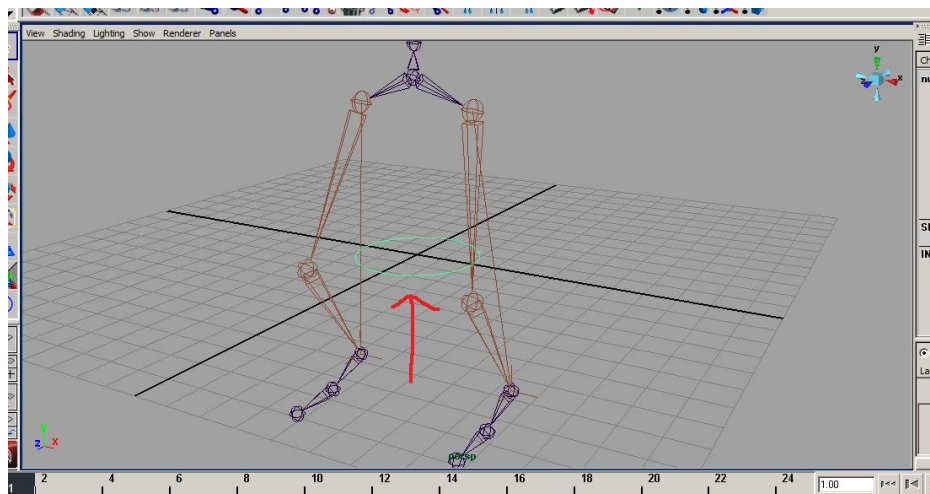


Rigging (Part2): Controlling Your First Skeleton

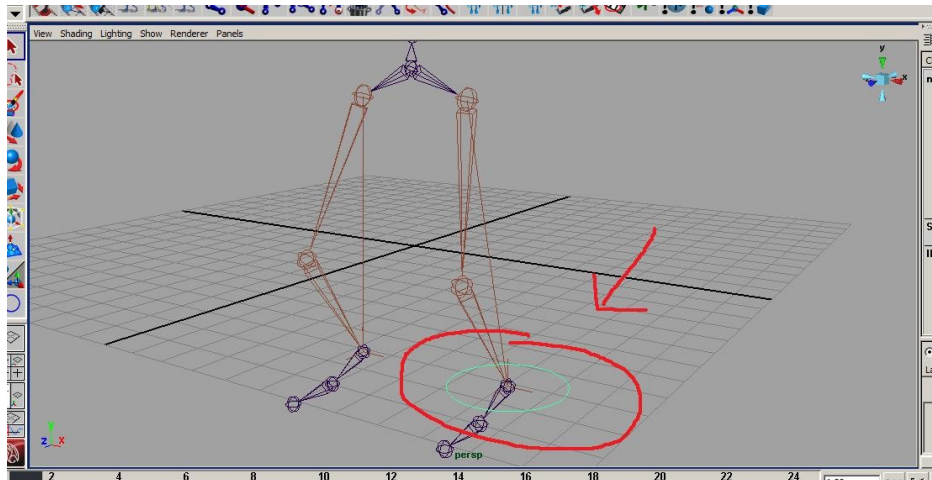
by Gary Wu

Now that you have your skeleton ready for action, we're going to learn how to build controllers to help manipulate and control your skeleton with ease.

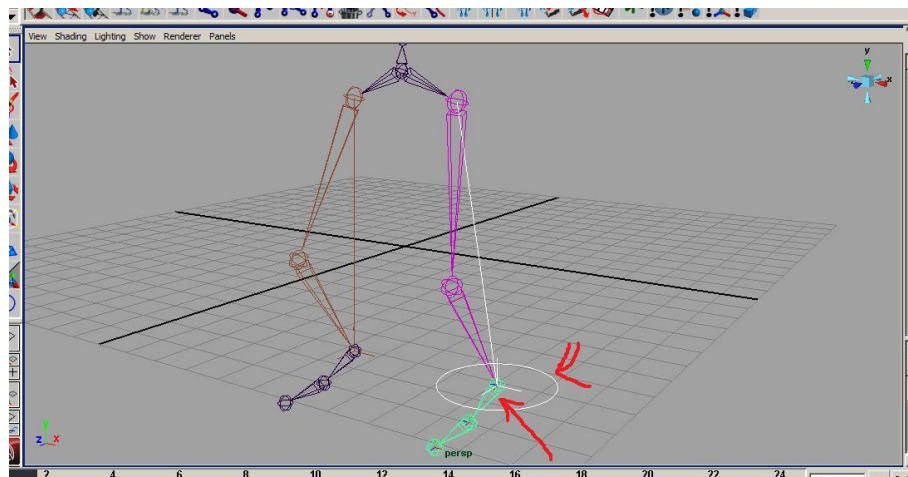
1. Let's start with the lower body setup first. From the top menu, go to Create>Nurbs Primitive>Circle. On the screen create a circle that is roughly the same size of the skeleton's foot.



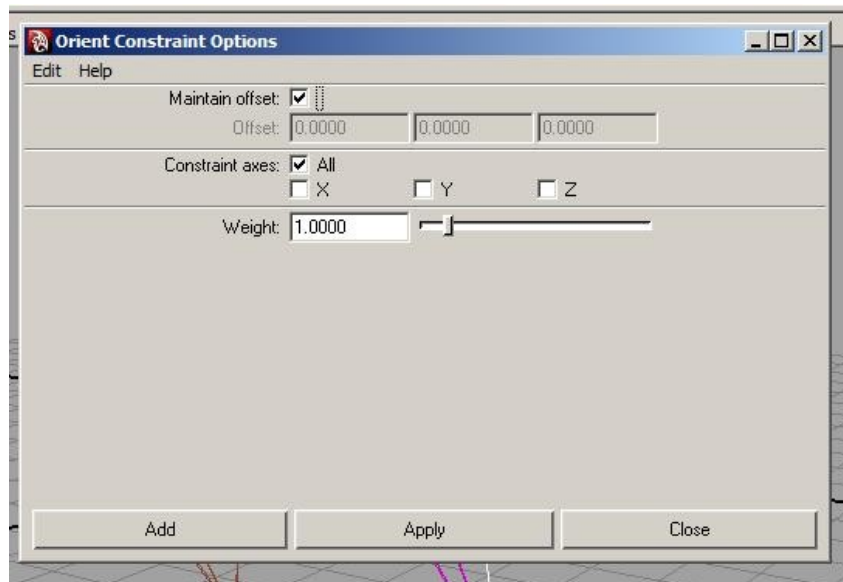
2. Grab this controller and press W (the translate tool) then hold the 'V' button down. This makes everything you try to edit snap to points on your screen. While still holding down 'V', move your circle to your LEFT_ANKLE. Try to match the picture below.



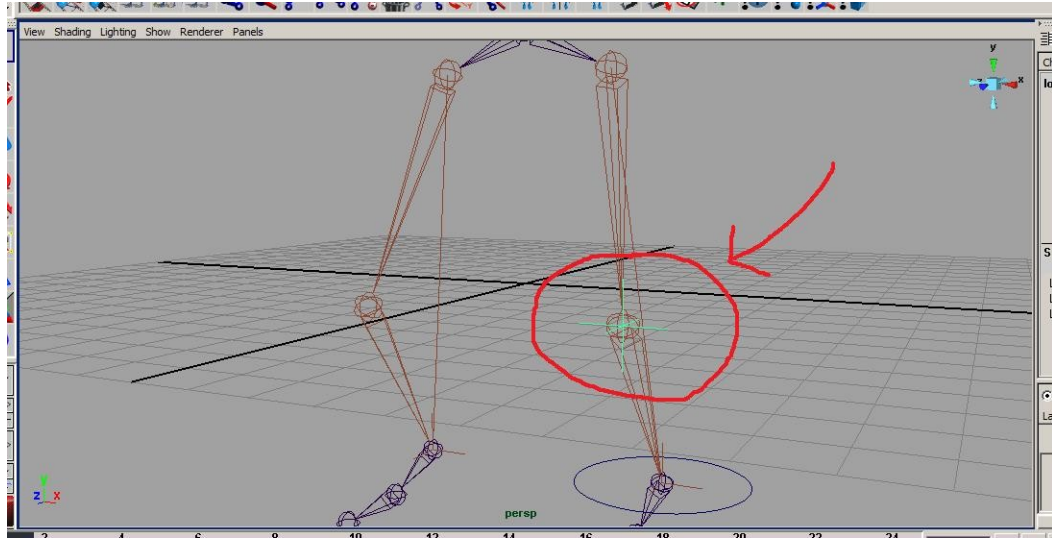
3. Great! Now that your first controller is in place let's hook it up to our skeleton. First select your left leg's IK handle ... then shift+click the circle. Now press 'p'. Notice that if you select your circle and translate it, your leg moves along with it. What you just did is parent the IK Handle to the circle so wherever the circle goes, the IK Handle has to follow. Since the IK Handle controls the entire leg, this means the circle also controls the entire leg as well. Let's give our circle a descriptive name, such as "left_leg_manip"
4. Now let's add more control to our left_leg_manip. We want to be able to not only control the leg of the skeleton but the foot as well. To do this select the left_leg_manip, then shift+click the left_ball joint. It should look like this.



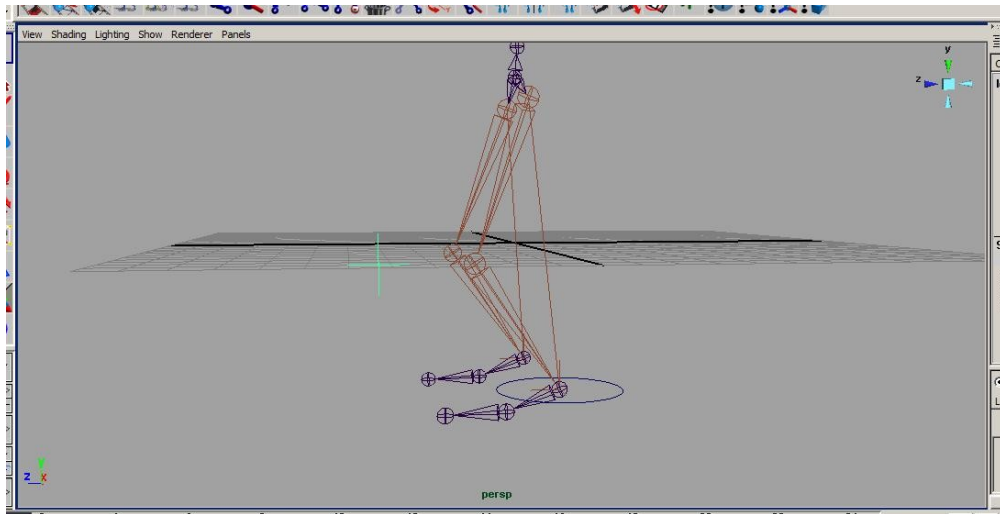
- Next, from your top menu (make sure you are in the animation menu), go to Contrain>Orient>(option box). MAKE SURE MAINTAIN OFFSET IS CHECKED. Set the options as below and hit Add!



- Notice that if you select your left_leg_manip and ROTATE it, your foot rotates with it as well. Remember that since everything in Maya is pretty much keyable, you can now set key frames on your left_leg_manip to control your entire leg instead of the individual joints and IK Handles.
- Another important constraint is the Pole Vector Constraint. This especially applies to your elbows and knees (or any other joints that behave similarly). To create a Pole Vector constraint, from your top menu, go to Create>Locator. A 3d-crosshair should pop up in the center of your grid. Select this locator, press W and hold V. Snap this locator to your LEFT_KNEE joint. Try to match the picture below.



8. Now move the locator a little bit in front of the knee like so.

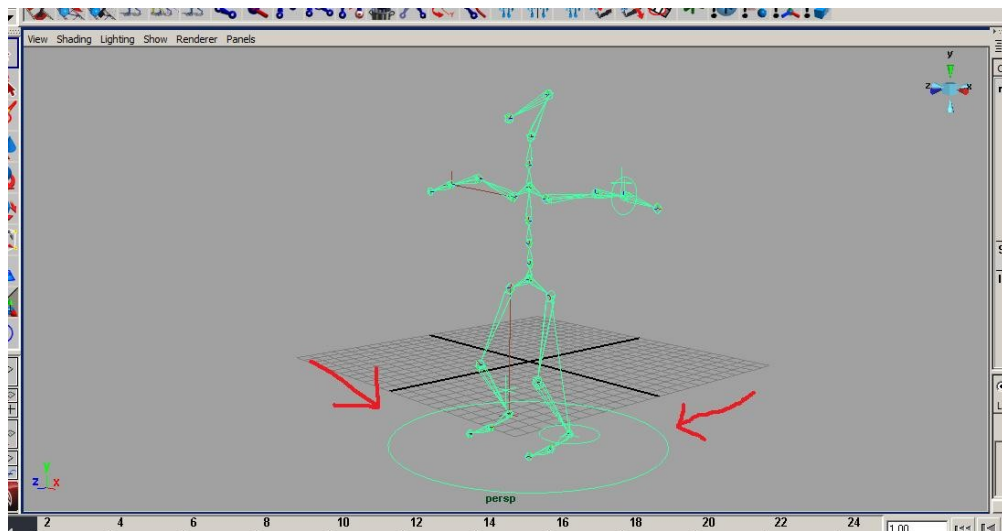


9. Now select the locator, then shift+click the left_leg IK Handle. From the top menu, go to Constrain>Pole Vector. Now select your locator and move it around. Notice that your knee joint in your leg should follow this locator. You can now make your character bowl-legged if you wanted to. Let's give our locator a name like, left_leg_pv.

10. There is no easy way to mirror your controllers to the other leg so just repeat the process with the right side. This is one of the most tedious parts of rigging. You should have a workable setup for your lower body now!

11. The arm setup is basically exactly the same as the leg setup. To run through the process, here's a quick walkthrough.
 - a. First, create a nurbs primitive circle. Move (while holding V) the circle to the left_wrist joint. This should snap to the joint. Rotate the circle by 90 degrees in the X and Y axis. Go to Modify>Freeze Transformations.
 - b. Name this circle, left_arm_manip
 - c. Select the left arm IK Handle, then shift+click the left_arm_manip and press 'p'. Test that your left_arm_manip now controls your entire arm movement.
 - d. Now, select the left_arm_manip, then shift+click the left_hand joint. From the top menu, go to Constrain>Orient<(option box). Make sure MAINTAIN OFFSET is on. Click add. Check to make sure that if you rotate your left_arm_manip, your left_hand joint rotates with it.
 - e. Create a locator by going to Create>Locator. A crosshair should pop up in the middle of your grid. Move (while holding V) this locator to your left_elbow joint. This should snap pretty easily. Move the locator a little bit behind the elbow. Name this locator, left_arm_pv.
 - f. Select the left_arm_pv, then shift+click the left arm IK Handle. From the top menu, go to Constrain>Pole Vector. Check to make sure that your left_arm_pv now controls the movement of your left_elbow joint.
 - g. Repeat for the right-side and you should now have fully functioning and keyable arms.

12. Another really useful controller is the MASTER MANIP. What this manipulator does is just translate your entire skeleton. To do this, go to Create>Circle and create a circle about as wide as half your character's height. Move this circle down to where your skeleton's feet touch the theoretical floor. Try to match the picture below.



13. Next, rename this circle to master_manip. Now parent your COG joint to this master manip. Also, parent all your other manips and locators to this master_manip. To parent the COG joint, select the COG joint, shift+click the master_manip and press 'p'. Do the same for the rest of your manips. When you are done you should notice that everything should turn green when you click on the master_manip. Translate this master manip and you should notice that your whole skeleton (controllers and all) move along with it.

14. As a final exercise, create a hip manipulator that controls your COG joint. This is as simple as creating a circle, snapping it to your COG joint, and point constraining your COG joint to your hip manipulator circle.