Introduction to Computer Graphics CS 174A: Assignment 1

Weight: 15 %

Points: 24

Collaboration: None permitted. If you discuss this assignment with others you should submit their names along with the assignment material. Using code from previous offerings of the course constitutes plagiarism and is strictly prohibited. We will use automated tools to check for plagiarism.

Submission: Follow the instructions carefully to avoid point reductions.

Submit a zipped file (UID.zip — e.g: 313939200.zip) that includes the source files (just the .cpp and .h files you edited, or just the .js and .html files you edited) and if applicable a README file explaining which parts are partially fulfilled, or any key settings you feel are necessary for the grader to successfully build your project. Please remove the executable and object files to reduce the zip file size.

Assignment:

Write an OpengGL program using either the provided C++ or javascript template (provided on the course Piazza forum), that draws the scene shown in the sample videos, also found on the Piazza forum under "Resources/Resources". For drawing objects, use only the procedures provided, cube.draw() and sphere.draw(); for now do NOT use any other built-in cube and sphere drawing functions.

Requirements:

(a) You must use a hierarchical approach to model the complex objects. This applies both conceptually (during your order of matrix transformations) and programmatically (breaking up your code into a hierarchy of subroutines). (5 Points)

(b) Model a static ground plane. (1 Point)

(c) Model a tree that has a trunk made of 8 parts and a sphere for foliage. (2 Points)

(d) The tree must visibly sway as shown by the sample executable. (2 Points)

(e) Trunk parts rotate around the middle of the bottom face. (4 Points)

(f) Animate the wings and legs of the wasp. You may use the same value for more than one

angle. The wasp's main axis is X. All moving body parts must rotate around the X-axis.

(5 Points)

(g) The wasp flies in a circle around the vertical axis, and it should always be aligned with

the tangent of the circle. (3 Points)

(h) The wasp must move up and down. (2 Points)

(i) You need NOT match the exact motion or dimensions or colors of the sample code; however, your scene must be qualitatively and visually similar to the one provided. **You must rotate objects around the correct point; i.e., where they touch the parent object matters. Pay special attention to the locations of these hinge / rotation points.**

Hints:

(a) Create a function drawLeg() and use it for all the legs.

(b) Call your drawing function in display(). Use the animation_time variable.

(c) Functions of the form f(t) = a + b*sin(w*t) are useful for modeling periodic motion.