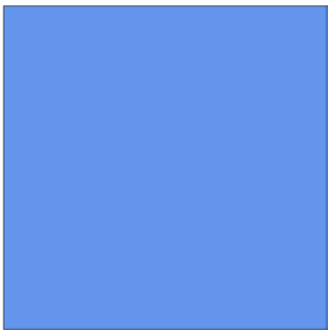
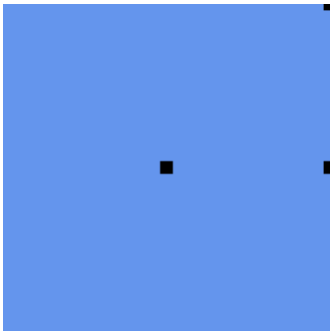
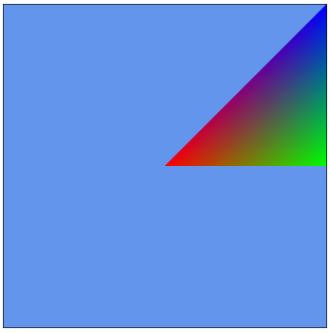
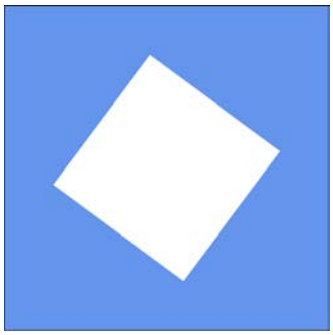
02561 COMPUTER GRAPHICS DTU COMPUTE

Worksheet 1: Getting started with WebGL

Reading	Angel: Chapter 2 and Section 3.1. (Optional) Angel: Chapter 1 (especially Sections 1.3-1.5).
Purpose	The purpose of this set of exercises is to get started with WebGL. You will setup a WebGL application from scratch, create a canvas and a WebGL context, compile and use simplistic shader programs, setup the needed buffers for drawing, and draw and animate simple shapes. A handy WebGL quick reference card can be downloaded here: https://www.khronos.org/files/webgl/webgl-reference-card-1_0.pdf Basic JavaScript reference: http://www.w3schools.com/jsref/ Tips: - You can press F12 or right click and choose “Inspect [element]” in most browsers to show the developer/debug menus which can be quite helpful.
Part 1 	Setup a basic WebGL application. • Create a HTML document with a 512x512 canvas element and write a script to create a WebGL context. [Angel 2.8] • Setup a viewport and clear the canvas with the color cornflower blue (0.3921, 0.5843, 0.9294, 1.0). [Angel 2.5.1] • If not already done, move the script to a separate JavaScript file and include it in the HTML document. • Setup the WebGL context using Angel’s “setupWebGL”. You can use the window.onload event to initialize and setup the application. [Angel 2.8]
Part 2 	Shaders and buffers. • Load and compile a shader program. Write a basic vertex shader and a constant color fragment shader. [Angel 2.8.3 to 2.8.8] • Setup a vertex buffer with the corresponding attribute pointer. Add the coordinates and draw three points of size 20 pixels, like in the figure. [Angel 2.4, 2.8, and 2.5.3]

Worksheet 1: Getting started with WebGL

Part 3 	Triangles. • Change the code in the previous example to draw triangles instead of points. [Angel 2.4.2] • Extend the application to include a second color buffer and draw the triangle with a red, green and blue vertex color. [Angel 2.5.1 and 2.10]
Part 4 	A rotating square. • Add a second triangle to the previous part such that you have a quadrilateral (which is maybe even a square). [Angel 2.4] • Center your quad (short form of quadrilateral) and rotate it such that it has its vertices on the coordinate axes. • Add a rotation so the quad rotates around its center. Animate the rotation angle over time. Use requestAnimFrame to continuously call your render function. [Angel 3.1]
Part 5 	A fan of triangles. • Create and draw a circle using the triangle fan drawing mode. [Angel 2.4.2] • Make the circle bounce up and down over time.