Visualization

Visualization

It's impossible to overstate the importance of visualization in data analysis.

- Helps us explore data
- Suggest a model
- Assess the validity of a model and its parameters
- Vital for a non-technical audience

Visualization in R

4 plotting engines (at least)

- base plotting system
- lattice
- ggplot2
- rCharts

We'll look at the base plotting system now and ggplot2 after lunch.

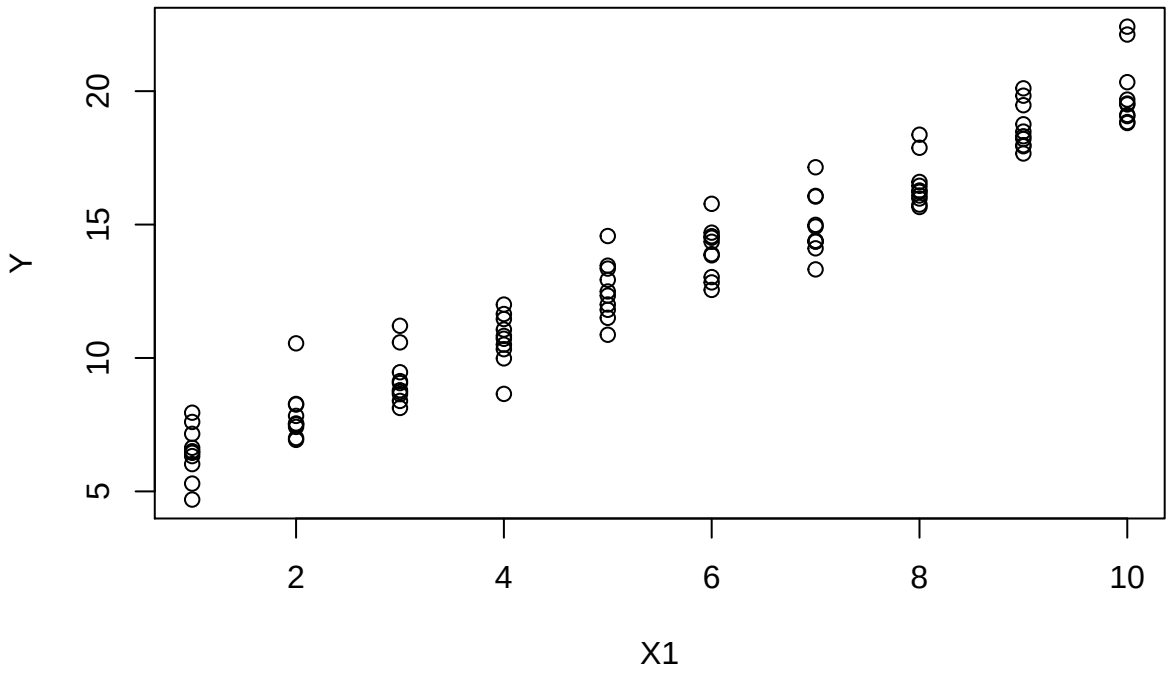
Common geometric objects

- scatter
- line
- hist
- density
- boxplot

plot is the most basic graphics command. There are several dozen options that you can set. Spend a lot of time reading the documentation and experimenting.

A basic scatter plot

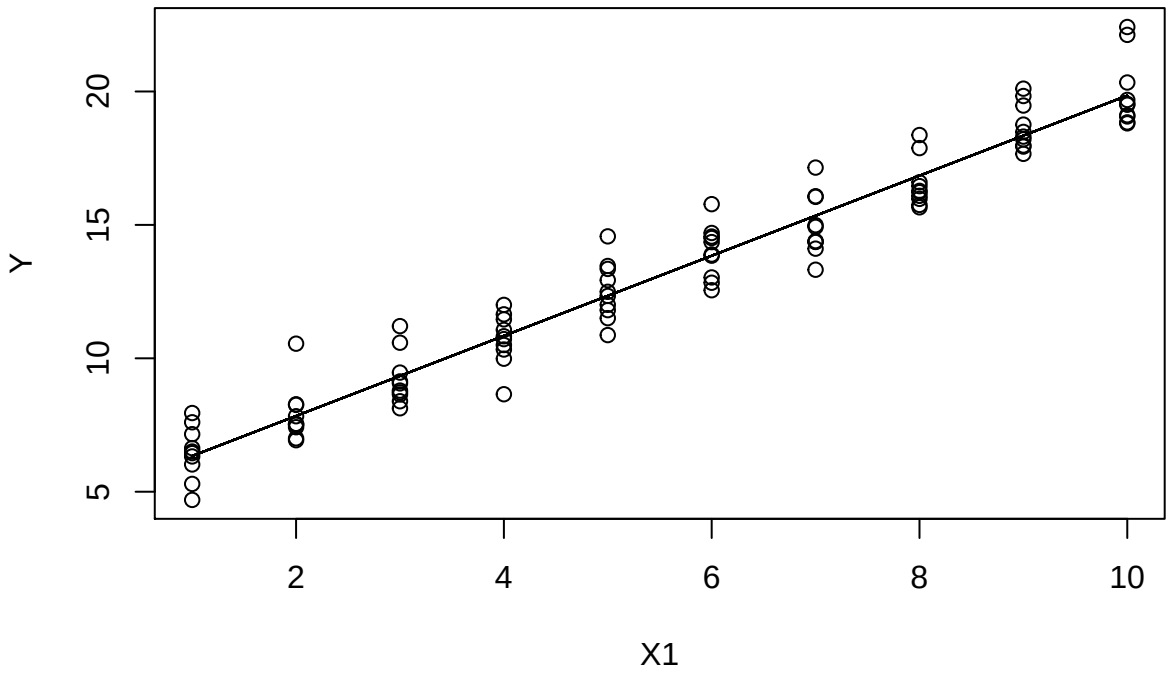
```
source("BasicScript.R")
plot(X1, Y)
```



Add lines

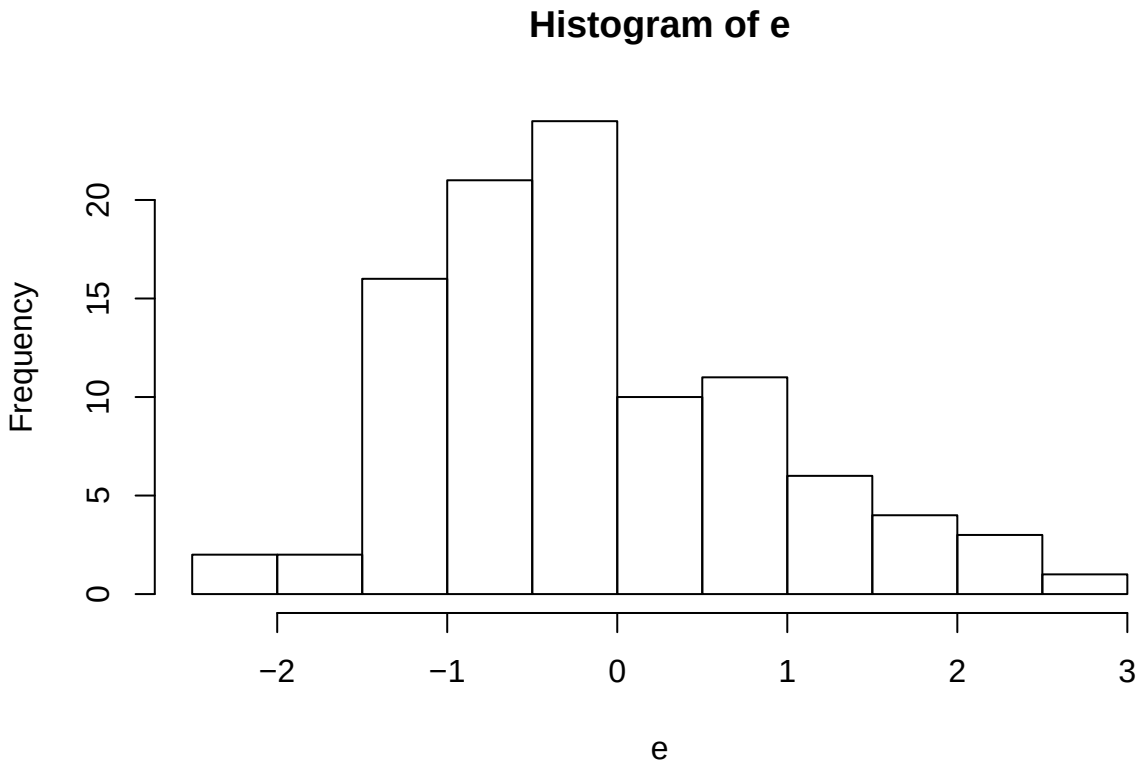
The functions 'lines' will add lines to a pre-existing plot.

```
plot(X1, Y)
lines(X1, yHat)
```



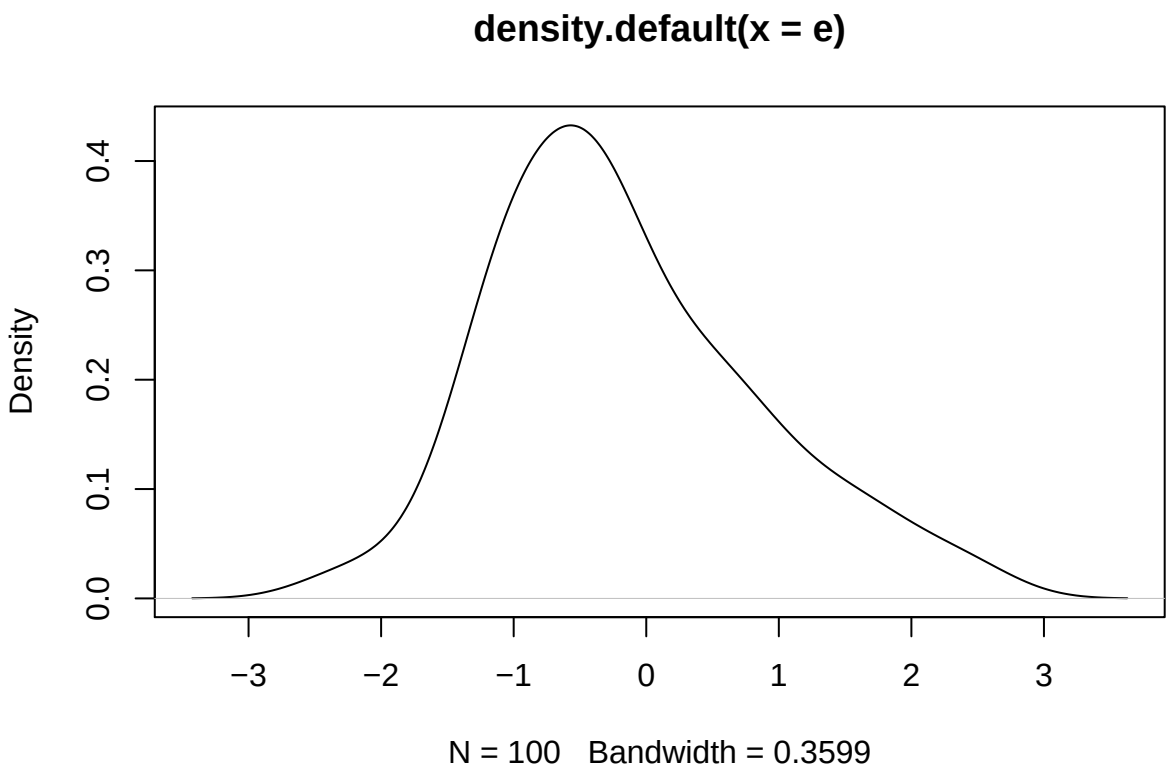
Histogram

```
hist(e)
```



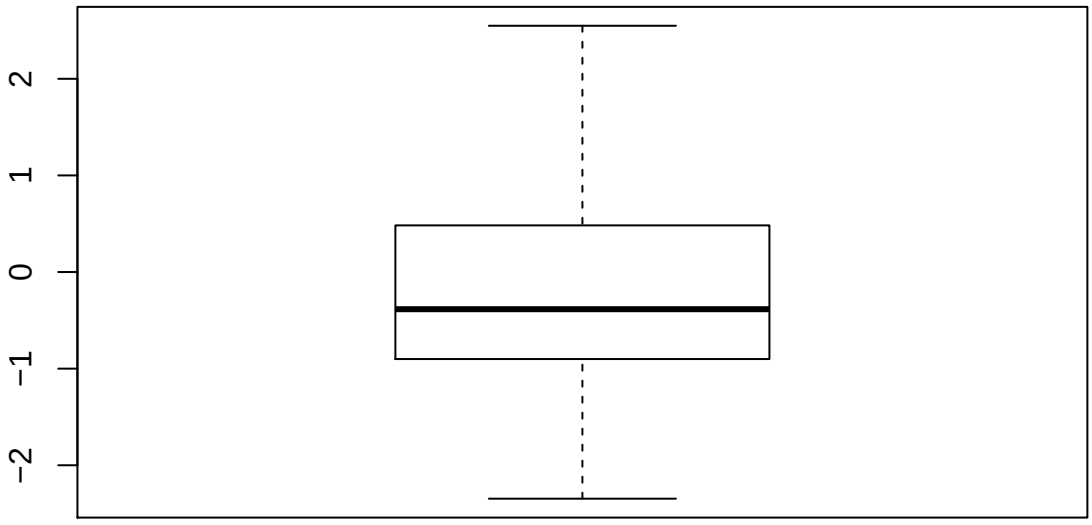
Density plot

```
plot(density(e))
```



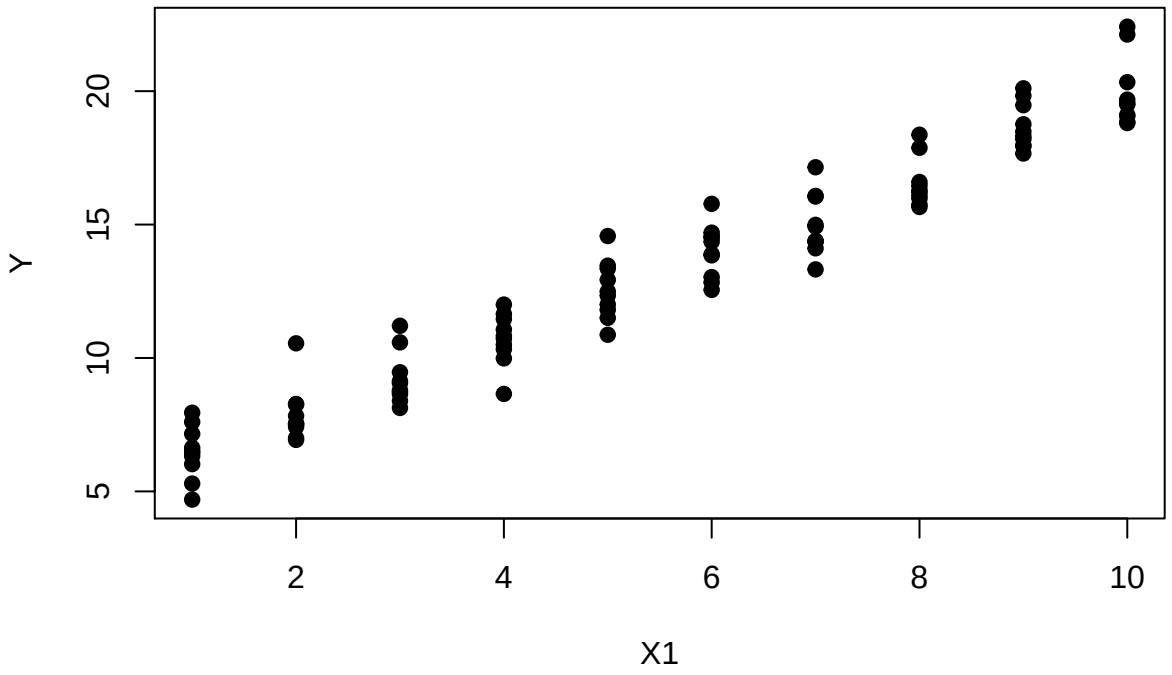
Boxplot

```
boxplot(e)
```



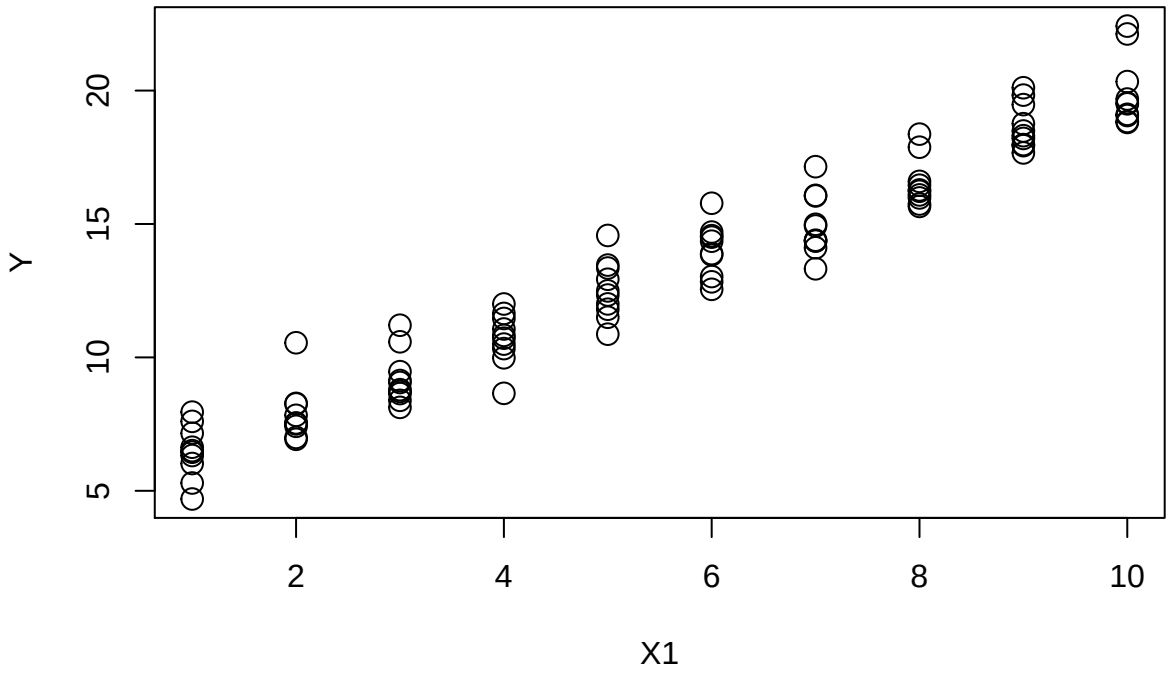
Plotting a formula

```
plot(Y ~ X1, pch=19)
```



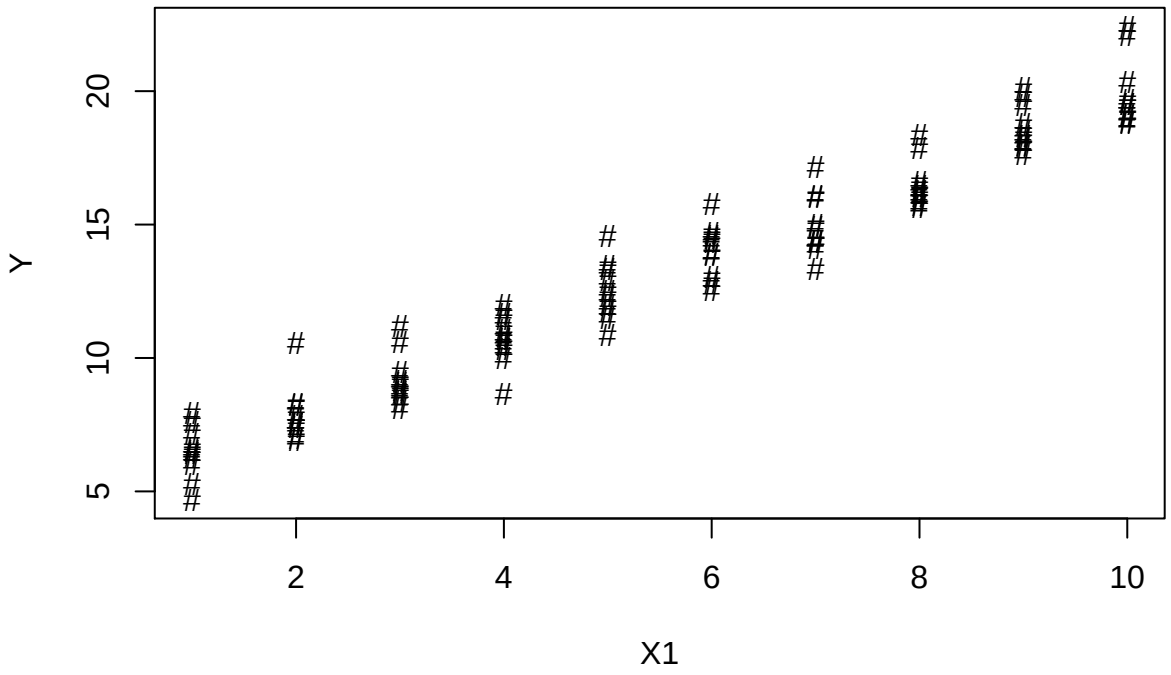
Graphical Parameters: Text and Symbol Size

```
plot(Y ~ X1, cex=1.5)
```



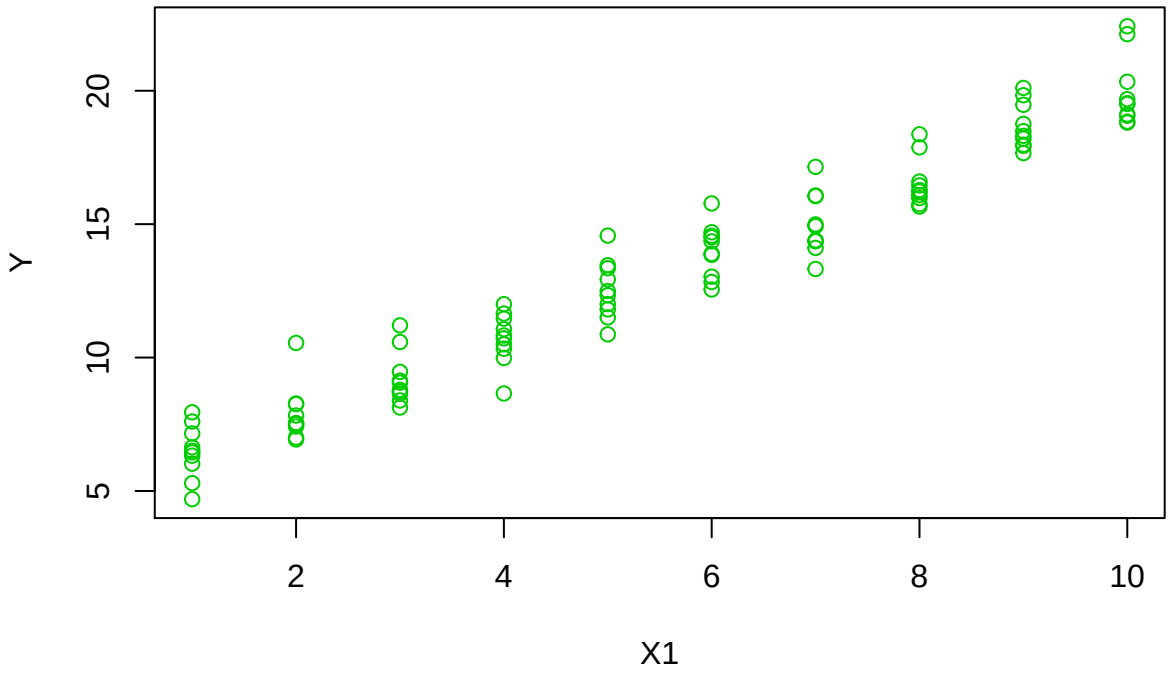
Graphical Parameters: Plotting Symbols

```
plot(Y ~ X1, pch='#')
```



Graphical Parameters: Colors

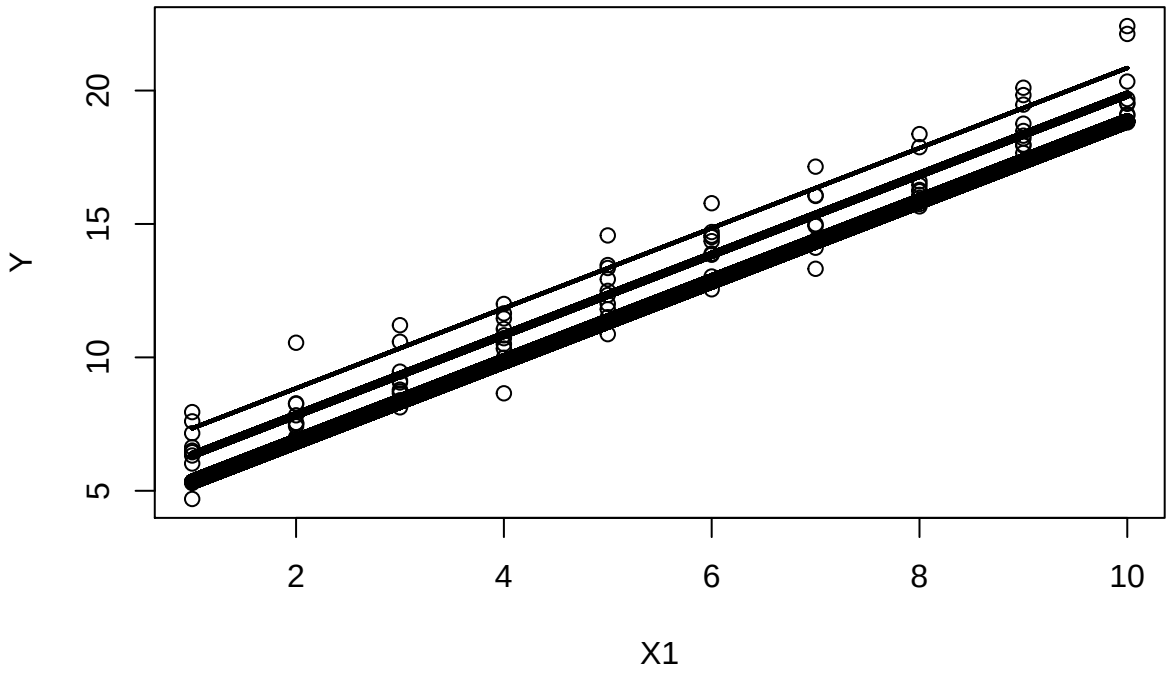
```
plot(Y ~ X1, col=3)
```



Graphical Parameters: Line

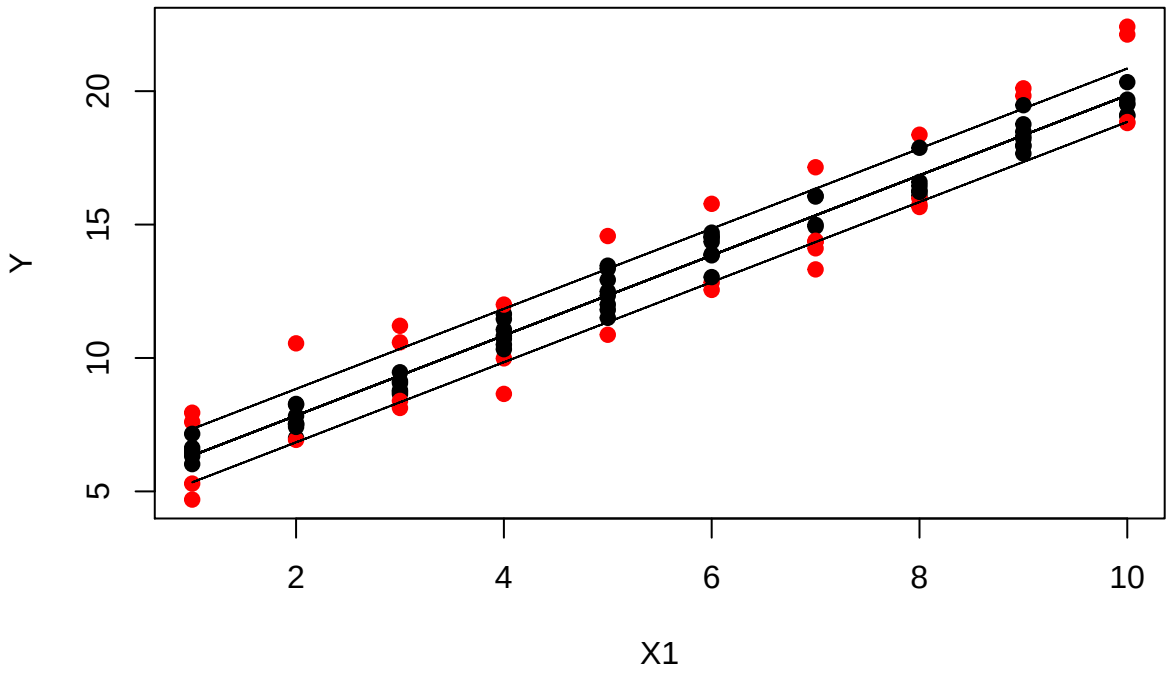
```
plot(Y ~ X1)
lines(X1, yHat, lwd=4)
```

```
lines(X1, yHat+1, lwd=2)
lines(X1, yHat-1, lwd=8)
```



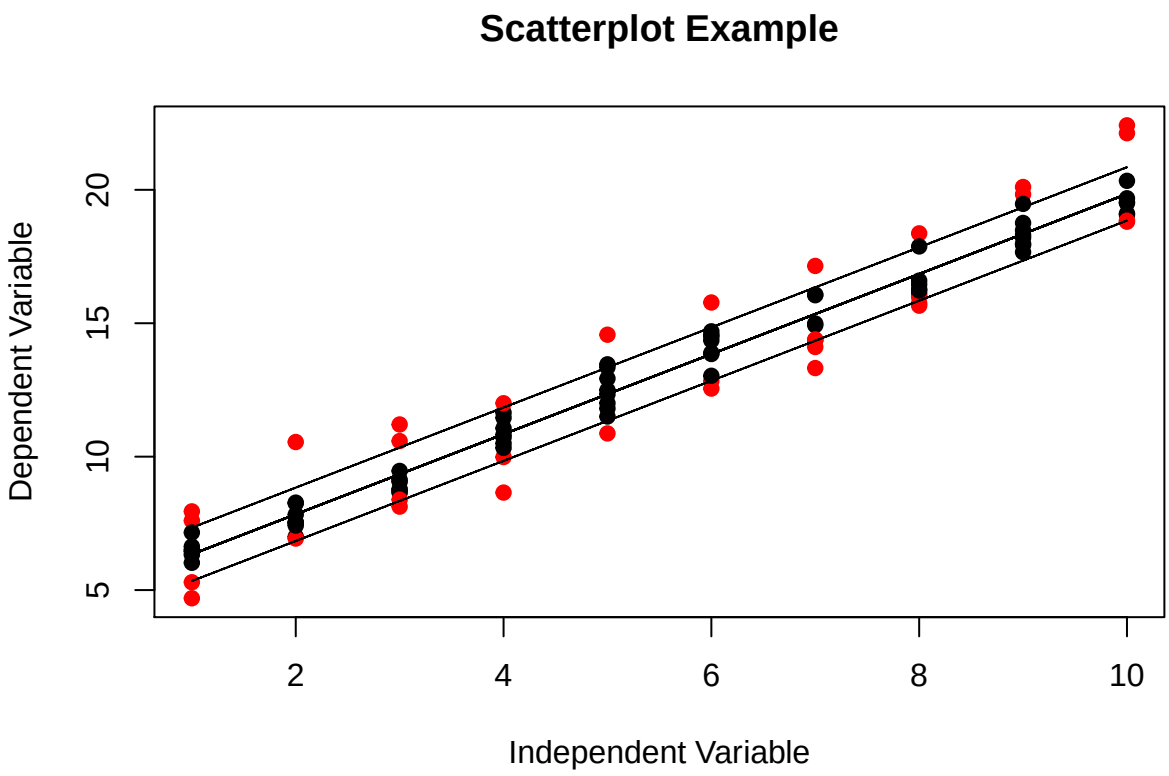
Emphasizing outliers

```
colors = ifelse(abs(e) > 1.0, "red", "black")
plot(Y ~ X1, pch=19, col=colors)
lines(X1, yHat)
lines(X1, yHat+1, lty="dotted")
lines(X1, yHat-1, lty="dotted")
```



Titles

```
colors = ifelse(abs(e) > 1.0, "red", "black")
plot(Y ~ X1, pch=19, col=colors     , main="Scatterplot Example",
    xlab="Independent Variable", ylab="Dependent Variable")
lines(X1, yHat)
lines(X1, yHat+1, lty="dotted")
lines(X1, yHat-1, lty="dotted")
```



Resources

- Nathan Yau - FlowingData.com
- Stephen Few - PerceptualEdge.com
- Edward Tufte - edwardtufte.com
- junkcharts.typepad.com