

## GraPRA: Graphics Programming and Application (Aufgabenblatt 5)

**The island of two faces.** In a cooperative multiplayer, the players build and craft items during the day to prepare themselves for the dark nights where they are attacked by dangerous creatures. One can either craft weapons by digging different types of blocks and combining them or by picking up weapons of dead creatures in the night.

**Abgabe bis 09.02.2022, Mitternacht. Präsentation am 11.02.2022, vorläufig 10:00**



**Abbildung 1:** Water reflections. Source.

### **Aufgabe 1–6 [10 Punkte] Graphical Effects**

The first 6 numbers describe the graphical effects. Before you can start with them, roughly read through numbers 7–10 and set up a basic rendering pipeline.

#### **Aufgabe 1 [3 Punkte] Water [Hisham]**

**Reflections.** Create water reflections reflecting the scene depending on the view angle. Render the scene from under the water and blend with water texture. See figure [1].

**Refraction.** Mimic the way light bends when passing from air into water.

**Normal maps + specular highlighting.** Simulate water movement and highlight bright reflection spots. See figure [2].

**Aufgabe 2** [1 Pur] Day-night-cycle [Daniel]**Abbildung 2:** Sunset. Source.

**Atmosphere.** Implement a Day-night-cycle by creating a Sky-sphere, rotating it around the world, using one texture for the day and one for the night and cyclic blending between them. See figure [2].

**Aufgabe 3** [1 Punkte] Aerial perspective [Ediz]**Abbildung 3:** Aerial perspective. Source.

**Less colors and blue tint.** Imitate Rayleigh-scattering in distance by reducing color values and giving them a blue tint. See figure [3].

**Abbildung 4:** Torch. Source.**Aufgabe 4** [2 Punkte] Light sources [Daniel, Hisham]

**Torches.** Add torches that emit point lights and particles. See figure [4].

**Shadows.** Basic and point shadows



**Abbildung 5:** Rain. Source.



**Abbildung 6:** Lens-flare. Source.

**Aufgabe 5** [2 Punk] Weather effects [Ediz, Michelle]

**Lens-flare.** Replicate lens-flare by drawing sprites along light ray, taking placement, brightness, blur, occlusion int account. (Screen space volumetric light scattering). See figure [6].

**(Block-)clouds.** Add simple solid clouds.

**Rain.** Set Atmosphere by darkening clouds and overall scene color. Limit view size, add rain and thunderstruck. See figure [5].

**Aufgabe 6** [1 Punkt] Screen effects [Daniel, Michelle]

**Zoom.** Slight zoom-in when the player runs.

**Hit effect.** Slightly red tint on the players screen when being hit.

**Aufgabe 7–10 [8 Punkte]** Game play

The last 4 numbers are all about the gameplay.

**Aufgabe 7 [3 Punkte]** Multiplayer [Daniel, Hisham]

Implement a client-server architecture to allow multiple players join the same cooperative game.

**Aufgabe 8 [2 Punkte]** Basic features [Daniel, Ediz, Hisham, Michelle]

**Design.** Entry level, self modeled meshes (enemies, powers, trees, grass, items). GUI related implementations (Menu, player inventory (half-transparent when inactive)).

**Movement.** First person Camera. Smooth player movement and simple animation.

**Digging blocks.** Player can change terrain by adding and removing blocks (Creative-mode and persistent saving). Highlight focused block, show progress cycle and particles when mining a block to show progress.

**Aufgabe 9 [2 Punkte]** Survival-Mode [Ediz, Michelle]

During daytime there are animals walking around, everything is peaceful and beautiful. The player is busy preparing for the night. After dawn enemies spawn in dark spots and start attacking the player with various weapons. Enemies drop their weapons when they die.

**Aufgabe 10 [1 Punkte]** Sound [Daniel, Ediz, Hisham, Michelle]

Auditory enhancement through different sounds when walking on surfaces and overall soundtrack.