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Tech paper
Fall 2019
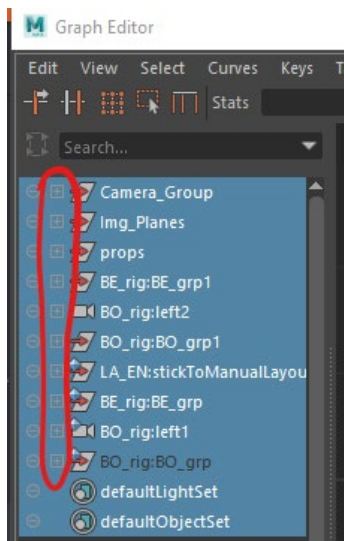
Contents

Part 1: Retiming Methods

Retiming an entire Sequence Uniformly

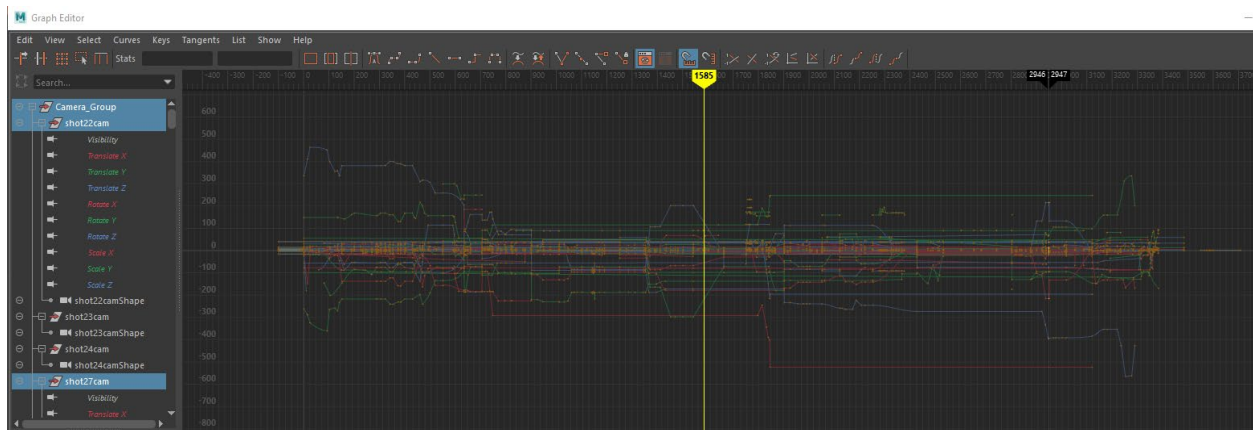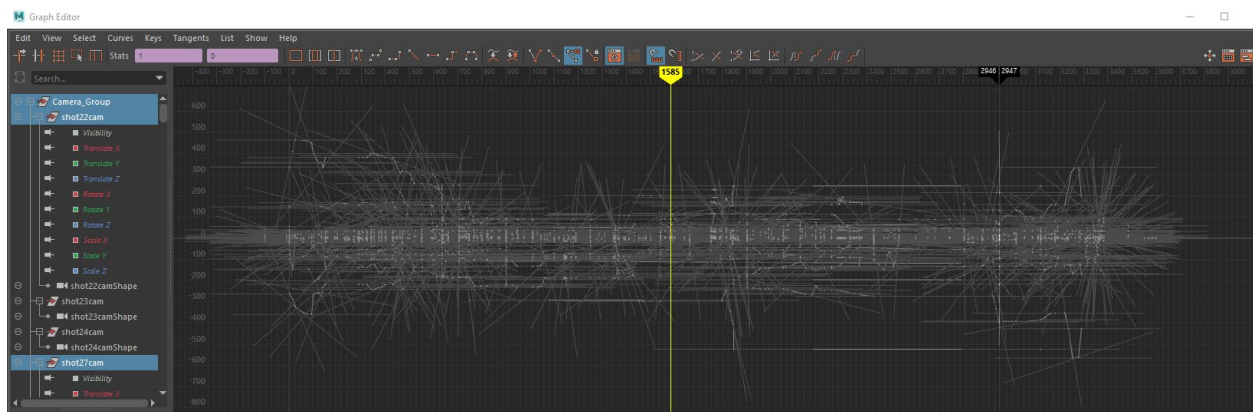Select everything in the outliner.
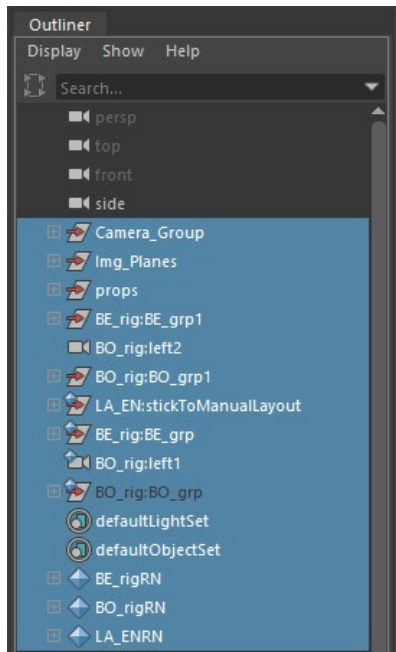
In the graph editor, hold shift and click all these little plus signs. I recommend clicking on them from bottom to top so you don't have to scroll through anything when they expand.
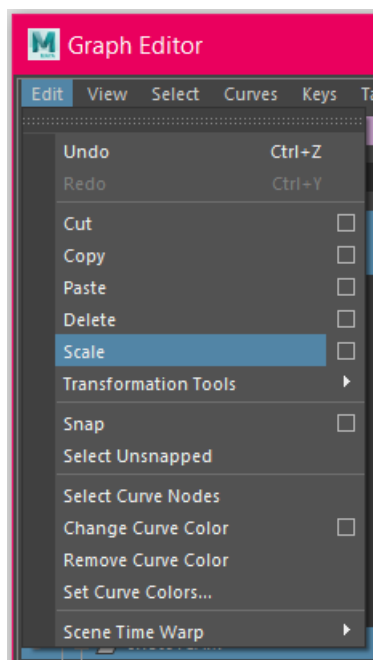

Now ALL of the curves for anything that's been animated in your scene will show up in the graph editor.

Click and drag over all keys to select them.

Edit > Scale options box

Look at the boxes next to Time scale/pivot. The first box is the amount you want to scale by. The second box is the frame you're starting from. For example, if you want to make everything after frame 0 twice as fast, type in 0.5 in the first box and leave the second box at 0. Write down or remember the number you've scaled your frames by – you will need it later.

Press scale keys.

In the graph editor, click Edit > Select unsnapped. It may take a minute to select them all.
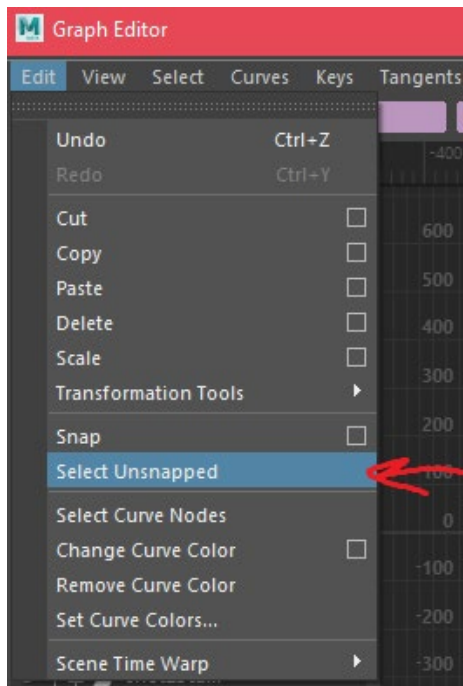

Click Edit > Snap. This may also take a while.

Warning: If there are multiple keys sitting between one frame, Maya may not snap all of them. If this happens, you will have to manually delete some of those keys, then snap them (I have not found an easier solution). If you are speeding up your sequence, be on the lookout for this.

Now all of the keys are scaled, but the shots in the camera sequencer no longer line up with the action.

Before continuing, make sure there are no gaps or overlaps between any of the shots, and remove any unnecessary shots.

Select the first shot and look in the Attribute editor.

Multiply both Start Frame and End Frame by the amount that you had scaled all of your keys by earlier. For example I scaled my keys by 0.5, and I have a shot from frames 3119 to 3170, now it will be from frames 1559 to 1585 (Note: 3119 * 0.5 comes to a decimal, but the keys were then snapped to frames, so it could have either been 1559 or 1560. I don't know how Maya decides this, so I just try one and see if it looks fine or if it is one frame off.)
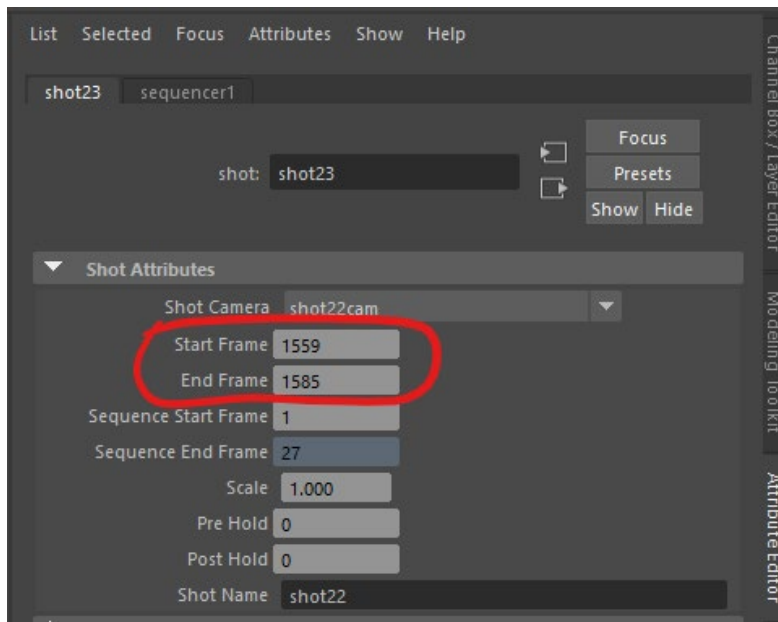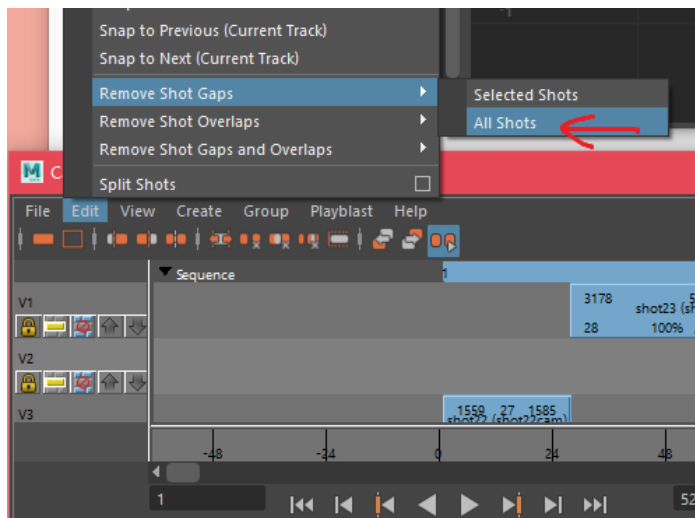
Do this for every shot.

To remove all of the gaps
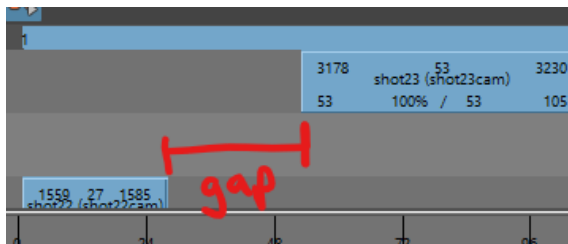
Edit > Remove shot gaps > All shots

Now just watch through your sequence to check for errors.

Scale tool in graph editor

Select the keys you want to scale in the graph editor.

Press "R" to activate the scale tool

Hold down shift, MMB click at the frame you want to scale from (the pivot) and drag. Dragging towards the pivot will squish the keys towards each other and dragging away will stretch them further apart in time.

Edit > Select unsnapped. Edit > Snap.

This method is much more imprecise, but it works well for quickly retiming sections of animation.

Retiming tool in graph editor

This method is also imprecise, but it is helpful for when you want to retime only a section of a sequence (for example if you only want to retime one shot).

Click this button in the graph editor. It is the retiming tool.
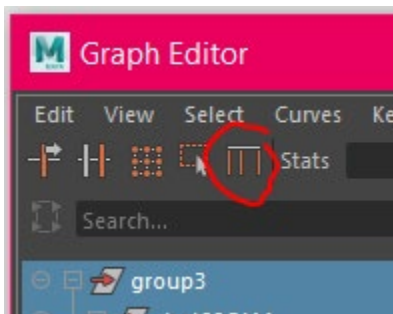
Double click at the starting and ending frames of the section you want to retime.

If you mistakenly put one in the wrong place, you can click the little X at the bottom to remove it, then double click on the correct frame to add it where it should go.

Click and drag the fat part of the yellow bar to retime a section. Take a note of the original end frame and the new one after the action has been retimed.

The frames in between the two yellow bars will be retimed according to where you drag the bars to be. This is similar to scaling them, but it also moves the frames after the section being retimed. If you had just used the scale tool, you would have to manually move the frames after the section being retimed to avoid overlapping frames or having a gap.

Edit > Select unsnapped. Edit > Snap.

Take a note of the original end frame and the new one after the action has been retimed.

To get the shots in the camera sequencer to line up with the action after it has been retimed, change the frame numbers on the specific shot to the new frame numbers. Then, you have to change the frame numbers on any shots with frames that have been affected by the retiming. Calculate the difference in frames made by the retiming, and change the numbers on any affected shots accordingly. (For example, if the shot used to be from frames 1 to 10 and is now from 1 to 5, there is a 5 frame difference. Subtract 5 from the start and end frame of every shot after this shot).

Retiming in the camera sequencer

The camera sequencer allows you to scale the timing of a shot. It is recommended to not do this, because it makes it difficult to animate later on, and will give you unsnapped keys. Any time we had done this, we undid it later on by actually scaling the keys in the graph editor using one of the above methods. This method is only useful for quickly experimenting with timing within a sequence while still in the layout stage.

There are 3 ways to do this.

> #1. Double click on the "100%" on the shot in the camera sequencer. Type in the amount you want to scale the shot by. For example 50% will speed up the shot to double speed.

#2. Hover your cursor over the bottom right number. It should change to a double headed arrow. Click and drag to change the timing to whatever you want it to be. You will notice the number from the #1 changes as you do this.

#3. Click the shot, then look in the attribute editor. Change the value next to scale to whatever you want to scale the shot by. For example, 0.5 is double speed (It is the decimal version of the percentage from #1).

Part 2: Problem Solving

Overview:

Part 2 of this tech paper will cover problems that were brought to me while working as the layout lead of our film. Often, the problems were very strange and specific to our files and could have been prevented with a few changes made while setting up our files. I will explain how to fix a couple of the problems that were encountered, as well as some steps to prevent them from happening in the first place. Even though it is unlikely for another team to come across these exact issues, I hope that in explaining how they were fixed, I can give some insight on how to detect the cause of similar issues and figure out solutions. Overall, both of the following problems deal with references, and are solved using the node editor.

Problem #1: Stubborn green objects
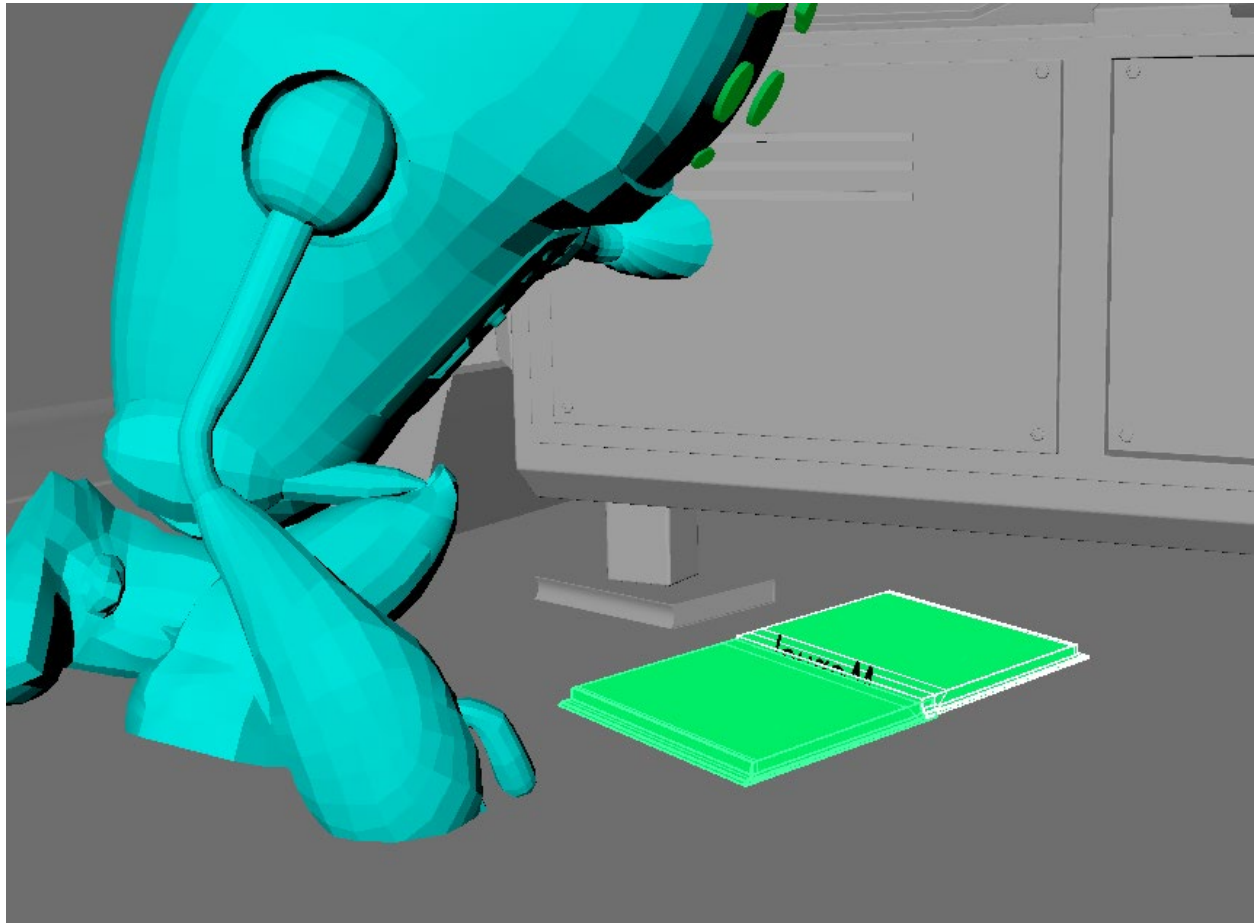
In general, if an object is neon green, that means it does not have a material applied to it. Normally the solution would just be to apply lambert1 to it (or whatever other material you want it to have). However, with the issue that we were facing, this did not work.
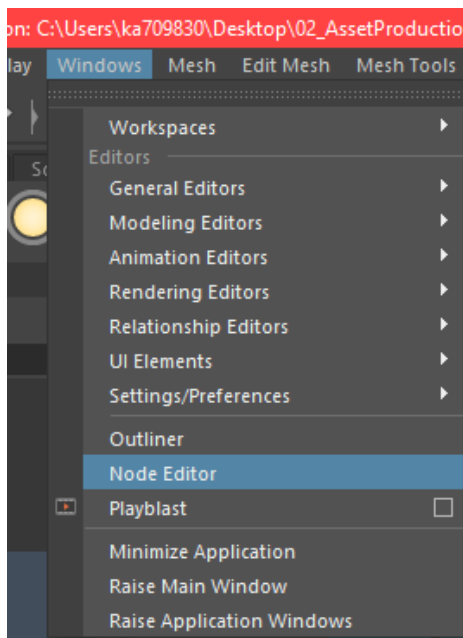
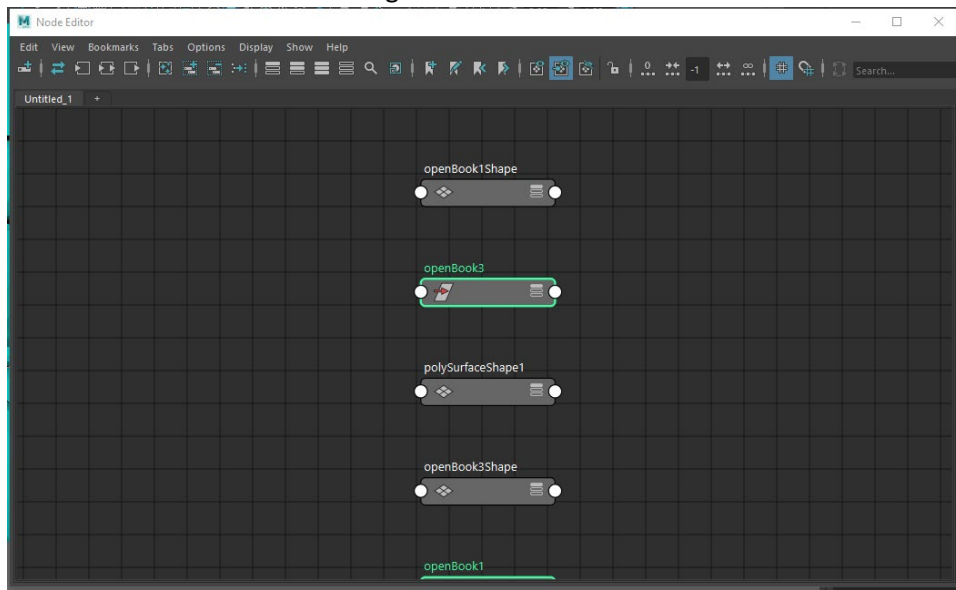(To apply lambert1 to the object, right click it in the viewport > apply existing material > lambert1)
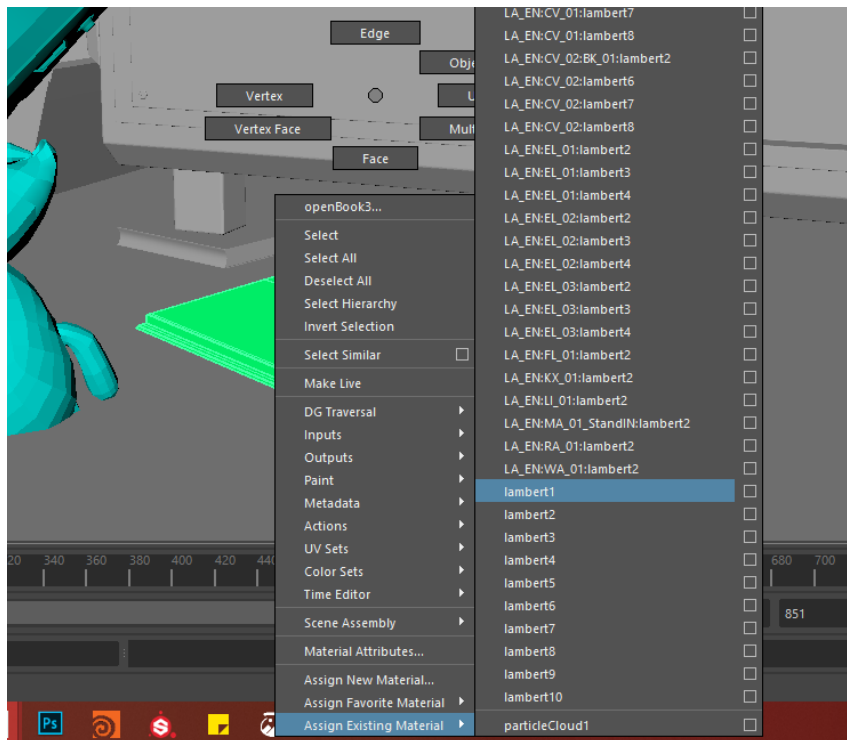
Doing this did not apply to lambert to the object, and the book is still green.
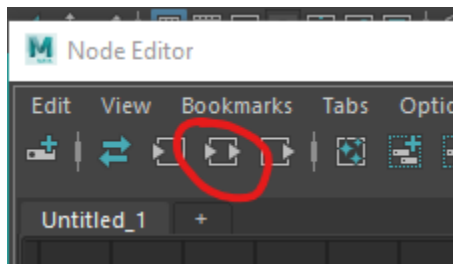
Why is this happening?

With the object still selected, open the Node editor (Windows > Node editor).
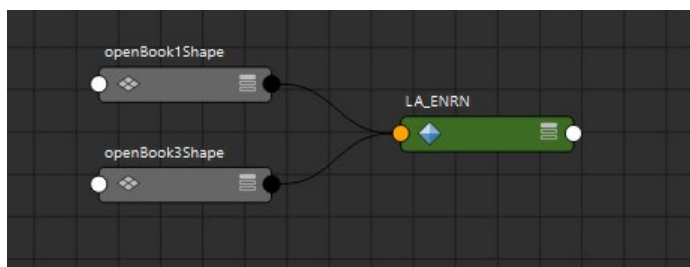
The node editor looks something like this:

With the problematic object still selected, click the button that looks like a box with two arrows.

This button lets you see what nodes the selected item is connected to.

Now the node editor looks like this:

LA_EN is the name of the environment file being referenced into this layout sequence file. Why is this geometry, which is not part of the reference, linked to the reference node? In this case, someone had selected some book from the reference and pressed CTRL+D to duplicate it. When you do this, the duplicated object appears at first to act just like any imported geometry or geometry you created directly in the file. This can cause problems later on though, when the file being referenced in changes.

Prevention:

To prevent this, avoid duplicating referenced objects out of the reference. While working on layout, it is better to just make a placeholder object in the file (create > polygon primitives > cube). If the set dresser wants to create duplicates of referenced objects in the environment file, the way to do that is by right clicking the object in the outliner > Reference > Duplicate.
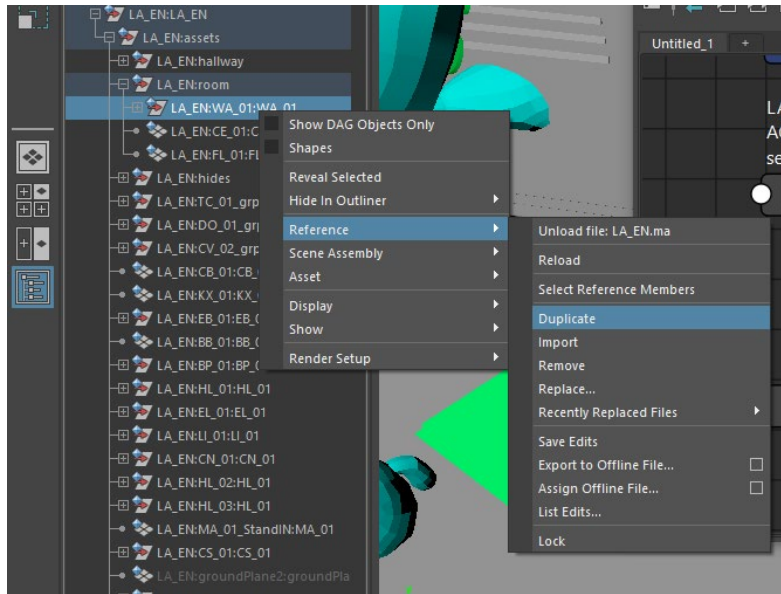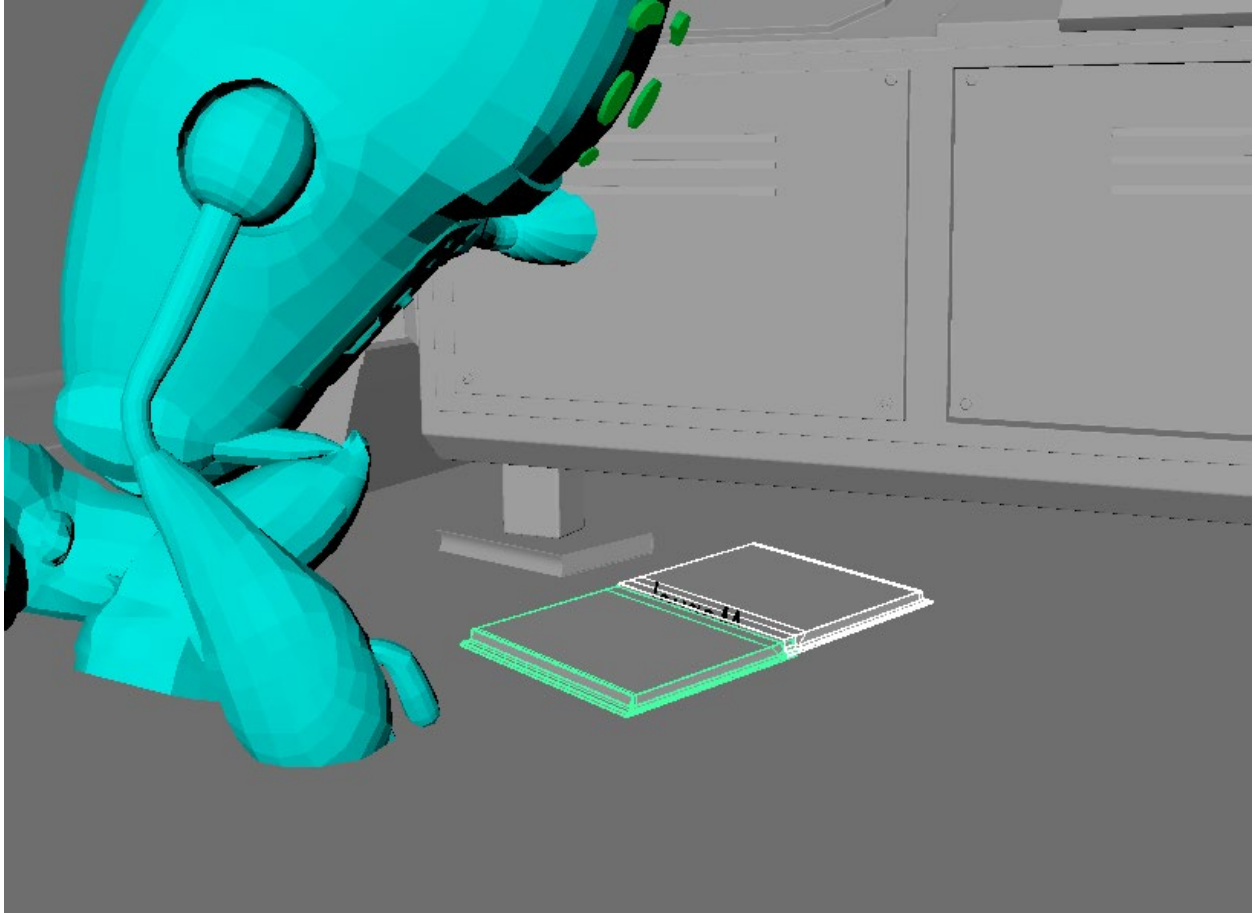

Solution:

Click on the wires, and press delete to disconnect them.
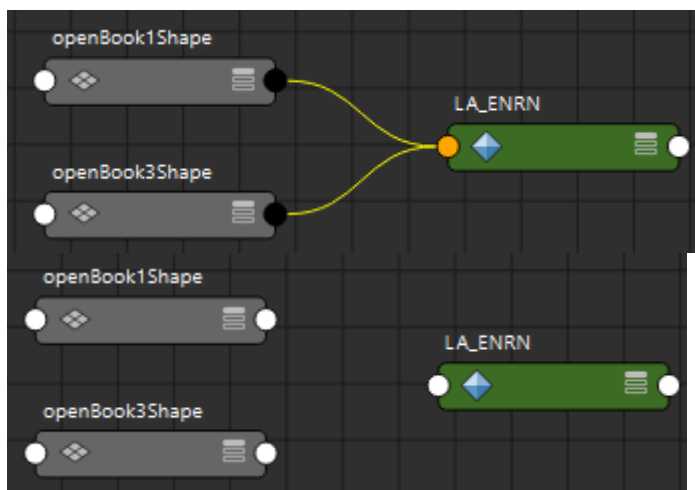
Now you can close the node editor and go back into the viewport. You should be able to apply lambert1 (or any other material) to it because it is no longer connected to the referenced file.
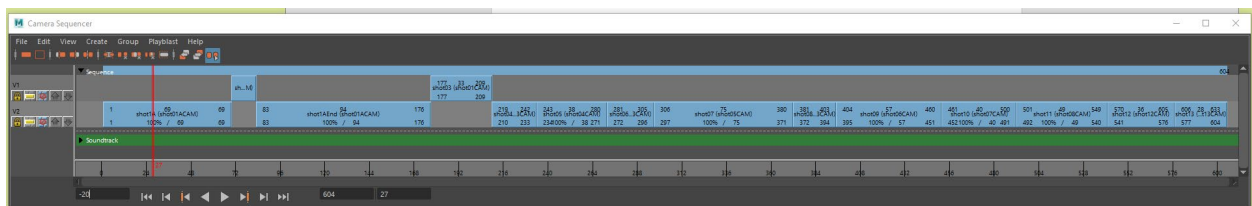
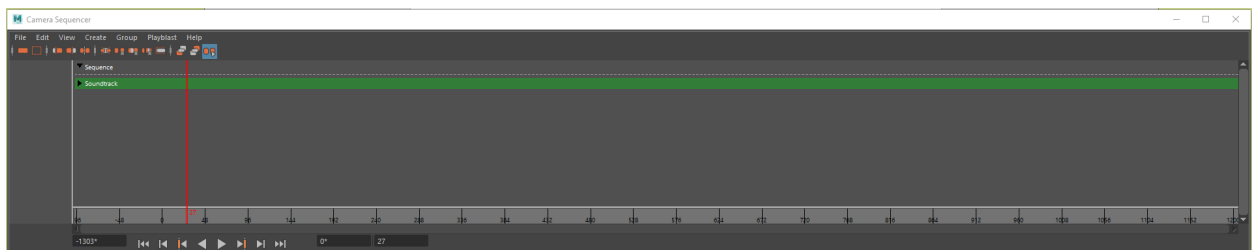(Right click the object > apply existing material > lambert1)

Problem #2: Empty camera sequencer

Another problem we ran into is all of the shots disappearing from the camera sequencer.

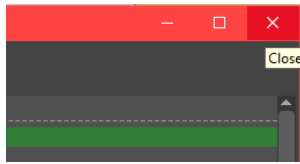What it looked like before I replaced the environment file with the updated one:
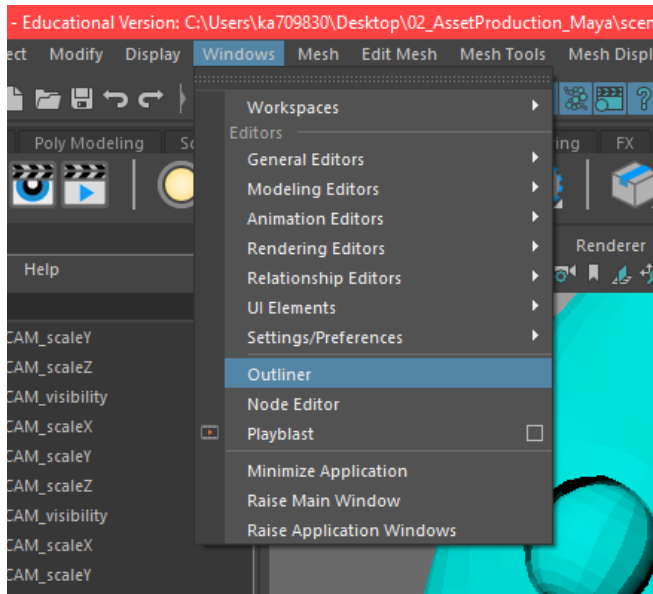

What it looks like now:
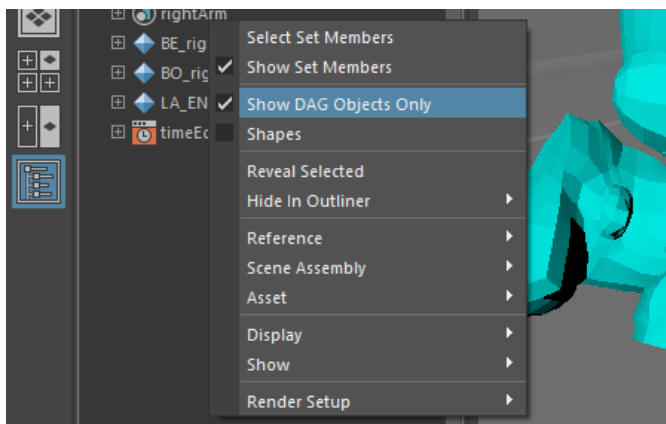
Why is this happening?

Close your camera sequencer (if you have it open).

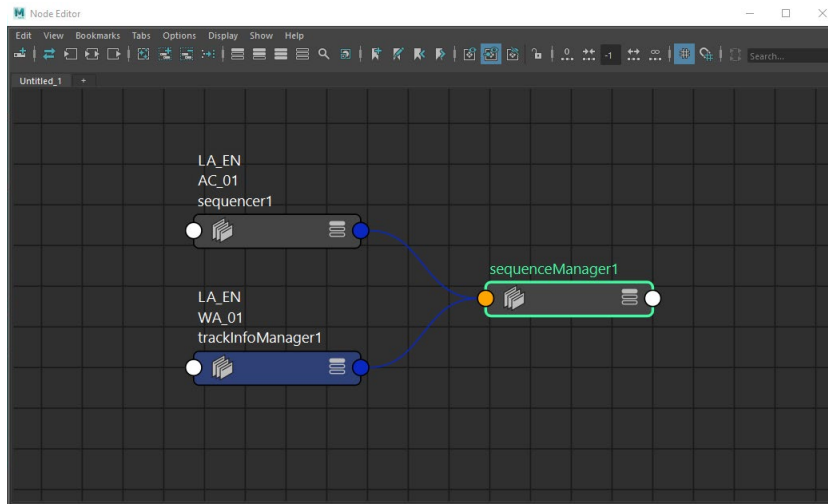Go to your outliner (Windows > outliner if you don't already have it open).

Right click > show DAG objects only (it should be checked by default, and you want it to be unchecked).

At the top of the outliner go to the search bar and type in "sequence."

Click on sequenceManager1, open the node editor (windows > node editor), and click the button with the two arrows. This is the result:

Again, LA_EN is the referenced in environment file. AC_01 and WA_01 are assets within the environment. So why is our sequenceManager connected to nodes from the referenced file?

If you have the camera sequencer open while working on a file, Maya will create a sequencer and trackInfoManager node for that file. So, whoever had modeled AC_01 and WA_01 at some point had the camera sequencer open, and it created these nodes, which then got referenced into this file. Maya saw that a sequencer and trackInfoManager node already existed in this file, so it did not create new ones when the camera sequencer was opened. Something happened to these assets in the referenced in environment file that caused the shots to stop showing up properly in the layout file after the environment file was updated. This issue is actually similar to the first one in that it is related to things being linked to a referenced file when they should not be.

Prevention:

Having the camera sequencer open before referencing in the files when setting up the layout template file will prevent this from happening because Maya will automatically create sequenceManager, sequencer, and trackInfoManager nodes for the file.
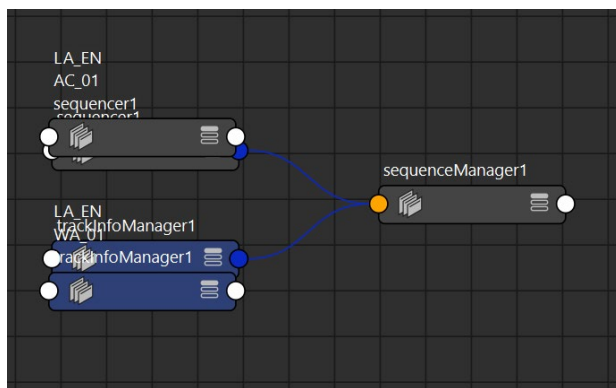
Solution:

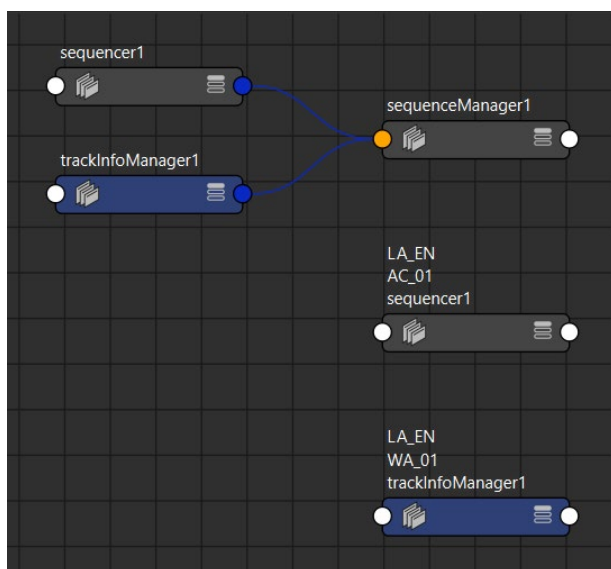Select the wires and delete them to disconnect sequenceManager1 from the other nodes.
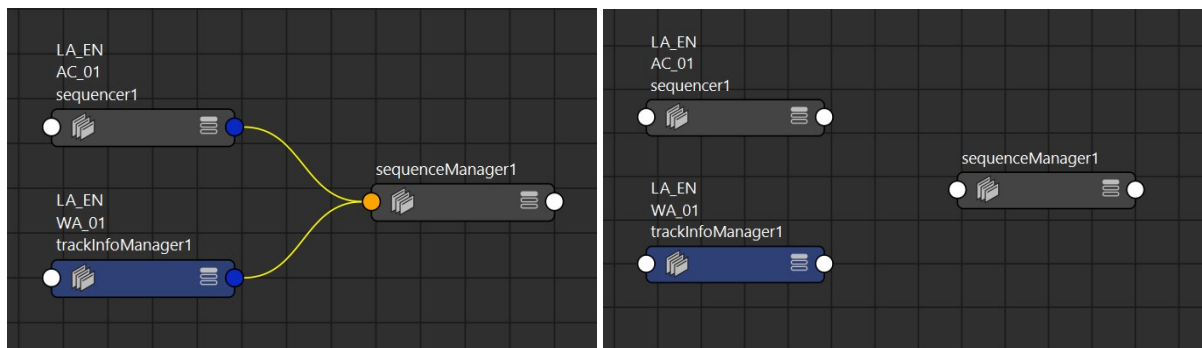
Open the camera sequencer (windows > animation editors > camera sequencer).
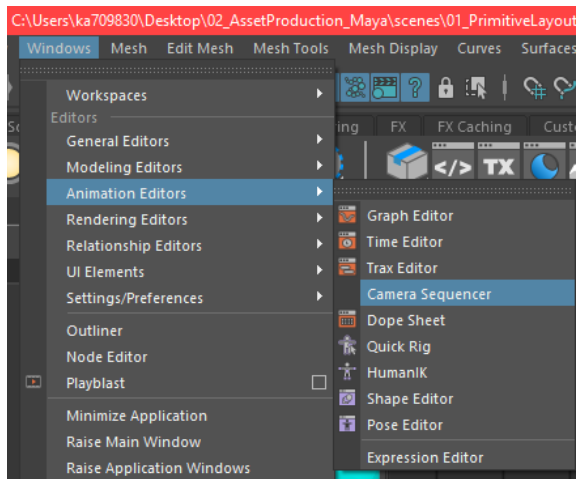
You should see that two new nodes have appeared in your node editor and connected themselves to sequenceManager1.

Select all nodes and press "L" to lay out the nodes nicely.

Since sequenceManager1 was no longer connected to a sequencer and trackInfoManager, it created new ones when you opened the camera sequencer. Now you don't have to worry about the environment file messing up your camera sequencer again.
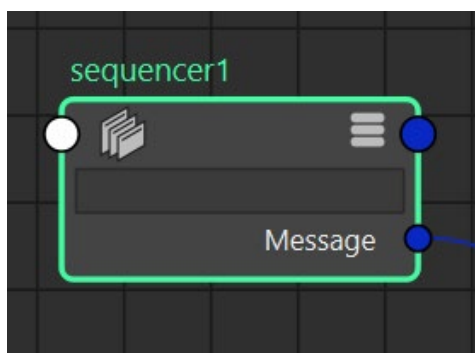
The camera sequencer is still empty, though. Where are the shots?

In the outliner search bar type in "shot", then scroll all the way down
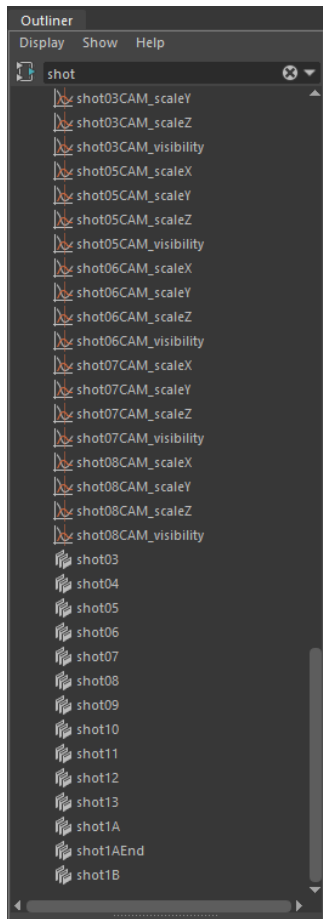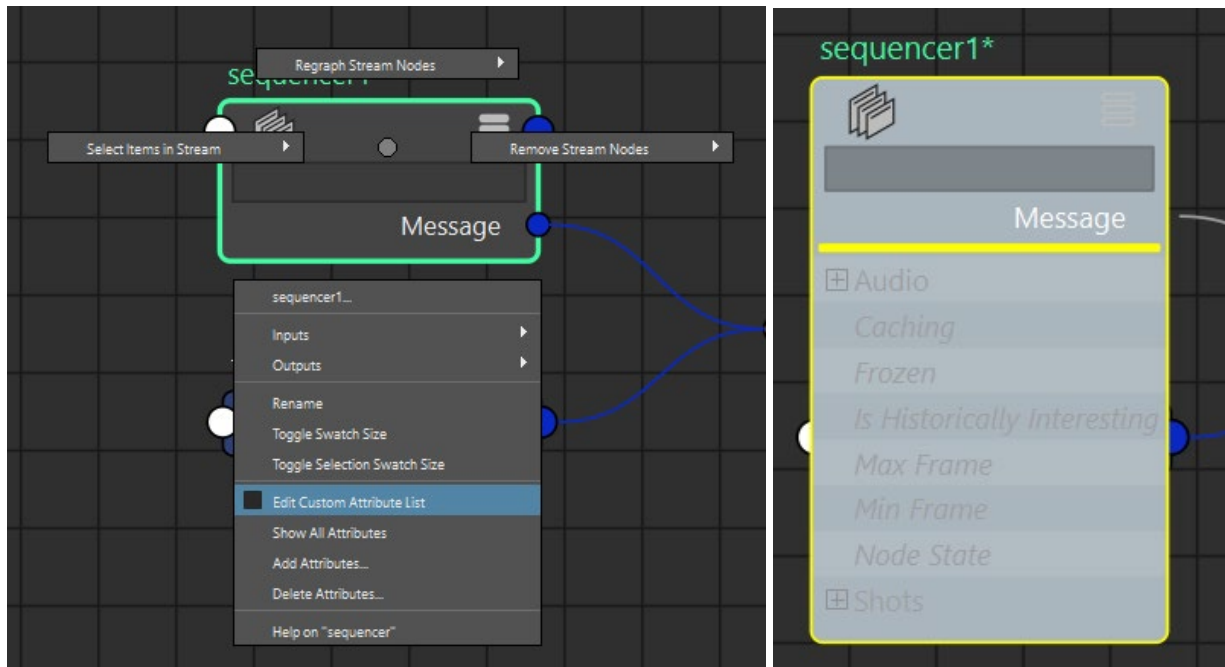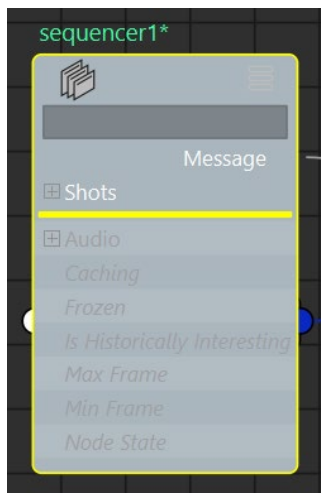

There they are.

Click twice on the 3 bars on the right of the sequencer1 node to expand the node fully. You can see that there is nowhere to plug your shot nodes into.
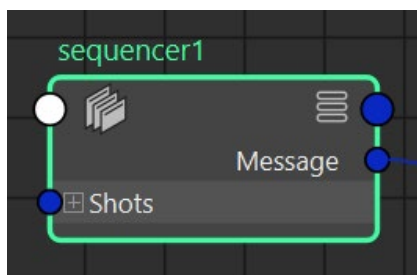
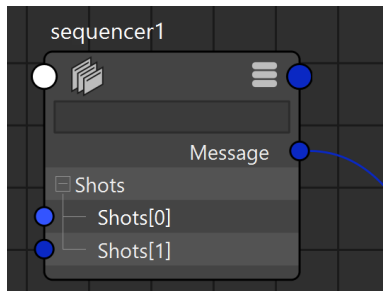Right click on the sequencer1 node > Edit Custom Attribute List
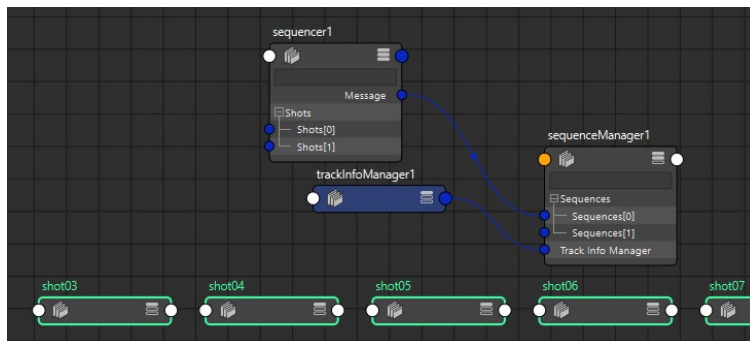

Click on Shots.

Click anywhere in the Node Editor outside of that node. Now you can now see that there is a space in the sequencer1 node to connect shot nodes to.
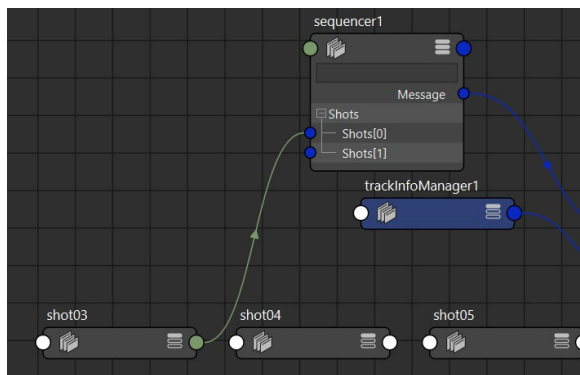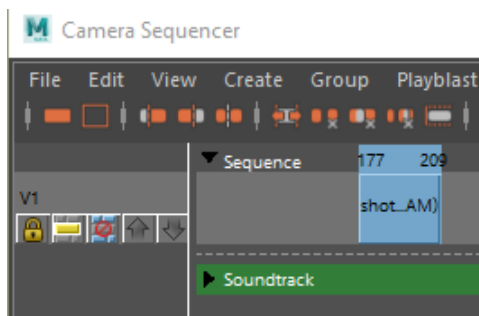
Click the plus sign next to Shots.

In the outliner, select all of your shots, then hold CTRL and MMB drag them into the node editor

Plug the first shot into Shots[0] by clicking the circle on the right side of the shot node and dragging it to the blue circle next to Shots[0]. It should snap into place.

And that shot should reappear back in the camera sequencer.

Repeat this for all remaining shots.

All the shots are back where they should be.