Chapter 17:

In this chapter, we will be animating the scaled height of a cube to simulate a 3d bar chart. It will also change colors from red to green depending on the current time frame. We are going to explore the **Switch** node. This node can be very handy when it comes to switching which nodes will be used based on some arbitrary selection. The project is meant to be viewed in Top Orthographic mode.

Download the two Chapter 17 files from https://github.com/rbarbosa51/GeometryNodesByTutorials/tree/main/Chapter17 . Open the Chapter17Start.blend file so you can follow along.

If you examine the Chapter17 object, you will see that its a simple cube with 1m, 1m, 1m dimensions and its pivot aligned to world origin (0,0,0). This will be allow us to just scale upwards in the y axis. Connect a **Transform(3)** node in between the **Group Input(1)** and **Group Output(2)** nodes. On the **Transform(3)** node, change the *Scale's* Y axis up and down from 0 to 5.0. You should see the cube scale upwards. Change the value of the *Scale's Y* axis back to 1.0.

Connect a **Join Geometry(4)** node in between the **Transform(3)** and **Group Output(2)** nodes (Figure 17-1). Grab a **Scene Time(5)**, a **Map Range(6)**, a **Math(7)**, and a **Combine XYZ(8)** nodes. Connect the **Scene Time(5)'s** *Frame* socket to the *Value* socket of the **Map Range(6)** node.

Change the **Map Range(6)** node as follows: *From Min* to 1.0, *From Max* to 250.0, *To Min* to 0.0, *To Max* to 1.0. Change the function of the **Math(7)** node to *Multiply*. Connect the *Result* socket of the **Map Range(6)** node to to first *Value* socket of the **Math(7)** node. Change

the second *Value* of the **Math(7)** node to 5.0. Connect the outbound *Value* of the **Math(7)** node to the *Y* socket of the **Combine XYZ(8)** node. Change the *X* and *Z* socket of the **Combine XYZ(8)** node to 1.0. Then connect the *Vector* output of the **Combine XYZ(8)** node to the *Scale* of the **Transform(3)** node. Your node tree should look like Figure 17-2.

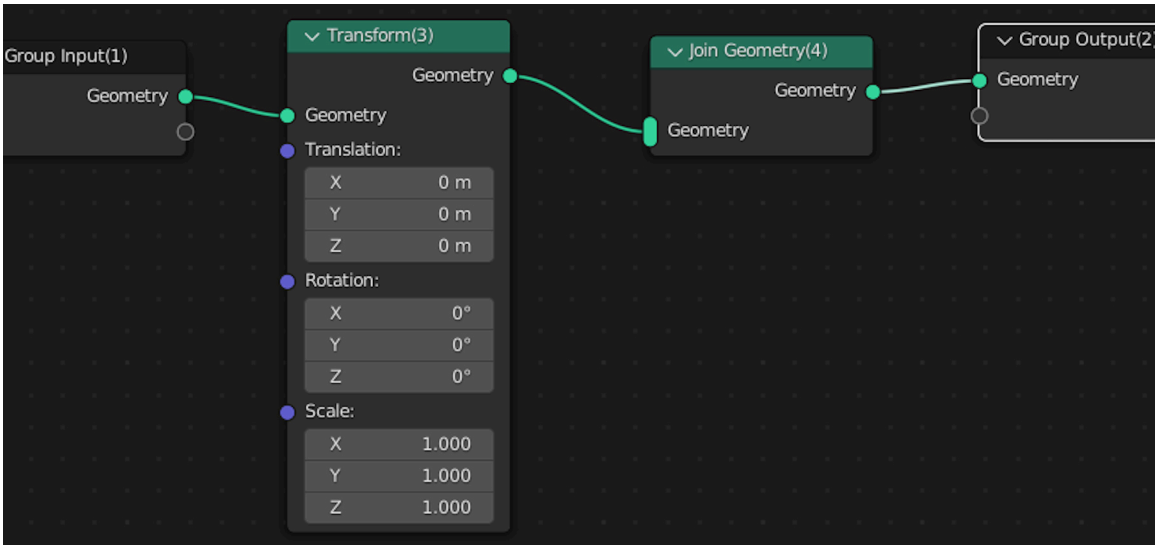

Figure 17-1

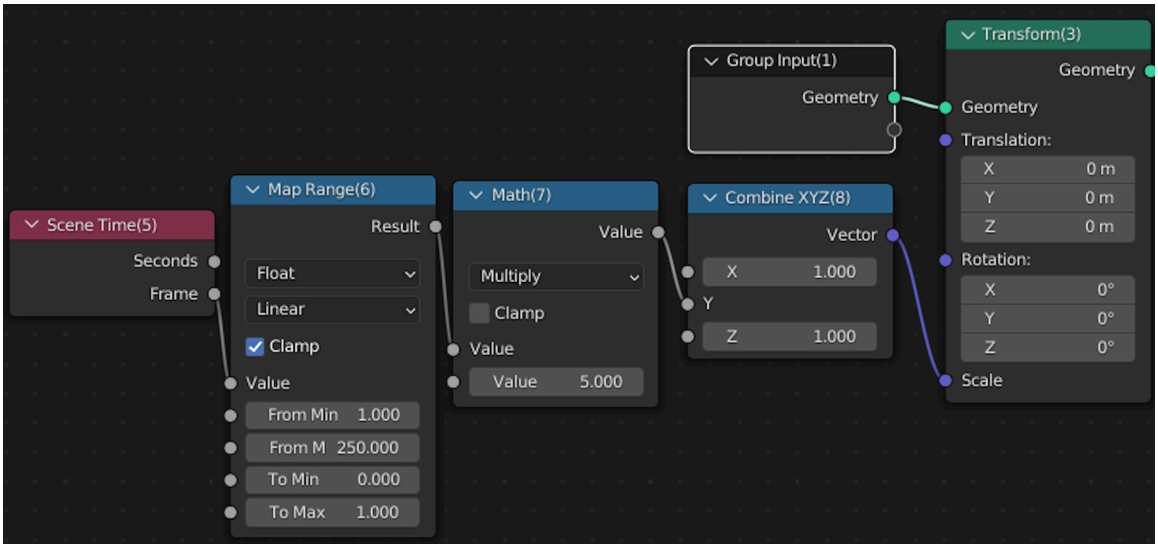

Figure 17-2

The purpose of this particular node tree configuration is relatively straight forward. First it it gets the current Frame number of the animation, then it maps it to a range of 0.0 to 1.0. In other words when it starts at frame 1 it maps to 0.0, and then when it reaches the last frame (250 in this particular case) it maps it to 1.0. You then multiply this number by 5, to get a result ranging from 0.0 to 5.0. This becomes the *Y* value of the **Combine XYZ(8)** node. Finally, the **Combine XYZ(8)** node gets fed to the **Transform(3)'s** *Scale*.

To view it in action, Go to the Layout Workspace. Ensure that you are in Top Orthographic view, and then turn on the animation. Let the animation go from start to finish. When the animation frame is at 1 the cube is barely visible, but when it reaches the end of the animation the its scaled in the Y axis by 5.

Connect a secondary connection between the **Scene Time(5)'s** *Frame* to the **Value to String(9)** node. Leave the **Value to String(9)'s** *Decimal* at 0. Connect the **Value to String(9)'s** *String* socket to the **String to Curves(10)'** *String* socket. Connect the **String to Curves(10)'** *Curve Instances* socket to a **Transform(11)**

node. On the **Transform(11)** node, change the *Translation's Y* value to -1. Connect the **Transform(11)** node to a **Fill Curve(12)** node. Connect the **Fill Curve(12)** node to the **Join Geometry(4)** node. Your node tree should look like Figure 17-3.

Go to the Layout Workspace and turn on the animation. You should see that in addition to the cube scaling, we are now rendering the current frame number as instances. Figure 17-4 displays the cube when at animation frame 92.

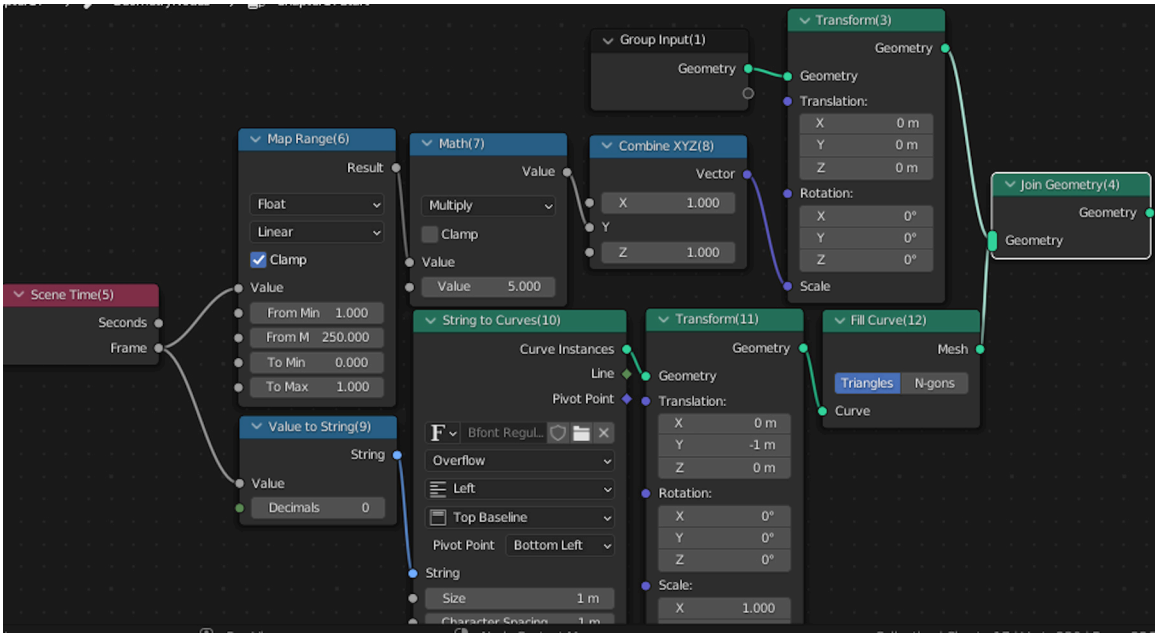

Figure 17-3

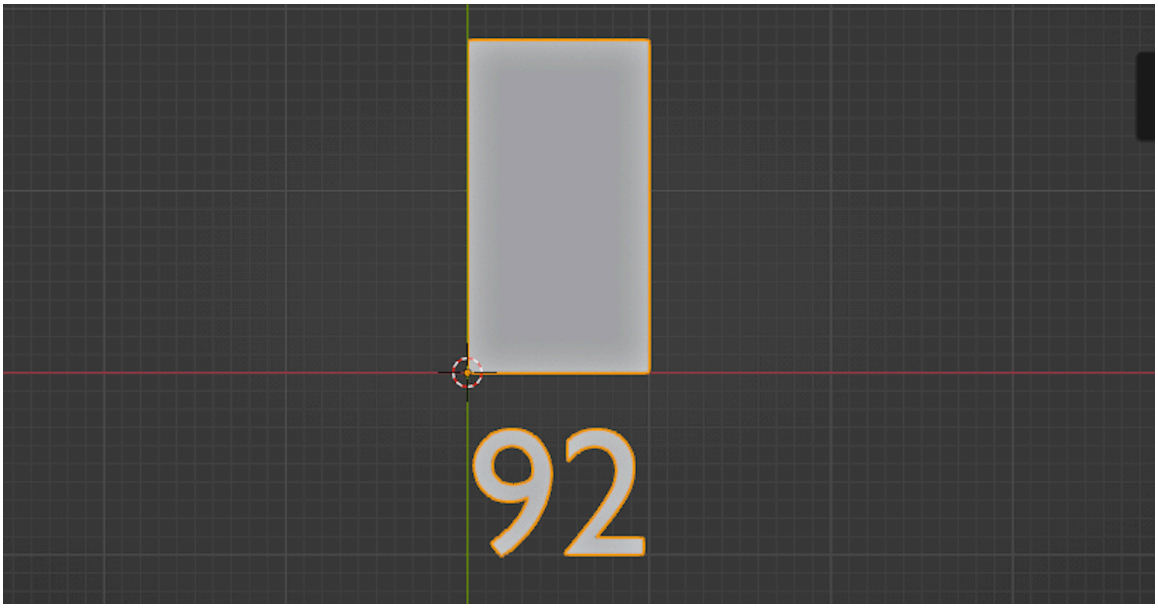

Figure 17-4

We now want to be able to assign a specific color depending on the current frame of the animation. If a value is under 125, then we will use a Red material. If the frame value is 125 or above, then we will use a Green material.

Connect another **Scene Time(13)** node *Frame* socket to a **Math(14)'s** first *Value* socket. Change the **Math(14)** node function to *Less Than* and its Threshold to 125. This will give us a 0 or 1 value depending if the animation has reached its halfway point. Grab a **Switch(15)** node and set its mode to *Material*. Connect the **Math(14)'s** outbound *Value* socket to the *Switch* socket of the **Switch(15)** node. On the **Switch(15)** node, assign *False* the pre-made *Green* material, and assign *True* the pre-made *Red* material. Connect a **Set Material(16)** node in between the **Join Geometry(4)** and **Group Output(2)** nodes. Finally, connect the **Switch(15)'s** *Output* to the **Set Material(16)'s** *Material* socket. Ensure that your viewport shading is set to Material Preview. Your node tree should look like Figure 17-5.

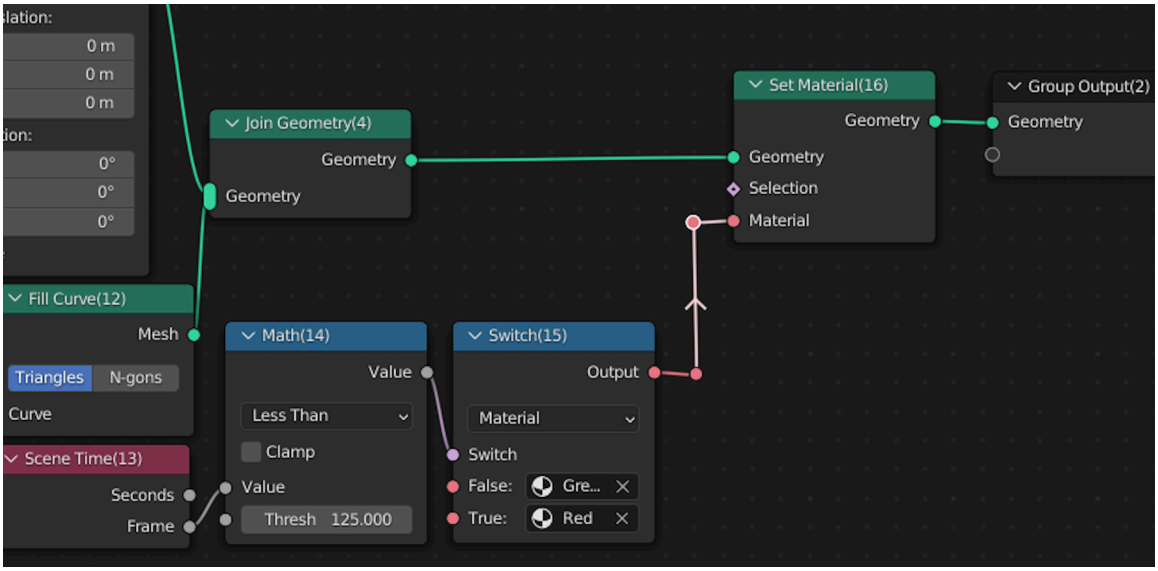

Figure 17-5

Go to the Layout Workspace and turn on the animation. You should now see the color change after the halfway point. See Figure 17-6 for an output example.

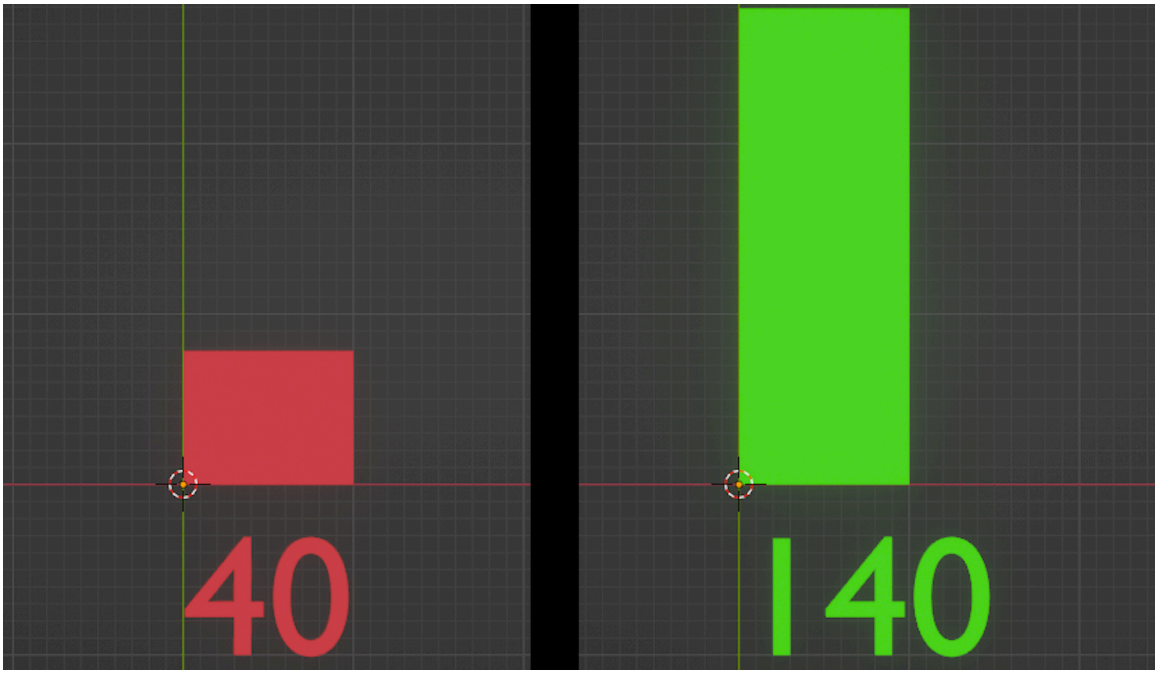

Figure 17-6

Compare your results and node tree with those of the downloaded Chapter17Final.blend file.