# Maths and Technologies for Games, CO3303

# Assignment 2018-2019 – Post-Processing

Post processes used in the basic scene are one area effect with is a swirl that transforms from normal to a whirl over time and back. There are also five windows and a sixth spinning window, the spinning window and the window in the single wall use a cut class effect, they are semi transparent with a shattered look, the second window uses a tint and tints anything threw the window, the third window uses a retro shader to reduce the colour pallets bit depth and also reduce the pixels in the scene, the fourth window is a invert shader and inverse the colours like a pictures negative and the final window uses a grey noise.

Other shaders can use used as a full screen post processing effect are: Copy, Tint2, Burn, Distort, Heat Haze, Grayscale, Gaussian Blur, Bloom and Gameboy.

Copy is a simple shader that just returns the same frame. Tint2 is a two-tint shader that has a gradient from one colour at the top to another colour, the program uses HSL to rotate which colours are used in the tint. Burn is an effect that slowly burns away the screen to black. Distort as a glass window and distorts the edge of the glass. Heat haze distorts the view to give the wobble effect give off by hot areas. Grayscale use the rec 601 luma ratio to create a colour scale. Gaussian blur takes the scene and saturates the scene over a threshold, it is then scaled and blurred, the blur required kernels to blur with this is calculated to use as many kernals as needed to make the blur correctly, the original scene is then added to this new scene to create bloom, saturations is adjusted. Gameboy is just a preset effect that uses pixilation, grayscale, tinting and changing the bit depth to mimic the original Gameboy.

The stain glass windows use different models, it would be better to change the material of the models after it is loaded instead of duplicate models. The gaussian blur uses a few for loops to get values, it would be better to precalculated these then just store them on the graphics card instead of each frame. Shaders use the same variables across instances, it would be better to make variables for each instant rather than per effect so for now a tint can only tint a single colour, while it would be better to be able to add a red tint and then a green tint, this is not too much of a problem since most problems can be solved by working the result and do it in one pass which would be more efficient but harder to calculate.

A graphical interface has been added so that the player can use a drop-down box to select the desired effect to apply, then can be added with the add button and removed with the remove button. A second window has the setting for each effect which can be adjusted by moving the sliders or by control clicking the values and typing them in. There is a up and down button easily swap the order of the effects.