

Policy and agenda

- You need to finish the weekly reading **before** coming to the lab.
- Activity is marked as satisfactory completion or not:
 - Poor quality submissions will result in a 0.
 - Suspicious AI-generated content will be flagged (manually) and forwarded to the instructor.
- We will work on activities (part I) during the lab:
 - The focus is more on *how to code* rather than on theories.

Packages we use today

Load the following three packages.

```
1 library(isdas)
2 library(sf)
3 library(tidyverse)
```

If you have trouble restoring the reproducible environment, you need to manually install the packages first.

```
1 install.packages("remotes")
2 remotes::install_github("paezha/isdas")
3
4 install.packages("sf")
5
6 install.packages("tidyverse")
```

What does each package do?

- `isdas`: The course companion package containing all the data we will use.
- `sf`: The GIS package that enables us to work with **vector** data.
- `tidyverse`: A meta-package that encompasses plotting, data manipulation, and additional functionality.

ggplot2 package

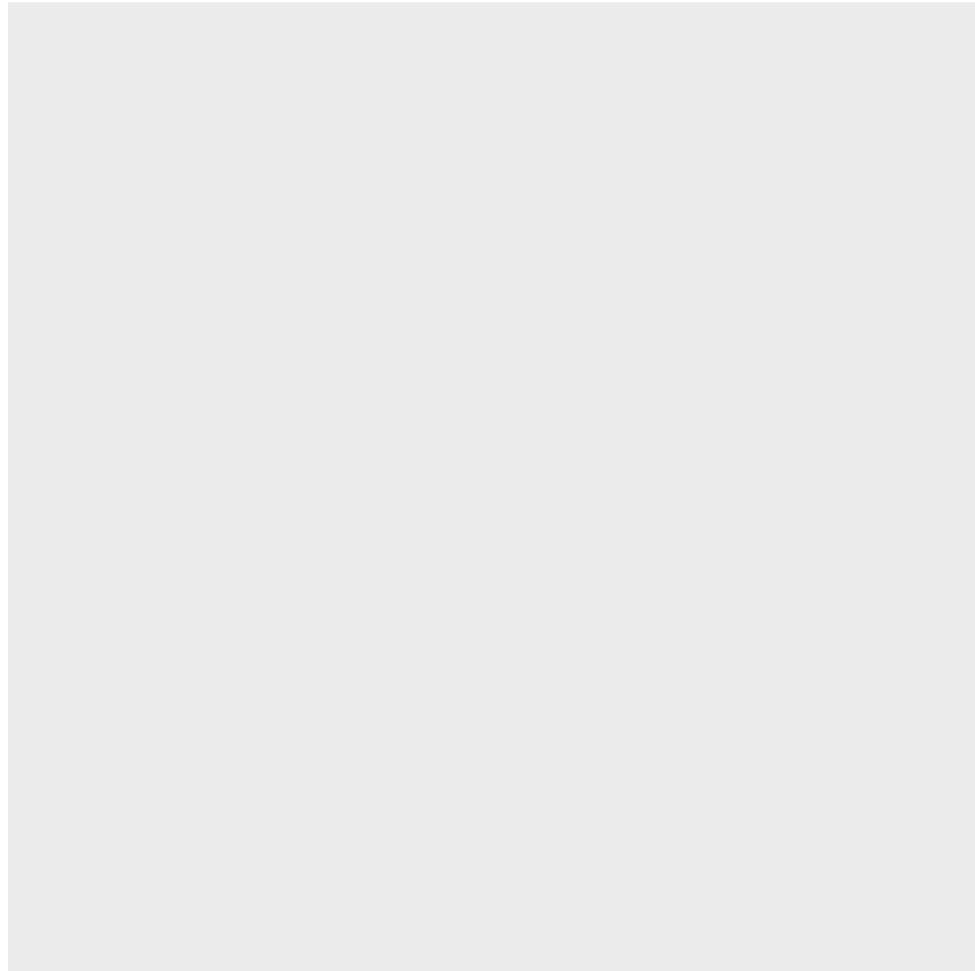


- `ggplot2` is one of the packages included in tidyverse.
- It enables us to use the Grammar of Graphics to create plots.
- It creates plots through overlaying layers created using `geom_*`.

How layering works?

```
1 ggplot(data = mpg)
```

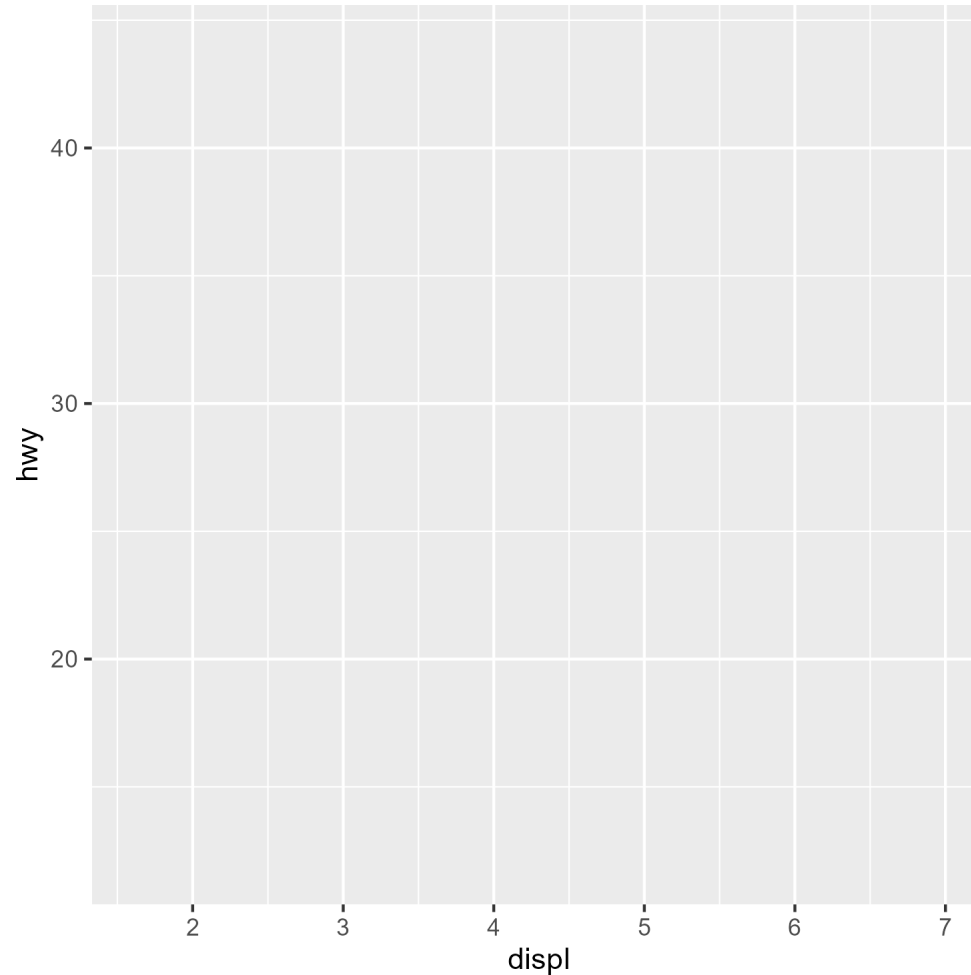
First, we create a canvas.



How layering works?

```
1 ggplot(data = mpg) +  
2   aes(x = displ,  
3       y = hwy)
```

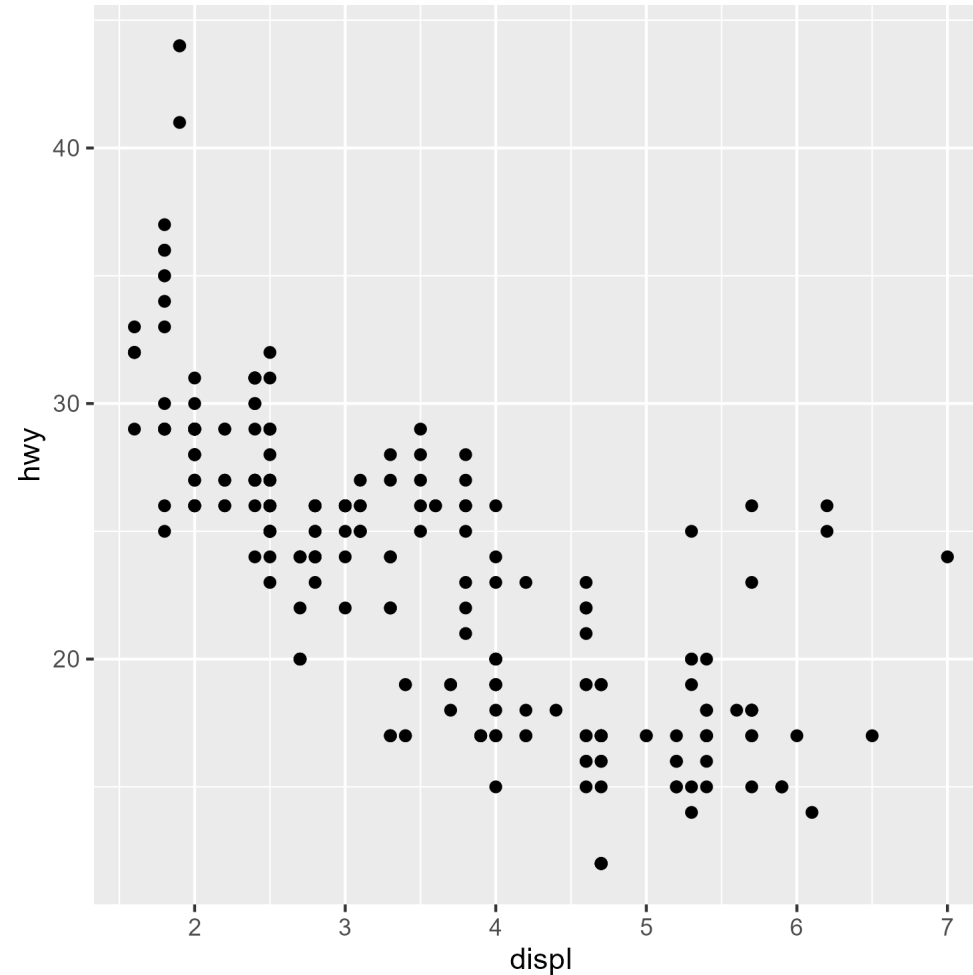
Then, we assign which variables go to which axis.



How layering works?

```
1 ggplot(data = mpg) +  
2   aes(x = displ,  
3       y = hwy) +  
4   geom_point()
```

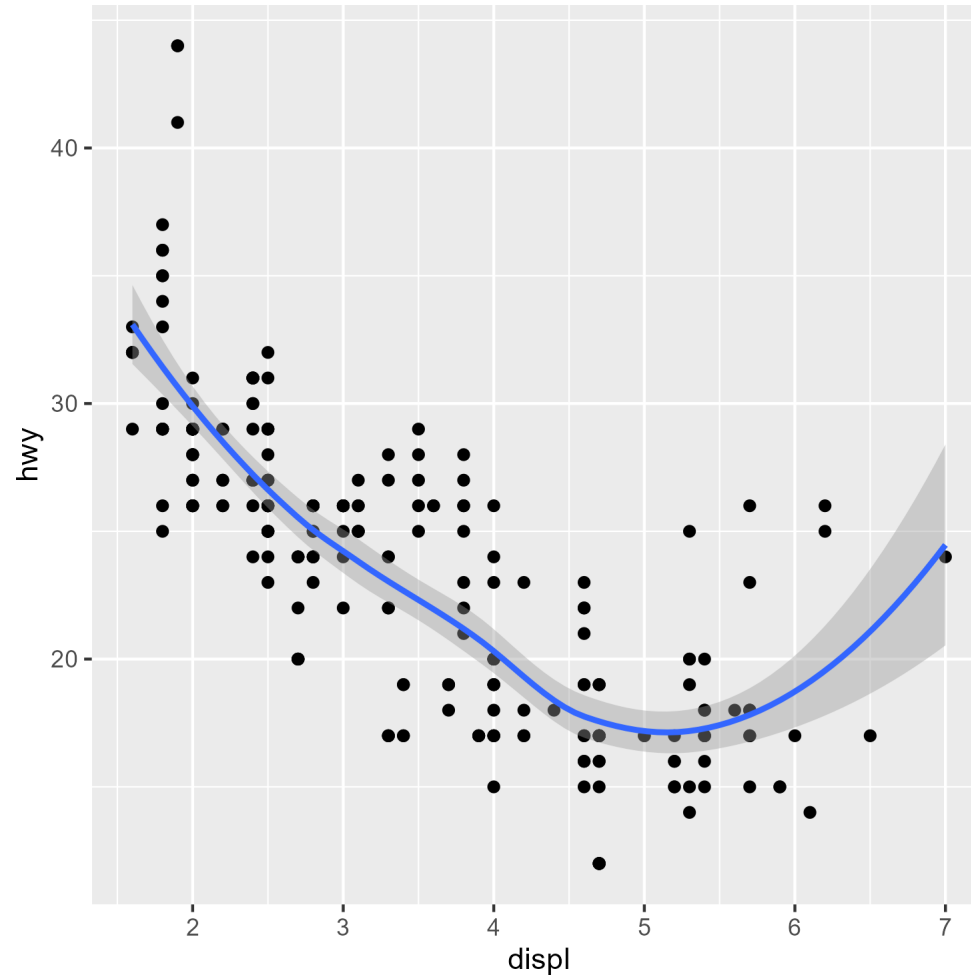
We add data points to the plot.



How layering works?

```
1 ggplot(data = mpg) +  
2   aes(x = displ,  
3       y = hwy) +  
4   geom_point() +  
5   geom_smooth()
```

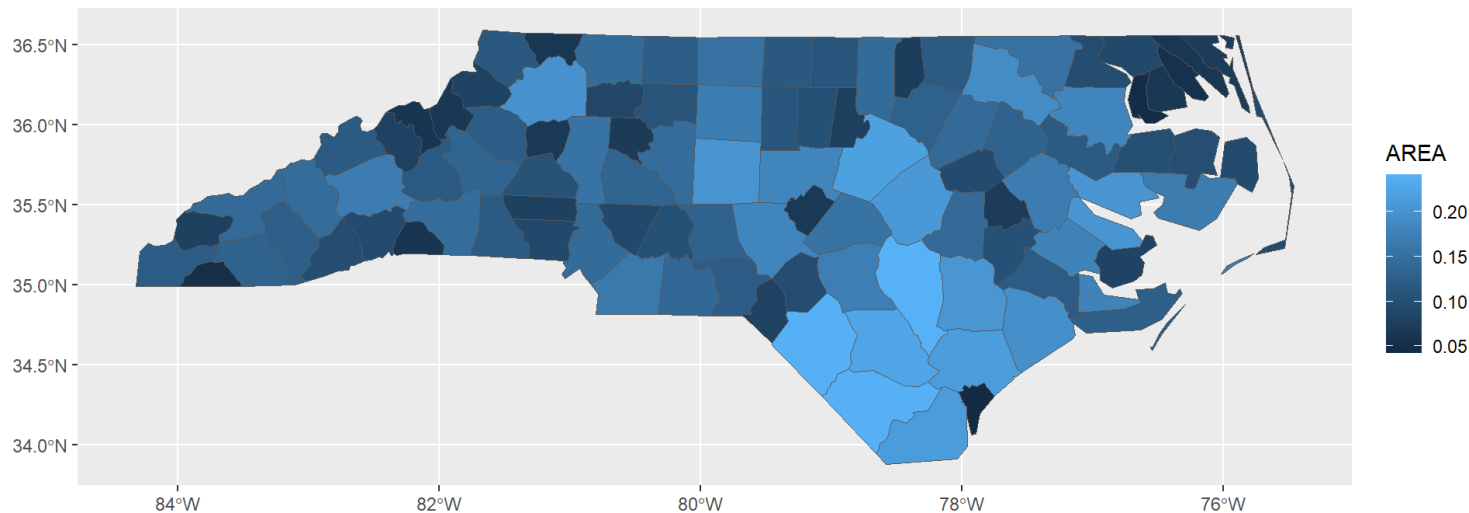
Finally, we add an
(default: local
polynomial) regression
line to the points.



Mapping

Mapping an `sf` object (vector data) is straightforward. We use `geom_sf` for this purpose.

```
1 ggplot(data = nc) +  
2   geom_sf(aes(fill = AREA))
```



Activities for today

- We will work on the following chapter from the textbook:
 - Chapter 4: Activity: Statistical Maps I
 - Chapter 6: Activity 2: Statistical Maps II
- The hard deadline is **Thursday, September 24.**

References

- <https://ggplot2.tidyverse.org/>
- <https://metricsf20.classes.ryansafner.com/slides/1.3-slides#1>