

# CS 6323.001 Computer Animation & Gaming

## Assignment 1 (10 points)

Write an OpenGL program that display a rotating bunny.

- 1) Initially place a bunny 5 units along the x-axis at (5, 0, 0) of world coordinate system. *This is already implemented in the provided starting code.*
- 2) Draw a ground plane and xyz-axis of world coordinate system. Draw xyz axis from an arrow object. *This is already implemented in the provided starting code.*
- 3) Rotate the bunny around the **global y-axis of world coordinate system (WCS)** and at the same time rotate around **its own x-axis of local coordinate system (LCS)**.

For the rotating bunny, do the following transformation in order:

- a. rotate the bunny around its own x-axis of local coordinate system by ' $a$ ' degree; (grade: 4 points)
- b. then rotate the bunny by ' $b$ ' degrees around the global y-axis of world coordinate system. (grade: 3 points)

Note that the rotation around its own x-axis will not change the center position of bunny. The center position of bunny is changed when it rotates around the global y-axis. Some implementation hints are given below.

- 4) The program should have user-interaction controls to allow users to interactively increase or decrease  $a$  and  $b$ . The controls can be buttons, checkboxes, mouse clicks, mouse motion, etc. as long as it is easy to use. (grade: 2 points)
- 5) Have a “Reset” button that can reset the bunny to the initial state,  $a$  to 0 and  $b$  to 0. (grade: 1 point)

You are required to submit your source codes on eLearning before the due time.

A starting code (c++) animating a bunny has been provided. GUI is implemented by Nanogui and GLFW. To build the code, the following libraries are needed: GLEW, GLFW, Nanogui.

Hints:

1. Every bunny transformation can be implemented by modifying the “Model” matrix in the OpenGL code. The Model matrix is used to transform the vertex coordinates from model’s local coordinate system (LCS) to world coordinate system (WCS).