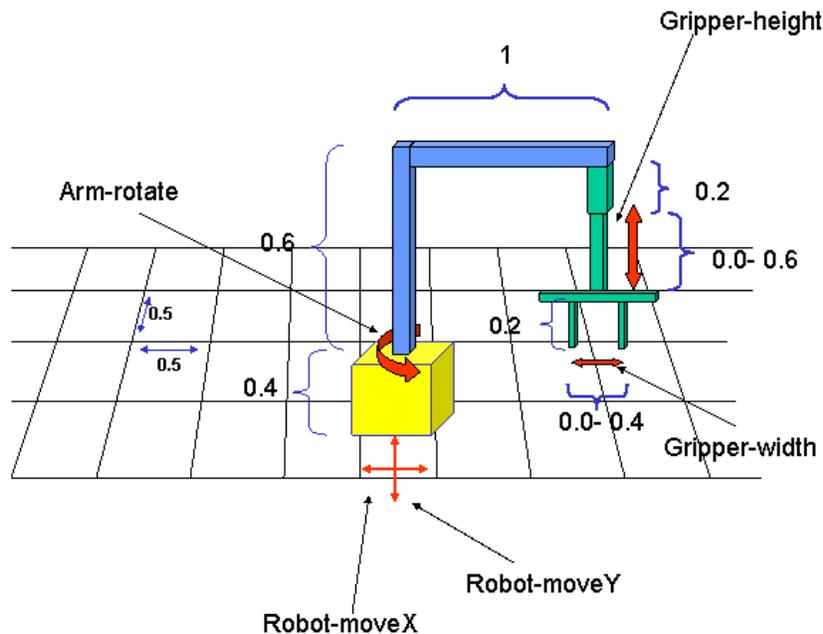


# CS155 - Homework #4 (OpenGL)

## Due: Mon Nov 10

Objective: Experiment with 3D, solids, perspective and user interaction.

Write a program that draws the robot in the figure, standing on the floor, and let the user manipulate the 5 degree of freedom and the view of the object.



### Scene and object definitions:

1. All the measures should fit the description, moving parts should respect the limits indicated in the picture. Colors should be the ones in the figure.
2. Any change in the robot status (due to a change in a DOF value) should be animated interactively (meaning – draw the robot in the new state continuously).
3. Mouse resolution should be such that a reasonable movement/rotation will be executed while the DOF is manipulated by the user (for example, a small mouse movement shouldn't throw the robot out of sight).
4. Use ONE “draw\_cube” function to draw the parts of the robot. Apply different transformations to get the wanted measures.
5. The floor is the XZ plane.
6. A white grid (0.5x0.5 each square) should be drawn.

### **Robot Interface definition:**

1. Pressing the right mouse button will pop a selection menu with the names of the DOF's, and a "select none" item.
2. Once a DOF is selected, the line "Selected: <DOF name>" is printed on the console, and all the affected robot parts are colored red. If nothing selected all colors are normal, and a "Nothing selected" is displayed on the console.
3. Pressing the left mouse button and moving, while a DOF is selected will move/rotate the DOF.

### **View Interface:**

1. Define, describe and implement your own interface to change the point of view and move the camera into the scene.
2. You can use, for example, the arrow keys or a combination of pop up menu and mouse.

### **Extra Credit:**

1. Make sure the basic HW works properly.
2. Populate the scene with simple objects (cubes, spheres, other solids, Utah teapots ☺).
3. Use the robot to grasp and move the objects in the scene.

### **Submission:**

- Submit the C program both on paper (before the beginning of the class) and by email ([cs155@cs.brandeis.edu](mailto:cs155@cs.brandeis.edu)).
- Comment the program with your name and email. Indicate on which platform has been developed (Windows, Mac OS, Linux, etc..).
- State clearly in the comment section whether the program works properly or not. In case it doesn't, describe the problems.
- Before submitting, test the program on one of the computers in the Berry Patch and make sure it works properly on Linux. State otherwise.