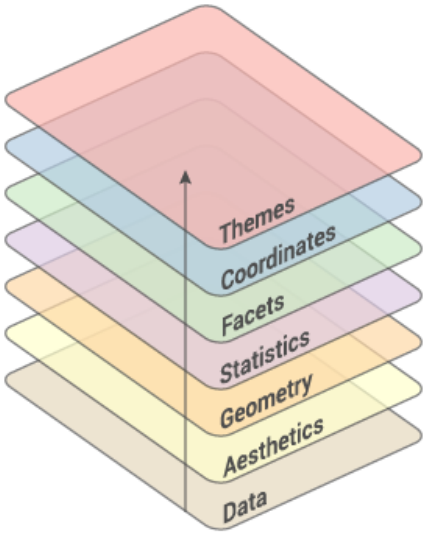
ggplot Part I

SBW - Data Visualization Workshop

Lokesh Mano • 19-Oct-2022
NBIS, SciLifeLab

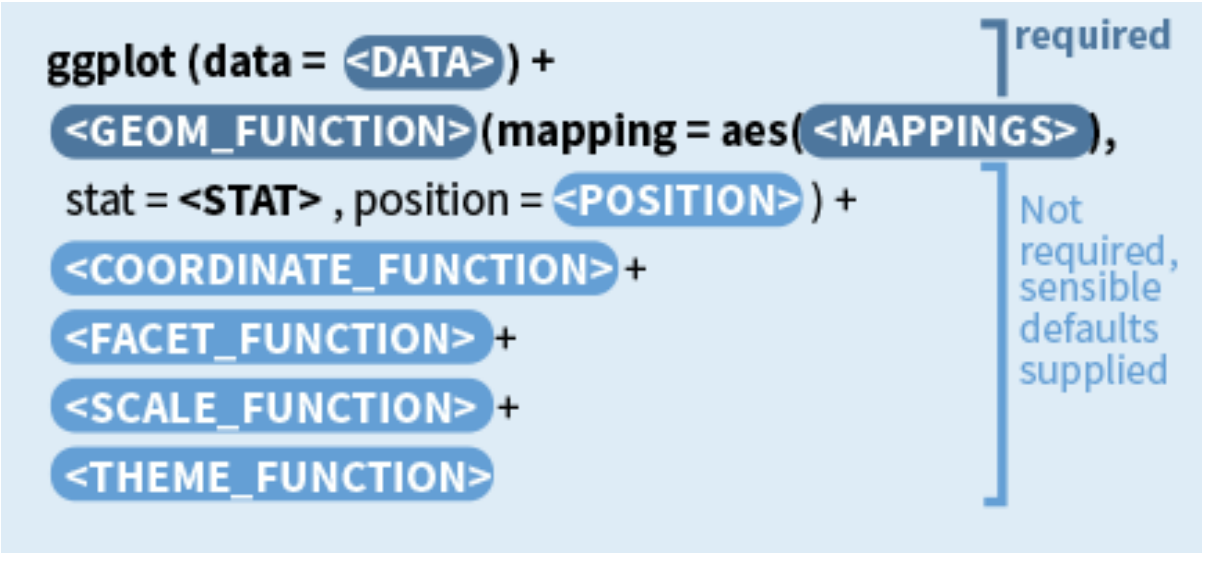
Contents

Grammar of Graphics



- **Data:** Input data
- **Geom:** A geometry representing data. Points, Lines etc
- **Aesthetics:** Visual characteristics of the geometry. Size, Color, Shape etc
- **Scale:** How visual characteristics are converted to display values
- **Statistics:** Statistical transformations. Counts, Means etc
- **Coordinates:** Numeric system to determine position of geometry. Cartesian, Polar etc
- **Facets:** Split data into subsets

Building a graph

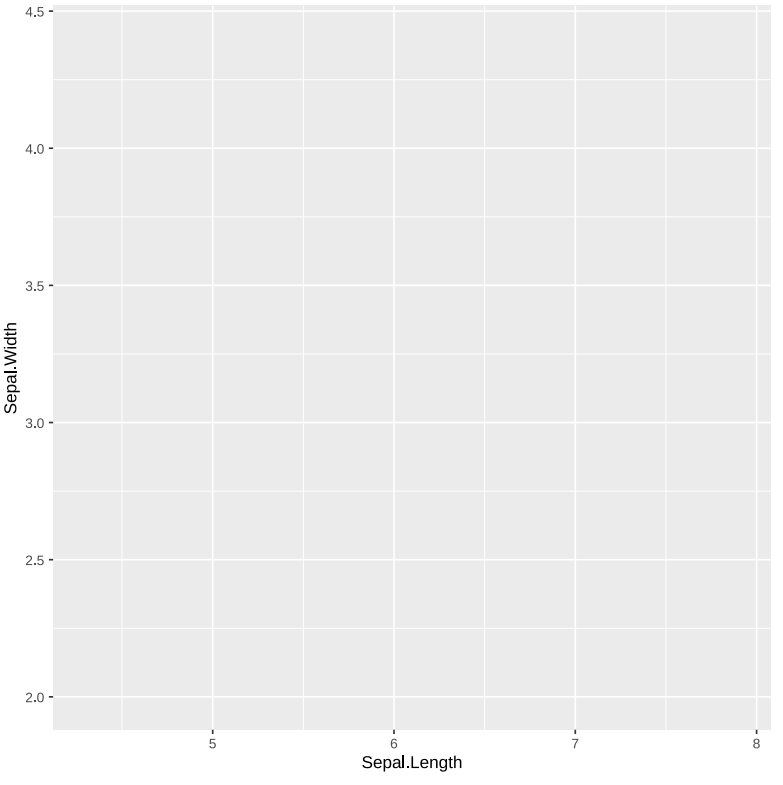


Build-Demo

```
ggplot(iris)
```

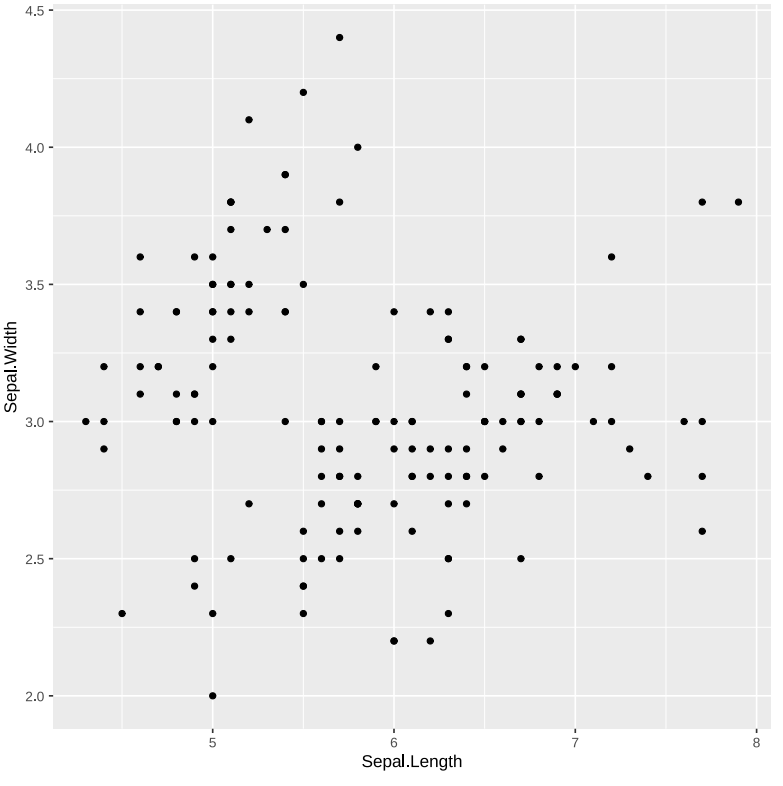
Build-Demo

```
ggplot(iris,aes(x=Sepal.Length,
                y=Sepal.Width))
```



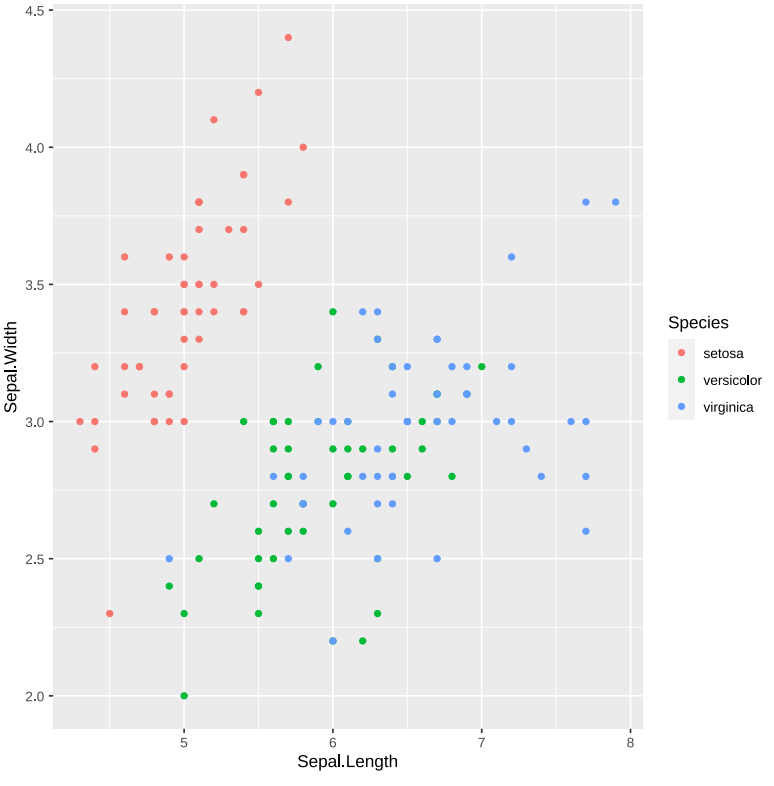
Build-Demo

```
ggplot(iris,aes(x=Sepal.Length,
                y=Sepal.Width))+
  geom_point()
```

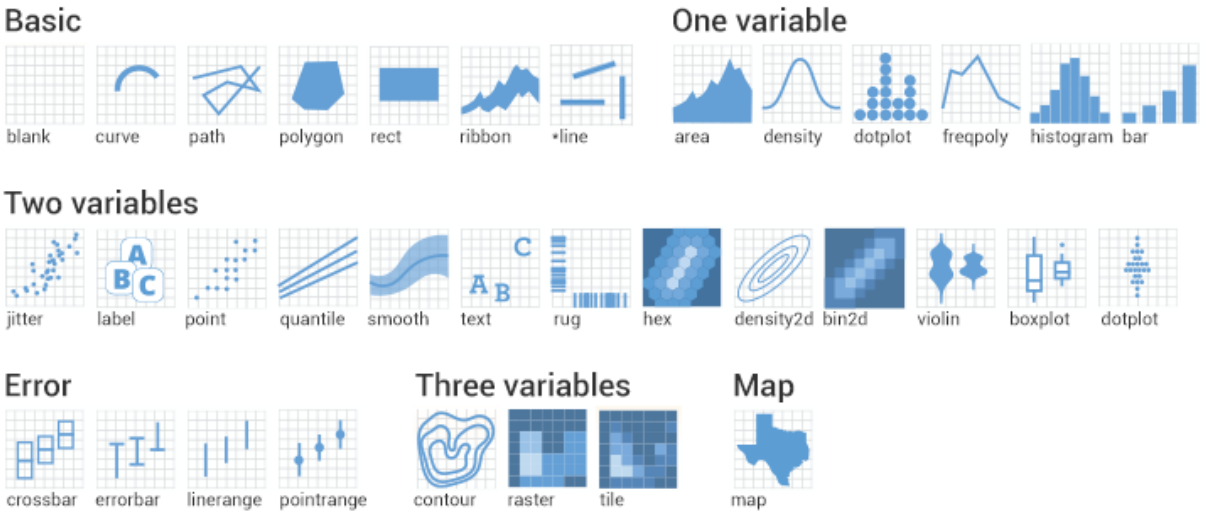


Build-Demo

```
ggplot(iris,aes(x=Sepal.Length,
                y=Sepal.Width,
                colour=Species))+
  geom_point()
```



Geoms

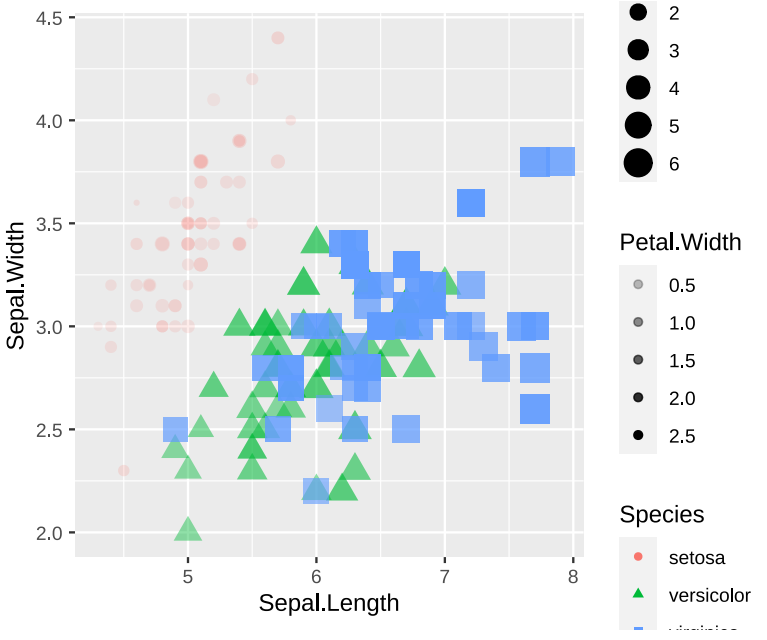



```
p <- ggplot(iris)
# scatterplot
p+geom_point(aes(x=Sepal.Length,y=Sepal.Width))
# barplot
p+geom_bar(aes(x=Sepal.Length))
# boxplot
p+geom_boxplot(aes(x=Species,y=Sepal.Width))
# search
help.search("^geom_",package="ggplot2")
```

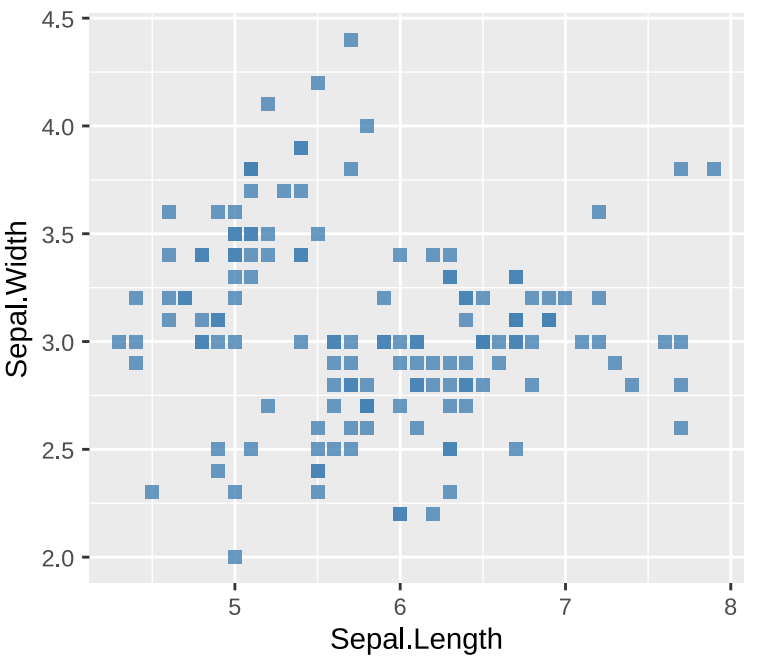
Aesthetics

- Aesthetic mapping vs aesthetic parameter

```
ggplot(iris)+
  geom_point(aes(x=Sepal.Length,
                 y=Sepal.Width,
                 size=Petal.Length,
                 alpha=Petal.Width,
                 shape=Species,
                 color=Species))
```

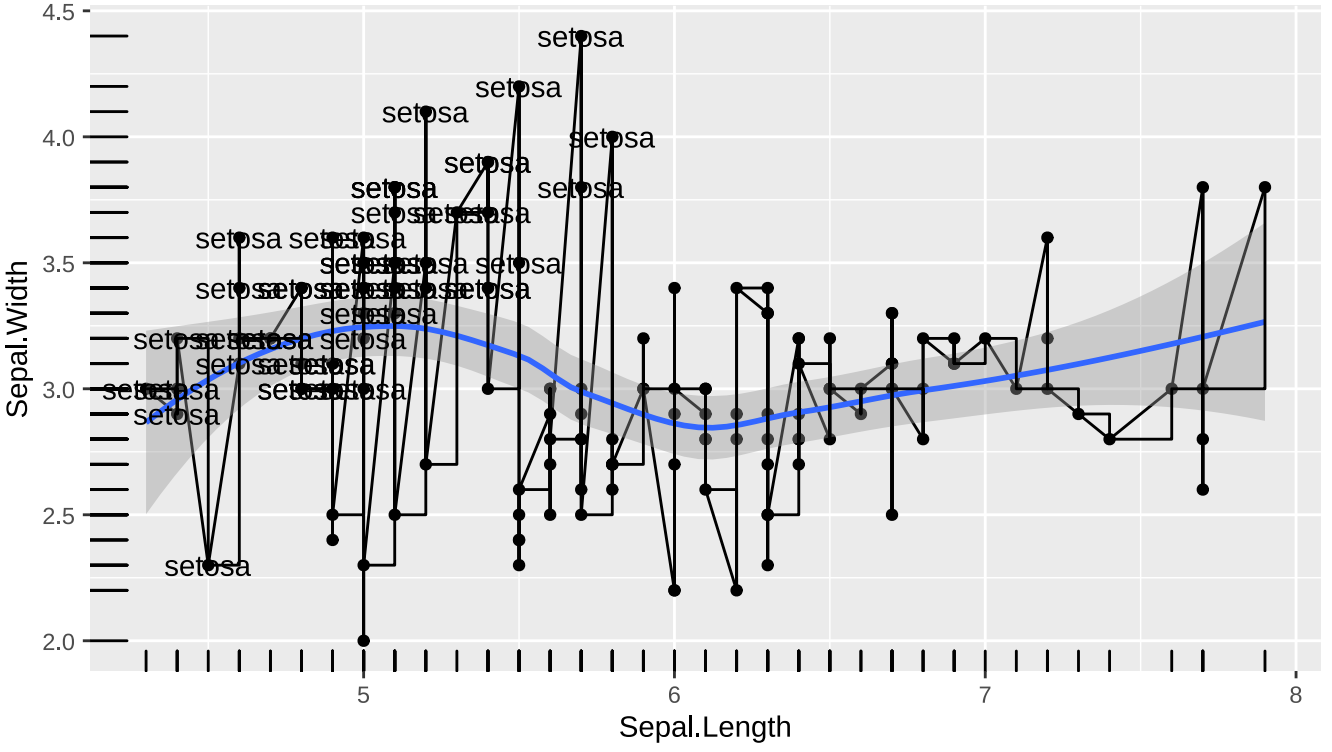



```
ggplot(iris)+
  geom_point(aes(x=Sepal.Length,
                 y=Sepal.Width),
                 size=2,
                 alpha=0.8,
                 shape=15,
                 color="steelblue")
```



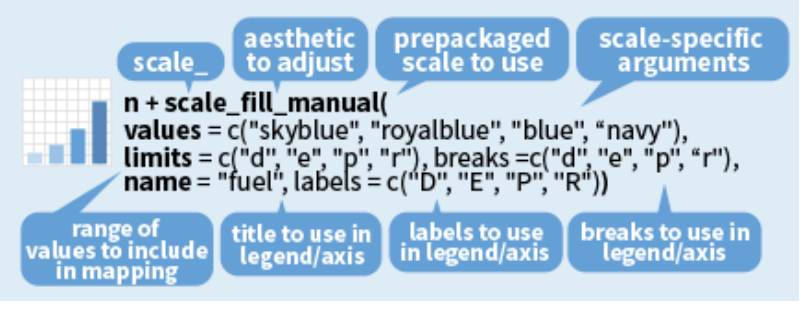
Multiple geoms

```
ggplot(iris,aes(x=Sepal.Length,y=Sepal.Width))+
      geom_point()+
      geom_line()+
      geom_smooth()+
      geom_rug()+
      geom_step()+
      geom_text(data=subset(iris,iris$Species=="setosa"),aes(label=Species))
```



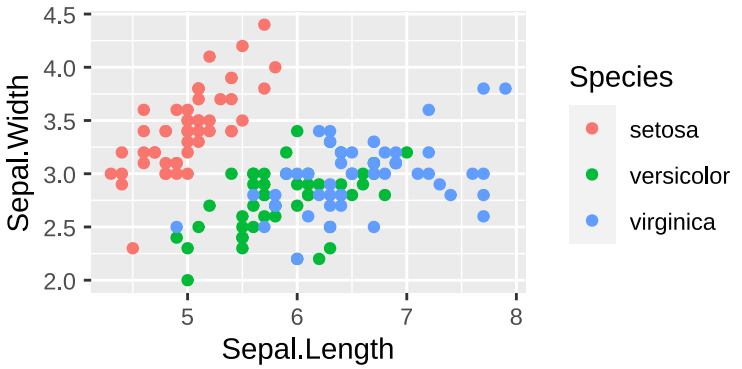
Scales • Discrete Colors

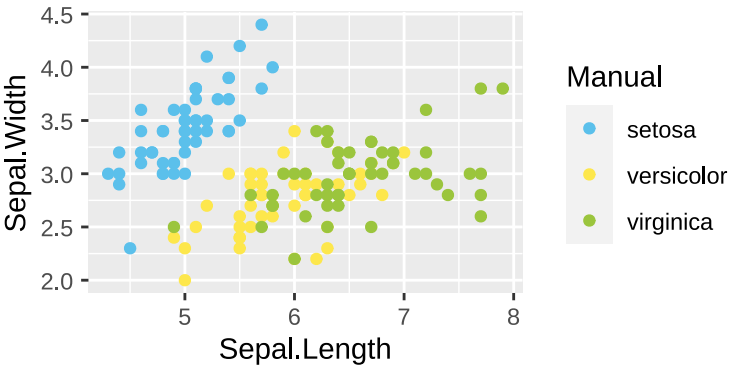
- scales: position, color, fill, size, shape, alpha, linetype
- syntax: `scale_<aesthetic>_<type>`




```
p <- ggplot(iris)+geom_point(aes(x=Sepal.Le
                    y=Sepal.Width,color=Sp
p
```

```
p + scale_color_manual(
     name="Manual",
     values=c("#5BC0EB","#FDE74C","#9BC53D"
```



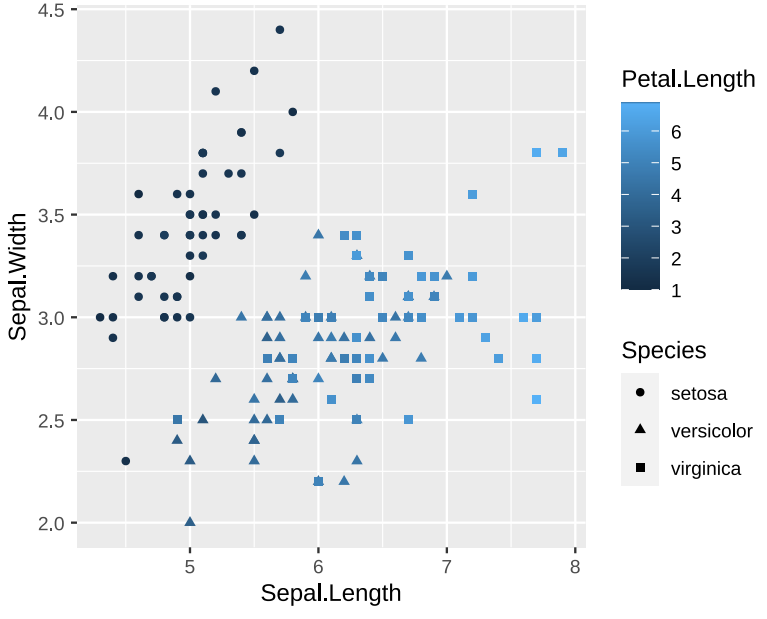


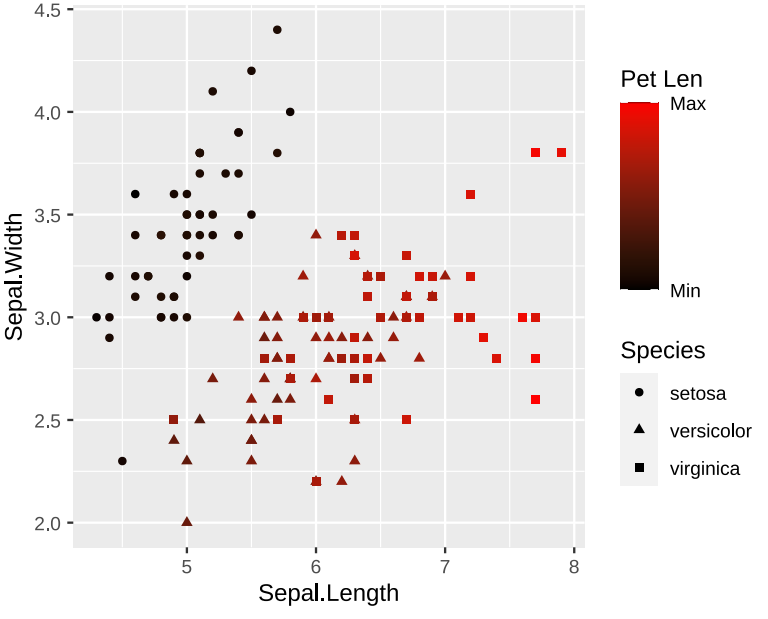
Scales • Continuous Colors

- In RStudio, type `scale_`, then press **TAB**

```
p <- ggplot(iris)+
      geom_point(aes(x=Sepal.Length,
                     y=Sepal.Width,
      shape=Species,color=Petal.Length))
p
```

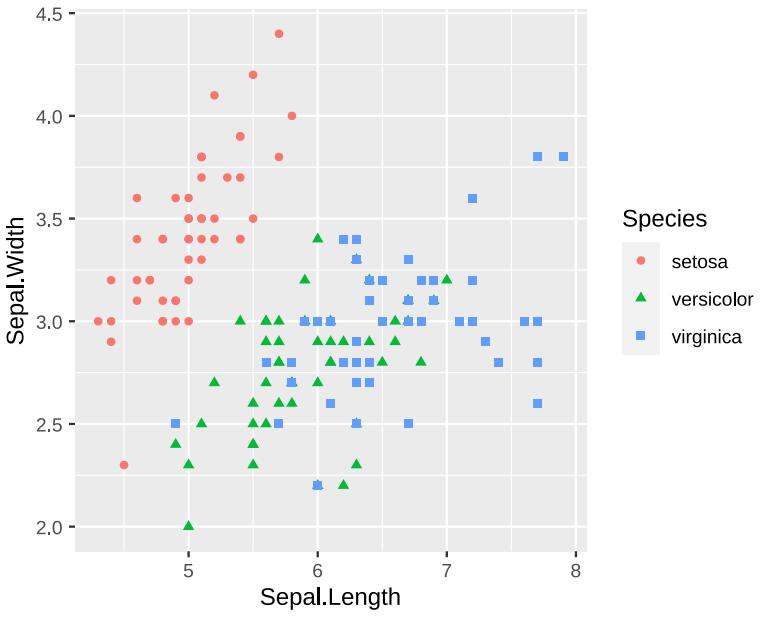
```
p +
scale_color_gradient(name="Pet Len",
  breaks=range(iris$Petal.Length),
  labels=c("Min","Max"),
  low="black",high="red")
```



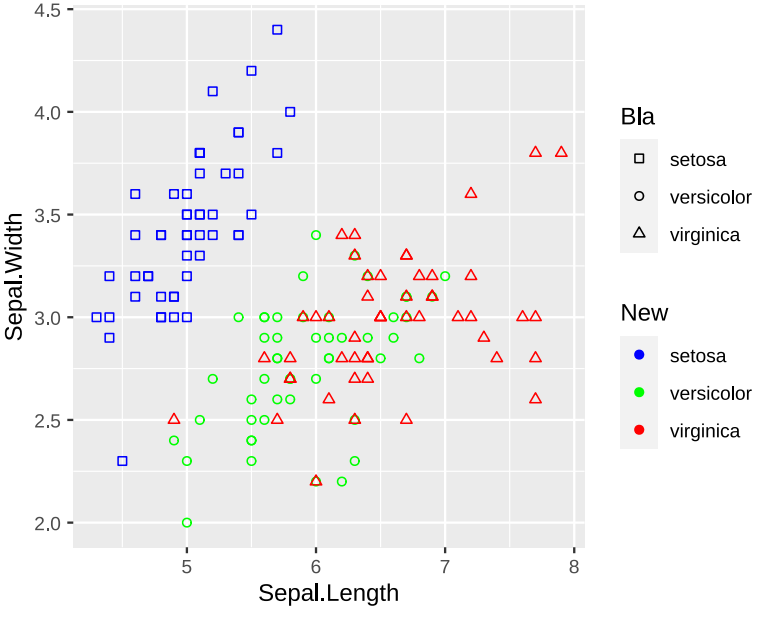


Scales • Shape

```
p <- ggplot(iris)+
      geom_point(aes(x=Sepal.Length,
                     y=Sepal.Width,
      shape=Species,color=Species))
p
```



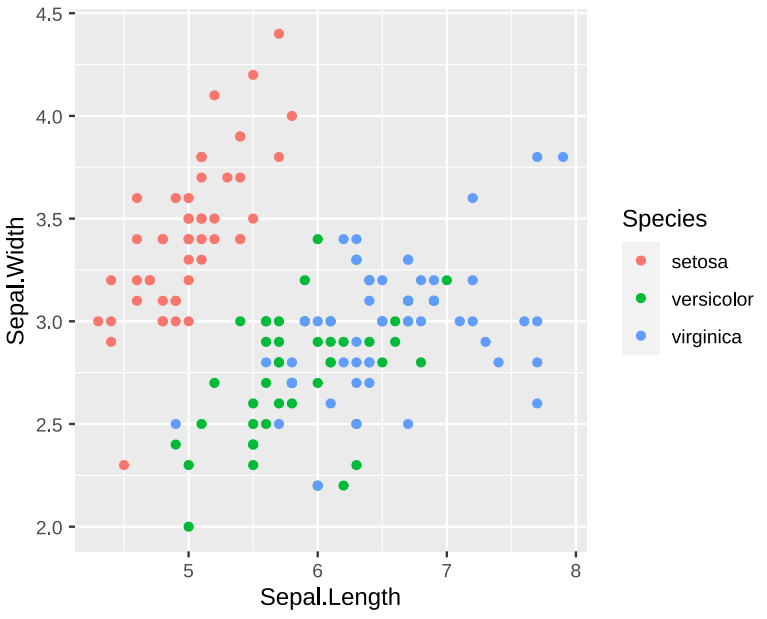

```
p +
scale_color_manual(name="New",
   values=c("blue","green","red"))+
scale_shape_manual(name="Bla",values=c(0,1,
```



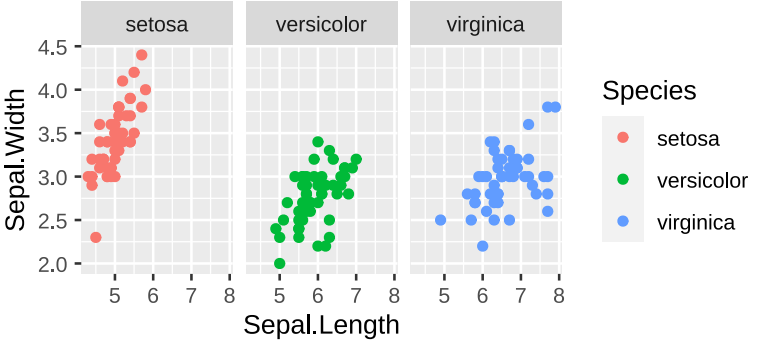
Facets • facet_wrap

- Split to subplots based on variable(s)
- Facetting in one dimension

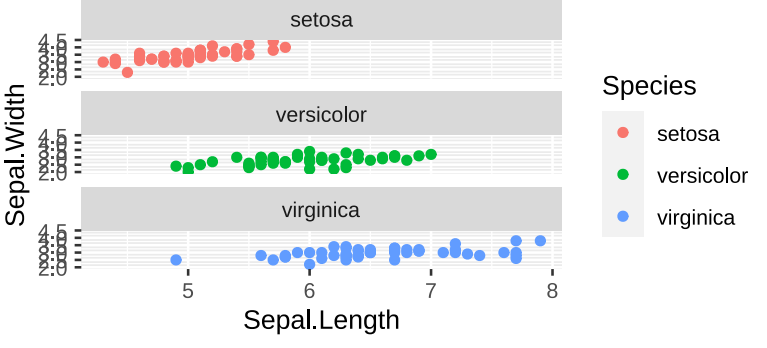
```
p <- ggplot(iris)+
      geom_point(aes(x=Sepal.Length,
                     y=Sepal.Width,
                     color=Species))
p
```




```
p + facet_wrap(~Species)
```




```
p + facet_wrap(~Species,nrow=3)
```



Thank you. Questions?

R version 4.1.3 (2022-03-10)

Platform: x86_64-pc-linux-gnu (64-bit)

OS: Ubuntu 18.04.6 LTS

Built on : 19-Oct-2022 at 10:36:18

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