

Libraries

- [tiny-gltf](#)
- [JoltPhysics](#)
- [inih](#)
- [stb](#)
- [fmt](#)
- [soloud](#)
- [miniaudio](#)

References

- [Vulkan Abstraction](#)
- [Wave animations](#)

Effects

Gameplay

3D Geometry (6 points)

- Nontrivial objects: enemies, gun, grenade, ground, trees, waves...
- Used tiny-gltf for model loading

Playable (3 points)

- We hope it is :)

Min 60 FPS and Framerate Independence (3 points)

- Used Nvidia Geforce Now to measure FPS
- Used delta time both for rendering and physics

Win/Lose Condition (3 points)

- Lose = lose all HP or fall off the map
- Win = timer-based; survive longer than last attempt to "win"

Intuitive Controls (2 points)

- WASD for movement
- Left Click for shooting
- G for throwing grenade (one every 60 seconds)
- F-keys for special functions:
 - - Debug mode
 - - Hide HUD
 - - Show wireframes
 - - Fullscreen mode
- Debug mode: Shift + Space to fly up/down, Scroll to change speed
- For development: custom keys for moving objects in the scene (disabled in release)

Intuitive Camera (2 points)

- Standard third-person camera
- No collision in debug mode

Illumination Model (2 points)

- Blinn-Phong terrain + waves

Textures (2 points)

- Loaded using tiny-gltf
- Enabled mip-mapping and trilinear filtering (except for the skybox)

Moving Objects (2 points)

- Enemies, waves, grenade

Documentation (1 point)

- This is it

Collision Detection (6 points)

- Player + ground, player + enemies, enemies + ground, grenade + ground, grenade + enemies

Advanced Physics (4 points)

- Grenade with knockback

Heads-Up Display (4 points)

- Blending is enabled
- Gun model is projected orthographically, same with text

NEW: View Frustum Culling (6 points)

- F8 to enable/disable
- debug text shows rendered game object count

Visual**L-System (12 points)**

- Trees

Tessellation from Height Map (12 points)

- Ground, F9 for wireframe mode

Vertex Shader Animation (8 points)

- Water with waves around the map

Procedural Texture (8 points)

- Ground

We tried to implement a shadow map with PCF but failed. The remnants of it are still in the codebase.

Extra features**Sound**

- Gunshots, ambient, enemy growling, death, hurt

INI-Reader

- used for parameter hot-reloading: read position from file every frame so that you don't have to rebuild (used also with the custom keybinds for moving objects we mentioned above)

Skybox

- nice

Text

- used for UI