

First day on Earth – Kristijan Mitrov, Daniel Dancea

The libraries list did not change compared to Submission 2, the following libraries were used:

Library	Usage	Reference
GLFW	Window creation, input handling	https://www.glfw.org/
GLAD	OpenGL function loader	https://github.com/Dav1dde/glad
stb_image	Loading texture files	https://github.com/nothings/stb
tinyobjloader	Loading custom (more complex) .obj models with textures (such as the firefly or well)	https://github.com/tinyobjloader/tinyobjloader

Testing:

The solution was tested on the following GPUs:

- NVIDIA MX 250 → ~60-90 fps
- NVIDIA RTX 5070 → ~150fps

Scene composition:

In the scene we can observe the following elements.

In the sky we can see the sun and the moon which are built in a “billboard” way, meaning that no matter where the camera is located the sun/moon will look the same, we decided on this to imitate how these celestial bodies look like in real life. The sun’s “image” is done through shader code and for the moon we use a 2D texture. Additionally we also observe stars in the sky, which fade in and out depending on the sun, also they “twinkle”.

On the island (which is a free model we used) we can see a well (free model), a firefly (free model), and plants (generated in an L-system). With the movement of the automatic camera we can see the sunrise which demonstrates the sunflare effect of the camera. Moving to an top down view we can see the island and how the rotating sun influences the shadowmapping (directional, with manual PCF). Getting down to a closer view we can see the plants generated by the L-system. Getting to the well we can observe a firefly, which follows and automatic path, after a few second of following it, we zoom out to close the scene. During the scene, there is a background music playing.

Controls:

- Mouse - camera rotation
- W/A/S/D - camera movement
- SHIFT - 4x speed for camera movement
- SPACE - go vertically up
- CONTROL - go vertically down
- R - start/stop sun rotation
- N - toggle between sun and moon
- C – enter manual camera mode/restart automatic scene (if scene is finished)
- M – mute music
- Scroll wheel – adjust moving speed

Implementation:

Feature	Implemented by
Shadow Mapping (manual PCF)	Daniel Dancea
Water / Wave Animation	Kristijan Mitrov
Lens Flare	Kristijan Mitrov
L-System	Kristijan Mitrov
Automatic camera movement	Daniel Dancea
Firefly automatic movement	Daniel Dancea
Basic lighting system	Daniel Dancea
Firefly glow effect	Daniel Dancea & Kristijan Mitrov