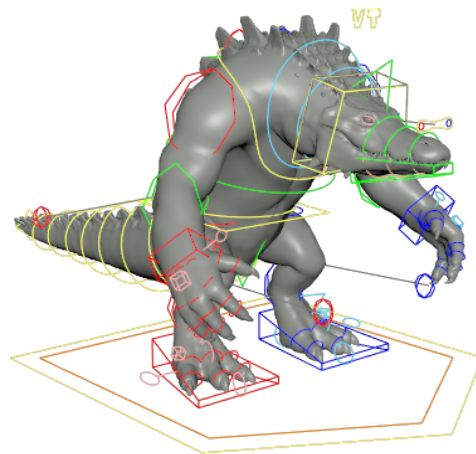
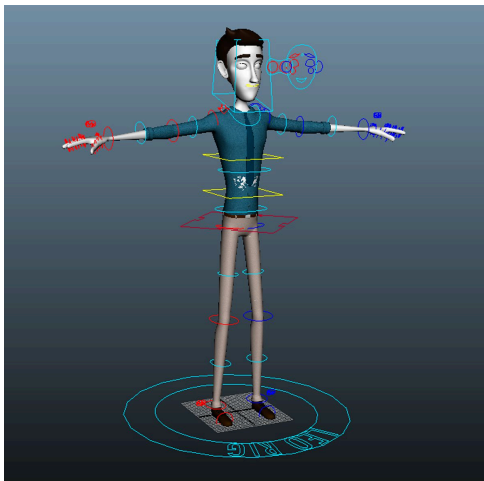


Maya Rigs

What is a rig?

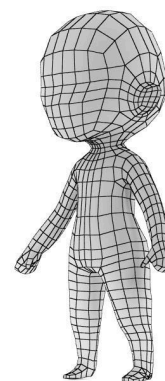
A rig is a digital puppet used to create animations. Typically used for 3D, they make use of a model and a skeleton. Rig's are used for many different productions, including films, animations, tv shows and games. In the industry, there are whole roles dedicated to rigging - to create a rig can be quite complex and fiddly. Rigs don't just refer to organic characters - rigs are also made for vehicles, clothing and other items.



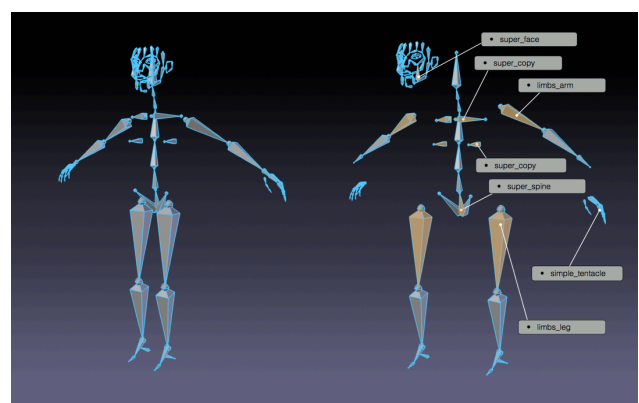
Rig Structure

A rig is usually broken down into several different elements. These all work together to allow you to move the body or parts (limbs, wheels, faces) of the characters.

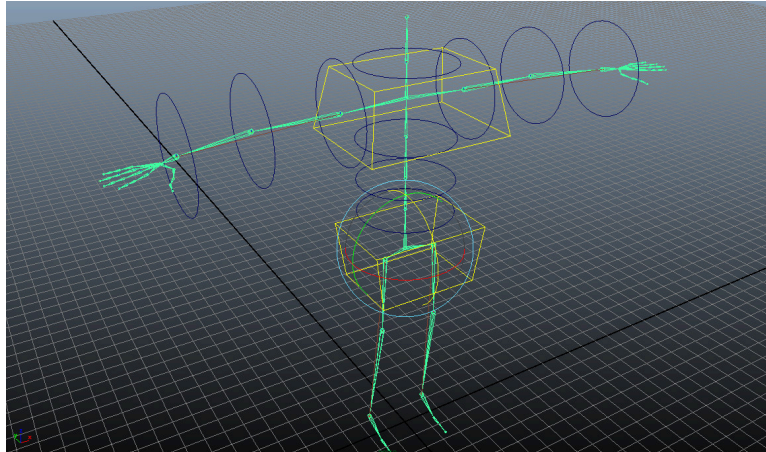
Mesh - the mesh is the actual body of the character. You may have some experience creating meshes - sometimes referred to as modelling. The mesh acts like the skin of the character.



Bones - Just like in real life, your body is given structure by your bones. Same with a rig, we use the bones to give your characters structure. The bone structure on a rig also determines how the body parts rotate and bend. For instance, your knee can't rotate forwards.



Controls - the final part of a rig are the controls. These are little handles that stick out. These are the bits you actually use to pose/move your character. There are lots of different controls, and they come in different shapes/styles depending on who created the rig.



The rig controls

Meet 'Monty'

The rig you will be using is called 'Monty'. Monty is a relatively simple rig - with it's controls mainly focused on movement of the legs. Monty was created with the express purpose of making animation easy to learn. [Click here](#) for a link to monty.

Example Animations

Look at these following examples. These were created with rigs very similar to the one you will use in this tutorial. These rigs are very simple and use expression through animation to communicate and convey emotion.

Monty Circus - <https://www.youtube.com/watch?v=OA1KKhibVmk&t=4s>

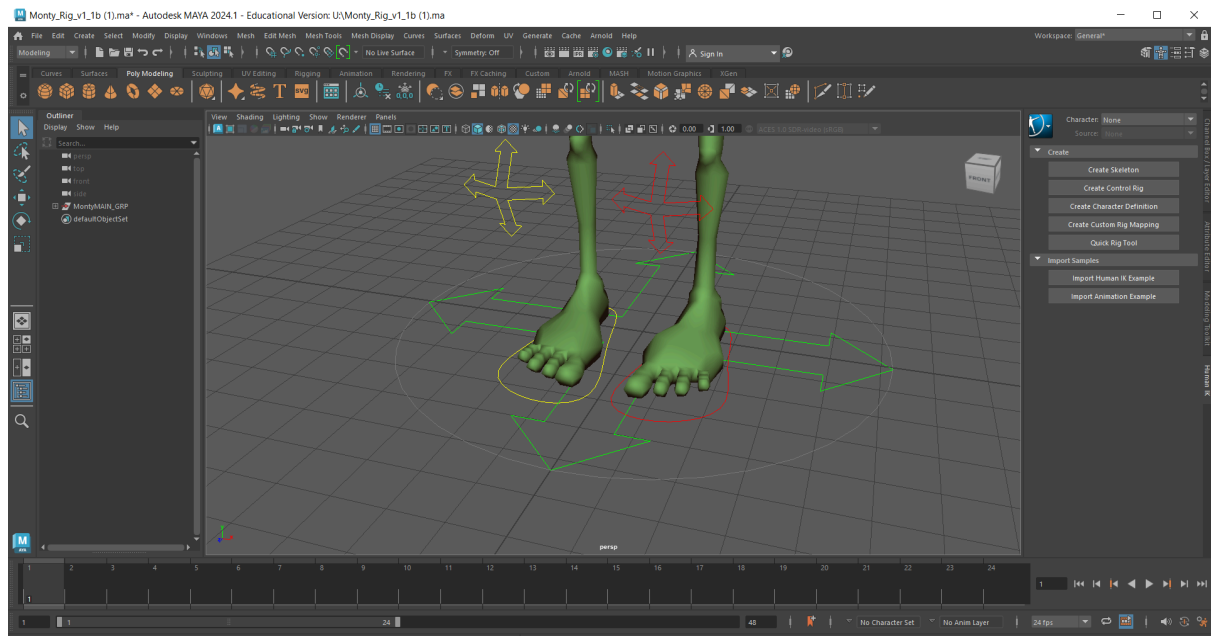
Monty Jump - <https://www.youtube.com/watch?v=fagGRT23Ku0&t=1s>

The Dog of Wisdom - <https://www.youtube.com/watch?v=D-UmfqFjpl0>

Kiwi - <https://www.youtube.com/watch?v=sdUUx5FdySs&t=19s>

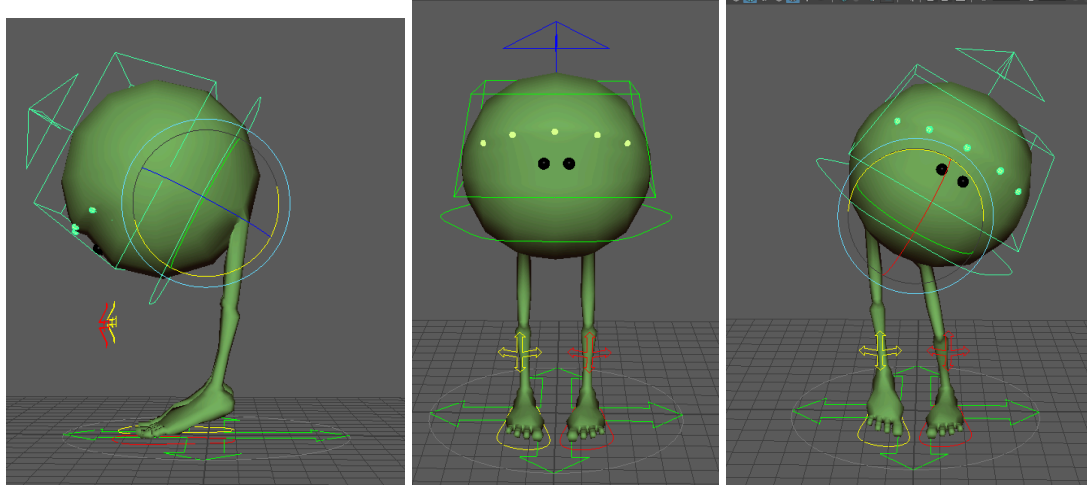
Global Control

The global control is the big 4 sided arrow at Monty's feet. Its purpose is to allow you to reposition Monty anywhere in the Maya world.



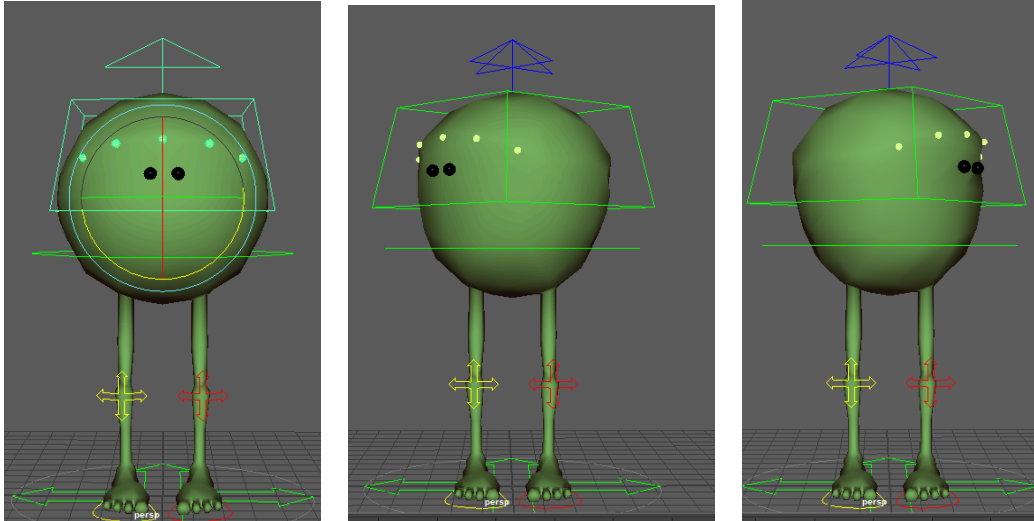
Body

In the centre of Monty's model there is a green ring. This serves as Monty's main waist or hips. This control allows monty to lean forwards or back or even lean side to side.



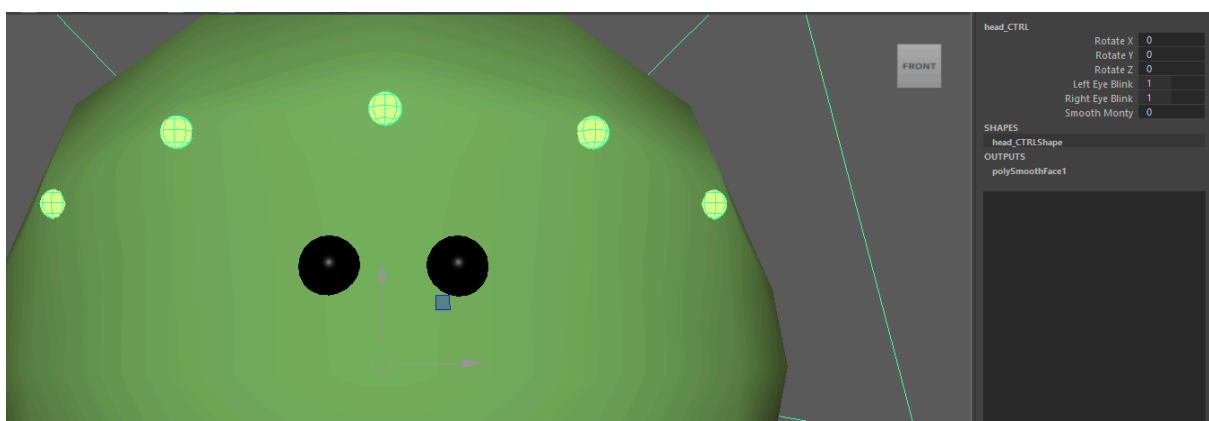
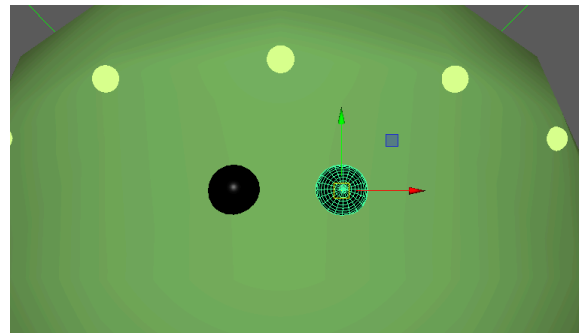
Head

The head control is acting as Monty's neck. On this rig it is seen as a big green box centred around the top of Monty's head. Due to the cartoony nature of Monty's shape - it is not clearly defined. But do think of this part as his head and neck control. As with the body control, you use to rotate Monty to look in different directions.



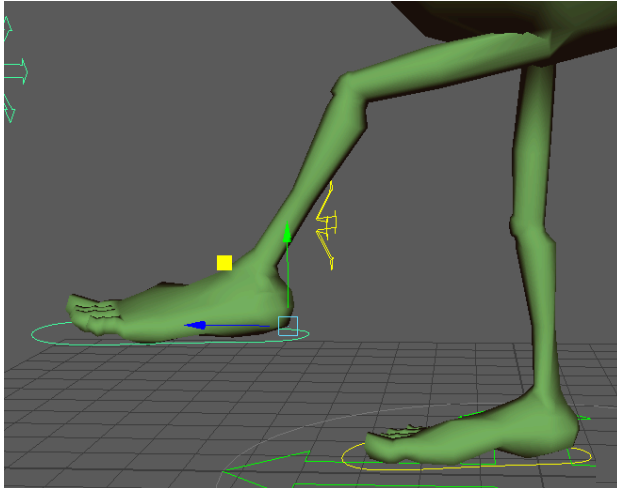
Eyes

Monty doesn't have a specific eye controller. But you can move and scale their eyes to create reactions from them. If you click on the Head control, you can see that Monty has two controls that allow them to blink. Make sure you are on the "Channel Box/Layer Tab" to see this.



Legs

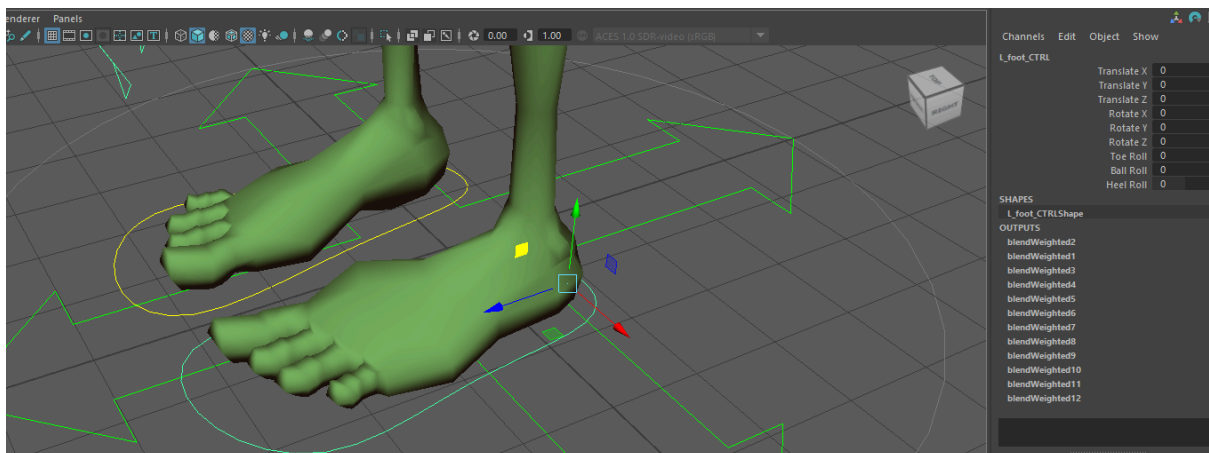
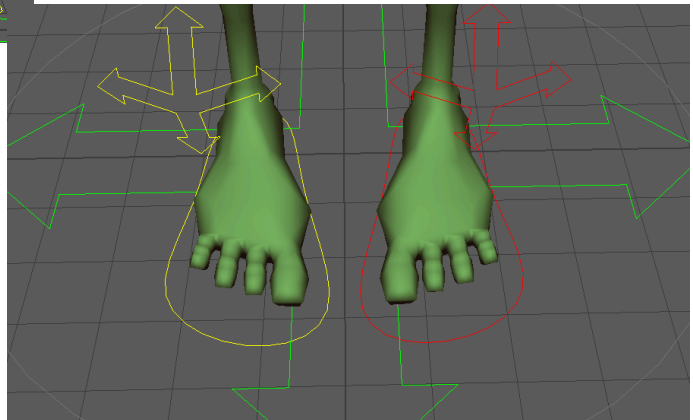
Monty is known as a bipedal rig - meaning Monty has two legs. The legs are where we have some more complex controls. If you move the leg controls(red and yellow located at Monty's feet) you will notice that where you position them will change the angle and position of Monty's legs. It also can bend the knees.

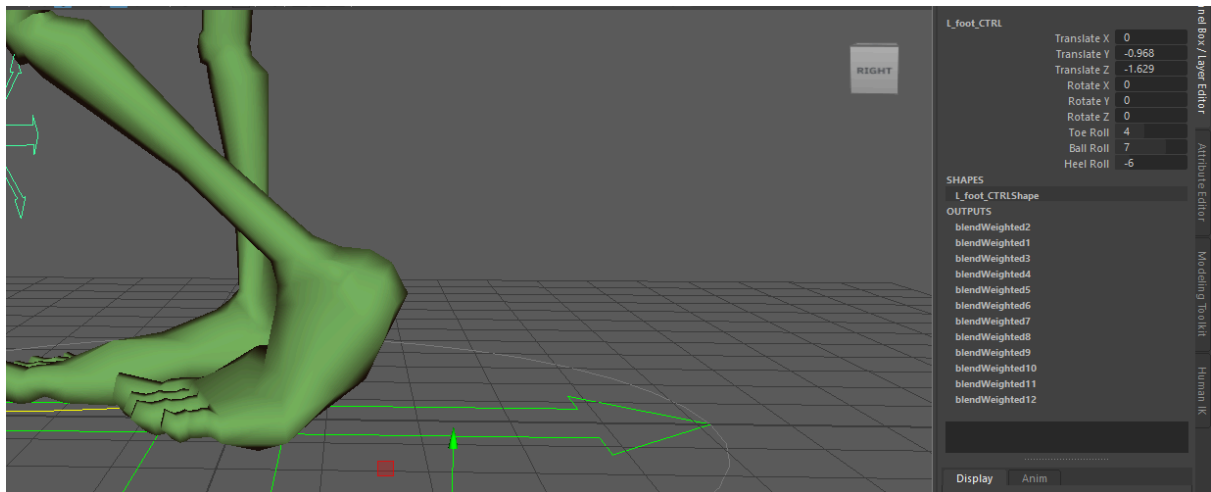


As you can see, by just moving the control to the left and up, Monty has posed themselves appropriately. The leg controls can be affected by the move and rotate tools.

You can use the rotate tool to angle the foot. By careful not to rotate too far otherwise you might break Monty's legs.

The legs/feet control has some advanced options. Again make sure you are on the Channel Layer tab. You will notice there are some roll tools. These allow you to manipulate the foot and ankle. This allows us to create more realistic foot shapes - for walking/running/kicking.

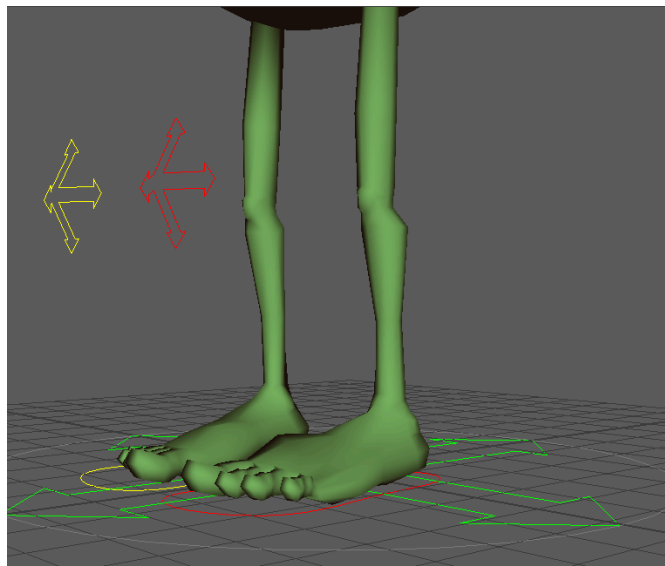




To manipulate the roll values, just hover your mouse over the dark grey box - which should have zeroes in and then drag your mouse to the right or left.

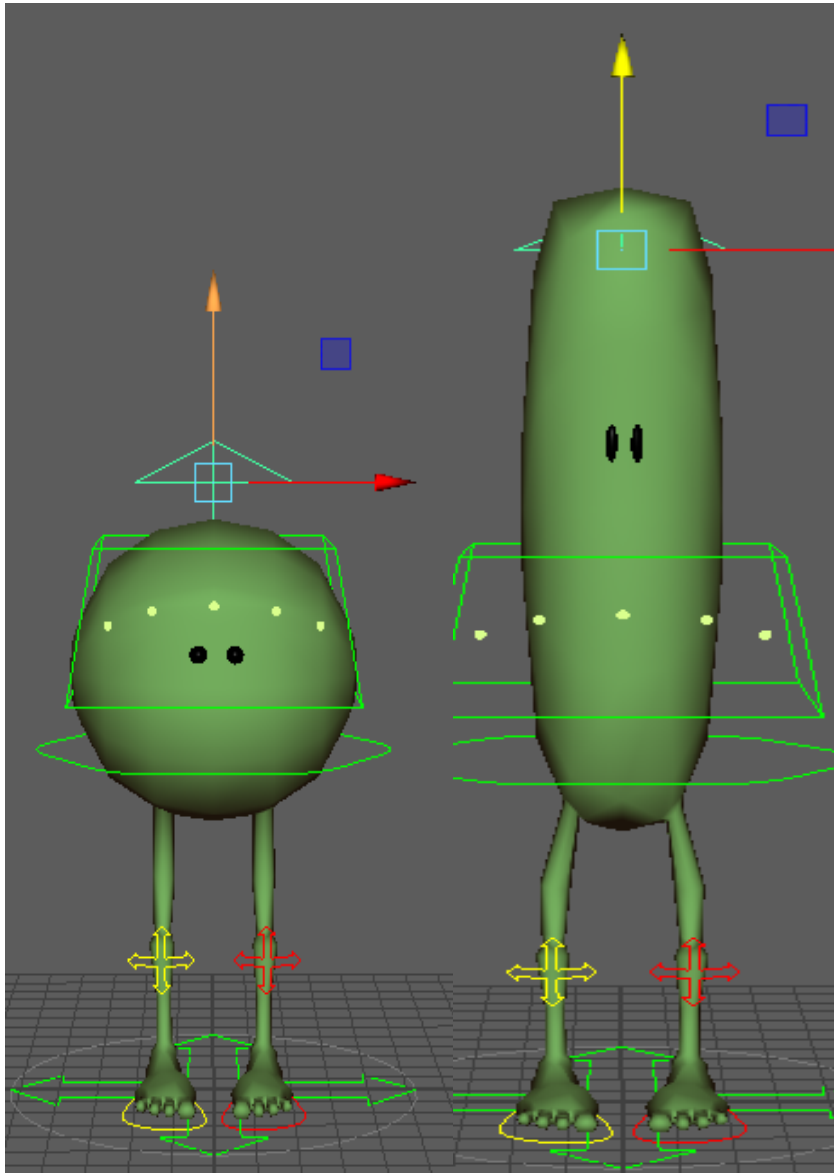
Knees

Monty has two knee controllers - one of each knee. These allow you to change the angle of where the knees are pointing. The controller is shaped like a 4 headed arrow. Yellow is for the left leg and red is for the right leg.



Stretch controller

The final controller on Monty is the stretch controller. This is a blue arrow pointing upwards from Monty's head. The purpose of this controller is to allow Monty to stretch - adhering to one of the 12 principles of animation. Just click on the control and then use the move tool to stretch Monty. Focus on an up and down movement for this.

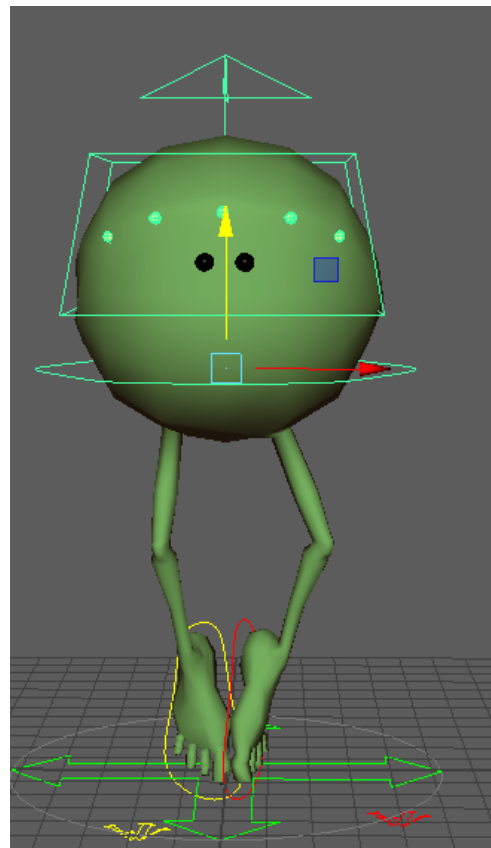
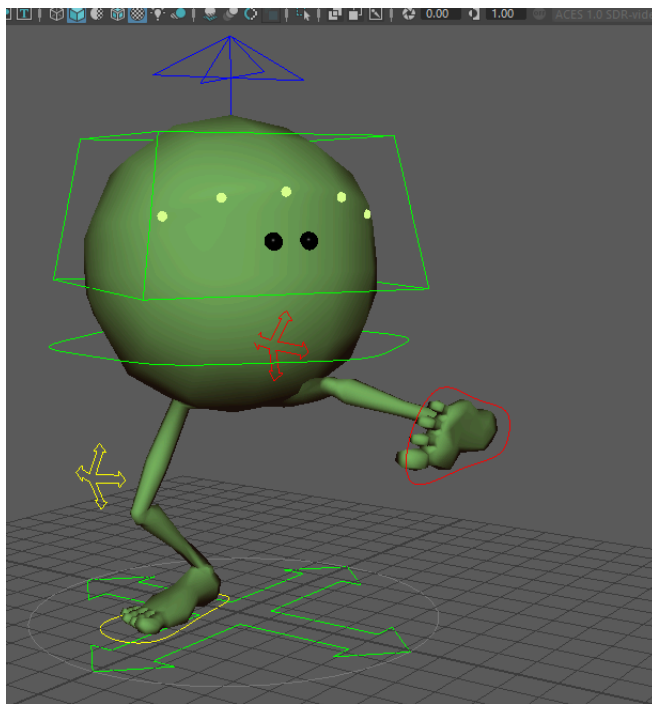


Posing

Posing monty

Now we can use all the tools you've read about to pose Monty. Have a go at just playing around with rig and moving the controllers around. Digital animation can be pretty much summarised to timings and poses. Focus on creating strong poses (this hits a number of the 12 principles of animation).

Here we have 'Martial Arts Monty' and 'Ballay Monty'.



Posing Tasks

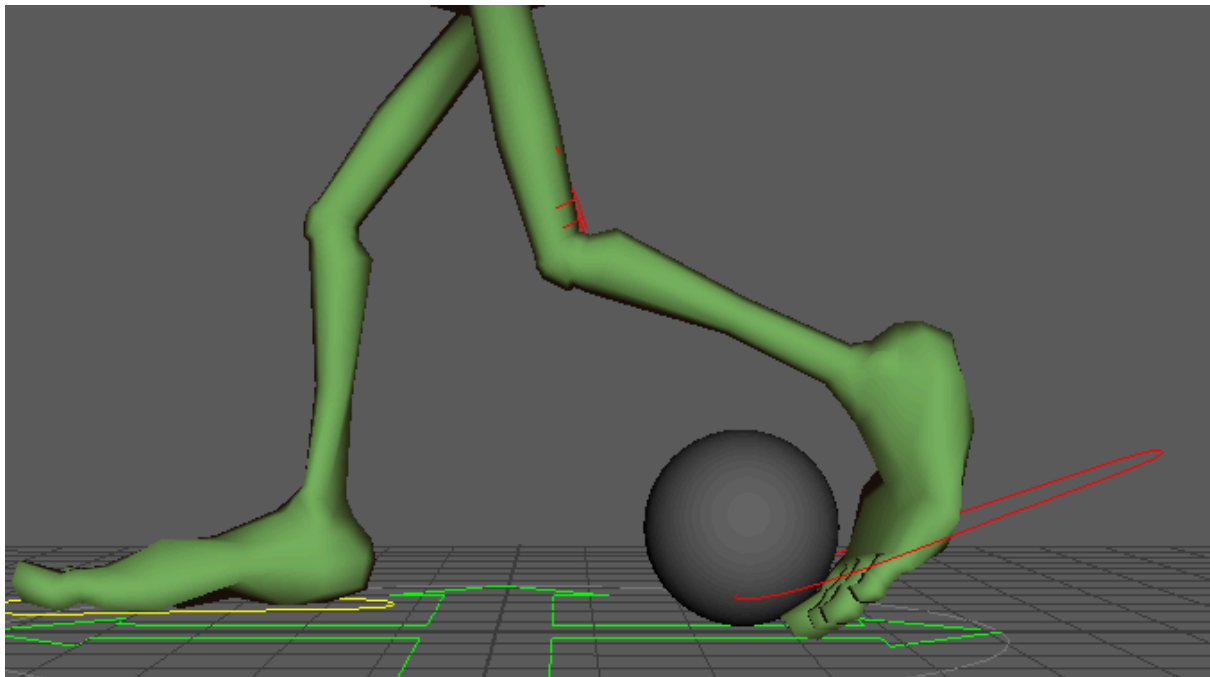
Your first set of tasks will be to pose Monty in various poses. Getting used to how a rig works and being able to pose them convincingly are key to being a good animator.

Take a screen shot once you've completed each pose and upload it to your blog.

Top Tip: Use reference!!! No shame in getting a reference picture to help you!!

Task 1 - Pose Monty like they're about to kick a ball

Your first task is to pose Monty like they're about to kick a ball. Remember about the roll controls on the channels tab to help you get a convincing kick.

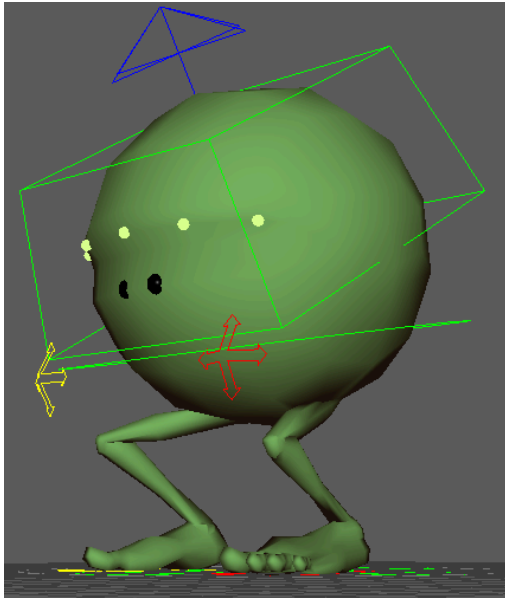


Tip: Create a sphere to help you figure out where a ball would be

Tip: Show>Viewport>Joints will enable you to angle the foot

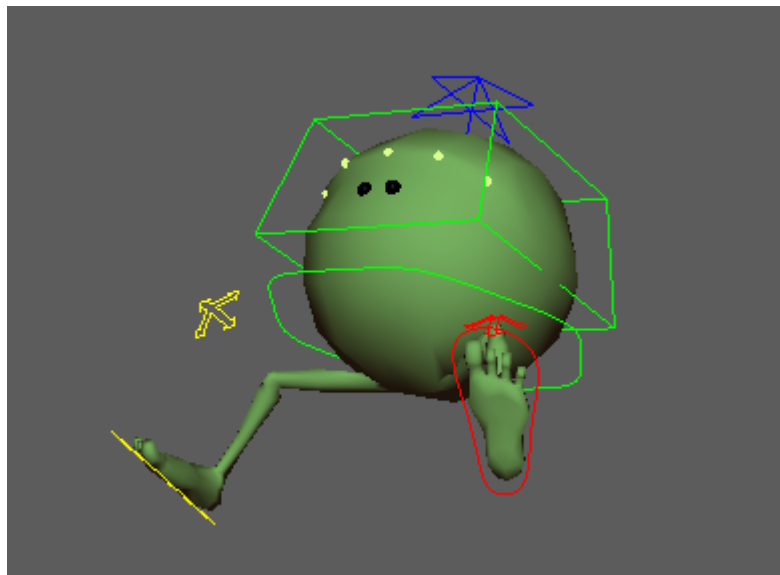
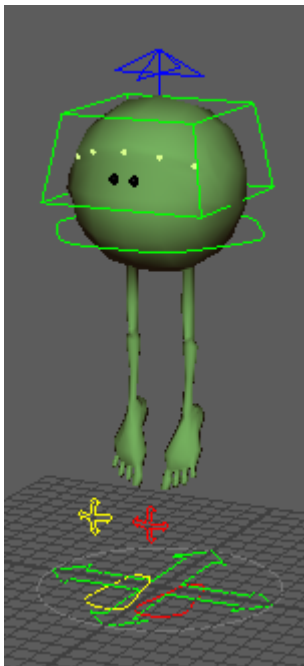
Task 2 - Pose Monty getting ready to jump

Your second task is to pose Monty like they're about to jump. Make sure to get the crouch right - make sure of the main body control to crouch your character down. This should also bend the legs for you. Again we are trying to make the pose look as natural as possible - think about if Monty was to jump, would they land safely? (consider where the feet are and Monty's balance)



Task 3 - Pose Monty mid jump

This next pose is a follow on from the last. You now need to pose Monty like they're in mid air for the jump. Now consider - the way you position Monty's legs will tell us about the jump - is the jump controlled? Wild? Excited? Exercise? Look at reference images to get an idea of the tone you want to convey.



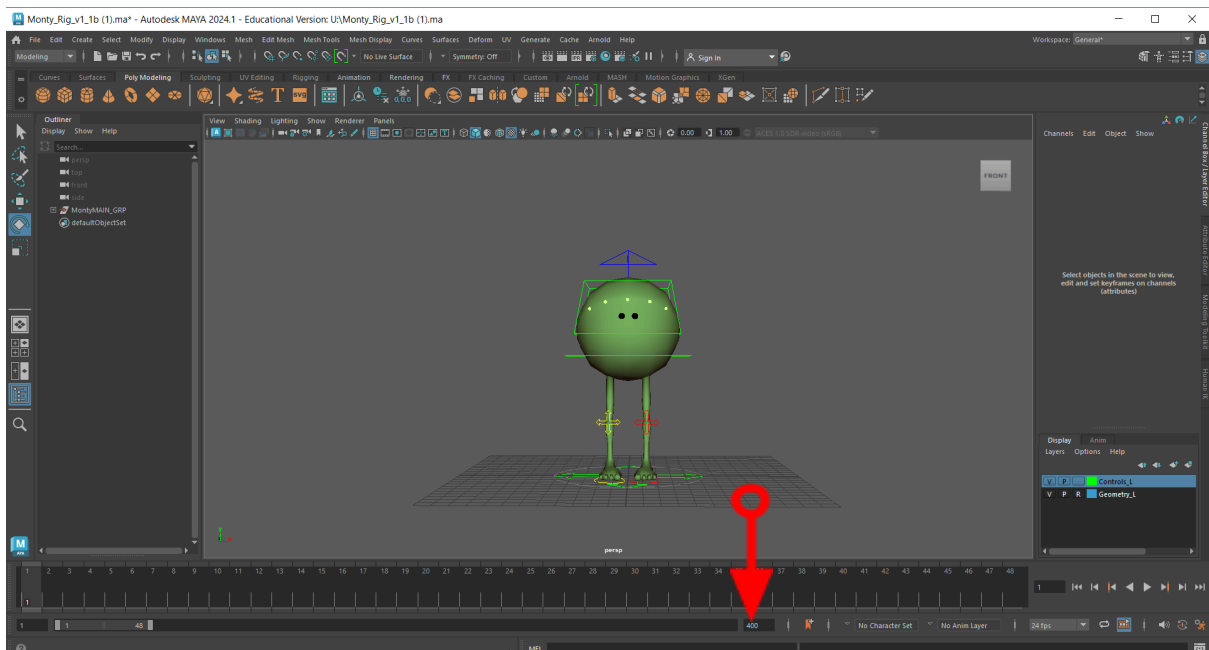
Animating

Now that you are used to posing and moving around the rig, it is time to animate the rig. For this exercise, think of animating as going from one pose to another. Like with the jump posing. We just need to time it nicely and create in between poses to smooth the animation out. Below will be a step by step of how to animate Monty.

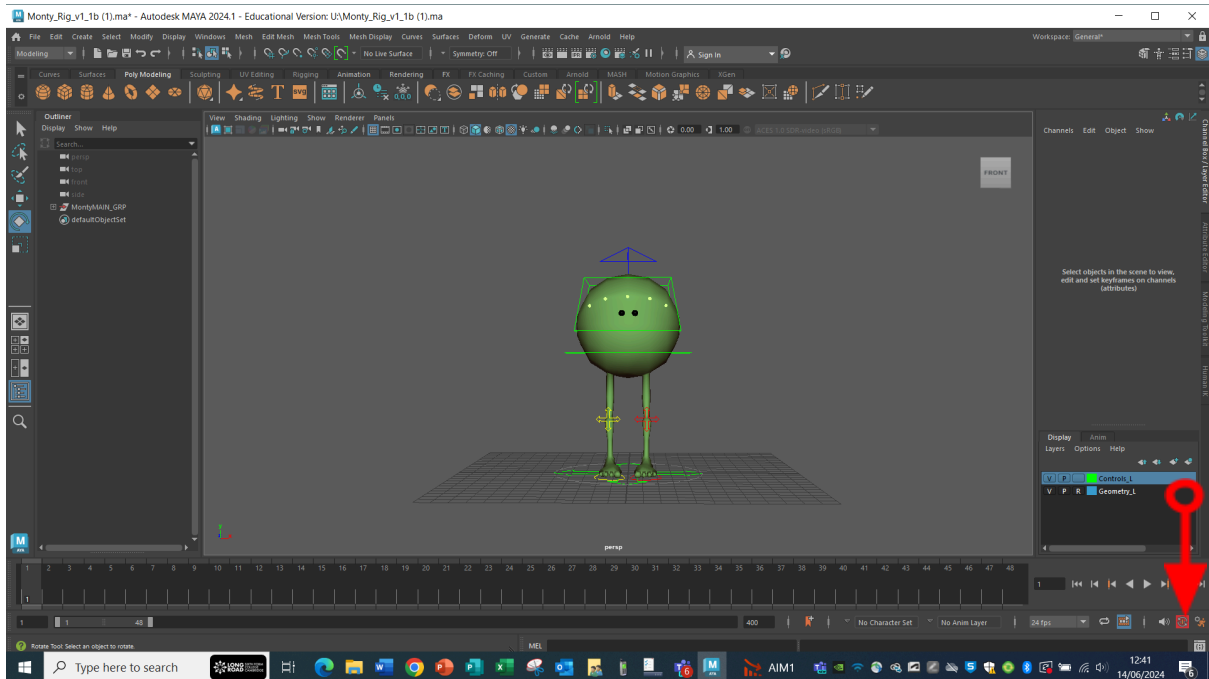
Animation Control

First we need to set up Maya for animation. This will involve creating lots of extra frames and turning on autokey.

1. Firstly we need to give ourselves enough frames. At the bottom of the screen there is your animation timeline and below that a little navigation bar. To the right of the bar is a small box where we can enter how many frames we want. Type 400 for now(if you find you need more you can change this later). The red arrow shows you where to do this.

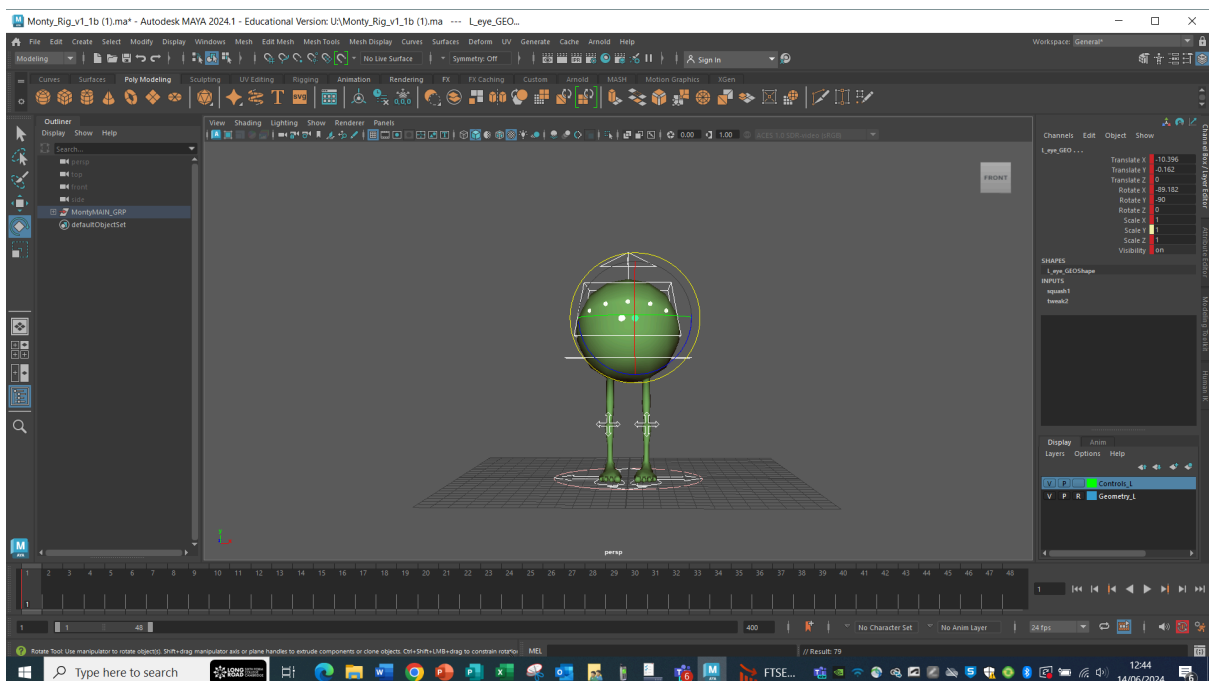


2. Now the next step is to turn on the auto key. Normally you would have to create frames yourself. But Maya is great because it saves the key and the movement for you. You just need to turn it on. Once again look for the red arrow to show you where to click. If the button is on, it will have a red background like in the image.



Setting all frames

3. Before animating. We need Maya to remember the default position of our character. Make sure you are on frame 1 on your timelines.
4. Then draw a box over your character and all controls.
5. Then press the "S" Key on your Keyboard. That will set all the bones, controls and movements.
6. You will notice a little red line appearing on your timeline.



7. Move to frame 1 to begin animating.

Task 4 - Animating a Jump: Step by Step

When animating, it's best to break down the key positions in the movement you are animating. For a jump we would have:

1. Crouching - getting ready to jump
2. Mid air jump
3. Landing

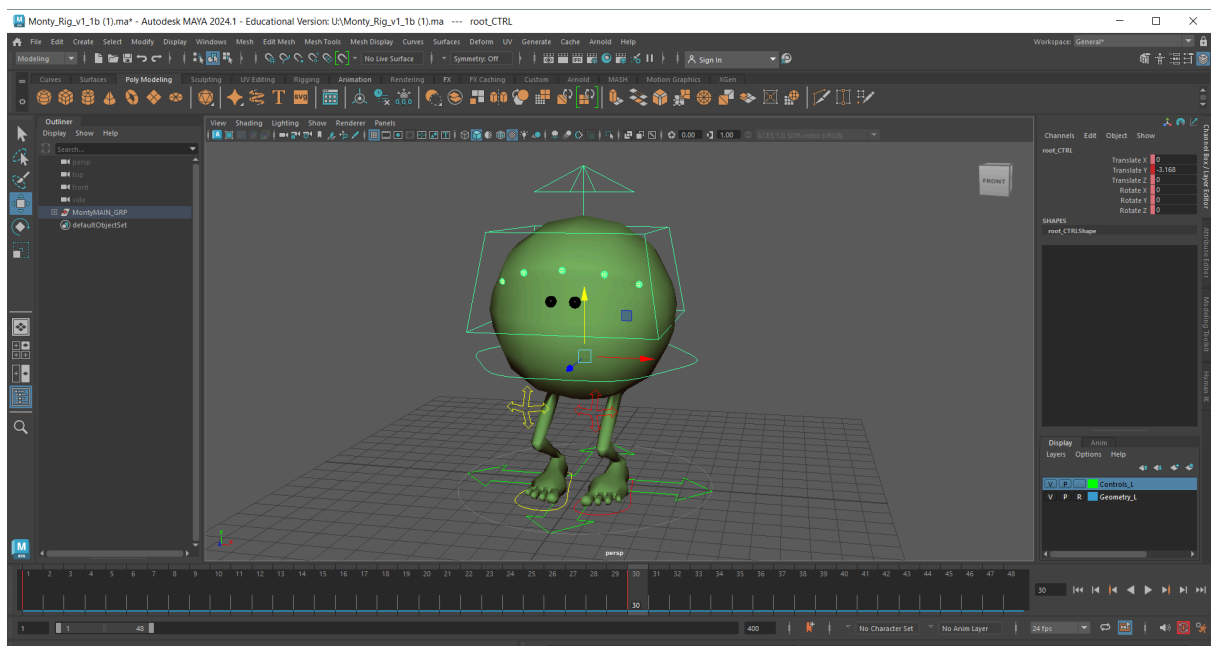
These will make our extreme poses.

Step by step

1. Making sure we have set our frames on frame 1, lets shuffle the timeline to frame 30 (we will smooth out timings later).

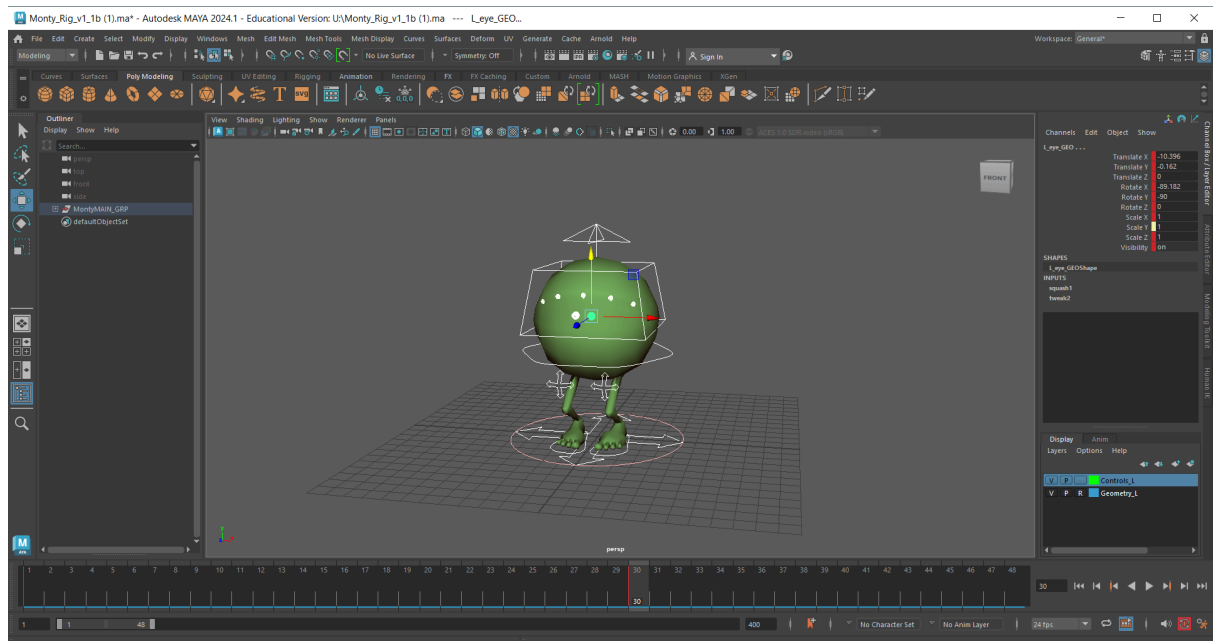


2. Now let's put our character in the crouching position getting ready to jump.

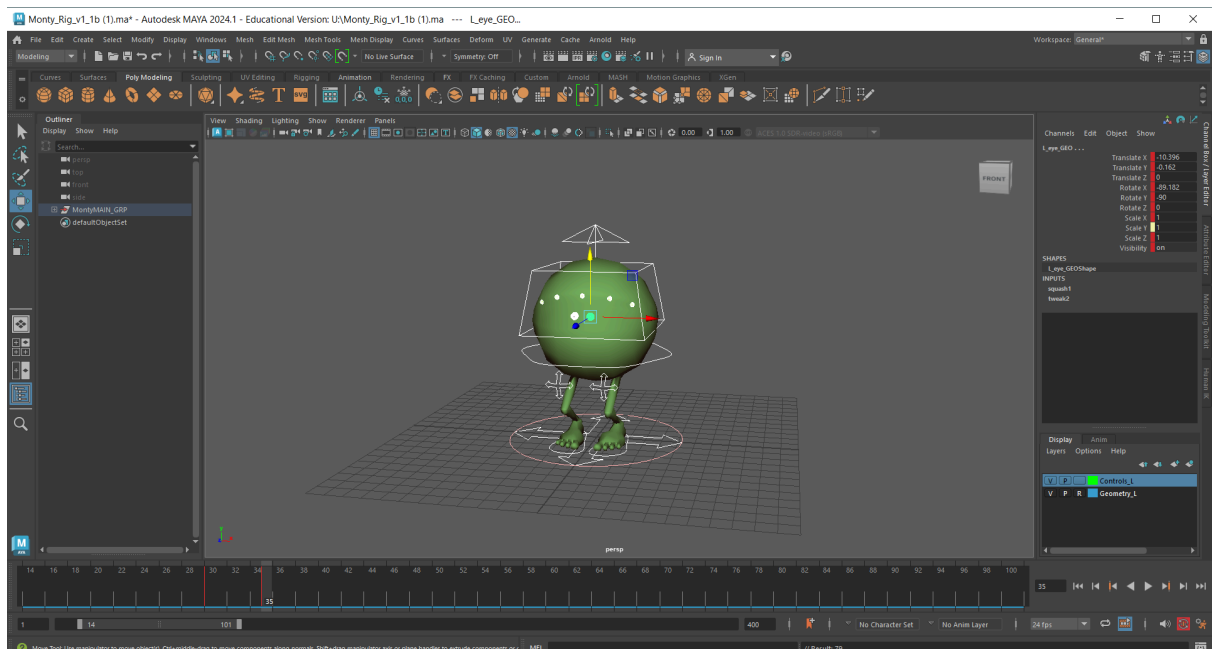


3. Now if you drag your mouse across the timeline while holding the left bottom. You will see your character has started moving and is now crouching down ready to jump. Maya has done all the inbetweens for you.

4. The next step is to set all the keys again - this ensures Maya will remember the pose and position for every limb. If you do not do this then Maya will animate from the last set key - at the start.
 - a. So at frame 30, draw a box over your model and controllers
 - b. Then press S to set the key.

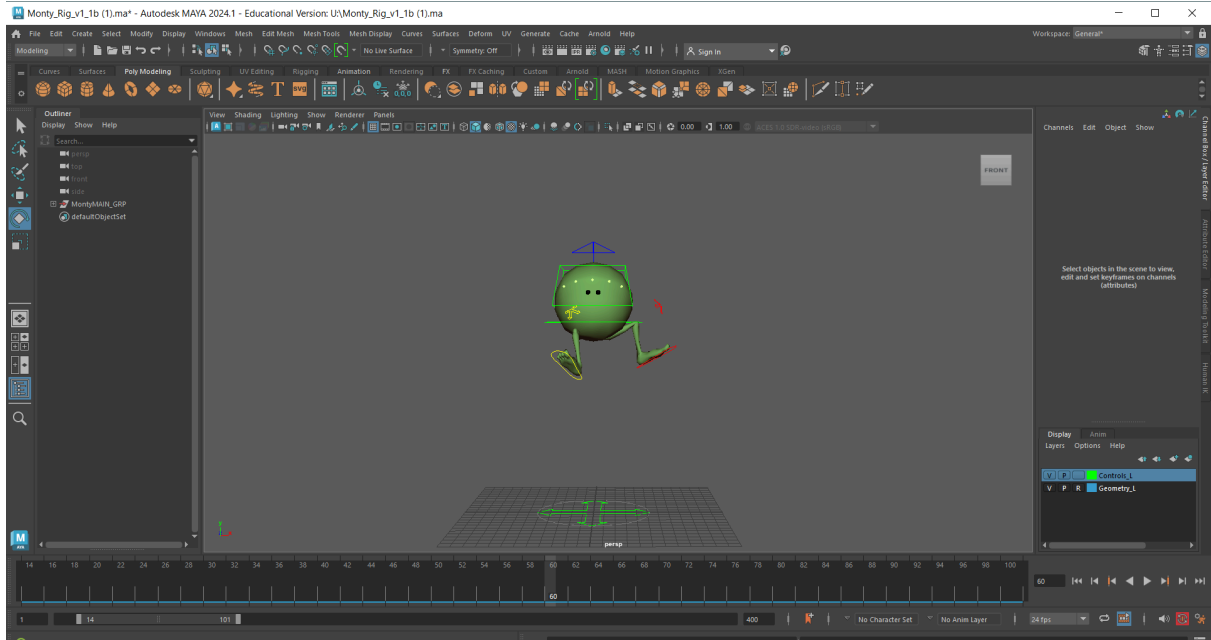


5. Next let's move the frame along 5 frames. To Frame 35. Then we will set all the frames like we did before. This is to create a quick pause between when the character crouches and when they jump into the air - this creates anticipation - another one of the 12 principles.

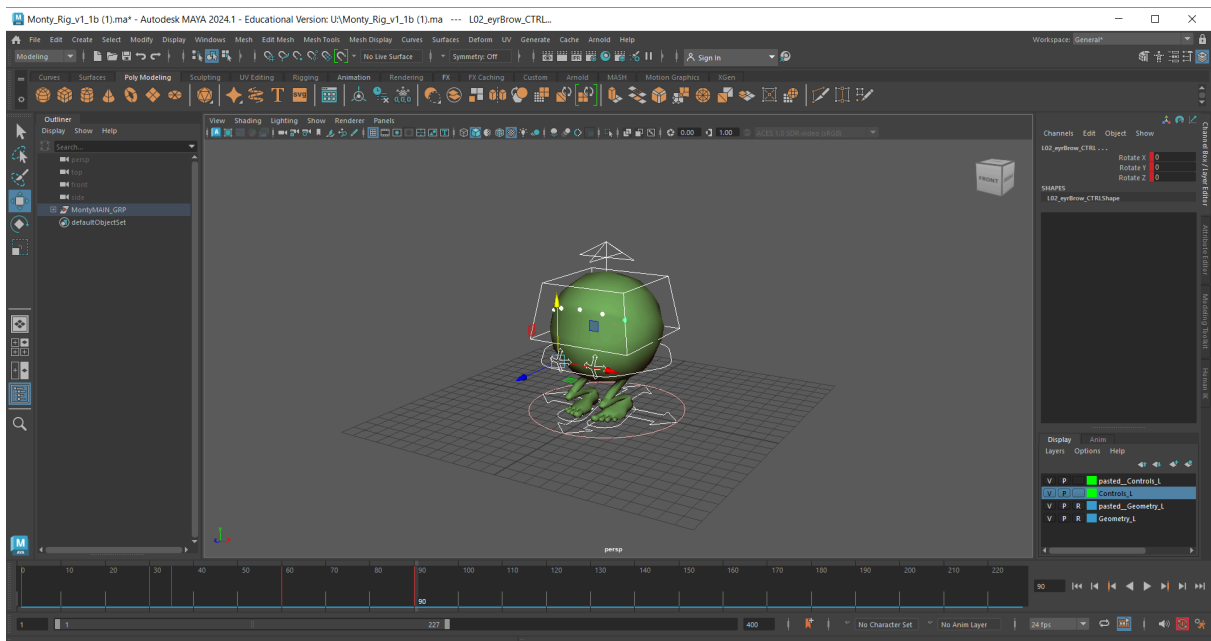


6. Lets move the timeline along to frame 60.

- a. Now we want to pose our character in mid air - mid jump. Like you did earlier.
- b. Once you have posed your character, you need to once again set all the keys. Draw a box over the character and press the S key. Make sure you are at frame 60.

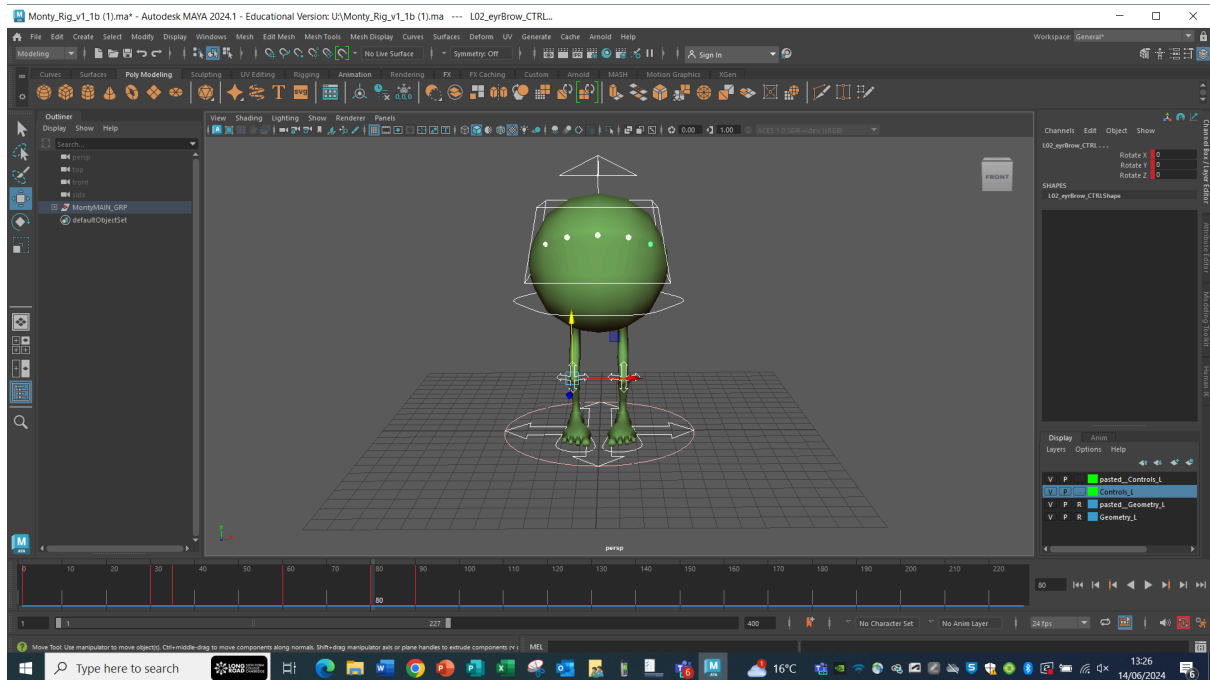


7. Now let's create the landing.
- a. As mentioned before you might want to have Monty land normally, or you might want Monty's footing to be off to make them look clumsy. It's up to you!
- b. So let's move to frame 90 and pose Monty landing.
- c. Make sure to have Monty crouch when they land and set all keys!!

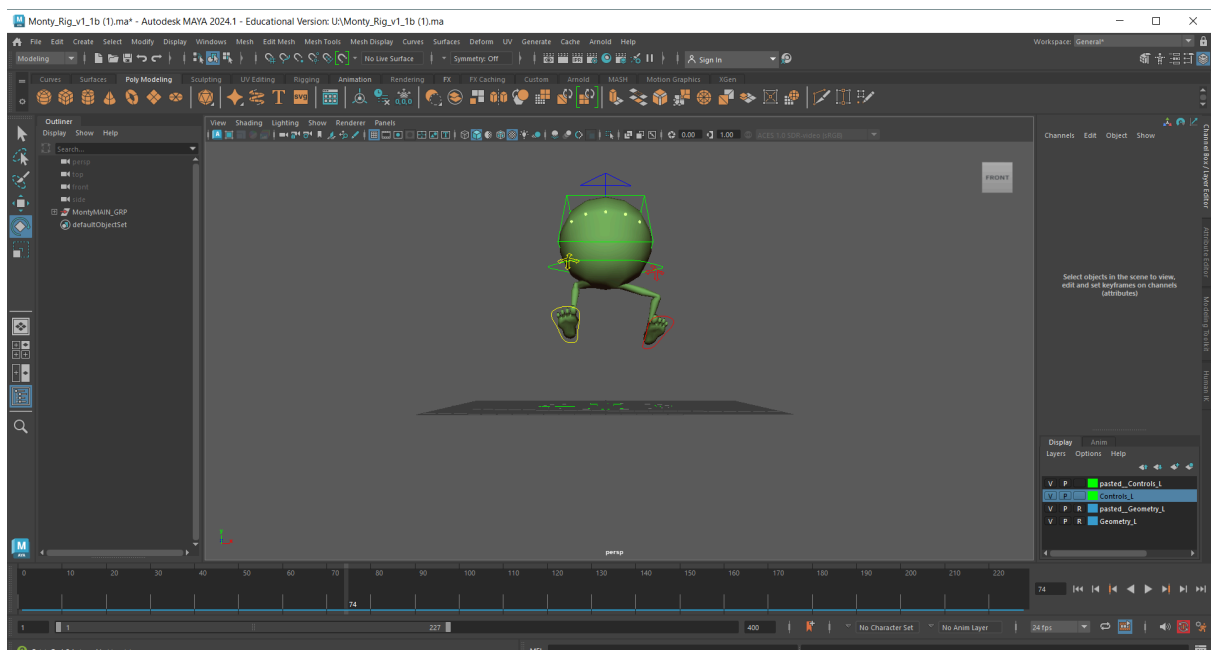


8. Now scrub through your animation. Its looking okay but a bit janky in places. Particularly the end.

9. Typically when we land a jump, we land first, bend our knees to absorb the impact and then return to a standing position. We don't land in a kneeling position. Now we need to go back and fix our animation to look more realistic.
10. Go to slide 80 and create a pose of Monty's feet landing but not crouching down yet. Remember to set all keys afterwards.



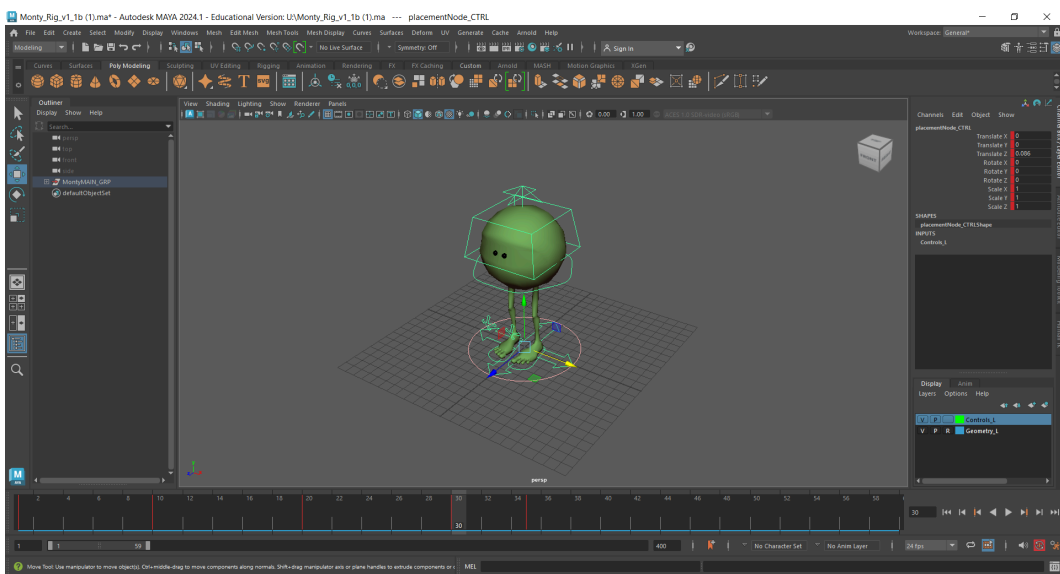
11. You have added an inbetween frame. Now its time to go through and add in between to various parts of the animation to smooth it out. For me, I think the feet go flat way too quick between the mid air pose and the landing pose. So I will reposition the feet to make it look more natural.



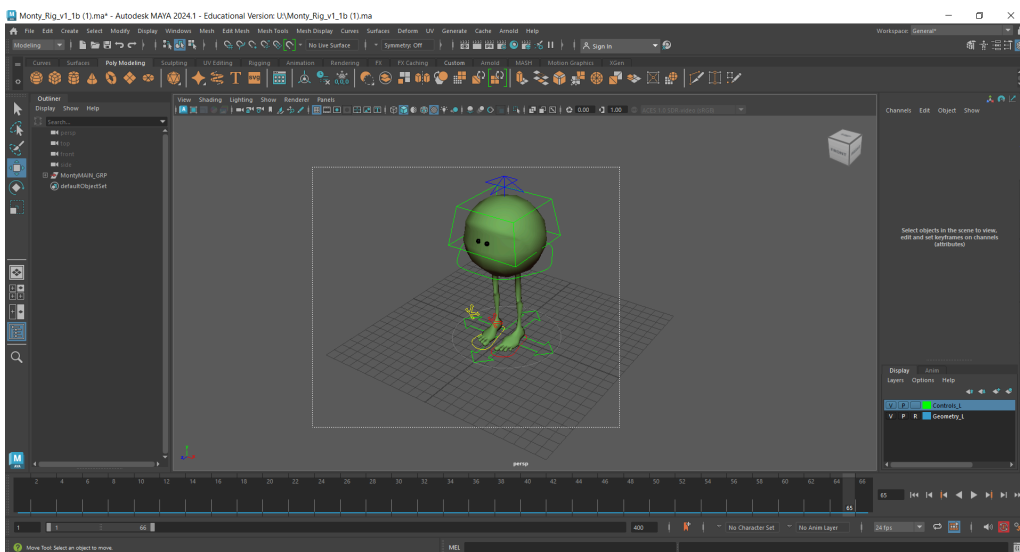
- Note - this is the longer part of the animation process and you might find you have to reposition several of your key frames, including your extremes to get your animation looking smooth.

Adjusting Timings

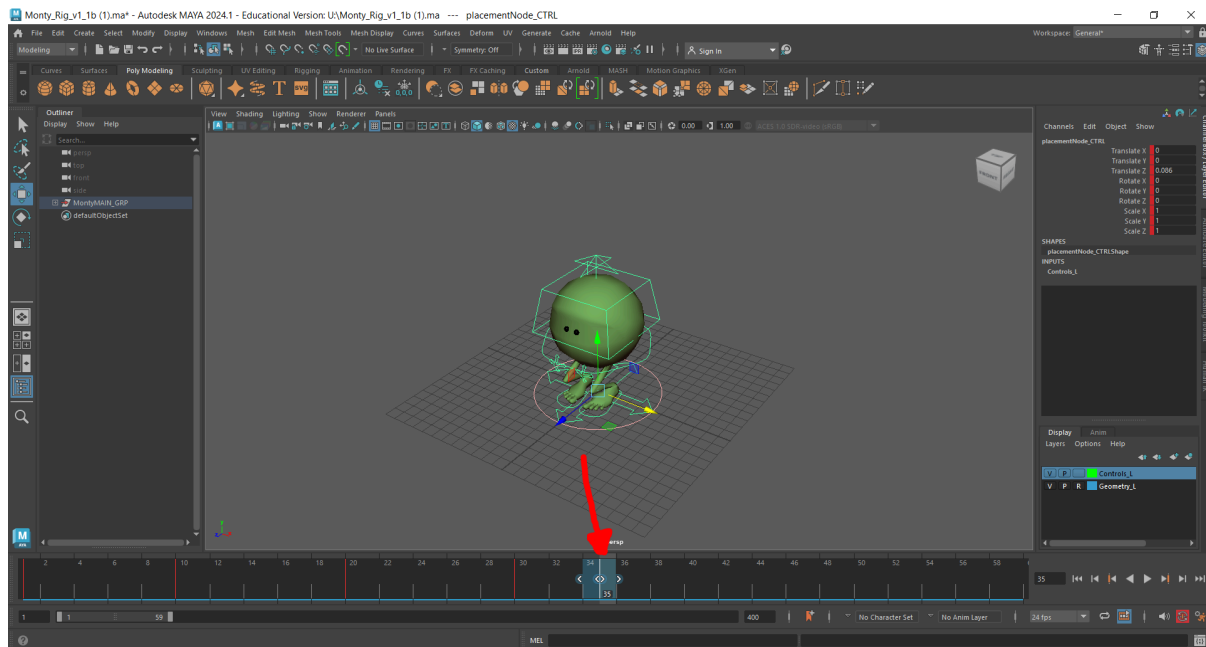
- Now you're probably going to find that the timings of Monty don't quite work. They could be too fast, too slow, maybe you want to move one of your keyframes to be slightly later or earlier to make the animation look smoother. In this next session you will learn how to adjust keyframes to adjust Monty's movements. Your keyframes are the little red lines on your timeline.



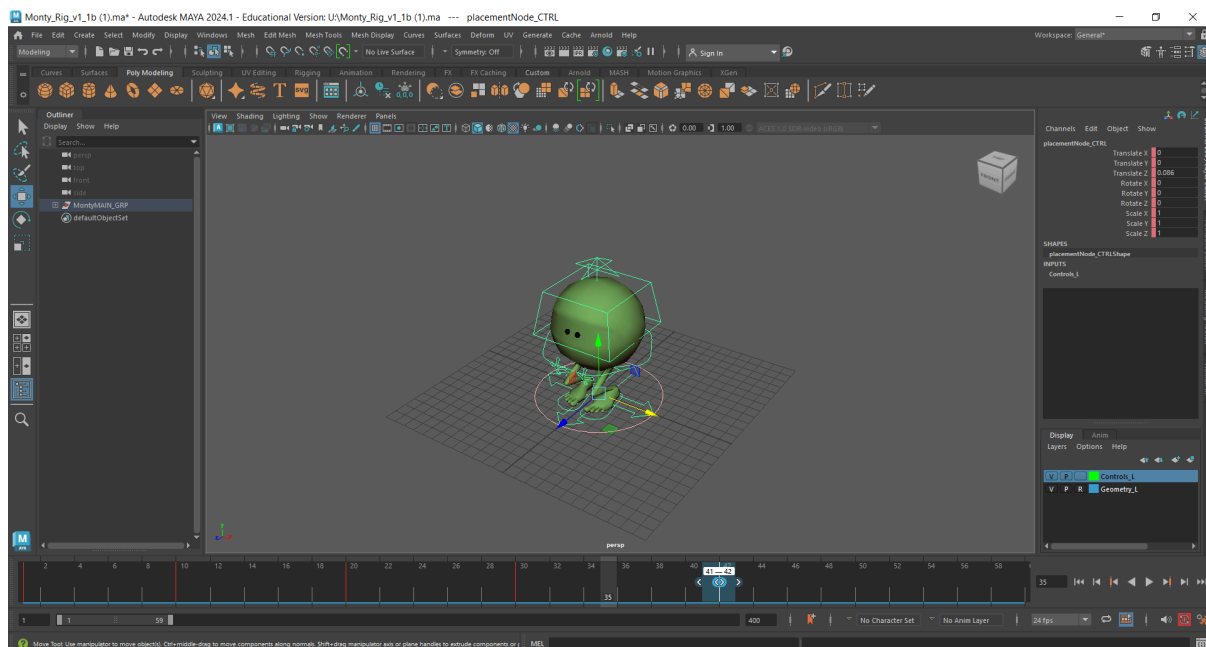
- To begin, you **must** have all the controls selected. So in the main maya viewport draw a box over Monty, making sure you include all the controls.



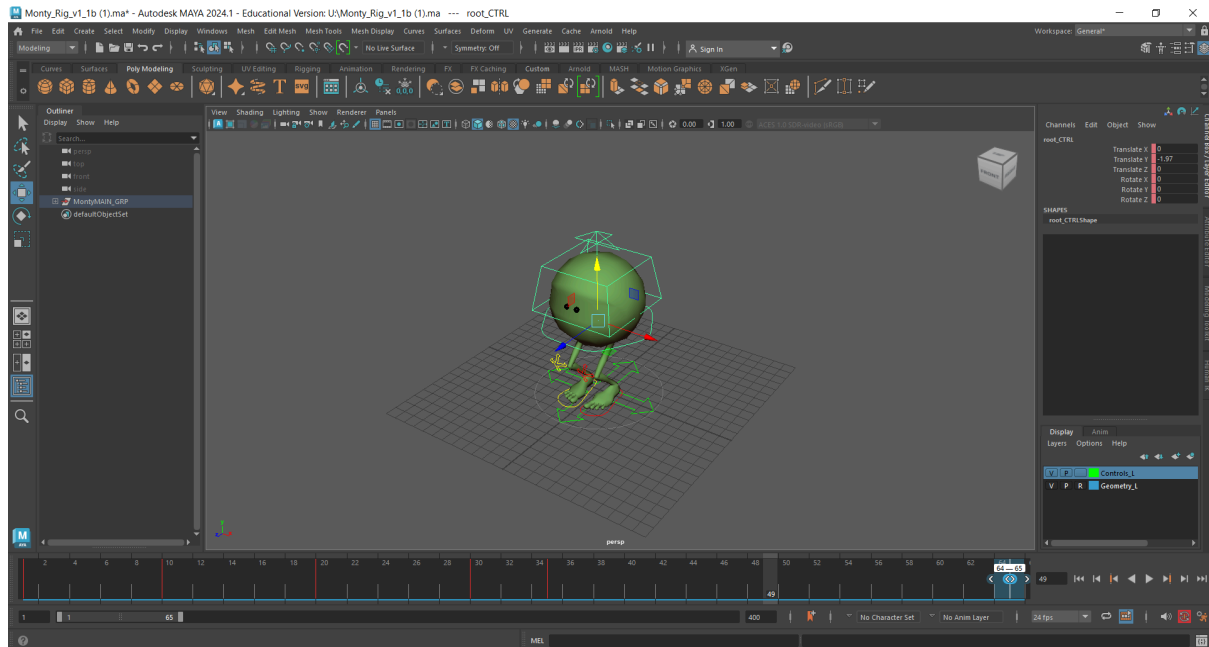
3. For this tutorial we will be focusing on the timeline. The controls for this section are a little fiddly. We will be making use of the “shift” key. On the left of your keyboard it's the one with an arrow facing upwards. To adjust a singular frame, hold shift and drag your mouse over the frame you wish to move. Make sure your mouse is over the timeline.



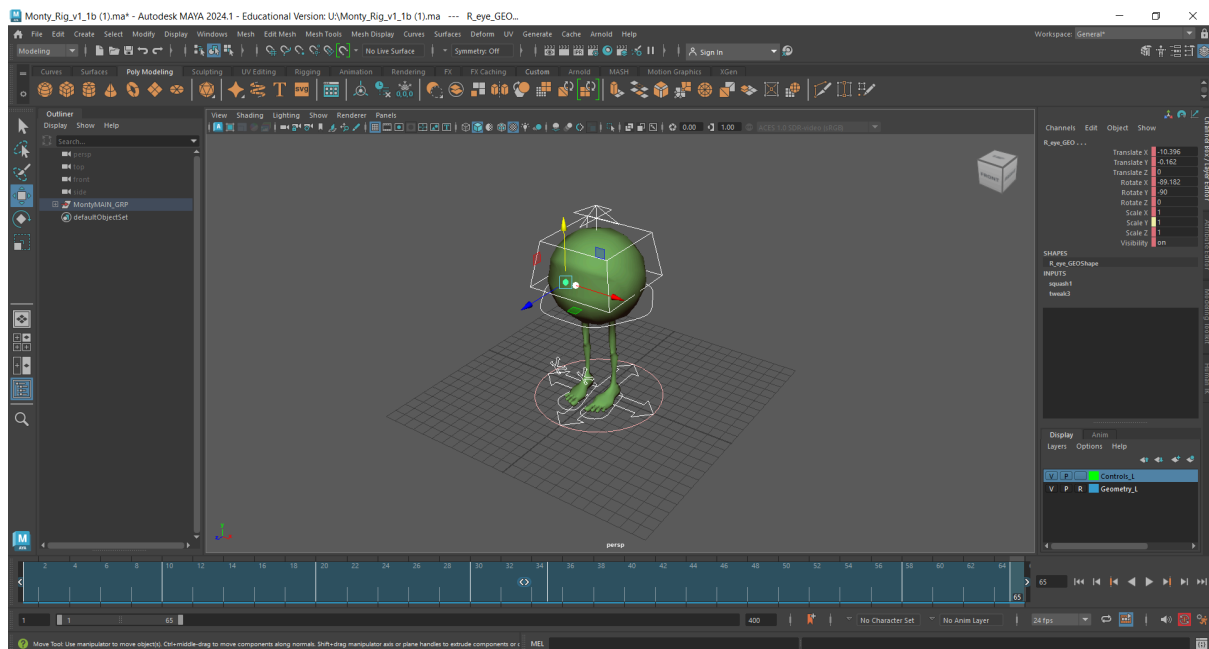
4. You should now notice the frame you wish to move is highlighted in blue. There will also be a set of four different arrows next to your frame. For now just use the inside arrows.



5. If you move your mouse over the two arrows in the middle they will highlight in a lighter blue. If you click and hold those arrows you can now change where the frame is. This adjusts how long it takes to get to this frame from the previous one. If you drag it to the right, you will be making your animation longer. If you move it to the left closer to a previous frame you will make the animation quicker. Adjust your frames to make your animation more realistic now.



6. Next we are going to have a go at adjusting the entire animation. As you did before, hold shift and drag from the right to left to cover all of your frames.



The screenshot displays the Autodesk Maya 2024.1 interface. The main viewport shows a 3D character model with a green body and a white head. The character is standing on a grid. The interface includes the Outliner, Hierarchy, and Properties panels. The timeline at the bottom shows a keyframe at 200 seconds.

The screenshot displays the Autodesk Maya 2024.1 interface. The main viewport shows a 3D scene with a green sphere and a character model. The sphere is selected, and its transform properties are visible in the Properties panel on the right. The Outliner on the left shows the scene hierarchy, including the selected sphere and other objects. The timeline at the bottom indicates the current time is 65 seconds. The interface is in English, and the workspace is set to 'General'.

Task 5 - Animating a Walk Cycle

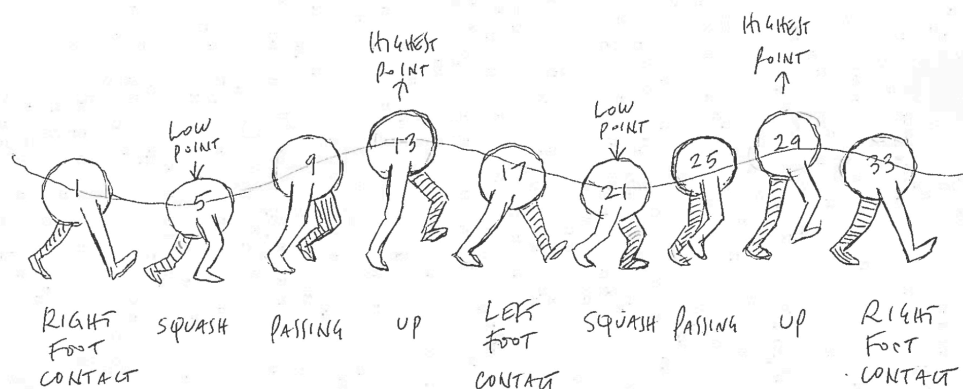
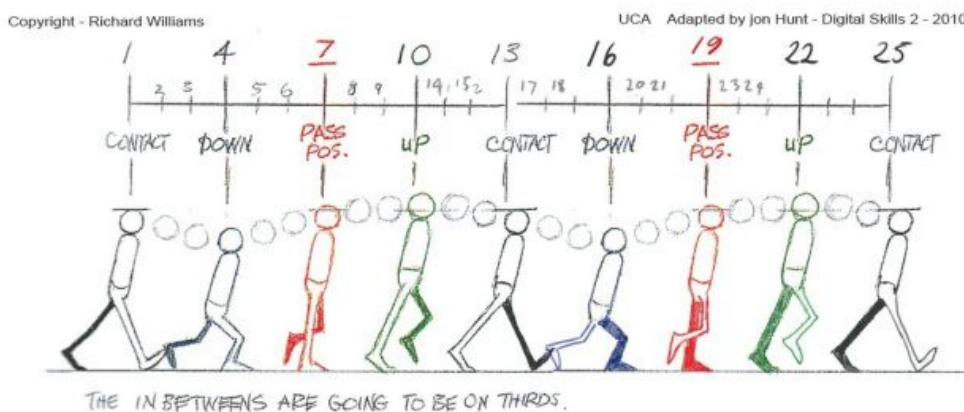
Using the knowledge you have gained you must now animate Monty walking. Walk cycles are common in the animation industry - it's a great way to demonstrate weight and motion in your character.

Use this diagram by Richard Williams to help you get the posing correct. I would also recommend that you move your viewport to have a side on view of your character.

TO DO: Screenshot your animation process and upload to your blog to show your progress.

Tips and hints

- Make sure you turn autokey on and that you set your keys
- Notice how there are numbers at the top of the diagram. These are your frames.
- Each number depicts an "Extreme" pose - animate those first
- Once you have completed each extreme, go back and tidy up the animation, some of the leg movements will look a little weird
- Record yourself or a friend walking past if you are struggling with movement - try to use a slow motion feature on your phone for a better result
- Make use of the rolls mechanics on the foot controls
- If you get stuck or can't remember anything - look through this tutorial again



16 frame walk cycle with "Monty"

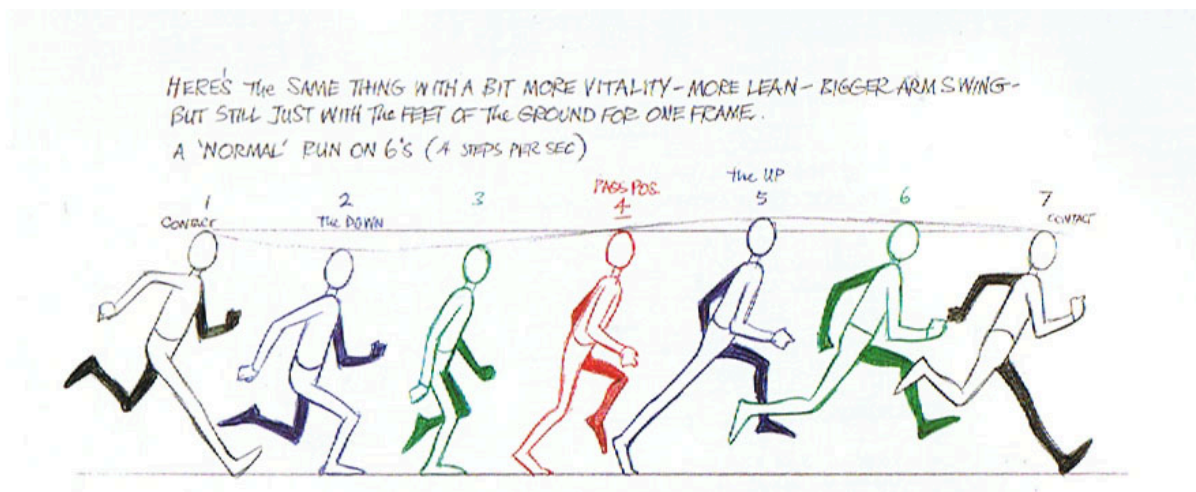
Task 6 - Animating a Run Cycle

Your next task is to animate a run cycle. Much the same as a walk cycle but we want to convey the sense of speed and motion. The weight and lean of the character will be much different here.

TO DO: Screenshot your animation process and upload to your blog to show your progress.

Tips and hints

- Make sure you turn autokey on and that you set your keys
- This one hasn't got the timings made for you, so you will need to think about the timings yourself
- Once again, lay out the extreme poses and then go back and do the inbetweens
- Make use of the timing adjustments



Task 7 - Animating a tired/confused/scared Monty?

You choose: inject some character into your rig

BRIEF

YOU HAVE A CHOICE

Task 8 - Bring both your modelling skills and your Monty rig together

Create a scene for Monty to interact with

Render out and export into Premiere

Add music and sound effect.

If you wish you can find a different rig to add to your scene

[This](#) is a good source of rigs

[Here](#) is a nice one that comes recommended

Suggested models that may be of use: <https://itch.io/game-assets/free/tag-3d>

You will need to email IT if you're downloading Maya files that are in RAR format.

3D files come in many formats, only some work in Maya (other 3D software you may wish to explore are Blender, Cinema 4D, 3DSMax. Some are more suited to architecture or product design, eg AutoCAD)

OR

Task 8

Using inspiration from the [Game of Thrones](#) title sequence, create a 3D animated 15-30 second opening.

Export and add music in Premiere.

You can use existing [models](#) if you need but would need to reference them

REMINDER:

You will need to render out from Maya and add music in Premiere

https://www.youtube.com/watch?v=8ht_Gp6P9DY