Tobias Boggess

MTH 3270

January 31, 2022

Homework 1

Homework 1

Question 1. Answer the following questions

1. Output of pi, round(pi), round(pi, digits = 4), trunc(pi), ceiling(pi), floor(pi)

pi # Output: 3.141593

round(pi) # Output: 3

round(pi, digits = 4) # Output: 3.1416

trunc(pi) # Output: 3

ceiling(pi) # Output: 4

floor(pi) # Output: 3

1. Output of sqrt(16), 16^0.5

sqrt(16) # Output: 4

16^0.5 # Output: 4

1. Output of 4^3

4^3 # Output: 64

1. Output of log10(1000), log(1000), log2(64)

log10(1000) # Output: 3

log(1000) # Output: 6.907755

log2(64) # Output: 6

1. Output of the first few lines of ? log

The text does match the results from part d) according to the first few lines from the help documentation.

Question 2. Do the following using the character vector:  
queue <- c("Steve", "Russell", "Alison", "Liam")

# Barry arrives and stands at the end of the line

queue <- c(queue, "Barry")

queue

# Steve is served and is no longer in the line

queue <- queue[! queue %in% c("Steve")]

queue

# Pam arrives and talks her way to the front of the line

queue <- c("Pam", queue)

queue

# Barry is super impatient and leaves the line

queue <- queue[! queue %in% c("Barry")]

queue

Question 3. Do the following using the following objects  
w <- 6

x <- 7

y <- 8

z <- 9

# a) Command that lists the objects in the workspace

ls()

# b) Command that removes x from the workspace

rm(x)

ls()

# c) Command that removes all the objects in the workspace

rm(list = ls())

ls()

Question 4. Do the following from the given vector.

x <- c(3, 2, 0, 1, 4, 5, 9, 0, 6, 7, 2, 8)

1. Result of x == 0

# Output: FALSE FALSE TRUE FALSE FALSE FALSE FALSE TRUE FALSE FALSE FALSE FALSE

1. Command using sum() and x == 0

sum(x == 0) # Output: 2

1. Command finding the proportion of elements of x that are equal to 0

proportion <- any(x == 0) / length(x)

proportion # Output: 0.08333333

Question 5. Create the following data frame

numVec <- c(2, 4, 6, 5, 9, 8, 2, 4, 7, 8)

charVec <- c("a", "b", "c", "c", "b", "c", "a", "b", "b", "c")

myData <- data.frame(x1 = numVec, x2 = charVec, stringsAsFactors = FALSE)

1. What do the following commands do?

myData$x1

myData[["x1"]]

myData[[1]]

The above commands result in the following.

# Output: 2 4 6 5 9 8 2 4 7 8

1. What kind of objects is returned by the commands in part a) using is.vector(), is.list(), is.data.frame()? If the output is a vector, is it a character or numeric vector?

The object returned from the above commands is a vector. The vector is a numeric vector.

1. What does the following commands do?

myData[2, ] # Output: x1 x2

# 2 4 b

myData[, 2] # Output: "a" "b" "c" "c" "b" "c" "a" "b" "b" "c"

1. What is the class of the myData

class(myData) # Output: "data.frame"

1. What is the result of the following command?

summary(myData)

# Output:

# x1 x2

# Min. :2.00 Length:10

# 1st Qu. :4.00 Class :character

# Median :5.50 Mode :character

# Mean :5.50

# 3rd Qu. :7.75

# Max. :9.00

Appendix B Problems.

Question B.2) Which of these kinds of names should be wrapped with quotation marks when used in R?

• function name

• file name

• the name of an argument in a named argument

• object name

The only kind of names that should be wrapped with quotation marks is the file name.

Question B.9) A user has typed the following commands into the RStudio console. Report the following commands and what class they belong to.

a <- c(10, 15)

b <- c(TRUE, FALSE)

c <- c("happy", "sad")

data.frame(a, b, c)

a b c

1 10 TRUE happy

2 15 FALSE sad

The class of the above command is "data.frame".

cbind(a, b)

a b

[1,] 10 1

[2,] 15 0

The class of the above command is "matrix" "array".

rbind(a, b)

[,1] [,2]

a 10 15

b 1 0

The class of the above command is "matrix" "array".

cbind(a, b, c)

a b c

[1,] "10" "TRUE" "happy"

[2,] "15" "FALSE" "sad"

The class of the above command is "matrix" "array".

list(a, b, c)[[2]]

[1] TRUE FALSE

The class of the above command is "logical".

Question B.4) Using the following commands tell what the results return.

mylist <- list(x1 = "sally", x2 = 42, x3 = FALSE, x4 = 1:5)

is.list(mylist) # Output: TRUE

names(mylist) # Output: "x1" "x2" "x3" "x4"

length(mylist) # Output: 4

mylist[[2]] # Output: 42

mylist[["x1"]] # Output: "sally"

mylist$x2 # Output: 42

length(mylist[["x4"]]) # Output: 5

class(mylist) # Output: "list"

typeof(mylist) # Output: "list"

class(mylist[[4]]) # Output: "integer"

typeof(mylist[[3]]) # Output: "logical"