Stat 610 Homework 1

Due Wednesday, September 10, 11:59pm

Assignment

In this assignment, you will practice using for loops to make a large number of sample plots for different color scales. Please make a first attempt without using generative AI. If you are happy with the code you wrote on your own, you can turn in just what you wrote. If you felt like you needed to use chatGPT or something similar, compare the code you wrote to what chatGPT gives you in response to the questions. Note whether the code works and whether there are any stylistic or substantive differences with what you wrote.

You should do the following:

- Install the `ggplot2` and `wesanderson` packages from CRAN using `install.packages('ggplot2')` and `install.packages('wesanderson')`. Load both packages using `library(ggplot2)` and `library(wesanderson)`.

  Notice that `names(wes_palettes)` gives you a list of the color palettes that are available in this package, and `wes_palette(p)` will give you an object containing the colors that correspond to palette `p`.

- What type of object is `names(wes_palettes)`?

- What type of object is `wes_palette('AsteroidCity2')`? What are its elements?

  Hint: Try using `str`, `typeof`, `length`, *and querying individual elements.*

- Run the following code. What role do `pal[1]` and `pal[2]` play? (We have not talked about plotting and for the most part will not. You can answer this question by experimenting or looking at the documentation https://ggplot2.tidyverse.org/reference/scale_gradient.html)

```
data(heatmap)
pal <- wes_palette('Rushmore', 3, type = 'discrete')
ggplot(heatmap, aes(x = X2, y = X1, fill = value)) +
  geom_tile() +
  scale_fill_gradient2(
    low = pal[1],
    mid = "white",
    high = pal[2],
    ) +
  scale_x_discrete(expand = c(0, 0)) +
  scale_y_discrete(expand = c(0, 0)) +
  coord_equal()
```

- Looping over the elements of `names(wes_palettes)` with a for loop, make one plot for each palette as above, where the low value for the gradient is the first element of the palette, the

middle value is white, and the high value is the second element of the palette.

Hint: Sometimes `ggplot` doesn't interact well with for loops. You can usually fix this by calling `print` on the plot (so `print(ggplot(...) + geom_tile() + ...)`.

- Do the same as before, but this time make one plot for each palette where the low value for the gradient is the first element of the palette, the middle value is the second element, and the high value is the third element.
- Choosing one of the palettes, use a for loop to make a sequence of plots as above where the middle value is white and the low/high values one pair of colors from the palette. If there are n colors in the palette, you should have $n^2 - n$ plots here.

Submission parameters

You should submit an Rmd file and the corresponding pdf or html on canvas. The files should contain both the code you ran and the answers to the problems. Because of the large number of plots created by the for loop, it will be very long.