BGGN 213

Hands-on Lab Session

Class 05

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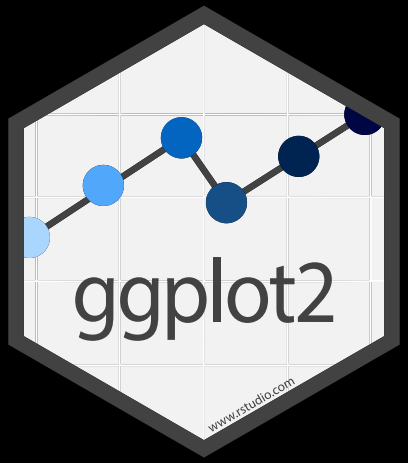
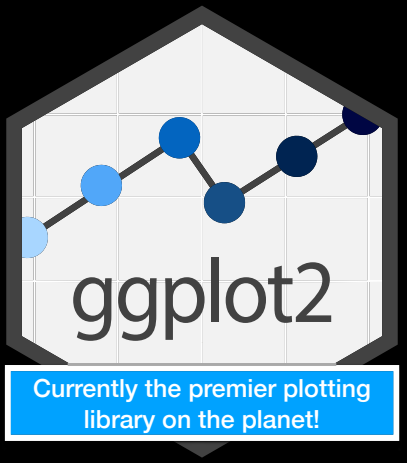
UC San Diego
http://thegrantlab.org/bggn213

How do we make informative and compelling figures?





Currently the premier plotting library on the planet!

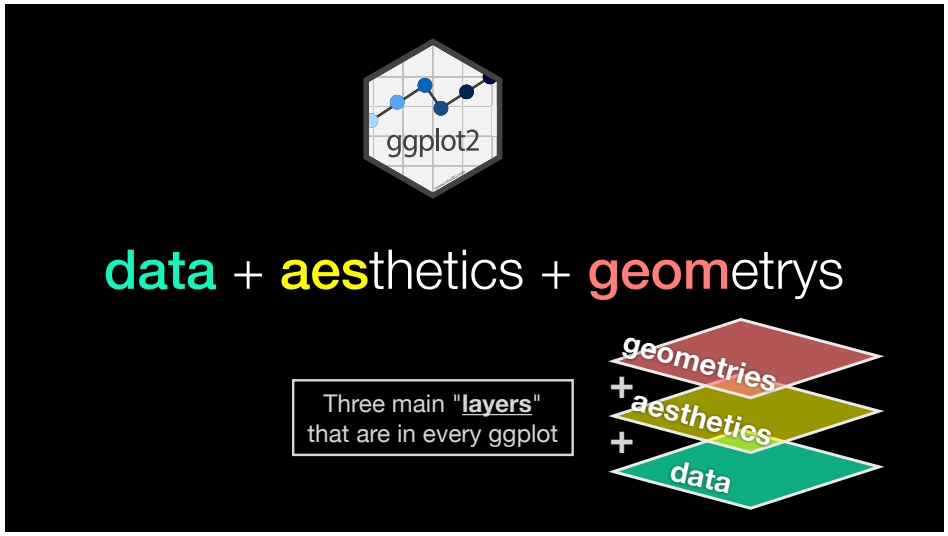
Key Insight: All visualizations
map data into quantifiable aesthetic
features of the resulting graphic

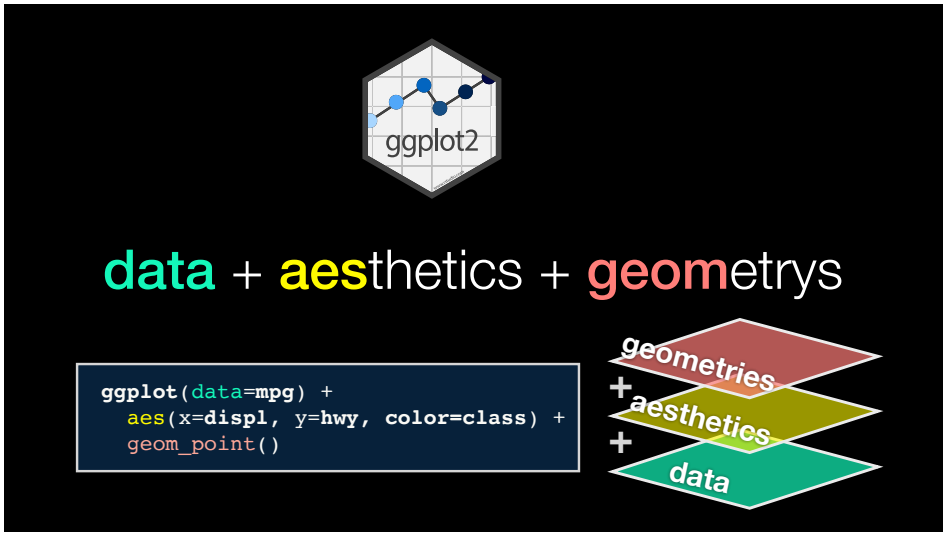
Key Insight: All visualizations
map **data** into quantifiable **aesthetics**
features of the resulting graphic

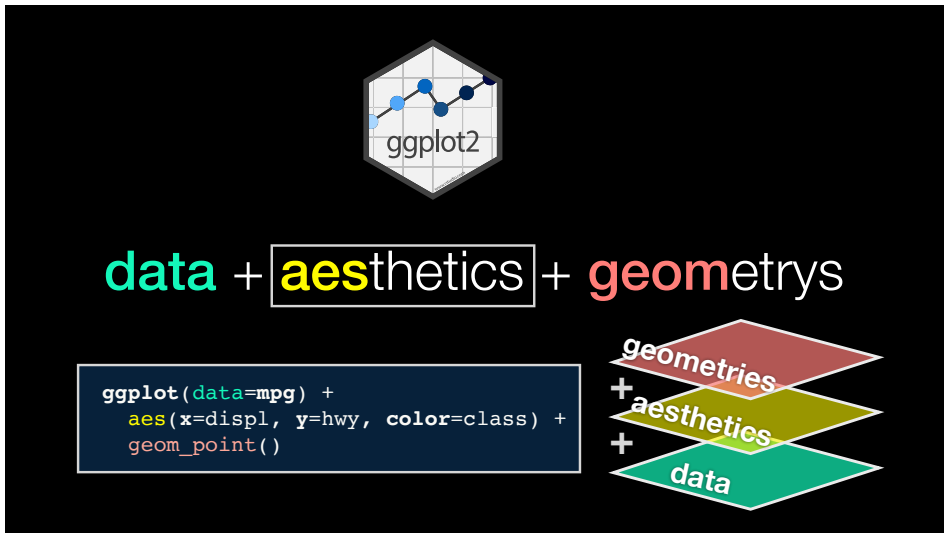
data ➡ aesthetics

data + aesthetics + geometrys

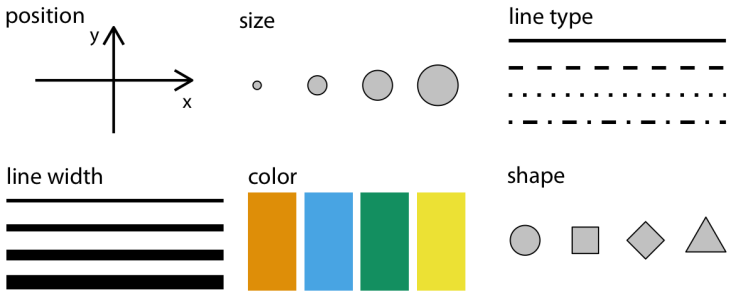
Three main "**layers**"
that are in every ggplot







Common aesthetics include

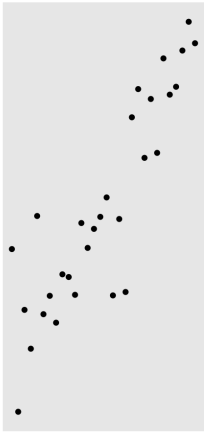


Modified from: Wilke (2019)

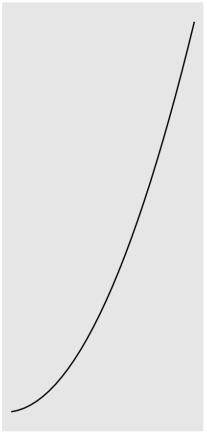
data + aesthetics + geometrys

Three main "**layers**" that are in every ggplot

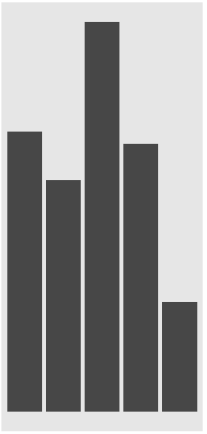
geom_point()

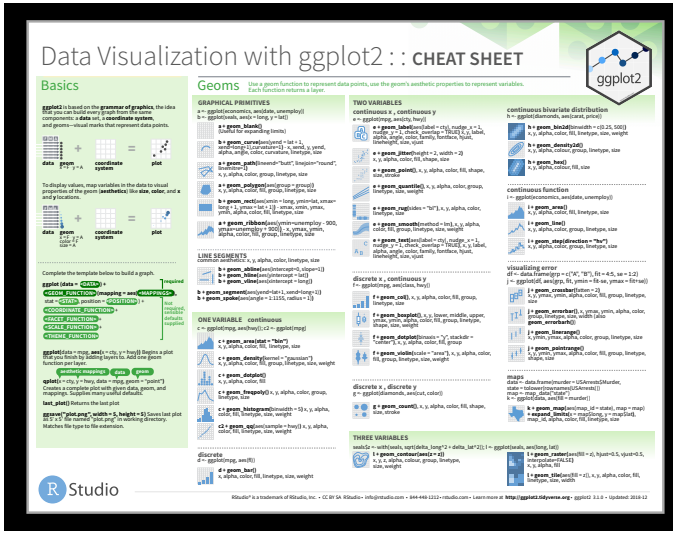


geom_line()



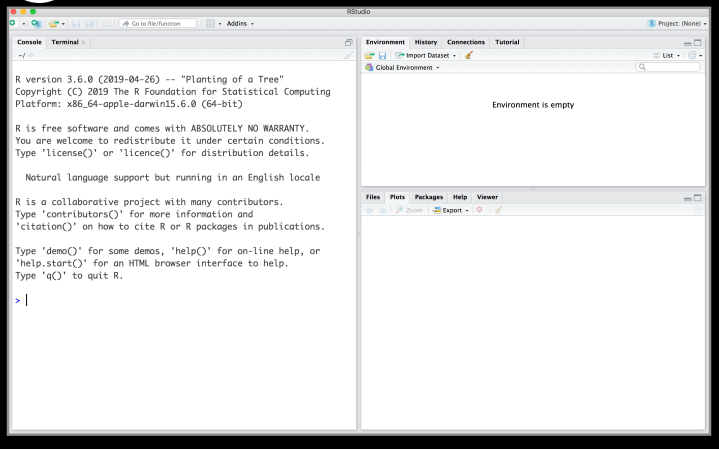
geom_col()

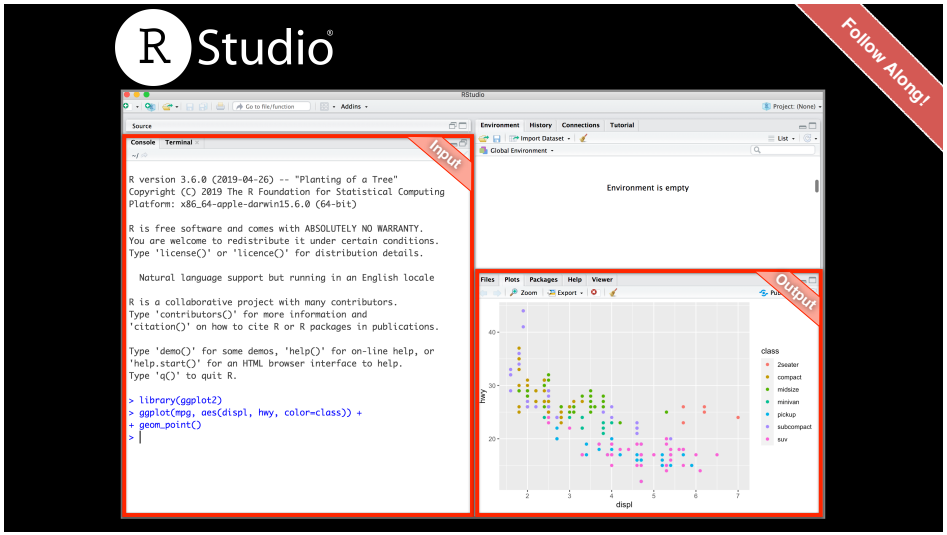




Learn more about core `geom_FUNCTIONS()`

There are > 40 core "geom" functions.
See cheat-sheet link on class website!



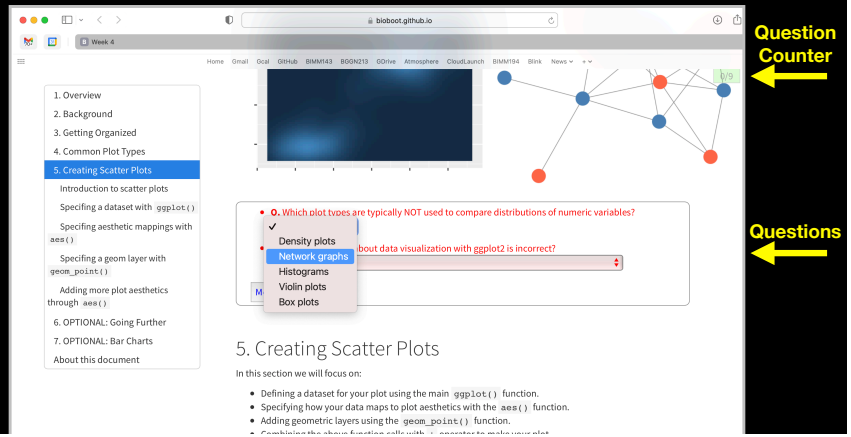


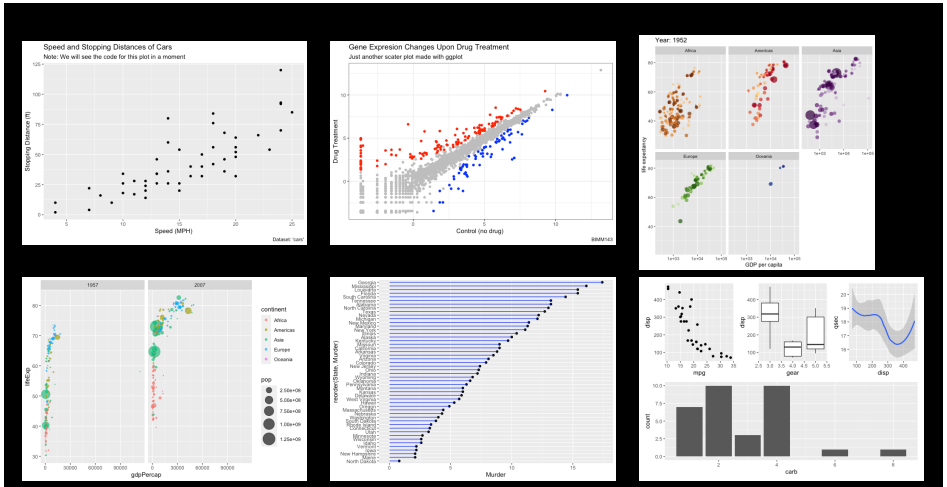
RStudio >

Create a new Project and open a new R Script

(N.B. make a report with notes and plots)

In addition to your **PDF lab report** answer the **inbuilt questions**





Making a HTML Lab Report

Lab Report

- Save your **R script** (make sure it has some plots and comments)
- Can you source this R script file to re-generate all your plots without error?

- If so you can now generate a nice PDF report of your work for upload to **GradeScope...**

[Optional Sections get you bonus points!]

data + aesthetics + geometrys

- **Summary:** ggplot takes an input *data.frame*, a mapping of columns to aesthetics and one or more geom *layers* (e.g. geom_point(), geom_line(), ...)

```
ggplot(data=mpg) +
  aes(x=displ, y=hwy) +
  geom_point()
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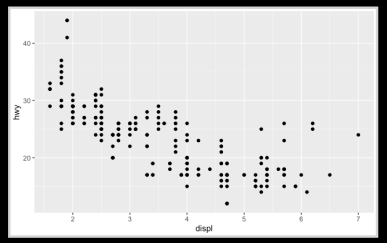

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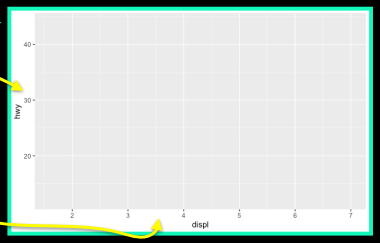

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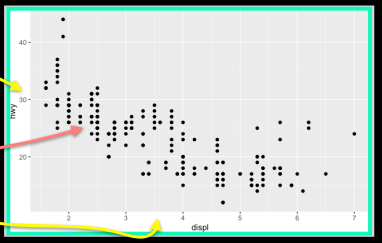

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- We can keep building more complicated plots by adding more **layers**

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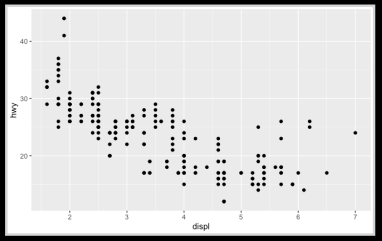
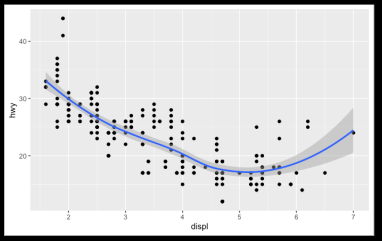


data + aesthetics + geometrys

- We can keep building more complicated plots by adding more **layers**
- For example lets add another ***geom***, in this case a smooth line fitted to the data...

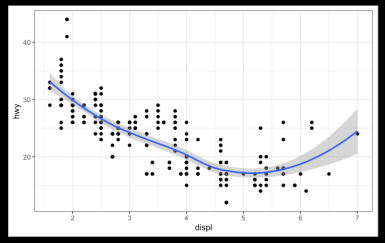
```
ggplot(data=mpg) +
  aes(x=displ, y=hwy) +
  geom_point() +
  geom_smooth()
```



data + aesthetics + geometrys

- We can also add other customizations like themes...

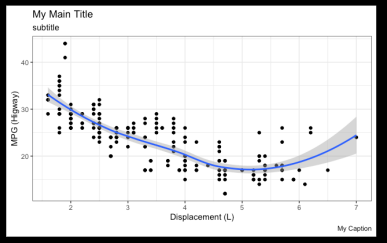
```
ggplot(data=mpg) +
  aes(x=displ, y=hwy) +
  geom_point() +
  geom_smooth() +
  theme_bw()
```



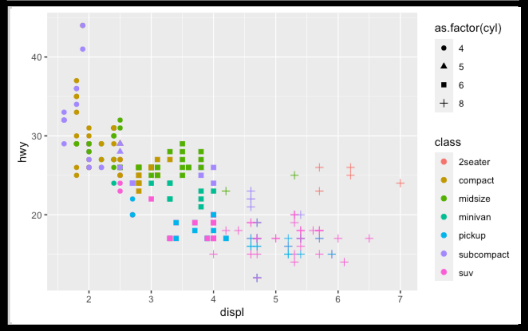
data + aesthetics + geometrys

- And various custom annotation labels...

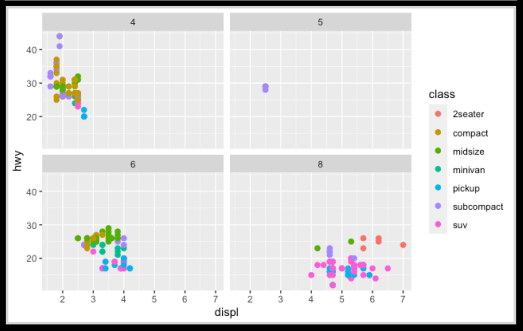
```
ggplot(data=mpg) +
 aes(x=displ, y=hwy) +
 geom_point() +
 geom_smooth() +
 theme_bw()+
 labs(title="My Main Title",
      subtitle = "subtitle",
      caption ="My Caption",
      x="Displacement (L)",
      y= "MPG (Higway)")
```

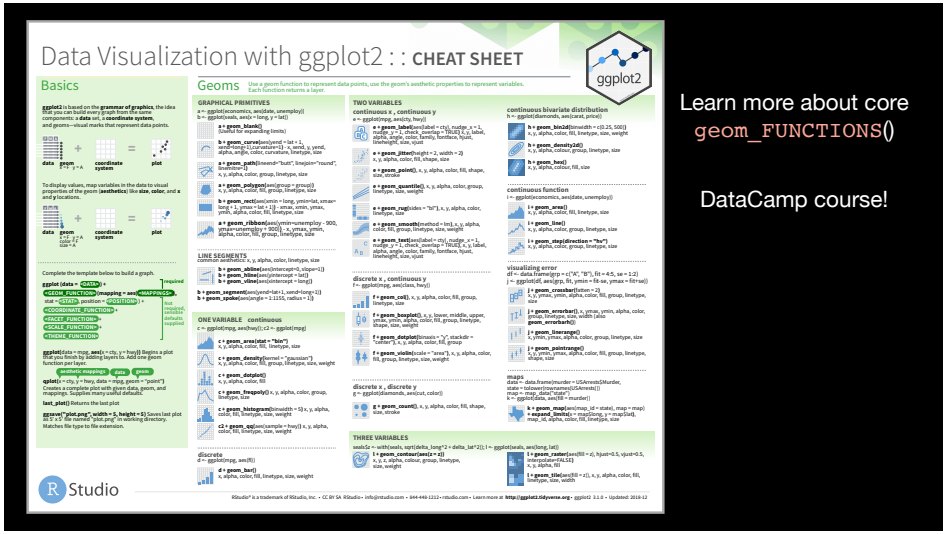



```
ggplot(data=mpg) +
  aes(x=displ, y=hwy, color=class,
      shape=factor(cyl)) +
  geom_point()
```




```
ggplot(data=mpg) +
  aes(x=displ, y=hwy, color=class) +
  geom_point() +
  facet_wrap(~cyl)
```





Learn more about core `geom_FUNCTIONS()`

DataCamp course!