# Maths and Tech assignment

## What is post processing

Postprocessing is the editing of data captured by a camera. Therefore, postprocessing is popular technique within the films and games industry.

## Describe generally the use of post-processing in a graphics application

Snapchat, Instagram, Facebook all have the capabilities to give their users access to post processing effects with the use of user’s phone camera. The technique is referred to as image processing which is the manipulation of each individual pixel within an image so basically just post processing. They use image processing to locate a person’s face, (I’ve not fully looked into the how they determine a person’s face within an image but if I was to guess they probably look for determining features like eyes, nose, mouth and so on). After locating a user’s face, filters can be applied to manipulate the pixels on the image for example you warp your face to make yourself look weird.

Films use post processing or also known as postproduction to edit and add elements to a film, this will involve graphical applications like photoshop to enhances and edit images.

<https://medium.com/cracking-the-data-science-interview/snapchats-filters-how-computer-vision-recognizes-your-face-9907d6904b91>

Video games are graphical applications that use postprocess effects for things such as screen transitions, god rays, fog, rain drops… this is just a few examples of what can be accomplished with this technique.

For example, games have used this effect to show water running down a window.

On screen effects can be achieved like rain running down window. Which helps immerse the user.

## Explain the specific techniques used for your post-processing effects

Texture passing

Displacement mapping is used to displace pixels

I use Height mapping to perform the burn process in my project it uses a timer an a texture

Sin wave

Colour manipulation

Brightness manipulation

Pin ponging

* + Discuss improvements or extensions you could make.

To create a post process effect, you must render scene to a texture then send that texture through multiple passes of different postprocess shaders to give the texture different effects. but in many cases the effects are not worth it or complicated effects create performance issues. For example, bloom requires 4 passes of the scene texture to create the effect but a less expensive way to create bloom would be to create a bloom map by using a glossiness map this would be a way of faking. The advantage of this would be performance the trade-off is a lower quality effect but most users will not notice the difference.

Gaussian blur can be improved by using linear sampling instead of point sampling. Linear sampling will grab a collection of pixels from a texture instead of one pixel therefore the process is able to blur multiple pixels every iteration resulting in a stronger blur. This method is only beneficial if the blur is being run multiple times.

Gaussian blur can be improved by using a 9 tap version which uses different sampling to grab more pixels therefore blur will require less passes.

<https://community.arm.com/developer/tools-software/graphics/b/blog/posts/post-processing-effects-on-mobile-optimization-and-alternatives>

* Basic Requirements
* Advanced Requirements
* Additional Features
  + Distance sorting for post processes
  + Light Beams (God rays attempt)
  + Gaussian Blur with weight adjustment
  + Tv Object with portal implementation and alpha cut out also has post process capabilities
  + Camera picking
  + Imgui