

Processing Tutorials

Tutorial 3

3D primitives in Processing

- ◇ 3D coordination system

- ◇ `size(w, h, renderer)`

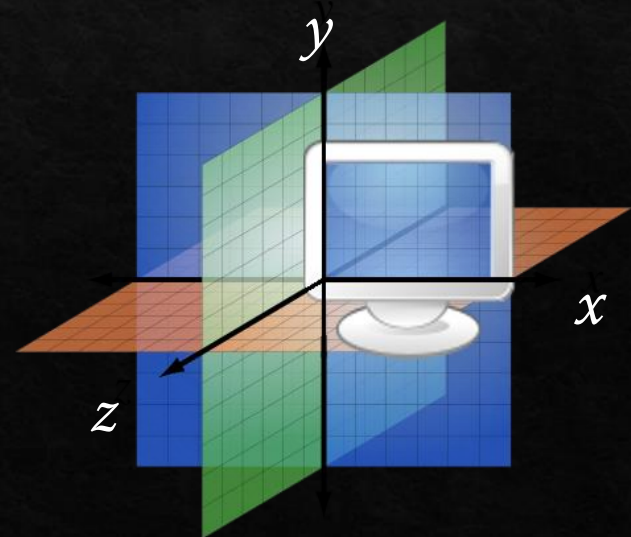
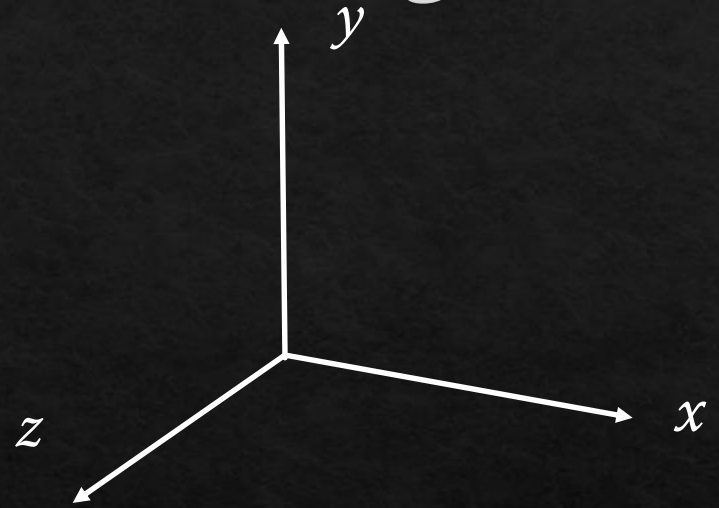
 - `size(400, 400, P3D);`

- ◇ `box()`

 - ◇ `box(size)`

 - ◇ `box(w, h, d)`

- ◇ `sphere(r)`

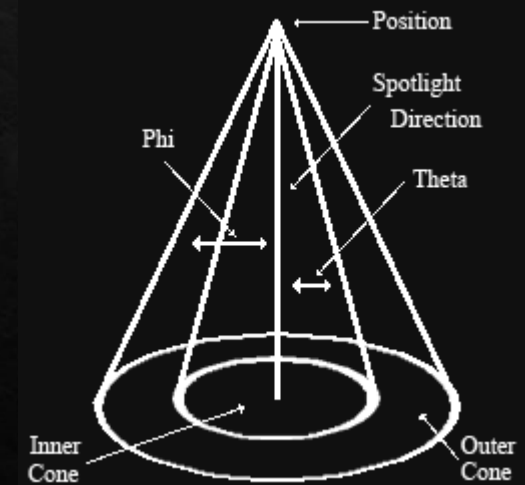
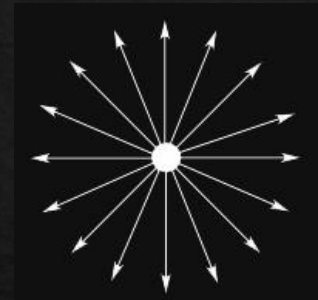
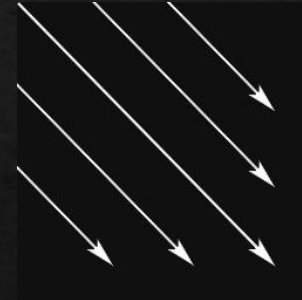
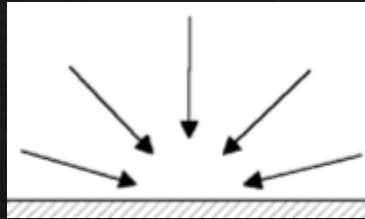


Transformation of 3D objects

- ◇ Translation
 - ◇ `translate(x, y, z)`
- ◇ Rotation
 - ◇ `rotateX(angle)`
 - ◇ `rotateY(angle)`
 - ◇ `rotateZ(angle)`
- ◇ Scale
 - ◇ `scale(s)`
 - ◇ `scale(x, y)`
 - ◇ `scale(x, y, z)`

Lights

- ◇ `ambientLight()`
- ◇ `directionalLight()`
 - ◇ See Lighting example
- ◇ `pointLight()`
- ◇ `spotlight()`
- ◇ Parameters:
 - ◇ $(v1, v2, v3)$
 - ◇ or $(v1, v2, v3, x, y, z)$
- ◇ `light()`



Camera

- ◆ Sets the position of the camera through setting the eye position, the center of the scene, and which axis is facing upward.
- ◆ The default position points to the center of the display window with the Y axis as up
 - ◆ `camera()`
 - ◆ `camera(eyeX, eyeY, eyeZ, centerX, centerY, centerZ, upX, upY, upZ)`

Introduction to Shapes3D library

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- ◆ Download: <http://www.lagers.org.uk/s3d4p/download.html> or <http://sse.tongji.edu.cn/yingshen/course/HCI2015Spring/software/Shapes3D V2.1.5.zip>
- ◆ References: <http://www.lagers.org.uk/s3d4p/ref/index.html>

3D Objects in Shapes3D

- ◇ Box
 - ◇ See RotateBox example
- ◇ Cone
 - ◇ See DrawCone example
- ◇ Ellipsoid
 - ◇ See DrawEllipsoid example
- ◇ Helix
- ◇ Toroid
- ◇ Tube

Picking Objects

- ◆ See Picking example

Exercise

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1. Install Shape3D for Processing library
2. Run previous examples
3. Finish the following tasks:

Task 1:

- ◇ Draw an ellipsoid on the screen;
- ◇ The ellipsoid can rotate with the movement of the cursor when the left button of the mouse is pressed.

Task 2:

- ◇ When key “m” is pressed, the ellipsoid should move with the cursor.