Introduction to Augmented Reality
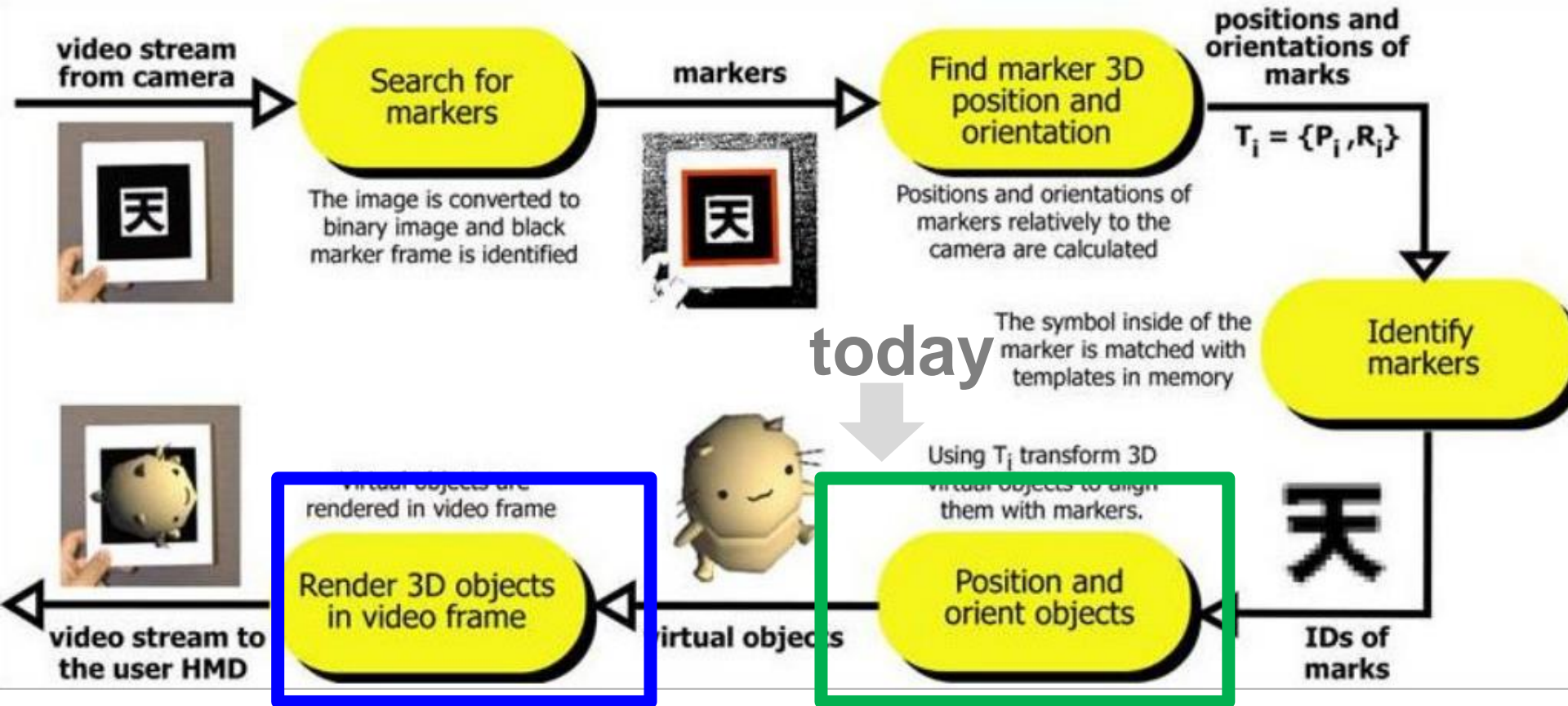
Tutorial 7: OpenGL Snowman
May 30 2018

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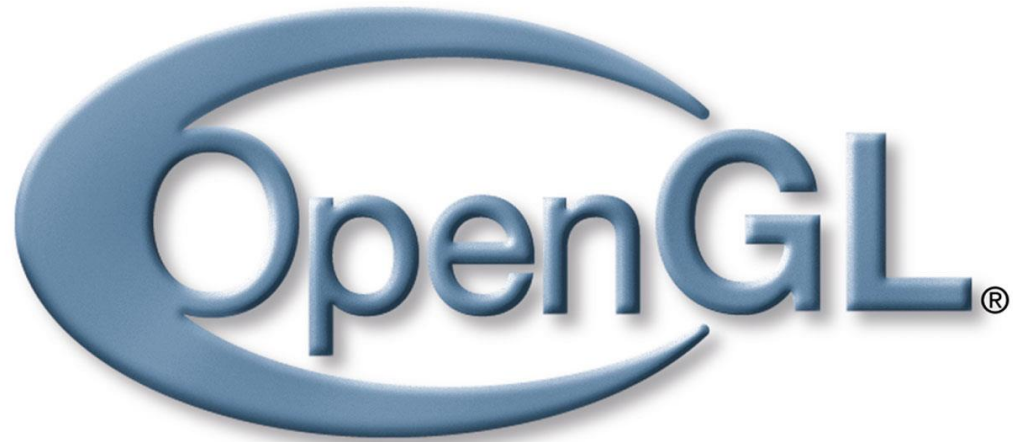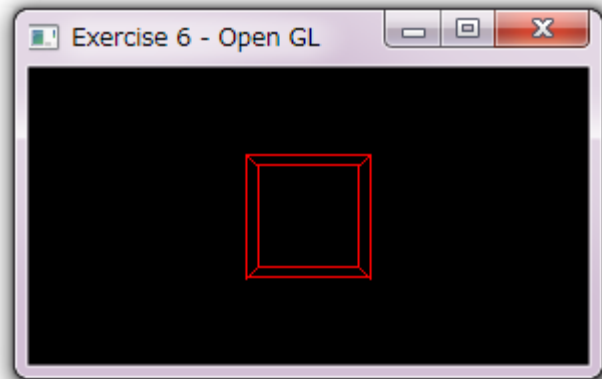
Marker-based Tracking

ARToolKit

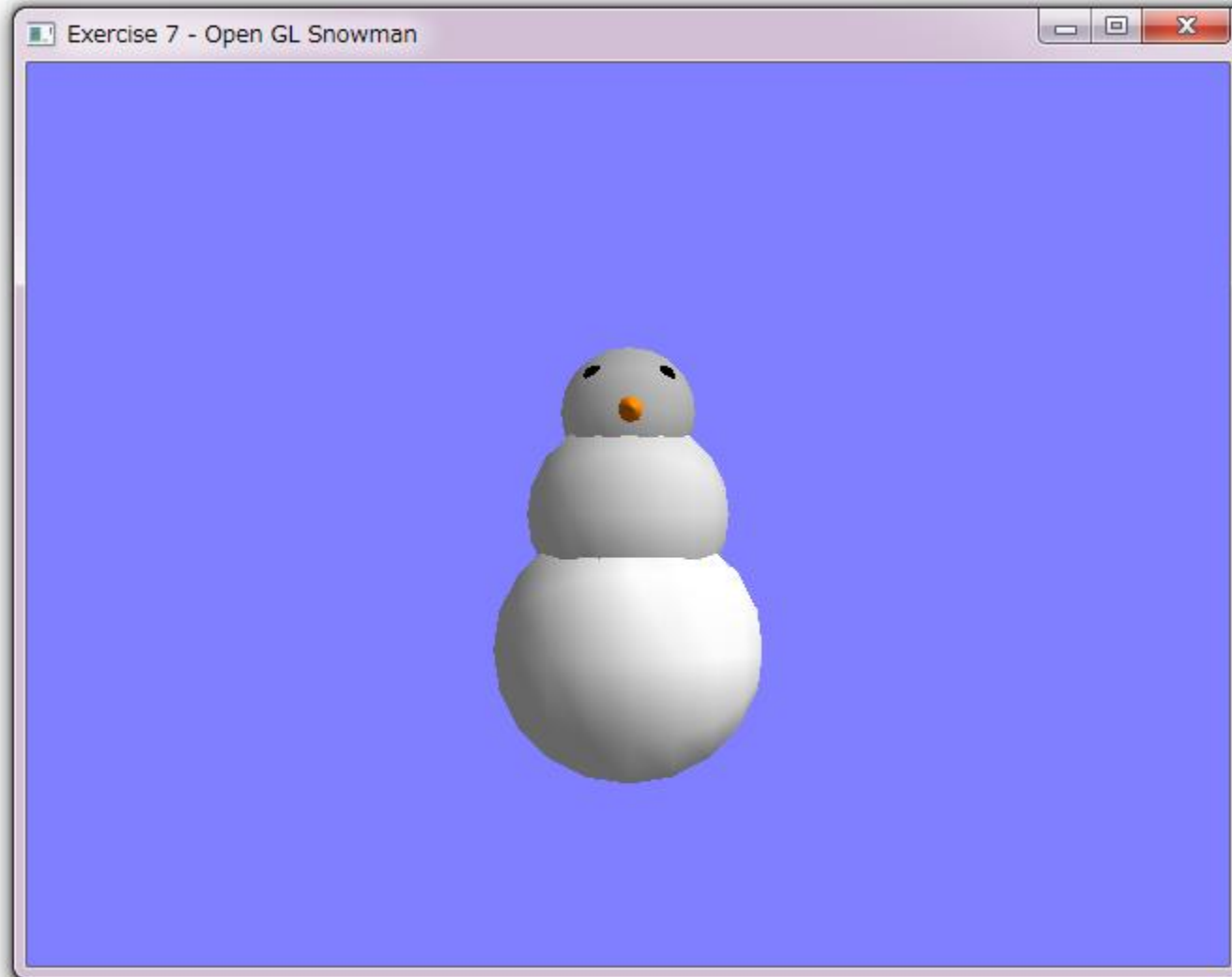Ex. 8~9

Ex. 6~7

Solution for the Previous Tutorial

OpenGL basics

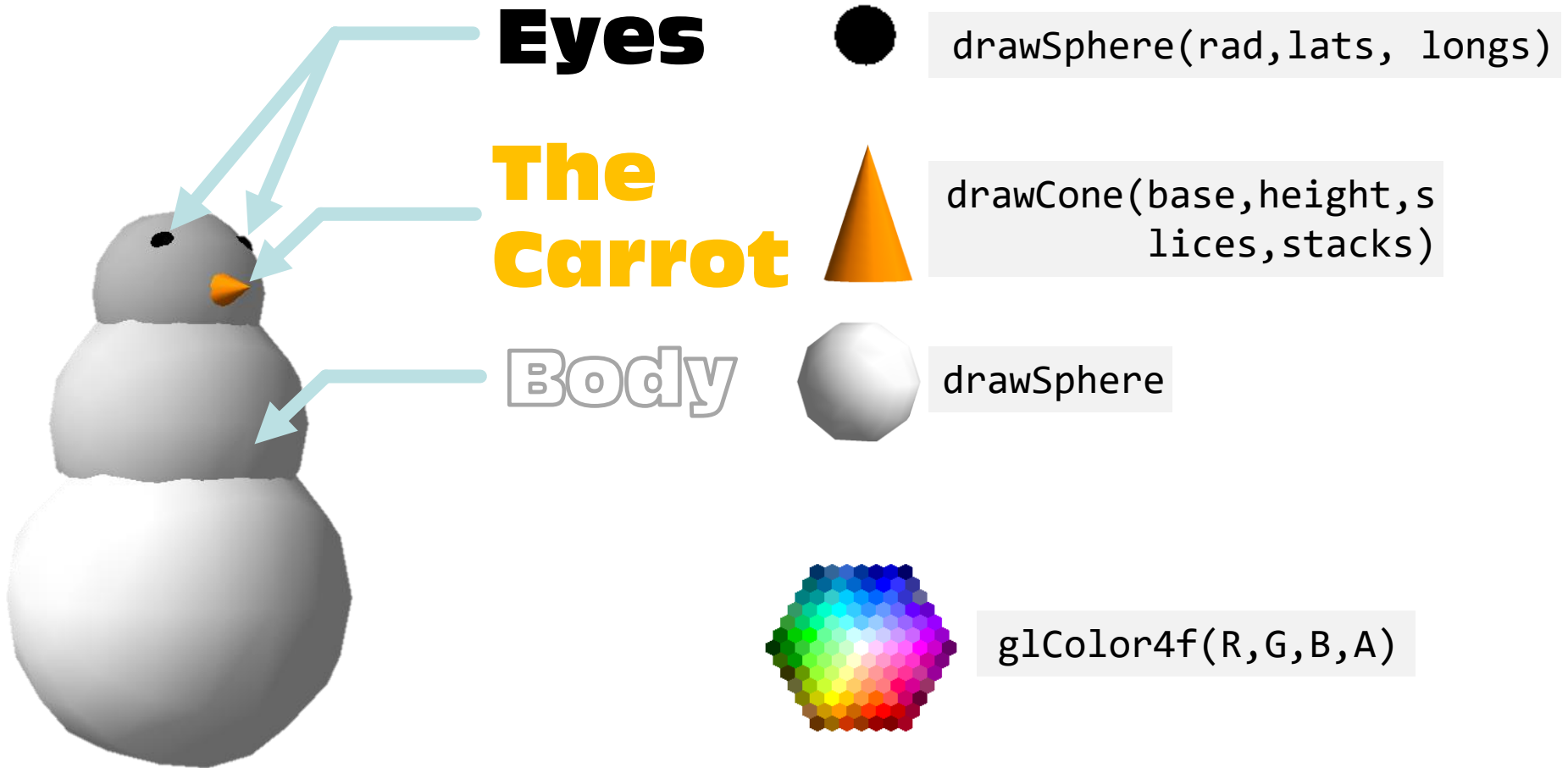# Today's Tutorial

Render Snowman

OpenGL Snowman

Eyes

drawSphere(rad,lats, longs)

The Carrot

drawCone(base,height,s
lices,stacks)

Body

drawSphere

glColor4f(R,G,B,A)
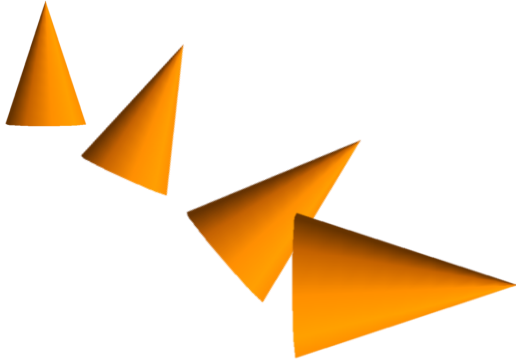
Place Objects & Organize Your Scene

glTranslatef(x, y, z)
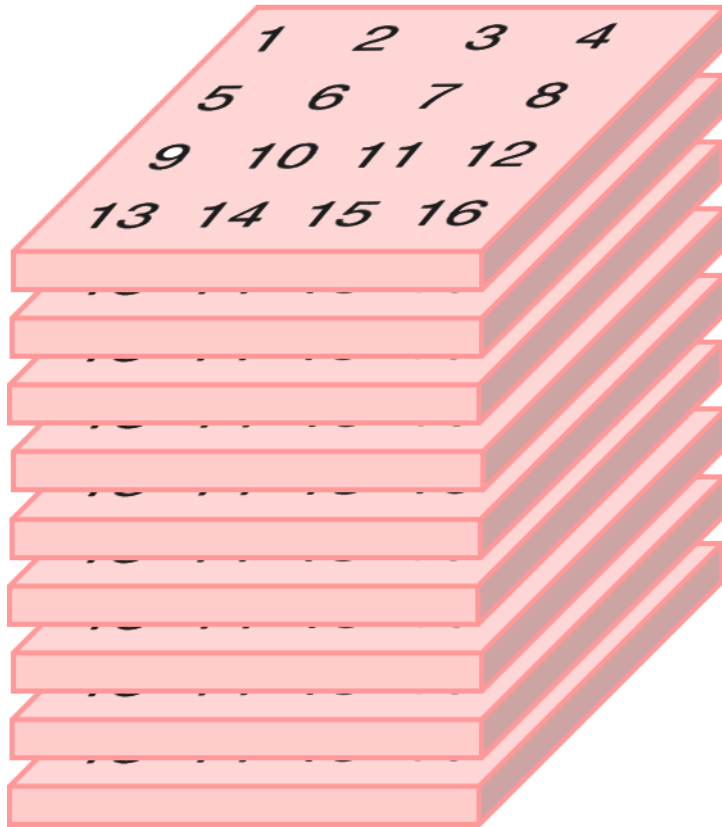
glRotatef(angle, x, y, z)

glMatrixMode(XXX);
- GL_PROJECTION
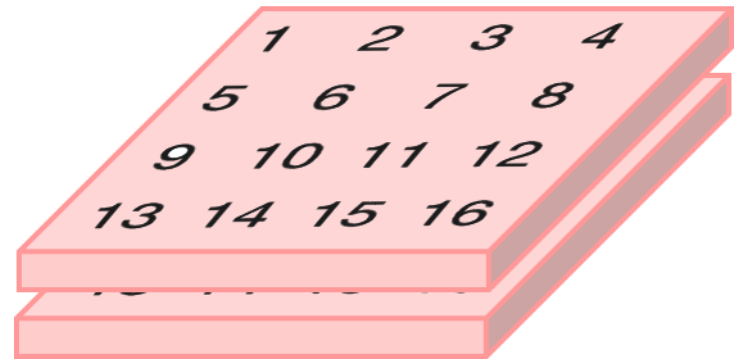- **GL_MODELVIEW**
- GL_TEXTURE

(OpenGL is a state machine)
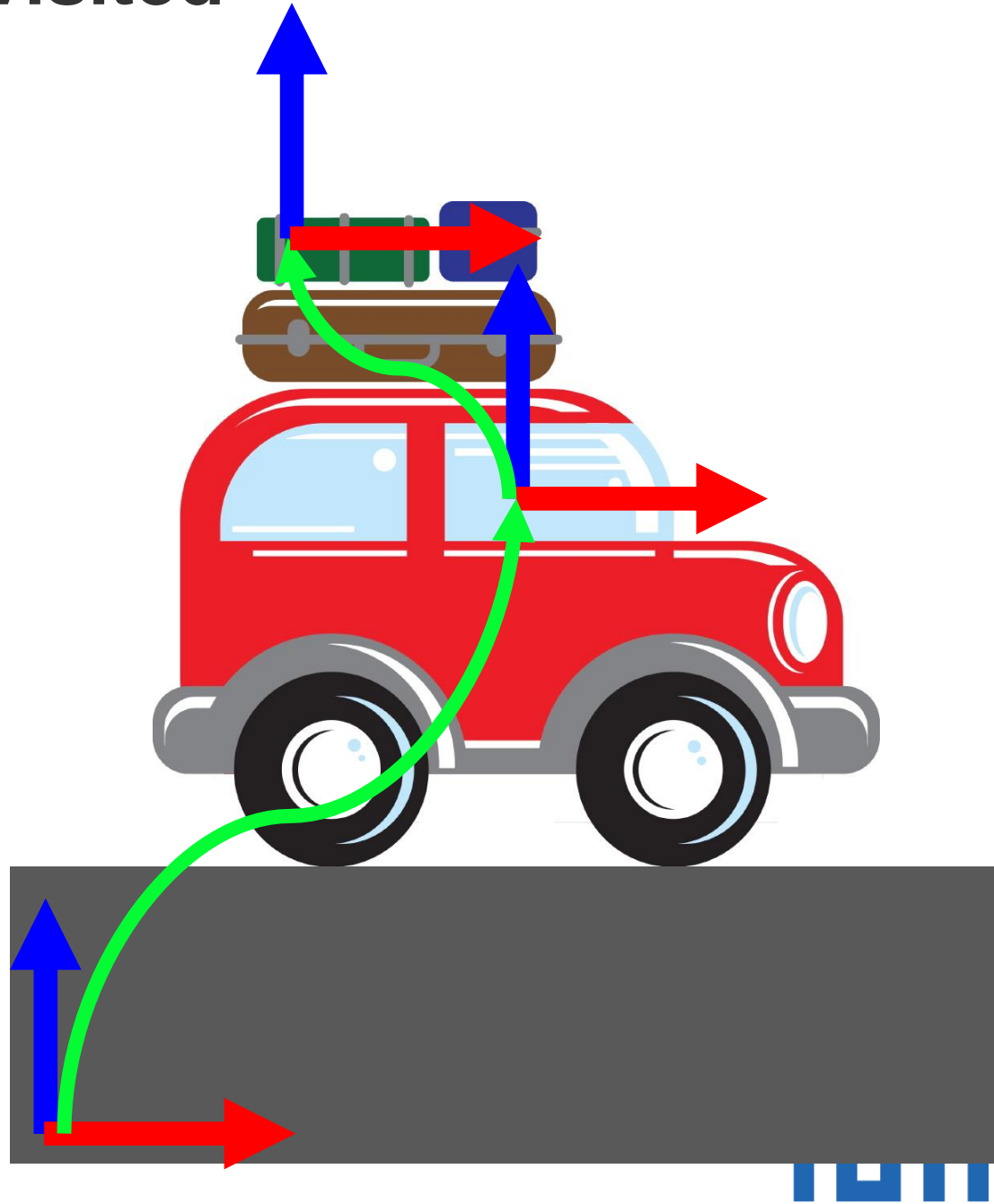
Matrix Stacks Revisited
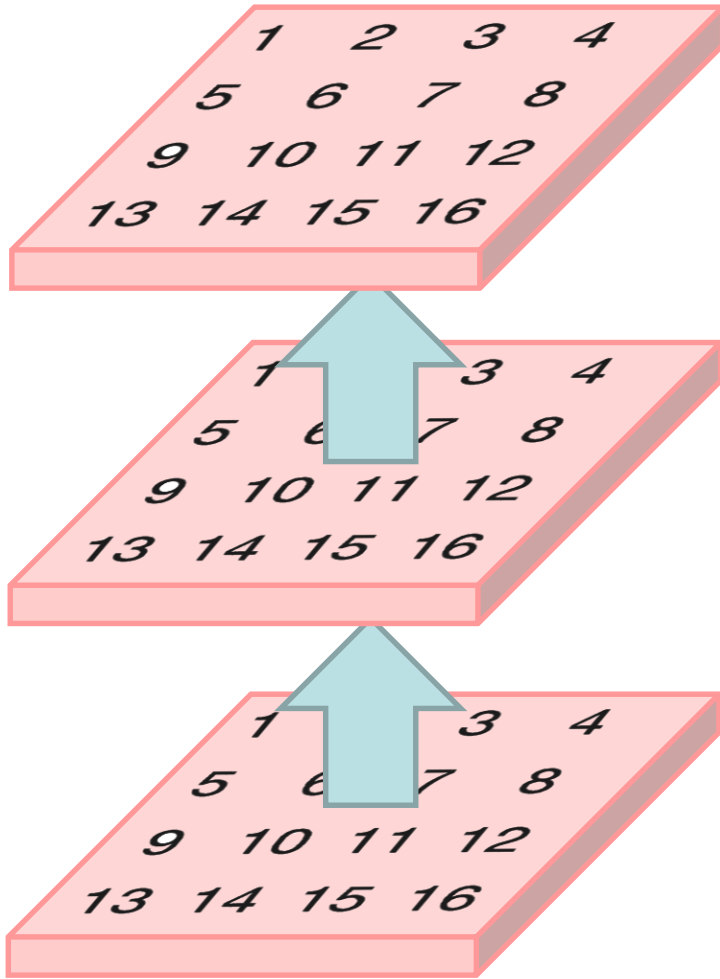
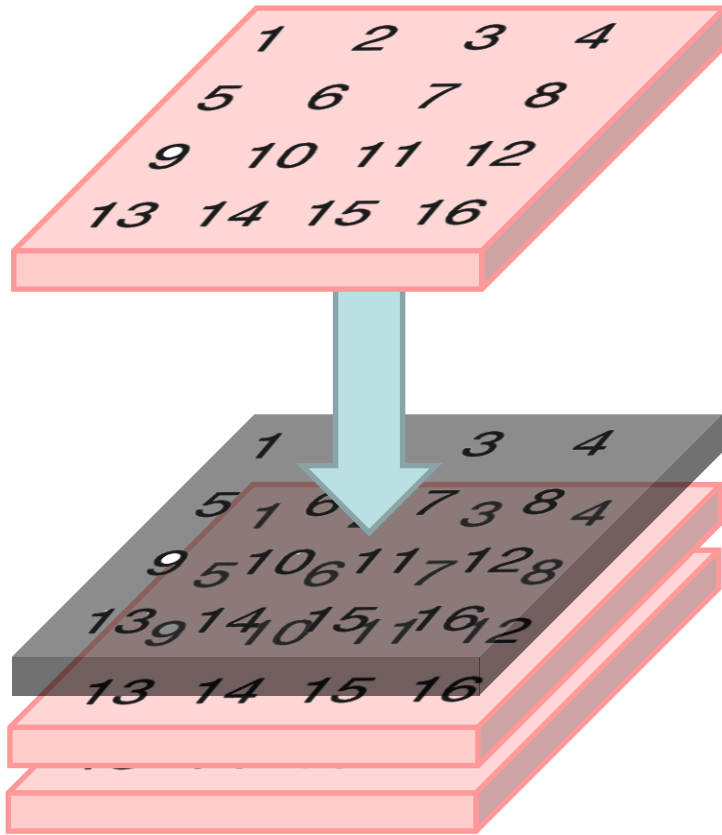GL_MODELVIEW
stacks:12<
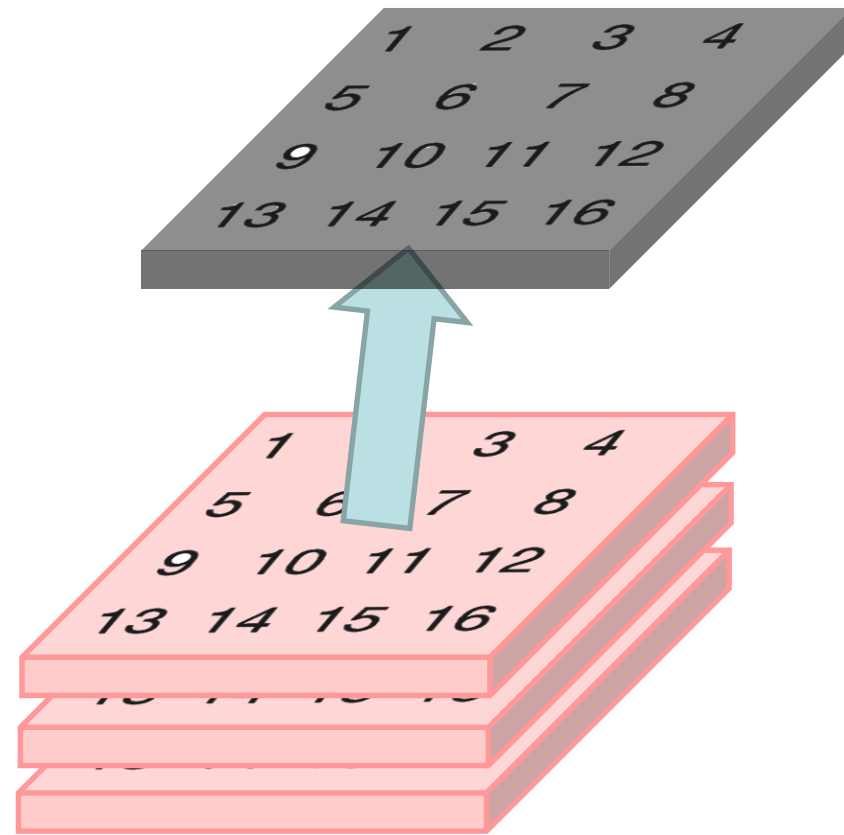
GL_PROJECTION
GL_TEXTURE
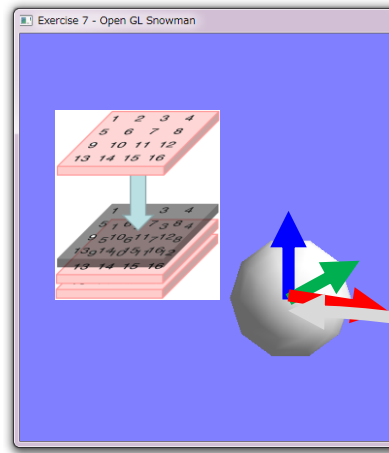stacks: 2<
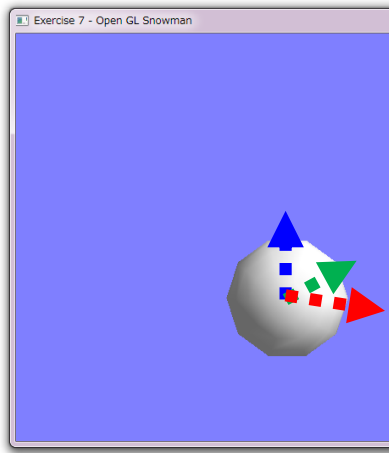
Matrix Stacks Revisited

GL_MODELVIEW
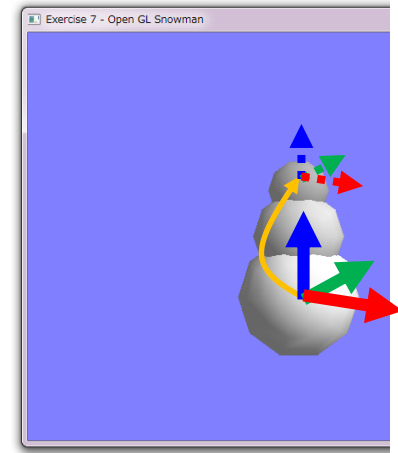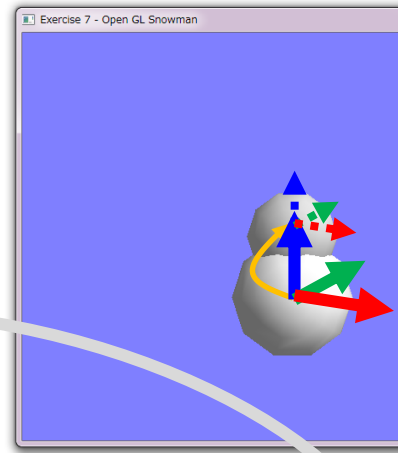
Matrix Stacks Revisited

glPushMatrix();   glPopMatrix();

Push Translate....
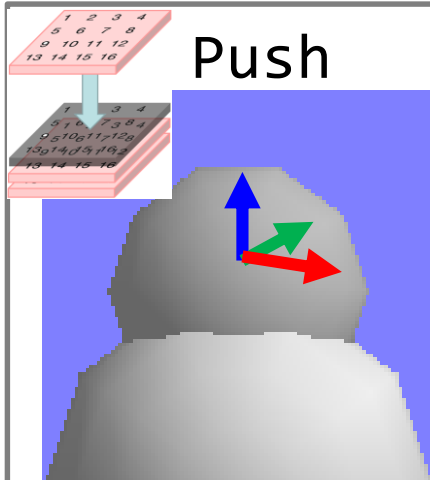
Push Translate.... Pop
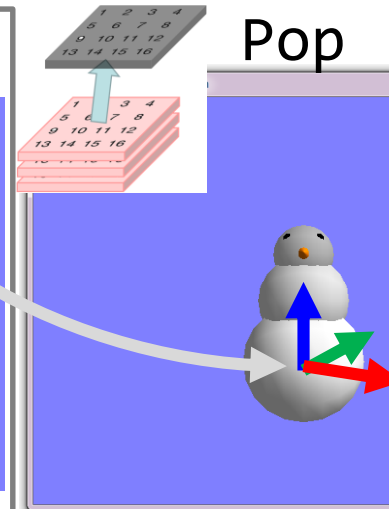
OpenGL Snowman so far…
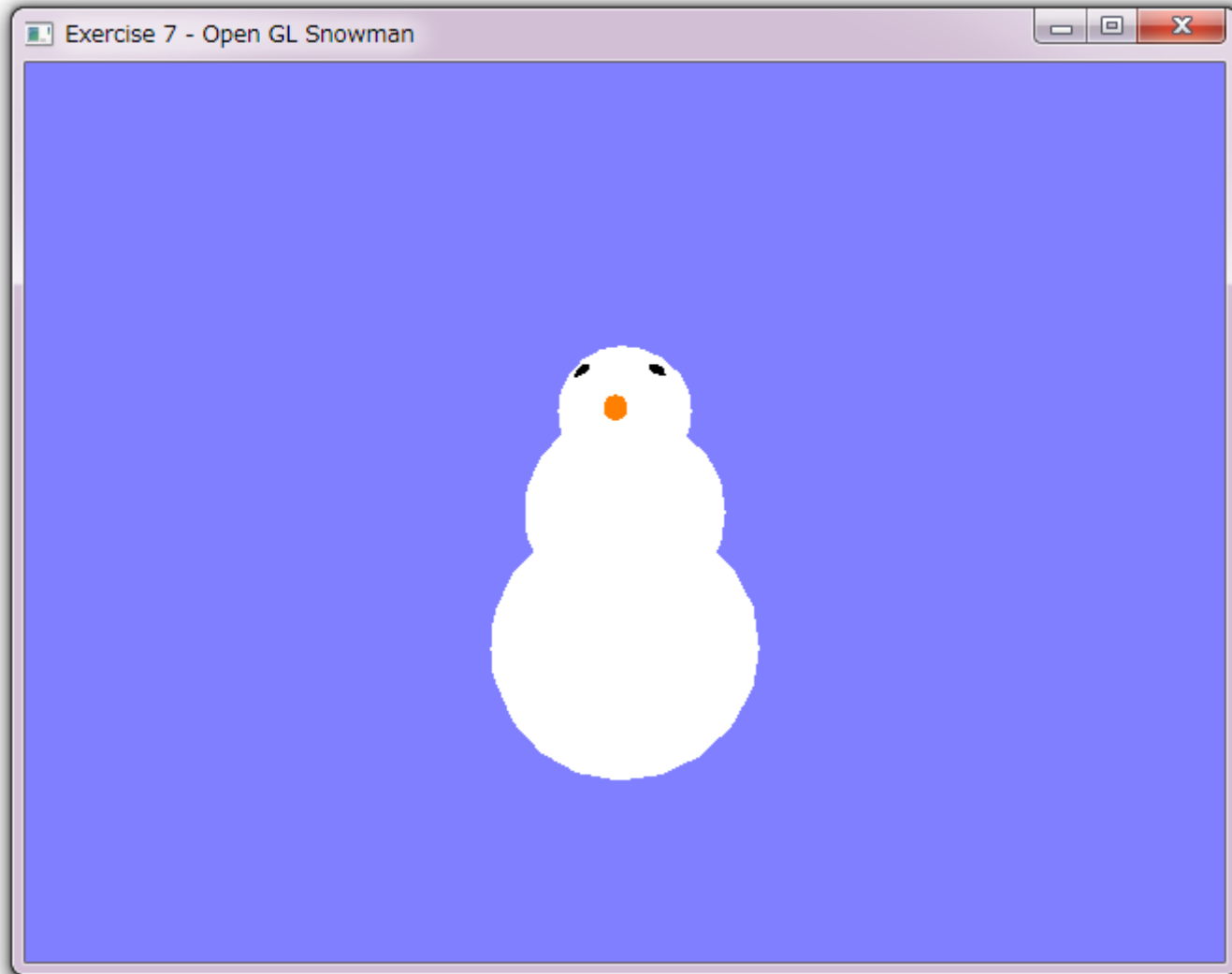
OpenGL: Light

3 Components (In Phong rendering)

Ambient + Diffuse + Specular = Phong Reflection

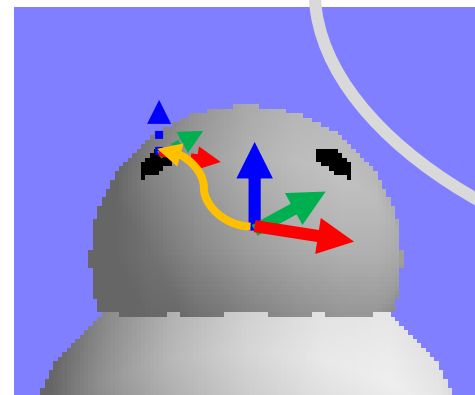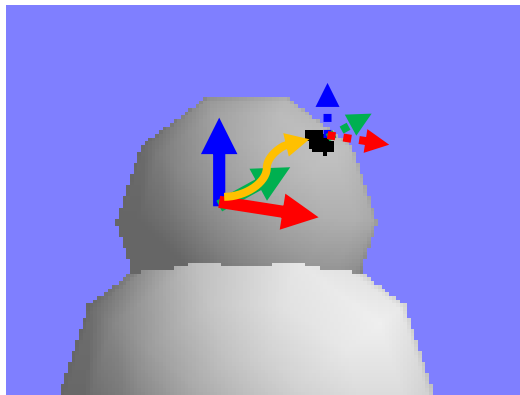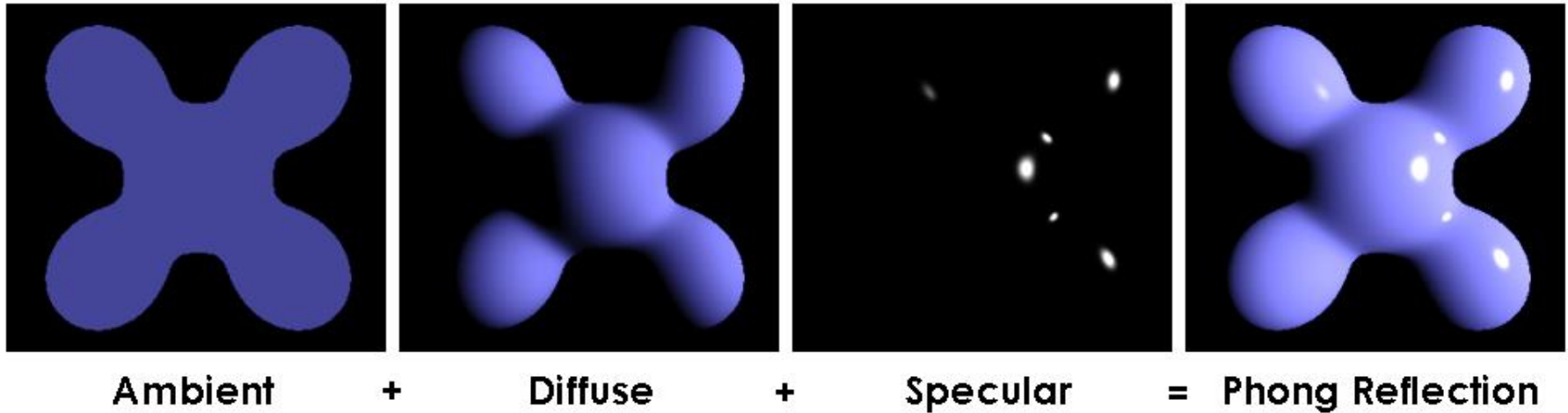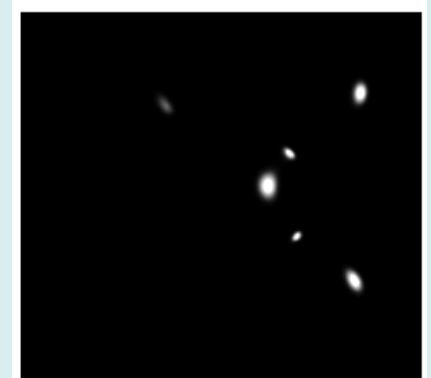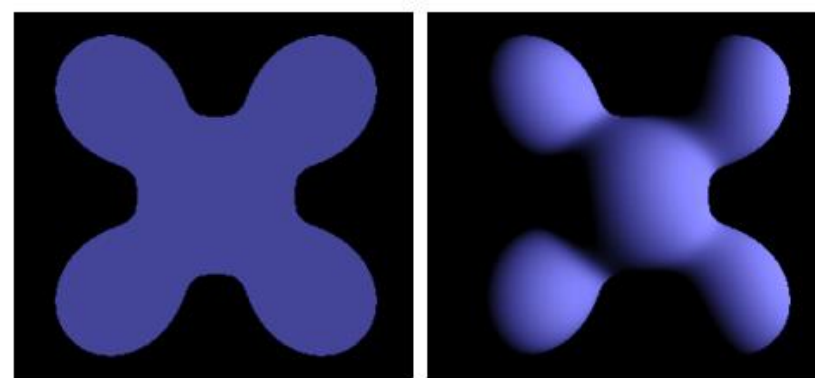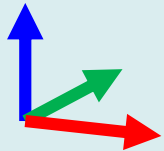Image by Brad Smith

Open GL - Switch on Light

Light Sources:
{GL_LIGHT0, …, GL_LIGHTX} (X>=8)

Light State:

{ GL_POSITION, GL_AMBIENT, GL_DIFFUSE, GL_SPECULAR

Open GL - Switch on Light

GL_POSITION: [x, y, z, w$_{(=0.0)}$]

w: directional light influences (diffuse/ specular)

GL_AMBIENT color: e.g. [0.3 , 0.3 , 0.3 , 1.0]

GL_DIFFUSE color: e.g. [0.8 , 0.8 , 0.8 , 1.0]

```
glLightfv(GL_LIGHT0,GL_POSITION,light_pos);
glLightfv(GL_LIGHT0,GL_AMBIENT, light_amb);
glLightfv(GL_LIGHT0,GL_DIFFUSE, light_dif);

glEnable(GL_LIGHTING);
glEnable(GL_LIGHT0);
```

Open GL - Animation

glfwGetTime()

glfwInit()   glfGetTime()

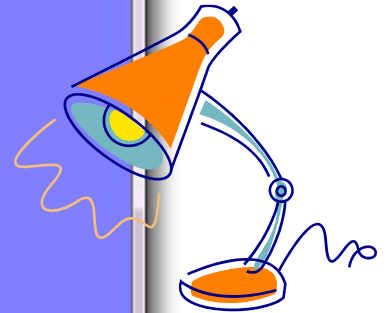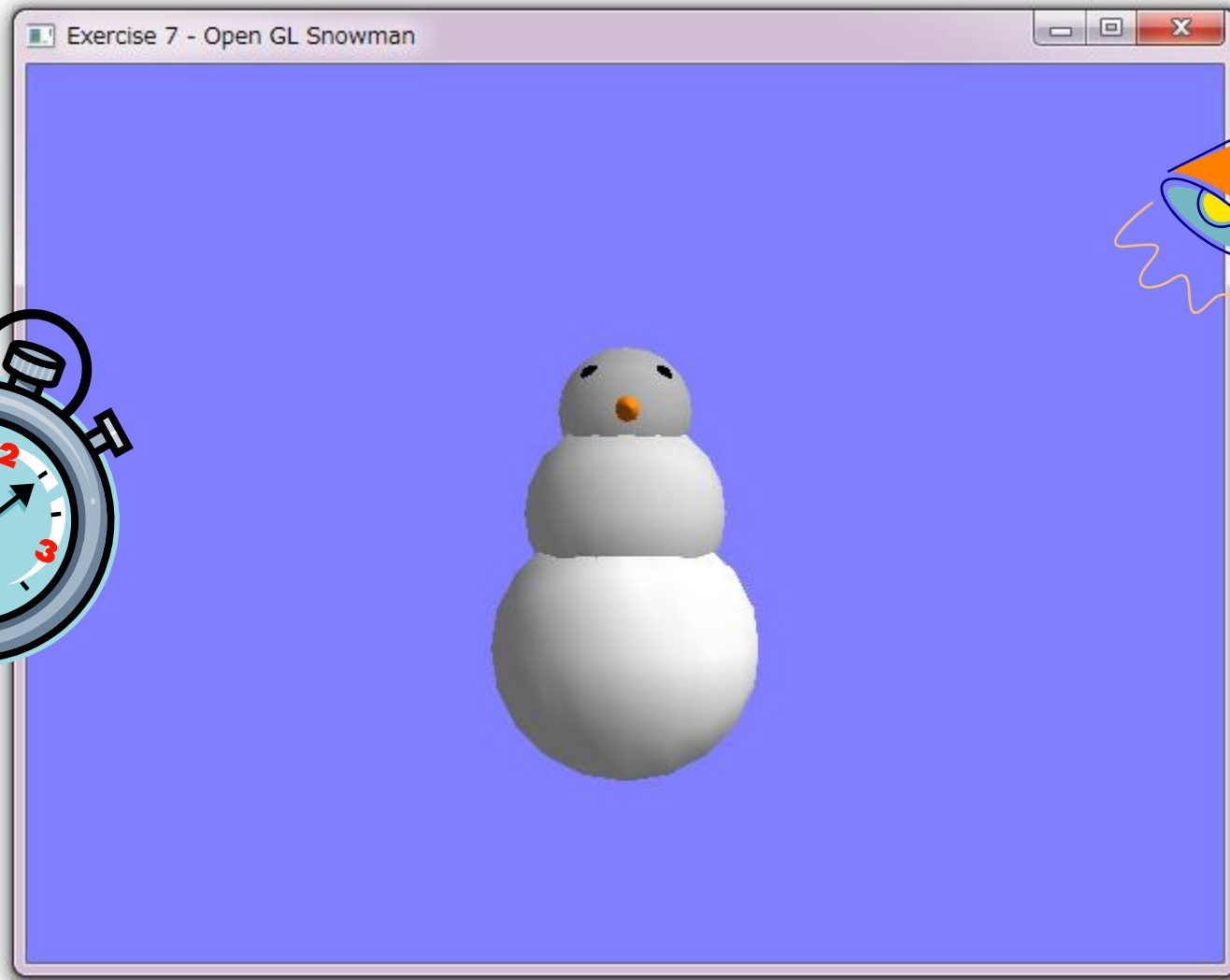0   [sec]

glRotatef(**angle**, 0, 1, 0);

Homework

Implement, illuminate and animate snowman

Spoiler of the next tutorial

Combine snowman with marker tracker

That's it...

- Questions