WebGL and GIS

DEUS Concilium coffee on Fri 8Apr 2022

What is and when use GL (Graphic Libraries)

A small trip from vertex to massive data representation

Wich are GL (Graphic Libraries)

- WebGL
- OpenGL
- Vulkan
- DirectX

Which are not GL

- Most common chart libraries
- Static images
- Videos
- Paralax effects on headers websites

So when should we use GL?

- 2D/3D expensive calculated rendering
- Create object/models which user can interact with

And... why?

Because we get the GPU power over the CPU for parallell processing!
Graphic libraries take advantage of the GPU to calculate multiple small things.

And we can also do that in Web development

Examples of GL rendering

The examples on this link are made for web but they can be generalize to other platforms.

https://webglsamples.org/

Art and tech united again

https://le-voyage-azarien.art/

GL 101

Vertex

Each one of the point that delimit a poligon

Fragment

Space that can be drawn between vertex

Shader

Program that runs for every fragment and vertex on the model

Buffers

Contiguous memory space in GPU loaded with data (attributesunidimensional array)

Atribute

These variables represent a particular vertex in our mesh.

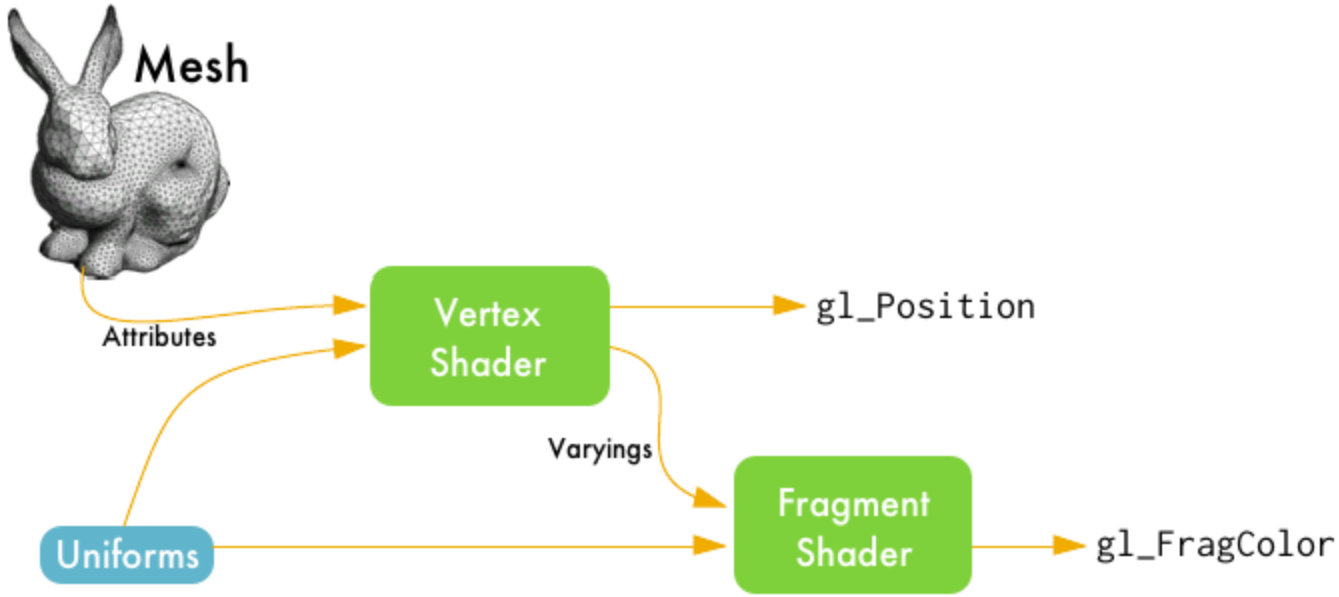
Uniforms

Global read-only variables that can be use in the vertex and fragment shaders.

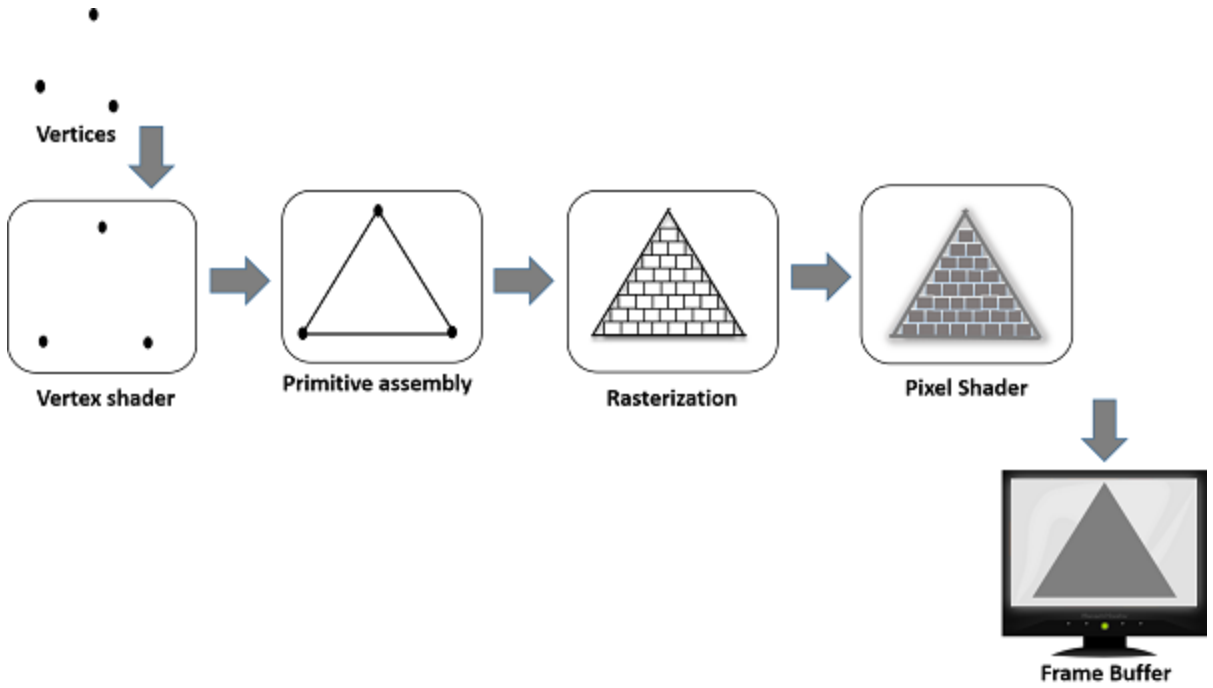
Varyings

Variables you can write in your vertex shader which then is passed to the fragment shader.

The rendering pipeline concepts assembled



The rendering pipeline



Show me the code

- The 2D Triangle
  - https://codesandbox.io/s/color-triangle-fqoy28
- Multicolor 3D cube
  - https://web.cs.upb.de/cgvb/WebGLEditor/

Analytics and GL? Overpowered

- https://deck.gl/
- https://kepler.gl/
- https://threejs.org/examples/#webgl_geometry_spline_editor

Bibliography

- https://webglfundamentals.org
- https://thebookofshaders.com/
- https://www.cis.upenn.edu/~cis277/16sp/lectures/2_9_OpenGL_Shaders.pdf
- http://learnwebgl.brown37.net
- https://developer.mozilla.org/es/docs/Web/API/WebGL_API/Tutorial/Getting_started_with_WebGL
- https://eater.net/quaternions <-- just for freaks

And that's all!

Q&A ?