# Mock Exam Q2 Part C-3

A very useful vertex technique for a lot of visual effects is drawing an outline around an object. This is commonly done using vertex normals. Research outline shaders and implement one.

Outline shaders – Have a thick black line around an object

A simple outline shader is Hull outline shader.

Idea is

1. Render a slightly bigger object.

2. Shade the object black (or other colour).

3. Draw the original object on the black object

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| A black ball on a white background  Description automatically generated with low confidence | A picture containing floor, black  Description automatically generated | A picture containing shape  Description automatically generated |

New a Unity project, name it as Outline.

To achieve the above effect, we need to shade the object twice.

First is the slightly bigger black object and second is the original object.

As such we need to shade the object twice.

However, currently Universal RP does not support multiple pass in one shader.

To overcome this limitation, we need to configure the Universal RP directly with Layer and Material (which is linked to layer). Then we need to configure the layer of the object which need the Outline shader.

Implement the Outline shader

See OutlineShader code.

Graphical user interface, text, application, chat or text message

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Create a OutlineMaterial, link OutlineShader to OutlineMaterial.

Graphical user interface, text

Description automatically generated

In Project Setting (Edits-> Project Setting…)

Set a new Layer with “Outlined”

Graphical user interface, text, application, table

Description automatically generated

In Universal Render Pipeline Asset\_Renderer

Add Renderer Feature -> Render Object (Experimental)

Name it as “Outlines”

Change Layer Mask to “Outlined”

Change Material to “OutlineMaterial”

Graphical user interface, text, application, email

Description automatically generated

Add in a Cube and Sphere into the scene.

Change both object layer to “Outlined”

Background pattern

Description automatically generated

Change the Outline Shader colour to see the effect.

A picture containing logo

Description automatically generated