Brief description:

We used OpenGl with C++ to create our game. Functionality like the camera or geometry are separated in their own classes. Main.cpp is just used to set up various things and run the render loop. Some of the Logic is based on the ECG-Framework while e.g. sound is outsourced to a library.

Features:

- Music Playback
- Moving Objects
- Textured Objects
- External Models – there is a separate Mesh Class for external Models which has to be merged with our own Vertex Class
- Moving Camera
- Collision Detection between player and obstacles
- Fixed movement (switching between lanes)
- Physically based shading
- Generative textures
- Vertex shader animations

Illumination:

The 5 lanes as well as the obstacles use the Cook-Torrance BRDF model for physical based shading and are lit with several point lights. The sky texture isn't lit at all. The ground texture is lit by a directional light and uses Phong shading.

PBR:

The human model in the bottom middle of the screen has PBR textures. This can bee seen on the glass visor and the metallic chest when switching lanes. The cube Obstacles come in 4 different Materials:

- Metallic (grey with reflections)
- Plastic (red)
- Dirt
- Rock

Effects:

- Physically based shading
- Generative textures
- Vertex shader animations

Controls:

You control the character with the "A" and "D" key. Pressing "Shift" will increase the movement speed and "esc" will close the game. "F8" toggles the wireframe view. "F2" toggles backface culling. Pressing "Space" will pause the game. The game will start in a paused stat so pressing "space" will also start the game. Pressing "+" and "-" will adjust the brightness. Pressing "print" will show a showacase cube with PBR.

Textured Objects:

The character, the obstacles and the floor on which you move are textured. Currently the textures are a placeholder and not final.

Libraries:

- Assimp: http://www.assimp.org/

- GLFW: https://www.glfw.org/download.html
- GLAD: https://glad.dav1d.de/
- GLM: https://glm.g-truc.net/0.9.8/index.html
- Irrklang: https://www.ambiera.com/irrklang/

Tutorials:

- http://ogldev.atspace.co.uk/index.html
- https://learnopengl.com/
- https://thebookofshaders.com/
- ECG Framework & Slides
- Various stackoverflow threads
- (renderdoc)