Hi, everyone. In this video, we are going to look at the anatomy of a Shiny application. So we're here on Shiny on the [INAUDIBLE].com on the gallery. And we've got this example, which is looking at the k-means clustering. And so what it's giving us is a scatterplot and widgets. We've got one to choose the x variable and one to choose the y variable of our scatterplot.

And it's using the famous Iris data set. And then it's got this one down here, the cluster count. And we can see that we're getting these x's in colour based on our cluster analysis. We can flick that to four. And we'll see that it flicks over. We've now got four clusters. Going to three. And so it's colour coding and giving us the centroid of our cluster.

So let's go down and have a look at our code. Let's maybe make it a little bigger for you. OK, so here is our UI. It's our User Interface. And we can see that it starts off by giving us a title in our header panel, then our side panel. We've got three functions for our three widgets.

So remember, Select Input gives us our drop-down. And the drop-down options are just the names from the Iris data set. And so that's for our x variable and for our y variable. So these bits are labels. They've tried to compact the code a little bit by leaving off the label equals and the name equals bits. Probably good for us while we're learning to be putting those in there.

So we've got Select Input for our drop-down. Select Input, another drop-down, and then Numeric Input. Our variable is going to be called clusters, the label is Cluster Count. The default is three. And the minimum is one and the maximum is nine.

And in our main panel, we're just going to get our plot output. So in terms of setting up the user interface, fairly straightforward, not a lot of code. And all we're needing is to say, put in my three widgets, have a title, put in my scatter plot.

If we come over to our server, this very first line here, the palette, we can see it has happened before Shiny server function call. And so that's just setting up the colours. We could just leave the default colours. They've put in a set here so that they know exactly what colour are there-- one or two or three, up to nine clusters. As you can see, they've got nine different colours selected there so that they have control over that.
And that happens once, so once we get into the Shiny server. But that’s not going to keep having to be processed when we make changes that’s sitting outside. We then come down into our Shiny server function and we’re grabbing our data. So the data is the Iris data. You can see twice in here they’re using the reactive functions.

We aren’t quite as worried about reactive functions for what we’re going to be doing because we are really focusing on pretty simple things for our Shiny applications that we're going to make. It is good coding practice, and certainly when you start doing something bigger or more complex, I would encourage you to do it.

So the reactive statement really just means that when we make the changes on the widgets—so this one, the change in the widgets, is what our x column and y column are. That’s the only bit that has to get rerun. We're not having to rerun lots of other stuff which we don’t need to.

So we’ve got a second reactive here with k-means. K-means is the function that does a k-means clustering. And so k-means is grabbing our selected data and then clustering it into however many clusters we selected using our clusters widget.

Then down at the bottom here, we’ve got our plot. So our plot is just going to plot the data. The colours are going to be based on the clusters. And then the plotting character—plotting character 20—is going to give us our nice, filled-in circles.

And then our last one here, points, the points—our clusters object has got the centres for our clusters. So all it's going to do is plot the centres. And it's just saying to plot them in nice big crosses. So that’s how we get these big crosses here.

So you can see that, really, it's not a huge amount of code that we’ve had to do. Certainly, while you're learning and getting used to Shiny, and particularly if functions were already new to you, I would really work from templates, work from ones that you already started off. You know what they’re going to look like. And grab those and try and edit those rather than trying to write things from scratch to start with. And that will certainly made the learning of using these applications quite a lot easier.

For this unit, I'm really focused on you having exposure to Shiny and just familiarity with the real basics. So we’re not really getting into anything. This would be really the top-end of the level of complexity that we would even consider.

And in terms of this code here, if all of it didn't quite make sense, don't get too worried about that. There's certainly some of these bits where we could have done it in a kind of less code-wise and less efficient way. So we could have had several lines of code, whereas this is all been done quite tightly.

OK. So hopefully that was helpful. It covered most of the key functions and [INAUDIBLE] spaces that we’ve been looking at in the notes.