

Lab 03

due January 28th by 11:59 PM

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1/24/2022

```
library(tidyverse)
library(viridis)
```

Exercise 1

```
midwest %>%
  group_by(state) %>%
  summarize(sumpop = sum(poptotal)) %>%
  arrange(sumpop)
```

```
## # A tibble: 5 x 2
##   state    sumpop
##   <chr>    <int>
## 1 WI      4891769
## 2 IN      5544159
## 3 MI      9295297
## 4 OH     10847115
## 5 IL     11430602
```

Of these five states, Illinois has the largest population at 11,430,602.

Exercise 2

```
midwest %>%
  filter(state == "WI") %>%
  arrange(desc(poptotal)) %>%
  slice(1:3) %>%
  select(county, poptotal)
```

```
## # A tibble: 3 x 2
##   county    poptotal
##   <chr>    <int>
## 1 MILWAUKEE  959275
## 2 DANE      367085
## 3 WAUKESHA   304715
```

The three most populated counties in Wisconsin are Milwaukee (pop. 959275), Dane (pop. 367085), and Waukesha (pop. 304715).

Exercise 3

```
midwest %>%
  mutate(metro = if_else(inmetro == 0, "Not in Metro", "In Metro")) %>%
  group_by(metro) %>%
  summarize(avg_pop_density = mean(popdensity),
            number = n())
```

```
## # A tibble: 2 x 3
##   metro      avg_pop_density number
##   <chr>          <dbl>   <int>
## 1 In Metro      7205.     150
## 2 Not in Metro   951.     287
```

The mean population density of counties in a metro area is 7205 people per unit area, while those not in a metro area have an average population density of 951 ppl/unit area. There are 150 counties in metro areas and 287 counties not in metro areas.

Exercise 4

```
midwest %>%
  arrange(desc(percollege)) %>%
  slice(1:5) %>%
  select(county, state, percollege)
```

```
## # A tibble: 5 x 3
##   county      state percollege
##   <chr>      <chr>     <dbl>
## 1 WASHTENAW MI         48.1
## 2 DANE       WI         43.6
## 3 DU PAGE    IL         42.8
## 4 HAMILTON   IN         42.1
## 5 CHAMPAIGN IL         41.3
```

Washtenaw, MI, is home to Ann Arbor and the University of Michigan; Dane, Wisconsin is home to Madison and the University of Wisconsin; Champaign, Illinois, is home to the University of Illinois. All of these are flagship universities for their states, requiring faculty to be college educated and focused on raising students to have the same.

Exercise 5

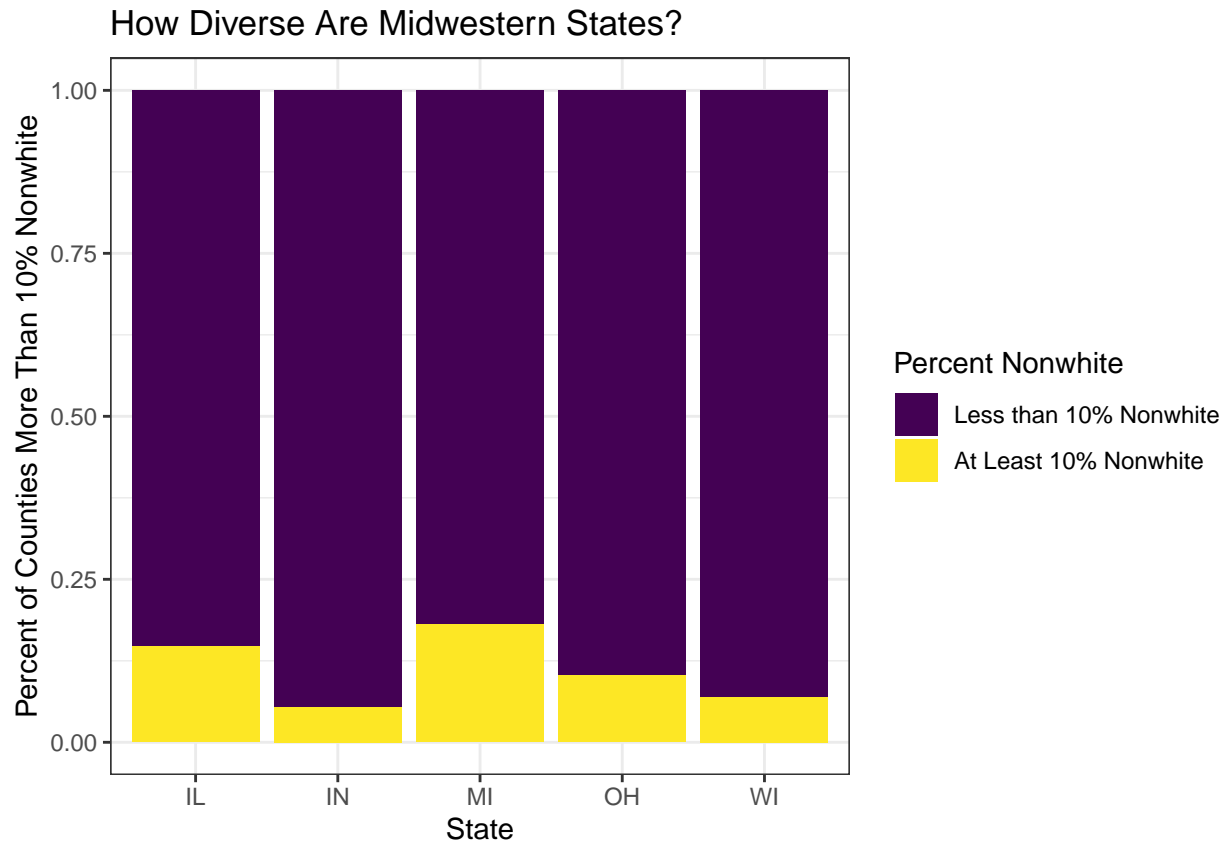
```
midwest %>%
  group_by(county) %>%
  filter(n() == 5) %>%
  summarize(number = n())
```

```
## # A tibble: 3 x 2
##   county  number
##   <chr>   <int>
## 1 CRAWFORD     5
## 2 JACKSON      5
## 3 MONROE      5
```

The counties that occur in all five states are Crawford, Jackson, and Monroe.

Exercise 6

```
midwest %>%
  mutate(nonwhite = if_else(percwhite > 90,
                            "Less than 10% Nonwhite", "At Least 10% Nonwhite")) %>%
ggplot(aes(x = state, fill = forcats::fct_rev(nonwhite))) +
  geom_bar(position = "fill") +
  scale_fill_viridis(discrete = TRUE, option = "D") +
  labs(title = "How Diverse Are Midwestern States?",
       x = "State", y = "Percent of Counties More Than 10% Nonwhite",
       fill = "Percent Nonwhite") +
  theme_bw()
```



In general, midwestern states are not very diverse at all. No states are over 25% counties which are at least 10% nonwhite, with the greatest proportion being Michigan at around 20% and then Illinois at maybe 15%. Then, it is Ohio, Wisconsin, and in very last Indiana containing the smallest proportions of diverse counties in the midwest.