Documentation Submission 3 - Beats & Bytes

Implementation:

We are still using C++ and GLSL with OpenGL for our project, as specified in the design document of Submission 1. The story with the concert stage as well as the crowd and the lights also remains the same.

No additional libraries have been used that have not been specified already in the design document. A list of the libraries used is below:

- Assimp (model loading)
- GLM (math)
- GLFW (creating windows)
- GLEW (extension loading)
- GLUT (geometric primitives)
- IrrKlang (music library)

Graphics Card:

This project has been tested on the following two graphics cards:

- NVIDIA GeForce GTX 1070
- NVIDIA GeForce RTX 3060 ti

Effects:

The effects that have been implemented are "deferred shading" and GPU particle system. For the deferred shading effect, we used a geometry-pass to store scene information as position, normals and albedo of our objects into buffers, a lighting-pass where the lighting calculations are done and then a combine pass which combines the generated buffers. We use 14 colorful spotlights located around the stage, shining onto the stage as well as an orange pointlight in the middle of the stage and a white directional light. We store the results of the passes also in textures (for debugging purposes).

We also implemented a GPU particle system. We created multiple instances of the particle system, one rotating on a circle behind the DJ and some along the stage. We tried to implement screen-space ambient occlusion but did not get it to work properly.

If you press the following keys, you can see the different stages of the effect:

"**1**" → position
"**2**" → normals
"**3**" → albedo
"**4**" → lighting texture
"**5**" → depth Texture
"**6**" → combined result
"**7**" → combined result with particles (default)

Who did what - Effects:
- Deferred Shading (Aline)
- GPU Particle System (Sebastian)
- Screen Space Ambient Occlusion (Sebastian, not working)

Who did what - Else:
- Robot Animation (Sebastian)
- Queue for Camera movements (Aline)
- DJ Animation (Sebastian)
- Spotlights for Demo Sequence (Aline)

Demo Controls:
Currently, the camera can be controlled using "**WASD**" keys for moving and the mouse for rotations. The **space** button can be used to go up and the **control** button to go down. To start/end the demo, press **F1**. And to change between the demo camera and the manual camera, press **M** during the demo.