

## Lab Assignment #2

To be graded in class 2/12/2020 2:10pm

### Framebuffer objects

The goal of this lab assignment is to get experience with using framebuffer objects and solving some of the problems you might encounter when rendering to textures. This can be a group project.

The template program, *FBO example*, creates an FBO and creates and attaches a texture (fbo\_texture). In the display callback a mesh is rendered to the FBO in the first rendering pass. A second rendering pass renders a quadrilateral with fbo\_texture applied.

**Part 1: Fix bugs.** Notice that the image produced by the template program looks blurry, and that there are depth testing issues. Demonstrate to me, in class, that you have fixed these problems by performing the tasks below.

- Initialization: see initOpenGL()
  - [20 pts] Make the texture size and the window size equal. (Both should be 1280 x 720).
  - [20 pts] Create a depth renderbuffer the same size as the window.
  - [20 pts] Attach the depth renderbuffer to the FBO.
- Usage: see display()
  - [20 pts] Clear both color and depth before rendering pass 1.

**Part 2: Freestyle.** Do something interesting in the shader with the FBO texture.

- Shading: see fragment shader fbo\_fs.glsl
  - [20 pts] Change the fragment shader to do some interesting **fullscreen effect**. You may also change any part of the project (the mesh, colors, pass different uniform variables, etc.), but the main focus is the fragment shader in the second pass. Brainstorm to see what kind of interesting effects you can come up with. Some effects to consider:
    - Vignetting
    - Edge detection
    - Underwater ripple or heat wave effect
    - Glow or bloom
    - Noise / glitch effects

Each group should **submit a video** of their effect and a list of group member names to Blackboard by the time listed above.