

Class 10

First Version - September 6, 2019
Present Version - September 6, 2019

Softwares

Rstudio - getting started



Knowledge, freedom, uncertainty and the brutal truths of reality



Security, happiness, beauty, and the blissful ignorance of illusion





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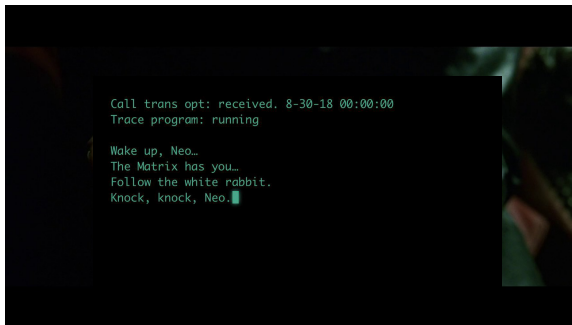




Knowledge, freedom, uncertainty and the brutal truths of reality



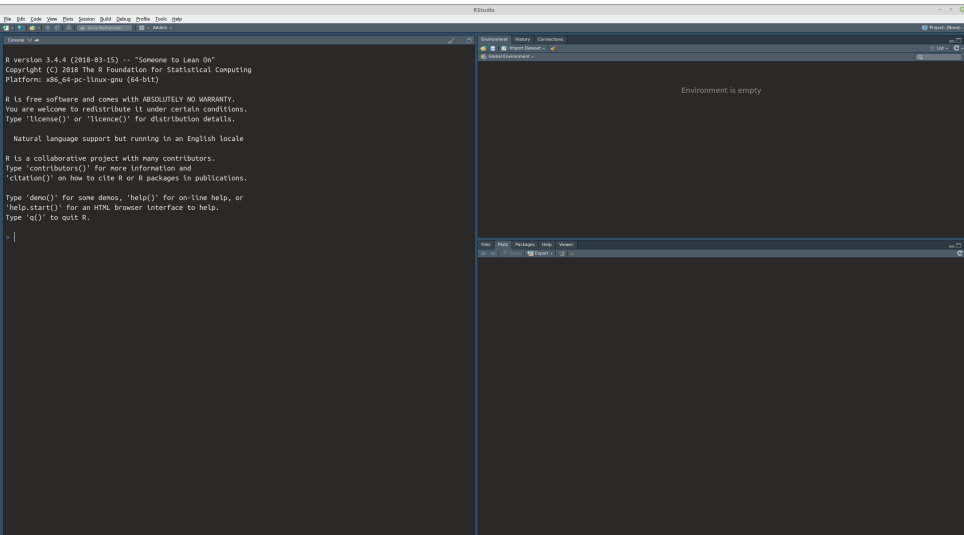
Security, happiness, beauty, and the blissful ignorance of illusion



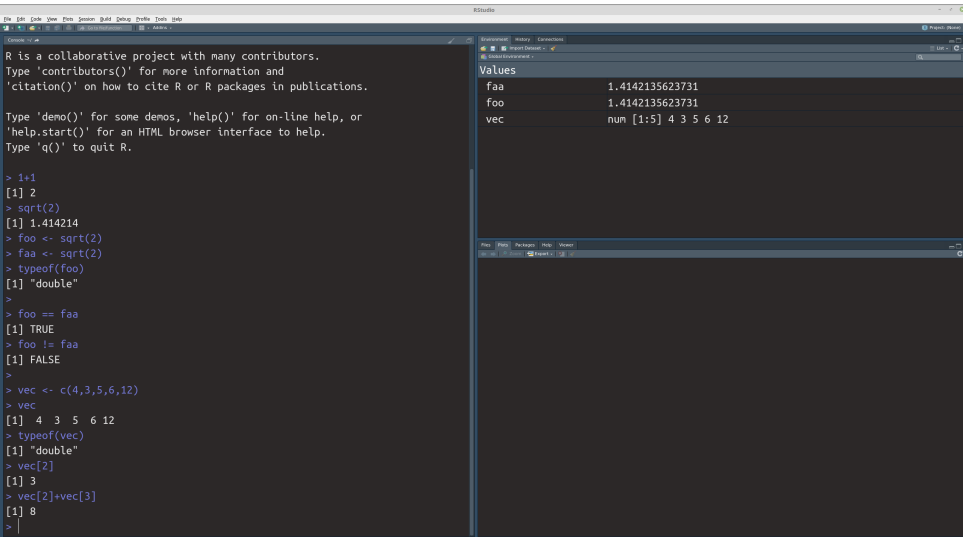
Softwares

Rstudio - getting started

windows



basic operations



The screenshot displays the RStudio interface. The left pane shows the R console with the following code and output:

```
R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

> 1+1
[1] 2
> sqrt(2)
[1] 1.414214
> foo <- sqrt(2)
> faa <- sqrt(2)
typeof(foo)
[1] "double"
>
> foo == faa
[1] TRUE
> foo != faa
[1] FALSE
>
> vec <- c(4,3,5,6,12)
> vec
[1] 4 3 5 6 12
> typeof(vec)
[1] "double"
> vec[2]
[1] 3
> vec[2]+vec[3]
[1] 8
>
|
```

The right pane shows the Environment window with the following values:

Variable	Value
faa	1.4142135623731
foo	1.4142135623731
vec	num [1:5] 4 3 5 6 12

The bottom pane shows the Files, Packages, Help, and Viewer tabs.

characters and lists

The screenshot displays the RStudio interface. The left pane shows the R console with the following code and output:

```
> rm(foo,faa,vec)
> vec2 <- ("secchi", "jacquemet", "charroin")
Error: unexpected ',' in "vec2 <- ("secchi", "
> vec2 <- c("secchi", "jacquemet", "charroin")
> typeof(vec2)
[1] "character"
> vec2[2]
[1] "jacquemet"
> vec2[2]+vec[1]
Error: object 'vec' not found
> paste(vec2[2],vec[1])
Error in paste(vec2[2], vec[1]) : object 'vec' not found
> paste(vec2[2],vec2[1])
[1] "jacquemet secchi"
> paste(vec2[2],vec2[1],sep="+++")
[1] "jacquemet+++secchi"
> c(vec2,'iodice')
[1] "secchi" "jacquemet" "charroin" "iodice"
>
```

The right pane shows the Environment window with the following content:

```
Values
vec2      chr [1:3] "secchi" "jacquemet" "charroin"
```

The bottom pane shows the menu bar with options: File, Edit, Code, View, Data, Session, Build, Debug, Profile, Tools, Help.

mean

The image shows a screenshot of the RStudio interface. The left pane displays the R console with the following session:

```
> x <- seq(from = 1, to = 5, by = 1)
> x
[1] 1 2 3 4 5
> p_unif <- rep(1/5,5)
> p_unif
[1] 0.2 0.2 0.2 0.2 0.2
> sum(p <- p_unif)
[1] 1
> weighted.mean(x,p_unif)
[1] 3
> p <- c(rep(2/5,2),rep(1/15,3))
> p
[1] 0.4000000 0.4000000 0.0666667 0.0666667 0.0666667
> sum(p)
[1] 1
> weighted.mean(x,p)
[1] 2
> p*x
[1] 0.4000000 0.8000000 0.2000000 0.2666667 0.3333333
> sum(p*x)
[1] 2
> ls()
[1] "p"          "p_unif"    "x"
> list=ls()
> rm(list=ls())
> |
```

The right pane shows the R documentation for the `weighted.mean` function. The environment is empty. The documentation includes:

- Weighted Arithmetic Mean**
- Description**: Compute a weighted mean.
- Usage**: `weighted.mean(x, w, ...)`
- Arguments**:
 - `x`: an object containing the values whose weighted mean is to be computed.
 - `w`: a numerical vector of weights the same length as `x` giving the weights to use for elements of `x`.
 - `...`: arguments to be passed to or from methods.
 - `na.rm`: a logical value indicating whether NA values in `x` should be stripped before the computation proceeds.
- Details**: This is a generic function and methods can be defined for the first argument `x`. Apart from the default methods there are methods for the date-time classes "POSIXct", "POSIXlt", "difftime" and "date". The default method will work for any numeric-like object for which `+`, `*`, `/`, `sum` and `abs` have suitable methods, including complex vectors. If `w` is missing then all elements of `x` are given the same weight, otherwise the weights coerced to numeric by `as.numeric` and normalized to sum to one (if possible; if their sum is zero or infinite the value is likely to be NA). Missing values in `x` are not handled specially and so give a missing value as the result. However, zero weights are handled specially and the corresponding `x` values are omitted from the sum.
- Value**: For the default method, a length-one numeric vector.
- See Also**: `mean`.
- Model**: `mean`.

simple functions

The screenshot shows the RStudio interface with the following content:

```
> compute_wmean <- function(input1,input2) {
+   x_inside <- input1
+   p_inside <- input2
+   output <- sum(x_inside*p_inside)
+   return(output)
+ }
>
> x_outside <- seq(from = 1, to = 5, by = 1)
> p_outside_unif <- rep(1/5,5)
> p_outside <- c(rep(2/5,2),rep(1/5,3))
> compute_wmean(x_outside,p_outside_unif)
[1] 3
> compute_wmean(x_outside,p_outside)
[1] 2
>
> compute_wmean(x_outside)
Error in compute_wmean(x_outside) :
  argument "input2" is missing, with no default
> compute_wmean(x)
Error in compute_wmean(x) : argument "input2" is missing, with no default
> p <- c(rep(2/5,2),rep(1/5,3))
> sum(p)
[1] 1.4
> compute_wmean(x,p)
[1] 3.6
> weighted.mean(x,p)
[1] 2.571429
> #comment behavior of weighted.mean using help
> |
```

The Environment pane shows the following values:

Object	Class	Value
p	num [1:5]	0.4 0.4 0.2 0.2 0.2
p_outside	num [1:5]	0.4 0.4 0.06667 0.06667 0.06667
p_outside_unif	num [1:5]	0.2 0.2 0.2 0.2 0.2
p_unif	num [1:5]	0.2 0.2 0.2 0.2 0.2
x	num [1:5]	1 2 3 4 5
x_outside	num [1:5]	1 2 3 4 5

The Functions pane shows the definition of the `compute_wmean` function:

```
compute_wmean function (input1, input2)
```

The Help pane shows the documentation for `weighted.mean`:

Weighted Arithmetic Mean

Description
Compute a weighted mean.

Usage
`weighted.mean(x, w, ...)`
Default S3 method:
`weighted.mean(x, w, ..., na.rm = FALSE)`

Arguments
`x` an object containing the values whose weighted mean is to be computed.
`w` a numerical vector of weights the same length as `x` giving the weights to use for elements of `x`.
`...` arguments to be passed to or from methods.
`na.rm` a logical value indicating whether NA values in `x` should be stripped before the computation proceeds.

Details
This is a generic function and methods can be defined for the first argument `x`, apart from the default methods there are methods for the date-time classes "POSIXct", "POSIXlt", "difftime" and "Date". The default method will work for any numeric-like object for which `+`, `*`, `/`, `sum` and `length` have suitable methods, including complex vectors. If `w` is missing then all elements of `x` are given the same weight, otherwise the weights coerced to numeric by `as.numeric` and normalized to sum to one if possible. If their sum is zero or infinite the value is likely to be NA.
Missing values in `w` are not handled specially and so give a missing value as the result. However, zero weights are handled specially and the corresponding `x` values are omitted from the sum.

Value
For the default method, a length-one numeric vector.

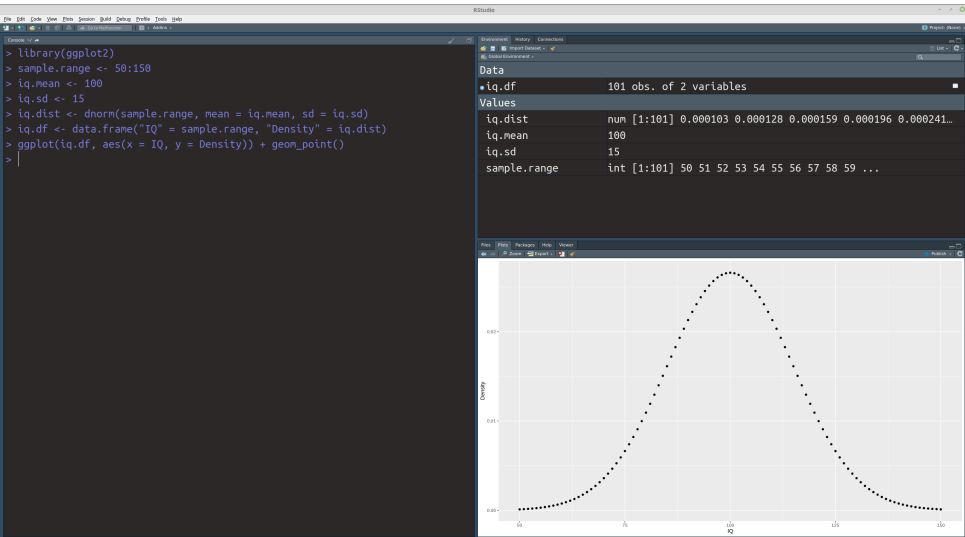
See Also
`mean`

packages

The screenshot shows the RStudio environment with the following content:

```
Environment: Global Environment  
Global Environment  
Values  
p                num [1:5] 0.4 0.4 0.2 0.2 0.2  
p_outside        num [1:5] 0.4 0.4 0.0667 0.0667 0.0667  
p_outside_unif   num [1:5] 0.2 0.2 0.2 0.2 0.2  
p_unif           num [1:5] 0.2 0.2 0.2 0.2 0.2  
x                num [1:5] 1 2 3 4 5  
x_outside        num [1:5] 1 2 3 4 5  
Functions  
compute_wmean    function (input1, input2)  
Files: Files Packages Help Viewer  
8. Weighted Arithmetic Mean - [R60000000]  
weighted.mean (stats)  
Weighted Arithmetic Mean  
Description  
Compute a weighted mean.  
Usage  
weighted.mean(x, w, ...)  
## default S3 method  
weighted.mean(x, w, ..., na.rm = FALSE)  
Arguments  
x      an object containing the values whose weighted mean is to be computed  
w      a numerical vector of weights the same length as x giving the weights to use for elements of x.  
...    arguments to be passed to or from methods.  
na.rm a logical value indicating whether NA values in x should be stripped before the computation proceeds.  
Details  
This is a generic function and methods can be defined for the first argument x; apart from the default methods there are methods for the data-time classes "PDL", "Efficient" and "Date". The default method will work for any numeric-like object for which [, multiplication, division and sum have suitable methods, including complex. If w is missing then all elements of x are given the same weight, otherwise the weights coerced to numeric by as.numeric and normalized to sum to one (if possible) or to the value of sum(w).  
Missing values in w are not handled specially and so give a missing value as the result. However, zero weights are handled specially and the corresponding x value is used.  
Value  
For the default method, a length-one numeric vector.  
See Also  
mean
```

plotting



Hyper-references