Assignment 4

Criteria			Comments
ADDING BODY PARTS: (1) right arm, (2) right leg, (3) nose, (4) two ears, (5) two feet – on the end of the legs!	20	20	
Add motion to the right arm, right leg, two feet.	5	5	
ADD SOME OTHER BODY PART of your choosing. ADD motion to it	2	5	Custom part(hands) should also have some extra motion
2. Draw the tree corresponding to the model corresponding to your program from question 1. Show the Constant, Variable, and Node transformations on the diagram. You do not have to show any transformations in the display_cylinder or display_* functions, where * is some body part. We will consider those transformations to be part of the objects.	5	5	
3. Construct a table with columns for the Node Index, Object Model (e.g., "Neck"), Parent Index, Constant Transformation, Variable Transformation, Node Transformation, and Child Indices for your program from question 1. See example table in notes (but add more columns). For the Constant Transformation, you should have X, Y, and Z columns, and for the Variable Transformation, you should have one column that indicates whether the transform is Rx (meaning rotation around the X axis), Ry, or Rz and two other columns giving the minimum and maximum amounts of rotation that you think are reasonable for a human-like body. See also question 4.	10	10	
4. Change the program from question 1 to use separate minimum and maximum values for every limb (instead of just giving them all minimum 0 and maximum 45). Adjust the minimum and maximum values in your table for question 3 according to your experience of what a human body is capable of in these types of motions. Suggestion: add two arrays, one for max and one for min. For each joint, the figure should progress from its current setting to the maximum and then down to the minimum and then back to the maximum, etc.	10	10	

5. A pose vector gives the current values for the parameters of the Variable Transformations. For example, the angle by which the wooden figure is leaning forward its neck is given by theta[1] in the program. Determine the pose vector corresponding to the following configurations: a. pose 0: figure standing straight with legs straight down and arms straight out; b. pose 1: figure standing with upper right arm straight out and lower right arm turned straight up; right leg out in kicking motion; c. pose 2: figure standing with upper left arm straight out and lower left arm turned straight up; lower part of right leg back Make a table in a Word/txt/pdf file showing the three pose vectors.	5	5	
6. Change the program from question 1 to perform animations between poses. Animation can be performed by gradually changing the angle parameters of the Variable Transformations between one pose and another and back and repeat. Create three possible animations by setting the initial and final poses: a. On input 'f', set one pose to be pose 0 and the other to be pose 1. b. On input 'b', set one pose to be pose 0 and the other to be pose 2. c. Add more two more poses of your choice and choose a keyboard key to cause the figure to animate motion between those two poses.	2	20	When changing to a pose you should set the theta array angles to the values of the first pose. The min and max arrays also have to be updated based on the first and second pose.The delta array should also then be updated so that the transformation angles can be interpolated from the first pose to the second. Once this has been done, in idle(), you can remove the if pose == X and just use `if ((theta[i] > maxArray[i]) || (theta[i] < minArray[i]))`
Total	59	80	