CSC 240
Computer Graphics

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Fall 2016
Smith College

Outline: 10/31

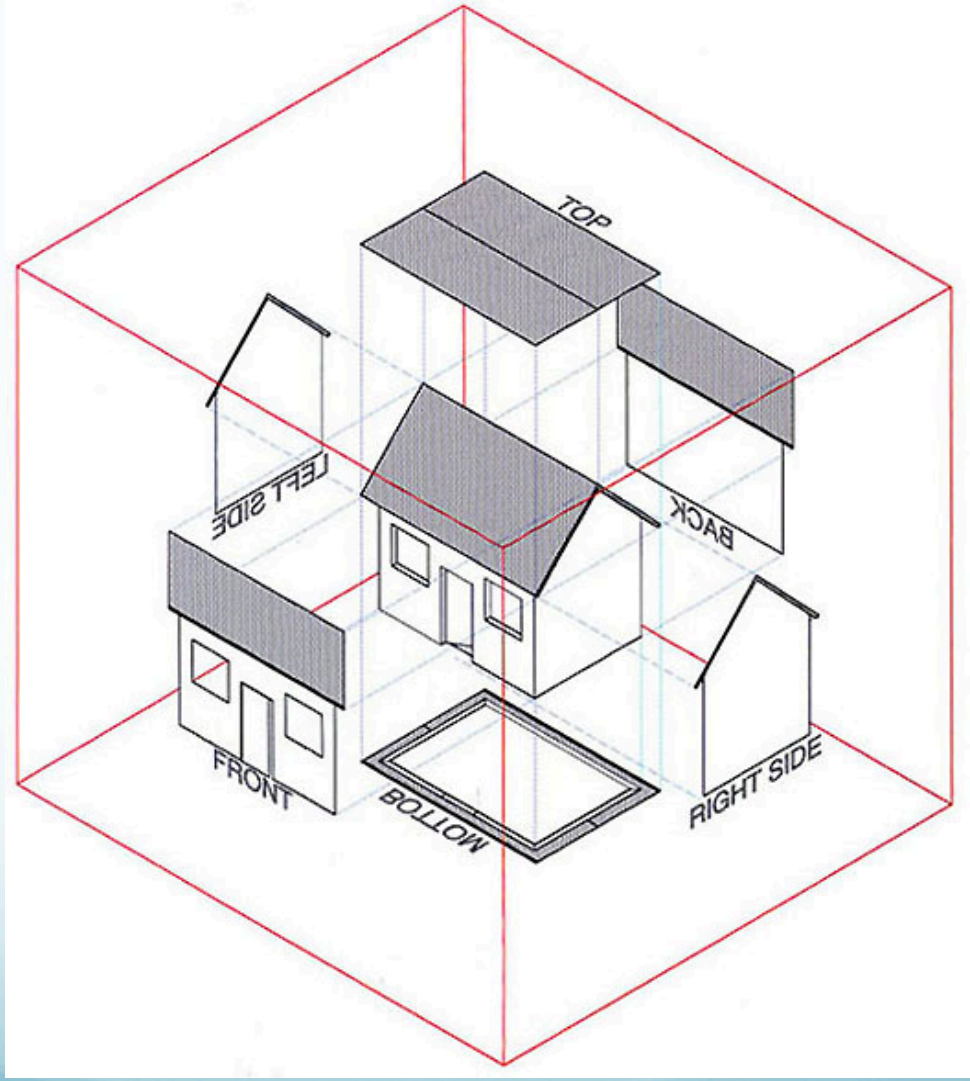
Happy Halloween!

- Recap Projection
- WebGL/Three.js intro
- Lab 6: Pyramid in WebGL
- MSA (mid-semester assessment)

  - **HW 6**: due Tuesday Nov 8
  - **Office Hours**: Mon/Tues 4-5pm
  - **Reading**: Section 5.1

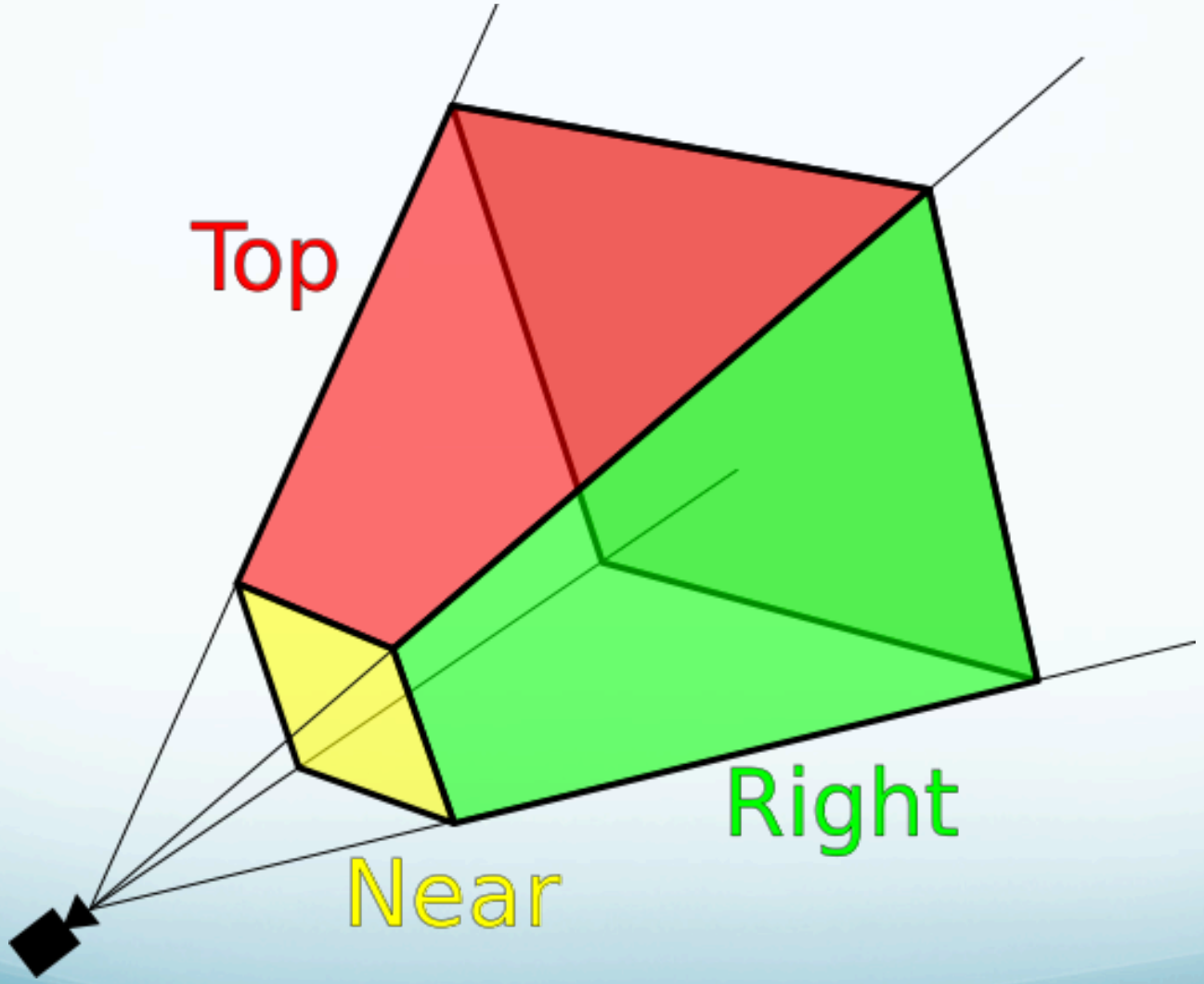
Recap Projection

Orthographic Projection



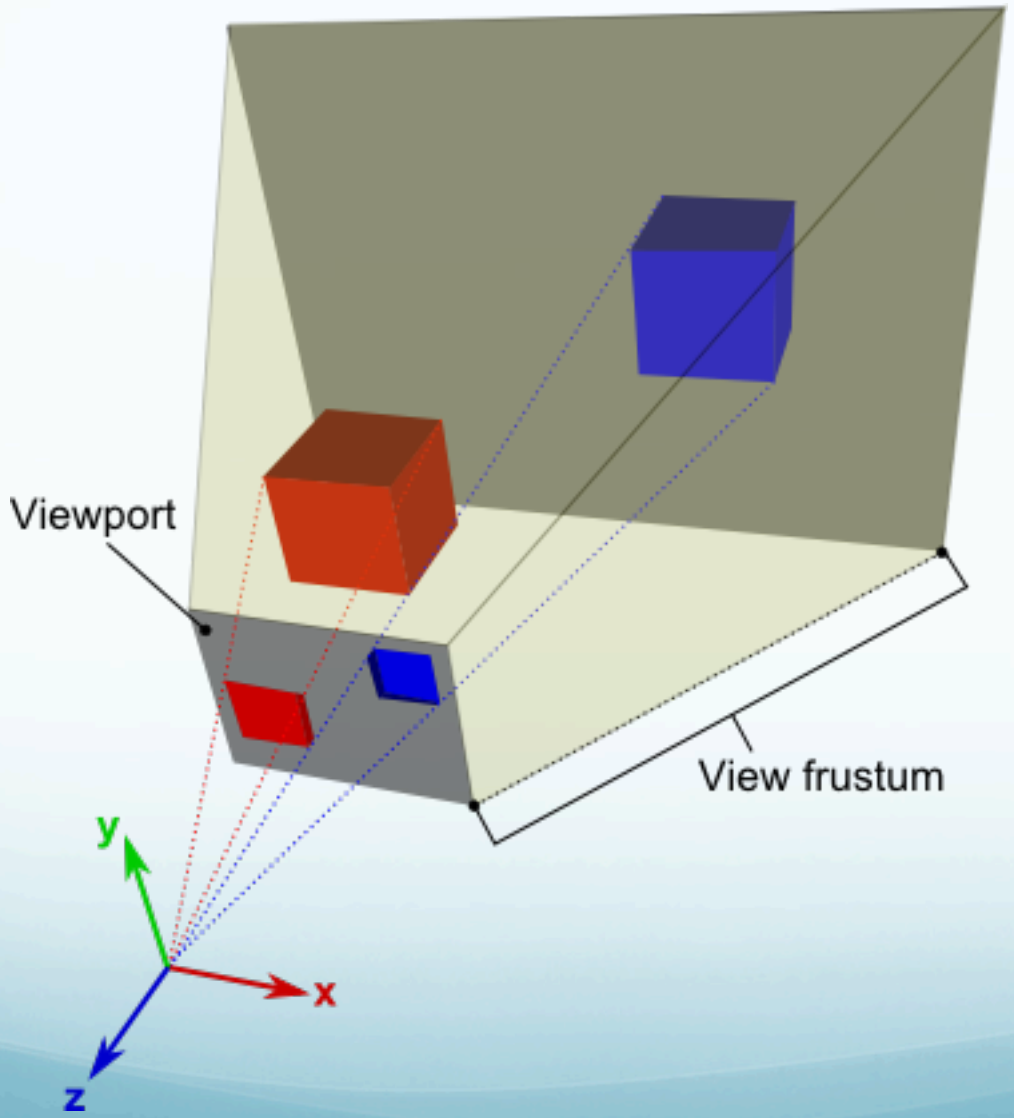
Robert Gardiner, the University of British Columbia

Perspective Projection: Frustum



"ViewFrustum" by MithrandirMage

Perspective Projection: Frustum



WebGL and Three.js

Three.js

- Useful and popular library for WebGL
- Allows us to create and manipulate 3D objects
- Still have a canvas (what we're drawing on)

- Main new elements:
  - **Scene**: where we add 3D objects and lights
  - **Camera**: where our "eye" is, not part of the scene
  - **Renderer**: tool to draw the scene on the screen

Example WebGL code

Global Variables

```
var scene, camera, renderer; // Three.js rendering basics.

var canvas; // The canvas on which the image is rendered.
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// set up the geometry for our pyramid
var pyramidGeom = new THREE.Geometry();
```

```
// Creates a material for the pyramid that is "matte" not "shiny".
var pyramidFaceMaterial = new THREE.MeshFaceMaterial( [
    new THREE.MeshLambertMaterial( { color: 0xffffff, shading: THREE.FlatShading } ),
    new THREE.MeshLambertMaterial( { color: 0x99ffff, shading: THREE.FlatShading } ),
    new THREE.MeshLambertMaterial( { color: 0xff99ff, shading: THREE.FlatShading } ),
    new THREE.MeshLambertMaterial( { color: 0xffff99, shading: THREE.FlatShading } ),
    new THREE.MeshLambertMaterial( { color: 0xff9999, shading: THREE.FlatShading } )
] );
```

```
// Create the pyramid using the geometry and materials we've set up.
var pyramid = new THREE.Mesh( pyramidGeom, pyramidFaceMaterial );
```

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```
// Create the pyramid using the geometry and materials we've set up.
var pyramid = new THREE.Mesh( pyramidGeom, pyramidFaceMaterial );
```

```
pyramid.position.x = 1.5;
```

```
scene.add(pyramid);
```

Rendering Loop

```
function render() {
    renderer.render(scene, camera);
}
```