

Submission 4

The demo is being implemented using Vulkan based on the Auto-Vk-Toolkit "Hello World" as proposed. For sound the library "miniaudio" was used.

It has been tested on a NVidia Geforce RTX 3080 and requires an RTX capable card!

The scene is feature complete and shows a 45s animation with sound effects.

The rendering is based on a raytracing pipeline featuring both procedural (orbs, pillar) and triangle (pedestal, temple, cyclops) geometry. The latter is rendered with textures.

Materials are either implemented as dielectrics (with reflection and refraction) or perfectly diffuse.

Illumination consists of a basic directional light and three spot lights in red, blue and green to demonstrate thrown shadows. When the fog comes out they are also rendered in volumetric lighting including volumetric shadows. The lasers shown in later stages are implemented as distorted point lights and animated using a compute shader.

By default the camera controls are deactivated but can be activated with F1 (for debug/inspection purposes) and has the following functions:

The camera can be controlled using WASD and QE.

In addition the orb can be moved with IJKL and UO to see the changes in illumination and to demonstrate updates to the acceleration structure. Note that the orb's movement is not adjusted by dt so it will be extremely fast with high framerates.

The UI features a brightness slider that should hopefully make everything light enough for the projector. The default setting of 1.0 is what in my opinion looks best on my monitor (Samsung G9 OLED). A setting of 2.0 seems good on an older LCD screen.

The noise mentioned in submission 3 feedback has been fixed and was not caused by z-fighting but messed up normals in the blender export.