Introduction to Computer Graphics		15/06/2022
	Treasure Island	
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1 Introduction

Treasure Island is the name of my project done in blender 3.1.2. The idea came to me when I was talking about *"Pirates of Caribbeans"* with some friends. The first decision was to do a low poly scene, mainly for two aspects. The most relevant was the weak hardware of my PC that had to render the scene and the second one was that this was my first experience with Blender and 3D software in general. For this report, for each section, I will discuss an aspect of my journey to making Treasure Island.

2 Modelling

Modelling is the first thing I learned and the aspect where I spent most of my time. In the scene, we can see different models: the sea, an island, a parrot, a skull, three palms, a treasure chest, a boat, some rocks, some grass, and four clouds. Some of them were easy and others very tricky but in most cases manipulating single vertices was the most difficult part.

The sea is the first thing I did. It is a simple plane scaled to be pretty large.

The island, starting from an icosphere with subdivision level 4, was flattened and modelled with the grab command to a shape I liked. Then I applied a decimate modifier to it to give a feel of a low poly island without losing the shape. Finally, I deleted all the unnecessary faces of the mesh under the seaplane.

The palms are divided into three components: trunk, leaves, and coconuts. Starting from the tree trunk, I used a cylinder as a base and then extruded and modelled how I pleased. Then the leaves are done from a plane with a mirror and solidify modifier. Finally, the coconuts are simple icospheres. The three plants are then tweaked uniquely. What helped me the most with them was setting the origin point of the leaves on the tip inside the tree trunk.

The treasure chest comes from a simple cube and the use of the mirror modifier on the X and Y axis.

The boat with its oars is created from three planes with a solidify modifier, using mostly extrude and scale commands. The boat was created also using the mirror modifier.

The rocks are all done by hand from an icosphere with multiple subdivisions, and then multiple faces are removed with the decimate modifier.

The grass has three different models that were created similarly, i.e. from a cube with the extrude, rotate and scale options.

The clouds were created using blender *Metaball*, and then I reduced the number of faces with the decimate modifier.

The skull was the longest and most difficult model to do. Starting from a cube and with a mirror modifier, I created both the jaw and the cranium. What helped me the most was having multiple reference photos of the skull. In this way, I could replicate the shape of the object.

The parrot was not created by me, but it was downloaded from Sketchfab[1], a site where you can download and upload 3D models for free or for a price. I did this to understand how to import models of other artists and because I was short on time and the skull model had taken a lot of it with him.

3 Shading

In the scene, we can see that almost all the colours used are simple, and only a few models have a particular shading. Let us start from the chest, where the iron bars are coloured light grey with a metallic value of 1. Then we can see that the grass and the rocks have all similar colours, but they are not the same. This effect was obtained with a colour ramp with the colours picked randomly. Finally, the sea was obtained with the simple combination of a noise texture and a bump node that feeds into the normal component of the shader. Playing with the strength of the bump, the noise scale, and the roughness of the noise texture, I obtained the results in the scene.

Relevant to the shading is also the light. In this scene, I used only a single sunlight with a strength value of 7 and a slightly yellow colour like the real sun. In this way, and based on the Y angle of the light, we obtain different shades of colours in our scene.

4 Geometry Nodes

The grass on the island was not put by hand one model at a time, but with the help of blender *Geometry Nodes* and the *Weight Paint*. First, I set the Poisson Disk option and the density value in the "Distribute points of faces" component and then plugged it into the "Instance on points" component with the multiple grass models and a random value

[1]Parrot page at Sketchfab: https://sketchfab.com/3d-models/low-poly-pirate-parrot-3-pieces-cff0abda2b8f4395bd5d57516d9ea982

to the rotation and scale of them. Then in the Weight Paint mode, I painted the area where the blade of grass would have been put randomly. Finally, I chose the proffered seed.

5 Rendering and Animation

For the rendering, I chose to use Cycles because even if Eevee could have done a good job, it would have been less beautiful. The render proprieties I used are the default ones except for two options: the denoise one, for which I used the OpenImageDenoise as the preferred denoiser and in the Color Management tab, I changed the view transform to filmic with a look of very high contrast. The camera is put in front of the scene, has a focal length of 70mm, and has activated the option depth of field. The focus object is the treasure chest, and the f-stop is set to 8. In this way, the clouds in the distance are more blurred.

For the final render, I chose to do an animation with a still camera while the sunlight goes from 0 degrees to 90 to simulate the passing of the hours. Meanwhile, in the last frames, the light becomes more red to give a sense of sunset to the watcher. The animation was created by combining 250 frames in OpenEXR format into a 10 seconds animation (i.e. 25 fps).

6 Conclusion

Before I started to model this scene, I followed many tutorials and created something; in the end, I understood how to use multiple modifiers and tools of Blender, the most basic ones, but with them, I was able to create Treasure Island. When I modelled everything I needed, I thought I was almost finished from that point, but I was wrong. When I tried to put everything together, I understood that I was only halfway through. I then studied and tweaked every little thing and parameter only to obtain a better result until I was happy with what I got. Making this project was difficult because, as I said previously, I had not done something like this before, but it was fun.