Student's ***NetID***_____Student's Name_____Grader's Name_____
(netID == 3 letters, 3 digits: e.g. jet861)

EECS 351-1 Grading Sheet: Project B Win 2015

J. Tumblin 2/18/2015

_____**10% Report:** clear illustrated PDF file report with your name project title, goals, user-guide, at least 4 results pictures, and a sketch of the scene graph of your program (the tree of transforms)?

_____ **5% User instructions:** on-screen, or shown whe users press 'help' key of some kind? These instructions alone should enable any user to demonstrate all program features.

_____**10% Ground-Plane Grid:** Project shows horizontal 'floor' of repeated shapes or lines that extend nearly endlessly to all distant horizons, and thus let us easily assess changes to camera position and aiming direction. In the world coordinate system where +z is 'up', the ground plane at z=0 spans x,y coords that appear horizontal on-screen.

_____**10% Animated, adjustable 3-Jointed, 4-Segment Shape**: draws at least one shape of at least 4 parts connected by 3 or more sequential joints that move smoothly.
(Joint adjustments MUST NOT CHANGE any cameras or any views!)

_____**10% 4 or more Additional Multi-color 3D Shapes placed on ground plane.** Each with at least 3 different vertex colors specified, these items create an interesting 'world' to explore (fixed, non-jointed objects OK…)

_____ **5% Draw 3D Axes (r,g,b == x,y,z):** Draws 3D **world-space** coord. axes on-screen, and at least one more set of 3D of 3D axes to depict the coordinate system used for a rotatable joint or movable part in the jointed object.

_____**15% Simple Diffuse Overhead Shading.** At least one moving 3D shape shows orientation-dependent on-screen vertex colors, smoothly interpolated between vertices. Compute each vertex color from the dot-product of surface normal and the world-space +z vector in your Vertex Shader program: see Assignment Sheet.

_____**10% 2 Side-by-Side Viewports** Divides display window evenly into 2x2 grid of viewports that always fill the screen and never distort (squash/stretch) the images when users re-size window for taller or wider images.

_____**10% Perspective Camera** with 40-degree vertical field-of-view (top-to-bottom) in left viewport, **AND Orthographic Camera** view in right viewport. Both cameras share the same eye-point and 'look-at' point; choose your view volume for the orthographic camera to match the perspective camera for objects at distance (far-near)/3.

_____**15% Smoothly adjustable 3D View Control:** User interaction provides smoothly adjustable viewpoint control with no movement restrictions (adjust to any 3D position without changing viewing direction; adjust to any viewing direction without changing 3D position; try 'glass cylinder' method).

==========

_____3% extra credit: user adjustable asymmetric camera; make all 6 frustum parameters user-adjustable (left, right, top, bottom, left, right adjustments)

_____3% extra credit: Switch Perspective camera to show view from the end segment of the animated 4-segment shape. If your shape is a robot arm, attach the camera to the robot's finger, aimed where the finger points as it moves.

_____3% extra credit: 'flying-airplane' navigation controls: forward velocity; aiming by roll, pitch, yaw…

_____3% extra credit: quanternion-based 'trackball' control of orientation for at least one on-screen object. Mouse dragging must change the on-screen orientation of the object as if it were enclosed in an invisible sphere that we rotate by 'dragging' its surface with the mouse.

==========**TOTAL POINTS/100** (24% of final grade)