

## Java Bindings to Desktop OpenGL

- early prototype: summer 2002
- JOGL 1.0: 4/2004
- can mix use of fixed function pipeline & shader-based pipeline

## WebGL

- Early prototypes: 2006-2007
- WebGL 1.0: 3/2011
- > Based on OpenGL ES 2.0
- > Programs written in JavaScript and run inside a web page
- > No fixed function pipeline

### OpenGL ES

- 1.0: 2003
- > only fixed function pipeline

### OpenGL ES

- 2.0: 3/2007
- > Based on OpenGL 2.0, but no fixed function pipeline

### OpenGL 1.x

- 1.0: 1/1992
- > first “open, cross-platform” version
- > 1.1-1.5 added:
  - \*\* arrays
  - \*\* extensive texture enhancements
- 1.5 released 7/2003

### OpenGL 2.x

- 2.0: 9/2004
- > introduced GLSL
- > can mix use of fixed function pipeline & shader-based pipeline
- > extensive texture & related bitmap and imaging enhancements
- 2.1: 7/2006
- > GLSL enhancements

### OpenGL 3.x

- 3.0: 8/2008
- > deprecation model
- > fairly radical GLSL changes (preparing for other shaders)
- 3.1: 3/2009
- 3.2: 8/2009
- > Geometry shader
- 3.3: 3/2010
- > eliminates nearly 1/2 of old API
- > eliminates fixed function pipeline

### OpenGL 4.x

- 4.0: 3/2010
- > Tessellation shaders
- > double in GLSL
- 4.1: 7/2010
- 4.2: 8/2011
- 4.3: 8/2012
- > Compute shaders
- > Shader storage buffers
- 4.4: 7/2013
- 4.5: 6/2017
- 4.6: 2/2019



Iris GL (Silicon Graphics)



## Language Bindings

- Desktop OpenGL: C/C++
- Desktop JOGL: Java
- WebGL: JavaScript
- OpenGL ES:
  - \*\* C/C++: android
  - \*\* Java: android (different from JOGL)
  - \*\* Objective-C: iOS

Source for more complete details

- [www.opengl.org/registry](http://www.opengl.org/registry)

Blue: Desktop OpenGL