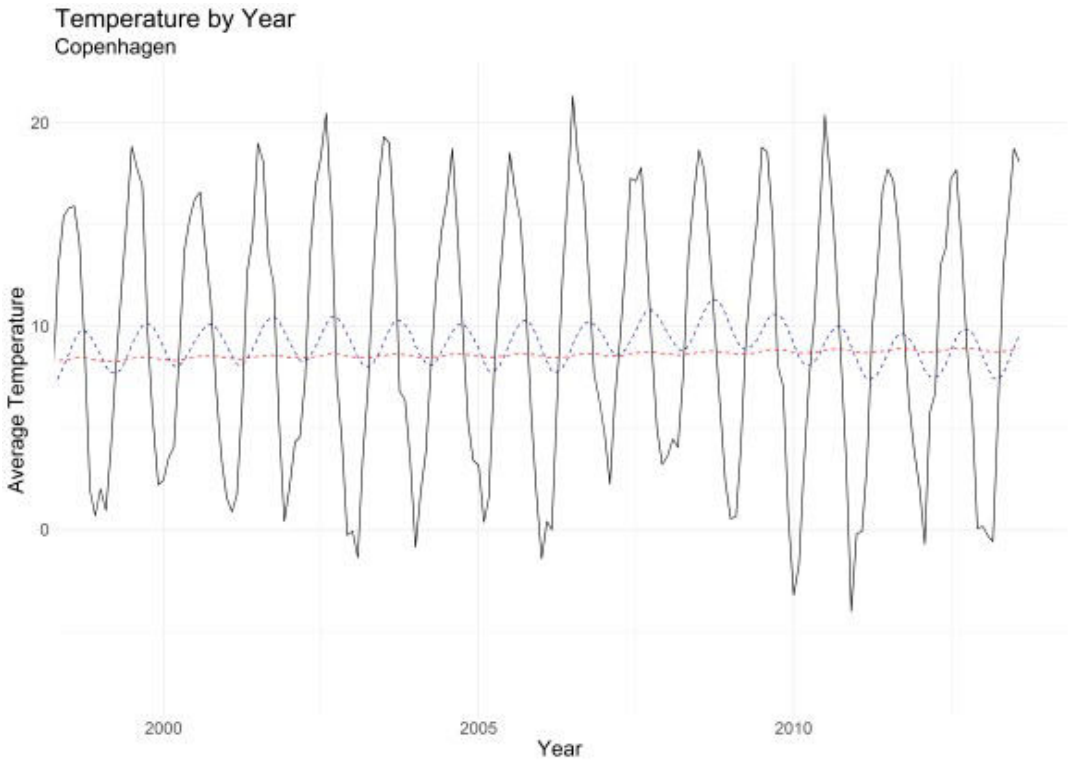
To generate the graph we first need to import the data, filter for Copenhage, and format the date column as a date.

```
df <- read.csv("Data/GlobalLandTemperaturesByCity.csv")
df <- df %>% filter(City == "Copenhagen" & !is.na(AverageTemperature))
df$dt <- as.Date(df$dt)
```

Once the data is prepared, it's time to plot! Here we use ggplot2 to make the basic plot. The first few lines of code are similar to any plot that we might make with ggplot2: we call the dataframe, make a ggplot object with x and y variables specified in the `aes()`, and add geom_line() for a line graph. Then, the interesting, time series part comes up. We call `geom_ma()` twice to add two different moving averages. We call `coord_x_date()` to specify the date range. This let's us select the time frame that we're interested in which is very helpful if we have a long time series of data but only want to show part of it.

```
cop_temp <- df %>%
  ggplot(aes(x = dt, y = AverageTemperature)) +
  geom_line() +
  geom_ma(ma_fun = SMA, n = 30) +                  # Plot 30-day SMA
  geom_ma(ma_fun = SMA, n = 365, color = "red") +  # Plot 365-day SMA
  coord_x_date(xlim = c("1999-01-01", "2013-08-01")) + # Zoom in
  labs(x = "Year", y = "Average Temperature", title = "Temperature by Year",
subtitle = "Copenhagen") +
  theme_minimal() +
  theme(text = element_text(size = 20))
cop_temp
```

Using this code chunk we produce a nice plot of the temperature in Copenhagen with the underlying data and moving averages shown.



`Tidyquant` has 6 types of moving average:

- simple moving averages (SMA)
- exponential moving averages (EMA)
- weighted moving averages (WMA)

- double exponential moving averages (DEMA)
- zero-lag exponential moving averages (ZLEMA)
- volume-weighted moving averages (VWMA)
- elastic, volume-weighted moving averages (EVMA)

Moving averages are applied as an added layer to a chart with the `geom_ma` function. In this example `geom_ma(ma_fun = SMA, n = 30)` indicates that the moving average geom should use the SMA function which applies a simple moving average. So a moving window averages the last 30 points. Then we add another `geom_ma` with a simple moving average but specify n = 365 and plot that in red. So the red line is a moving window average of the last 365 points. You can see that when more points are used for the average it makes a smoother fit and reduces much of the annual variation.