Homework 3

Aritra Samanta

1/27/2022

library(tidyverse)

## -- Attaching packages --------------------------------------- tidyverse 1.3.1 --

## v ggplot2 3.3.5 v purrr 0.3.4  
## v tibble 3.1.4 v dplyr 1.0.7  
## v tidyr 1.1.3 v stringr 1.4.0  
## v readr 2.0.1 v forcats 0.5.1

## -- Conflicts ------------------------------------------ tidyverse\_conflicts() --  
## x dplyr::filter() masks stats::filter()  
## x dplyr::lag() masks stats::lag()

library(dplyr)  
library(purrr)

Vector1 <- (c( 10, 19, 121, 83, 63, 7, 77, 61, 51, 97, 123, 41))

1. For the vector given above, use and show two methods of R coding to extract the first element and the last element.

Vector1[c(1,12)]

## [1] 10 41

q1=Vector1[Vector1==10 | Vector1==41]  
q1

## [1] 10 41

1. For the vector given above, use and show two methods of R coding to extract all of the elements that are less than 60.

Vector1[Vector1<60]

## [1] 10 19 7 51 41

Vector1[c(1,2,6,9,12)]

## [1] 10 19 7 51 41

1. For the vector given above, use and show two methods of R coding to extract all numbers that are not divisible by 2 or 3.

Vector1[Vector1 %% 2 != 0 & Vector1 %% 3 != 0]

## [1] 19 121 83 7 77 61 97 41

Vector1[c(2,3,4,6,7,8,10,12)]

## [1] 19 121 83 7 77 61 97 41

1. Use and show two R coding methods to confirm that Vector1 does not have missing values

myList <- list(TRUE, 12.35, 'pear', 48, c = 3:8, list(23, 'team'))  
myList

## [[1]]  
## [1] TRUE  
##   
## [[2]]  
## [1] 12.35  
##   
## [[3]]  
## [1] "pear"  
##   
## [[4]]  
## [1] 48  
##   
## $c  
## [1] 3 4 5 6 7 8  
##   
## [[6]]  
## [[6]][[1]]  
## [1] 23  
##   
## [[6]][[2]]  
## [1] "team"

str(myList[!is.na(myList)])

## List of 6  
## $ : logi TRUE  
## $ : num 12.3  
## $ : chr "pear"  
## $ : num 48  
## $ c: int [1:6] 3 4 5 6 7 8  
## $ :List of 2  
## ..$ : num 23  
## ..$ : chr "team"

str(myList[]) #clearly there are no NA's here or else it would have reported as logi NA!

## List of 6  
## $ : logi TRUE  
## $ : num 12.3  
## $ : chr "pear"  
## $ : num 48  
## $ c: int [1:6] 3 4 5 6 7 8  
## $ :List of 2  
## ..$ : num 23  
## ..$ : chr "team"

1. For the list given above, use and show R coding to confirm that “pear” is a character element.

str(myList[3])

## List of 1  
## $ : chr "pear"

1. For the list given above, use and show R coding to extract the first three elements of the list.

str(myList[1:3])

## List of 3  
## $ : logi TRUE  
## $ : num 12.3  
## $ : chr "pear"

1. Use the $ operator to extract the element “pear” from your list. Be sure to use and show required R code to produce the requested output.

myList <- list(TRUE, 12.35, p='pear', 48, c = 3:8, list(23, 'team')) #creating a new variable p for pear so the $ can extract it  
  
myList$p

## [1] "pear"

1. Use and show R code to write a function to solve the following quadratic equations by using the quadratic formula. (all equations have two real number solutions)
2. x2- 3x - 28 = 0
3. x2 + x - 30 = 0
4. 3x2+ 14x + 8 = 0
5. 2x2+11x = 6

quadratic <- function(a,b,c){  
 { x\_1 = (-b+sqrt(delta(a,b,c)))/(2\*a)  
 x\_2 = (-b-sqrt(delta(a,b,c)))/(2\*a)  
 result = c(x\_1,x\_2)  
 }  
 }  
# Constructing delta  
delta<-function(a,b,c){  
 b^2-4\*a\*c  
} #from: https://rpubs.com/kikihatzistavrou/80124  
  
a=quadratic(1,-3,-28)  
a

## [1] 7 -4

b=quadratic(1,1,-30)  
b

## [1] 5 -6

c=quadratic(3,14,8)  
c

## [1] -0.6666667 -4.0000000

d=quadratic(2,11,-6)  
d

## [1] 0.5 -6.0

1. In your book (towards the end of chapter 16) a special set of vectors are defined as Augmented Vectors. One such augmented vector is a Tibble. Use and show R code that will produce the Tibble shown below. Do not simply type or copy and paste. You must show and use R coding that will output the tibble.

z= rev(seq(0.5,5,by=0.5))  
t=tibble::tibble(x = 1:10, y = 10:1, z=z)  
t

## # A tibble: 10 x 3  
## x y z  
## <int> <int> <dbl>  
## 1 1 10 5   
## 2 2 9 4.5  
## 3 3 8 4   
## 4 4 7 3.5  
## 5 5 6 3   
## 6 6 5 2.5  
## 7 7 4 2   
## 8 8 3 1.5  
## 9 9 2 1   
## 10 10 1 0.5

1. In statistics, the Interquartile Range is the difference between Q3 and Q1. Now show and use map function coding to find the Interquartile Range for each column of the tibble from number 9.

map\_dbl(t, IQR)

## x y z   
## 4.50 4.50 2.25