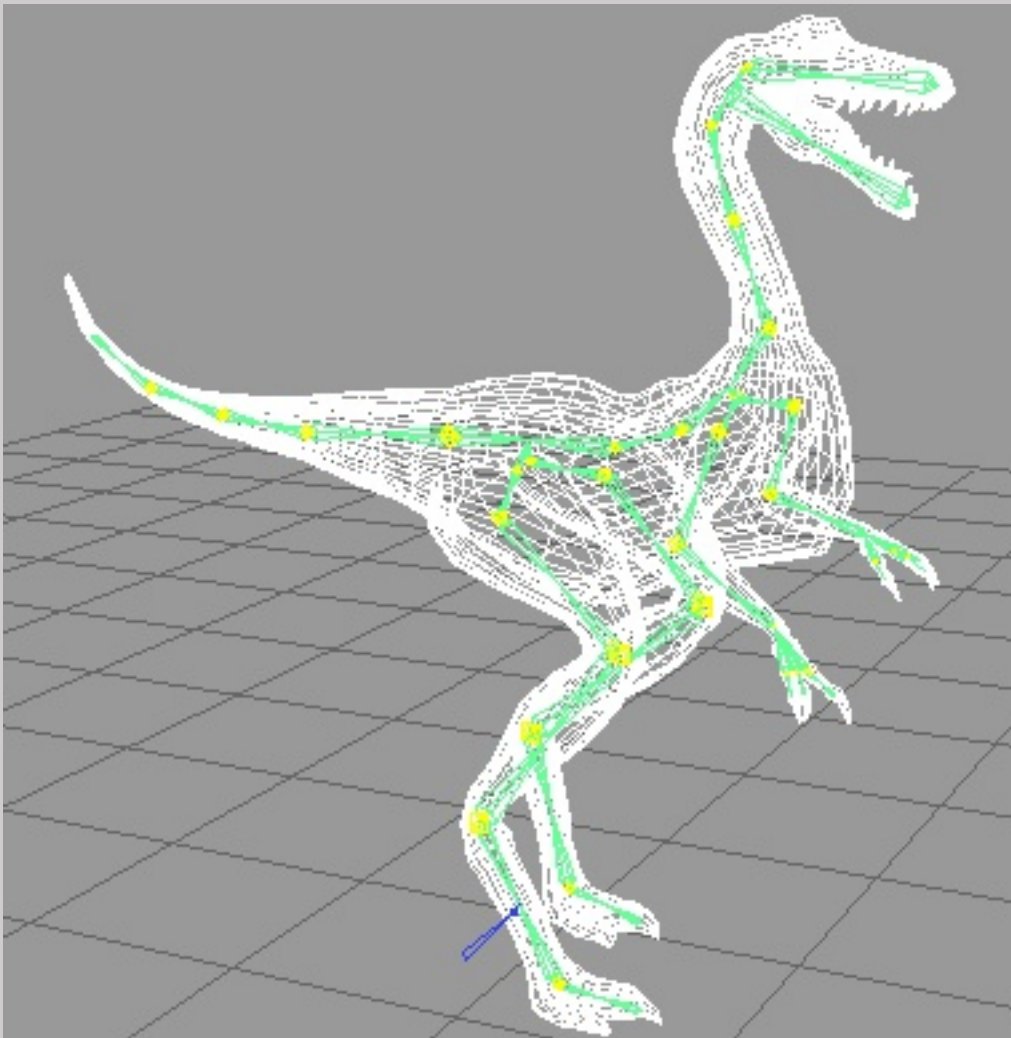


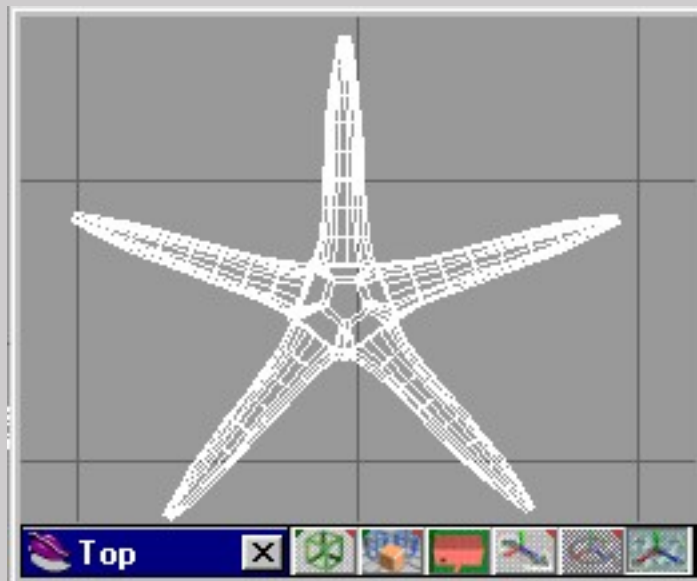
# Bones © Chris Tyler






Even the word sounds basic doesn't it? Well, this tutorial is the basics. If you are just starting out and have never even seen a CG bone, this is the place for you! In order to make this as painless as possible, I will NOT be showing you how to bone the dino models from the image above- see the image below as well:

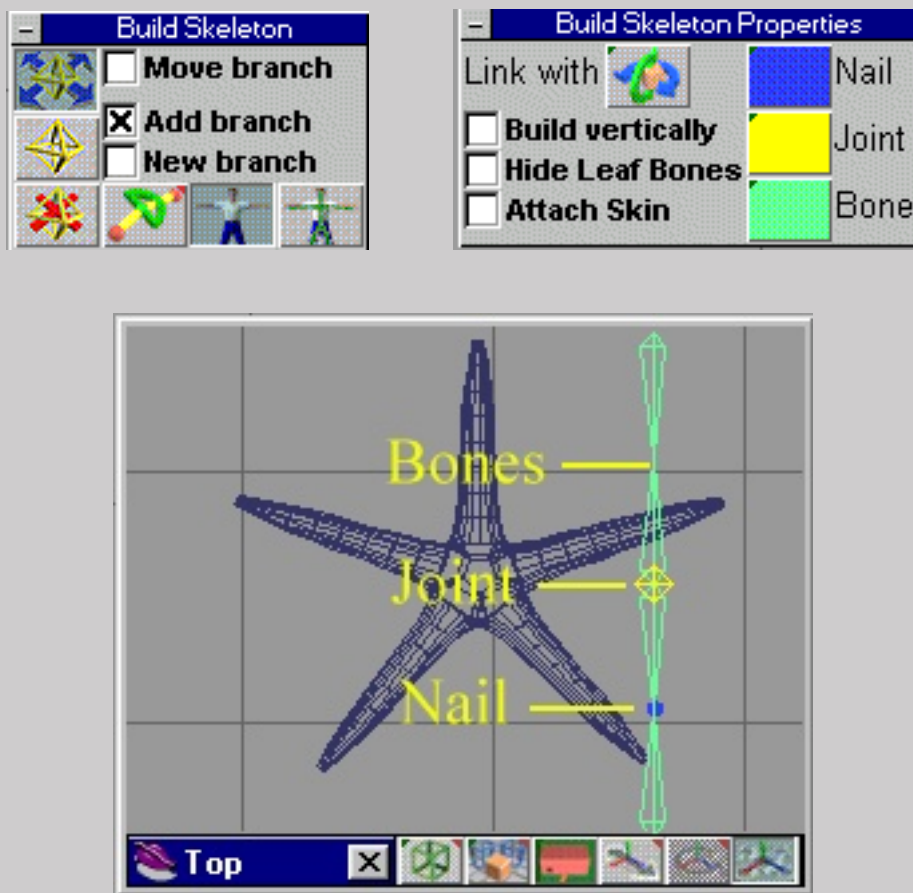


The dinos in the image at the top were made from this model. Each one was meticulously moved and posed keeping the flesh integrity and muscle mass intact using the very same techniques that are given here. The model can then be animated through each of its moves as your artistic talents are applied to realistic motion, now that a realistic model is in your toolbox. Interested? Then let's get down to basics:



Begin with a model. If the model has limbs like this starfish, they need to be attached. The model you want to bone needs to be one complete mesh. (you can have glued parts) This will take a little getting used to for those of us who have jointed everything, but the results of bones and skinning is what we were waiting for. You will be able to easily apply the techniques from this lowly starfish of only ten bones and five joints to the more complicated but rewarding dino or human of 41 bones or more!

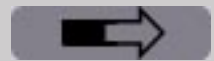
You can begin one of two ways; with the "Add New Bone" tool;  which just gives you one single bone, by itself, which you must add joints to using the "Add Custom Joints" tool  OR the way I will use here, which is to select the "Build Skeleton" tool.  .When you do that, right click on the tool as well to bring up these two boxes:



First of all you want to select the type of joint you want to use for each of your bones and limbs. In the properties box (above) select your choice in the "link with" button. The joints work like IK in the earlier versions of TrueSpace so if you are unsure of this, check the manuals. Here, I want the little dude to be very flexible, so he gets the multi-rotational 2D spherical joint. Also in the properties panel, select which view you want the bones to appear as, vertical or leave it unchecked for horizontal. then just click on the screen to get a bone and joint set.

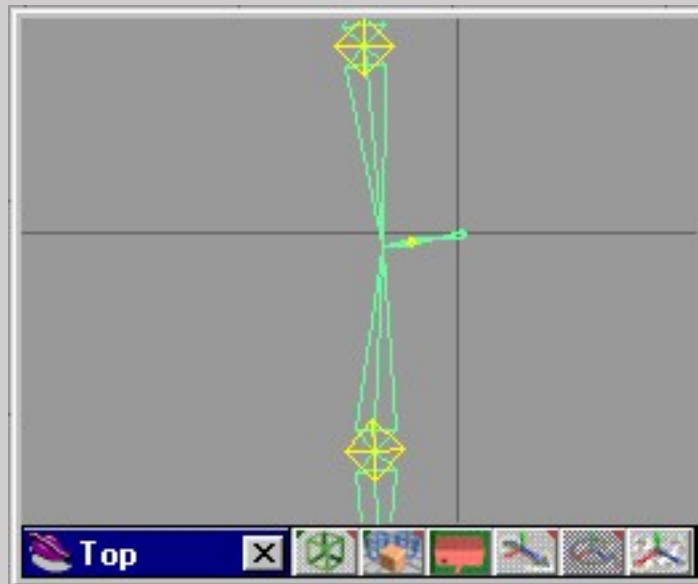
Note: when I was trying to figure this all out, this part almost drove me crazy, being new to these concepts myself, so here's a few little brain savers that I hope also will be time savers for you (wish I had known them ;) In the "Build Skeleton" Box (above) there are

three buttons on the left, (from top to bottom) the "Move Joint", "Add Joint" and "Delete Joint". Watch these little guys. The "add joint" button loves to come on when you don't want it to. Here's what I do. I add my first bone section. then I make sure I turn off the "Add Joint" button. Now only "Move Joint" is on, and I can manipulate my section where I want it, resize it, whatever. ( You may need to double click on the "Move Joint" button to reactivate it.)



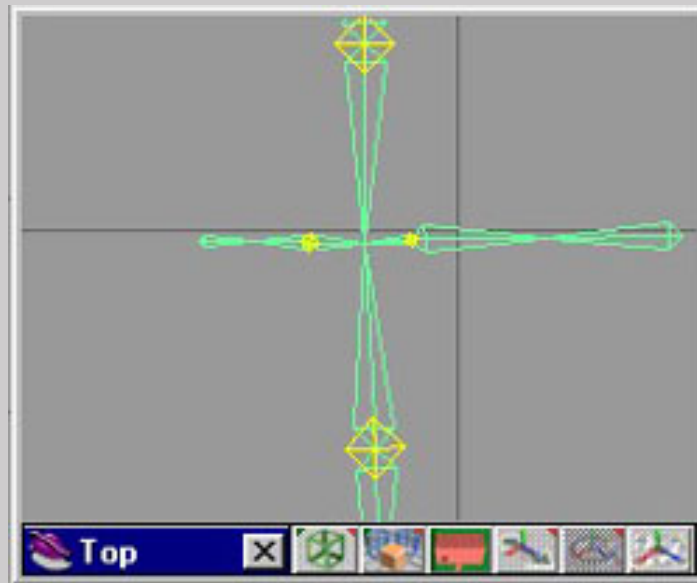
## Bones © Chris Tyler

Next, to add just one section to what you already have, simply recheck which type of joint you want in the "Skeleton Properties" box, (the starfish is going to be all the same joint type) , turn on the "add joint" button in the " Build Skeleton" box and just click on whichever end you want. POOF! a new bone and joint is added!



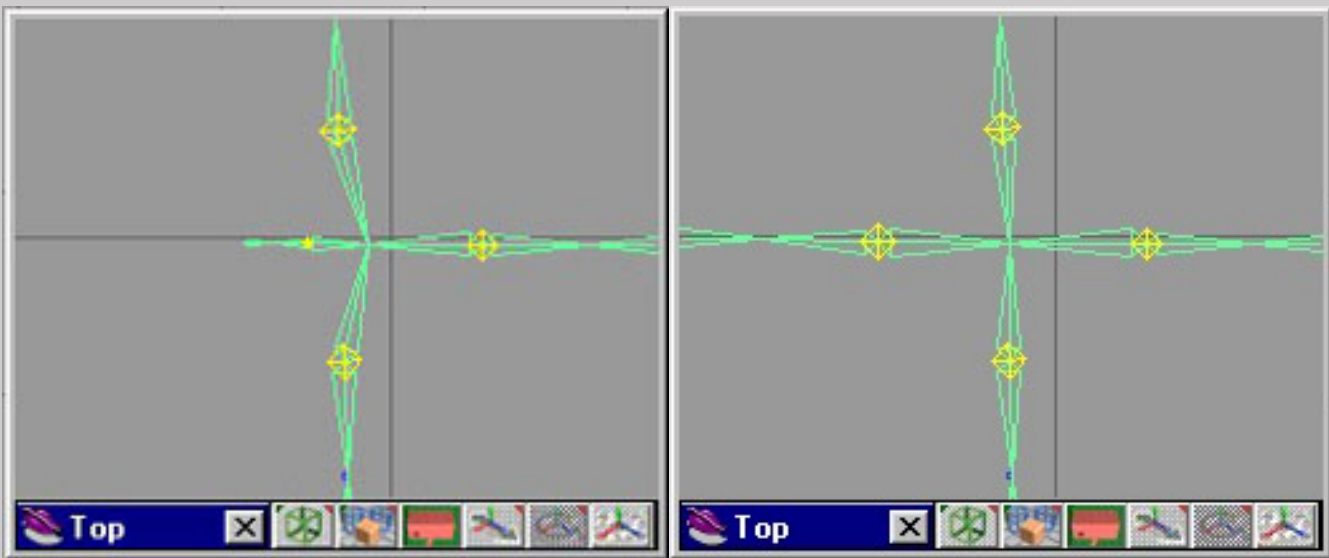
That done, let's get to the serious part of bone building. Adding branches is a vital technique used for hips, shoulders and hands etc. Just remember to keep those "Add Joint" and "Move Joint" buttons under your complete control and this is not too hard. I have removed the starfish mesh so you can see everything, and this is easy since you know it just has five equal arms from a central base. You only want to bone what you are going to move, so keep them simple. Now in the "Build Skeleton" box, check "Add Branch" that will automatically turn on the "Add Joint" button, and just

make sure you have your joint type selected as well. Click on the **SIDE** of the bone center that you want to add the branch. Don't touch the existing bone, but move the mouse away somewhat. You may even want to zoom in or enlarge the bone segment you are working on. TS will then more readily put that bone right where you want it.



Now turn off the "Add Branch" button, if you want, and re-activate the "move joint" button, if you need to. Resize the arm you just added, add a new joint and segment on the end; if you need to. Then return to the mode we were just in and get ready to add another branch. Recheck that option now. (If you wanted to begin another part of the skeleton totally new, you could select the "New Branch" option) but for now we just want to add a branch to what we are already working on. Go to the left side and off to that side click on the working window for a new arm.

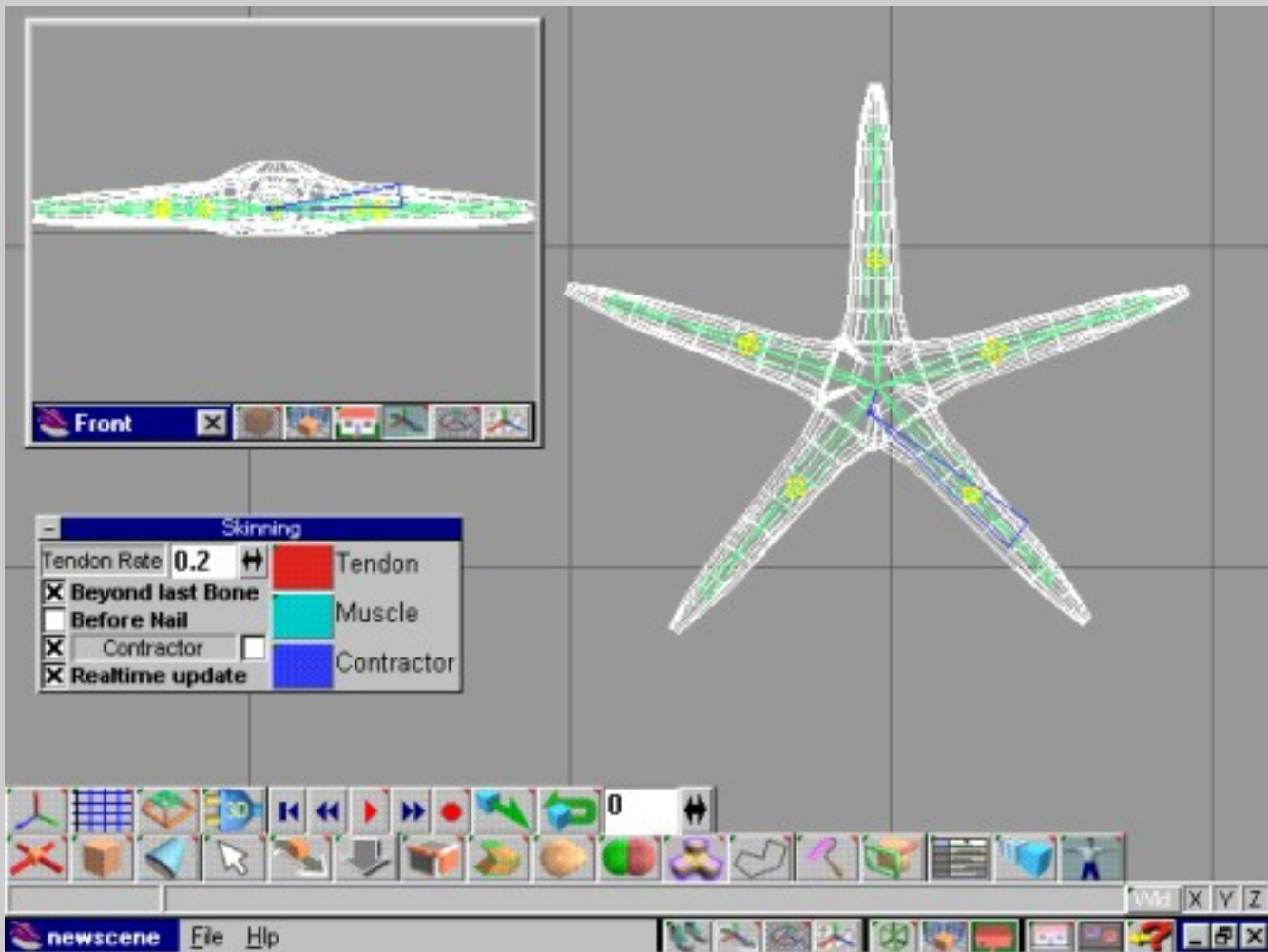





Do this for each of the other arms in turn. Going back to the center bone segment, clicking a little away from it to create a new arm. If there is any confusion in TS with the branch wanting to start from the last arm, resize the central segment and move the other arms out of the way. TS wants to go to the closest bone oftentimes, so make your choice too big for it to ignore.

Now resize the arms to make them even and move the whole new skeleton inside your mesh. (see below) Then click on the object arrow to take your whole skeleton out of build mode. If not done already, move the nail to the center segments; now one solid mass of five branches. the nail will keep this part still while you move the arms for posing and animating.



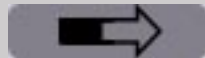
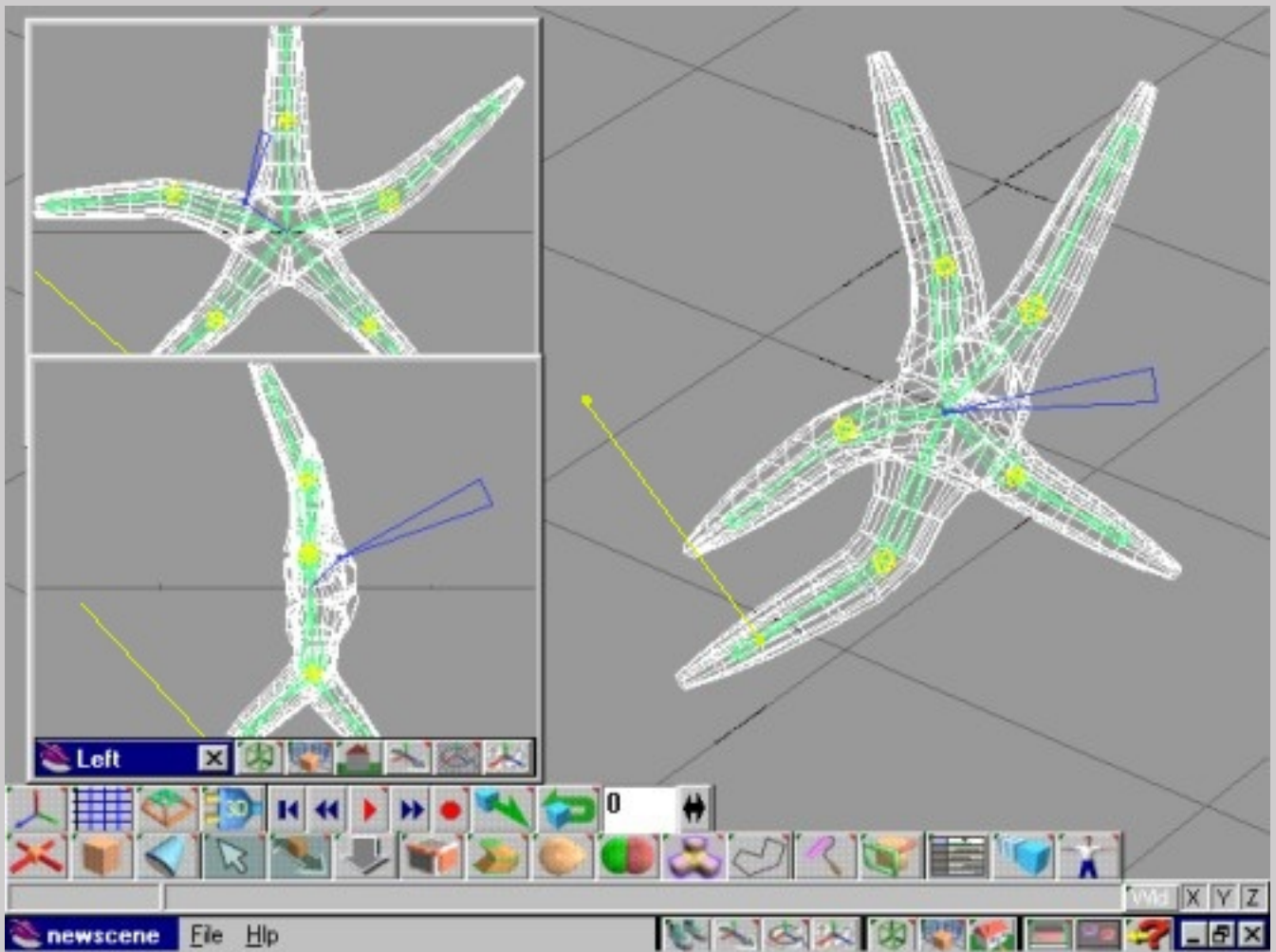


Lastly in this building section you are now ready to skin the whole. Select the "Skin" option  A glue bottle will appear, just click it on your mesh. For ease of use later, try to make sure that your skeleton is COMPLETELY encompassed by the mesh- nothing sticking out. If anything is, or you are not sure, check the "Beyond Last Bone" option in the "Skinning" panel. This will allow for that potential problem. Skinning will attach your skeleton to your mesh at points (vertices) of it's own choosing. In a model this simple, you will find TrueSpace's choices more than adequate for animation. Skinning causes the mesh to bend realistically as the IK connected bones are moved.

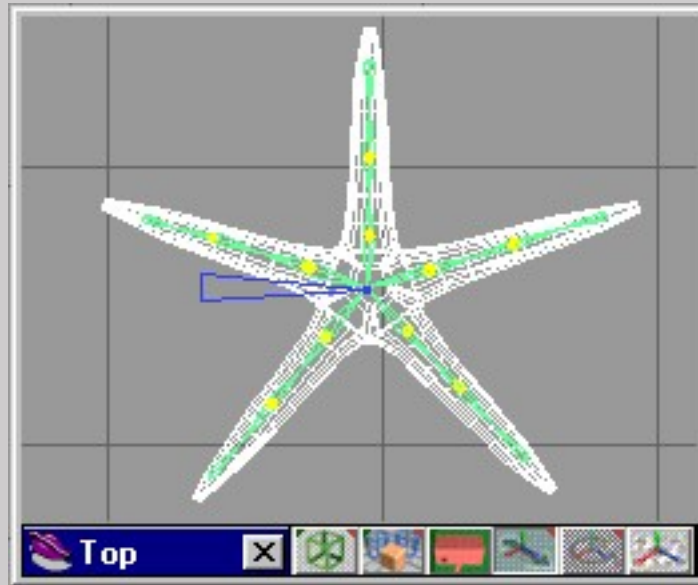
For a small model like this, it only took a matter of a

minute for the skin and bones to be merged as one. But on my Pentium 133 system it took almost 15 minutes for the merge on the dino to take place. At first I thought it had crashed. Be patient and give it some time, this is mathematically complicated and takes some time.

Finally, you are ready to animate or pose your model. This couldn't be more simple. in object mode click on the bone you want to move and move it. A yellow line appears, (see below) showing the direction of your move. On a simple model like this one, it occurs in real time with the mesh moving with the bone. With a model as complicated as the dinosaur, or a human you may want to deselect the "Realtime Update" in the "Skinning" panel, (see the panel in the above picture). This allows you to move the bone, then the mesh will catch up after you release the mouse button; saving time. Also, a side note: If you notice one vertice that keeps seeming to get stuck whenever you move the mesh, (the dino had one in his neck) simply delete that vertice and resave your model. This usually solves that problem



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This starfish is admittedly very oversimplified. But just by adding a segment on the end of each branch, it becomes more human like in movement possibilities. Just return in heirarchy to the skeleton, check the "Add Branch" box and click on each arm. See how easy that is. The dino model is now within reach!



There you go. this will hopefully get you started in the wonderful world of bones and animation. You may need other tutorials on Inverse Kinetics for the joints, others for animation and there's more fine tuning you can do with the muscle and tendon controls.

**Close**