

Implementation

In First-Person-View, which is the standard gaming mode, the spaceship can be navigated with mouse and WASD (or Arrow keys). When the Key "1" is pressed, the view is changed to Free Camera Mode, where you can freely navigate the camera without controlling the ship. The ship, that is navigated, is one of the moving objects. Other moving objects are the enemies, who follow the ship to capture it.

The game is over if you get caught by one of the enemies or ram another object. To win the game you need to get far enough away from the enemies to be safe. Be on your run - the enemies are close by!

For shadows we used Shadow Mapping with a Omnidirectional Cubemap with our own interpretation of PCF.

Controls

The ship can be controlled in the following way: To move forwards press the Forward Arrow Key or the "W"-Key. To move backwards press the Backward Arrow Key or the "S" key. To move left or right press the Left Arrow/"A" or the Right Arrow/"D" Key. To move up or down without changing direction, press Shift or Space. To slow the ship down to a halt, hold the "Q"-Key. There are further functions for development: Key "1" sets the camera to free mote to navigate the camera freely, key "2" sets the camera to gaming mode (First-Person-Mode). These views are fixed, to free the camera again press "1" or "2".

F1	Toggle Enemy movement
F2	Frametime + FPS on/off (CLI)
F3	Wireframe on/off
F4	Texture Sampling Quality
F5	Mip Mapping Quality
F6	LoD on/off
F7	Blur on/off
F8	Frustum Culling on/off
F9	Transparency on/off

Features

There is a sky box, that creates an illusion of endless space, a huge textured planet, a moving asteroid field, an enemy ship and a navigable ship. Illumination/Textures All objects are illuminated with specular shading or diffuse shading. For non-textured objects, materials were defined, with attributes like ambient color, diffuse color, shininess. The textured planet is illuminated with a simple diffuse shader (Lambert shading). The lighting was

implemented with phong interpolation.

The light source itself is a point light, shining in all direction without attenuation, so it is also strong in distance.

There are two enemies that are chasing you, with a avoidance algorithm, so they only hit the player ship, and do not collide with other objects or each other.

As an animation we surrounded one of the enemy ships by a transparent sphere, which rotates around the ship.

Additional Libraries

For loading meshes into the program Assimp was used, and for loading textures we used FreeImage.

Effects:

- Omnidirectional Shadow Mapping with Percentage Closer Filtering (2 Points)
- Bloom (1 Point)
- Static Level of Detail (1 Point)

How Effects were implemented:

Omnidirectional Shadow Mapping and Bloom was created after the tutorial from Learnopengl:

<http://www.learnopengl.com/#!Advanced-Lighting/Shadows/Point-Shadows>

<http://www.learnopengl.com/#!Advanced-Lighting/Bloom>

Static Level of detail was implemented by simple distance measurement and different models, it was implemented without a tutorial. The LOD effect was used on the asteroids, which turn into simple spheres, when in distance.

Model Creating Tools:

We partly created the models in Blender (Asteroids, Enemy Ships, Spheres), and used a free-license model (for the player ship). The skybox texture was generated by a program published under Gnu Public License.