

Worksheet-1 in R

Worksheet for R Programming

Instructions:

- Use RStudio or the RStudio Cloud accomplish this worksheet. + Save the R script as *RWorksheet_lastname#1.R*.
- Create your own *GitHub repository* and push the R script as well as this pdf worksheet to your own repo.

Accomplish this worksheet by answering the questions being asked and writing the code manually.

Using functions:

`seq()`, `assign()`, `min()`, `max()`, `c()`, `sort()`, `sum()`, `filter()`

1. Set up a vector named `age`, consisting of 34, 28, 22, 36, 27, 18, 52, 39, 42, 29, 35, 31, 27, 22, 37, 34, 19, 20, 57, 49, 50, 37, 46, 25, 17, 37, 42, 53, 41, 51, 35, 24, 33, 41.

How many data points?

- There are 34 data points.

Write the R code and its output.

```
age <- c(34, 28, 22, 36, 27, 18, 52, 39, 42, 29, 35, 31, 27, 22, 37, 34, 19, 20, 57, 49, 50, 37, 46, 25, 17, 37, 42, 53, 41, 51, 35, 24, 33, 41)
```

- `age`
- `[1] 34 28 22 36 27 18 52 39 42 29 35 31 27 22 37 34 19 20 57 49 50`
- `[22] 37 46 25 17 37 42 53 41 51 35 24 33 41`

2. Find the reciprocal of the values for `age`.

Write the R code and its output.

- `reciprocal <- function(age) vec <- 1/age`
- `reciage <- reciprocal(age)`

- `reciage`
- `[1] 0.02941176 0.03571429 0.04545455 0.02777778 0.03703704 0.05555556
0.01923077`
- `[8] 0.02564103 0.02380952 0.03448276 0.02857143 0.03225806 0.03703704
0.04545455`
- `[15] 0.02702703 0.02941176 0.05263158 0.05000000 0.01754386 0.02040816
0.02000000`
- `[22] 0.02702703 0.02173913 0.04000000 0.05882353 0.02702703 0.02380952
0.01886792`
- `[29] 0.02439024 0.01960784 0.02857143 0.04166667 0.03030303 0.02439024`

3. Assign also `new age <- c (age, 0, age)`.

What happened to the new age?

New age shows the values of age but with 0 at the center.

4. Sort the values for age.

Write the R code and its output.

- `sort (age)`
- `[1] 17 18 19 20 22 22 24 25 27 27 28 29 31 33 34 34 35 35 36 37 37 37 39 41 41 42`
- `[27] 42 46 49 50 51 52 53 57`

5. Find the minimum and maximum value for age.

Write the R code and its output.

- `min (age)`
- `[1] 17`
- `max(age)`
- `[1] 57`

6. Set up a vector named `data`, consisting of 2.4, 2.8, 2.1, 2.5, 2.4, 2.2, 2.5, 2.3, 2.5, 2.3, 2.4, and 2.7.

a. How many data points?

- There are 12 data points.

b. Write the R code and its output.

- `Data`
- `[1] 2.4 2.8 2.1 2.5 2.4 2.2 2.5 2.3 2.5 2.3 2.4 2.7`

7. Generates a new vector for data where you double every value of the data. | What happen to the data?
- `2*Data`
 - `[1] 4.8 5.6 4.2 5.0 4.8 4.4 5.0 4.6 5.0 4.6 4.8 5.4`
 - The data was doubled.
8. Generate a sequence for the following scenario:
- 8.1. Integers from 1 to 100.
- `seq(1:100)`
- 8.2 Numbers from 20 to 60
- `x <- 20:60`
 - `print(seq(x))`
- *8.3 Mean of numbers from 20 to 60
- `print(mean(x))`
- *8.4 Sum of numbers from 51 to 91
- `print(sum(51:91))`
- *8.5 Integers from 1 to 1,000
- `seq(1:1000)`
- a. How many data points from 8.1 to 8.4? _____
- There are 43 data points in 8.1 to 8.4.
- b. Write the R code and its output from 8.1 to 8.4.
- `seq(1:100)` Output is the number sequence 1 - 100.
 - `x <- 20:60`
 - `print(seq(x))` output is numbers 1 - 41.
 - `print(mean(x))` output is 40
 - `print(sum(51:91))` output is 2911
- c. For 8.5 find only maximum data points until 10.
- `m <- seq(1:10)`

- max(m)

- The answer is 10

9. *Print a vector with the integers between 1 and 100 that are not divisible by 3, 5 and 7 using filter option.

Filter (function(i) { all(i %% c(3,5,7) != 0) }, seq(100))

Write the R code and its output.

- Filter (function(i) { all(i %% c(3,5,7) != 0) }, seq(100))
- [1] 1 2 4 8 11 13 16 17 19 22 23 26 29 31 32 34 37 38 41 43 44 46 47 52 53 58
- [27] 59 61 62 64 67 68 71 73 74 76 79 82 83 86 88 89 92 94 97

10. Generate a sequence backwards of the integers from 1 to 100.

Write the R code and its output.

- seq(from = 100, to = 1)
- [1] 100 99 98 97 96 95 94 93 92 91 90 89 88 87 86 85 84 83 82
- [20] 81 80 79 78 77 76 75 74 73 72 71 70 69 68 67 66 65 64 63
- [39] 62 61 60 59 58 57 56 55 54 53 52 51 50 49 48 47 46 45 44
- [58] 43 42 41 40 39 38 37 36 35 34 33 32 31 30 29 28 27 26 25
- [77] 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6
- [96] 5 4 3 2 1

11. List all the natural numbers below 25 that are multiples of 3 or 5.

Find the sum of these multiples.

- sum((1:25)[((1:25)%3 == 0) | ((1:25)%5 == 0)])

- The sum is 168.

- a. How many data points from 10 to 11?

- There are 101 data points.

- b. Write the R code and its output from 10 and 11.

- seq(from = 100, to = 1)

- Output is the number sequence 100 - 1

- sum((1:25)[((1:25)%3 == 0) | ((1:25)%5 == 0)])

- Sum is 168

12. Statements can be grouped together using braces '{' and '}'. A group of statements is sometimes called a **block**. Single statements are evaluated when a new line is typed at the end of the syntactically complete statement. Blocks are not evaluated until a new line is entered after the closing brace.

Enter this statement:

```
{ x <- 0+ x + 5 + }
```

Describe the output.

- { x <- 0+ x + 5 + }
- Error: unexpected '}' in "{ x <- 0+ x + 5 + }"
- the statement gives out this error and if the brackets are removed, the statement still needed another variable.

13. *Set up a vector named score, consisting of 72, 86, 92, 63, 88, 89, 91, 92, 75, 75 and 77. To access individual elements of an atomic vector, one generally uses the x[i] construction.

Find x[2] and x[3]. Write the R code and its output.

- Score <- c(72, 86, 92, 63, 88, 89, 91, 92, 75, 75, 77)
- x[2] = 86 x[3] = 92

14. *Create a vector a = c(1,2,NA,4,NA,6,7).

a. Change the NA to 999 using the codes print(a,na.print="-999").

- print(a,na.print="-999")
- [1] 1 2 -999 4 -999 6 7

b. Write the R code and its output. Describe the output.

- a <- c(1,2,NA,4,NA,6,7)
- print(a,na.print="-999")
- [1] 1 2 -999 4 -999 6 7

15. A special type of function calls can appear on the left-hand side of the assignment operator as in `> class(x) <- "foo"`.

Follow the codes below:

```
name = readline(prompt="Input your name: ") age = readline(prompt="Input
your age: ") print(paste("My name is",name, "and I am",age ,"years old. "))
print(R.version.string)
```

What is the output of the above code?

- The output of the above code is "My name is age = readline(prompt="\nInput your age: \n") and I am x years old." that is repeated 34 times and each time x is a different number.