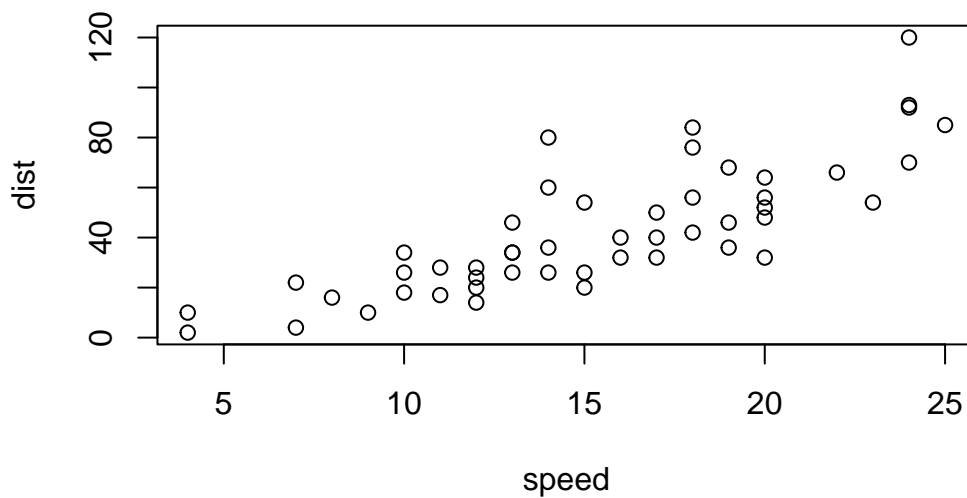# class 5: Data Visulalization

Nikan

Plotting in R

R has multiple plotting and graphics systems. The most popular of which is **ggplot2**.

we have already played with "base" R graphics. this comes along with R "out of the box".

```
plot(cars)
```


compared to base R plots ggplot is much more verbose - I need to write more code to get simple plots like the above.

have to first install ggplts

the install is a onetime only requirement. package is now on our computer. no need to reinstall. does have to be loaded into the project tho by calling `library()`.

```
library(ggplot2)
```
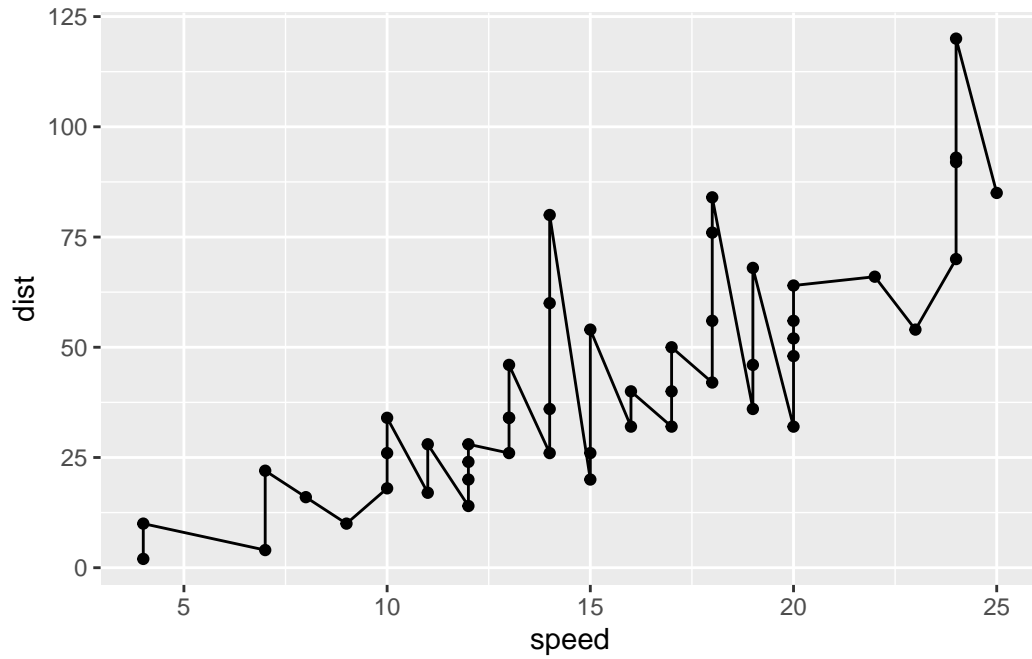
```
ggplot(cars)
```
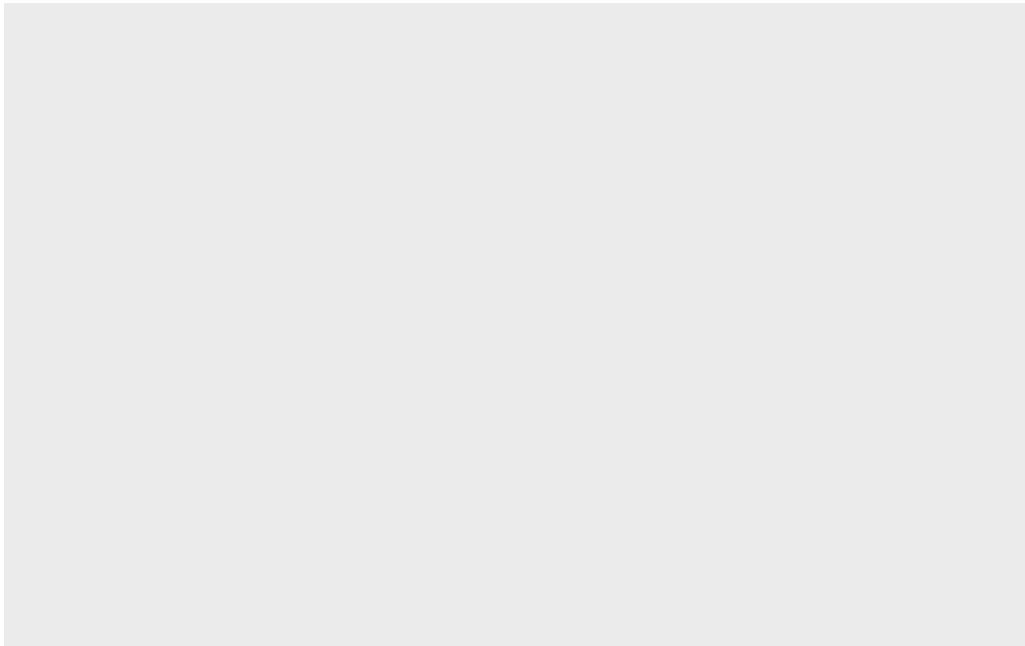
all ggplot figures need at least 3 things: - data(this is the data.frame with our numbers) - aesthetics ("aes", how our data mpas to the plot) - geomes (do want lines, points, columns, etc...)

```
ggplot(data = cars) +
  aes(x=speed, y = dist) +
  geom_point()
```

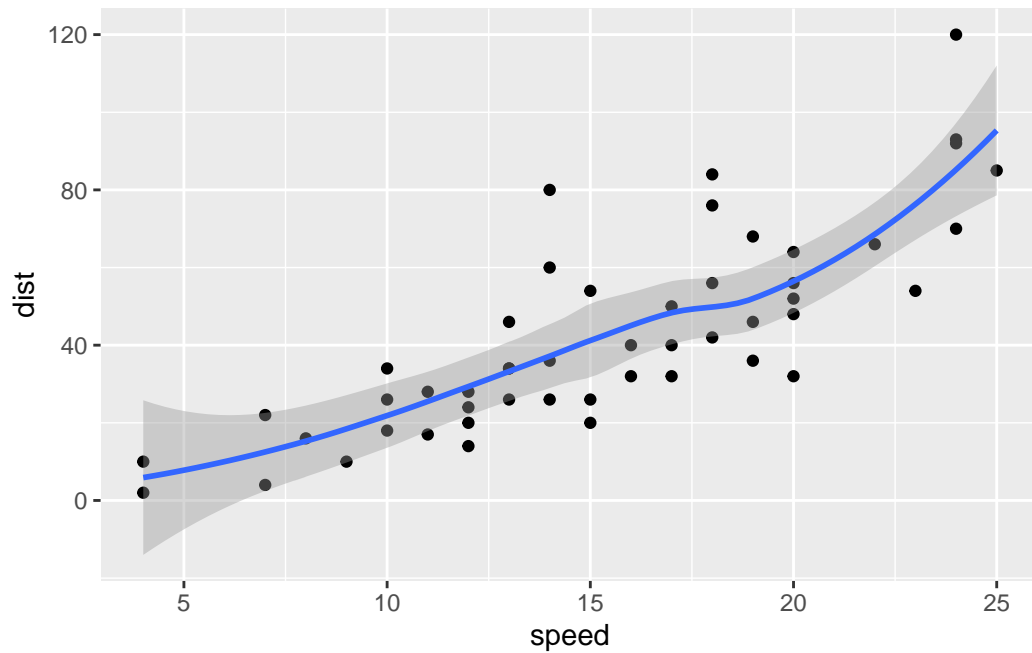i want a trend line to show the relationship between speed and stopping distance

```r
ggplot(data = cars) +
  aes(x=speed, y = dist) +
  geom_point() +
  geom_line()
```

thats not what we want

```
ggplot(data = cars) +
  aes(x=speed, y = dist) +
  geom_point() +
  geom_smooth()
```

`geom_smooth()` using method = 'loess' and formula = 'y ~ x'

```
url <- "https://bioboot.github.io/bimm143_S20/class-material/up_down_expression.txt"
genes <- read.delim(url)
head(genes)
```

```
       Gene Condition1 Condition2      State
1      A4GNT -3.6808610 -3.4401355 unchanging
2       AAAS  4.5479580  4.3864126 unchanging
3      AASDH  3.7190695  3.4787276 unchanging
4       AATF  5.0784720  5.0151916 unchanging
5       AATK  0.4711421  0.5598642 unchanging
6 AB015752.4 -3.6808610 -3.5921390 unchanging
```
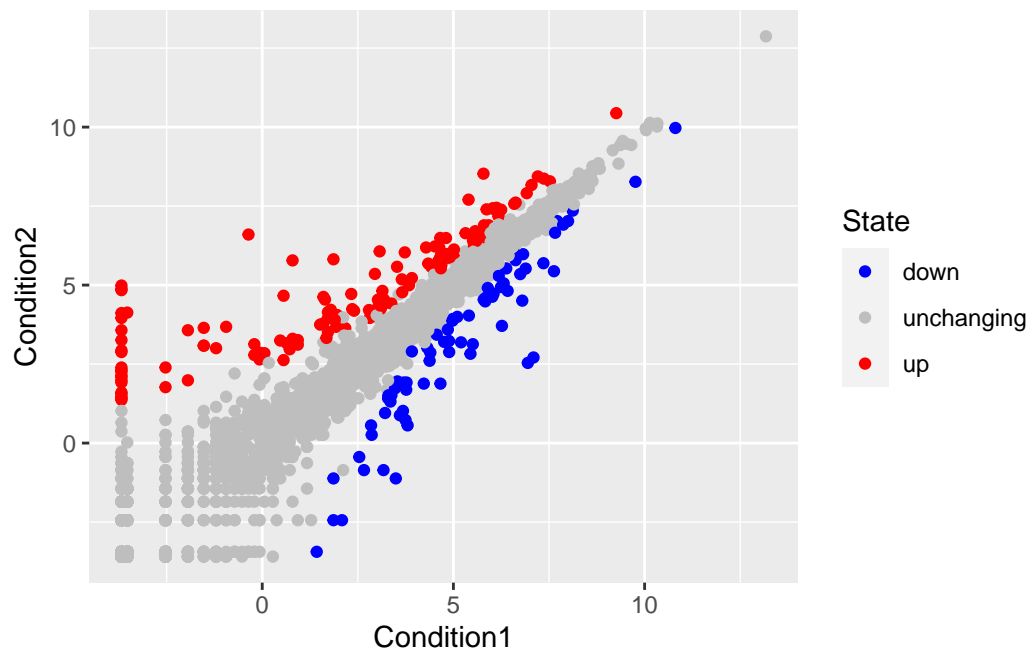
```
ggplot(genes) +
  aes(x=Condition1, y=Condition2) +
  geom_point()
```
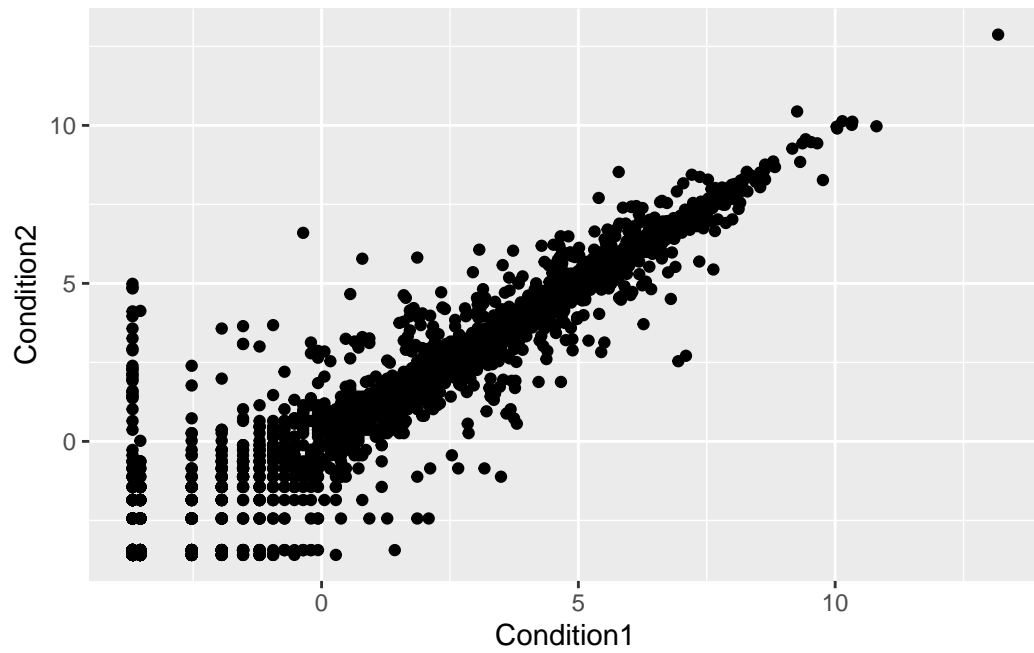
```
p <- ggplot(genes) +
  aes(x=Condition1, y=Condition2, col=State) +
  geom_point()
p
```
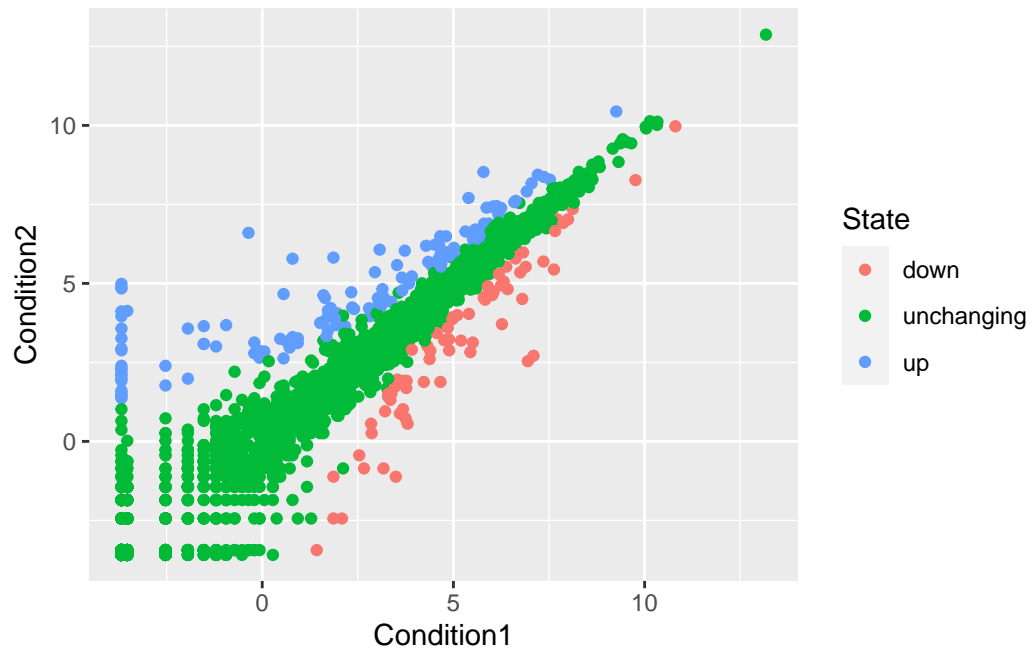
```
p + scale_colour_manual( values=c("blue","gray","red") )
```

```
p + scale_colour_manual(values=c("blue","gray","red")) +
    labs(title="Gene Expression Changes Upon Drug Treatment",
        x="Control (no drug) ",
        y="Drug Treatment")
```


Gene Expresion Changes Upon Drug Treatment