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IMB0847

## Project C: Lighting and Shading

### Goals

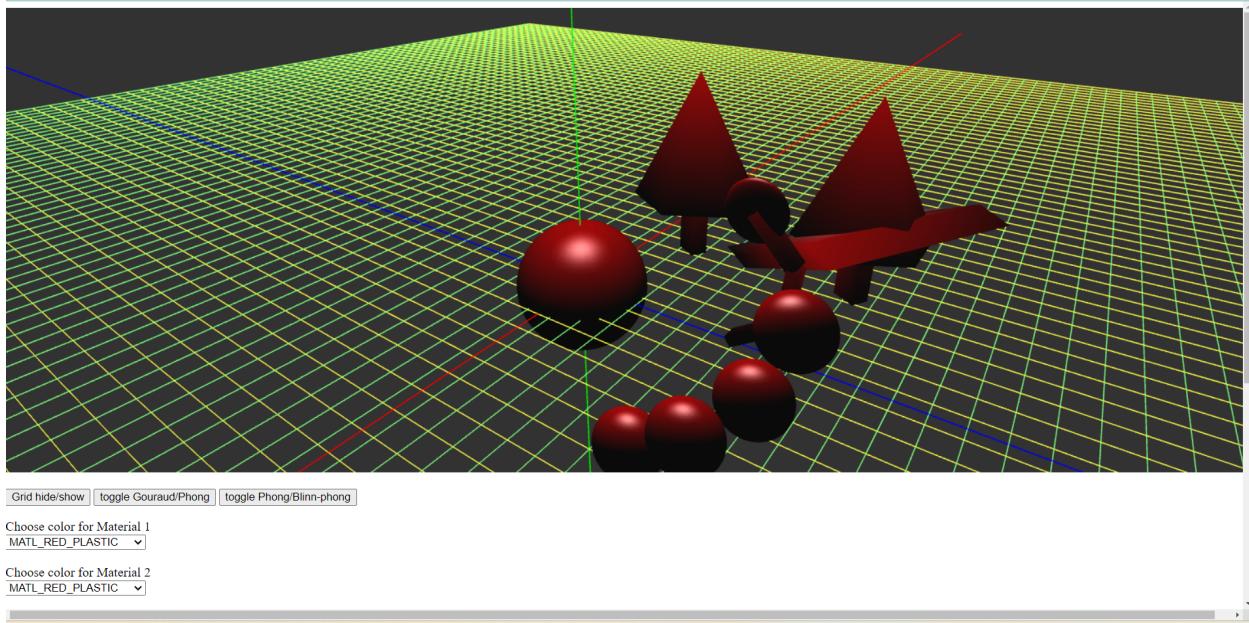
- Goal is to draw 3D graphics including Light shading options and camera views projections
- I did geometric shapes for cube, cone, and sphere using mathematical functions and vertices with triangle primitives.
- I also used these geometries and created assemblies which include tree, flower, Shaky pagoda, and Sphere ensemble.
- I have grid lines with Z facing up. I have also included lines for origin.
- I created one viewport occupying to 70% of browser window
- I have implemented lightning with phong and Blinn-phong techniques switched by toggling. See: instructions.
- I have implemented shading with phong and gouraud techniques switched by toggling. See: instructions.
- I also included using two Material types selectable for different assemblies. See: instructions.
- I also have multiple attenuation for light with respect to distance from light source. Quadratic, linear and constant. See: instructions
- First, unzip folder and ensure that you have projC.js, projB.js and lib folder including webgl libraries.
- To run the code, open projB.html in web browser which supports webgl
- Then follow instructions on screen for user interactions.

## Instructions

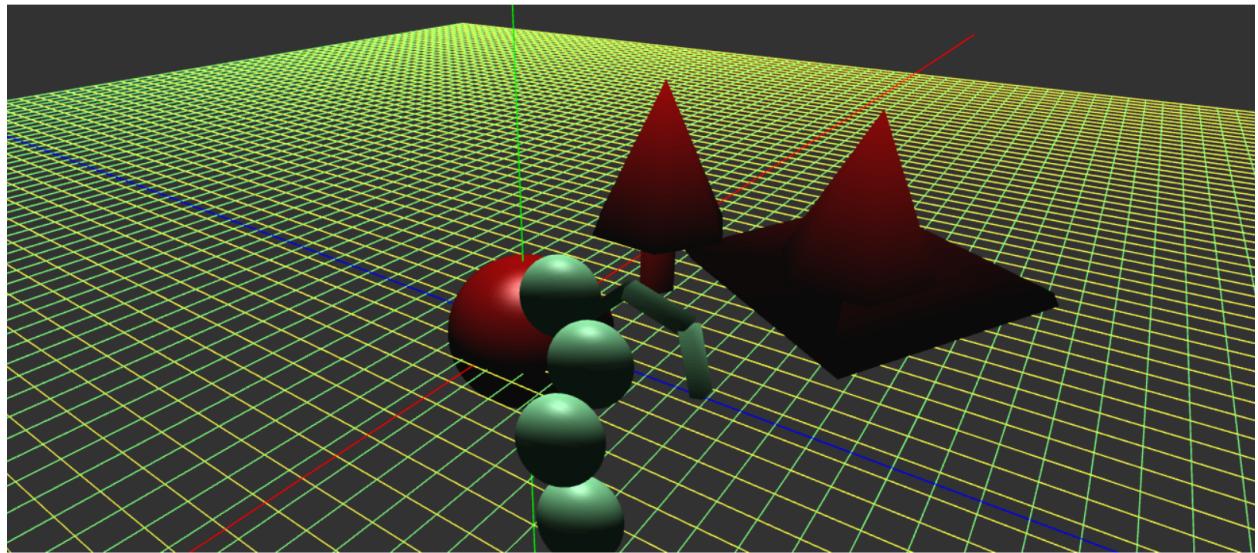
1. Use W, A, S, D keys to move around scene up, left, down, right respectively
2. Use i, j, k, l keys to change look at up, left, down, right respectively
3. you can toggle grid view with "Grid hide/show" button
4. you can toggle between Phong and Gouraud shading with "toggle Phong/Gouraud" button
5. you can toggle between Phong and Blinn-phong light with "toggle Phong/Blinn-phong" button
6. You can select materials from the dropdowns for material 1 and material 2
7. you can adjust shininess with shininess slider
8. you can choose attenuation option on ATT buttons
9. you may adjust different 'R' (red), 'G' (green), 'B' (blue), value to change the color of the ambient, diffuse, and specular light.

## RESULTS

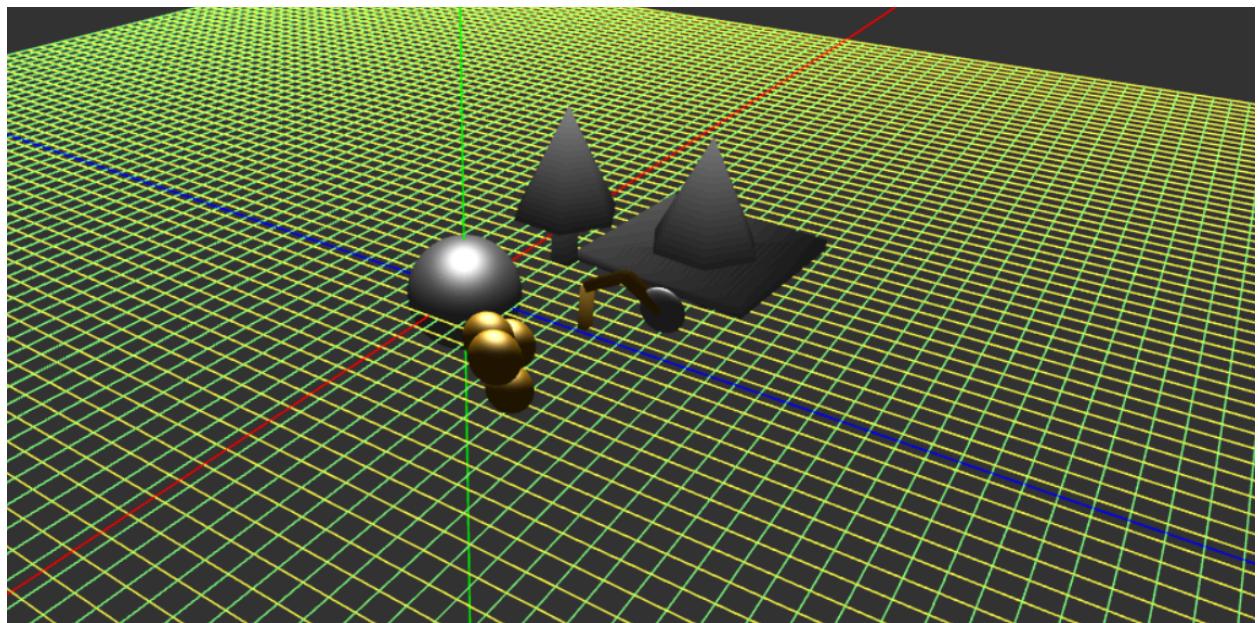
### Basic layout



### Different materials

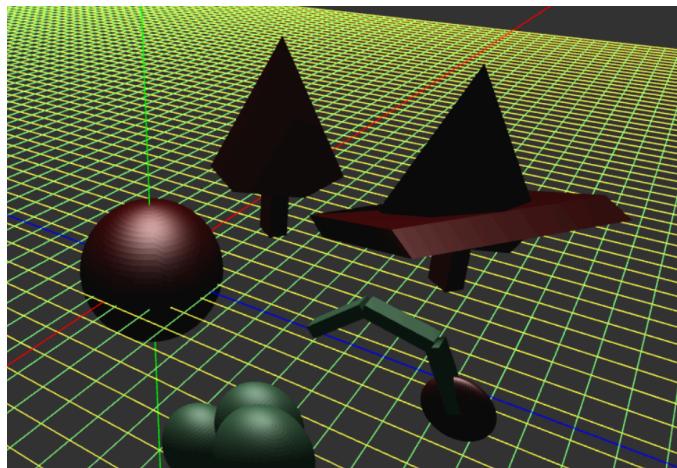


Spherical/Phong | toggle Phong/Blinn-phong

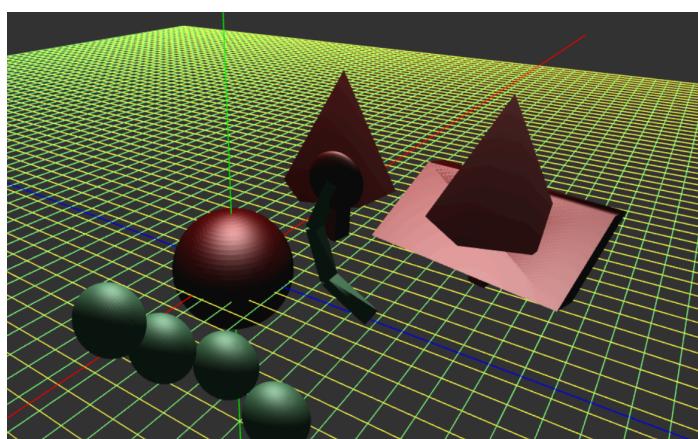


## Attenuation

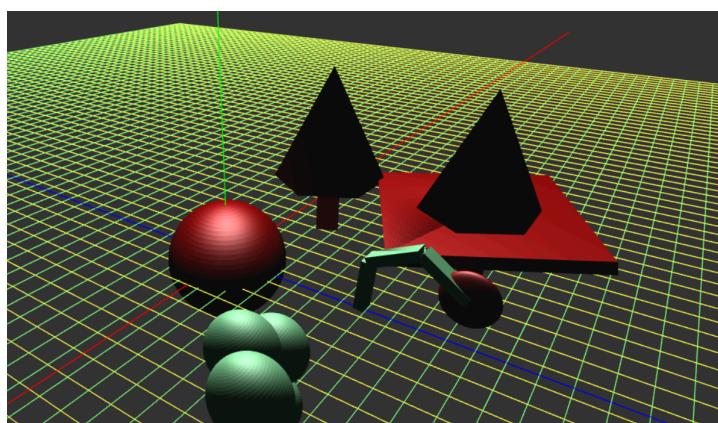
- Quadratic attenuation



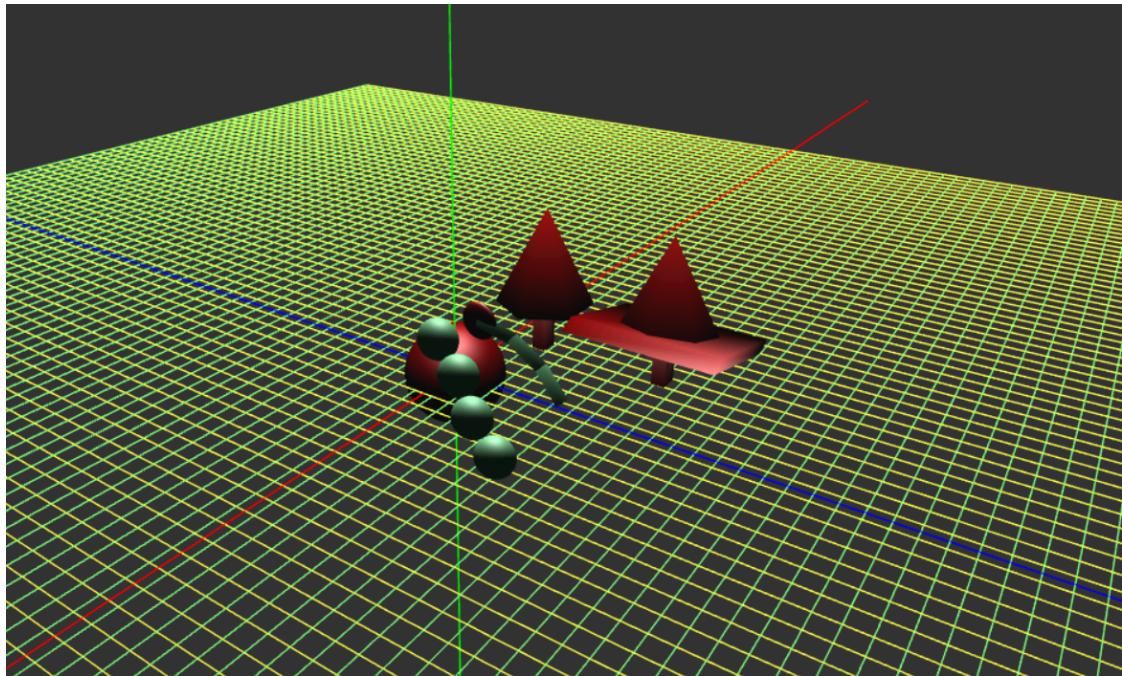
b. Linear attenuation



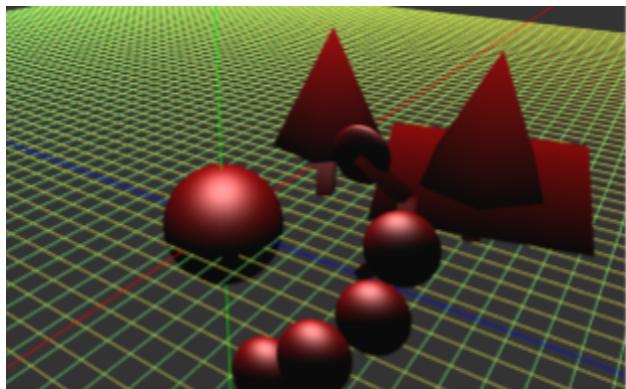
c. Constant attenuation ( no attenuation)



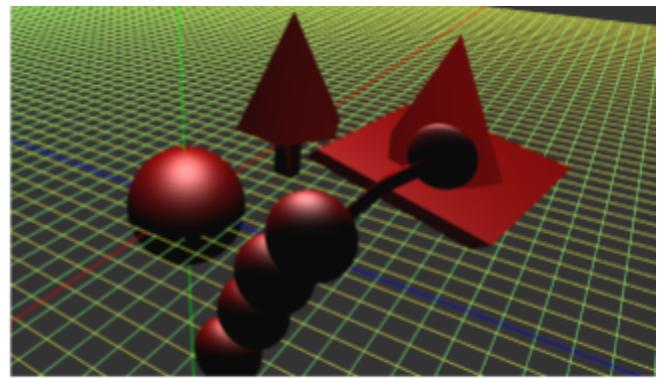
**Eye position controls**



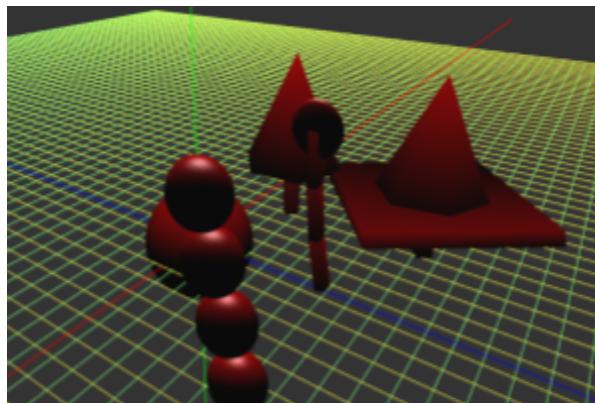
## Lighting and Shading



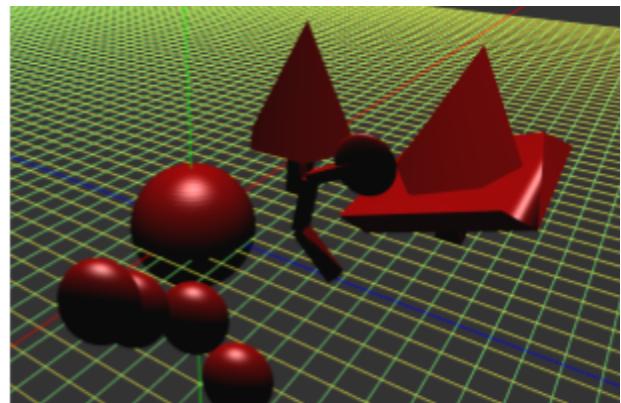
Phong shading, Blinn Shading



Gouraud shading, Blinn Shading



Phong shading, Phong lighting



Gouraud shading, Phong lighting

## SCENE GRAPH

