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I n t r o d u c t i o n

This tutorial require you to know how to organize Blender windows and how to model basic objects.

If you have already used a 3D software other than Blender, you will surely seek a 'group' function. Here it is. Within Blender this is called 'parenting' (an action consisting in making a link 'child->parent' between two or more objects). Easy to understand at first, this kind of family hierarchy can become real challenging when dealing with complex groups of objects, unless you make sure to follow a few elementary rules since the beginning :

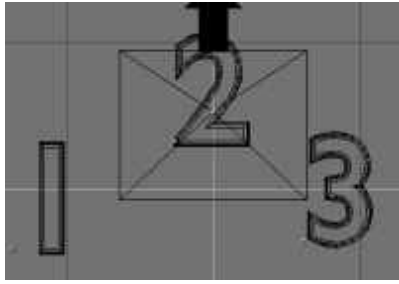
The first rule consist in opening a view on the '**datas blocks**' (**SHIFT+F9**) and to reorder them a bit. Data appear in these blocks unsorted. You can move the '**blocks**' the same way as you move common objects ((Right click in order to select, and G-KEY to grab and move it).

*The second rule consist in naming in an explicit way each object in the task bar from the Edit buttons (**F9-KEY**). When you don't respect this simple rule, you'll find painful when you'll try to guess if 'plan.088' is the floor of your virtual living-room or the ceiling of the kitchen.*

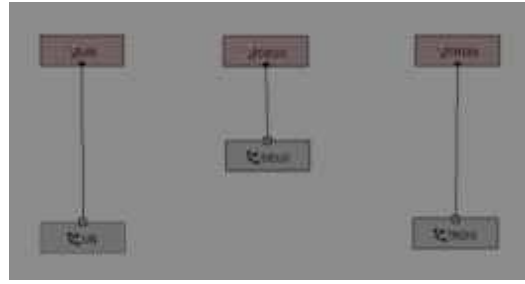


The left case is used for the name of the object, the right case names the 'data-block' linked to the object (the data-bloc is beyond the scope of this tutorial ; translator note : UN = ONE in french).

For the first part of this tutorial, just model any three objects in any 3D view. Then open the 'data-blocks' and sort the blocks in order to get something close to the following (brown rectangles are affiliated to 'datas-blocks', grey ones to the objects). Don't display materials or textures, it will crowd needlessly the views.



The standard view



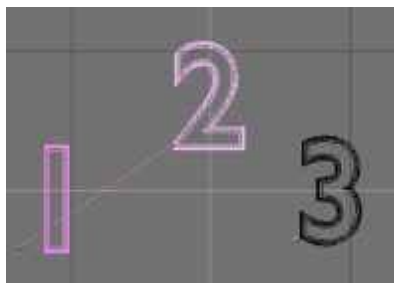
The 'Data Blocks' view



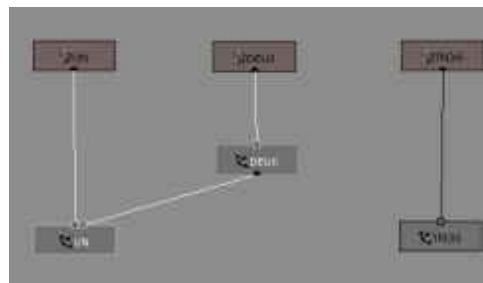
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S t e p 1 :

Now select the object 'one' and then the 'two' (right click and SHIFT). Press '**CTRL+P**' and validate by clicking on '**Make parent**'. It's done: 'two' is now the parent of 'one'. The link is showed with a white line joining the two objects. When you do a multiple selection, it is always the last selected item that becomes the parent of the others.



The standard view



The 'Data Blocks' view

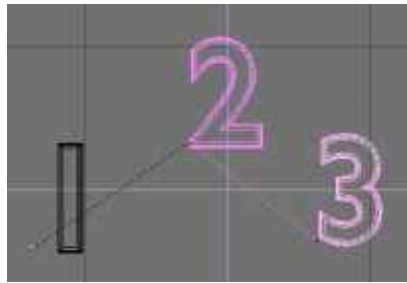
Select the 'two' and apply to it some of the classics operators: Grab ('G'), Rotation ('R') and Scale ('S'). You should note that everything you do to the parent also affects the child, but the reverse isn't true. Please note that any operator using the gravity center of an object (such as Rotation or Scale) always use the gravity center of the parent.

Duplicate the child 'one' and note that the duplicata is also a child of the parent 'two'. The reverse is not true.

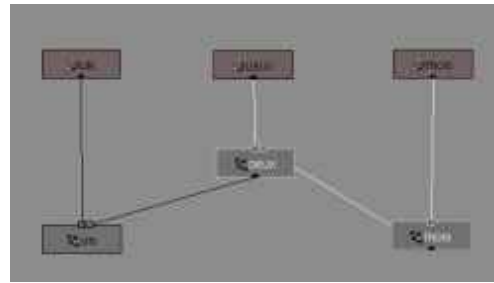


The standard view

You can make infinite chains this way. Select both 'two' and 'three' and using **CTRL+P** make 'three' the parent of 'two'. You then have 'three' as the parent of 'two' and 'two' itself parent of 'one'. As a result, any operator effecting 'three' will effect both 'two' and 'one'. Also, any operator applied to 'two' will effect 'one', but none of the operators applied to 'one' will effect 'two' or 'three'.



The standard view



The Datas Blocks' view



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Step 2:

Discarding a parent→children hierarchy is easy. You just have to select the children to unlink and press '**ALT+P**'. Three choices are offered to you:

Clear parent: The link is removed and the orphan recovers its initial location, size and orientation. Some remarks of note : if the parent object hasn't been modified by any of the three base operators (grab and move, rotate, scale), everything is alright. In the contrary case, you must know that all operators on the parent also effects the child but that the new data aren't written in the child's 'Data-Block' . This is why the child might disappear from the visible part of the 3D screen when using this command. Press the DOT-KEY '.' to visualize it again, or '**SHIFT+C**' in order to get a global view of all objects.

Clear parent and keep transform: (CLR Track) This option solves the trouble dealt with in the previous option : all the modification applied to the child through the parent will be kept when the parental link is removed.

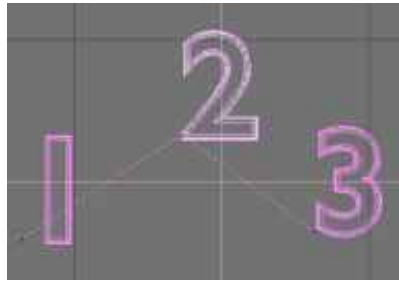
Clear parent without inverse: When a standard parent → child hierarchy is set, the (possible) alterations applied to the parent **before** that the link was set aren't applied to the child object. Use this option if '**Make parent**' has been used by error. It is sometimes used when you have used the second parenting option '**Make parent without transform**' through the '**CTRL+SHIFT+P**' shortcut ; in this case, the initial alterations are applied to the child and it is only when a link of this kind is established that this clearing option find its use.

'Make parent without transform' through the 'CTRL+SHIFT+P' shortcut: If the object to be set as a parent has been altered **before** the hierarchy is set, the alterations are inherited by the child as well during the setting of the hierarchy. This means that the gravity center of the child will be placed over the gravity center of the parent, and that the child will inherit the scale factor and the rotation angle from its parent (about this subject, it is highly recommended to clear any child rotation by using **ALT+R** before setting the hierarchy). This option is barely useful (you can need it in order to link an object to a curve) and you should avoid to use it along with the standard '**Make parent**' option. You may have some trouble to understand what is the situation of your objects...

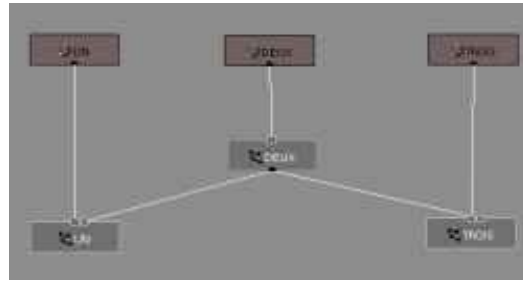
In order to tell the difference between a parent and its children : take a look to the link in the 'Data blocks' window and you should see a filled circle at the end of a link, indicating the parent.

After all these explanations, you can know unlink the two hierarchy set in the previous step, and select

(in this straight order): 'one', 'three', 'two'. Set the hierarchy and you'll see that a lone parent can have an infinite number of children.



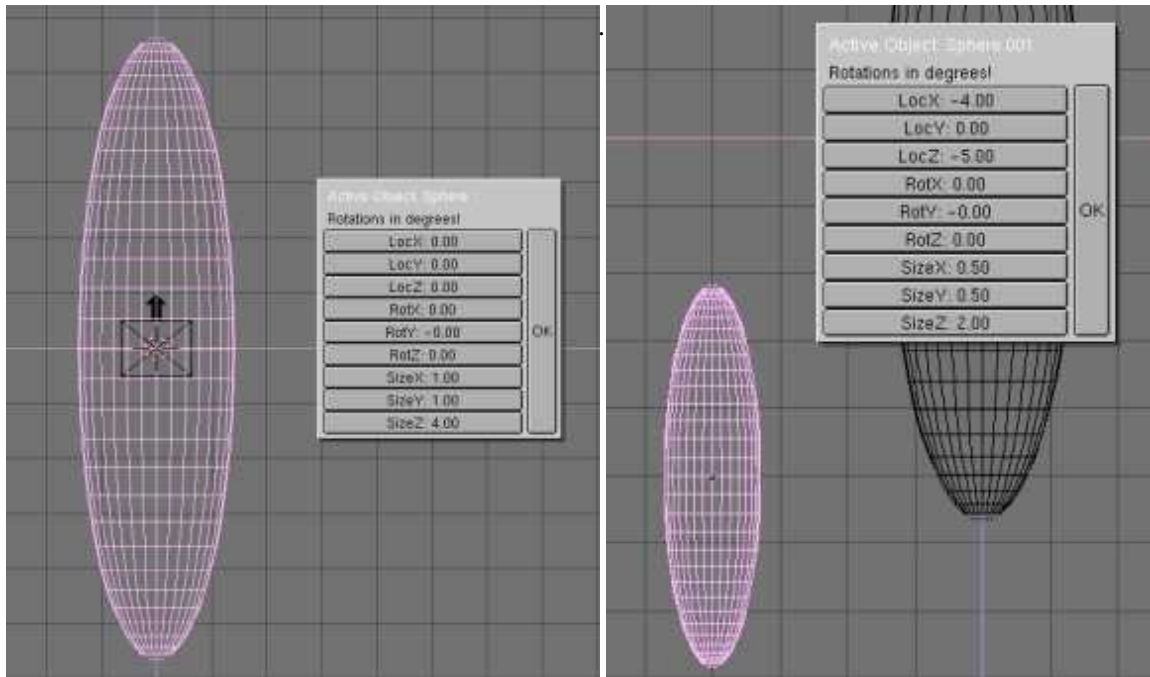
The standard view



The 'Data Blocks' view

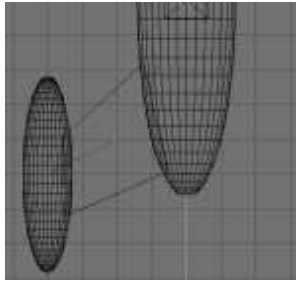


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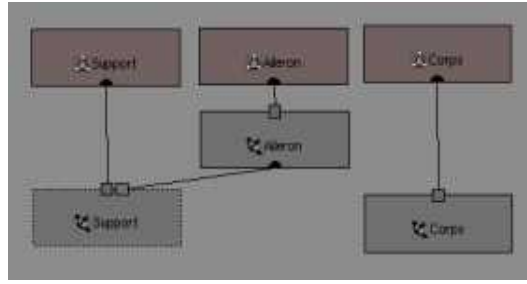


Let's go through a full length example : create a sphere and give it the following parameters : **Loc x,y and z = 0. Rot x, y and z = 0. Size x, y = 1, Size z = 4.** Duplicate it and give the resulting copy the parameters **Loc x = -4, Loc y = 0, Loc z = -5. Rot x, y and z = 0. Size x and y = 0,5, Size z = 2.** The central egg-shape should be named 'body' and the copy 'stand'. Let the cursor at the center of 'body' (or place it at the according place using '**SHIFT+S**' -> **Curs->Sel**) and add a mesh plane. Move the plane between 'body' and 'stand', enter Edit mode and move each vertex in order to get something like in the following view. When you leave the Edit mode, open the Edit buttons (**F9-KEY**), click on '**centre new**' and name the plane as 'winglet'.

Now make the 'winglet' the parent of the 'stand', and you should get something like this (after sorting a bit the 'data-blocks' view).



The standard view

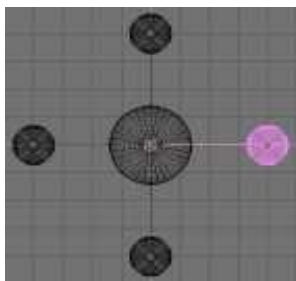


The 'Datas Blocks' view

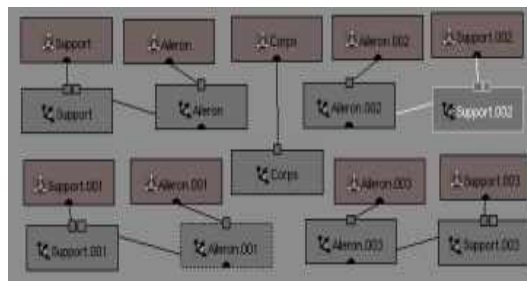


Before going through the next step : activate the red-enlighted button in the icons bar. This is for making the rotation (or the scaling) to occur around (or from) the cursor location and not around (or from) the gravity center of the objects. The cursor should always be at the gravity center of 'body'. Select 'stand' and 'winglet'. Shift to top view ; make a copy with '**SHIFT+D**' and apply to the resulting objects a rotation by 90 degrees (hold CTRL in order to get tabulated increments). Repeat the same two more times in order to get something like this (after you have sorted out a bit the mess in the 'data-blocs' window).

Note: The copying function keeps the hierarchy between the copied objects. You don't have to reset a link between 'stand' and 'winglet' for each of the copies.



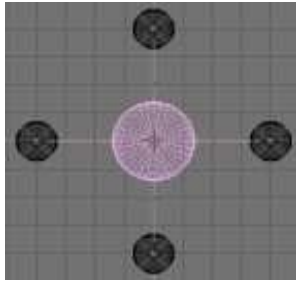
The standard view



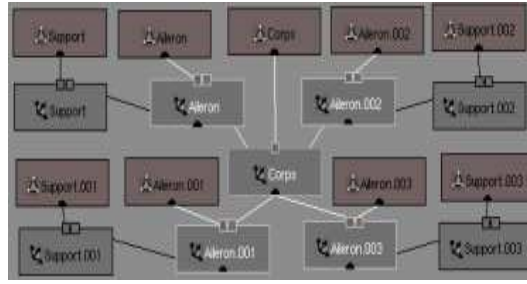
The 'Datas Blocks' view

As a conclusion, select the four 'winglets' and then the 'body' and go through a last '**Make parent**'. If everything went right from the start, by selecting and applying any operator to the shuttle's 'body', you should be able to move, rotate or scale the whole shuttle at once !

Note: You can select the objects directly from the 'Data blocks' windows but it isn't advised do so with the purpose of setting parenting links (the 'last select object becomes the parent' rule isn't valid here).



The standard view



The 'Data Blocks' view

Last note : About the Empty objects : with the only purpose of creating still images, or simple animations, we could stop here with this tutorial. But in the case of a complex animation, this example quickly shows its limits. You will always find easier to add one or many 'Empty objects' and to make them the parents of groups of objects. For example, you could create an Empty named 'Axis', and make it the parent of the body of the shuttle : any operator applied to the Empty will effect the whole shuttle (suppose that we choose to apply only a Rotation operator to 'Axis', it will effects the rotation angle of 'body' which will also pass the same alteration to all 'winglets' and 'stands', while the shuttle could keep an independant movement as 'Axis' deals only with rotation alteration). In order to be more simple : 'Body' could be used to move the shuttle while 'Axis' could be used to make it spin around itself.