DS413813HWK3KEY

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2/25/2021

library(purrr)  
library(tidyverse)

## Warning: package 'tidyverse' was built under R version 4.0.3

## -- Attaching packages ------------------ tidyverse 1.3.0 --

## v ggplot2 3.3.2 v dplyr 1.0.2  
## v tibble 3.0.3 v stringr 1.4.0  
## v tidyr 1.1.1 v forcats 0.5.0  
## v readr 1.3.1

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

library(stringr)  
  
#1  
  
# Use the R function nrow to confirm that the iris data frame has 150 rows. Then   
# use and show R code that features a map function to confirm that the iris data  
# frame has 150 rows.  
 nrow(iris)

## [1] 150

map\_dbl(iris, length)

## Sepal.Length Sepal.Width Petal.Length Petal.Width Species   
## 150 150 150 150 150

# Each column of the iris data frame has a unique number of values or objects. For   
# example the column Sepal.Length has 150 values but 35 of them are unique. Use and  
# show R code that features a map function to find the number of unique values or   
# objects for each column of the iris data frame.  
  
map\_dbl(iris, ~ length(unique(.x)))

## Sepal.Length Sepal.Width Petal.Length Petal.Width Species   
## 35 23 43 22 3

#2  
# Use and show R code that features a nested loop that will produce the 3 by 5  
# matrix shown below.  
z <- matrix( nrow = 3, ncol = 5)  
for (m in 1:3) {  
 for (n in 1:5) {  
 z[m, n] <- (n - m)  
 }  
}  
print(z)

## [,1] [,2] [,3] [,4] [,5]  
## [1,] 0 1 2 3 4  
## [2,] -1 0 1 2 3  
## [3,] -2 -1 0 1 2

#3   
X <- list(12, 14, 15, 18, 19)  
Mean <- list(8, 14, 20, 22, 30)  
sd <- list(10, 18, 28, 34, 40)  
  
# use and show R coding that features a map function to iteratively find maximum  
# values across the lists given above   
  
pmap\_dbl(list(X,Mean,sd), max)

## [1] 12 18 28 34 40

# In statistics, a z score indicates the standard deviation distance between the   
# mean and a specific value of the data set. What formula is used to find a z score?  
  
# Use and show R coding that features a map function to iteratively find z scores  
# across the lists given above.  
  
pmap\_dbl(list(X,Mean,sd), function(first, second, third) ((first - second)/third))

## [1] 0.4000000 0.0000000 -0.1785714 -0.1176471 -0.2750000

# The test statistic for a population mean is given by the formula ((X - mean)/s/sqrt(n))  
# Use and show R coding that features a map function to iteratively find test statistics   
# for population means across the lists given above.  
  
pmap\_dbl(list(X,Mean,sd), function(first, second, third) ((first - second)\*sqrt(3))/third)

## [1] 0.6928203 0.0000000 -0.3092948 -0.2037707 -0.4763140

#4  
  
V = c(10,15,17,22,32,38,42)  
  
# Another purr package function is the keep( ) function. Research, explore, and use the  
# keep( ) function to extract all number from the vector V given above that are less   
# than 20  
   
 keep(V, ~ .x < 20)

## [1] 10 15 17

# Another purr package function is the discard( ) function. Research, explore, and use the  
# discard( ) function to eliminate all number from the vector V given above that are less   
# than 20  
   
 discard(V, ~ .x < 20)

## [1] 22 32 38 42

# Another purr package function is the safely( ) function. Research, explore, and apply  
# the safely( )function to the given vector below as illustrated.  
   
 U = list(10,15,"mary",22,32,"james",42)  
   
 map(U, safely(~ .x + 15))

## [[1]]  
## [[1]]$result  
## [1] 25  
##   
## [[1]]$error  
## NULL  
##   
##   
## [[2]]  
## [[2]]$result  
## [1] 30  
##   
## [[2]]$error  
## NULL  
##   
##   
## [[3]]  
## [[3]]$result  
## NULL  
##   
## [[3]]$error  
## <simpleError in .x + 15: non-numeric argument to binary operator>  
##   
##   
## [[4]]  
## [[4]]$result  
## [1] 37  
##   
## [[4]]$error  
## NULL  
##   
##   
## [[5]]  
## [[5]]$result  
## [1] 47  
##   
## [[5]]$error  
## NULL  
##   
##   
## [[6]]  
## [[6]]$result  
## NULL  
##   
## [[6]]$error  
## <simpleError in .x + 15: non-numeric argument to binary operator>  
##   
##   
## [[7]]  
## [[7]]$result  
## [1] 57  
##   
## [[7]]$error  
## NULL

# In four or five sentences, explain the specific output for this problem and how the  
# definition and the application of the safely( ) function is used.