Introduction to 3D

In this exercise we will look at 3D using WebGL and Three.js. Refer to the lecture notes for code references.

Exercises

1. Create a blank HTML file.

- 2. Include three.js in your HTML file header (from a content delivery network).
- 3. Add a scene.
- 4. Create a sphere and add to the scene (See https://threejs.org/docs/index.html). Use MeshBasicMaterial as the the material of the sphere for now.
- 5. Add a camera (Set the field of view to be 80). Apply your canvas width and height parameters. Also set the camera z-position so that the camera is not inside the sphere.
- 6. Add a renderer. Apply your canvas width and height parameters.
- 7. Add and call a render() loop function. Have it rotate the sphere (as detailed below).

```
//Code to rotate sphere
sphere.rotation.x += 0.01;
sphere.rotation.y += 0.01;
```

8. View your sphere.

- 9. Set the wireframe property in the MeshBasicMaterial parameter object to true, and view your sphere.
- 10. Reset the wireframe property to false, for the next few steps in the exercise.
- 11. Add a spot light.

```
var spotLight = new THREE.SpotLight(0xfffffff);
spotLight.position.set(1, 0.5, 1);
scene.add(spotLight);
```

- 12. Change your material to a MeshLambertMaterial.
- 13. Now view your sphere.
- 14. Have your sphere move over back from left to right on the canvas (translation). Hint: you can modify the "position.x" attribute in the same way as you modified the "rotation.x" attribute in Step 7.
- 15. Add a plane (flat surface) vertically below the sphere and have the sphere project a shadow onto the plane. Remember not to use a MeshBasicMaterial. Add a camera helper (as detailed in the lectures) to display the light source
- 16. Have the sphere drop towards the plane and bounce off it when it strikes the plane. Have the sphere cast a shadow on the plane as it moves

Advanced exercises

- 1. Have the sphere slowly change in colour.
- 2. Add gravity to the sphere
- 3. Have the sphere bounce around a slightly transparent cube.
- 4. On the sphere, have the wireframe displayed on top of the MeshLambertMaterial

Notes

Creating a scene from threejs.org.