CSC 240 Computer Graphics

Sara Mathieson
Fall 2016
Smith College

Outline: 12/7

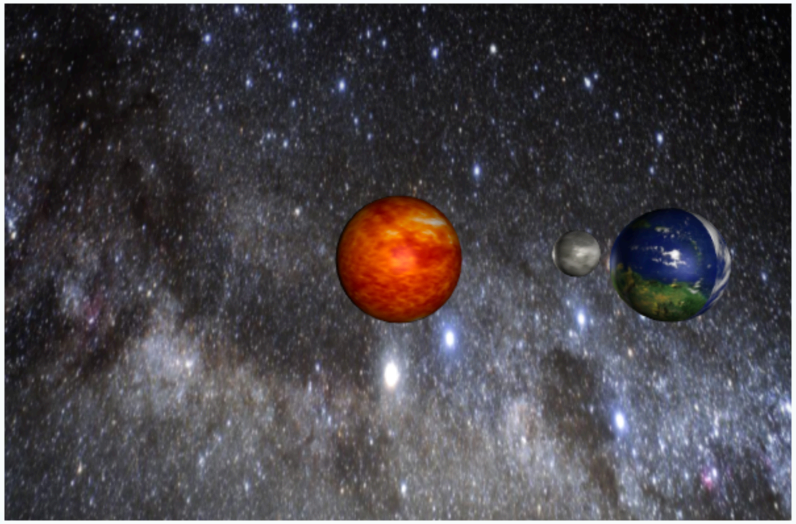
- Solar System demos
- Collision Detection
- Introduction to Animation
- Blender Lab (Bezier curves)

  - **Final Project**: due Thurs Dec 14
  - **3D printing**: only a few spots left!
  - **Office Hours**: Mon 4-5pm (015 Ford)
    Tues 4-5pm (346 Ford)
    can also come: Thurs 4-5pm
    TA hours end when classes end

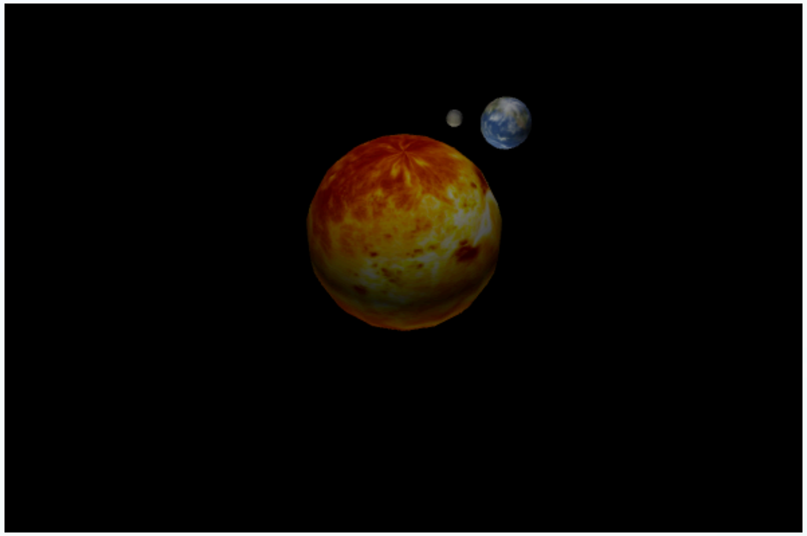
Solar System Demos

Solar System Images

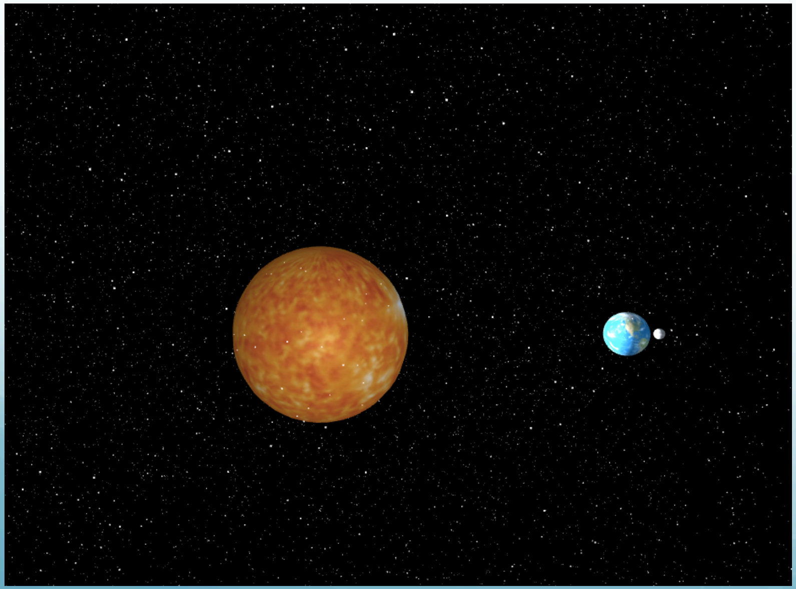
Perla



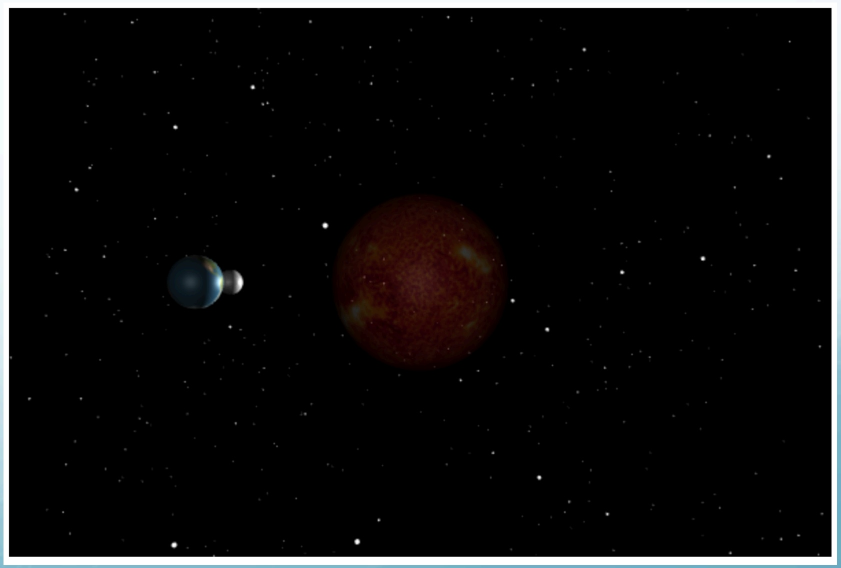
Sam



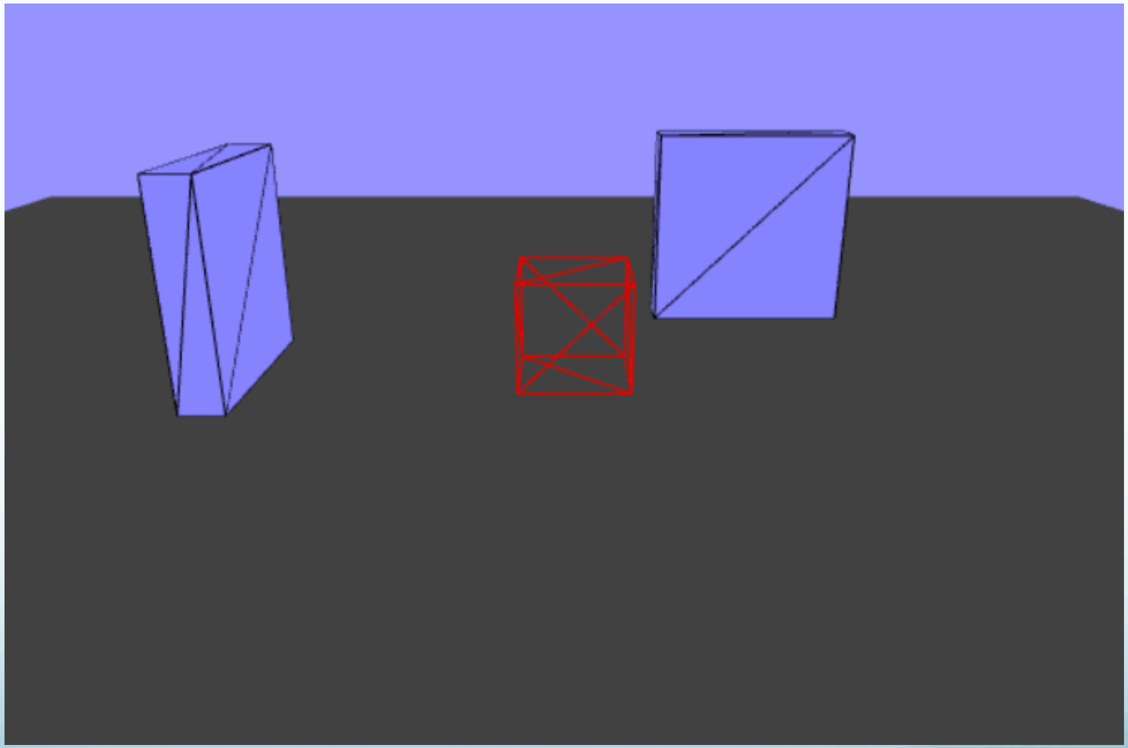
Prayasha



Anjali

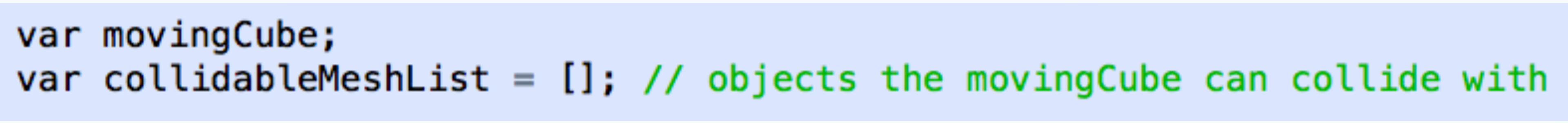


Collision Detection

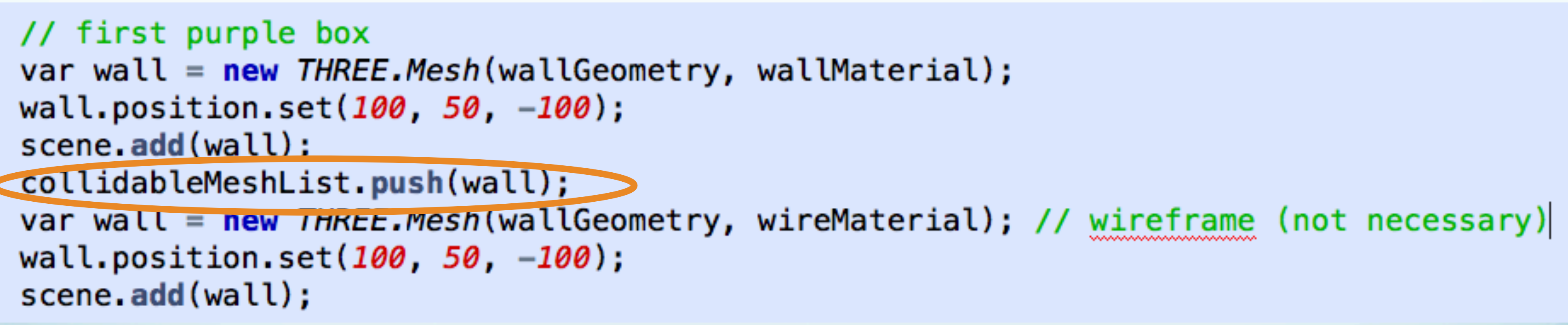


Modified from demo: http://stemkoski.github.io/Three.js/Collision-Detection.html

Setup up collidable objects



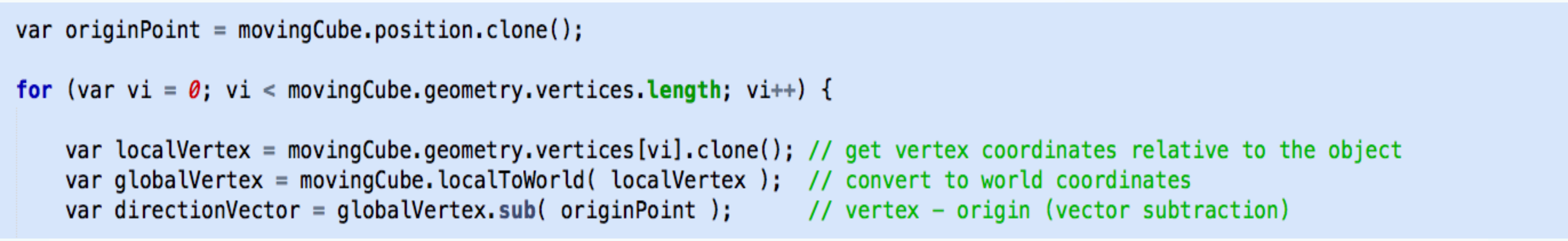
```
var movingCube;
var collidableMeshList = []; // objects the movingCube can collide with
```



```
// first purple box
var wall = new THREE.Mesh(wallGeometry, wallMaterial);
wall.position.set(100, 50, -100);
scene.add(wall);
collidableMeshList.push(wall);
var wall = new THREE.Mesh(wallGeometry, wireMaterial); // wireframe (not necessary)
wall.position.set(100, 50, -100);
scene.add(wall);
```

Modified from demo: http://stemkoski.github.io/Three.js/Collision-Detection.html

Collision Detection Code



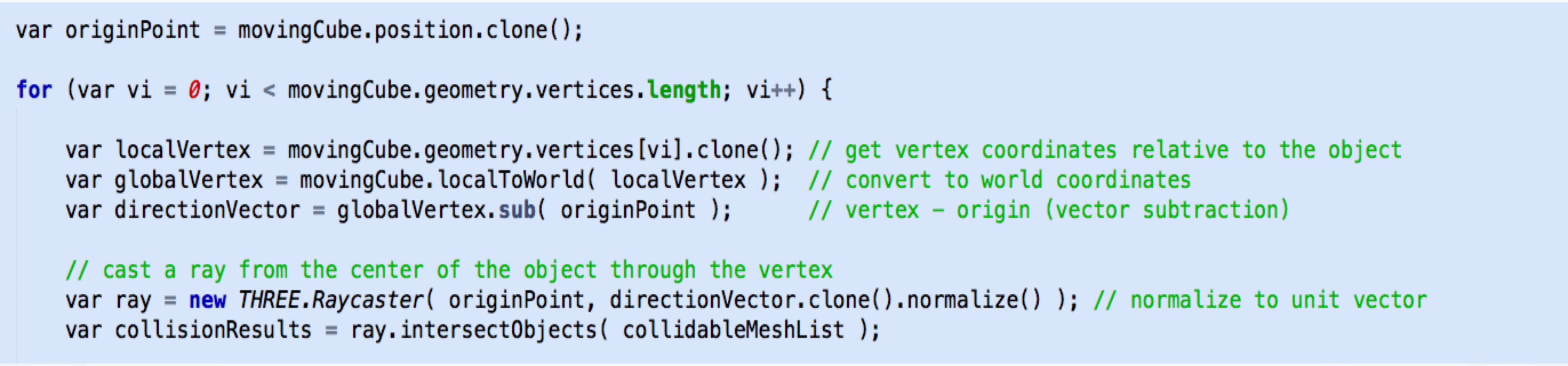
```
var originPoint = movingCube.position.clone();

for (var vi = 0; vi < movingCube.geometry.vertices.length; vi++) {

    var localVertex = movingCube.geometry.vertices[vi].clone(); // get vertex coordinates relative to the object
    var globalVertex = movingCube.localToWorld( localVertex );  // convert to world coordinates
    var directionVector = globalVertex.sub( originPoint );      // vertex - origin (vector subtraction)
```

Modified from demo: http://stemkoski.github.io/Three.js/Collision-Detection.html

Collision Detection Code



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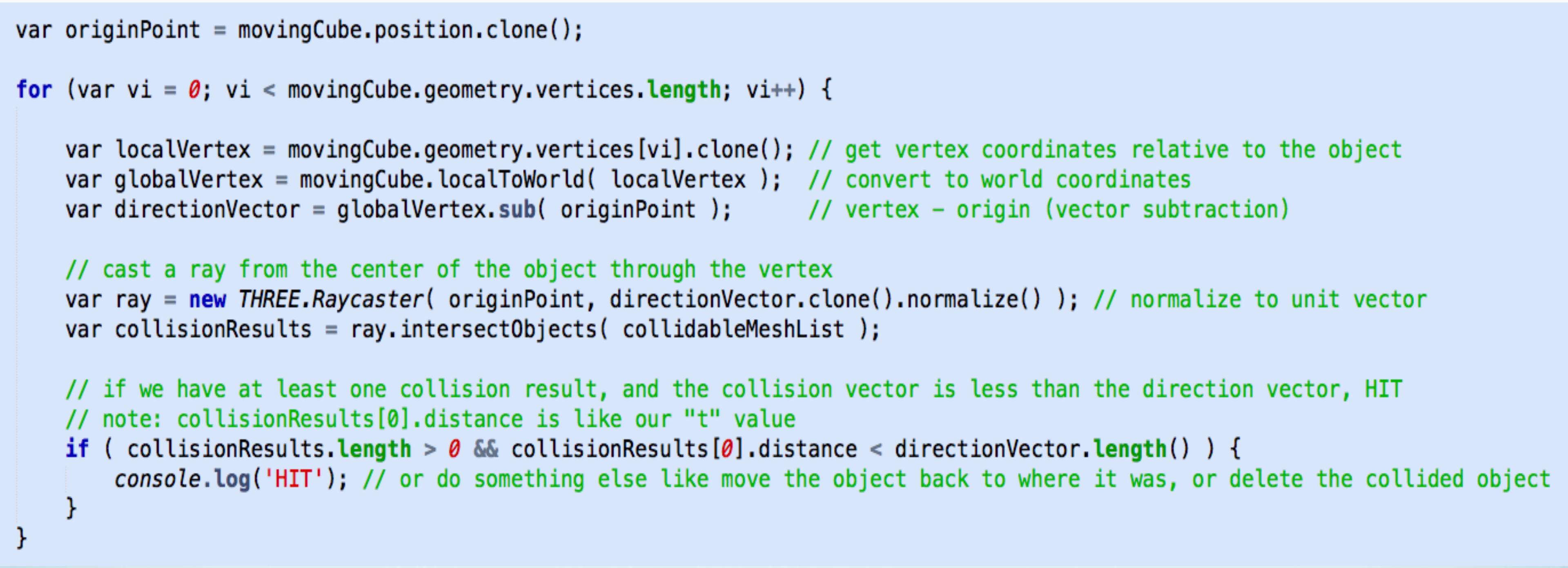
    // cast a ray from the center of the object through the vertex
    var ray = new THREE.Raycaster( originPoint, directionVector.clone().normalize() ); // normalize to unit vector
    var collisionResults = ray.intersectObjects( collidableMeshList );
```

Modified from demo: http://stemkoski.github.io/Three.js/Collision-Detection.html

Collision Detection Code



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    // if we have at least one collision result, and the collision vector is less than the direction vector, HIT
    // note: collisionResults[0].distance is like our "t" value
    if ( collisionResults.length > 0 && collisionResults[0].distance < directionVector.length() ) {
        console.log('HIT'); // or do something else like move the object back to where it was, or delete the collided object
    }
}
```
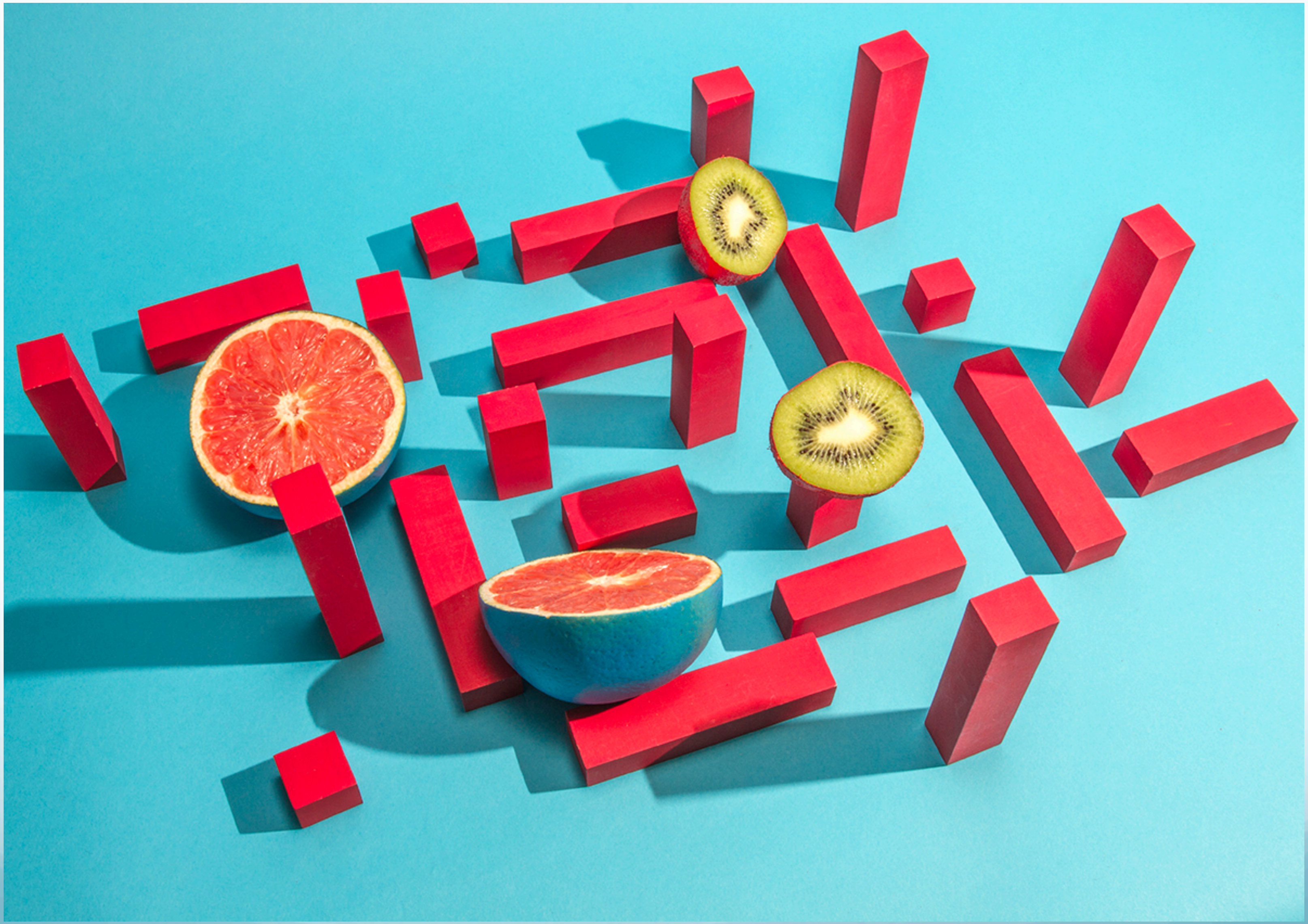

Modified from demo: http://stemkoski.github.io/Three.js/Collision-Detection.html

Final Project Photo Examples

Final project examples



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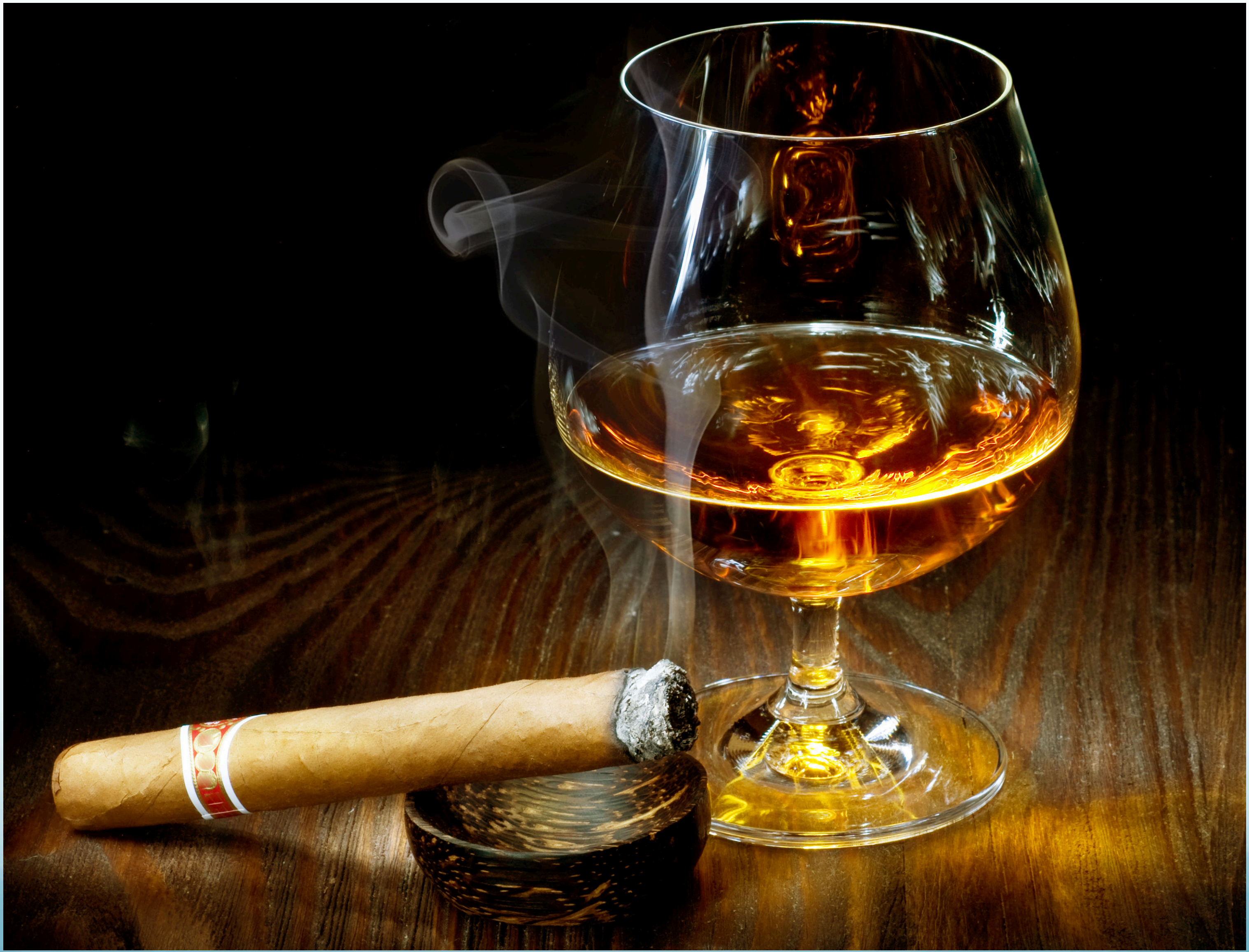
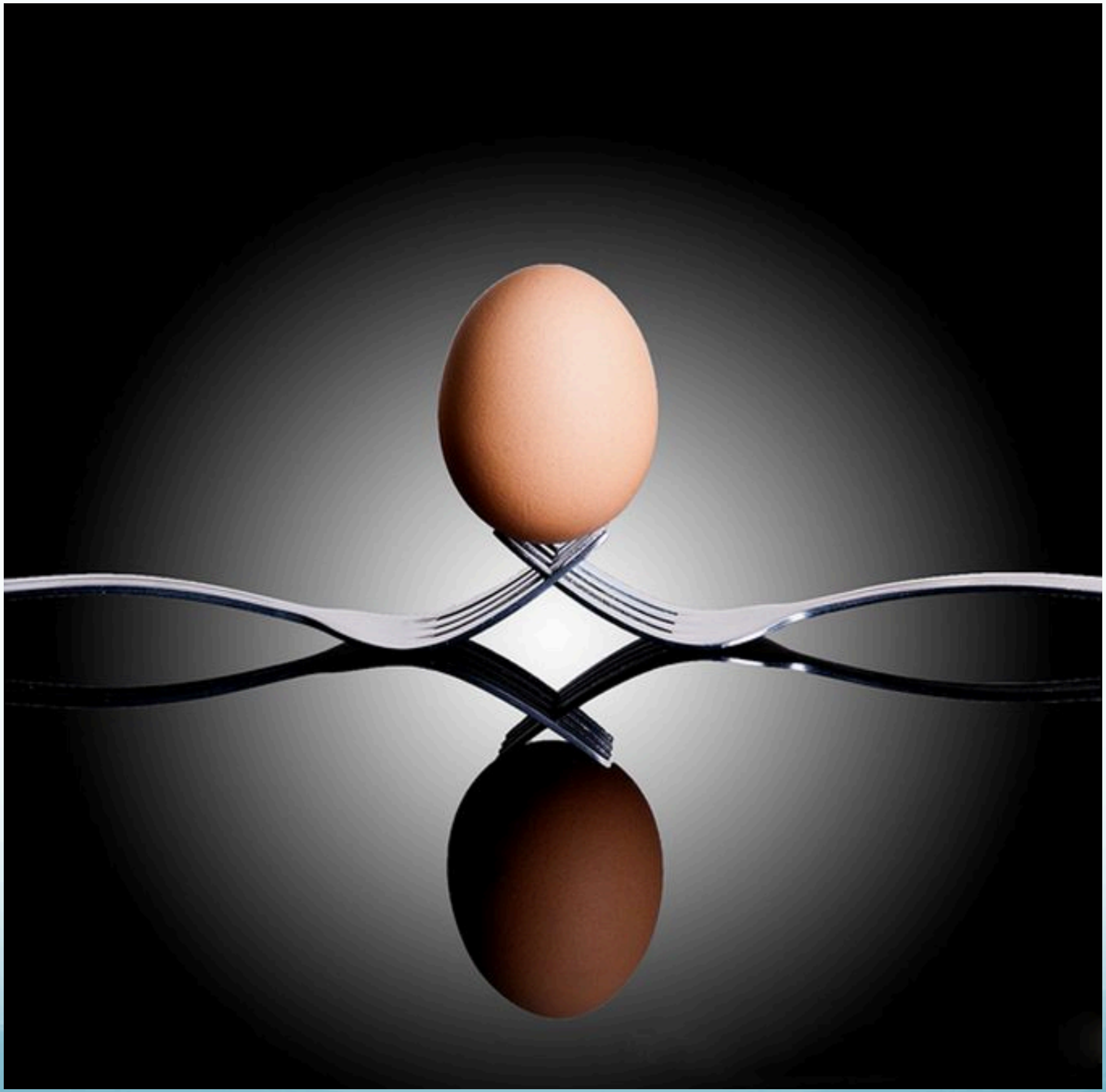
Final project examples



Final project examples



www.pinterest.com

Final project examples

thewalkupblog.com