**Report 1 - Data Description**

- **Name of the Project:** Analysis of Winter Weather in College Park, Maryland

- **Describe the population (data set):** The data set being used contains information about the winter weather in College Park, MD. Specifically, the entries are from December, January, and February months from 12/1/14 to 2/28/22 (720 entries total). The data was obtained from Visual Crossing Weather. The columns in the data set include:
    - Location
    - Date (day)
    - Maximum temperature, Minimum temperature, Average temperature (°F)
    - "Feels like" temperature minimum, maximum, average (°F)
    - Dew point (°F)
    - Humidity (%)
    - Precipitation (inches)
    - Precipitation probability (%)
    - Precipitation cover (%)
    - Precipitation type
    - Snow (inches), Snow depth (inches)
    - Wind gust (mph), Wind speed (mph), Wind direction (degrees from North)
    - Sea level pressure (millibars)
    - Cloud cover (%)
    - Visibility (miles)
    - Solar radiation ($W/m^2$), solar energy ($MJ/m^2$)
    - UV index, Severe risk
    - Sunrise (local time zone), sunet (local time zone)
    - Moonphase (decimal from 0 to 1 based on moon phase)
    - Conditions
    - Description of weather conditions, and icon (few-word summary)
    - Stations.

For more information on the column types and their units, please see: https://www.visualcrossing.com/resources/documentation/weather-data/weather-data-documentation/

- **Research question:** What is the average temperature (in Fahrenheit) in College Park, MD during the winter season (December, January, February months)?

- **Variable of Interest:** average temperature (in Fahrenheit)

- **Parameter that you need to estimate:** $\mu$ (in Fahrenheit)

- **Calculate the parameters of your population ($\mu$, $\tau$, $\sigma^2$):**
  - $\mu = \frac{1}{N}\sum_{i=1}^{N} y_i = \frac{28207.60}{720} \approx 39.177\ ^\circ\text{F}$
  - $\tau = N\mu = 720 * 39.1772222 \approx 28207.6\ ^\circ\text{F}$
  - $\sigma^2 = \frac{1}{N-1}\sum_{i=1}^{n} (y_i - \mu)^2 = \frac{1}{720-1} * 65949.49 \approx 91.724$

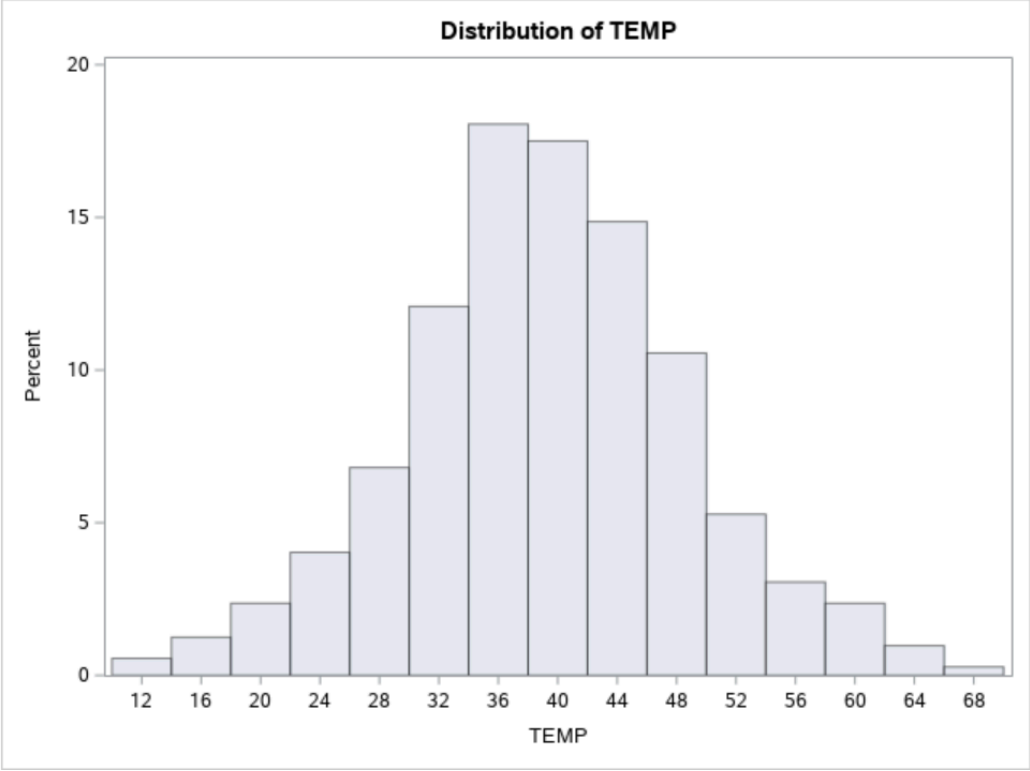
    Note: $y_i$'s are the values in the population

    Also verified in SAS software:

**Variable: TEMP**

| Moments | | | |
|---|---|---|---|
| N | 720 | Sum Weights | 720 |
| Mean | 39.1772222 | Sum Observations | 28207.6 |
| Std Deviation | 9.57725969 | Variance | 91.7239033 |
| Skewness | 0.01850255 | Kurtosis | 0.21005103 |
| Uncorrected SS | 1171044.9 | Corrected SS | 65949.4864 |
| Coeff Variation | 24.4459897 | Std Error Mean | 0.3569234 |

- **Make a histogram of your data:**



- **Tell a couple of words about population distribution of your variable of interest based on the histogram:**
    - The winter temperature in College Park is approximately normally distributed. Since the median (39.100˚F ) is roughly equal to the mean (39.177 ˚F), we can deduce the population has a normal distribution (i.e. a symmetrical, bell-shape). The mean temperature is around 39 ˚F, and the standard deviation is about 9.6 ˚F.