Lab 4

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Exercise 1

```
if (!file.exists("met_all.gz"))
  download.file("https://raw.githubusercontent.com/USCbiostats/data-science-data/master
  destfile = "met_all.gz",
  method = "libcurl",
  timeout = 60
  )

met <- data.table::fread("met_all.gz")
```

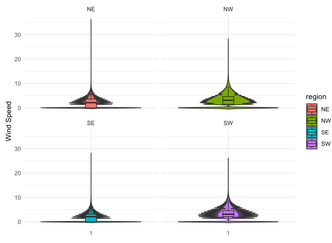
Exercise 2

```
met <- met[met$temp > -17][elev == 9999.0, elev := NA]

met_avg <- met[, .(mean_temp = mean(met$temp),
                   mean_rh = mean(met$rh),
                   mean_wind.sp = mean(met$wind.sp),
                   mean_vis.dist = mean(met$vis.dist),
                   mean_dew.point = mean(met$dew.point),
                   mean_lat = mean(met$lat),
                   mean_lon = mean(met$lon),
                   mean_elev = mean(met$elev)),
               by = .(met$USAFID)]

met[, region := ifelse(lon <= -98.00 & lat >= 39.71, "NW",
                       ifelse(lon <= -98.00 & lat < 39.71, "SW",
                              ifelse(lon > -98.00 & lat >= 39.71, "NE", "SE")))]
```

Exercise 3

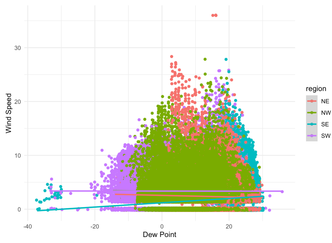
```
library(ggplot2)
ggplot(met, aes(x = "1", y = wind.sp, fill = region)) +
  geom_violin(trim = FALSE) +
  geom_boxplot(width = 0.1, outlier.shape = NA) +
  facet_wrap(~ region) +
  labs(x = NULL, y = "Wind Speed") +
  theme_minimal()
```

```
Warning: Removed 31743 rows containing non-finite values (`stat_ydensity()`).

Warning: Removed 31743 rows containing non-finite values (`stat_boxplot()`).
```



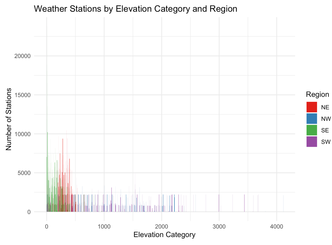
Exercise 4

```
ggplot(met, aes(x = dew.point, y = wind.sp, color = region)) +
  geom_jitter(width = 0.2, height = 0.2, na.rm = TRUE) +
  stat_smooth(method = "lm", formula = y ~ x, na.rm = TRUE) +
  labs(x = "Dew Point", y = "Wind Speed") +
  theme_minimal()
```



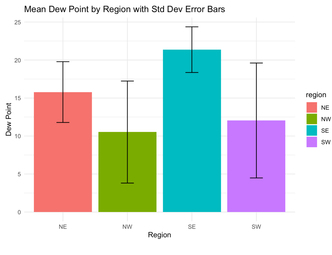
Exercise 5

```
ggplot(met, aes(x = met$elev, fill = region)) +
  geom_bar(position = "dodge", na.rm = TRUE) +
  scale_fill_brewer(palette = "Set1") +
  labs(x = "Elevation Category", y = "Number of Stations", fill = "Region") +
  ggtitle("Weather Stations by Elevation Category and Region") +
  theme_minimal()
```



Exercise 6

```
ggplot(met, aes(x = region, y = dew.point, fill = region)) +
  stat_summary(fun.data = "mean_sdl", fun.args = list(mult = 1), geom = "bar", na.rm =
  stat_summary(fun.data = "mean_sdl", fun.args = list(mult = 1), geom = "errorbar", na.
  labs(x = "Region", y = "Dew Point") +
  ggtitle("Mean Dew Point by Region with Std Dev Error Bars") +
  theme_minimal()
```



Exercise 7

```
library(leaflet)
met <- met[!is.na(met$rh), ]

color_palette <- colorFactor(
  palette = c("blue", "green", "yellow", "red", "orange"),
  domain = met$rh)

m <- leaflet(met) %>%
  addProviderTiles(providers$Stamen.TonerLite) %>%
  addCircleMarkers(
    lng = ~lon,
    lat = ~lat,
    radius = 5,
    color = ~color_palette(rh),
    fillOpacity = 0.7,
    popup = ~paste("Relative Humidity:", rh),
  )

top_10 <- met[order(-met$rh), ][1:10, ]
m <- m %>%
  addMarkers(
    lng = top_10$lon,
    lat = top_10$lat,
    label = ~paste("RH:", rh),
    labelOptions = labelOptions(noHide = TRUE)
  )
```

Exercise 8

```
library(gganimate)
```

```
No renderer backend detected. gganimate will default to writing frames to separate files
Consider installing:
- the `gifski` package for gif output
- the `av` package for video output
and restarting the R session
```

```
temperature_plot <- ggplot(met, aes(x = timestamp, y = temperature)) +
  geom_line() +
  labs(x = "Time", y = "Temperature (°C)") +
  theme_minimal() +
  transition_reveal(timestamp)
```