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EECS 351 Project A Report

Goal

Design and draw two different 3D parts which have two or more sequential, moving joints.

User-guide

Open the html file, there are one sequential rectangles, which models the posture of swimming, and a planet system, where three small balls spin around a big ball.

1. Press buttons on the web page to change the rotating speed or make the graphic stop.
2. Use mouse to drag the graphic to observe graphic with different view.
3. Stop the graphic quickly through press “Space” on the keyboard.

Result

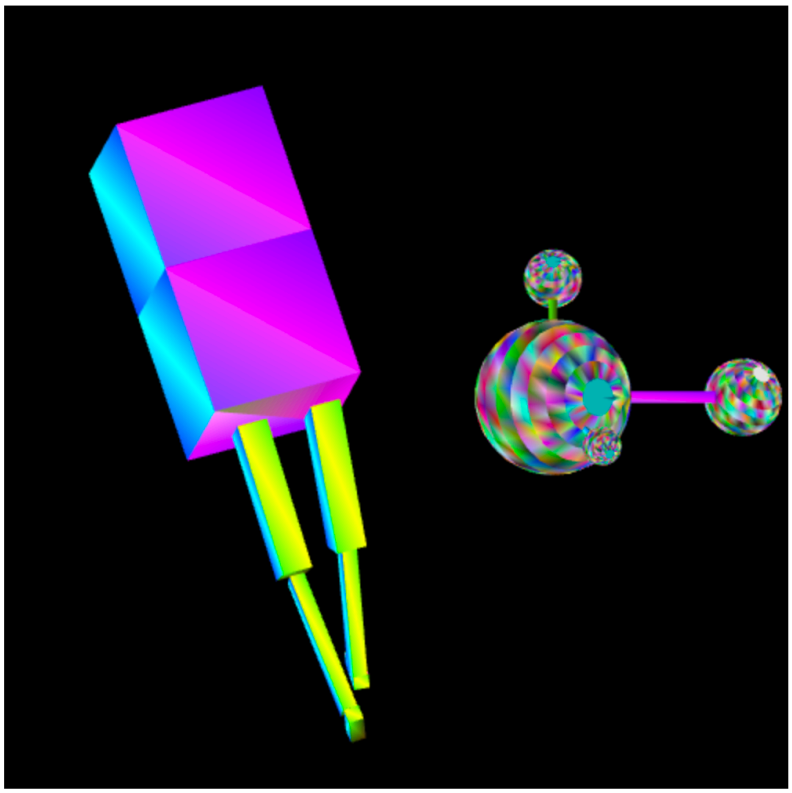

Figure 1

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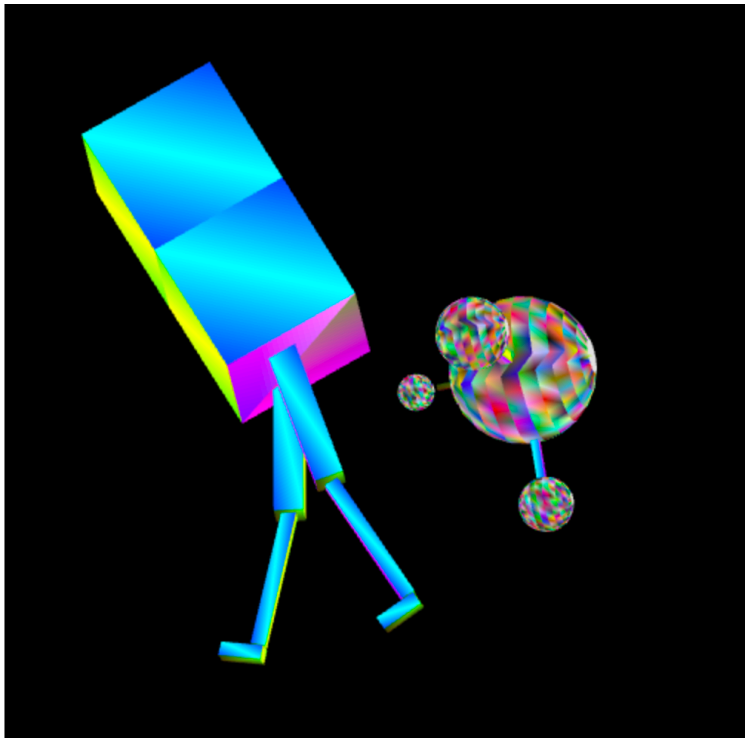

Figure 2

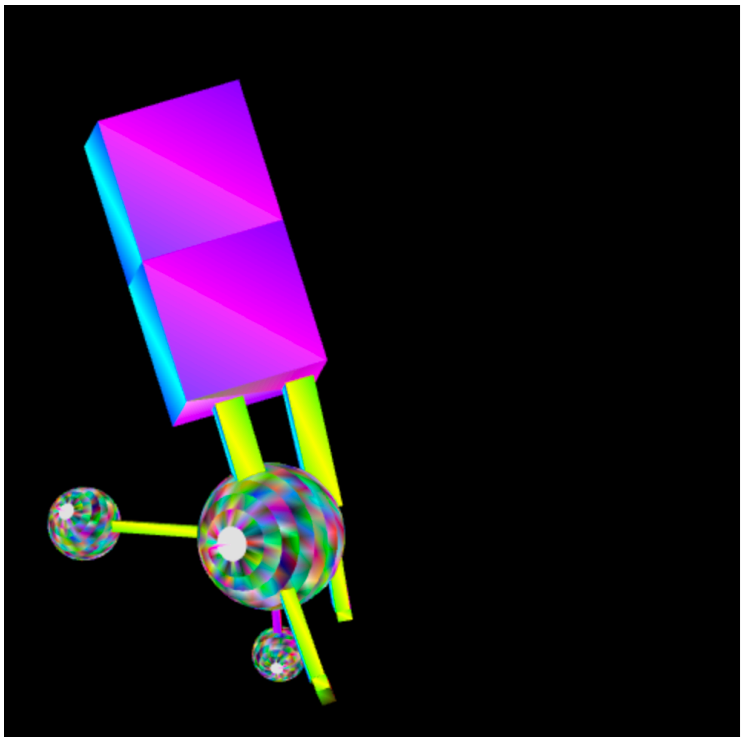

Figure 3

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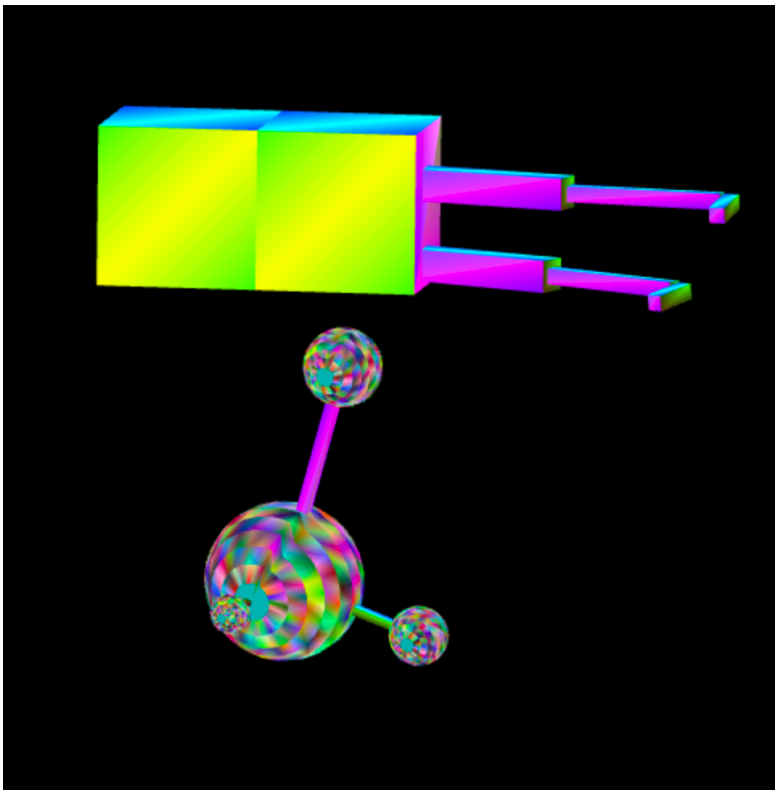

Figure 4

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Sketch of program's scene-graph

```
modelMatrix.setTranslate(0.4 + xNewPoint, 0 + yNewPoint, 0);  // 'set' means DISCARD old matrix,
            // (drawing axes centered in CVV), and then make new
            // drawing axes moved to the lower-left corner of CVV.
modelMatrix.scale(1,1,-1);
// modelMatrix.rotate(15, 0, 0, 1);
// modelMatrix.rotate(15, 0, 1, 0);
// modelMatrix.rotate(-15, 1, 0, 0);
var dist = Math.sqrt(xMdragTot*xMdragTot + yMdragTot*yMdragTot);
//             // why add 0.001? avoids divide-by-zero in next statement
//             // in cases where user didn't drag the mouse.)
modelMatrix.rotate(dist*120.0, -yMdragTot+0.0001, xMdragTot+0.0001, 0.0);
// modelMatrix.
            // convert to left-handed coord sys
                                    // to match WebGL display canvas.
// modelMatrix.scale(0.3, 0.05, 0.05);
modelMatrix.rotate(Angle_sphere, 0, 1, 0);
modelMatrix.scale(0.3, 0.015, 0.015);
modelMatrix.translate(0.8, 0 ,0);
// modelMatrix.rotate(Angle_sphere, 0, 0, 0);
            // Make it smaller:
modelMatrix.rotate(0, 0, 0, 1);  // Spin on XY diagonal axis
modelMatrix.translate(-1, -1, -1);
gl.uniformMatrix4fv(u_ModelMatrix, false, modelMatrix.elements);
    // Draw just the first set of vertices: start at vertex SHAPE_0_SIZE
gl.drawArrays(gl.TRIANGLES, recStart,36);


  //=====================================
  //
  //strip for ball two
  //
  //=====================================
modelMatrix.setTranslate(0.4 + xNewPoint, 0 + yNewPoint, 0);  // 'set' means DISCARD old matrix,
            // (drawing axes centered in CVV), and then make new
            // drawing axes moved to the lower-left corner of CVV.
modelMatrix.scale(1,1,-1);
// modelMatrix.rotate(15, 0, 0, 1);
// modelMatrix.rotate(15, 0, 1, 0);
// modelMatrix.rotate(-15, 1, 0, 0);
var dist = Math.sqrt(xMdragTot*xMdragTot + yMdragTot*yMdragTot);
//             // why add 0.001? avoids divide-by-zero in next statement
//             // in cases where user didn't drag the mouse.)
modelMatrix.rotate(dist*120.0, -yMdragTot+0.0001, xMdragTot+0.0001, 0.0);
// modelMatrix.
            // convert to left-handed coord sys
                                    // to match WebGL display canvas.
// modelMatrix.scale(0.3, 0.05, 0.05);
modelMatrix.rotate(Angle_sphere - 90, -1, 0, 0);
modelMatrix.scale(0.01125, 0.01125, 0.2);
modelMatrix.translate(0, 0, -0.6);
```

Figure 5