WFC 198 “Sampling Animal Populations” – Homework Week 1

Due April 11th, 9am

Please complete the following exercises in R, save your script (as you learned in lab) and submit it on Canvas under Assignments. To grade your assignment, we will run through your script; your code should not produce any error messages when run by us and should produce the correct answers.

The point of this assignment is for you to practice writing R code. You will get points for providing the correct R code that produces the correct answer. For example, the correct answer to the task “Add 1 and 1 together” would not be “2”, but rather “1+1”, which, when run in R, will produce the outcome of 2.

Please preface every line of code with a comment that states which question the code belongs to, for example: “#Task 3a” before the code used to tackle Task 3a. If we cannot follow your code, we cannot grade it. If you are unsure of how to format your script, see the short example homework script on Canvas (Files – Homework – Examplescript.R).

If you are using a Windows computer to do your homework, and you are struggling using R on Windows, see the Canvas page “R on Windows” for help (Pages – View All Pages - R on Windows).

Work through the tasks in order, as they build on each other.

Task 1 (1 Pt):

1. Calculate 54 to the power of 2
2. Calculate 5 times (4 minus 2)

Task 2 (2 Pts):

1. Create two numerical variables, x and y, and assign them the results from the above calculations (assign the result of 1.a to x and the result of 1.b to y) (1 Pt)
2. Using the appropriate operator, determine whether x is bigger than or equal to y and assign the result of that comparison to a third variable, z (0.5 Pts)
3. Using the appropriate function, find out what type of variable z is (0.5 Pts)

Task 3 (2 Pts):

1. Create a vector of numbers from 5 to 10 and call it ‘numbers’
2. Using the appropriate function, determine the length of that vector
3. Create a second vector of numbers from 3 to 8, call it ‘numbers2’, and subtract the elements in ‘numbers2’ from the element in ‘numbers’
4. Using the appropriate function, calculate the sum of ‘numbers’

Task 4 (2 Pts):

1. Create a character vector with the names of four of your friends; call it ‘friends’
2. Select only the first element of that vector and assign it to a variable ‘nam’ (use subsetting to select the first element)
3. Find out what type of variable ‘nam’ is
4. Select the second and fourth element of ‘friends’ (use subsetting to select these elements)

Task 5 (5 Pts):

1. Use the following line of code to set up a matrix: (0.5 Pts)

mat<-matrix(data = c(2,1,1,5,3,9,0,4,2,6,6,8), nrow = 3, ncol = 4)

1. Using an appropriate function, determine the dimensions (i.e., number of rows and number of columns) of ‘mat’ (0.5 Pts)
2. Name the rows of ‘mat’; ‘R1’ for row 1, ‘R2’ for row 2, and so on (1 Pt)
3. Name the columns of ‘mat’: ‘C1’ for column 1, ‘C2’ for column 2, and so on (1 Pt)
4. Calculate the sum of the second row of mat; use the appropriate function that calculates summaries of numerical vectors in combination with matrix sub-setting. (1 Pt)
5. Calculate the mean of the third column of ‘mat’ use the appropriate function that calculates summaries of numerical vectors in combination with matrix sub-setting. (1 Pt)

Task 6 (4 Pts):

1. Create a numerical vector called ‘Rnew’ and add it as a new row to ‘mat’ (matrix form Question 5). Use whatever numbers you like but make sure it has the right length! Call the resulting new matrix ‘mat2’
2. Create a numerical vector called “Cnew” and add is as a new column to ‘mat2’. Use whatever numbers you like but make sure it has the right length! Call the resulting new matrix ‘mat3’

Task 7 (4 Pts):

For this question, download the csv file called “Homework1.csv” from Canvas (under Files – Homework) and save it in a folder called “Homework1” on your desktop. To access this file from within R, change your working directory to the “Homework1” folder

1. Read in “Homework1.csv”, call the resulting data frame ‘dfr’ (0.5 Pts)
2. Look at the top few rows of ‘dfr’ (0.5 Pts)
3. Extract the column names from ‘dfr’ (0.5 Pts)
4. Determine the types of variables in the columns of ‘dfr’ (1 Pt)
5. Create a new object, ‘Height’, and assign it the column from ‘dfr’ that is called ‘Height.cm’ (1 Pt)
6. Extract the third element of the column from ‘dfr’ that is called ‘Length’ (0.5 Pts)

Task 8 (5 Pts):

1. Create a list object that contains (in this order) the data frame from Task 7, the matrix from Task 5, and the character vector from Task 4; call the object ‘lst’.
2. Add the numerical variable x from Task 2 to that list (the new list should also be called ‘lst’)
3. Determine the type and dimensions of all elements in the list with a single R command
4. Using list sub-setting, select the third element of ‘lst’
5. Calculate the sum of the second element of ‘lst’

TOTAL POINTS: 25

TIP: If you want more basic R exercises, check the following websites. Note that they deal with some commands that we haven’t used in lab yet

<http://rstatistics.net/r-lang-practice-exercises-level-1-beginners/>

<https://www.datacamp.com/courses/free-introduction-to-r?utm_source=adwords_ppc&utm_campaignid=897699256&utm_adgroupid=53374595030&utm_device=c&utm_keyword=beginner%20r%20tutorial&utm_matchtype=e&utm_network=g&utm_adpostion=1t1&utm_creative=235753489617&utm_targetid=aud-392016246653:kwd-381520757473&utm_loc_interest_ms=&utm_loc_physical_ms=9032434&gclid=Cj0KCQiA_JTUBRD4ARIsAL7_VeXplzHgmg29smF8ixgkbRvXb0_zsJUNa_sZMSDTfcT1aWoAsvrofqUaArsuEALw_wcB>