

CS 465 Homework 8

out: Saturday 12 November 2004
due: **Monday 21 November 2004**

Problem 1: Transformation hierarchies

Using the modeler you built for Program 4, or using the solution if you prefer, build an articulated humanoid model with a body, a head, two arms, and two legs. Your model should contain transformations named "Neck", "LeftShoulder", "RightShoulder", "LeftElbow", "RightElbow", "LeftHip", "RightHip", "LeftKnee", and "RightKnee". By editing the rotation components of these transformations (and leaving everything else in the hierarchy alone), one should be able to put the model into plausible poses—that is, all the joints should stay together while the limbs move. Your model won't have as many joints or as many degrees of freedom as a person, but it will be capable of the same kinds of large-scale motions.

Figure 1 shows a front view of a boring model made out of boxes in its neutral position (with all the rotations set to zero) and a view of the model in a particular pose. We encourage you to use more interesting primitives to make the model look nicer: build the pieces out of spheres, cylinders, or even revolutions. In the figure, the pivot points of the various named rotations are indicated.

The joints for the arms and legs should be arranged hierarchically, so that for instance adjusting the shoulder causes the whole arm to move as a piece. Don't worry about the precise dimensions of the parts. Just try for plausibly humanoid proportions; the point is the hierarchy. To get the right shapes and pivot points you will need to make appropriate use of scaling and translation.

For extra credit feel free to add hands, feet, a waist, fingers, toes, or a more movable torso.

Turn in your robot by saving a file from the modeler and handing it in via CMS.

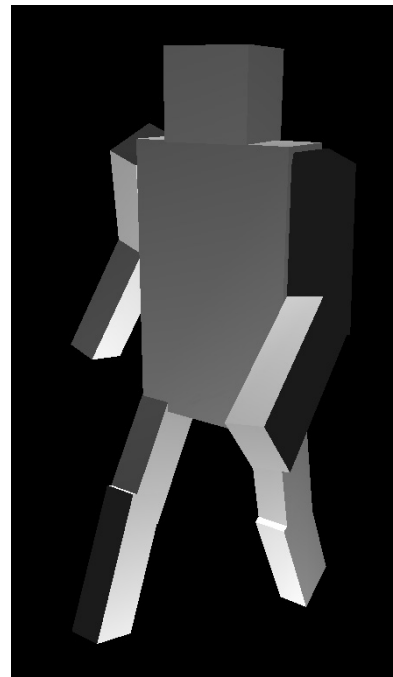
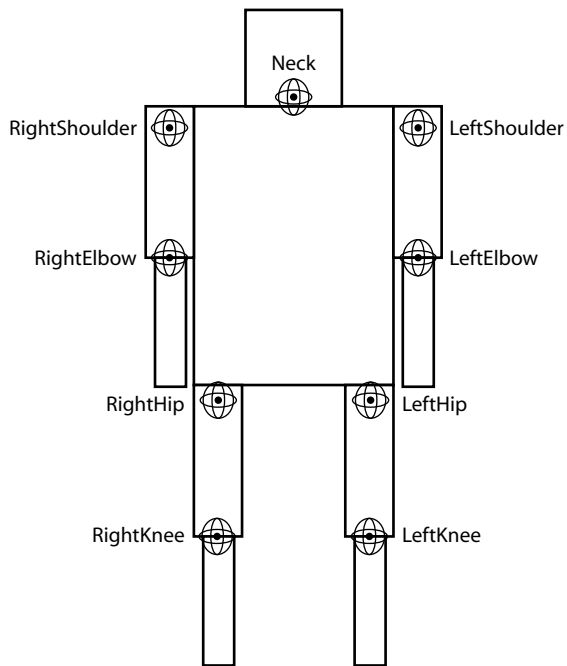


Figure 1: Two views of a crude robot model made out of cubes.