Worksheet#4a

#1.The table below shows the data about shoe size and height. Create a data frame. DATA <- data.frame (ShoeSize=c(6.5,9.0,8.5,8.5,10.5,7.0,9.5,9.0,13.0,7.5,10.5,8.5,12.0,10.5,13.0,11.5,8.5,5.0,10.0,6.5,7.5,8.5,10.5,8.5,10.5,11.0,9.0,13.0)

Height=c(66.0,68.0,64.5,65.0,70.0,64.0,70.0,71.0,72.0,64.0,74.5,67.0,71.0,71.0,77.0,72.0,59.0,62.0,72.0,66.0,64.0,67.0,73.0,69.0,72.0

Gender=c("F","F","F","F","M","F","F","F","M","F","M","F","M","M","M","M","F","F","M","F","F","M","M","F","M","M

DATA

#a. Describe the data. #The data has 28 entries with 3 columns #First Column shows Shoe_Size #Second Column displays Height #Third column shows Gender

#b.Create a subset by males and females with their corresponding shoe size and height. male-sub <- DATA[DATA$Gender == "M", c("ShoeSize", "Height", "Gender")] malesub femalesub <- DATA[DATA$Gender == "F", c("ShoeSize", "Height", "Gender")] femalesub #c. Find the mean of shoe size and height of the respondents. Shoes <- mean(DATA$ShoeSize) Shoes Heights <- mean(DATA$Height) Heights #d. Is there a relationship between shoe size and height? Why? #Yes #Shoe size generally is proportional to height. #We can expect people with large feet to be taller.

#2. Construct character vector months to a factor with factor() and assign the result to factor_months_vector.

months <- c("March","April","January","November","January","September","October","September","November","August","J months factor_months_vector <- factor(months) factor_months_vector

#3. Then check the summary() of the months_vector and factor_months_vector. Inter-pret the results of both vectors. Are they both equally useful in this case?

summary(months) summary(factor_months_vector) # In the summary of months, it shows the number of length, class, and mode of the vector. # In the summary of factor_months_vector, it shows the frequency of each months. # Both are useful in different cases where the no. of length, class, mode, or the frequency is needed.

#4.Create a vector and factor for the table below. factor_freq <- c(1,4,3) factor_vector <- c("East", "West","North") new_factor_vector <- factor(factor_vector,levels = c("East","West","North")) print(new_factor_vector)

#5.Enter the data below in Excel with file name = import_march.csv write.csv(import_march, file = "import_march.csv") file_path <- "/cloud/project/import_march.csv" imported_table <- read.csv(file = file_path, header = TRUE, sep = ",") View(imported_table)

#6. Full Search rannum <- readline(prompt = "Enter number from 1 to 50:") rannum <- as.numeric(rannum) paste("The number you have chosen is", rannum) if (rannum > 50) { paste("The number selected is beyond the range of 1 to 50") } else if (rannum== 20) { paste("TRUE") } else { paste(rannum) }

#7. Change minibills <- function(price) {

minbills <- price %/% 50 paste("The minimum no. of bills:", minbills) } minibills(90)

#8a.Create a dataframe from the above table. names <- c("Annie", "Thea", "Steve", "Hanna") grade1 <- c(85,65,75,95) grade2 <- c(65,75,55,75) grade3 <- c(85,90,80,100) grade4 <- c(100,90,85,90) mathgrades <- data.frame(Name = names, Grade1 = grade1, Grade2 = grade2, Grade3 = grade3, Grade4 = grade4) mathgrades

#8b. Without using the rowMean function, output the average score of students whose average math score over 90 points during the semester. mathgrades$Average <- (mathgrades$Grade1 + mathgrades$Grade2 + mathgrades$Grade3 + mathgrades$Grade4) / 4

highscorers <- mathgrades[mathgrades$Average > 90,] highscorers

if (nrow(highscorers) > 0) { paste(highscorers$Name, "'s average grade this semester is", high_scorers$Average) } else { paste("No students have an average math score over 90.") }

#8c. Without using the mean function, output as follows for the tests in which the average score was less than 80 out of 4 tests. firstTest <- sum(mathgrades$Grade1) / nrow(mathgrades) firstTest

secondTest <- sum(mathgrades$Grade2) / nrow(mathgrades) secondTest

thirdTest <- sum(mathgrades$Grade3) / nrow(mathgrades) thirdTest

fourthTest <- sum(mathgrades$Grade4) / nrow(mathgrades) fourthTest

if (firstTest < 80) { paste("The 1st test was difficult.") } else if(secondTest < 80) { paste("The 2nd test was difficult.") } else if(thirdTest < 80) { paste("The 3rd test was difficult.") } else if(fourthTest < 80) { paste("The 4th test was difficult.") } else { paste("No test had an average score less than 80.") }

#8d. Without using the max function, output as follows for students whose highest score for a semester exceeds 90 points. # annie scores if (mathgrades[1,2] > mathgrades[1,3] && mathgrades[1,2] > mathgrades[1,4] && mathgrades[1,2] > mathScore[1,5]) { annieHighest <- mathgrades[1,2] } else if (mathgrades[1,3] > mathgrades[1,4] && mathgrades[1,3] > mathgrades[1,5]) { annieHighest <- mathgrades[1,3] } else if (mathgrades[1,4] > mathgrades[1,5] && mathgrades[1,2] > mathgrades[1,5]) { annieHighest <- mathgrades[1,4] } else { annieHighest <- mathgrades[1,5] }

thea scores

if (mathgrades[2,2] > mathgrades[2,3] && mathgrades[2,2] > mathgrades[2,4] && mathgrades[2,2] > mathgrades[2,5]) { theaHighest <- mathgrades[2,2] } else if (mathgrades[2,3] > mathgrades[2,4] && mathgrades[2,3] > mathgrades[2,5]) { theaHighest <-mathgrades[2,3] } else if (mathgrades[2,4] > mathgrades[2,5] && mathgrades[2,2] > mathgrades[2,5]) { theaHighest <- mathgrades[2,4] } else { theaHighest <- mathgrades[2,5] }

steve scores

if (mathgrades[3,2] > mathgrades[3,3] && mathgrades[3,2] > mathgrades[3,4] && mathgrades[3,2] > mathgrades[3,5]) { steveHighest <- mathgrades[3,2] } else if (mathgrades[3,3] > mathgrades[3,4] && mathgrades[3,3] > mathgrades[3,5]) { steveHighest <- mathgrades[2,3] } else if (mathgrades[3,4] > mathgrades[3,5] && mathgrades[3,2] > mathgrades[3,5]) { steveHighest <- mathgrades[3,4] } else { steveHighest <- mathgrades[3,5] }

hanna scores

if (mathgrades[4,2] > mathgrades[4,3] && mathgrades[4,2] > mathgrades[4,4] && mathgrades[4,2] > mathgrades[4,5]) { hannaHighest <- mathgrades[4,2] } else if (mathgrades[4,3] > mathgrades[4,4] && mathgrades[4,3] > mathgrades[4,5]) { hannaHighest <-mathgrades[2,3] } else if (mathgrades[4,4] > mathgrades[4,5] && mathgrades[4,2] > mathgrades[4,5]) { hannaHighest <- mathgrades[4,4] } else { hannaHighest <- mathgrades[4,5] }

mathgrades$HighestGrades <- c(annieHighest, theaHighest, steveHighest, hannaHighest)

above90 <- mathgrades[mathgrades$HighestGrades > 90,] above90

if (nrow(above90) > 0) { paste(above90$Name, "'s highest grade this semester is", above90HighestGrade) } else { paste("No students have an average math score over 90.") }