STAT5014 Homework 1

Yixin Chen

8/27/2020

Problem 1

Done

Problem 2

Part A

Since I don't have much experience in programming, I hope I get to practice more in this course, especially with R and Rstudio. I also hope that I can implement basic statistical methods using software after learning this course. Here are some specific things that I want to learn from this course:

- Get familiar with version control.
- Get familiar with RMarkdown.
- Be able to implement Monte Carlo procedure in R.

Part B

Exponential Distribution:

$$f(x \mid \beta) = \frac{1}{\beta} e^{-x/\beta}, \quad 0 \leq x < \infty, \quad \beta > 0 \tag{1}$$

Normal Distribution:

$$f\left(x \mid \mu, \sigma^2\right) = \frac{1}{\sqrt{2\pi}\sigma} e^{-(x-\mu)^2/\left(2\sigma^2\right)}, \quad -\infty < x < \infty, \quad -\infty < \mu < \infty, \quad \sigma > 0 \tag{2}$$

Uniform Distribution:

$$f(x \mid a, b) = \frac{1}{b-a}, \quad a \leq x \leq b \tag{3}$$

Problem 3

Here are the steps that I regard as important in reproducible research:

(1) Keep track of how every result was produced.

(2) Note the exact names and versions of the main programs you use.

(3) Archive copies of your scripts from time to time.

(4) Archive any intermediate result files that are produced when running an analysis.

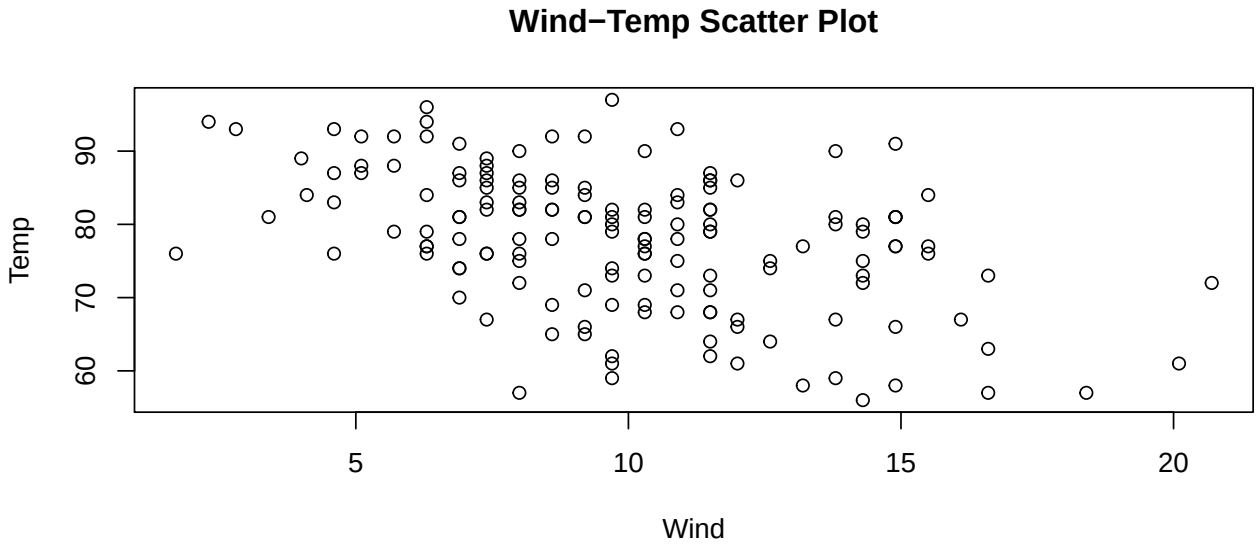
(5) Note the analysis steps that involve randomness.

(6) Store raw data behind plots.

(7) Submit the main data and source code as supplementary material in need of responding to any requests for further data or methodology details by peers.

Problem 4

```
library(datasets)
plot(airquality$Wind, airquality$Temp, main = "Wind-Temp Scatter Plot",
     xlab = "Wind", ylab = "Temp")
```




```
hist(airquality$Temp, main = "Temperature Histogram Plot", xlab = "Temperature")
```