CS460 Fall 2020
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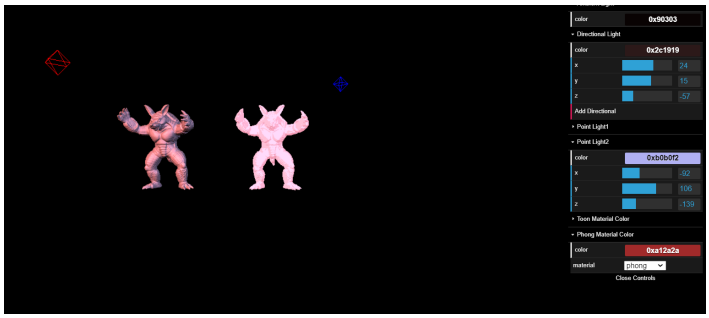
Assignment 9: Geometry, Materials, and Lighting!

We will load our favorite mesh from a file, try out different materials, and play around with light settings.



Starter code for assignment 9. After pulling from upstream, there is the folder `09` in your fork. If you run a webserver and access the file, you will see a sad single armadillo in the scene.

Part 1 (14 points): The armadillo needs a friend! Please load a second mesh from a file using a THREE.js loader. This could be any mesh you find online in any format THREE.js supports - or you could load the armadillo again. Please modify the positions so that the meshes do not overlap.

Part 2 (15 points): Please configure the second mesh from above with a different material of your choice (not MeshToonMaterial again!).

Part 3 (10 points): Please add two point light sources to the scene.

Part 4 (15 points): The starter code includes the following snippet to control the color and position of the directional light.

```
var directionalFolder = gui.addFolder('Directional Light');
directionalFolder.addColor(controller, 'color').onChange( function(value) {
  directionalLight.color.setHex(value);
});
directionalFolder.add(directionalLight.position, 'x', -100, 100);
directionalFolder.add(directionalLight.position, 'y', -100, 100);
directionalFolder.add(directionalLight.position, 'z', -100, 100);
directionalFolder.open();
```

Please setup dat.GUI to control position and color of the two point lights with similar code.

Part 5 (15 points): Please setup dat.GUI to control the color of both materials.

Part 6 (30 points): Please play around with the lights and try to understand why the toon material seems to work *sometimes*. What are your observations?

When multiple directional Light used then toon material color changes to white/washed out and the shading intensity is only observed when you change the position in x,y,z direction for different direction light as well as change color to

more darker shade. To observe light changes in a better way on toon material we need to darken the ambient light. With this we can easily play around with all the lights (directional lights or point lights) and observe the shading or intensity or light directions , color easily and more efficiently. This works better because ambient light globally illuminates all objects in the scene equally. While directional light emits in specific direction.

Note: To observe the changes when we play around the lights we need to the color of theses lights to darker shade and the ambient light to black to observe and understand more easily and efficiently.

Part 9 (1 points): Please update the screenshot above with your own and then post the github pages url here:

`https://nehagoyal1994.github.io/webgl-demo/loader_n_lights/index.html`

Bonus (33 points):

Part 1 (11 points): Please add dat.GUI elements that allow to switch the material for the two meshes. Here is an example of a combobox in dat.GUI:

```
// Choose from accepted values
gui.add(controller, 'material', [ 'toon', 'standard', 'phong' ] ).onChange( function(value) {

  if (value == 'phong') {
    // TODO
  }

});
```

Part 2 (22 points): Please make adding lights to the scene dynamic: Add dat.GUI buttons to add new directional lights that then also add a dat.GUI folder to the menu that allows to control (color and position), and remove the light.