# 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 during the lab:
  - The focus is more on *how to code* rather than on theories.

# Packages we use today

Load the following three packages.

```
library(isdas)
library(sf)
library(tidyverse)
```

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

```
install.packages("remotes")
remotes::install_github("paezha/isdas")

install.packages("sf")

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?

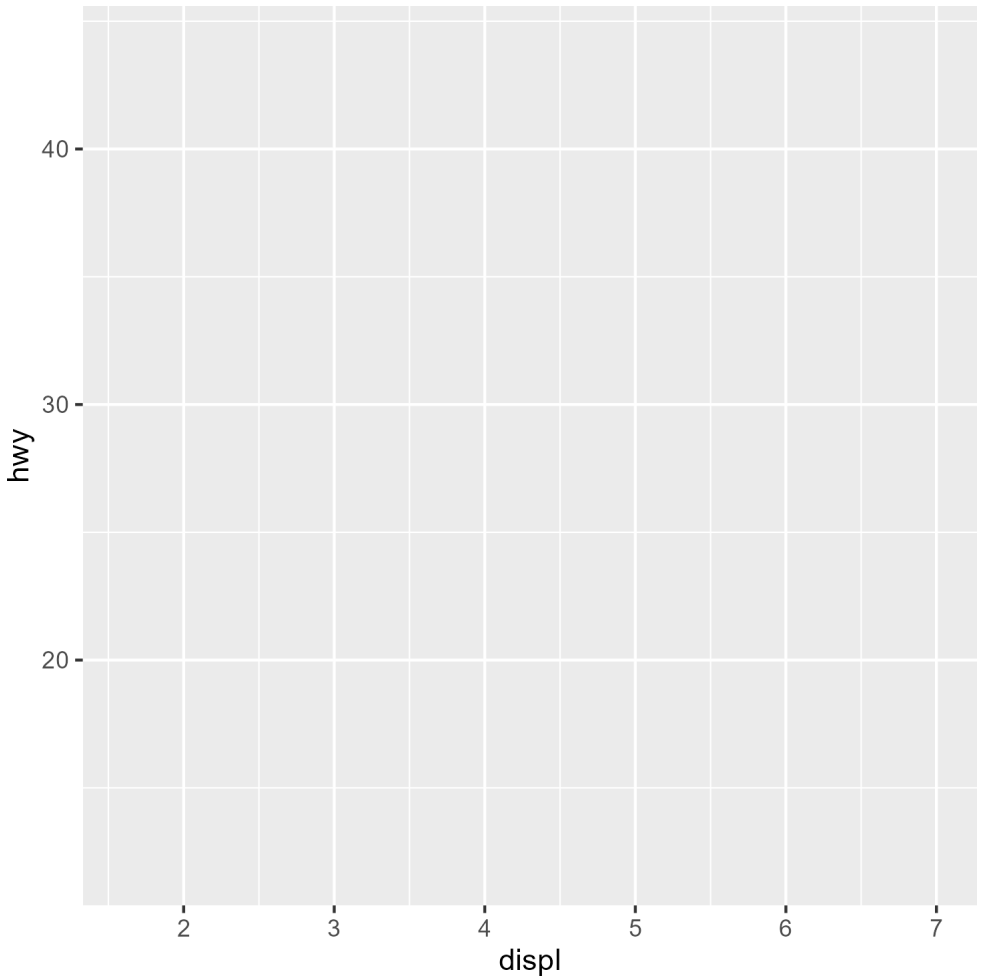
```
1 ggplot(data = mpg)
```

First, we create a canvas.

# How layering works?

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

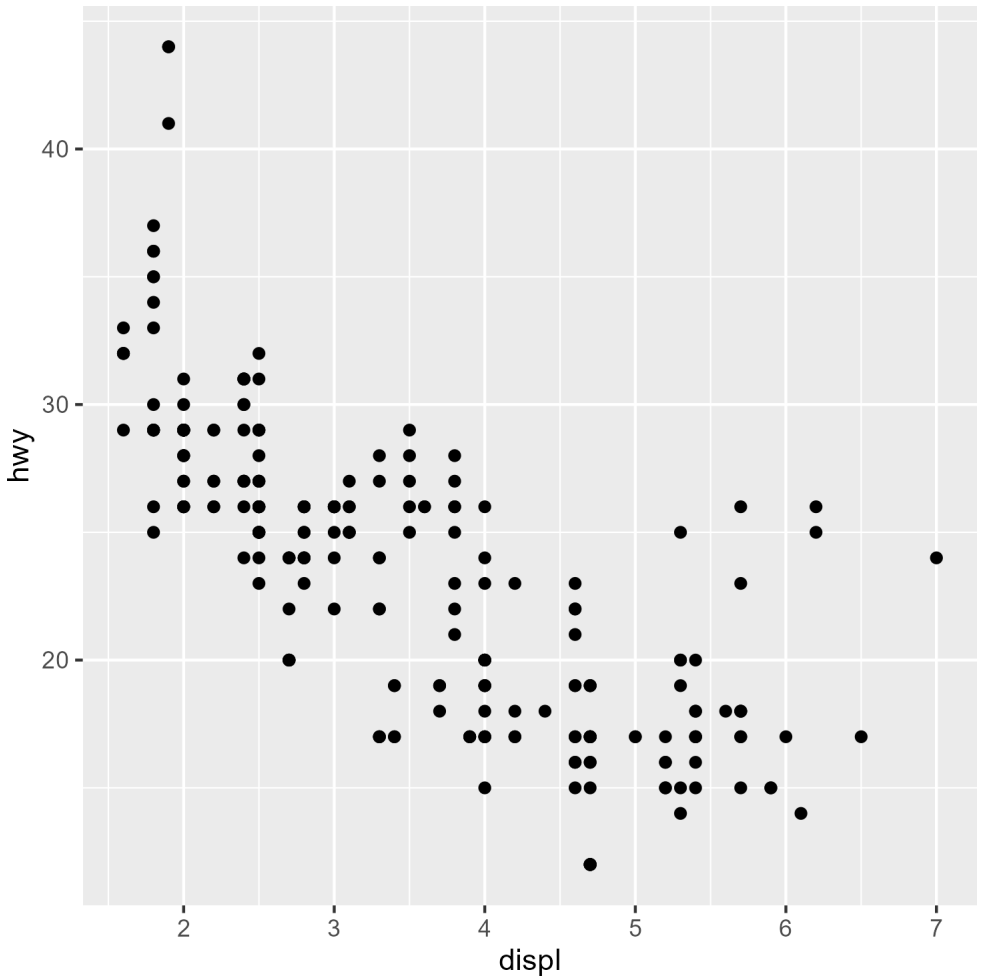
Then, we assign which variables go to which axis.



# How layering works?

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

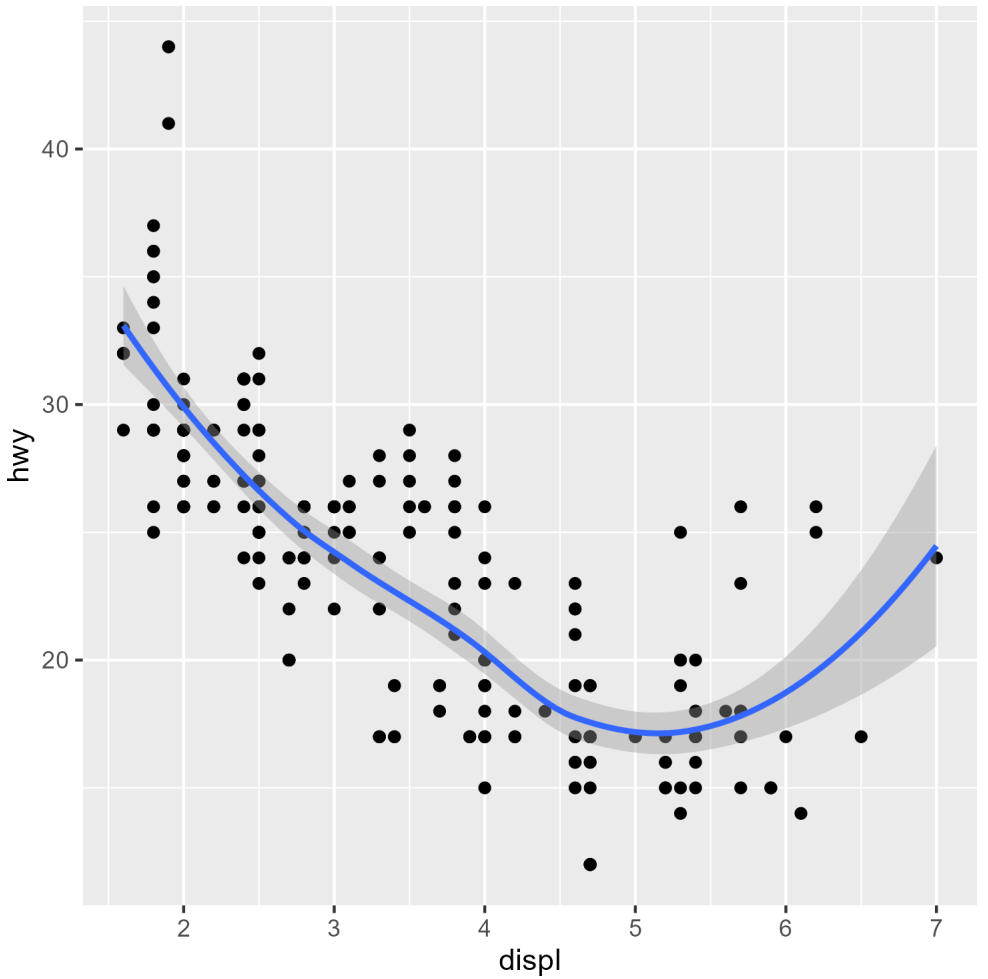
We add data points to the plot.



# How layering works?

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

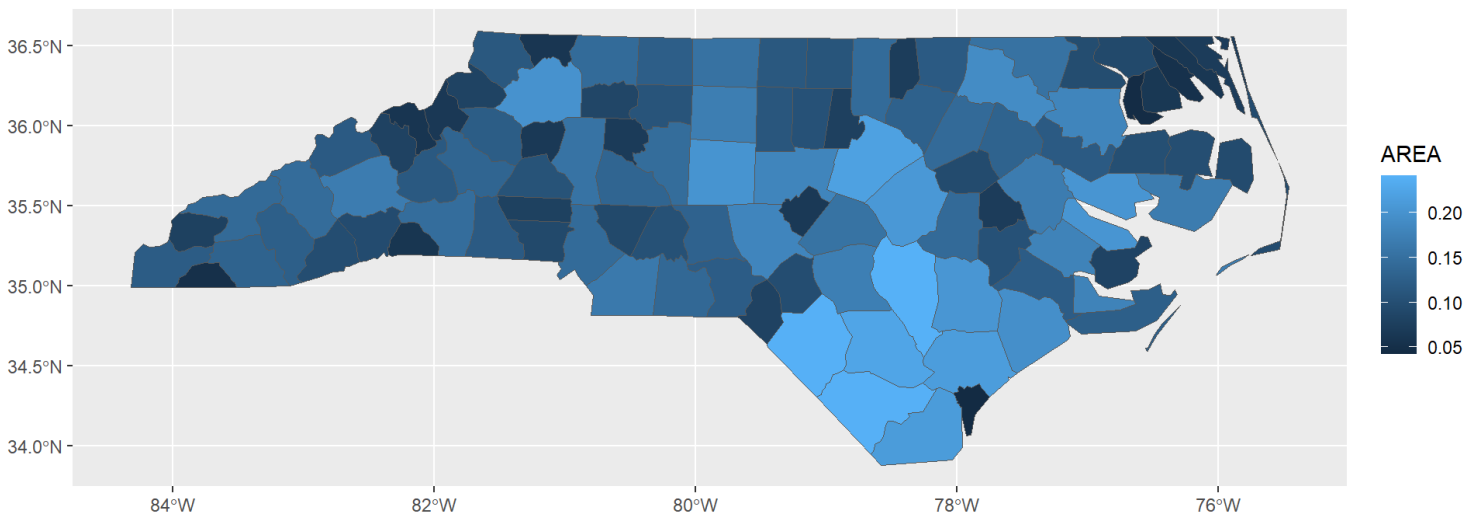
Finally, we add an (default: local polynomial) regression line to the points.



# 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 **Tuesday**, **January 20** (**8:00 am**).

# References


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