

## Homework 1 of STAT 540

Section 001, Fall 2024

Due: Wednesday 8/28 (before class)

Total Points: 30

Please hand in a hard copy of your homework (compiled pdf file from R markdown) in class and email your R code to Kaniz Fatema ([KFATEMA@email.sc.edu](mailto:KFATEMA@email.sc.edu)). Please use the R markdown Homework template (HWtemplate.Rmd) to write your homework solutions. Work on the homework independently.

**Problem 1.** Write your R codes (commands) for the following tasks and present your results clearly. (5 points each)

- a. Generate a vector  $x$  with 30 random numbers from uniform distribution, i.e.,  $U(0, 1)$ . Show the values of  $x$  you get.[Hint: runif]
- b. Use the R built-in functions (find the functions on your own if you don't know them yet) to calculate the sample mean, median, and standard deviation of  $x$ .
- c. Run the command  $y \leftarrow I(x > 0.5)$ . Is  $y$  a numerical vector? Confirm or disapprove it by executing some appropriate R functions.
- d. Run the command  $z = cbind(x, y)$ . Is  $z$  a matrix or data frame? Is the second column of  $z$  a logic vector or numerical vector? Show the output of `summary(z)`.
- e. What function can be used to change  $y$  into a character vector?
- f. Run command  $xx = diag(x)$  in R. Is  $xx$  a vector or matrix? Find the length of  $xx$  by implementing `length(xx)` in R.