Chapter 14- Child-Parent Relationships

Using Child-Parented Objects

So far, we’ve talked about making and editing objects, making them look good and how to render and animate them, but how do we make things like humans or robots or anything else move about that have several parts connected together? This is where child-parent relationships become useful. It allows us to link things together without actually joining them. This allows the individual parts to move about, but still follow a “master” object.

The concept of child-parent relationships is used in all animation programs and it involves an object assigned the role of a child and an object assigned the role of a parent. If the parent moves, rotates or scales, the child must do so too. On the other end, a child can move, rotate or scale without affecting the parent. An example would be: a hand is the child of the forearm while the forearm is the child of the upper arm and the upper arm is the child of the torso. Therefore, if the forearm moves or rotates, the hand must follow and if the upper arm rotates, the forearm and hand both must follow. If the torso moves, the entire arm must go with it. This is how you keep a body or machine from going to pieces!

In order to make child-parent relationships in Blender, you need to hold down the "Shift" key to select multiple objects. Select the child object FIRST, then select the PARENT object. The child object is always selected first. If you have a string of objects that need to be child-parented together (like the arm example), you can only do 2 parts at a time so start at the end of the chain and do the hand and forearm first, then forearm to upper arm and so on. After selecting the 2 objects, press "Ctrl-P" to make parent. You will see a dashed line drawn between the pivot points of the 2 objects. This shows a child-parent relationship.

RoboDude Asks: I did the Child and Parent selection backwards- How do I undo them? In order to delete a child-parent relationship, select both objects and press “Alt-P” to clear parent.

Look at the example on the next page. If we want to child-parent a few cylinders together to make a robot arm, create a cylinder and stretch it out in edit mode by moving one end of verticies. Remember to pay close attention to the object’s pivot point. If the object needs to pivot like an arm, you will need to keep the point at one end of the cylinder. Always pay close attention to the object’s pivot point in any case. It’s easy to forget about it when moving verticies around in edit mode. We'll look at moving center points next page. After you shape one cylinder, exit edit mode and press “Shift-D” to duplicate. Locate the cylinders and double check their pivot points. We want to make sure center points are correct before child-parenting. Start at the end and select the first 2 objects. Press “Ctrl-P” to make the relationship. Check it out to see if it’s correct and go to the next set. In the next set, the previous Parent object now becomes the Child object. Make a simple animation to check the function.
Adjusting Object Origins (center points)

In the basic editing chapter, we discussed how to move origins (center points) of objects. You were also cautioned about moving an object while in edit mode because the vertices will move, but not the object’s center point. To move the center point of an object, **select the object**, place the 3D **cursor** (LMB) in the location you want the center point to go, and find the “Origin” button in the **Tool Shelf**. You will have 3 options:

- “Geometry to Origin” (centers the mass around the object’s current center)
- “Origin to Geometry” (moves the center point to the object’s mass)
- “Origin to 3D Cursor” (moves the center point to the 3D cursor’s location)

In order to find a precise location, don’t forget about the “Shift-S” command to snap to locations. It is useful for finding exact locations of object or selected vertices. Also useful for moving things around in 3D space. The Shift-S command is useful for finding an exact location to move the cursor, then assigning the object’s origin to the cursor’s location.

RoboDude Says: You can child-parent almost any object including cameras, paths, empties and lamps. Great for keeping a camera attached to an object!
Creating a Robot Arm Practice Exercise

Create a new Blender scene and set up the views any way you wish. Your job is to design a robotic arm that is child-parented together and animated. Create all components using planes, cubes, spheres and cylinders. Locate your object origins to good logical pivot points. Place materials on all objects and develop a good scene with plenty of lighting.

After you create your scene, develop a 150 frame animation of your robotic arm moving in all directions.

Challenge exercise:
Try to make your robot arm pick something up off the plane!

Helpful Hint:
When animating, it may be useful to turn on the 3D Widgets, switch to Rotation and set it to Local. It will make setting animation keys much easier!

** Call the instructor when finished**