R_notes

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Preface

This is a Quarto book.

To learn more about Quarto books visit https://quarto.org/docs/books.

```
1 + 1
```

```
[1] 2
```

1 Introduction

This is a book created from markdown and executable code.

See Knuth (1984) for additional discussion of literate programming.

```
1 + 1
```

```
[1] 2
```

base R

The Comprehensive R Archive Network CRAN

```
help.start()
help()
?c
```

```r
installed.packages()
install.packages("ggplot2")
library(ggplot2) #
require(ggplot2) #
help(package = "ggplot2") # R ggplot2
?ggplot2
data(package="ggplot2")   # R ggplot2

data(mpg,package="ggplot2")  #
help(mpg) #   mpg
?mpg
mpg
```

mode

- **numeric – Integer/double integer – L**

```
mode(4.3)
#> [1] "numeric"
class(4.3)
#> [1] "numeric"
mode(1L)
#> [1] "numeric"
class(1L)
#> [1] "integer"
```

- **character –**

```
mode(c("car"))
#> [1] "character"
class("car")
#> [1] "character"
```

- **logical –**

```
mode(c(TRUE,FALSE))
#> [1] "logical"
class(c(TRUE,FALSE))
#> [1] "logical"
```

- **factor–**

```
mode(factor((c(1,2,3))))
#> [1] "numeric"
class(factor((c(1,2,3))))
#> [1] "factor"
```

- **date/datetime– /**

"%Y-%m-%d" xxxx-xx-xx, 2023-03-15

```
mode(as.Date("2023-12-11"))
#> [1] "numeric"
class(as.Date("2023-12-11"))
#> [1] "Date"

Sys.Date()
#> [1] "2023-12-19"
as.Date(c("02 14-2002","01 04-2013"),"%m %d-%Y") # "%m %d-%Y"
#> [1] "2002-02-14" "2013-01-04"
format(Sys.Date(),"%Y/%m/%d") # "%Y/%m/%d"
#> [1] "2023/12/19"
```

- **function–**

```
mode(c)
#> [1] "function"
class(c)
#> [1] "function"
```

- **list–**

```
mode(mpg)
#> [1] "list"
class(mpg)
#> [1] "tbl_df"     "tbl"        "data.frame"
```

- **complex –**

```
mode(c(1+2i,3-4i))
#> [1] "complex"
class(c(1+2i,3-4i))
#> [1] "complex"
```

- **raw–**

```
charToRaw("abcde12345") #
#>  [1] 61 62 63 64 65 31 32 33 34 35
```

```r
mode(charToRaw("abcde12345"))
#> [1] "raw"
class(charToRaw("abcde12345"))
#> [1] "raw"
```

(class) R ,

- **vector** –

```
?c      #Combine Values into a Vector or List
```

```
#
1
#> [1] 1

is.vector(1)
#> [1] TRUE

"a"
#> [1] "a"
is.vector("a")
#> [1] TRUE

#  c()

c(1)
#> [1] 1
c(1,2,3,4,5)
#> [1] 1 2 3 4 5
c("a","b","c")
#> [1] "a" "b" "c"
```

- **factor** –

```
?factor
```

```
factor(vector,order=FALSE,levels=c(v1,v2,…),labels= ,...)     c(1,2,3,...,k)
```

```
#
diabetes<-c("t1","t2","t1","t1")
str(diabetes)
```

```
#>  chr [1:4] "t1" "t2" "t1" "t1"
diabetes<-factor(diabetes)
str(diabetes)
#>  Factor w/ 2 levels "t1","t2": 1 2 1 1


#
status<-c("poor","better","best","poor")
status<-factor(status,order=TRUE)
str(status)
#>  Ord.factor w/ 3 levels "best"<"better"<..: 3 2 1 3
status<-factor(status,order=TRUE,levels = c("poor","better","best"))
str(status)
#>  Ord.factor w/ 3 levels "poor"<"better"<..: 1 2 3 1

#
sex<-c(1,2,2,1)
sex
#> [1] 1 2 2 1
sex<-factor(sex,levels=c(1,2),labels = c(" "," "))
str(sex)
#>  Factor w/ 2 levels " "," ": 1 2 2 1
sex
#> [1]
#> Levels:
```

- **matrix** –

```
?matrix
```

```
matrix(data= ,nrow=1 ,ncol=1 ,byrow=FALSE ,dimnames=list(rnames,cnames)
,...)
```

```
num<-c(16,22,24,28)
rnames<-c("R1","R2")
cnames<-c("C1","C2")
mymatrix<-matrix(num,nrow=2,ncol=2,byrow=TRUE,dimnames=list(rnames,cnames))
mymatrix
#>    C1 C2
#> R1 16 22
#> R2 24 28
```

- **array**–

`?array`

`array(data,dim_numeric_vector,dimnames = list(dim1,dim2,...),...)`

```
v<-1:24
dim1<-c("A1","A2","A3")
dim2<-c("B1","B2","B3","B4")
dim3<-c("C1","C2")
myarray<-array(v,c(3,4,2),dimnames = list(dim1,dim2,dim3))
myarray
#> , , C1
#>
#>    B1 B2 B3 B4
#> A1  1  4  7 10
#> A2  2  5  8 11
#> A3  3  6  9 12
#>
#> , , C2
#>
#>    B1 B2 B3 B4
#> A1 13 16 19 22
#> A2 14 17 20 23
#> A3 15 18 21 24
```

- **data.frame/tibble**–

`?data.frame`

`data.frame(name1=col1,name2=col2,...,row.names = ,...)`

`?tibble` `tibble()` tidyverse

```
id<-c(1,2,3,4)
age<-c(21,14,52,15)
diabetes<-c("t1","t2","t1","t1")
status<-c("poor","better","best","poor")
patient<-data.frame(patientID=id,age,diabetes,status,row.names = id) # 4
patient
#>   patientID age diabetes status
#> 1         1  21       t1   poor
#> 2         2  14       t2 better
#> 3         3  52       t1   best
#> 4         4  15       t1   poor
```

list –

```
?list
```

```
list(name1=object1,name2=object2,...)
```

```
mylist<-list(title="My list",
             matr=matrix(c("a1","b1","a2","b2"),nrow=2,ncol=2,byrow=TRUE,
                         dimnames = list(c("X1","X2"),c("Y1","Y2"))
             ),
             df=data.frame(id=matrix(c("Lisa","BOb","John","Jule"),
                                     nrow=4,ncol=1,byrow=TRUE
             ),
             int=c(3,5,7,9),
             TF=c(T,T,T,F)
             ),
             list=list(a=c(1,2,3),b=c("A","B"))
)
mylist
#> $title
#> [1] "My list"
#>
#> $matr
#>    Y1   Y2
#> X1 "a1" "b1"
#> X2 "a2" "b2"
#>
#> $df
#>     id int    TF
#> 1 Lisa   3  TRUE
#> 2  BOb   5  TRUE
#> 3 John   7  TRUE
#> 4 Jule   9 FALSE
#>
#> $list
#> $list$a
#> [1] 1 2 3
#>
#> $list$b
#> [1] "A" "B"
```