

OK, I'm going to assume that you know nothing about Blender, so please forgive me if you know more than me, which isn't difficult!

This appears to be long and wordy, sorry about that, but it's quicker to do than to write!

This is based on a YT Video <https://www.youtube.com/watch?v=7P5rdtzc18E> and I couldn't have done it without seeing that, but that is more complex than I need.

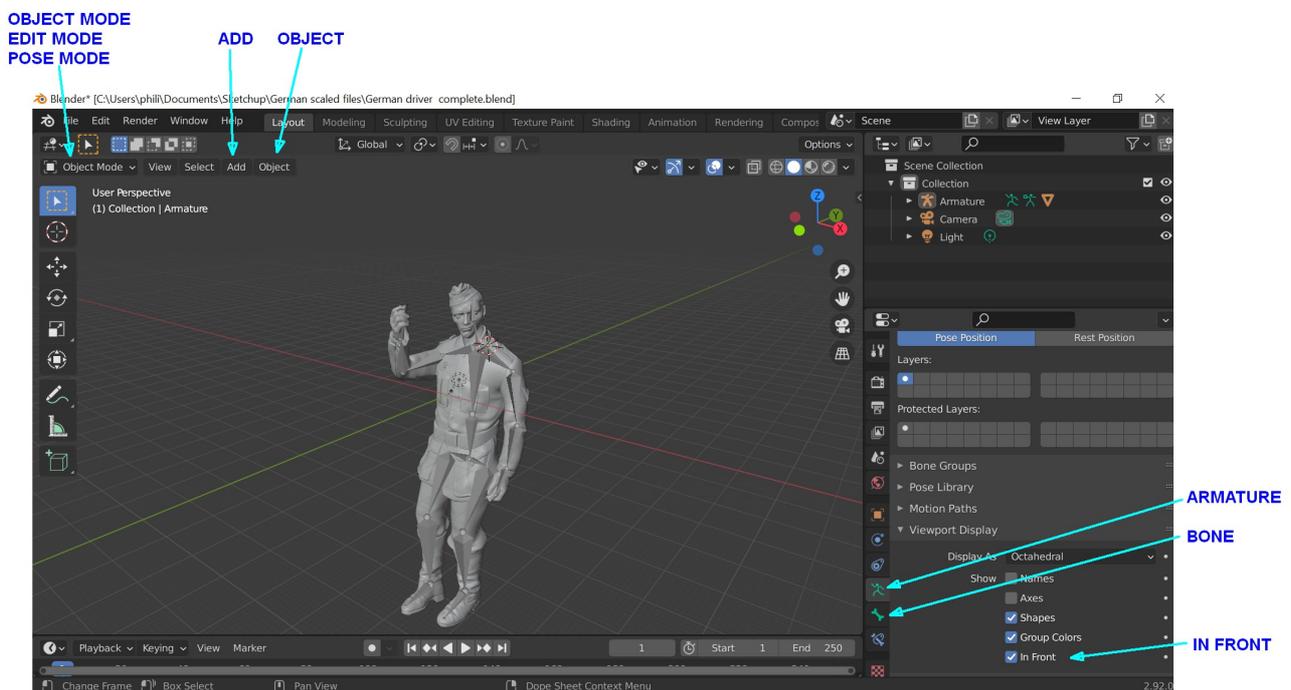
My version of Blender is quite old (v 2.92) and they do update quite frequently, (currently v 4.01 I believe) but that sometimes involves moving where things are, so I'm keeping with what I've got. Hopefully for anyone installing a newer version, none of the bits we need will have changed, but just be aware.

OK, when Blender first opens there is a large splash screen which you just want to get rid of by clicking anywhere else on the screen.

Then, top left of the screen is the normal File Menu and slightly below it is a little box/tab marked “**OBJECT MODE**”. That has a drop down menu attached and we will be using the drop down “**Edit**” and “**Pose**” Modes in due course.

In the centre of the screen there should be a 3D cube. Click on it to highlight it (in orange) if necessary and then just hit your keyboard Delete key to get rid of it.

Assuming that you have an stl figure to work on, somewhere on your computer (I suggest you make it easy to find, like putting it on your desktop for this exercise.), open the File menu and scroll down to “**Import**”, **NOT** “**OPEN**” or “**OPEN RECENT**”. Blender can't actually open an stl file.



Find your stl and double click on it and with luck it will appear on your screen. However it may not be immediately visible, so scroll out and use the middle key of your mouse to look around until you find it.

The first thing we're going to do is align the figure with it's origin point on the screen. It isn't

completely necessary but it's a good thing to do and makes finding it easier.

Make sure the model is in **OBJECT MODE** and selected with an **orange** outline, then go to the RHS of the “**OBJECT MODE**” button where there is another button called just: **OBJECT** . Click this and go down to “**Set Origin**” and select “**Geometry to Origin**”. The figure should then move across the screen and sit in front of the origin with a small circle and cross hairs roughly in it's centre.

We will now start by simply making one arm of the model moveable. There are three 'bones' in the arm that we might want to move separately in order to get the hand pointing to where we might want it, and that would work, but thinking to the future we will need a shoulder bone as well, so we'll put that in to start with.

I'm going to start at the back of the neck: - So, turn the model and move the 3D cursor to approximately where you want this bone to go (where the shoulder meets the neck) and **press shift and right click**. That moves the 3D cursor there, it doesn't need to be exact, it can be adjusted later.

Now we have to add an “**Armature**”, with a single bone.

So Click the “**ADD**” button (to the left of the **OBJECT** button we just used), and then scroll down to “**Armature**” and select “**Single bone**”.

*Please Note:- The base version of Blender doesn't have the “Select single bone” option, as installed. It is reported that the bone appears automatically after simply selecting the Armature and if this works for you that's fine. However to be able to select the “Single Bone” option you will need to enable a simple add-on called 'Rigging:Rigify'. See here:
<https://blender.stackexchange.com/quest...ns-missing>*

Either way, it puts our single bone under the cursor although **it is very small and not obvious**, and we also have an Armature in the outliner on the RHS of the screen.

Now the bone is very small so zoom in to see it and then click on the bone to select it if it isn't already selected, then Click from **OBJECT MODE** into **EDIT MODE**.

Now we are going to drag the bone to extrude it from the back of the neck to the top of the shoulder. i.e. to form a 'collar bone'. So, scroll in so that you can see the tiny bone and it should be outlined in orange, if not, click it to select it. The bone should have a small round knobble at one end. Click and hold the knobble and Press “**g**” (this Grabs it) and you can simply drag it to approximately wherever you want it and the bone will get bigger as you go – no need to be precise at this point. Now the bone may actually go inside the model and when it does it's not easy to see, but there's a simple way to fix that. - Go to the **Armature** button in the properties tab on the RH Side and click that, then we go down to **Viewport Display** and click the “**In Front**” button. That will make the bones always appear on top of the model wherever they actually happen to be.

Now we have to fine tune this bone and move it around into the right place. So Grab the small end of the bone again and move it as necessary. You have to swing the model around and view it from all directions to be sure, but you can adjust it as much as you want.

OK, now that we are happy with this first bone, we need to create the next one. So, select the tip of this bone again but Press “ **e** “ this time and move the cursor down to the elbow. As you do so, a new bone will magically grow from the end of the first one. Take this new bone tip to approximately the elbow and release it. As before, check the position all round and adjust as required.

Repeat this to extrude another bone to the wrist, and then do it again for a 4th one to the tip of the fingers.

At this point you should have a collar bone and three arm bones.

Now what we need to do is get the model's arm to attach itself to these bones, so that when we move the bones, the arm moves. The way to do that is to go back into **OBJECT MODE**, select your figure by clicking it (it will gain an **orange** outline), then press your **SHIFT** key and **select** any bone. Then do “**CTRL - p**” - a window will pop up and you then need to go down to, '**with automatic weights**' and select that.

It might take a little while before anything obvious happens, but eventually the window will disappear and it's ready to move on.

You should already be in **OBJECT MODE**, but check and select it if necessary. **Select** any bone, and then change from **OBJECT MODE** into **POSE MODE**. Now **select** the hand bone, and you should see it highlighted in **blue**.

Now Press “**r**” on your keyboard and two small curved black arrows appear on either side of the bone, and this allows you to rotate that bone. The actual direction of movement depends on which direction you view the model from. So for example, look from the side and the hand will simply move up and down or from the top it will move sideways, but look at it from the end and it will rotate – be careful!!

Similarly, selecting the lower arm bone moves that bone and the hand bone together, or selecting the upper arm bone moves the whole arm. Only make small adjustments at one time because otherwise you can end up with all sorts of weird poses!

OK, so now we need to do the same thing for the other arm and the legs, etc.

So, go back to the very first collar bone that you created but select the knobble at the **big end** (neck end) of it this time. Make sure it is showing in orange and do **Select “ e ”**, as before, and drag the new bone across to the other shoulder. From there you extrude the same three arm bones, as before.

Now, go back to the centre of the shoulders again and select the knobble at the junction of the 2 shoulder bones. Make sure you do get an orange selection, (because if not you may create a new bone underneath and this can get very confusing) then **Select “ e ”** and drag a new bone down the spine to wherever you want it – I'd suggest the waist. Check its position and then repeat a new bone down to hip level. From here it's a repeat of the shoulders and arms – two 'pelvis' bones and three leg bones each side.

Finally, go back up to the neck and select the centre knobble again – again ensure you get the orange colour, and extrude a bone up into the neck, then a second and third to the top of the head.

You should now have a complete skeleton and, as before, it needs to be fixed to the actual body, so repeat what you did before for just the arm. The way to do that is to go back into **OBJECT MODE**, select your figure by clicking it (it will gain an **orange** outline), then press **SHIFT** and **select** any bone. Then do “**CTRL p**” - a window will pop up and you then need to go down to, '**with automatic weights**' and **select** it.

It might take a little while before anything seems to happen, but eventually the window will disappear and it's ready to move on.

You should already in be **OBJECT MODE**, but check and select it if necessary. Then select the

bones, and then change from **OBJECT MODE** into **POSE MODE**. Now select any bone, and you should see it highlighted in **blue**. Press “**r**” on your keyboard and the two small curved black arrows appear on either side of the bone and which allows you to rotate that bone. The actual direction of movement depends on which direction you view the model from, as before.

Now you can pose it as you need, one bone at a time, and once you are happy, go into the File menu and “**Export**” then select “**stl**”.

You will be prompted to give it a name before you go on. Then open the file in Cura, Chitubox, etc and away you go.