

# Simple legs setup

This tutorial describes a simple IKA Leg setup using Blender. It shows how to setup a set of legs from a simple mesh. This is a fast way to setup legs but may not give as much control as some would like. Also remember that this is only one solution to rigging legs.

**1.** Open Cartoon Legs.blend. This is a simple set of legs modelled using subsurfs. The setup is kept simple so that all the steps can be easily and readily explained.

**2.** Position your cursor above the left leg and add an armature of three bones. Select all three bones and name them in order L Thigh, L Shin, L Null. See Figure 1. You can use any name but it is best to keep some kind of order. Next Select the L Null joint. Press Shift-S to snap your cursor to this joint. Then add another armature of two bones at this point. Name these two bones in order L Foot, L Toe. See Figure 2.

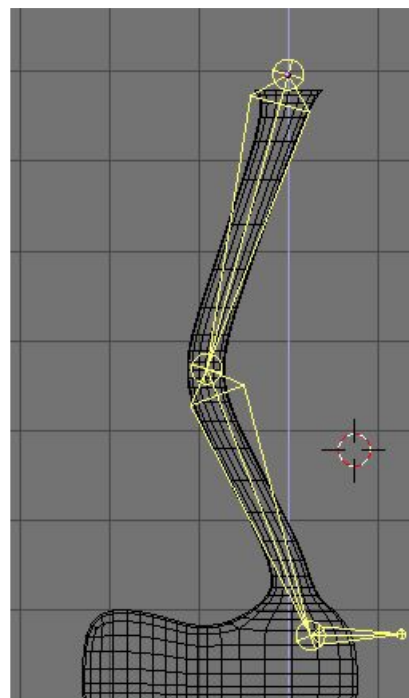


Fig 1. Adding first three bones to the mesh



Fig 2. Adding foot and toe bones to the mesh

**3.** So you should have a chain of bones in order of L Thigh, L Shin, L Null, L Foot, L Toe

4. Go into a front view and make a duplicate of the bones using Shift-D. This should put you into grab mode. Drag the duplicate set of bones across to the other leg. Make sure that you hold down CTRL as you drag so they are positioned exactly. You should only need to drag them across in the x direction with no movement in y or z direction.

5. Select all the right leg bones using a box select B-Key and rename them. Remove the extra numbers and change all the L to R. So you should have a chain of bones in order R Thigh, R Shin, R Null, R Foot, R Toe. See Figure 3

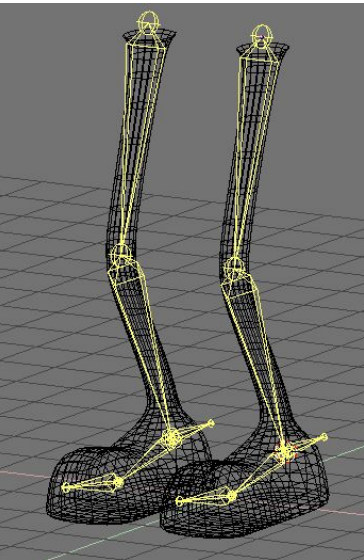


Fig 3. All bones have been added and copied to other side.

**TIP:** To mirror bones across you can press Shift-D to duplicate and then press the S-Key and then the X-Key or Y-Key. If the character did not have legs that went straight up and down you would have to do this.

6. Add another bone in between the two thigh bones and above it. Rename this bone pelvis and parent both thigh bones to it. While adding all these bones make sure you stay in edit mode. You want to add all bones to the one armature.

| Selected Bones |          |         |    |            |              |
|----------------|----------|---------|----|------------|--------------|
| BO:L Foot      | child of |         |    | Dist: 1.00 | Weight: 1.00 |
| BO:L Toe       | child of | L Foot  | IK | Dist: 1.00 | Weight: 1.00 |
| BO:R Foot      | child of |         |    | Dist: 1.00 | Weight: 1.00 |
| BO:R Toe       | child of | R Foot  | IK | Dist: 1.00 | Weight: 1.00 |
| BO: Pelvis     | child of |         |    | Dist: 1.00 | Weight: 1.00 |
| BO:L Thigh     | child of | Pelvis  | IK | Dist: 1.00 | Weight: 1.00 |
| BO:L Shin      | child of | L Thigh | IK | Dist: 1.00 | Weight: 1.00 |
| BO:L Null      | child of | L Shin  | IK | Dist: 1.00 | Weight: 1.00 |
| BO:R Thigh     | child of | Pelvis  | IK | Dist: 1.00 | Weight: 1.00 |
| BO:R Shin      | child of | R Thigh | IK | Dist: 1.00 | Weight: 1.00 |
| BO:R Null      | child of | R Shin  | IK | Dist: 1.00 | Weight: 1.00 |

Fig 4. This shows the bone chain setup and how everything is parented together. You don't want anything too different from this otherwise you will get all sorts of problems.

**7.** Add an empty and call it Master Legs. This will be parented to the legs and armature and provide a means of moving the whole structure around in the scene. If you create an animation it enables you to move it around to face another direction or out of the way of another object etc. It is a good habit to get into. Parent the legs mesh to the armature. Select the mesh and hold SHIFT and select the armature. Press CTRL-P and choose mesh. Select the armature and hold SHIFT and select the null. CTRL-P to parent the armature to the master null. See Figure 5.

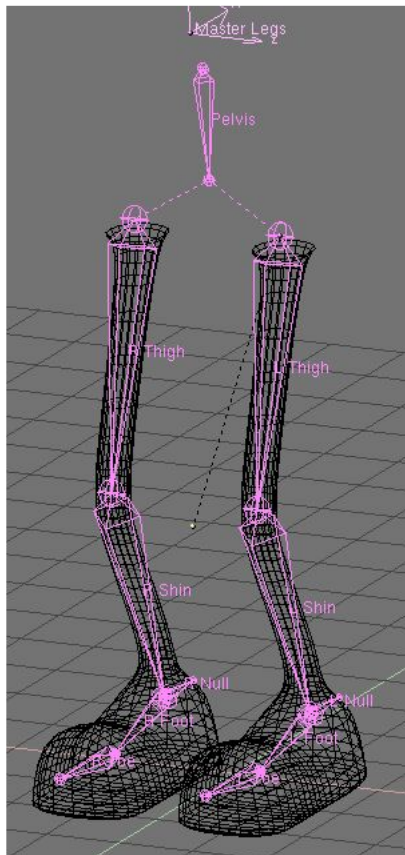


Fig 5. The complete setup for the bones and mesh. This shows the names as well.

**TIP:** To see bone names go into bone edit mode using TAB-Key and click on names in the lower left hand corner.

**8.** Now groups need to be assigned to each bone from the mesh. The group functions can be found under the edit mesh menu. Create a group for each bone that you made except the Two null bones and the pelvis. These groups need to have exactly the same names as the bones. To create a group just hit the new button. Rename each group in the little text box. See Figure 6.



Fig 6. The groups button can be found under the mesh edit menu. Clicking on new will create a new group. Delete will remove a group. Once you have selected all the vertices for a particular group you press the Assign button to assign them to that group. The small Square next to the Name of the group allows you to select any one of your groups. By pressing the select button you can see what vertices you have already assigned to that group.

**TIP:** Pressing the B-Key will allow you to box select. Pressing the B-Key Twice will allow you to paint a selection. By selecting vertices and pressing the H-key you can hide certain vertices to make your selections easier.

**8.** Look at the Figure 7 and see where the groups have been assigned. Red is for the thigh. Blue is for the shin. Green is for the foot. Yellow is for the toe. So select the right leg and hide it using H-Key. Then go into a side view Numpad 3 and start assigning vertices to groups. For example choose the L Thigh group and then select the vertices box select is easiest as shown. Press the assign button. Continue down the whole leg. Once the left leg has been completed you can swap legs unhide one and hide the other and repeat the above steps for the right leg.

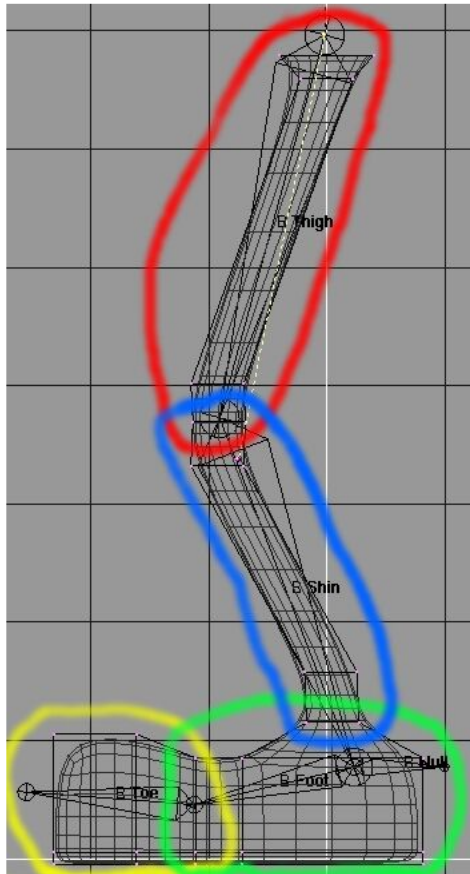


Fig 7. The vertices that were assigned to different groups. Make sure that the names of the groups are EXACTLY! the same as the names of the bones.

**9.** Save all your work. Before moving all your bones around and maybe getting into an unrecoverable mess.

**10.** Go into pose mode using Ctrl-Tab and rotate some foot bones and check deformation. If everything seems alright then add IK. If you need to clear any rotations, scales or translations...press Alt-R, Alt-S or Alt-G. This works with multiple selections as well. This is an easy way to undo everything if you have bones going everywhere.

**11.** Adding IK. **Make sure you are in pose mode!** Ctrl-Tab. Select the L Null Bone and go into the constraints menu. Add an IK solver to this bone. For object enter your armature name. Everything will jump around. But not to worry. For bone chose the L Foot bone. Your bones should all jump back to their previous positions. Now grab the L Foot bone and move it around. You should have IK movement. Add the same constraint to the R Null bone using the R Foot as the bone and the same name for the armature. If you now grab the pelvis bone and move around both legs should work how they are supposed to.

**12.** That's the end of this tutorial. Hope you like it. If you have any problems you can open up Cartoon Legs Finish.blend to check my setup. If you read everything carefully you should have no problems.