

# Plotting in Base R

## 1. Plotting function

- `plot()`
- `boxplot()`
- `barplot()`
- `lines()`
- `hist()`

## 2. Add options inside the function

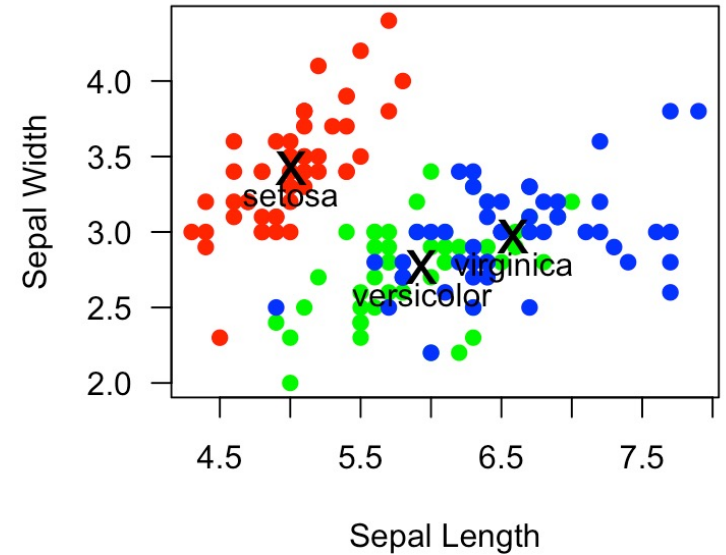
```
plot(x,y, col="red", pch=19)
```

## 3. Add elements with new functions (e.g., `points`, `text`, `lines`)

```
plot(x,y, col="red", pch=19)
```

```
points(mean.x, mean.y, pch="x")
```

```
text(mean.x, mean.y, labels=c("setosa", "versicolor", "virginica"))
```



# Plotting in ggplot

“Layered grammar of graphics”

## 1. the data

```
ggplot(iris)
```

## 2. use aes() to add mapping aesthetics (how the variables are converted to graphic elements)

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

## 3. + geom (i.e., set the geometric object)

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

## 4. + scaling

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

## 5. + theme

```
ggplot(iris, aes(x=Sepal.Length, y=Sepal.Width)) +  
geom_point() +  
scale_color_discrete() +  
theme_bw() + theme(legend.position = "none")
```

