Homework 4

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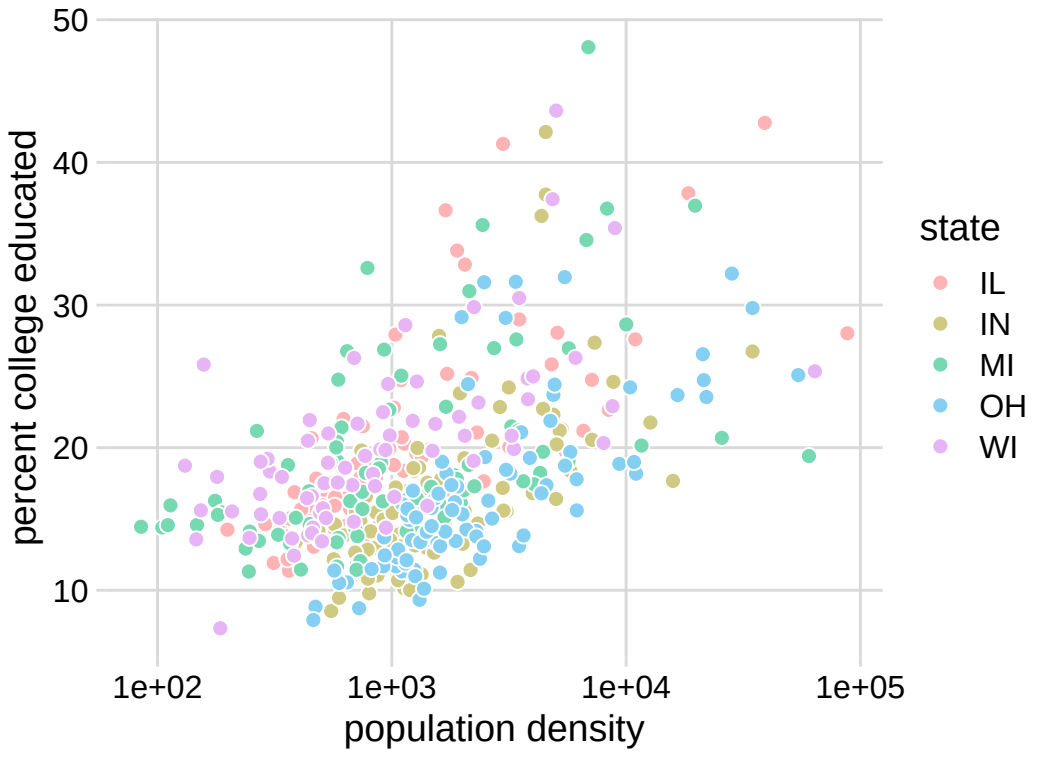
This homework is due on Feb. 15, 2021 at 11:00pm. Please submit as a pdf file on Canvas.

Problem 1: (5 pts) We will work with the `midwest` dataset provided by **ggplot2**. See here for details: https://ggplot2.tidyverse.org/reference/midwest.html

For the following plot, add an appropriate color scale from the **colorspace** package and explicitly set the palette you want to use. Also add an appropriate theme that works well with the color scale you have chosen. Explain in 2-3 sentences your choice of color scale and theme.

```
ggplot(midwest, aes(popdensity, percollege, fill = state)) +
  geom_point(shape = 21, size = 2.5, color = "white", stroke = 0.5) +
  scale_x_log10(name = "population density") +
  scale_y_continuous(name = "percent college educated") +
  scale_fill_discrete_qualitative(palette = "Set 3") +
  theme_minimal_grid()
```

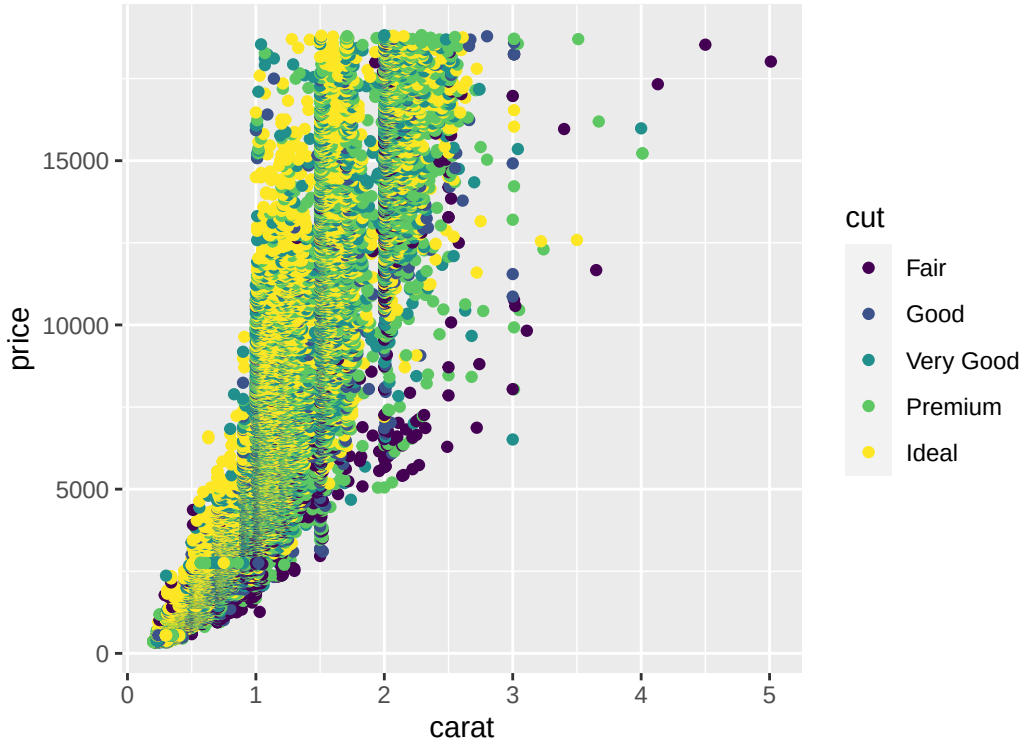


This data is qualitative scale. I used 'scale_fill_discrete_qualitative ()' to present the categorical data, which doesn't have particular order of the categories. Considering many data points of this dataset, I'm using "Set 3" for palette, a lighter color set, that is less distracting. Among many theme options, the " theme_minimal_grid() presents the dataset better with minimal grid lines and the clean background.

Problem 2: (2 pts) The following is a plot of the `diamonds` dataset provided by **ggplot2**. See here for

details: https://ggplot2.tidyverse.org/reference/diamonds.html

```
ggplot(diamonds, aes(carat, price, color = cut)) +
  geom_point()
```

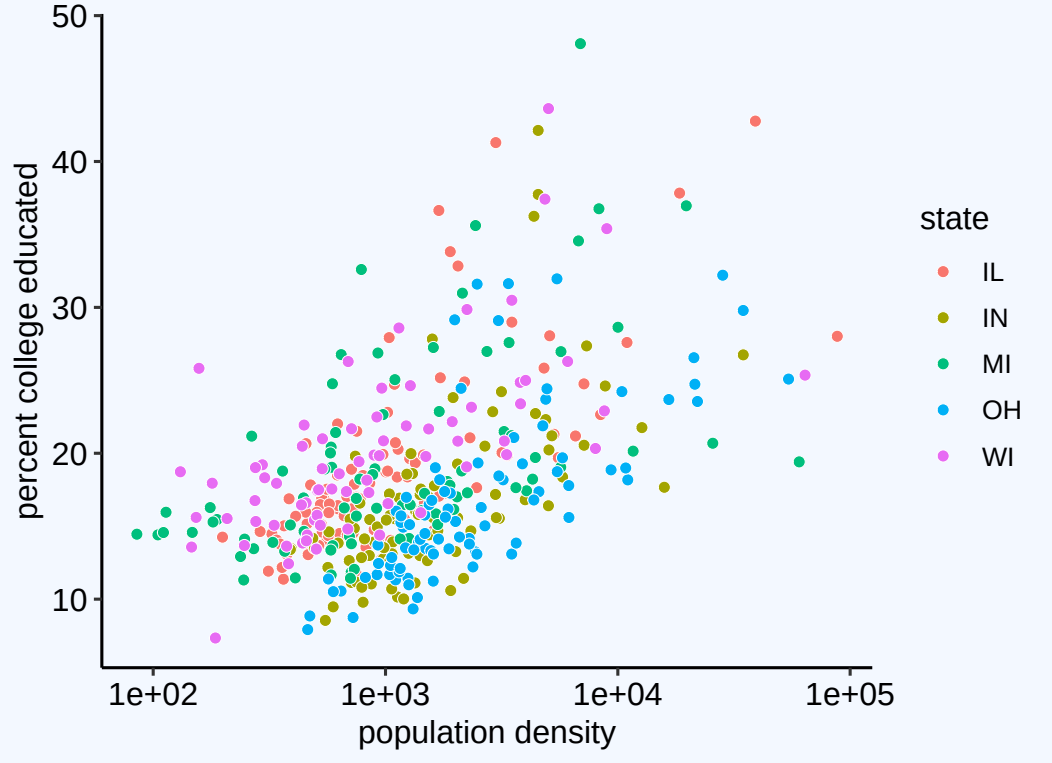


As you can see, if we don't specify a color scale ggplot chooses the viridis scale by default. Explain in 2-3 sentences why the viridis scale is an appropriate choice here.

The viridis scale using colors can show the variation of the different sequential values in the diamond cutting. Thus, the colors present different diamond cuttings that are associated with carat and price. sequential data we actually want to indicate that every step along the

Problem 3: (3 pts) For this problem, we will go back to the `midwest` dataset. In the following plot, you may notice that the axis tick labels are smaller than the axis titles, and also in a different color (gray instead of black). Make the axis tick labels the same size (`size = 12`) and give them the color black (`color = "black"`). Then, set the entire plot background to the color `"#F3F8FF"`. Make sure there are no white areas remaining, such as behind the plot panel or under the legend.

```
ggplot(midwest, aes(popdensity, percollege, fill = state)) +
  geom_point(shape = 21, size = 2, color = "white", stroke = 0.2) +
  scale_x_log10(name = "population density") +
  scale_y_continuous(name = "percent college educated") +
  theme_classic(12) +
  theme(axis.text = element_text(color = "black", size = 12),
        plot.background = element_rect(fill = "#F3F8FF"),
        panel.background = element_rect(fill = "#F3F8FF"),
        legend.background = element_rect(fill = "#F3F8FF", color = "#F3F8FF")
  )
```


50
40
30
20
10
percent college educated
1e+02
1e+03
1e+04
1e+05
population density
state
IL
IN
MI
OH
WI