ECO 634 - Lab 1 – R Fundamentals
Johanna Ravenhurst

Worked with: Sarah Guitart, Wen Xiu
September 14, 2022

Expressions and Strings

Q1 (2 pts.): Explain why the outputs of the two lines are different.

- The outputs are different because the first line is not in quotes and the second line is in quotes. R interprets the first line as an expression, so the output is a vector containing the 3 numbers. R interprets the second line as a string, so R doesn't do anything with the information contained in quotes and the output is just the same string of text.

Variables

Q2 (1 pt.): Is c_1 a variable, or a function? How do you know?

- C_1 is a variable because it is a vector that contains 3 values. It is not a function which does something specific with input data. It also is assigned a value using an = sign.

Q3 (1 pt.): Is c_2 a variable, or a function? How do you know?

- C_2 is a variable because it just contains string, or character data. It is not a function which does something specific with input data. It also is assigned a value using an = sign.

Q4 (1 pt.): If c_1 and c_2 have different values, why?

- They have different values because c_1 is not in quotes and is recognized as a vector containing numeric data. C_2 is in quotes and R interprets that as string data which is just a character value.

Matrices

Q5 (1 pt.): What are the dimensions of the matrix (i.e. how many rows and columns)?

- 3 rows, 2 columns

Q6 (2 pts.): Write R code to retrieve the element of mat_1 that has a value of 3.

- mat_1[3,1]

Q7 (1 pt.): Paste the code you used to create mat_2.

- mat_2 = matrix(my_vec, nrow = 2, ncol = 3)

Q8 (1 pt.): Paste the code you used to create mat_3.

- mat_3 = matrix(my_vec, nrow = 3, ncol = 2)

Q9 (1 pt.): Did R use rows or columns to recycle/distribute the values in my_vec?

- R distributed the values by column. This seems to be the default setting, since I did not add a byrow argument to specify how R should distribute the values. If I had included byrow=TRUE, R would have distributed the values by row.

Q10 (1 pt.): Using my_vec, create a matrix, mat_4. mat_4 must have a total number of elements that is not a multiple of 3.

- mat_4 = matrix(my_vec, nrow=2, ncol=1). This contains 2 elements.

Q11 (1 pt.): How did R handle the recycling/distributing of values of my_vec in mat_4?

- R created mat_4 but also gave the following message "Warning: data length differs from size of matrix: [6 != 2 x 1]". This is letting me know that the matrix does not include all of the values from the vector my_vec. R just filled in the values until it reached the end of my specified matrix of 2 rows and 1 column of data.

List Subsetting

Q12 (8 pts.): For each of the 8 lines, answer the following:
A. Did the line return a 1: value, 2: error, or 3: NULL?
B. What type of subsetting operation was used (or attempted)?
C. If it **did not** return an error describe, in ordinary English, a plausible explanation of how R could have performed the subsetting.

- my_list_1[[1]]
  - value 5.2
  - select element 1 from the list
  - R selected the first element in the list
- my_list_1[[as.numeric("1")]]
  - value 5.2
  - used a function to convert a string variable to numeric and then subsetted element 1 from the list
  - R converted "1" from a character value to a numeric value and then selected the first element from the list.
- my_list_1[["1"]]
  - NULL
  - R tried to select an element named "1" from the list
  - This didn't work because there is no element named "1" in the list
- my_list_1[["one"]]
  - value "five point two"
  - selected element named "one" from the list (a string value)

    - R looked for an element named one and printed the value of that element
- my_list_1$one
    - value “five point two”
    - selected the element named one from the list
    - The symbol $ told R that we were inputting the name of a character variable, so R looked for a character element in the list named one and selected that element.
- my_list_1$"one"
    - value “five point two”
    - selected the string element named “one” from the list by looking for the characters
    - The symbol $ told R that we were inputting the name of a character variable, so R looked for a character element in the list named “one” and selected that element.
- my_list_1$1
    - Error
    - R was expecting to select a character value after the $, but since we specified a number it gave an error.
    - Error because we entered a numeric constant when R was expecting a character element.
- my_list_1$"1"
    - Null
    - R tried to select a character element named “1”, which does not exist
    - R looked for an element named “1”, but that does not exist in the list

Q13 (2 pts.): Identify which lines produced the string output "five point two" and explain why.

- my_list_1[["one"]]
- my_list_1$one
- my_list_1$"one"
- These three lines produced the string output “five point two” because it selected the second element of the list named “one” and printed out the value of that element.

Q14 (1 pt.): Identify which lines produced NULL output and explain why.

- my_list_1[["1"]]
- my_list_1$"1"
- These lines produced a NULL output because there is no character element named “1” contained within the list.