Lesson 3

João Fonseca -103154

Diogo Paiva - 103183
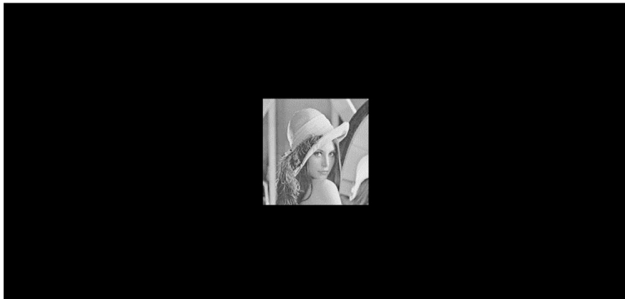
Information Visualization, 2023 (MSc Computer Science and Engineering, University of Aveiro)

Introduction

This report addresses the exercises done in Lesson 3 of Three.js.

Exercise 1

Load the texture and apply it to the planeGeometry. If we modify the size of the plane the texture will stretch.
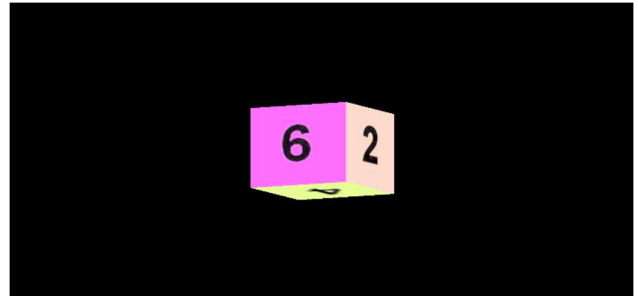

Exercise 2

Add texture on a cube.

How is the image (lena.jpg) mapped to the cube? The image is repeated in all faces.

```
var texloader = new
THREE.TextureLoader();
var tex1 = texloader.load("../Im1.jpg");
var tex2 = texloader.load("../Im2.jpg");
var tex3 = texloader.load("../Im3.jpg");
var tex4 = texloader.load("../Im4.jpg");
var tex5 = texloader.load("../Im5.jpg");
var tex6 = texloader.load("../Im6.jpg");

const materials = [];
materials.push(new
THREE.MeshBasicMaterial({map: tex1}));
materials.push(new
THREE.MeshBasicMaterial({map: tex2}));
materials.push(new
THREE.MeshBasicMaterial({map: tex3}));
```

```
materials.push(new
THREE.MeshBasicMaterial({map: tex4}));
materials.push(new
THREE.MeshBasicMaterial({map: tex5}));
materials.push(new
THREE.MeshBasicMaterial({map: tex6}));

const cube = new THREE.Mesh( geometry,
materials );
```


Exercise 3

Create the earth and view the model with a fixed rotation on the Z axis (use 0.41 rad) and with an animation (a rotation around the y axis of 0.0025 rad).

```
//fixed rotation on the z axis of 0.41
rad
    earth.rotation.z = 0.41;

    //rotation around the y axis of
0.0025 rad
    earth.rotateOnAxis(new
THREE.Vector3(0,1,0),0.0025);
```

Exercise 4

Check which key was pressed on the console.

Exercise 5

Allow turning on/off the directional light and increase/decrease the intensity. (In folder Ex 4).

```
if(keyCode==76){ //l
    //verify if the light is on
    if(light.intensity == 0){
        light.intensity = 1;
    } else {
        light.intensity = 0;
    }
};
if(keyCode==107) {
    light.intensity += 1;
} else if(keyCode==109) {
    light.intensity -= 1;
}
```

Exercise 6

Use the arrow keys to increase/decrease the rotation speed around the yy axis axes and the Up/Down keys to increase/decrease the inclination of the model around the zz axis. (In folder Ex 4).

```
if(keyCode==37){ //left arrow
    z = z - 0.01;
} else if(keyCode==39){ //right arrow
    z = z + 0.01;
}
if(keyCode==38){ //up arrow
    y = y + 0.00025;
} else if(keyCode==40){ //down arrow
    y = y/2;
}
```
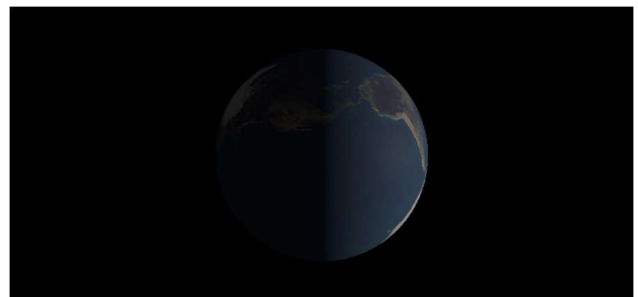

Exercise 7

Additon of the moon

```
const geometryMoon = new
THREE.SphereGeometry(SIZE_IN_EARTHS,32,32
);

var texloader = new
THREE.TextureLoader();
var texMoon =
texloader.load("../moon_1024.jpg");
```

```javascript
const materialMoon = new
THREE.MeshPhongMaterial( { map: texMoon}
);

const moon = new THREE.Mesh(
geometryMoon, materialMoon );

var distance = DISTANCE_FROM_EARTH /
EARTH_RADIUS;
moon.position.set(Math.sqrt(distance /
2), 0,-Math.sqrt(distance / 2));
…
earth.add(moon);
…
moon.rotation.y = Math.PI;
    moon.rotation.x = INCLINATION;
    moon.rotation.y += (earth.rotation.y
/ PERIOD);
```