Graphics Application Coursework Proposal – Gabriel Lacey (1602949)

Summary

As seen in the drawing below, the scene for my coursework will be set in a no man's land battlefield. This will include a blimp in the air with its own light source, occasional explosions in the sky, a muddy field terrain, and a puddle with a crate half submerged in it.

Techniques

- Vertex manipulation
    - The explosions in the sky will be animated through vertex manipulation using a multi-channel height map, along with an additional texture to describe the colour of each vertex at different heights of the explosion.
    - The water in the puddle will also be minimally animated.
- Post processing (Render Texture)
    - At any point the user will be able to enter an FPS target, when they do so the program will check if that target is being hit and if not will down sample until it is matched and will do the opposite if the fps is set lower than the current target (capping at the max resolution of the window).
    - There will also be an edge detection mode, using a sobel filter to check the horizontal and vertical differences in intensity. This will also require passing the scene through a greyscale filter beforehand.
- Lighting and Shadows
    - The blimp will cast a spotlight down to the terrain, and will pan across the field, occasionally passing over a box which will be correctly lit and shadowed.
    - The explosions in the sky will also use recycled point lights that will start with high intensity at the start of the animation then fade to 0 very quickly as the explosion dissipates. Multiple point lights will be used as there may be multiple explosions happening at the same time.
    - The entire scene will have a very dim directional light applied to it to simulate moonlight, and almost no ambient lighting.
    - The surface of the water will also be blended with the crate submerged in it.
- Tessellation
    - Tessellation will be applied to the two largest objects in the scene, the terrain and the blimp. The tessellation factor will be applied to individual patches that make up each object to allow for distance-based tessellation, giving more detail to patches that are closer to the camera.
- Geometry Shader
    - Billboarding will be used to create a fog effect over the battlefield, starting a certain distance out from the camera and rotating to follow their view.

Blimp w/spotlight

Explosions in sky

moonlight

Box with shadow

Muddy
Field

Deep puddle with
crate half submerged