E-fólio B | Folha de resolução para E-fólio

Curriculum Unit: Computer Graphics

Code: 21020

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In this document, I will provide a detailed overview of the code developed on each module of the project. I will start with a concise explanation of each module and its main features and finally I will speak about the extras that were added.

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errainGeneration.mjs:

In the Teroingeneration.MJS module, the code creates a three -dimensional representation of detailed terrain using a plan geometry. The material and appearance properties of this Land, controlling characteristics such as colors, shine, shadows and light emission. The land is added to Three - dimensional scene, allowing interactions with other elements. It is also configured to design and Receive shadows of other objects in the scene.

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Errappustomization:

In the TerranCustomization module, there are two functions:

Randomizeterrain (Noise, PGEOM): This function randomizes the terrain defining the heights of the vertices with Noise base generated by the Noise.js library. It calculates the heights using different scales and amplitudes, allowing to create varied terrain.

UpdateHeightmap (Noise, PGEOM, VALUE): This function updates the land height map with a value provided. The heights are calculated in the same way as in the previous function, but are multiplied by the value provided. This is useful for adjusting the elevation of the land according to specific needs.

Rendering.Mjs:

In the rendering.mjs module, the code uses the Three.js library to create a 3D environment that includes a land and controls the camera. In addition, it incorporates a cycle simulation of day and night, where a sun and Moon move over time to create lighting variations.

It creates a three -dimensional scene, a camera and a rendering to display the elements on the screen.

It initializes land and applies noise to add realistic details.

Set up camera controls to allow the user to explore the 3D environment.

Enables the break by pressing the S key.

Manage keyboard events to control camera movement, such as moving forward, backwards, to the left and right.

Continuously renders the scene with a cycle of day and night, adjusting the position of the sun and moon to create the feeling of passage of time.

Exports important variables, such as the scene and the camera, which can be used in other modules for Additional interactions with the 3D scene.

Skysphere.mjs:

In the skysphere module, the code uses the Three.js library to create celestial elements such as the sun and the sun and the moon. The Add Sky Objects (Scene) function adds these scene objects with your light, shadow, color and position. The sun is represented by a yellow light and a yellow sphere, while the moon is represented for a white light and a white sphere. The code also controls the apparent movement of the sun and moon to simulate the day/night cycle. These objects and settings are stored in the Skyobjects variable to facilitate access to other modules.

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icontrol.mjs:

In the Uicontrols.MJS module, a Graphic Interface (GUI) is developed to interact with the rendered scene. Gui offers options to adjust the color of the land, the intensity of the sun, control the rain and modify the wind intensity. These controls allow the user to customize the scene in real time, making it more interactive and dynamic. Gui is created with the help of the Dat.GU Library, which simplifies the configuration and the use of controls.

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ddons.mjs:

In the Addons.MJS module, the code adds a rainfall to the Three.js scene and allows it to be Removed when necessary. Rain is represented by points that fall and move at random in the presence of wind. It is possible to control the intensity of rain and the intensity of the wind through a Graphic Interface (Gui).

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ain.js:

In the Main.JS module, some essential actions are performed. First, the UpdateHeightmap function is Call to define the initial surface of the terrain. Then event listeners are added to the cases where the user wants to redefine the map or generate a new random map. Finally, the functions Initialize rendering () and renderer () are called to start the presentation of the rendered scene.

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Extras:

Due to some incompatibilities with the code, it was not possible to put all the extras in the module Addons.MJS, and are distributed between the Uicontrols, Skysphere and Rendering modules. The extras include:

-Sun intensity control

-Harlt and respective intensity

-Windfulness that, according to its intensity, will change the direction of the rain particles

-Movement Possibility inside the map using the keyboard arrows