

# ENTOMBED-DOKUMENTAION

## Gameplay

Since this is a first-person game, moving the camera is like moving the character of the game. We have a wooden switch in the game. By pressing E you rotate the switch, which opens the door in return and gives you free passage.

If you fall from a platform you will die and respawn to the beginning of the game. However all the items you picked before your characters death will still be in your possession.

Any form of interaction happens by pressing E. Click U to jump to the beginning of the game.

To jump from platform to platform simply press SPACE. You can also sprint by clicking LEFTSHIFT and turn off/on flash light by clicking F.

## Effects

We have implemented the **spotlight-effect**. In the game the protagonist uses a flashlight. So the position of the light is in our case the position of the camera. We used a 40 percent angle for the flashlight. Everything else, that is not illumined by the flashlight is darker.

We also implemented **normal mapping** to every mesh in the game. For that we calculated the TBN matrix in the vertex shader and passed it to the fragment shader. We have many complex objects in our game, that use normal mapping. For instance the broken stairs in the room, where you find the first key or the stones where you put in the keys.

The next effect we implemented is **environment mapping**. We implemented a skybox for that. To see environment mapping you have to exit the pyramid, which means you already have almost finished the game. On the platform, you will find a ball, where you can see the effect of environment mapping.(To see the effect also try not to aim the flashlight at the ball, otherwise it will appear yellow.)

The last effect we implemented was **Shadow mapping**. We used our spot light to calculate our shadows.

## Animation

In the main room you will find a ball that is being attached to a cylinder, where these separate meshes are rotate in different directions while simultaneously moving up and down. In addition to that you will see a different more complex mesh that rotates around the cylinder.

## **View-Frustum-Culling**

We have not implemented View-Frustum-Culling.

## **Transparency**

Since we don't use any transparent objects in the game, you can make the world transparent by pressing F9.

## **Experimenting with OpenGL**

Everything has been implemented except for View-Frustum-Culling.

Feedback is being printed in the consol.

## **Illumination**

We use many point lights to illuminate our scene in addition to our spotlight to avoid a darker world.

## **Used Libraries, Code and Tools**

We used the libraries Assimp, SOIL, glm, glew, glfw.

We relied mostly on the OpenGL tutorial on the website: <http://www.learnopengl.com/>

The link for their source-code: <https://github.com/JoeyDeVries/LearnOpenGL>

We used their model( slightly altered), mesh( slightly altered), camera, shader(which only loads our vertex and fragment shader), depth shader, shadow shader and the skybox vertex and fragment shaders. Everything else has been altered or has been written by us.

However we left their comments mostly untouched, to improve readability.

Normal Mapping: <http://learnopengl.com/#!Advanced-Lighting/Normal-Mapping>

Environment Mapping: <http://learnopengl.com/#!Advanced-OpenGL/Cubemaps>

Spotlight: <http://learnopengl.com/#!Lighting/Light-casters>

Shadow Mapping: <http://learnopengl.com/#!Advanced-Lighting/Shadows/Shadow-Mapping>

[https://lva.cg.tuwien.ac.at/cgue/wiki/lib/exe/fetch.php?media=students:cgue\\_shadow\\_mapping\\_ss2016.pdf](https://lva.cg.tuwien.ac.at/cgue/wiki/lib/exe/fetch.php?media=students:cgue_shadow_mapping_ss2016.pdf)

We used Blender to draw our world.

## **Controls**

W: moving forward

S: moving backwards

A: moving to the left

D: moving to the right

E: interact

F: turn flash light off/on

LEFT SHIFT: Sprint

U: jump to beginning of the game.

## **How to beat the game(Anleitung):**

In the beginning it is very straightforward . You jump from platform to platform to open the door in the beginning. Then you will have to follow the path to the main room. There you will find three stones with keyholes in them. One key is already in a keyhole. You will have to find the remaining two key. The first one in the same room. You simply have to take the broken stairs to the left and follow the path until you find the key. You pick up the key by pressing E. To get to the second key you have to take the stairs down to the left until you find a room with traps. Beat the traps to get to the second key. Go back and put the keys in the keyholes by pressing E. The spinning knives will deactivate and you can go through. Exit the pyramid, then go the rope and press E to finish the game(Feedback in the console).