EECS 351 - Project C
SpongeBob SquarePants Toy in the Spotlight

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Goals

The goal is to show different kinds of drawing and lighting methods using WebGL language in 3D space. In my implementation, I will implement drawing different lighting and texture, as well as basic shape animation and user interaction.

User Guide

F1 / Esc: show / hide help.

A / S / D / W: move camera in xy-plain.
F / R: move camera in z-height.
↑ / ↓ / ← / → : move view angles.

H / J / K / U: move light in xy-plain.
L / O: move light in z-height.

[/]: adjust toy's nose length.
Key Point and Extra:
1. sphere-stick - extra 2 shader distort
2. cylinder - extra 3 shader twist
3-1. joint arms+hands swing
3-2. legs swings
3-2. nose stretches

Code Guide

HangbinLi_ProjC.html
It mainly contains definition for 3 parts.
1. The canvas for drawing for WebGL content.
2. Interactive controls. There are several html input controls, such as buttons, range inside.
3. The area for help content.

Thera are some css code inside this file helped for formatting. No javascript code inside this file.

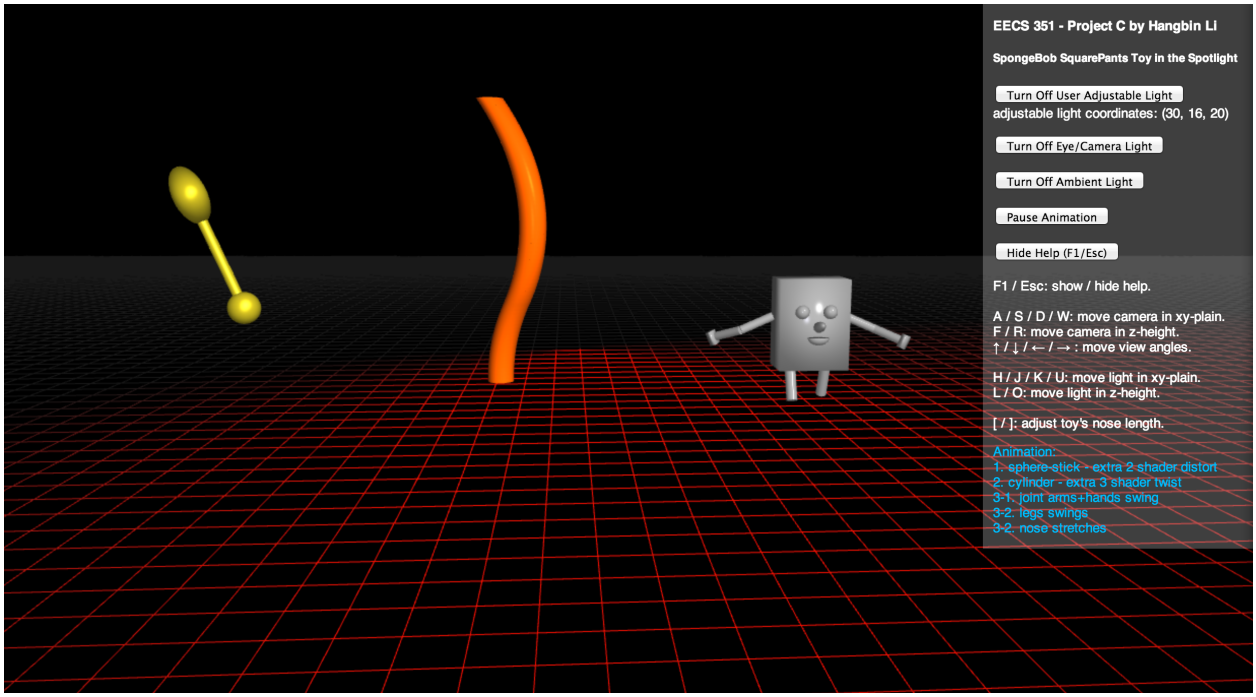
HangbinLi_ProjC_main.js
It contains GLSL code and javascript code that calls to draw and animate the picture, as well as javascript functions interact with html page and keyboard and mouse. The functions are:
1. main() - It initiates vertex and fragment shader then call to draw the object. It contains listener for mouse and keyboard event.
2. initVertexBuffers() - Initiates VBO.

3. draw() - Draw all views.
4. declareGlobalVar() - Where all global variables are declared.
5. setMatrix() - Reset all matrixes' parameters.
6. initArrayBuffer() - To initialize different buffers.
7. initTextures() - To initialize texture
8. loadTexture() - Load textures into gl.

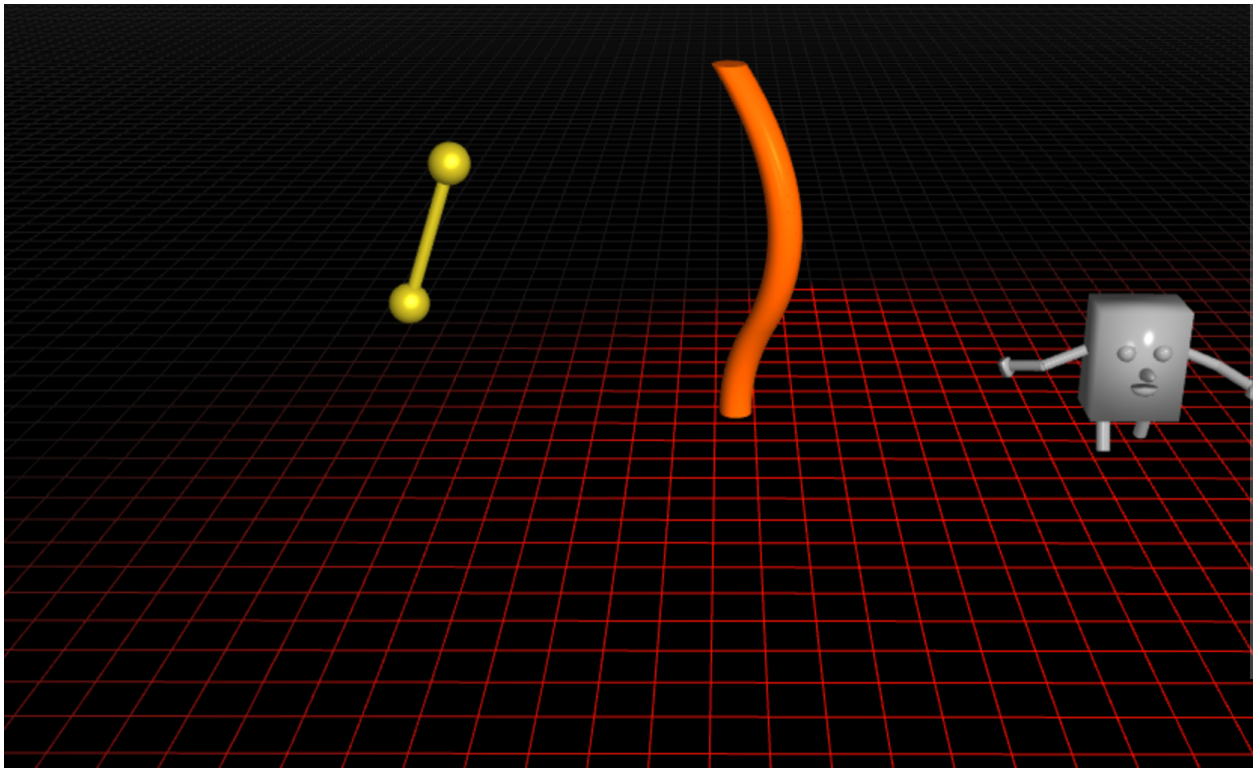
HangbinLi_ProC_makeshape.js
Functions that make all kinds of shapes that is used in the other javascript file.

HangbinLi_ProjC_interact.js
All functions that consider the interaction with HTML file are included in this source file.
1. animate() - Control the animation rules.
2. keydown() - Handle the action of key press event.
3. writeHelp2Html() - Write help content to webpage when needed.
4. winResize() - When the webpage is resized, the canvas should do the same.

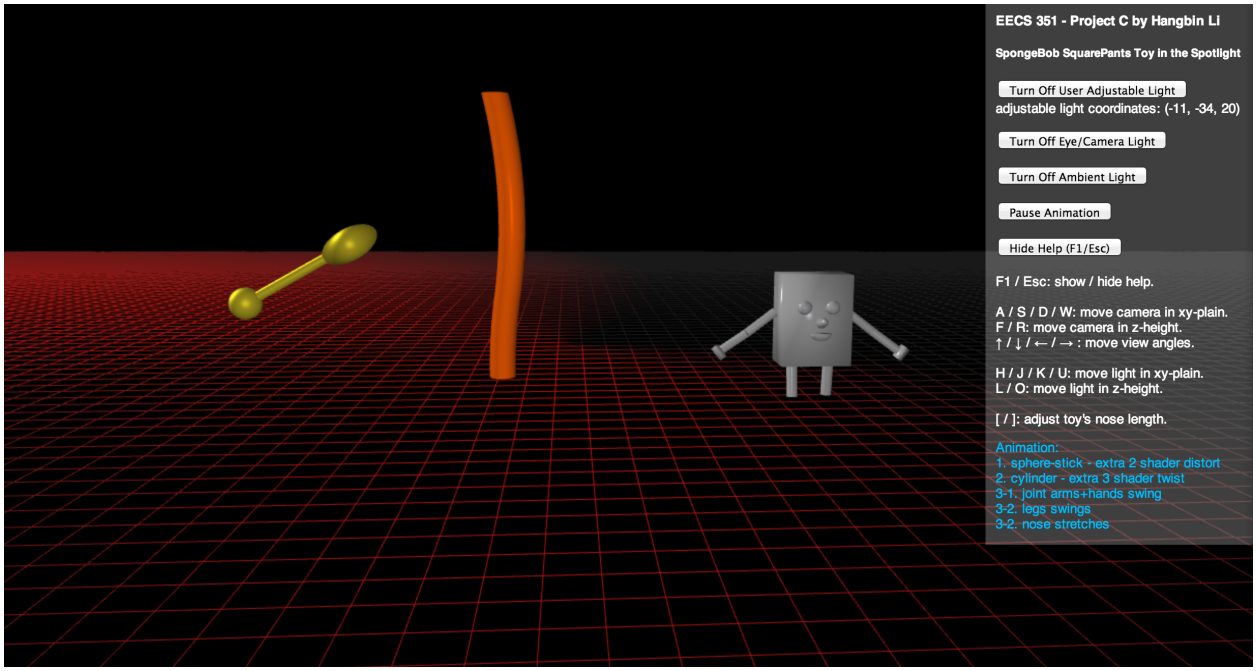
Picture Illustration



The initial status of animation. All moving elements are showing in the help content above. Help content can be displayed or hidden by clicking button or keyboard shortcut keys.



The drawing canvas. You can change the camera position.
Animation:
1. sphere-stick - extra 2 shader distort
2. cylinder - extra 3 shader twist
3-1. joint arms+hands swing
3-2. legs swings
3-2. nose stretches



Viewing angle and viewing position can all be changed in all dimensions.
You can move eye point and direction to any point in the space. And it's direct movement towards the position, not following axis fold lines.

Two lights can be turned on/off independently.

Reference

1. In order to save a little time, I started my code from professor's source files as references:
   JTPointPhongSphere_perFragment - for lighting and textures
   phongMaterials.txt - different textures' parameters
   BasicShapes.js - for drawing simple shapes
   HelloCube_Resize.js - for resize the canvas when the windows is resized.

2. SpongeBob SquarePants Cartoon is a famous cartoon figure, the reference images that I use are found using Google Image Search which spread across the Internet.