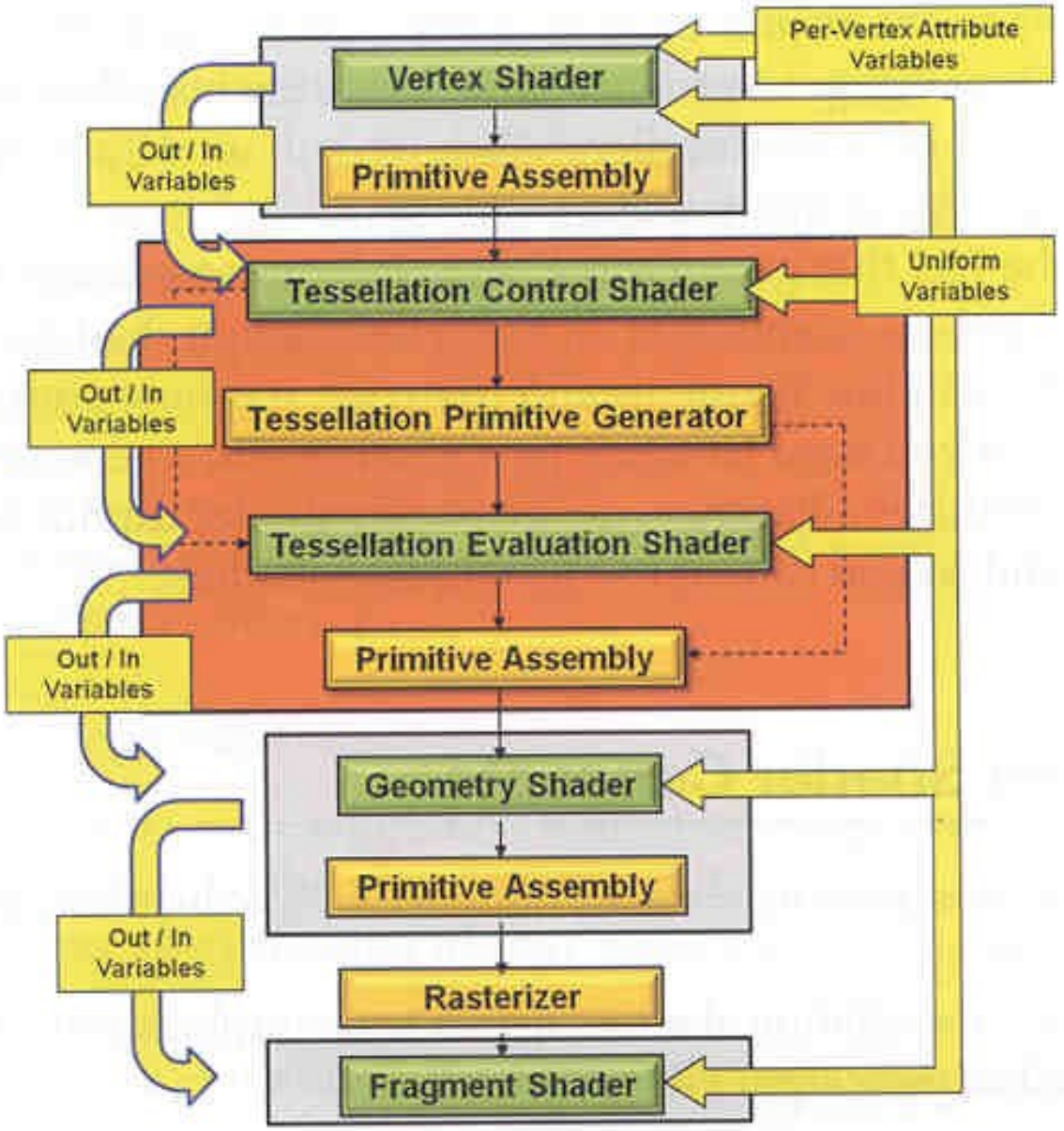
Tesselation Shader

CSCI 4239/5239
Advanced Computer Graphics
Spring 2019

What is it?

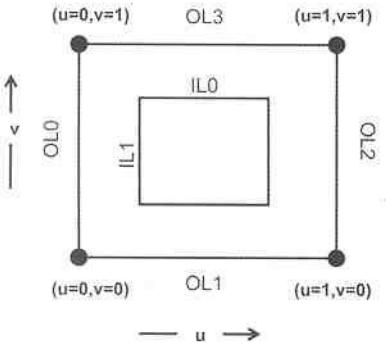
- Allows dynamic refinement of objects
- Subdivides lines, triangles or quads
- Inserted between vertex shader and geometry shader
- Special Type: GL_PATCHES
- Best resource
  - Graphics Shaders: Theory and Practice (2e)
    - Bailley and Cunningham
    - Chapter 12

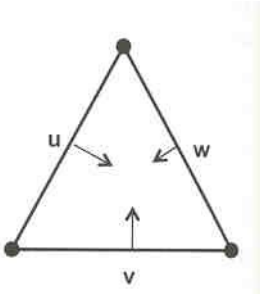
Where does it fit?

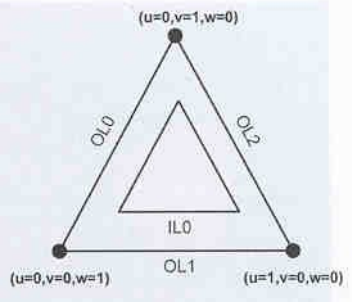


Coordinates

- Quads
  - Cartesian coordinates
  - Two outer division levels
  - Two inner division levels
- Triangles
  - Barycentric coordinates
  - Three outer division levels
  - One inner division level







OpenGL Implementation

- Requires OpenGL 4.0
- Create and compile just like others
  - glCreateShader(GL_TESS_CONTROL_SHADER)
  - glCreateShader(GL_TESS_EVALUATION_SHADER)
- Requires additional parameters
  - In program
    - glPatchParameter*()
  - In shader
    - layout( )

GLSL Implementation

- Tesselation Control
  - Set position
  - Set inner level
  - Set outer level
- Tesselation Evaluation
  - Interpolate in cartesian/barycentric coordinates
  - Set vertex gl_Position
- Geometry
  - Expand to triangle strip

Ex 21: Geodesic Tesselation

- Approximates sphere by subdividing geodesic icosahedron
  - 12 vertices
  - 20 triangles
- Collection of all shaders
  - Vertex Shader
  - Tesselation Control Shader
  - Tesselation Evaluation Shader
  - Geometry Shader
  - Fragment Shader