COMP220: Graphics & Simulation

2: Getting Started with OpenGL

Learning outcomes

By the end of this week, you should be able to:

- **Implement** a basic scene using OpenGL and SDL
- **Recall** the role of shaders in graphics programming
- **Write** simple shader programs in GLSL

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- Lecture (async):
  - **Introduce** the basic concepts of OpenGL
  - **Review** the roles of the vertex shader and the fragment shader

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  - **Introduce** the basic concepts of OpenGL
  - **Review** the roles of the vertex shader and the fragment shader
- Workshop (sync):
  - **Implement** a basic scene using OpenGL and SDL
  - **Practice** creating simple shaders in GLSL

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Introducing OpenGL

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  - Changed to **core-profile** mode: flexible and powerful, but more complex to learn.
  - Requires a greater understanding of what's actually happening.

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  - **OpenGL Extension Wrangler Library (GLEW)**: cross-platform C/C++ extension loading library.

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- To change a portion of the image by default requires **clearing** and **redrawing** the whole screen.
- Change the state by **setting options** (e.g. draw mode) and **manipulating buffers**.

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- We will use **SDL** (which you have used before, including in COMP270).

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Shaders

Recap: processing pixels

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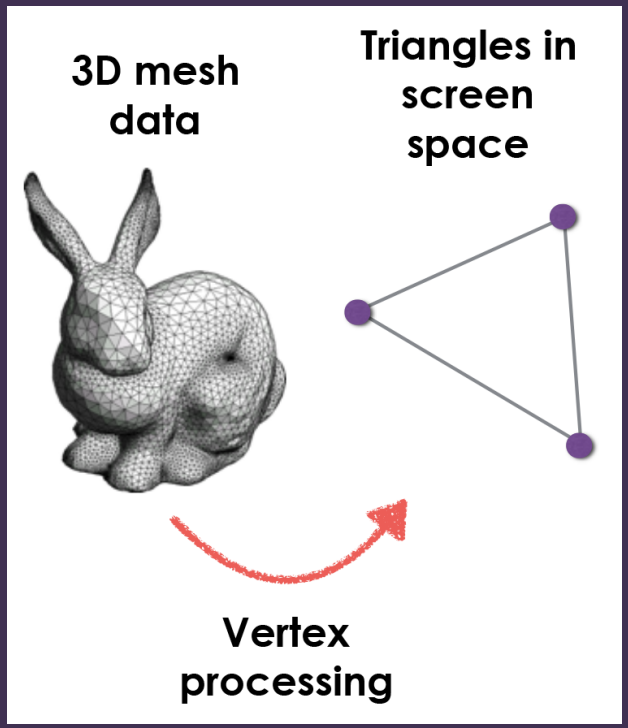

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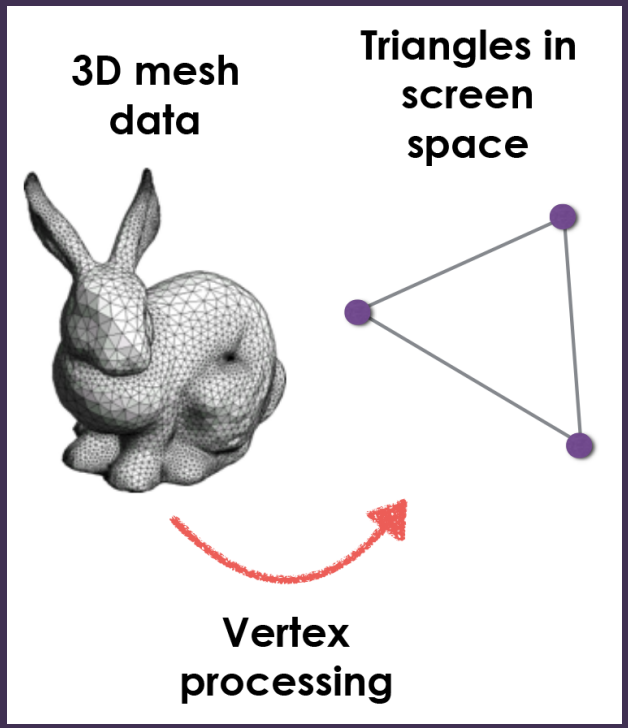

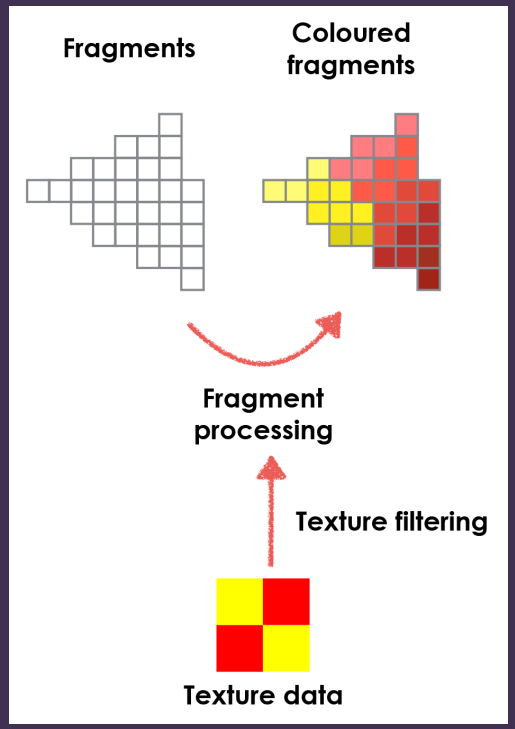

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Fragment processor determines the **colour** of each fragment covered by the triangle.

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- Programs for these units are called **shaders**
- **Vertex shader**: responsible for geometric transformations, deformations, and projection
- **Fragment shader**: responsible for the visual appearance of the surface
- Vertex shader and fragment shader are separate programs, but the vertex shader can pass arbitrary values through to the fragment shader

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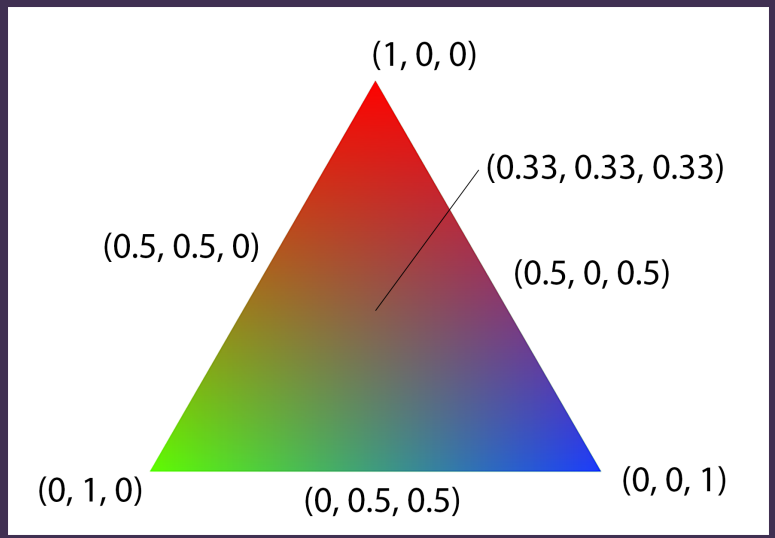

Next steps

- **Review** the additional asynchronous material for more background on OpenGL and shaders/GLSL
- **Attend** the workshop to see how to use OpenGL with SDL to set up a scene and render it with shaders in GLSL