

Exercises for Advanced Graphics (Lectures 1-4)

All work to be submitted by email in a single PDF, no less than 48 hours before supervision.

In this exercise you are asked to write OpenGL code in Java. We have prepared a minimal 'HelloGL' at:

<https://github.com/AlexBenton/Teaching/tree/master/AdvGraph1617/OpenGL%20Demos/com/bentonian/gldemos/helloogl/HelloGL.java>

HelloGL.java uses LWJGL, available through Maven or at:

<https://www.lwjgl.org/download>

You are free to expand on HelloGL.java, or write your own Java code from scratch, or build on the framework classes supplied in the repo, as you see fit.

1. Initial geometry

- a. Render a white triangle on a blue background.
[HelloGL.java does this for you already.]
- b. Render a blue rectangle on a white background.
- c. Texture your rectangle with an 8x8 checkerboard.
- d. Replace your rectangle with a cube.

2. Perspective

- a. Implement 3D orthographic projection.
- b. Implement 3D perspective projection.

3. Lighting

- a. Implement ambient + diffuse illumination with Phong shading.
- b. Add specular illumination.

4. Final geometry

- a. Replace your cube with the Utah Teapot[1] or Stanford Bunny[2].

You should submit nine screenshots. You do not need to submit your code, but feel free to include code snippets if you have questions.

[1] Available in many file formats online, or from:

<https://github.com/AlexBenton/Teaching/blob/master/AdvGraph1617/OpenGL%20Demos/teapot.off>

[2] Available in many file formats online, or from:

<https://github.com/AlexBenton/Teaching/blob/master/AdvGraph1617/OpenGL%20Demos/bunny.off>

