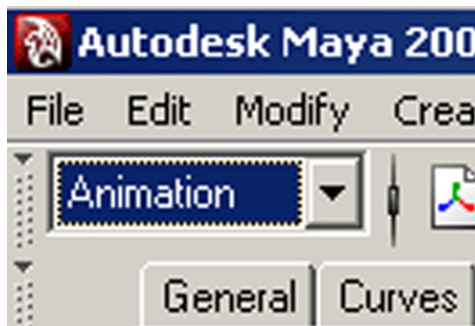


## Character Rigging Tutorial

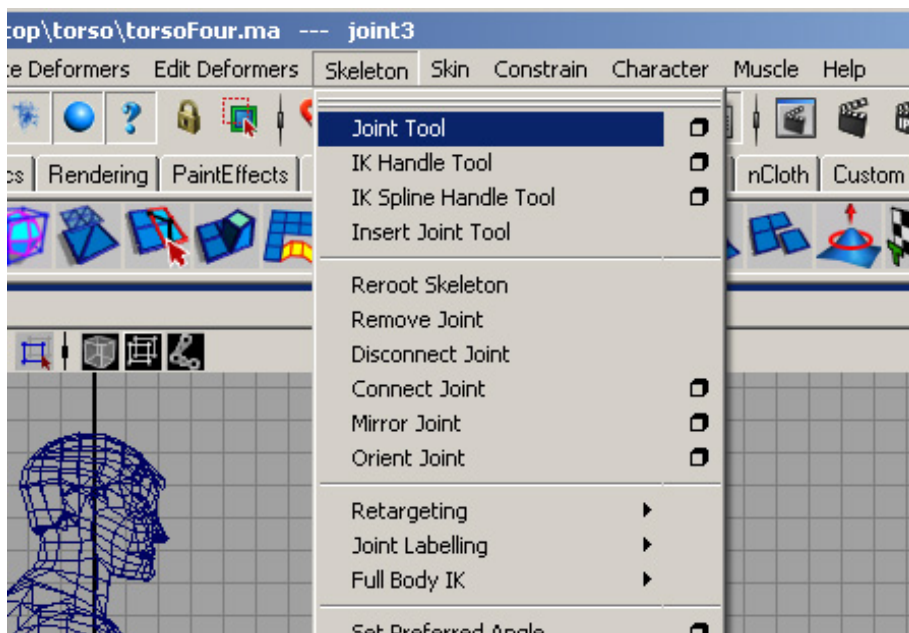
Rigging a character is creating the bones and a substructure so you can animate your character. Creating the rig is the last step before BINDING your character. Once you have bound your character YOU CAN NO LONGER DELETE THE HISTORY OF THE BOUND CHARACTER. Doing so will delete the bind.

Before you can start creating a rig there are a few things you have to do to your character model. Make sure you have no border edges or tears in your model, or else when it moves these tears will become apparent. Make sure you are 100% satisfied with your character, you cannot go back and make major changes without redoing your rig, and it is not something you want to make more than once.

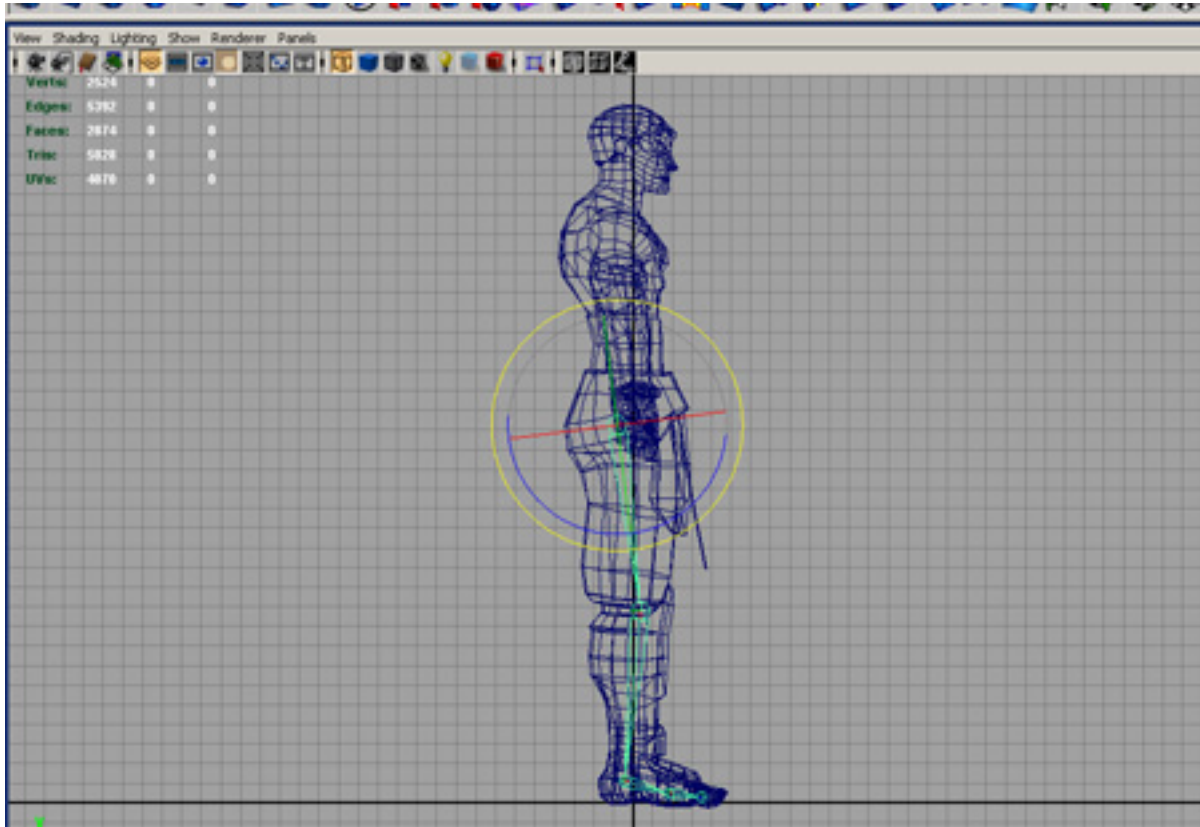
Make sure you are first in the animation tab in Maya, as all of the tools are there.



I personally start with the legs when rigging, by going into the Four View you can then choose by pressing the spacebar to take a full window view of one of the four angles presented by the Four View. Then choose the SKELETON MENU-JOINT to bring up the JOINT TOOL .



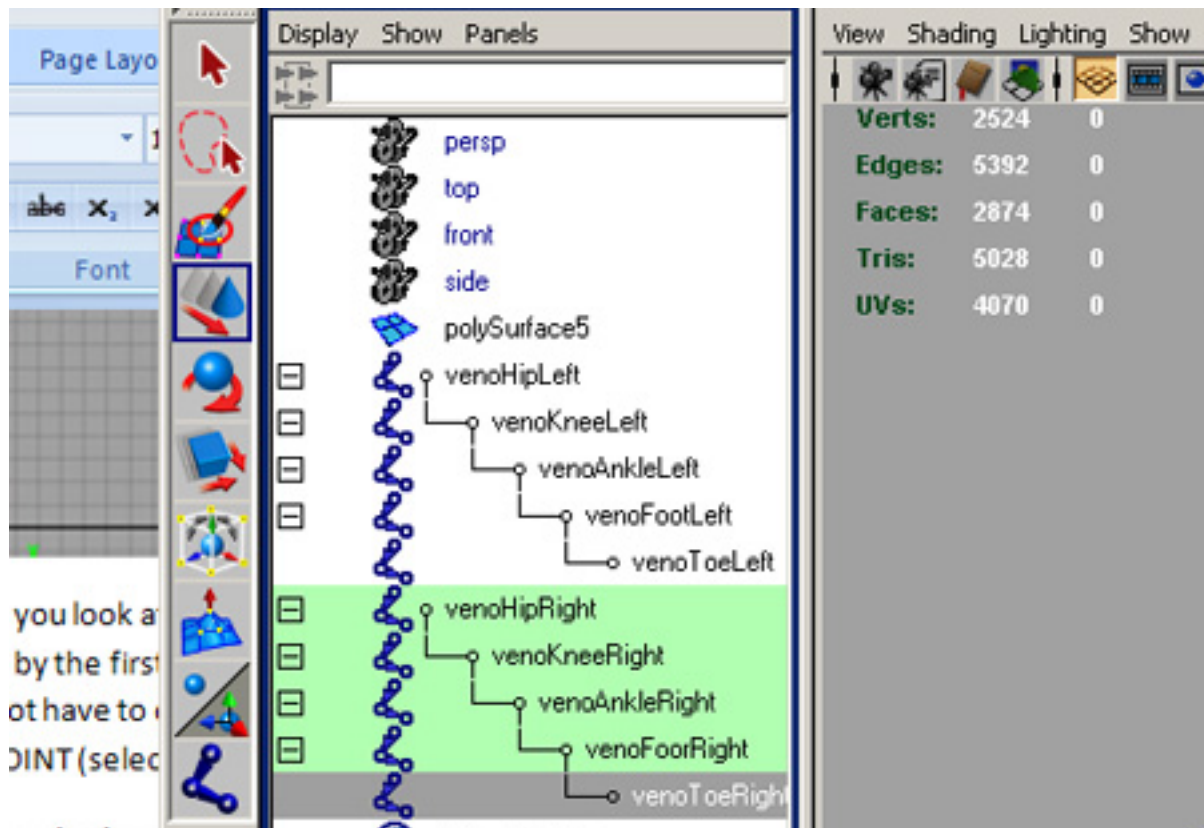
Create a string of joints by clicking where you want them. Create one for the HIP, one for the KNEE, one for the ANKLE, one for the INSTEP, and one for the TOES. Finish the tool by pressing enter.



If you look at this in your Perspective View you will notice that this joint chain is outside the model, grab it by the first Joint of the chain and move the string to where it belongs. Now for some tricks, you do not have to create and line up another Joint String, we can just duplicate it using SKELETON-MIRROR JOINT (select with box) and choose to mirror across the YZ axis.

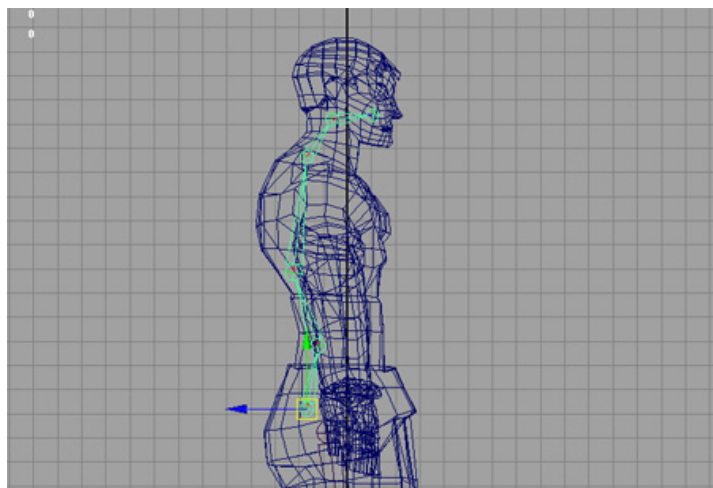
Naming is very important for rigging, and creating a naming convention is of utmost importance. So we are going to go into the Outliner and rename all of our leg joints. Just double click the joint, in the outliner, and rename it. You cannot start the names in the Outliner with a capital letter. I take the initials of my character/body part/left or right leg and rename thusly. So for Venom's right hip I would rename in "vHipRight" if I had another character in the same scene who's name started with V I would have to go deeper in the name "venoHipRight". What is most important is that you know who the joint belongs to and what it is associated with.

Rename all of your leg joints at this time.



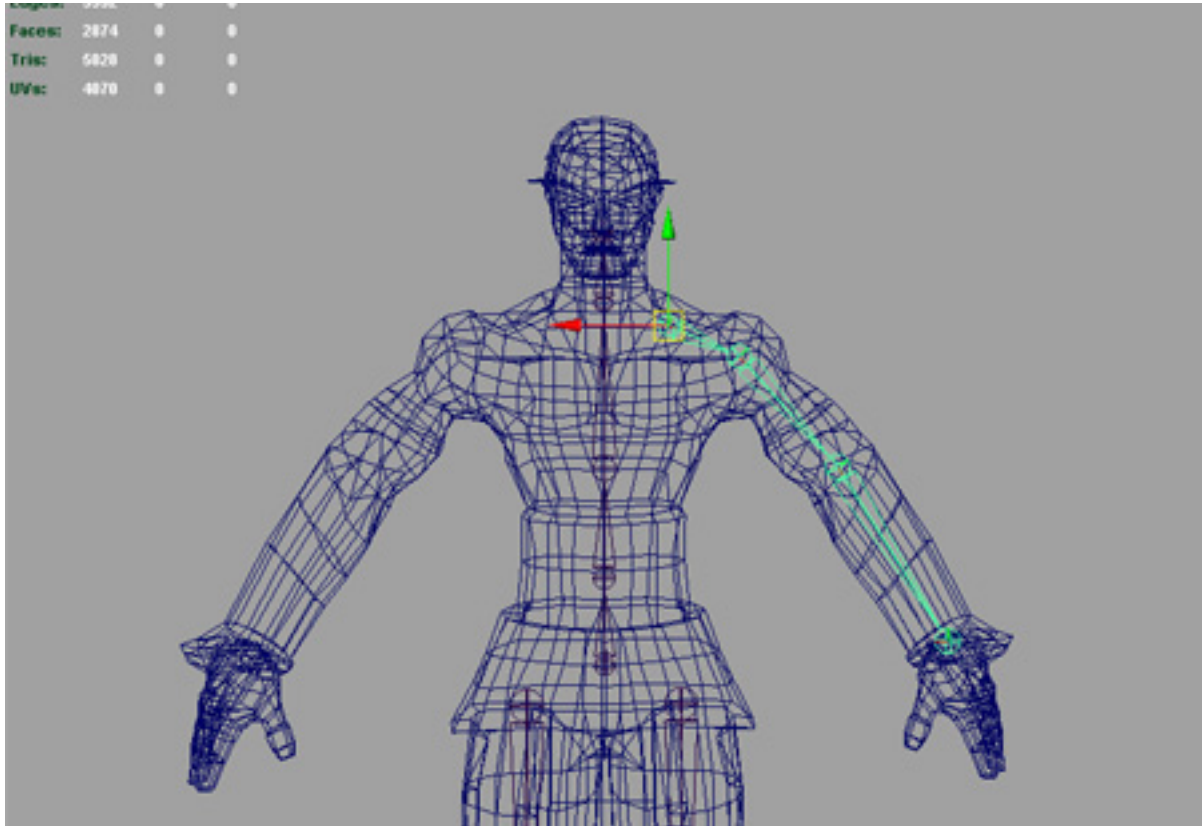
The next step is creating the Spine. Instead of creating the Spine down from the head we start at the HIPS and start up. For a game we do not need the same amount of joints as we have bones in the spine, I do the HIPS, a LOWBACK joint, a MIDBACK joint, an UPBACK joint, a NECK joint, and a FACE joint. For this tutorial we will not be doing a mouth, but that is only 1-2 more joints depending.

Once again from the Side View via your Four View put the bones in the back and rename them in the Outliner.



I named my Spine Joints “venoHips”, “venoLowBack”, “venoMidBack”, “venoUpBack”, “venoNeck”, and “venoFace”.

Next is the arms, I do this from the Front View via the Four View. You need four bones for the arms, collar bone, shoulder, elbow, and wrist. We will do hands later. You will have to reset where the bones are placed by selecting the joint you want to move and hitting the Insert button, this will let you move the joint, hit insert again when you are done, DO NOT ROTATE THE JOINTS INTO PLACE. Rename your joints in the Outliner. Clavicle, Shoulder, Elbow, and Wrist are my usual names.



Mirror your joints, just like you did your legs.

Now that we have all of the bones put in place we have to put them all together. Open up your Hypergraph under WINDOW-HYPERGRAPH: HIERARCHY. Once your Hypergraph is open go to OPTIONS-LAYOUT-FREEFORM LAYOUT. This will allow us to manipulate objects inside the Hypergraph.



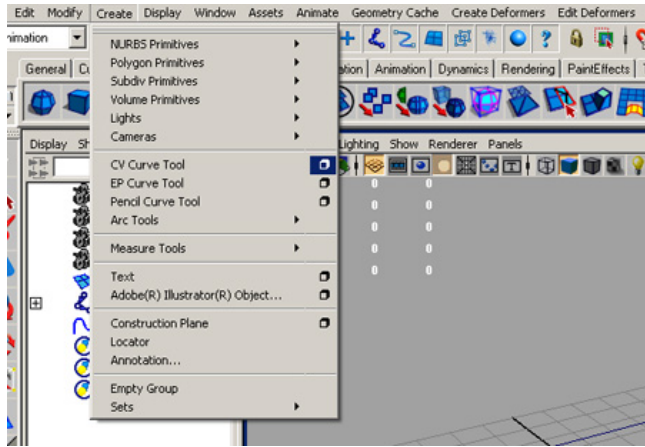


With this layout the Hips will be our Root object, or the object that all other objects are connected to. So you can select the hips to select all of the joints. We will create another Root object called ROOT, that will let us scale and move our whole model.

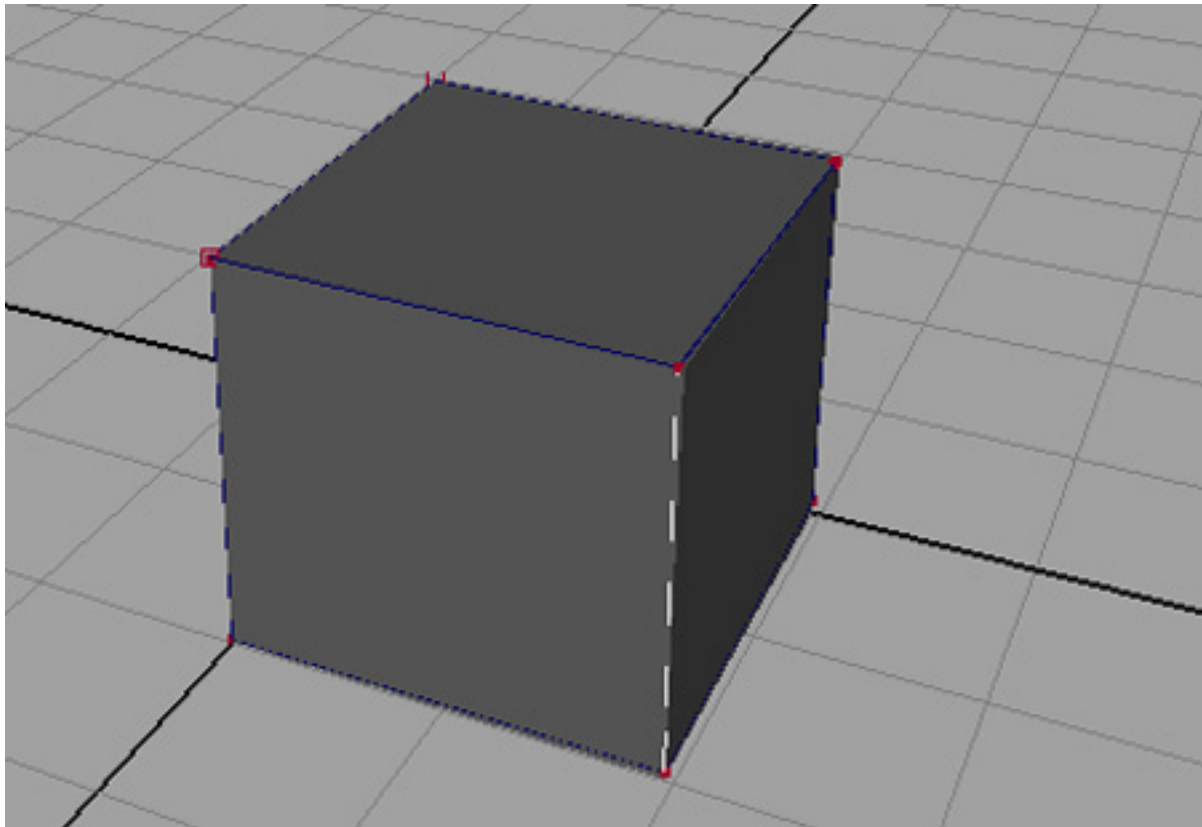
I make a new Joint for the hand. Then continue it down with a joint at the first knuckle, and then the second knuckle, two knuckles is enough. I detach those two knuckles, and duplicate them and put the joints where they belong in the other fingers and thumb, make sure you move your joints by pressing the insert key. This will take some time, be patient and work it out, start where you think will work for you angle wise. Connect your hands to your wrists.

Now that the easy part is over, let's move on to the hard stuff. Control Boxes and the rig.

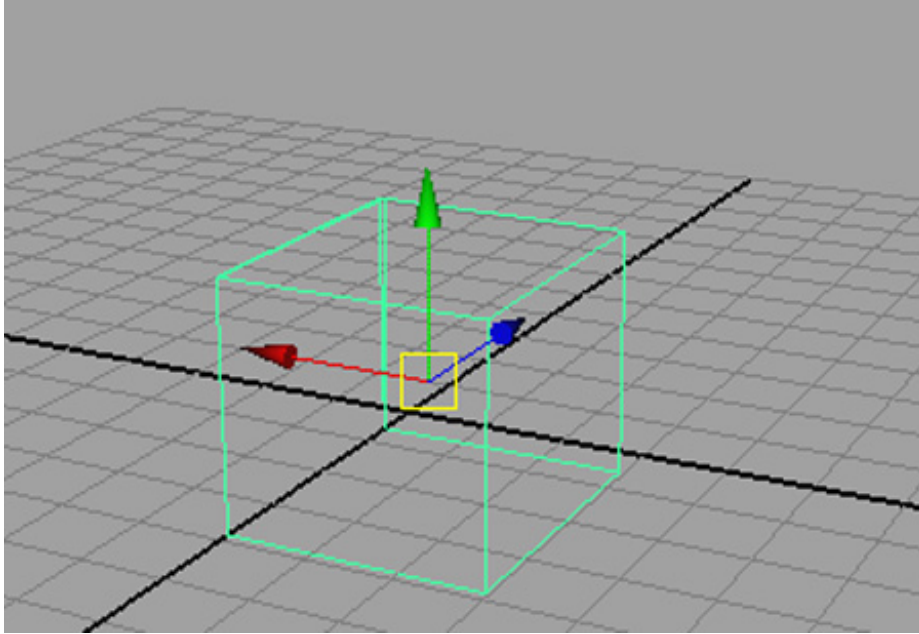
First we have to make some non-renderable moveable boxes. First we create a 1x1x1 polygon cube, drag it out and make it as square as you can get it without spending over 30 seconds. Now we have to outline the cube using a CV curve, go to CREATE, CV CURVE TOOL (select the box tab and make sure your Curve Degree is set to One, so you create a Linear Curve).



Create a curve on your polygon box by holding the “c” key on your keyboard, and clicking on the corners on your box until you have recreated all of the sides of the box. Then delete the polygon cube. Select your box made of curves and MODIFY-CENTER PIVOT.



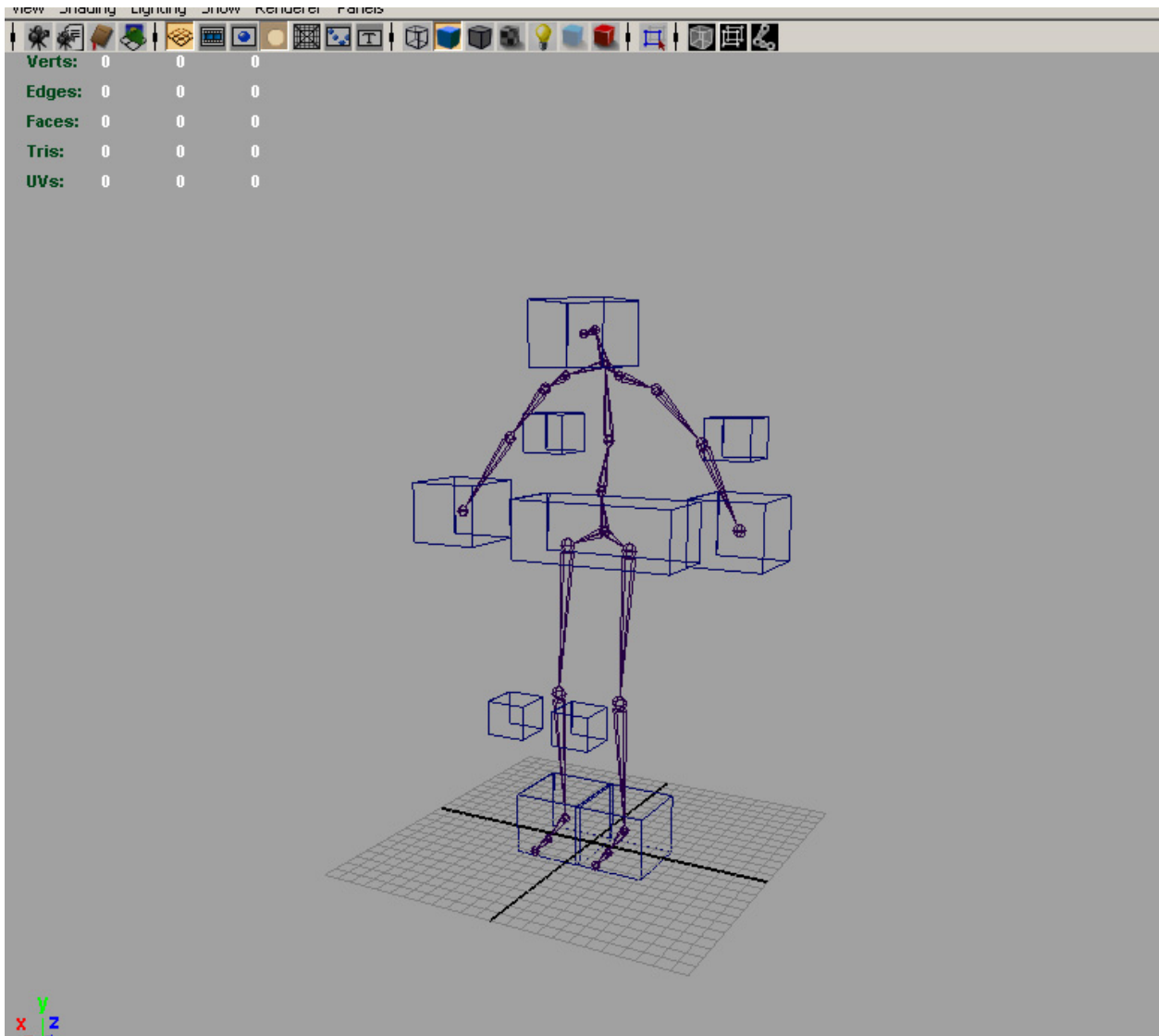




Duplicate your boxes until you have 10 boxes, and start moving them and placing them certain joints in your characters skeleton.

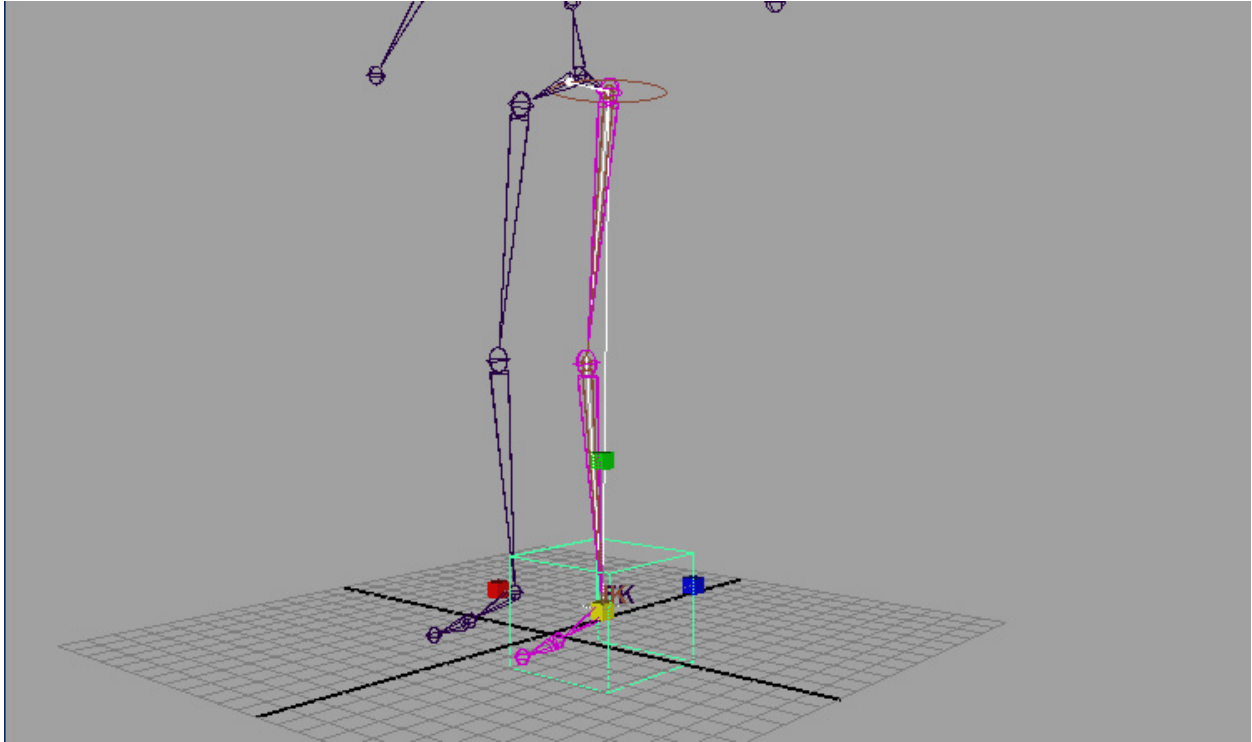
Place a box on each wrist, each elbow, each ankle, each knee, the hips, and the face. By holding "v" you can snap to the exact middle of the joint. Once all of the boxes are placed at the appropriate joints take the knee boxes and translate them forward slightly, do the same with the elbow but translate them back, and translate the face box forward too.





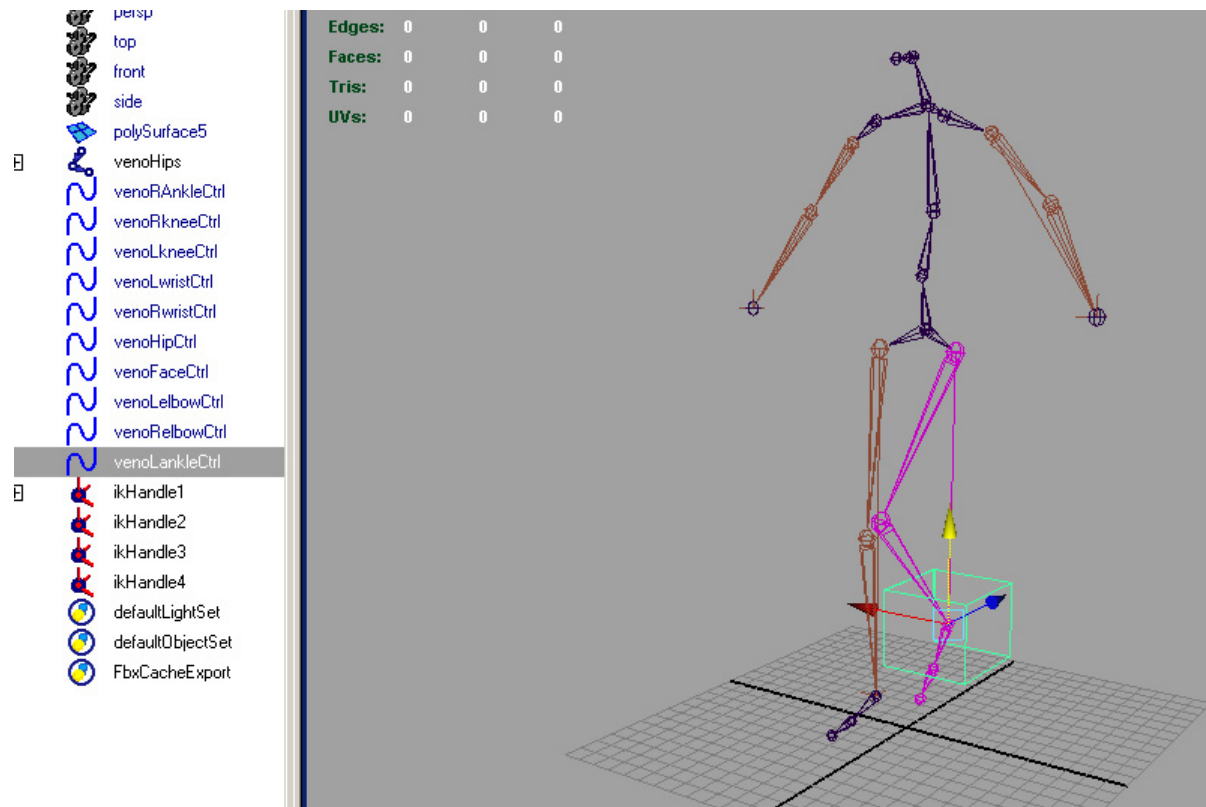
Once this is done you MUST FREEZE THE TRANSFORMS OF ALL OF THE BOXES, and not move them again. If you have any history or information on these boxes your rig will be very wonky. At this time rename all of your boxes, I usually name mine something like this “venoRkneeControl”. I know what character this is for, if it is right or left and what it controls.

Now we have to create some IK Handles. Select SKELETON-IK HANDLE TOOL and make sure “ikRPsolver” is selected. Then select the hip of a leg chain then the ankle of that same leg chain to create an IK handle.

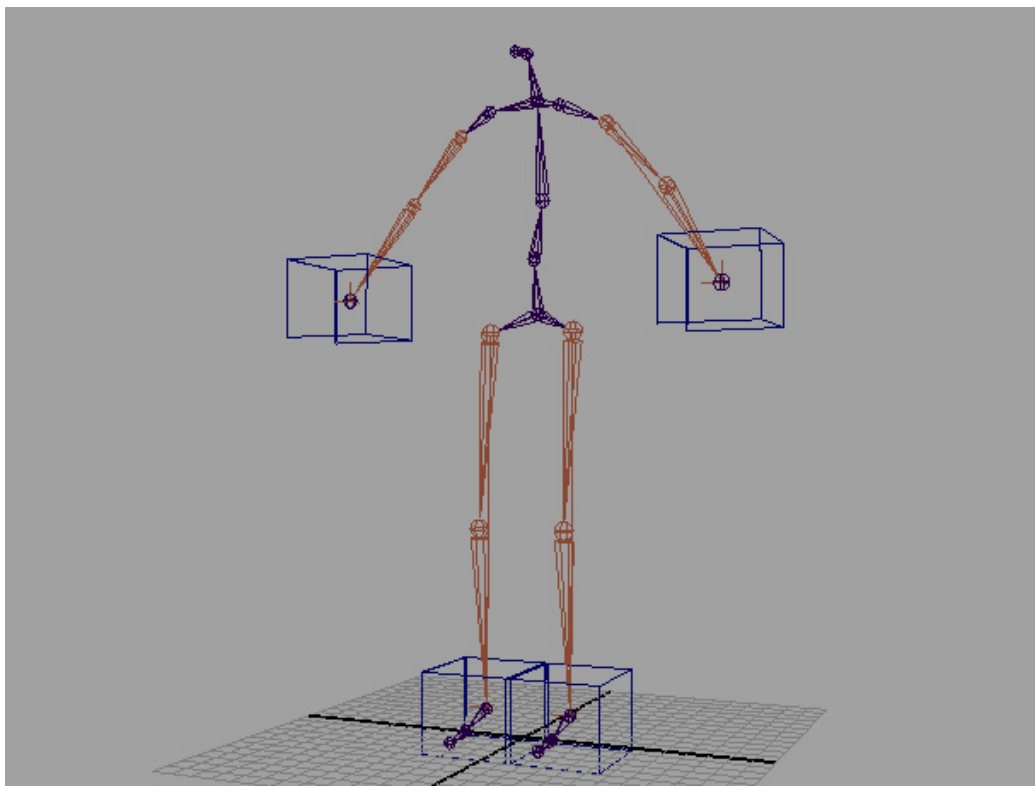


If you see a circle around the hip joint you have done this correctly. Do this same technique to both legs, and then from the Shoulder joint to the Wrist Joint of your arms.

Now we have to attach our IK Handles to our Control Boxes. Select the Control Box associated with the Right Ankle in the Outliner, then the IK handle associated with the Right Leg, then select CONSTRAINT-POINT CONSTRAINT. The letters TK should appear around the Ankle Joint. Grab the Control Box and move it up and down to see if the constraint worked, then take it back to its rested position.



Do this same thing with the other leg and both arms, first selecting the control box and then the appropriate IK Handle in the Outliner. It should look something like this when you are done.



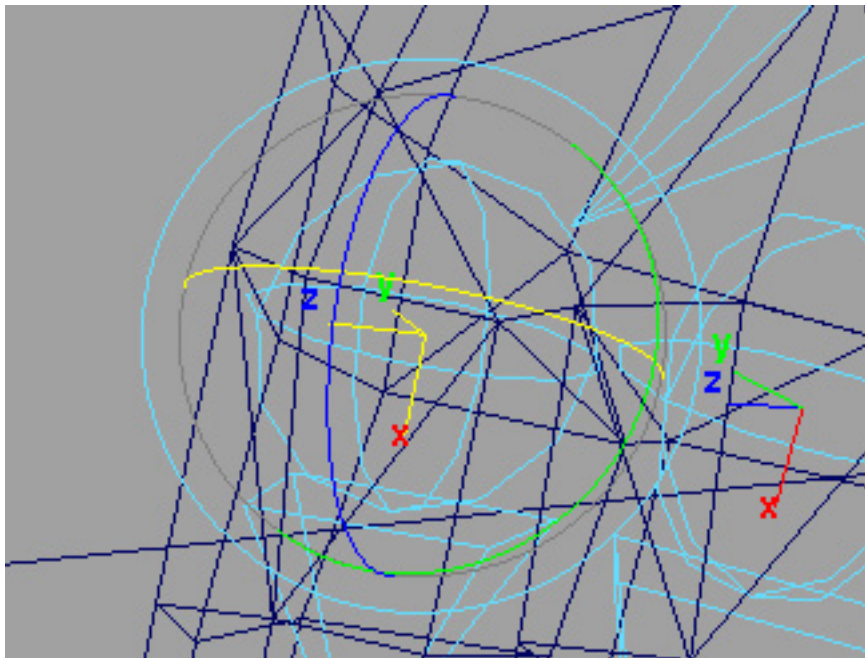
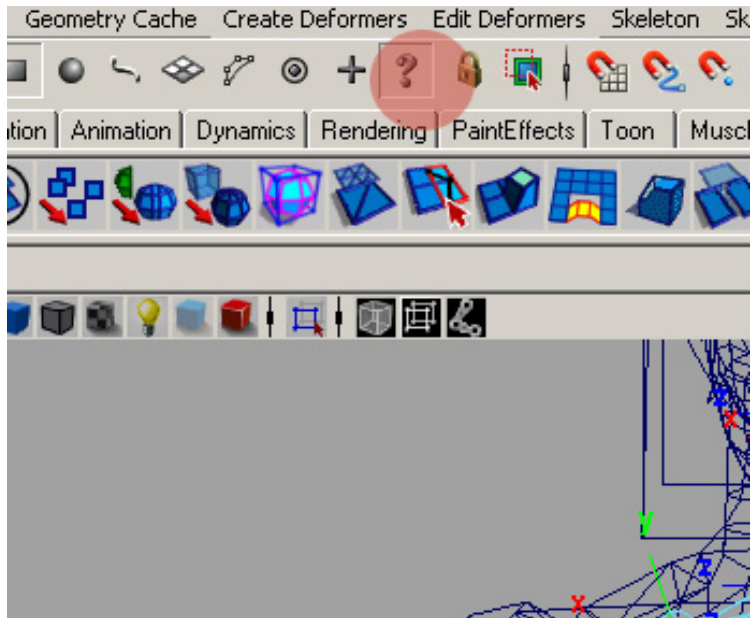
Now we have to make it so our Knee Boxes can control the knees. Select your Right Knee Control Box, then the IK Handle in the outliner and select CONSTRAINT-POLE VECTOR. This will allow you to move your characters knees back and forth. Do this with both knees and both elbows. You may have to move things in your Outliner so you can do a multiple select of just the two objects. You can do this by moving the object by selecting and dragging with the middle mouse button.

The next step is to select your Neck/Face Control Box, then your Neck Joint and use CONSTRAINT-AIM so that when you move that box your head and neck will follow.

Another option for the neck is to create a control curve. CREATE-NURBS PRIMITIVES-CIRCLE. This will create a non-renderable circle. Center the pivot, and snap it to your neck joint, at this point you should FREEZE TRANSFORMS. Un-attach the neck joint from the joint below it and above it, do this by selected what you want to deselect in the Hypershade and middle mouse dragging the object to the background instead of an object. Select your NURBS CURVE, then select your NECK JOINT and do CONSTRAINT-ORIENT CONSTRAINT. Now reattach the joints back to the NECK JOINT. Rename your curve so you know what it does, I suggest something like "NECK CONTROL", sheesh, I have to do everything for you guys.

Now for the hips, first un-parent both leg chain hips from the main hip joint, do the same with your lower back joint. Do this by selected what you want to deselect in the Hypershade and middle mouse dragging the object to the background instead of an object. Now select your Hip Control Box then your Hip Joint. Before we re-parent the hips select your Waist Control Box, then your un-parented Hip Joint and do a POINT CONSTRAINT, and an ORIENT CONSTRAINT. Parent the hips and back to the Hip Joint, now rename your Hip Joint to ROOT.

Select your Hip Joint now, then select SKELETON-ORIENT JOINT. This will make rotating the joints easier down the line. After the joints are orientated, we have to go in and manipulate some by hand, press F8, and that will put us in component mode, then press the "?" tab on your hot bar in Maya. Now you can select the ZYX tangents for each Joint and rotate them so they line up where you need to rotate them. Fix the Joints in your fingers, and in the back so they will have clean rotations.



Once you are done un-press the "?" key and press F8 again to take yourself out of Component Mode.

Now let's do a few things to make using this rig a bit easier to use. Select your ROOT and press CONTROL/G, this will create an empty group. Rename this ROOT GROUP. Parent your Knee Control Boxes to your Ankle Control Boxes, and your Elbow Control Boxes to your Wrist Control Boxes, then your

Wrist Control Boxes to your Waist Control Box. Parent your Hip Control Box, Wrist Control Boxes, Feet Control Boxes, and Head Control Box to the ROOT GROUP. Now you can select that empty group and Translate and Scale your whole model.

