Week 4 Tutorial Worksheet

AY23/24 Semester 2

Submission: End of tutorial day

Question 1 Historical temperature

Download the file `Shanghai.csv` from Canvas. The data contain historical land-surface temperature by Berkeley Earth (https://berkeleyearth.org/data/), which takes temperature observations from a large collection of weather monitoring stations and produces an estimate of the underlying temperature for a given location.

1. Read the data into `R` as an object named `df`. The first three rows of the data frame would read as the following:

```
head(df, 3)
```

```
##   Year Month  Temp
## 1 1841     1 1.809
## 2 1841     2 3.366
## 3 1841     3 7.122
```

2. Calculate the monthly mean temperature. Round them to the second decimal place. Save the result in an object named `avg_temp`.

3. The data frame has information on date across two columns: `Year` and `Month`. They are both stored as integers. Combine them into a string that follows a year-month format and name the new column as `yr_month`.

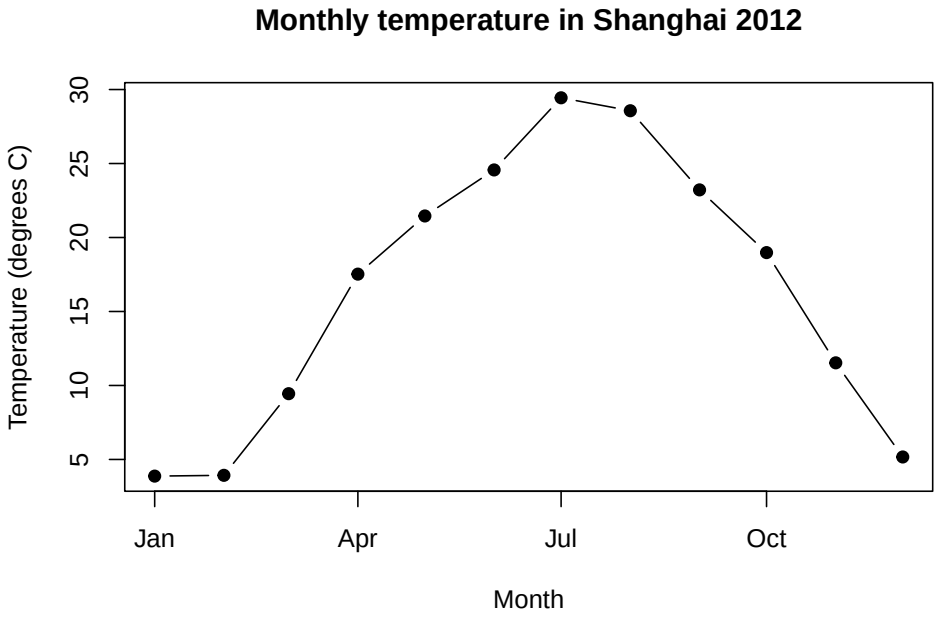
   Hint: After this, the first few observations in the data frame would read as the following:

```
head(df, 5)
```

```
##   Year Month   Temp yr_month
## 1 1841     1  1.809   1841-1
## 2 1841     2  3.366   1841-2
## 3 1841     3  7.122   1841-3
## 4 1841     4 13.306   1841-4
## 5 1841     5 19.007   1841-5
```

4. Use `lubridate` functions to convert the variable `yr_month` into a `Date` type variable. You can read its documentation here to look for the appropriate function before you start.

5. Re-create, as much as you can, the graph below using base `R` syntax.



Requirements

- After you answer all questions in the `Rmd` file, knit it into HTML.
- The code in your `Rmd` should create the following object(s):
  - `df` and `avg_temp`.
- The knitted HTML should contain:
  - A plot for Question 1.5.
- **Submit your `Rmd` file to Canvas after your tutorial session (by end of your tutorial day).**
  - This is for the teaching team to check if your `Rmd` file can be run by us.
  - Due to time constraints, we **do not** check the correctness of your answers or grade your submissions. Rather, we check a minimal set of things including
    (1) whether your Rmd can knit to HTML, and
    (2) whether the code in your `Rmd` can create the required object(s) and plot(s).