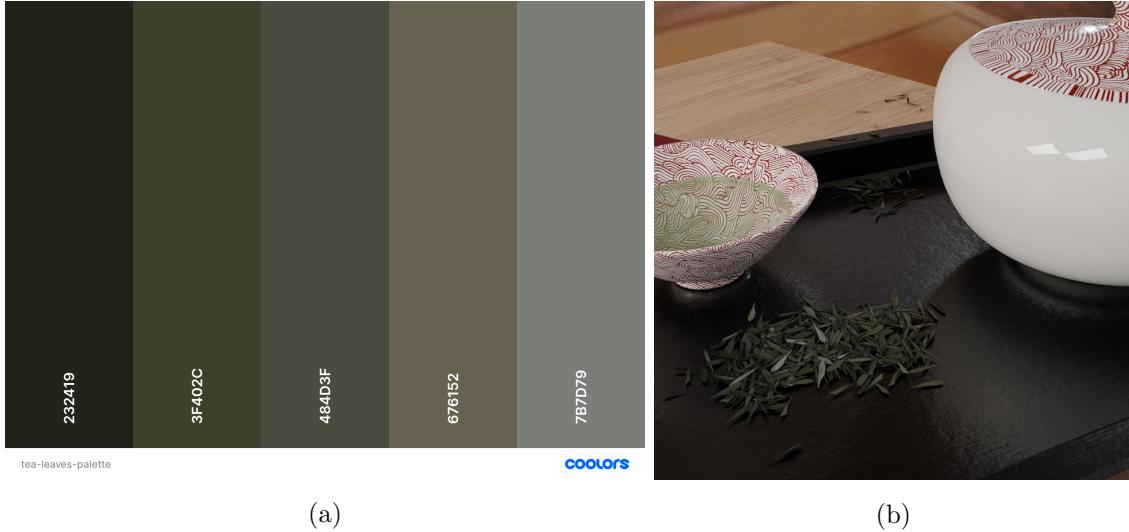


Figure 5: The palette and the rendered result of the tea leaves.

1.9 Cloth

The cloth's material has been chosen among the repository's selection and it's **Procedural Red Silk**. The only change done to this material was to change the Hex of the color to "Chocolate Cosmos" (#4F1B21).



Figure 6: A close up of the cloth.

1.10 Lighting

In this scene, lighting plays a very important role: it should highlight all the properties of the materials while also looking somewhat realistic with the setting, which is inside a Japanese tearoom. Japanese tearooms are famous for having a very warm calming light setup so a goal was to try to get the same feel.

After an enormous amount of trials, the best result was achieved using:

- 3 area lights:
 - two squared ones on the left of the table. The first is Floral White (#FFFCAF3) and has 0.25W power and the other is very pale orange (#FFF3E2) and has 500 mW power. They're used to emulate inside ceiling lights;
 - one white, 1W vertical one to emulate the light coming from the "wintery" outside.
- one very pale blue (#DCEEFF), 3W spotlight. This one is used to emulate direct sunlight without using the **sun** kind of light, which would result too bright;
- the background supposed to be reflected on the vase has been given an emission value of 0.15 white, so it can contribute to the ray path.

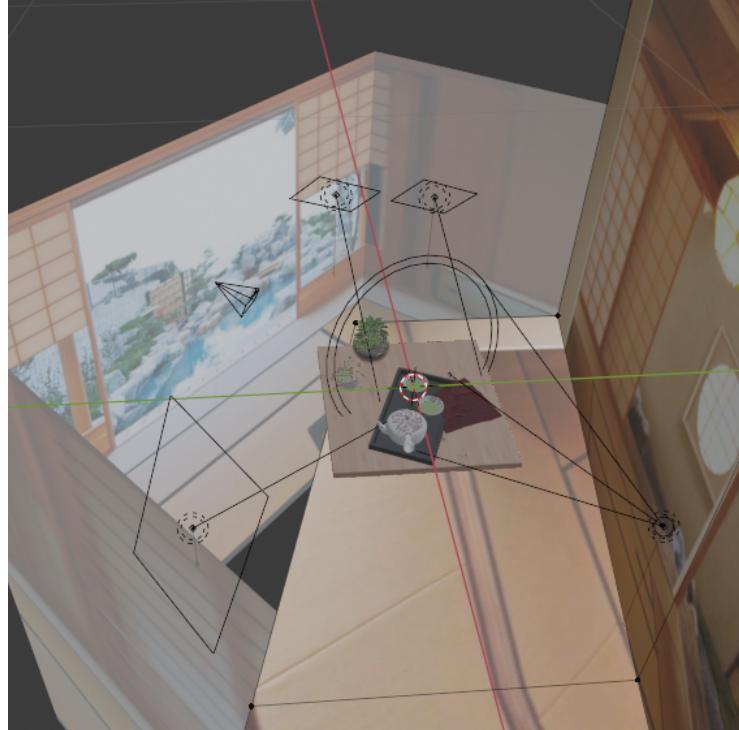


Figure 7: Lights positioning in the scene.

2 Final Result: comparing Cycles and Eeve

The differences between the two results are very easy to spot: since Cycles uses the Path Tracing technique to determine the reflective and refractive components in the scene we get a very realistic result and nice effects especially on the glass vase, where reflection and refraction are present at the same time. With the Eeve render, since it uses rasterization, we loose most of the information about them and get a much more "flat" result.

The final results can be seen in the last page of the report. Figure 8 is also the entry for the Digital Art contest.



Figure 8: Complete scene rendered with the Cycles engine.



Figure 9: Complete scene rendered with the Eeve engine.