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.

Submission: Follow the instructions carefully to avoid point reductions.
Submit a zipped file (UID.zip — e.g: 313939200.zip) that includes the template files (keep the same folder structure) and if applicable a README file explaining which parts you only partially fulfilled, or any key actions you feel are necessary for the grader to successfully look at your project.

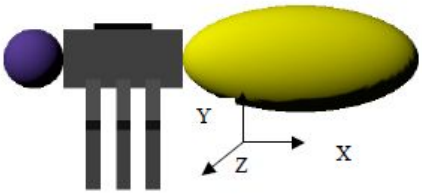
Assignment:
Write a program using our javascript template (provided on the course Piazza forum), that **draws the scene shown in the Homework 1 sample videos**. The sample videos are also found on the Piazza forum under "Resources/Resources". **A diagram / blueprint showing how the hinges should hook up to each other is included on the page below**. For drawing objects, the provided examples at the bottom of animation.js (lines showing the command to draw a box (cube) or a ball (sphere)) will be all you'll need. For now don't worry about the details of how data is sent to the graphics card.

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 segments and a sphere for foliage. **(2 Points)**
(d) The tree must visibly sway as shown by the sample video. **(2 Points)**
(e) Trunk parts rotate around the **middle of the bottom face**. **(4 Points)**
(f) Animate the wings and legs of the wasp. The legs have **two segments each**, not one. You may use the same value for more than one angle. Pieces should rotate along the bee's lengthwise axis, and should stay connected at the corner edges where they touch one another. **(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. The wasp must move up and down. **(5 Points)**

You need NOT match the exact motion or dimensions or colors of the sample code. Extra details won't hurt you, however:

- Your scene must be qualitatively 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 hinges - edges where two boxes make contact - and center your rotations along those.
- To make that part easier to grade, please leave all boxes (m_cubes) as boxes -- they're supposed to always touch at their corners like in the diagram below, and using corner-less shapes instead would defeat your demonstration that you can do that.

Hints:
(a) Create a function drawLeg() and use it for all the legs.
(b) Find class Animation's display() function and put your main code there. Use the **this.graphicsState.animation_time** variable whenever you need movement as a function of time..
(c) Functions of the form f(t) = a + b*sin(w*t) are useful for modeling periodic motion.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