An Introduction to R

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What is R? Is a computer language that allows the user to program algorithms and use tools that have been programmed by others.

R is based on the computer language S, which was developed by John Chambers and others at Bell Laboratories in 1976. In the early 1990s, Ross Ihaka and Robert Gentleman (University of Auckland, in Auckland, New Zealand) experimented with the language and called their product R. Note that both their first names begin with the letter R. Also when modifying a language called S, it is tempting to call it T or R.

R comes with a series of default packages. A package is a collection of previously programmed functions, often including functions for specific tasks. It is tempting to call this a library, but the R community refers to it as a package.

" > " Significa "What now?" The screen prompt > is an invitation to put R to work. Each line can have at most 128 characters, When continuation is expected, the prompt changes from > to + Note that the + continuation prompt does not carry out arithmetic plus.

1. Primer paso para comenzar a trabajar en R es instalar y llamar las librerias con las que vamos a trabajar.
   En cualquier momento se pueden llamar, pero si las pones arriba sera mejor visualizarlas luego.

```
# install.packages("Kendall")
```

```
library(Kendall)
```

```
## Warning: package 'Kendall' was built under R version 4.0.5
```

```
library(tibble)
```

```
citation('Kendall')
```

```
##
## To cite package 'Kendall' in publications use:
##
##   A.I. McLeod (2011). Kendall: Kendall rank correlation and
##   Mann-Kendall trend test. R package version 2.2.
##   https://CRAN.R-project.org/package=Kendall
##
## A BibTeX entry for LaTeX users is
##
##   @Manual{,
##     title = {Kendall: Kendall rank correlation and Mann-Kendall trend test},
```

```
##      author = {A.I. McLeod},
##      year = {2011},
##      note = {R package version 2.2},
##      url = {https://CRAN.R-project.org/package=Kendall},
##    }
##
## ATTENTION: This citation information has been auto-generated from the
## package DESCRIPTION file and may need manual editing, see
## 'help("citation")'.
```

1.1 Si necesitas ayuda de como trabaja una funcion en R puedes usar " ? "

```
# ?lm
```

2. Si comienzas un analisis nuevo. Recomiendo limpiar en "Environment".

```
# rm(list = ls(all = TRUE))
```

3. Hay que definir el directorio donde estas trabajando. A no ser que estes en un proyecto en Github donde la documentacion (scripts, RMarkdown) y las tablas estan juntas.

```
# setwd('D:/Curriculum/14_ Colaboracion/2021 Pulse LTER/Pulse WG PR/PulseDynWorkingGroup_Luq/data')
```

4. Importar tablas a R. Hay varias maneras.

```
# xxx.frm=read.table("xxx.txt",header=T)
# attach(xxx.frm)
#xxx.frm


# xxx.frm=read.csv("xxx.csv")
# attach(xxx.frm)
# xxx.frm
```

4.1 Se puede importar tablas seleccionandalas directamente

```
# data<-read.table(file.choose(),header=T)
```

5. Construccion de tablas en R.

Usando data.frame

```
example<- data.frame(Day=c(2,4,8,16,32,44,2,4,8,16,32,44,2,4,8,16,32,44),
        Replicate=c(1,1,1,1,1,1,2,2,2,2,2,2,3,3,3,3,3,3,
                    1,1,1,1,1,1,2,2,2,2,2,2,3,3,3,3,3,3,
                    1,1,1,1,1,1,2,2,2,2,2,2,3,3,3,3,3,3),
        Treament=c("CC","CC","CC","CC","CC","CC","CC","CC","CC","CC","CC","CC","CC","CC","CC","CC","CC","CC
                    "HP","HP","HP","HP","HP","HP","HP","HP","HP","HP","HP","HP","HP","HP","HP","HP","H
                    "LL","LL","LL","LL","LL","LL","LL","LL","LL","LL","LL","LL","LL","LL","LL","LL","L
        AFDM=c(94.669342,94.465752,84.897023,81.435993,86.556221,75.328294,94.262162,88.791240,75.7354
```

```
                  67.050593,76.346244,95.076522,88.968823,83.879073,73.958836,70.645724,67.184695,99.763
                  92.245362,74.513934,50.083136,36.979418,94.872932,86.353037,81.843173,67.795465,46.622
                  95.089932,93.244212,81.679814,65.352385,18.286525,7.517794,99.559972,86.759404,84.6934
                  67.456961,54.765706,94.074014,87.543693,82.492548,72.333367,51.304676,51.304676,98.3408
                  87.950873,84.693433,63.316485,63.723665))
```

example

```
##     Day Replicate Treament      AFDM
## 1     2         1       CC 94.669342
## 2     4         1       CC 94.465752
## 3     8         1       CC 84.897023
## 4    16         1       CC 81.435993
## 5    32         1       CC 86.556221
## 6    44         1       CC 75.328294
## 7     2         2       CC 94.262162
## 8     4         2       CC 88.791240
## 9     8         2       CC 75.735474
## 10   16         2       CC 81.232403
## 11   32         2       CC 67.050593
## 12   44         2       CC 76.346244
## 13    2         3       CC 95.076522
## 14    4         3       CC 88.968823
## 15    8         3       CC 83.879073
## 16   16         3       CC 73.958836
## 17   32         3       CC 70.645724
## 18   44         3       CC 67.184695
## 19    2         1       HP 99.763156
## 20    4         1       HP 92.022673
## 21    8         1       HP 92.245362
## 22   16         1       HP 74.513934
## 23   32         1       HP 50.083136
## 24   44         1       HP 36.979418
## 25    2         2       HP 94.872932
## 26    4         2       HP 86.353037
## 27    8         2       HP 81.843173
## 28   16         2       HP 67.795465
## 29   32         2       HP 46.622106
## 30   44         2       HP 18.323099
## 31    2         3       HP 95.089932
## 32    4         3       HP 93.244212
## 33    8         3       HP 81.679814
## 34   16         3       HP 65.352385
## 35   32         3       HP 18.286525
## 36   44         3       HP  7.517794
## 37    2         1       LL 99.559972
## 38    4         1       LL 86.759404
## 39    8         1       LL 84.693433
## 40   16         1       LL 79.196504
## 41   32         1       LL 67.456961
## 42   44         1       LL 54.765706
## 43    2         2       LL 94.074014
## 44    4         2       LL 87.543693
```

```
## 45    8         2        LL 82.492548
## 46   16         2        LL 72.333367
## 47   32         2        LL 51.304676
## 48   44         2        LL 51.304676
## 49    2         3        LL 98.340870
## 50    4         3        LL 86.322153
## 51    8         3        LL 87.950873
## 52   16         3        LL 84.693433
## 53   32         3        LL 63.316485
## 54   44         3        LL 63.723665
```

6.1 Usando tribble

```
 data <- tibble(
  x = 1:5,
  y = 1,
  z = x ^ 2 + y
)

data
```

```
## # A tibble: 5 x 3
##       x     y     z
##   <int> <dbl> <dbl>
## 1     1     1     2
## 2     2     1     5
## 3     3     1    10
## 4     4     1    17
## 5     5     1    26
```

7. Simbolos comunes en r, que vamos a estar usando.

```
%>% dplyr. What the function does is to pass the left hand side of the operator to the first argument o:

$ allows you extract elements by name from a named list. For example
```