

## RAGE

## 3D Objects / Cameras

## RAGE game builds objects and moves the camera:

(only `setupScene()` is shown – the rest is mostly unchanged)

```
protected ManualObject makePyramid(Engine eng, SceneManager sm)
    throws IOException
{
    ManualObject pyr = sm.createManualObject("Pyramid");
    ManualObjectSection pyrSec =
        pyr.createManualSection("PyramidSection");
    pyr.setGpuShaderProgram(sm.getRenderSystem().
        getGpuShaderProgram(GpuShaderProgram.Type.RENDERING));

    float[] vertices = new float[]
    { -1.0f, -1.0f, 1.0f, 1.0f, -1.0f, 1.0f, 0.0f, 1.0f, 0.0f, //front
      1.0f, -1.0f, 1.0f, 1.0f, -1.0f, -1.0f, 0.0f, 1.0f, 0.0f, //right
      1.0f, -1.0f, -1.0f, -1.0f, -1.0f, 0.0f, 1.0f, 0.0f, //back
      -1.0f, -1.0f, -1.0f, -1.0f, 1.0f, 0.0f, 1.0f, 0.0f, //left
      -1.0f, -1.0f, 1.0f, 1.0f, -1.0f, -1.0f, 1.0f, 0.0f, //LF
      1.0f, -1.0f, 1.0f, -1.0f, -1.0f, -1.0f, 1.0f, -1.0f //RR
    };
    float[] texcoords = new float[]
    { 0.0f, 0.0f, 1.0f, 0.0f, 0.5f, 1.0f,
      0.0f, 0.0f, 1.0f, 0.0f, 0.5f, 1.0f,
      0.0f, 0.0f, 1.0f, 0.0f, 0.5f, 1.0f,
      0.0f, 0.0f, 1.0f, 0.0f, 0.5f, 1.0f,
      0.0f, 0.0f, 1.0f, 1.0f, 0.0f, 1.0f,
      1.0f, 1.0f, 0.0f, 0.0f, 1.0f, 0.0f
    };
    float[] normals = new float[]
    { 0.0f, 1.0f, 1.0f, 0.0f, 1.0f, 1.0f, 0.0f, 1.0f, 1.0f,
      1.0f, 1.0f, 0.0f, 1.0f, 1.0f, 0.0f, 1.0f, 1.0f, 0.0f,
      0.0f, 1.0f, -1.0f, 0.0f, 1.0f, -1.0f, 0.0f, 1.0f, -1.0f,
      -1.0f, 1.0f, 0.0f, -1.0f, 1.0f, 0.0f, -1.0f, 1.0f, 0.0f,
      0.0f, -1.0f, 0.0f, 0.0f, -1.0f, 0.0f, 0.0f, -1.0f, 0.0f,
      0.0f, -1.0f, 0.0f, 0.0f, -1.0f, 0.0f, 0.0f, -1.0f, 0.0f
    };
    int[] indices = new int[] { 0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17 }

    FloatBuffer vertBuf = BufferUtil.directFloatBuffer(vertices);
    FloatBuffer texBuf = BufferUtil.directFloatBuffer(texcoords);
    FloatBuffer normBuf = BufferUtil.directFloatBuffer(normals);
    IntBuffer indexBuf = BufferUtil.directIntBuffer(indices);

    pyrSec.setVertexBuffer(vertBuf);
    pyrSec.setTextureCoordsBuffer(texBuf);
    pyrSec.setNormalsBuffer(normBuf);
    pyrSec.setIndexBuffer(indexBuf);

    Texture tex =
        eng.getTextureManager().getAssetByPath("chain-fence.jpeg");
    TextureState texState = (TextureState)sm.getRenderSystem().
        createRenderState(RenderState.Type.TEXTURE);
    texState.setTexture(tex);
    FrontFaceState faceState = (FrontFaceState) sm.getRenderSystem().
        createRenderState(RenderState.Type.FRONT_FACE);

    pyr.setDataSource(DataSource.INDEX_BUFFER);
    pyr.setRenderState(texState);
    pyr.setRenderState(faceState);
    return pyr;
}
```

```
protected void setupScene(Engine eng, SceneManager sm)
    throws IOException
{
    setupInputs();

    // make manual objects – in this case a pyramid
    ManualObject pyr = makePyramid(eng, sm);

    SceneNode pyrN =
        sm.getRootSceneNode().createChildSceneNode("PyrNode");
    pyrN.scale(0.75f, 0.75f, 0.75f);
    pyrN.attachObject(pyr);

    // set up earth
    Entity earthE = sm.createEntity("myEarth", "earth.obj");
    earthE.setPrimitive(Primitive.TRIANGLES);
    SceneNode earthN = sm.getRootSceneNode().
        createChildSceneNode(earthE.getName() + "Node");
    earthN.attachObject(earthE);
    earthN.setLocalPosition(-2.0f, 2.0f, -1.0f);
    earthN.setLocalScale(0.2f, 0.2f, 0.2f);

    RotationController rc = new
        RotationController(Vector3f.createUnitVectorY(), .02f);
    rc.addNode(earthN);
    rc.addNode(pyrN);
    sm.addController(rc);

    // set up lights
    sm.getAmbientLight().setIntensity(new Color(.3f, .3f, .3f));
    Light plight = sm.createLight("testLamp1", Light.Type.POINT);
    plight.setAmbient(new Color(.1f, .1f, .1f));
    plight.setDiffuse(new Color(0.8f, 0.8f, 0.8f));
    plight.setSpecular(new Color(1.0f, 1.0f, 1.0f));
    plight.setRange(20f);

    SceneNode plightNode =
        sm.getRootSceneNode().createChildSceneNode("plightNode");
    plightNode.attachObject(plight);
    plightNode.setLocalPosition(1.0f, 1.0f, 5.0f);
}
```

## an Action class for moving the camera forward:

```
import ray.input.action.AbstractInputAction;
import ray.rage.scene.*;
import ray.rage.game.*;
import ray.rml.*;
import net.java.games.input.Event;

public class MoveForwardAction extends AbstractInputAction
{
    private Camera camera;

    public MoveForwardAction(Camera c)
    { camera = c;
    }

    public void performAction(float time, Event e)
    { Vector3f v = camera.getFd();
      Vector3f p = camera.getPo();
      Vector3f p1 =
          (Vector3f) Vector3f.createFrom(0.01f*v.x(), 0.01f*v.y(), 0.01f*v.z());
      Vector3f p2 = (Vector3f) p.add((Vector3f)p1);
      camera.setPo((Vector3f)Vector3f.createFrom(p2.x(),p2.y(),p2.z()));
    }
}
```