Team Members: Andy (Yitian) Luo, Rory Bennett, and Shinell Manwaring

Brief description of the topic/technique:

After individually researching a variety of graphics topics/techniques, we proposed the following:

- Rubix Cube Modeling
- Generate Stippling Image
- 3D Convex Hull
- Modeling Water

We ultimately decided to implement a graphics project that encompassed modeling water physics, light refraction, and shading. The idea is to generate a water tank, and to see how dropping objects in the tank will affect the water flow. In the sandbox environment referenced below (first link in Possible References/Sources), only the surface is noticeably affected when the ball enters the water. We cannot actually drop the water in this demo, and must instead drag it vertically into the tank, which means that the ball enters the water at a constant rate. Therefore, we will add functionality to the demo by allowing the user to drop the ball into the tank at different heights, and the ball will affect the surface differently, at possibly greater depths, based on the heights at which they are dropped. If time permits, we will also add renderings of how movement below the surface of the water affects the overall model.

Proposed Timeline:

Since the deadline of project 5 is March 13th, we have devised the following timeline (this is subject to change depending on time constraints):

Part 1: (complete by: Feb 26th)

Rendering the container and objects. The objects respond to mouse click and can be dropped into the container.

Part 2: (complete by: March 5th)

Adding water to the container. The objects should look different under water due to light refraction.

Part 3: (complete by: March 13th)

Water surface will react to the objects that are dropped in the container. The frequency of water wave should be higher if the object is dropped from a greater altitude.

Possible References/Sources:

While researching we found the following examples, which may useful for our final implementations:

- http://madebyevan.com/webgl-water/ (Evan Wallace's WebGL Water Example)
- https://github.com/evanw/webgl-water (Water Physics Example - Repository)
- https://github.com/evanw (Evan Wallace's Github)
- http://madebyevan.com/ (Evan Wallace's Website)
- https://graphics.stanford.edu/papers/water-sg02/water.pdf (An article on water surface rendering)
- https://graphics.stanford.edu/papers/water-sg02/water.pdf (Animation and rendering of water)
- http://blog.bonzaisoftware.com/tnp/gl-water-tutorial/ (Tutorial on rendering water)

Below are additional resources that may be useful:

- https://www.shadertoy.com/

Alternate topics/examples that were considered:

- https://code.tutsplus.com/articles/21-ridiculously-impressive-html5-canvas-experiments--net-14210 (HTML canvas projects)
- https://www.creativebloq.com/3d/30-amazing-examples-webgl-action-6142954 (WebGL projects)
- https://lab.hakim.se/blob/03/ (Hakim El Hattab's Blob Example)
- https://hakim.se/ (Hakim El Hattab's Website)
- https://github.com/hakimel (Hakim El Hattab's Github)
- http://cycleblob.com/ (Cycle Blob - Tron Inspired WebGL game)
- http://media.tojicode.com/q3bsp/ (Quake 3 - Graphically Impressive)
- https://www.shadertoy.com/view/XtXBRX (Solar System)
- https://www.shadertoy.com/view/XstyD8 (Shadow Changes due to mouse click)
- http://in2gpu.com/2014/07/22/create-fog-shader/ (Fog Shader)
- http://graphics.uni-konstanz.de/publikationen/Deussen2017LindeBuzoGray/index.html (Stippling Art Technique)