Homework 5

This homework is due on Mar. 6, 2025 at 11:00pm. Please submit as a pdf file on Canvas.

Problem 1: (5 pts) We will once again work with the `ufo_sightings` dataset from Homework 4.

```
ufo_sightings
```

```
# A tibble: 70,662 × 13
   month day    year city                state country shape    duration_seconds
   <chr> <chr> <dbl> <chr>               <chr> <chr>   <chr>                <dbl>
 1 10    10     1949 san marcos          TX    us      cylind…               2700
 2 10    10     1955 chester (uk/england) <NA> gb      circle                  20
 3 10    10     1956 edna                TX    us      circle                  20
 4 10    10     1960 kaneohe             HI    us      light                  900
 5 10    10     1961 bristol             TN    us      sphere                 300
 6 10    10     1965 penarth (uk/wales)  <NA>  gb      circle                 180
 7 10    10     1965 norwalk             CT    us      disk                  1200
 8 10    10     1966 pell city           AL    us      disk                   180
 9 10    10     1966 live oak            FL    us      disk                   120
10 10    10     1968 hawthorne           CA    us      circle                 300
# i 70,652 more rows
# i 5 more variables: duration_hours_min <chr>, comments <chr>,
#   year_posted <chr>, latitude <dbl>, longitude <dbl>
```

Subset the UFO data to the following four cities: Phoenix, Las Vegas, Seattle, Portland. Then create a wide table that shows the number of UFO sightings in each city for each year, in the following format:

year	city 1	city 2	city 3	city 4
2014				
2013				
2012				
2011				
…				

The table should be sorted in descending order of years, from most recent to furthest ago.

```
# Your R code here
```

Problem 2: (5 pts) Continuing on from Problem 2, now make a faceted line plot (using `geom_line()`) of UFO sightings per year for the same cities. Sort the facets by the maximum number of UFO sightings in any given year, in descending order. (The city with the highest number should appear first, and the one with the lowest number last.)

Hints:

1. Look at the code from Homework 4, Problem 3 for assistance.
2. You are not required to modify the plot theme, scales, labels, etc. Default styling is fine.

```
# Your R code here
```

Problem 3: (5 pts)

Use the color picker app from the **colorspace** package (go here: https://wilkelab.org/SDS366/apps/bin/choose-color/, or run `colorspace::choose_color()` in your R session) to create a qualitative color scale containing four colors. One of the four colors should be `#A23C42`, so you need to find three additional colors that go with this one. Use the function `swatchplot()` to plot your colors.

Reminder: In a qualitative color scale, the colors should not appear to have an inherent order, they all need to be easily distinguishable, and no one color should stand out visually against the others.

```
my_colors <- c('#A23C42') # add three more colors here
swatchplot(my_colors)
```

Problem 4: (5 pts)

For this problem, we will work with the `midwest2` dataset (derived from `midwest`). 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).

1. Use the colors you chose in Problem 2 to color the points.
2. Increase the size of the points.
3. Make the axis tick labels the same size (`size = 12`) as the axis titles and give them the color black (`color = "black"`)
4. Set the entire plot background to the color `"#FEF8F0"`. Make sure there are no white areas remaining, such as behind the plot panel or under the legend.

```
midwest2 |>
  ggplot(aes(popdensity, percollege, fill = state)) +
  geom_point(
    # change point size here
    shape = 21, color = "white", stroke = 0.2
  ) +
  scale_x_log10(name = "population density") +
  scale_y_continuous(name = "percent college educated") +
  theme_classic(12) +
  # uncomment after defining four colors in Problem 3
  #scale_fill_manual(
```

```
#   values = my_colors
#) +
theme(
  # add theme modifications here
)
```