

HW1-R

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Installing/loading

```
if(!require("pacman"))  
install.packages("pacman")  
  
pacman::p_load(tidyverse,  
               dlookr,  
               ggpubr)
```

Introduction to R HW1

PART II

To check the R version installed in your system use the following code

```
R.version
```

```
platform      _  
arch          x86_64-pc-linux-gnu  
os            x86_64  
os            linux-gnu  
system        x86_64, linux-gnu
```

```
status
major      4
minor      3.1
year       2023
month      06
day        16
svn rev    84548
language   R
version.string R version 4.3.1 (2023-06-16)
nickname   Beagle Scouts
```

To install Packages in R use the following code

#here we are installing DMwR2 package which is used in data mining

```
####{r} ####install.packages("DMwR2") ####
```

We will use help() to see what is in the package

```
help(package="DMwR2")
```

If we want to use a function from the installed library we need to use library() function.

```
library(DMwR2)
```

Registered S3 method overwritten by 'quantmod':

```
method      from
as.zoo.data.frame zoo
```

As we have now loaded the package we can use any function from it example -

```
data(algae)
algae
```

```
# A tibble: 200 x 18
  season size speed mxPH mn02 C1 N03 NH4 oP04 P04 Chla a1
  <fct> <fct> <fct> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
1 winter small medium 8 9.8 60.8 6.24 578 105 170 50 0
2 spring small medium 8.35 8 57.8 1.29 370 429. 559. 1.3 1.4
3 autumn small medium 8.1 11.4 40.0 5.33 347. 126. 187. 15.6 3.3
4 spring small medium 8.07 4.8 77.4 2.30 98.2 61.2 139. 1.4 3.1
5 autumn small medium 8.06 9 55.4 10.4 234. 58.2 97.6 10.5 9.2
6 winter small high 8.25 13.1 65.8 9.25 430 18.2 56.7 28.4 15.1
7 summer small high 8.15 10.3 73.2 1.54 110 61.2 112. 3.2 2.4
8 autumn small high 8.05 10.6 59.1 4.99 206. 44.7 77.4 6.9 18.2
9 winter small medium 8.7 3.4 22.0 0.886 103. 36.3 71 5.54 25.4
10 winter small high 7.93 9.9 8 1.39 5.8 27.2 46.6 0.8 17
# i 190 more rows
# i 6 more variables: a2 <dbl>, a3 <dbl>, a4 <dbl>, a5 <dbl>, a6 <dbl>,
# a7 <dbl>
```

to find rows with too many nans

```
manyNAs(algae)
```

```
[1] 62 199
```

To get list of packages installed in different libraries use

```
library()
```

The following command will show the packages loaded in the session

```
(.packages())
```

```
[1] "DMwR2"      "ggpubr"      "dlookr"      "lubridate"  "forcats"    "stringr"
[7] "dplyr"      "purrr"      "readr"      "tidyr"      "tibble"     "ggplot2"
[13] "tidyverse" "pacman"     "stats"      "graphics"   "grDevices"  "utils"
[19] "datasets"  "methods"    "base"
```

#Another way to see the packages installed

```
installed.packages()
```

	Package
abind	"abind"
AsioHeaders	"AsioHeaders"
askpass	"askpass"
backports	"backports"
base64enc	"base64enc"
bit	"bit"
bit64	"bit64"
blob	"blob"
bookdown	"bookdown"
brio	"brio"
broom	"broom"
bslib	"bslib"
cachem	"cachem"
callr	"callr"
car	"car"
carData	"carData"
cellranger	"cellranger"
cli	"cli"
clipr	"clipr"
colorspace	"colorspace"
commonmark	"commonmark"
conflicted	"conflicted"
corrplot	"corrplot"
cowplot	"cowplot"
cpp11	"cpp11"
crayon	"crayon"
credentials	"credentials"
crul	"crul"
curl	"curl"
data.table	"data.table"
DBI	"DBI"
dbplyr	"dbplyr"
desc	"desc"
diffobj	"diffobj"
digest	"digest"
dlookr	"dlookr"
DMwR2	"DMwR2"
dplyr	"dplyr"

dtplyr	"dtplyr"
ellipsis	"ellipsis"
evaluate	"evaluate"
extrafont	"extrafont"
extrafontdb	"extrafontdb"
fansi	"fansi"
farver	"farver"
fastmap	"fastmap"
fontawesome	"fontawesome"
fontBitstreamVera	"fontBitstreamVera"
fontLiberation	"fontLiberation"
fontquiver	"fontquiver"
forcats	"forcats"
foreach	"foreach"
Formula	"Formula"
fs	"fs"
gargle	"gargle"
gdtools	"gdtools"
generics	"generics"
gert	"gert"
gfonts	"gfonts"
ggplot2	"ggplot2"
ggpubr	"ggpubr"
ggrepel	"ggrepel"
ggsci	"ggsci"
ggsignif	"ggsignif"
gh	"gh"
gitcreds	"gitcreds"
glmnet	"glmnet"
glue	"glue"
googledrive	"googledrive"
googlesheets4	"googlesheets4"
gridExtra	"gridExtra"
gtable	"gtable"
haven	"haven"
highr	"highr"
hms	"hms"
hrbrthemes	"hrbrthemes"
htmltools	"htmltools"
htmlwidgets	"htmlwidgets"
httpcode	"httpcode"
httpuv	"httpuv"
httr	"httr"

httr2	"httr2"
ids	"ids"
ini	"ini"
inum	"inum"
isoband	"isoband"
iterators	"iterators"
jomo	"jomo"
jquerylib	"jquerylib"
jsonlite	"jsonlite"
kableExtra	"kableExtra"
knitr	"knitr"
labeling	"labeling"
later	"later"
libcoin	"libcoin"
lifecycle	"lifecycle"
lme4	"lme4"
lubridate	"lubridate"
magrittr	"magrittr"
Matrix	"Matrix"
MatrixModels	"MatrixModels"
memoise	"memoise"
mice	"mice"
mime	"mime"
minqa	"minqa"
mitml	"mitml"
modelr	"modelr"
munsell	"munsell"
mvtnorm	"mvtnorm"
nloptr	"nloptr"
numDeriv	"numDeriv"
openssl	"openssl"
ordinal	"ordinal"
pacman	"pacman"
pagedown	"pagedown"
palmerpenguins	"palmerpenguins"
pan	"pan"
partykit	"partykit"
pbkrtest	"pbkrtest"
pillar	"pillar"
pkgconfig	"pkgconfig"
pkgload	"pkgload"
polynom	"polynom"
praise	"praise"

prettyunits	"prettyunits"
processx	"processx"
progress	"progress"
promises	"promises"
ps	"ps"
purrr	"purrr"
quantmod	"quantmod"
quantreg	"quantreg"
R6	"R6"
ragg	"ragg"
rappdirs	"rappdirs"
RColorBrewer	"RColorBrewer"
Rcpp	"Rcpp"
RcppEigen	"RcppEigen"
reactable	"reactable"
reactR	"reactR"
readr	"readr"
readxl	"readxl"
rematch	"rematch"
rematch2	"rematch2"
remotes	"remotes"
reprex	"reprex"
rlang	"rlang"
rmarkdown	"rmarkdown"
rprojroot	"rprojroot"
rstatix	"rstatix"
rstudioapi	"rstudioapi"
Rttf2pt1	"Rttf2pt1"
rvest	"rvest"
sass	"sass"
scales	"scales"
selectr	"selectr"
servr	"servr"
shape	"shape"
shiny	"shiny"
showtext	"showtext"
showtextdb	"showtextdb"
sourcetools	"sourcetools"
SparseM	"SparseM"
stringi	"stringi"
stringr	"stringr"
svglite	"svglite"
sys	"sys"

sysfonts	"sysfonts"
systemfonts	"systemfonts"
testthat	"testthat"
textshaping	"textshaping"
tibble	"tibble"
tidyr	"tidyr"
tidyselect	"tidyselect"
tidyverse	"tidyverse"
timechange	"timechange"
tinytex	"tinytex"
triebeard	"triebeard"
TTR	"TTR"
tzdb	"tzdb"
ucminf	"ucminf"
urltools	"urltools"
usethis	"usethis"
utf8	"utf8"
uuid	"uuid"
vctrs	"vctrs"
viridisLite	"viridisLite"
vroom	"vroom"
waldo	"waldo"
webshot	"webshot"
websocket	"websocket"
whisker	"whisker"
withr	"withr"
xfun	"xfun"
xml2	"xml2"
xtable	"xtable"
xts	"xts"
yaml	"yaml"
zip	"zip"
zoo	"zoo"
base	"base"
boot	"boot"
class	"class"
cluster	"cluster"
codetools	"codetools"
compiler	"compiler"
datasets	"datasets"
foreign	"foreign"
graphics	"graphics"
grDevices	"grDevices"

grid	"grid"	
KernSmooth	"KernSmooth"	
lattice	"lattice"	
MASS	"MASS"	
Matrix	"Matrix"	
methods	"methods"	
mgcv	"mgcv"	
nlme	"nlme"	
nnet	"nnet"	
parallel	"parallel"	
rpart	"rpart"	
spatial	"spatial"	
splines	"splines"	
stats	"stats"	
stats4	"stats4"	
survival	"survival"	
tcltk	"tcltk"	
tools	"tools"	
utils	"utils"	
	LibPath	Version
abind	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.4-5"
AsioHeaders	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.22.1-2"
askpass	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.1"
backports	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.4.1"
base64enc	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.1-3"
bit	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"4.0.5"
bit64	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"4.0.5"
blob	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.2.4"
bookdown	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.35"
brio	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.1.3"
broom	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.0.5"
bslib	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.5.1"
cachem	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.0.8"
callr	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"3.7.3"
car	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"3.1-2"
carData	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"3.0-5"
cellranger	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.1.0"
cli	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"3.6.1"
clipr	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.8.0"
colorspace	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"2.1-0"
commonmark	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.9.0"
conflicted	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.2.0"
corrplot	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.92"

cowplot	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.1.1"
cpp11	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.4.6"
crayon	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.5.2"
credentials	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.3.2"
crul	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.4.0"
curl	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"5.0.2"
data.table	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.14.8"
DBI	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.1.3"
dbplyr	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"2.3.3"
desc	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.4.2"
diffobj	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.3.5"
digest	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.6.33"
dlookr	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.6.2"
DMwR2	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.0.2"
dplyr	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.1.3"
dtplyr	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.3.1"
ellipsis	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.3.2"
evaluate	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.21"
extrafont	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.19"
extrafontdb	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.0"
fansi	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.0.4"
farver	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"2.1.1"
fastmap	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.1.1"
fontawesome	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.5.2"
fontBitstreamVera	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.1.1"
fontLiberation	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.1.0"
fontquiver	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.2.1"
forcats	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.0.0"
foreach	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.5.2"
Formula	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.2-5"
fs	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.6.3"
gargle	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.5.2"
gdtools	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.3.3"
generics	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.1.3"
gert	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.9.3"
gfonts	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.2.0"
ggplot2	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"3.4.3"
ggpubr	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.6.0"
ggrepel	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.9.3"
ggsci	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"3.0.0"
ggsignif	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.6.4"
gh	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.4.0"
gitcreds	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.1.2"

glmnet	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"4.1-8"
glue	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.6.2"
googledrive	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"2.1.1"
googlesheets4	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.1.1"
gridExtra	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"2.3"
gtable	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.3.4"
haven	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"2.5.3"
highr	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.10"
hms	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.1.3"
hrbrthemes	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.8.0"
htmltools	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.5.6"
htmlwidgets	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.6.2"
httpcode	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.3.0"
httpuv	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.6.11"
httr	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.4.7"
httr2	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.2.3"
ids	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.0.1"
ini	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.3.1"
inum	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.0-5"
isoband	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.2.7"
iterators	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.0.14"
jomo	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"2.7-6"
jquerylib	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.1.4"
jsonlite	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.8.7"
kableExtra	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.3.4"
knitr	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.43"
labeling	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.4.3"
later	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.3.1"
libcoin	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.0-9"
lifecycle	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.0.3"
lme4	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.1-34"
lubridate	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.9.2"
magrittr	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"2.0.3"
Matrix	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.6-1"
MatrixModels	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.5-2"
memoise	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"2.0.1"
mice	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"3.16.0"
mime	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.12"
minqa	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.2.5"
mitml	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.4-5"
modelr	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.1.11"
munsell	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.5.0"
mvtnorm	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.2-3"

nloptr	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"2.0.3"
numDeriv	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"2016.8-1.1"
openssl	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"2.1.0"
ordinal	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"2022.11-16"
pacman	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.5.1"
pagedown	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.20"
palmerpenguins	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.1.1"
pan	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.9"
partykit	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.2-20"
pbkrtest	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.5.2"
pillar	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.9.0"
pkgconfig	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"2.0.3"
pkgload	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.3.2.1"
polynom	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.4-1"
praise	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.0.0"
prettyunits	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.1.1"
processx	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"3.8.2"
progress	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.2.2"
promises	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.2.1"
ps	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.7.5"
purrr	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.0.2"
quantmod	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.4.25"
quantreg	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"5.97"
R6	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"2.5.1"
ragg	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.2.5"
rappdirs	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.3.3"
RColorBrewer	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.1-3"
Rcpp	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.0.11"
RcppEigen	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.3.3.9.3"
reactable	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.4.4"
reactR	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.4.4"
readr	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"2.1.4"
readxl	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.4.3"
rematch	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"2.0.0"
rematch2	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"2.1.2"
remotes	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"2.4.2.1"
reprex	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"2.0.2"
rlang	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.1.1"
rmarkdown	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"2.24"
rprojroot	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"2.0.3"
rstatix	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.7.2"
rstudioapi	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.15.0"
Rttf2pt1	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.3.12"

rvest	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.0.3"
sass	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.4.7"
scales	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.2.1"
selectr	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.4-2"
servr	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.27"
shape	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.4.6"
shiny	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.7.5"
showtext	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.9-6"
showtextdb	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"3.0"
sourcetools	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.1.7-1"
SparseM	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.81"
stringi	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.7.12"
stringr	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.5.0"
svglite	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"2.1.1"
sys	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"3.4.2"
sysfonts	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.8.8"
systemfonts	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.0.4"
testthat	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"3.1.10"
textshaping	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.3.6"
tibble	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"3.2.1"
tidyr	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.3.0"
tidyselect	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.2.0"
tidyverse	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"2.0.0"
timechange	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.2.0"
tinytex	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.46"
triebeard	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.4.1"
TTR	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.24.3"
tzdb	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.4.0"
ucminf	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.2.0"
urltools	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.7.3"
usethis	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"2.2.2"
utf8	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.2.3"
uuid	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.1-1"
vctrs	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.6.3"
viridisLite	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.4.2"
vroom	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.6.3"
waldo	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.5.1"
webshot	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.5.5"
websocket	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.4.1"
whisker	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.4.1"
withr	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"2.5.0"
xfun	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.40"
xml2	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.3.5"

xtable	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.8-4"
xts	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"0.13.1"
yaml	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"2.3.7"
zip	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"2.3.0"
zoo	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"	"1.8-12"
base	"/opt/R/4.3.1/lib/R/library"	"4.3.1"
boot	"/opt/R/4.3.1/lib/R/library"	"1.3-28.1"
class	"/opt/R/4.3.1/lib/R/library"	"7.3-22"
cluster	"/opt/R/4.3.1/lib/R/library"	"2.1.4"
codetools	"/opt/R/4.3.1/lib/R/library"	"0.2-19"
compiler	"/opt/R/4.3.1/lib/R/library"	"4.3.1"
datasets	"/opt/R/4.3.1/lib/R/library"	"4.3.1"
foreign	"/opt/R/4.3.1/lib/R/library"	"0.8-84"
graphics	"/opt/R/4.3.1/lib/R/library"	"4.3.1"
grDevices	"/opt/R/4.3.1/lib/R/library"	"4.3.1"
grid	"/opt/R/4.3.1/lib/R/library"	"4.3.1"
KernSmooth	"/opt/R/4.3.1/lib/R/library"	"2.23-21"
lattice	"/opt/R/4.3.1/lib/R/library"	"0.21-8"
MASS	"/opt/R/4.3.1/lib/R/library"	"7.3-60"
Matrix	"/opt/R/4.3.1/lib/R/library"	"1.5-4.1"
methods	"/opt/R/4.3.1/lib/R/library"	"4.3.1"
mgcv	"/opt/R/4.3.1/lib/R/library"	"1.8-42"
nlme	"/opt/R/4.3.1/lib/R/library"	"3.1-162"
nnet	"/opt/R/4.3.1/lib/R/library"	"7.3-19"
parallel	"/opt/R/4.3.1/lib/R/library"	"4.3.1"
rpart	"/opt/R/4.3.1/lib/R/library"	"4.1.19"
spatial	"/opt/R/4.3.1/lib/R/library"	"7.3-16"
splines	"/opt/R/4.3.1/lib/R/library"	"4.3.1"
stats	"/opt/R/4.3.1/lib/R/library"	"4.3.1"
stats4	"/opt/R/4.3.1/lib/R/library"	"4.3.1"
survival	"/opt/R/4.3.1/lib/R/library"	"3.5-5"
tcltk	"/opt/R/4.3.1/lib/R/library"	"4.3.1"
tools	"/opt/R/4.3.1/lib/R/library"	"4.3.1"
utils	"/opt/R/4.3.1/lib/R/library"	"4.3.1"
	Priority	
abind	NA	
AsioHeaders	NA	
askpass	NA	
backports	NA	
base64enc	NA	
bit	NA	
bit64	NA	
blob	NA	

bookdown	NA
brio	NA
broom	NA
bslib	NA
cachem	NA
callr	NA
car	NA
carData	NA
cellranger	NA
cli	NA
clipr	NA
colorspace	NA
commonmark	NA
conflicted	NA
corrplot	NA
cowplot	NA
cpp11	NA
crayon	NA
credentials	NA
crul	NA
curl	NA
data.table	NA
DBI	NA
dbplyr	NA
desc	NA
diffobj	NA
digest	NA
dlookr	NA
DMwR2	NA
dplyr	NA
dtplyr	NA
ellipsis	NA
evaluate	NA
extrafont	NA
extrafontdb	NA
fansi	NA
farver	NA
fastmap	NA
fontawesome	NA
fontBitstreamVera	NA
fontLiberation	NA
fontquiver	NA
forcats	NA

foreach	NA
Formula	NA
fs	NA
gargle	NA
gdtools	NA
generics	NA
gert	NA
gfonts	NA
ggplot2	NA
ggpubr	NA
ggrepel	NA
ggsci	NA
ggsignif	NA
gh	NA
gitcreds	NA
glmnet	NA
glue	NA
googledrive	NA
googlesheets4	NA
gridExtra	NA
gtable	NA
haven	NA
highr	NA
hms	NA
hrbrthemes	NA
htmltools	NA
htmlwidgets	NA
httpcode	NA
httpuv	NA
httr	NA
httr2	NA
ids	NA
ini	NA
inum	NA
isoband	NA
iterators	NA
jomo	NA
jquerylib	NA
jsonlite	NA
kableExtra	NA
knitr	NA
labeling	NA
later	NA

libcoin	NA
lifecycle	NA
lme4	NA
lubridate	NA
magrittr	NA
Matrix	"recommended"
MatrixModels	NA
memoise	NA
mice	NA
mime	NA
minqa	NA
mitml	NA
modelr	NA
munsell	NA
mvtnorm	NA
nloptr	NA
numDeriv	NA
openssl	NA
ordinal	NA
pacman	NA
pagedown	NA
palmerpenguins	NA
pan	NA
partykit	NA
pbkrtest	NA
pillar	NA
pkgconfig	NA
pkgload	NA
polynom	NA
praise	NA
prettyunits	NA
processx	NA
progress	NA
promises	NA
ps	NA
purrr	NA
quantmod	NA
quantreg	NA
R6	NA
ragg	NA
rappdirs	NA
RColorBrewer	NA
Rcpp	NA

RcppEigen	NA
reactable	NA
reactR	NA
readr	NA
readxl	NA
rematch	NA
rematch2	NA
remotes	NA
reprer	NA
rlang	NA
rmarkdown	NA
rprojroot	NA
rstatix	NA
rstudioapi	NA
Rttf2pt1	NA
rvest	NA
sass	NA
scales	NA
selectr	NA
servr	NA
shape	NA
shiny	NA
showtext	NA
showtextdb	NA
sourcetools	NA
SparseM	NA
stringi	NA
stringr	NA
svglite	NA
sys	NA
sysfonts	NA
systemfonts	NA
testthat	NA
textshaping	NA
tibble	NA
tidyr	NA
tidyselect	NA
tidyverse	NA
timechange	NA
tinytex	NA
triebeard	NA
TTR	NA
tzdb	NA

ucminf	NA
urltools	NA
usethis	NA
utf8	NA
uuid	NA
vctr	NA
viridisLite	NA
vroom	NA
waldo	NA
webshot	NA
websocket	NA
whisker	NA
withr	NA
xfun	NA
xml2	NA
xtable	NA
xts	NA
yaml	NA
zip	NA
zoo	NA
base	"base"
boot	"recommended"
class	"recommended"
cluster	"recommended"
codetools	"recommended"
compiler	"base"
datasets	"base"
foreign	"recommended"
graphics	"base"
grDevices	"base"
grid	"base"
KernSmooth	"recommended"
lattice	"recommended"
MASS	"recommended"
Matrix	"recommended"
methods	"base"
mgcv	"recommended"
nlme	"recommended"
nnet	"recommended"
parallel	"base"
rpart	"recommended"
spatial	"recommended"
splines	"base"

stats	"base"
stats4	"base"
survival	"recommended"
tcltk	"base"
tools	"base"
utils	"base"
	Depends
abind	"R (>= 1.5.0)"
AsioHeaders	NA
askpass	NA
backports	"R (>= 3.0.0)"
base64enc	"R (>= 2.9.0)"
bit	"R (>= 2.9.2)"
bit64	"R (>= 3.0.1), bit (>= 4.0.0), utils, methods, stats"
blob	NA
bookdown	"R (>= 3.5.0)"
brio	NA
broom	"R (>= 3.5)"
bslib	"R (>= 2.10)"
cachem	NA
callr	"R (>= 3.4)"
car	"R (>= 3.5.0), carData (>= 3.0-0)"
carData	"R (>= 3.5.0)"
cellranger	"R (>= 3.0.0)"
cli	"R (>= 3.4)"
clipr	NA
colorspace	"R (>= 3.0.0), methods"
commonmark	NA
conflicted	"R (>= 3.2)"
corrplot	NA
cowplot	"R (>= 3.5.0)"
cpp11	"R (>= 3.5.0)"
crayon	NA
credentials	NA
crul	NA
curl	"R (>= 3.0.0)"
data.table	"R (>= 3.1.0)"
DBI	"methods, R (>= 3.0.0)"
dbplyr	"R (>= 3.1)"
desc	"R (>= 3.4)"
diffobj	"R (>= 3.1.0)"
digest	"R (>= 3.3.0)"
dlookr	"R (>= 3.2.0)"

DMwR2	"R(>= 3.0), methods"
dplyr	"R (>= 3.5.0)"
dtplyr	"R (>= 3.3)"
ellipsis	"R (>= 3.2)"
evaluate	"R (>= 3.0.2)"
extrafont	"R (>= 2.15)"
extrafontdb	"R (>= 2.14)"
fansi	"R (>= 3.1.0)"
farver	NA
fastmap	NA
fontawesome	"R (>= 3.3.0)"
fontBitstreamVera	"R (>= 3.0.0)"
fontLiberation	"R (>= 3.0)"
fontquiver	"R (>= 3.0.0)"
forcats	"R (>= 3.4)"
foreach	"R (>= 2.5.0)"
Formula	"R (>= 2.0.0), stats"
fs	"R (>= 3.4)"
gargle	"R (>= 3.6)"
gdtools	"R (>= 4.0.0)"
generics	"R (>= 3.2)"
gert	NA
gfonts	"R (>= 2.10)"
ggplot2	"R (>= 3.3)"
ggpubr	"R (>= 3.1.0), ggplot2 (>= 3.4.0)"
ggrepel	"R (>= 3.0.0), ggplot2 (>= 2.2.0)"
ggsci	"R (>= 3.5.0)"
ggsignif	NA
gh	"R (>= 3.4)"
gitcreds	"R (>= 3.4)"
glmnet	"R (>= 3.6.0), Matrix (>= 1.0-6)"
glue	"R (>= 3.4)"
googledrive	"R (>= 3.6)"
googlesheets4	"R (>= 3.6)"
gridExtra	NA
gtable	"R (>= 3.5)"
haven	"R (>= 3.6)"
highr	"R (>= 3.3.0)"
hms	NA
hrbrthemes	"R (>= 3.4.0)"
htmltools	"R (>= 2.14.1)"
htmlwidgets	NA
httpcode	NA

httpuv	"R (>= 2.15.1)"
httr	"R (>= 3.5)"
httr2	"R (>= 3.4)"
ids	NA
ini	NA
inum	"R (>= 3.3.0)"
isoband	NA
iterators	"R (>= 2.5.0), utils"
jomo	NA
jquerylib	NA
jsonlite	"methods"
kableExtra	"R (>= 3.1.0)"
knitr	"R (>= 3.3.0)"
labeling	NA
later	NA
libcoin	"R (>= 3.4.0)"
lifecycle	"R (>= 3.4)"
lme4	"R (>= 3.5.0), Matrix (>= 1.2-1), methods, stats"
lubridate	"methods, R (>= 3.2)"
magrittr	"R (>= 3.4.0)"
Matrix	"R (>= 3.5.0), methods"
MatrixModels	"R (>= 3.6.0)"
memoise	NA
mice	"R (>= 2.10.0)"
mime	NA
minqa	NA
mitml	NA
modelr	"R (>= 3.2)"
munsell	NA
mvtnorm	"R(>= 3.5.0)"
nloptr	NA
numDeriv	"R (>= 2.11.1)"
openssl	NA
ordinal	"R (>= 2.13.0), stats, methods"
pacman	"R (>= 3.5.0)"
pagedown	"R (>= 3.5.0)"
palmerpenguins	"R (>= 2.10)"
pan	NA
partykit	"R (>= 3.5.0), graphics, grid, libcoin (>= 1.0-0), mvtnorm"
pbkrtest	"R (>= 4.1.0), lme4 (>= 1.1.31)"
pillar	NA
pkgconfig	NA
pkgload	"R (>= 3.4.0)"

polynom	NA
praise	NA
prettyunits	NA
processx	"R (>= 3.4.0)"
progress	NA
promises	NA
ps	"R (>= 3.4)"
purrr	"R (>= 3.5.0)"
quantmod	"R (>= 3.2.0), xts(>= 0.9-0), zoo, TTR(>= 0.2), methods"
quantreg	"R (>= 3.5), stats, SparseM"
R6	"R (>= 3.0)"
ragg	NA
rappdirs	"R (>= 3.2)"
RColorBrewer	"R (>= 2.0.0)"
Rcpp	NA
RcppEigen	"R (>= 3.6.0)"
reactable	"R (>= 3.1)"
reactR	NA
readr	"R (>= 3.5)"
readxl	"R (>= 3.6)"
rematch	NA
rematch2	NA
remotes	"R (>= 3.0.0)"
reprex	"R (>= 3.4)"
rlang	"R (>= 3.5.0)"
rmarkdown	"R (>= 3.0)"
rprojroot	"R (>= 3.0.0)"
rstatix	"R (>= 3.3.0)"
rstudioapi	NA
Rttf2pt1	"R (>= 2.15)"
rvest	"R (>= 3.2)"
sass	NA
scales	"R (>= 3.2)"
selectr	"R (>= 3.0)"
servr	"R (>= 3.0.0)"
shape	"R (>= 2.01)"
shiny	"R (>= 3.0.2), methods"
showtext	"sysfonts (>= 0.7.1), showtextdb (>= 2.0)"
showtextdb	NA
sourcetools	"R (>= 3.0.2)"
SparseM	"R (>= 2.15), methods"
stringi	"R (>= 3.1)"
stringr	"R (>= 3.3)"

svglite	"R (>= 3.0.0)"
sys	NA
sysfonts	NA
systemfonts	"R (>= 3.2.0)"
testthat	"R (>= 3.1)"
textshaping	"R (>= 3.2.0)"
tibble	"R (>= 3.4.0)"
tidyr	"R (>= 3.4.0)"
tidyselect	"R (>= 3.4)"
tidyverse	"R (>= 3.3)"
timechange	"R (>= 3.3)"
tinytex	NA
triebeard	NA
TTR	NA
tzdb	"R (>= 3.5.0)"
ucminf	"R (>= 3.5.0)"
urltools	"R (>= 2.10)"
usethis	"R (>= 3.6)"
utf8	"R (>= 2.10)"
uuid	"R (>= 2.9.0)"
vctrs	"R (>= 3.5.0)"
viridisLite	"R (>= 2.10)"
vroom	"R (>= 3.4)"
waldo	NA
webshot	"R (>= 3.0)"
websocket	NA
whisker	NA
withr	"R (>= 3.2.0)"
xfun	NA
xml2	"R (>= 3.1.0)"
xtable	"R (>= 2.10.0)"
xts	"R (>= 3.6.0), zoo (>= 1.7-12)"
yaml	NA
zip	NA
zoo	"R (>= 3.1.0), stats"
base	NA
boot	"R (>= 3.0.0), graphics, stats"
class	"R (>= 3.0.0), stats, utils"
cluster	"R (>= 3.5.0)"
codetools	"R (>= 2.1)"
compiler	NA
datasets	NA
foreign	"R (>= 4.0.0)"

graphics	NA
grDevices	NA
grid	NA
KernSmooth	"R (>= 2.5.0), stats"
lattice	"R (>= 4.0.0)"
MASS	"R (>= 4.0), grDevices, graphics, stats, utils"
Matrix	"R (>= 3.5.0), methods"
methods	NA
mgcv	"R (>= 3.6.0), nlme (>= 3.1-64)"
nlme	"R (>= 3.5.0)"
nnet	"R (>= 3.0.0), stats, utils"
parallel	NA
rpart	"R (>= 2.15.0), graphics, stats, grDevices"
spatial	"R (>= 3.0.0), graphics, stats, utils"
splines	NA
stats	NA
stats4	NA
survival	"R (>= 3.5.0)"
tcltk	NA
tools	NA
utils	NA
	Imports
abind	"methods, utils"
AsioHeaders	NA
askpass	"sys (>= 2.1)"
backports	NA
base64enc	NA
bit	NA
bit64	NA
blob	"methods, rlang, vctrs (>= 0.2.1)"
bookdown	"htmltools (>= 0.3.6), knitr (>= 1.38), rmarkdown (>= 2.14), \njquerylib, x"
brio	NA
broom	"backports, dplyr (>= 1.0.0), ellipsis, generics (>= 0.0.2), \n glue, lifecycle"
bslib	"base64enc, cachem, grDevices, htmltools (>= 0.5.4), jquerylib\n(>= 0.1.3)"
cachem	"rlang, fastmap (>= 1.1.1)"
callr	"processx (>= 3.6.1), R6, utils"
car	"abind, MASS, mgcv, nnet, pbkrtest (>= 0.4-4), quantreg, \n grDevices, utils"
carData	NA
cellranger	"rematch, tibble"
cli	"utils"
clipr	"utils"
colorspace	"graphics, grDevices, stats"
commonmark	NA

conflicted	"cli (>= 3.4.0), memoise, rlang (>= 1.0.0)"
corrplot	NA
cowplot	"ggplot2 (> 2.2.1), grid, gtable, grDevices, methods, rlang,\nnscales"
cpp11	NA
crayon	"grDevices, methods, utils"
credentials	"openssl (>= 1.3), sys (>= 2.1), curl, jsonlite, askpass"
curl	"curl (>= 3.3), R6 (>= 2.2.0), urltools (>= 1.6.0), httpcode\n(>= 0.2.0), "
curl	NA
data.table	"methods"
DBI	NA
dbplyr	"blob (>= 1.2.0), cli (>= 3.4.1), DBI (>= 1.0.0), dplyr (>=\n1.1.0), glue"
desc	"cli, R6, rprojroot, utils"
diffobj	"crayon (>= 1.3.2), tools, methods, utils, stats"
digest	"utils"
dlookr	"dplyr (>= 0.7.6), showtext (>= 0.9-4), sysfonts (>= 0.7.1),\nggplot2 (>= 3"
DMwR2	"xts (>= 0.9-7), zoo (>= 1.7-10), class (>= 7.3-14), rpart (>=\n4.1-10), q"
dplyr	"cli (>= 3.4.0), generics, glue (>= 1.3.2), lifecycle (>=\n1.0.3), magrittr"
dtplyr	"cli (>= 3.4.0), data.table (>= 1.13.0), dplyr (>= 1.1.0),\nglue, lifecycle"
ellipsis	"rlang (>= 0.3.0)"
evaluate	"methods"
extrafont	"extrafontdb, grDevices, utils, Rttf2pt1"
extrafontdb	NA
fansi	"grDevices, utils"
farver	NA
fastmap	NA
fontawesome	"rlang (>= 1.0.6), htmltools (>= 0.5.1.1)"
fontBitstreamVera	NA
fontLiberation	NA
fontquiver	"fontBitstreamVera (>= 0.1.0), fontLiberation (>= 0.1.0)"
forcats	"cli (>= 3.4.0), glue, lifecycle, magrittr, rlang (>= 1.0.0),\ntibble"
foreach	"codetools, utils, iterators"
Formula	NA
fs	"methods"
gargle	"cli (>= 3.0.1), fs (>= 1.3.1), glue (>= 1.3.0), httr (>=\n1.4.5), jsonlite"
gdtools	"Rcpp (>= 0.12.12), systemfonts (>= 0.1.1), htmltools, gfonts,\ntools, cur"
generics	"methods"
gert	"askpass, credentials (>= 1.2.1), openssl (>= 2.0.3),\nrstudioapi (>= 0.11"
gfonts	"utils, htmltools, shiny, curl, jsonlite, glue, crayon"
ggplot2	"cli, glue, grDevices, grid, gtable (>= 0.1.1), isoband,\nlifecycle (> 1.0"
ggpubr	"ggrepel (>= 0.9.2), grid, ggsci, stats, utils, tidyr (>=\n1.3.0), purrr, c"
ggrepel	"grid, Rcpp, rlang (>= 0.3.0), scales (>= 0.5.0), withr (>=\n2.5.0)"
ggsci	"ggplot2 (>= 2.0.0), grDevices, scales"
ggsignif	"ggplot2 (>= 3.3.5)"

gh	"cli (>= 3.0.1), gitcreds, httr2, ini, jsonlite, rlang (>=\n1.0.0)"
gitcreds	NA
glmnet	"methods, utils, foreach, shape, survival, Rcpp"
glue	"methods"
googledrive	"cli (>= 3.0.0), gargle (>= 1.5.0), glue (>= 1.4.2), httr,\njsonlite, life
googlesheets4	"cellranger, cli (>= 3.0.0), curl, gargle (>= 1.5.0), glue (>=\n1.3.0), go
gridExtra	"gtable, grid, grDevices, graphics, utils"
gtable	"cli, glue, grid, lifecycle, rlang (>= 1.1.0)"
haven	"cli (>= 3.0.0), forcats (>= 0.2.0), hms, lifecycle, methods,\nreadr (>= 0
highr	"xfun (>= 0.18)"
hms	"lifecycle, methods, pkgconfig, rlang (>= 1.0.2), vctrs (>=\n0.3.8)"
hrbrthemes	"ggplot2 (>= 3.3.0), grDevices, grid, scales, extrafont, knitr,\nrmarkdown
htmltools	"utils, digest, grDevices, base64enc, rlang (>= 0.4.12),\nfastmap (>= 1.1.
htmlwidgets	"grDevices, htmltools (>= 0.5.4), jsonlite (>= 0.9.16), yaml,\nknitr (>= 1
httpcode	NA
httpuv	"Rcpp (>= 1.0.7), utils, R6, promises, later (>= 0.8.0)"
httr	"curl (>= 5.0.2), jsonlite, mime, openssl (>= 0.8), R6"
httr2	"cli (>= 3.0.0), curl, glue, magrittr, openssl, R6, rappdirs,\nrclang (>= 1
ids	"openssl, uuid"
ini	NA
inum	"stats, libcoin (>= 1.0-0)"
isoband	"grid, utils"
iterators	NA
jomo	"stats, lme4, survival, MASS, ordinal, tibble"
jquerylib	"htmltools"
jsonlite	NA
kableExtra	"knitr (>= 1.16), magrittr, stringr (>= 1.0), xml2 (>= 1.1.1),\nrvest, rmar
knitr	"evaluate (>= 0.15), highr, methods, tools, xfun (>= 0.39),\nyaml (>= 2.1.
labeling	"stats, graphics"
later	"Rcpp (>= 0.12.9), rlang"
libcoin	"stats, mvtnorm"
lifecycle	"cli (>= 3.4.0), glue, rlang (>= 1.0.6)"
lme4	"graphics, grid, splines, utils, parallel, MASS, lattice, boot,\nnlme (>= :
lubridate	"generics, timechange (>= 0.1.1)"
magrittr	NA
Matrix	"grDevices, graphics, grid, lattice, stats, utils"
MatrixModels	"stats, methods, Matrix (>= 1.6-0)"
memoise	"rlang (>= 0.4.10), cachem"
mice	"broom, dplyr, generics, glmnet, graphics, grDevices, lattice,\nnmethods, m
mime	"tools"
minqa	"Rcpp (>= 0.9.10)"
mitml	"pan, jomo, haven, grDevices, graphics, stats, methods, utils"
modelr	"broom, magrittr, purrr (>= 0.2.2), rlang (>= 1.0.6), tibble,\nntidyr (>= 0

munsell	"colorspace, methods"
mvtnorm	"stats"
nloptr	NA
numDeriv	NA
openssl	"askpass"
ordinal	"ucminf, MASS, Matrix, numDeriv, nlme"
pacman	"remotes, methods, stats, utils"
pagedown	"rmarkdown (>= 2.13), bookdown (>= 0.8), htmltools, jsonlite,\nlater (>= 1
palmerpenguins	NA
pan	NA
partykit	"grDevices, stats, utils, survival, Formula (>= 1.2-1), inum\n(>= 1.0-0), 1
pbkrtest	"broom, dplyr, MASS, Matrix (>= 1.2.3), methods, numDeriv,\nparallel"
pillar	"cli (>= 2.3.0), fansi, glue, lifecycle, rlang (>= 1.0.2), utf8\n(>= 1.1.0)
pkgconfig	"utils"
pkgload	"cli (>= 3.3.0), crayon, desc, fs, glue, methods, rlang (>=\n1.0.3), rproj
polynom	"stats, graphics"
praise	NA
prettyunits	NA
processx	"ps (>= 1.2.0), R6, utils"
progress	"hms, prettyunits, R6, crayon"
promises	"fastmap (>= 1.1.0), later, magrittr (>= 1.5), R6, Rcpp, rlang,\nstats"
ps	"utils"
purrr	"cli (>= 3.6.1), lifecycle (>= 1.0.3), magrittr (>= 1.5.0),\nrlang (>= 1.1
quantmod	"curl, jsonlite(>= 1.1)"
quantreg	"methods, graphics, Matrix, MatrixModels, survival, MASS"
R6	NA
ragg	"systemfonts (>= 1.0.3), textshaping (>= 0.3.0)"
rappdirs	NA
RColorBrewer	NA
Rcpp	"methods, utils"
RcppEigen	"Matrix (>= 1.1-0), Rcpp (>= 0.11.0), stats, utils"
reactable	"digest, htmltools (>= 0.5.2), htmlwidgets (>= 1.5.3),\njjsonlite, reactR"
reactR	"htmltools"
readr	"cli (>= 3.2.0), clipr, crayon, hms (>= 0.4.1), lifecycle (>=\n0.2.0), met
readxl	"cellranger, tibble (>= 2.0.1), utils"
rematch	NA
rematch2	"tibble"
remotes	"methods, stats, tools, utils"
reprex	"callr (>= 3.6.0), cli (>= 3.2.0), clipr (>= 0.4.0), fs, glue,\nknitr (>= 1
rlang	"utils"
rmarkdown	"bslib (>= 0.2.5.1), evaluate (>= 0.13), fontawesome (>=\n0.5.0), htmltools
rprojroot	NA
rstatix	"stats, utils, tidyr (>= 1.0.0), purrr, broom (>= 0.7.4), rlang\n(>= 0.3.1)

rstudioapi	NA
Rttf2pt1	NA
rvest	"glue, cli, httr (>= 0.5), lifecycle (>= 1.0.0), magrittr, \nrang (>= 1.0.0), rlang (>= 1.0.0), rprojroot (>= 1.0.0), rstudioapi (>= 0.7), sass (>= 0.4.10), scales (>= 1.0.0), selectr (>= 1.0.0), shiny (>= 1.4.0), stringr (>= 1.4.0), svglite (>= 1.0.0), sysfonts (>= 1.0.0), systemfonts (>= 1.0.0), testthat (>= 3.0.0), textshaping (>= 1.0.0), tibble (>= 3.0.0), tidyr (>= 1.0.0), tidyselect (>= 1.0.0), tidyverse (>= 3.5.1), timechange (>= 0.2.0), tinytex (>= 0.29), triebeard (>= 0.10-0), TTR (>= 0.10-0), tzdb (>= 0.1.0), ucminf (>= 0.1.0), urltools (>= 0.1.0), usethis (>= 1.0.0), utf8 (>= 1.0.0), uuid (>= 1.0.0), vctrs (>= 0.3.0), viridisLite (>= 0.2.0), vroom (>= 1.0.0), waldo (>= 0.3.4), webshot (>= 1.0.0), websocket (>= 1.0.0), whisker (>= 0.4.0), withr (>= 2.0.0)"
sass	"fs (>= 1.2.4), rlang (>= 0.4.10), htmltools (>= 0.5.1), R6, \nrappdirs"
scales	"farver (>= 2.0.3), labeling, lifecycle, munsell (>= 0.5), R6, \nRColorBrewer"
selectr	"methods, stringr, R6"
servr	"mime (>= 0.2), httpuv (>= 1.5.2), xfun, jsonlite"
shape	"stats, graphics, grDevices"
shiny	"utils, grDevices, httpuv (>= 1.5.2), mime (>= 0.3), jsonlite\n(>= 0.9.16)"
showtext	"grDevices"
showtextdb	"sysfonts (>= 0.7), utils"
sourcetools	NA
SparseM	"graphics, stats, utils"
stringi	"tools, utils, stats"
stringr	"cli, glue (>= 1.6.1), lifecycle (>= 1.0.3), magrittr, rlang\n(>= 1.0.0), rprojroot (>= 1.0.0), rstudioapi (>= 0.7), sass (>= 0.4.10), scales (>= 1.0.0), selectr (>= 1.0.0), shiny (>= 1.4.0), stringr (>= 1.4.0), svglite (>= 1.0.0), sysfonts (>= 1.0.0), systemfonts (>= 1.0.0), testthat (>= 3.0.0), textshaping (>= 1.0.0), tibble (>= 3.0.0), tidyr (>= 1.0.0), tidyselect (>= 1.0.0), tidyverse (>= 3.5.1), timechange (>= 0.2.0), tinytex (>= 0.29), triebeard (>= 0.10-0), TTR (>= 0.10-0), tzdb (>= 0.1.0), ucminf (>= 0.1.0), urltools (>= 0.1.0), usethis (>= 1.0.0), utf8 (>= 1.0.0), uuid (>= 1.0.0), vctrs (>= 0.3.0), viridisLite (>= 0.2.0), vroom (>= 1.0.0), waldo (>= 0.3.4), webshot (>= 1.0.0), websocket (>= 1.0.0), whisker (>= 0.4.0), withr (>= 2.0.0)"
svglite	"systemfonts (>= 1.0.0)"
sys	NA
sysfonts	NA
systemfonts	NA
testthat	"brio, callr (>= 3.5.1), cli (>= 3.4.0), desc, digest, ellipsis\n(>= 0.2.0), lifecycle (>= 1.0.0), magrittr, methods, \npillar (>= 1.0.0), rlang (>= 1.0.0), rprojroot (>= 1.0.0), rstudioapi (>= 0.7), sass (>= 0.4.10), scales (>= 1.0.0), selectr (>= 1.0.0), shiny (>= 1.4.0), stringr (>= 1.4.0), svglite (>= 1.0.0), sysfonts (>= 1.0.0), systemfonts (>= 1.0.0), testthat (>= 3.0.0), textshaping (>= 1.0.0), tibble (>= 3.0.0), tidyr (>= 1.0.0), tidyselect (>= 1.0.0), tidyverse (>= 3.5.1), timechange (>= 0.2.0), tinytex (>= 0.29), triebeard (>= 0.10-0), TTR (>= 0.10-0), tzdb (>= 0.1.0), ucminf (>= 0.1.0), urltools (>= 0.1.0), usethis (>= 1.0.0), utf8 (>= 1.0.0), uuid (>= 1.0.0), vctrs (>= 0.3.0), viridisLite (>= 0.2.0), vroom (>= 1.0.0), waldo (>= 0.3.4), webshot (>= 1.0.0), websocket (>= 1.0.0), whisker (>= 0.4.0), withr (>= 2.0.0)"
textshaping	"systemfonts (>= 1.0.0)"
tibble	"fansi (>= 0.4.0), lifecycle (>= 1.0.0), magrittr, methods, \npillar (>= 1.0.0), rlang (>= 1.0.0), rprojroot (>= 1.0.0), rstudioapi (>= 0.7), sass (>= 0.4.10), scales (>= 1.0.0), selectr (>= 1.0.0), shiny (>= 1.4.0), stringr (>= 1.4.0), svglite (>= 1.0.0), sysfonts (>= 1.0.0), systemfonts (>= 1.0.0), testthat (>= 3.0.0), textshaping (>= 1.0.0), tibble (>= 3.0.0), tidyr (>= 1.0.0), tidyselect (>= 1.0.0), tidyverse (>= 3.5.1), timechange (>= 0.2.0), tinytex (>= 0.29), triebeard (>= 0.10-0), TTR (>= 0.10-0), tzdb (>= 0.1.0), ucminf (>= 0.1.0), urltools (>= 0.1.0), usethis (>= 1.0.0), utf8 (>= 1.0.0), uuid (>= 1.0.0), vctrs (>= 0.3.0), viridisLite (>= 0.2.0), vroom (>= 1.0.0), waldo (>= 0.3.4), webshot (>= 1.0.0), websocket (>= 1.0.0), whisker (>= 0.4.0), withr (>= 2.0.0)"
tidyr	"cli (>= 3.4.1), dplyr (>= 1.0.10), glue, lifecycle (>= 1.0.3), \nmagrittr, methods, \npillar (>= 1.0.0), rlang (>= 1.0.0), rprojroot (>= 1.0.0), rstudioapi (>= 0.7), sass (>= 0.4.10), scales (>= 1.0.0), selectr (>= 1.0.0), shiny (>= 1.4.0), stringr (>= 1.4.0), svglite (>= 1.0.0), sysfonts (>= 1.0.0), systemfonts (>= 1.0.0), testthat (>= 3.0.0), textshaping (>= 1.0.0), tibble (>= 3.0.0), tidyr (>= 1.0.0), tidyselect (>= 1.0.0), tidyverse (>= 3.5.1), timechange (>= 0.2.0), tinytex (>= 0.29), triebeard (>= 0.10-0), TTR (>= 0.10-0), tzdb (>= 0.1.0), ucminf (>= 0.1.0), urltools (>= 0.1.0), usethis (>= 1.0.0), utf8 (>= 1.0.0), uuid (>= 1.0.0), vctrs (>= 0.3.0), viridisLite (>= 0.2.0), vroom (>= 1.0.0), waldo (>= 0.3.4), webshot (>= 1.0.0), websocket (>= 1.0.0), whisker (>= 0.4.0), withr (>= 2.0.0)"
tidyselect	"cli (>= 3.3.0), glue (>= 1.3.0), lifecycle (>= 1.0.3), rlang\n(>= 1.0.4), rstudioapi (>= 0.7), sass (>= 0.4.10), scales (>= 1.0.0), selectr (>= 1.0.0), shiny (>= 1.4.0), stringr (>= 1.4.0), svglite (>= 1.0.0), sysfonts (>= 1.0.0), systemfonts (>= 1.0.0), testthat (>= 3.0.0), textshaping (>= 1.0.0), tibble (>= 3.0.0), tidyr (>= 1.0.0), tidyselect (>= 1.0.0), tidyverse (>= 3.5.1), timechange (>= 0.2.0), tinytex (>= 0.29), triebeard (>= 0.10-0), TTR (>= 0.10-0), tzdb (>= 0.1.0), ucminf (>= 0.1.0), urltools (>= 0.1.0), usethis (>= 1.0.0), utf8 (>= 1.0.0), uuid (>= 1.0.0), vctrs (>= 0.3.0), viridisLite (>= 0.2.0), vroom (>= 1.0.0), waldo (>= 0.3.4), webshot (>= 1.0.0), websocket (>= 1.0.0), whisker (>= 0.4.0), withr (>= 2.0.0)"
tidyverse	"broom (>= 1.0.3), conflicted (>= 1.2.0), cli (>= 3.6.0), \nbdplyr (>= 2.3.0), lifecycle (>= 1.0.0), magrittr, methods, \npillar (>= 1.0.0), rlang (>= 1.0.0), rprojroot (>= 1.0.0), rstudioapi (>= 0.7), sass (>= 0.4.10), scales (>= 1.0.0), selectr (>= 1.0.0), shiny (>= 1.4.0), stringr (>= 1.4.0), svglite (>= 1.0.0), sysfonts (>= 1.0.0), systemfonts (>= 1.0.0), testthat (>= 3.0.0), textshaping (>= 1.0.0), tibble (>= 3.0.0), tidyr (>= 1.0.0), tidyselect (>= 1.0.0), tidyverse (>= 3.5.1), timechange (>= 0.2.0), tinytex (>= 0.29), triebeard (>= 0.10-0), TTR (>= 0.10-0), tzdb (>= 0.1.0), ucminf (>= 0.1.0), urltools (>= 0.1.0), usethis (>= 1.0.0), utf8 (>= 1.0.0), uuid (>= 1.0.0), vctrs (>= 0.3.0), viridisLite (>= 0.2.0), vroom (>= 1.0.0), waldo (>= 0.3.4), webshot (>= 1.0.0), websocket (>= 1.0.0), whisker (>= 0.4.0), withr (>= 2.0.0)"
timechange	NA
tinytex	"xfun (>= 0.29)"
triebeard	"Rcpp"
TTR	"xts (>= 0.10-0), zoo, curl"
tzdb	NA
ucminf	NA
urltools	"Rcpp, methods, triebeard"
usethis	"cli (>= 3.0.1), clipr (>= 0.3.0), crayon, curl (>= 2.7), desc\n(>= 1.4.2), lifecycle (>= 1.0.0), magrittr, methods, \npillar (>= 1.0.0), rlang (>= 1.0.0), rprojroot (>= 1.0.0), rstudioapi (>= 0.7), sass (>= 0.4.10), scales (>= 1.0.0), selectr (>= 1.0.0), shiny (>= 1.4.0), stringr (>= 1.4.0), svglite (>= 1.0.0), sysfonts (>= 1.0.0), systemfonts (>= 1.0.0), testthat (>= 3.0.0), textshaping (>= 1.0.0), tibble (>= 3.0.0), tidyr (>= 1.0.0), tidyselect (>= 1.0.0), tidyverse (>= 3.5.1), timechange (>= 0.2.0), tinytex (>= 0.29), triebeard (>= 0.10-0), TTR (>= 0.10-0), tzdb (>= 0.1.0), ucminf (>= 0.1.0), urltools (>= 0.1.0), usethis (>= 1.0.0), utf8 (>= 1.0.0), uuid (>= 1.0.0), vctrs (>= 0.3.0), viridisLite (>= 0.2.0), vroom (>= 1.0.0), waldo (>= 0.3.4), webshot (>= 1.0.0), websocket (>= 1.0.0), whisker (>= 0.4.0), withr (>= 2.0.0)"
utf8	NA
uuid	NA
vctrs	"cli (>= 3.4.0), glue, lifecycle (>= 1.0.3), rlang (>= 1.1.0)"
viridisLite	NA
vroom	"bit64, cli (>= 3.2.0), crayon, glue, hms, lifecycle (>= \n1.0.3), methods, \npillar (>= 1.0.0), rlang (>= 1.0.0), rprojroot (>= 1.0.0), rstudioapi (>= 0.7), sass (>= 0.4.10), scales (>= 1.0.0), selectr (>= 1.0.0), shiny (>= 1.4.0), stringr (>= 1.4.0), svglite (>= 1.0.0), sysfonts (>= 1.0.0), systemfonts (>= 1.0.0), testthat (>= 3.0.0), textshaping (>= 1.0.0), tibble (>= 3.0.0), tidyr (>= 1.0.0), tidyselect (>= 1.0.0), tidyverse (>= 3.5.1), timechange (>= 0.2.0), tinytex (>= 0.29), triebeard (>= 0.10-0), TTR (>= 0.10-0), tzdb (>= 0.1.0), ucminf (>= 0.1.0), urltools (>= 0.1.0), usethis (>= 1.0.0), utf8 (>= 1.0.0), uuid (>= 1.0.0), vctrs (>= 0.3.0), viridisLite (>= 0.2.0), vroom (>= 1.0.0), waldo (>= 0.3.4), webshot (>= 1.0.0), websocket (>= 1.0.0), whisker (>= 0.4.0), withr (>= 2.0.0)"
waldo	"cli, diffobj (>= 0.3.4), fansi, glue, methods, rematch2, rlang\n(>= 1.0.0), rstudioapi (>= 0.7), sass (>= 0.4.10), scales (>= 1.0.0), selectr (>= 1.0.0), shiny (>= 1.4.0), stringr (>= 1.4.0), svglite (>= 1.0.0), sysfonts (>= 1.0.0), systemfonts (>= 1.0.0), testthat (>= 3.0.0), textshaping (>= 1.0.0), tibble (>= 3.0.0), tidyr (>= 1.0.0), tidyselect (>= 1.0.0), tidyverse (>= 3.5.1), timechange (>= 0.2.0), tinytex (>= 0.29), triebeard (>= 0.10-0), TTR (>= 0.10-0), tzdb (>= 0.1.0), ucminf (>= 0.1.0), urltools (>= 0.1.0), usethis (>= 1.0.0), utf8 (>= 1.0.0), uuid (>= 1.0.0), vctrs (>= 0.3.0), viridisLite (>= 0.2.0), vroom (>= 1.0.0), waldo (>= 0.3.4), webshot (>= 1.0.0), websocket (>= 1.0.0), whisker (>= 0.4.0), withr (>= 2.0.0)"
webshot	"magrittr, jsonlite, callr"
websocket	"R6, later (>= 1.2.0)"
whisker	NA
withr	"graphics, grDevices, stats"

xfun	"stats, tools"
xml2	"methods"
xtable	"stats, utils"
xts	"methods"
yaml	NA
zip	NA
zoo	"utils, graphics, grDevices, lattice (>= 0.20-27)"
base	NA
boot	NA
class	"MASS"
cluster	"graphics, grDevices, stats, utils"
codetools	NA
compiler	NA
datasets	NA
foreign	"methods, utils, stats"
graphics	"grDevices"
grDevices	NA
grid	"grDevices, utils"
KernSmooth	NA
lattice	"grid, grDevices, graphics, stats, utils"
MASS	"methods"
Matrix	"graphics, grid, lattice, stats, utils"
methods	"utils, stats"
mgcv	"methods, stats, graphics, Matrix, splines, utils"
nlme	"graphics, stats, utils, lattice"
nnet	NA
parallel	"tools, compiler"
rpart	NA
spatial	NA
splines	"graphics, stats"
stats	"utils, grDevices, graphics"
stats4	"graphics, methods, stats"
survival	"graphics, Matrix, methods, splines, stats, utils"
tcltk	"utils"
tools	NA
utils	NA
	LinkingTo
abind	NA
AsioHeaders	NA
askpass	NA
backports	NA
base64enc	NA
bit	NA

bit64	NA
blob	NA
bookdown	NA
brio	NA
broom	NA
bslib	NA
cachem	NA
callr	NA
car	NA
carData	NA
cellranger	NA
cli	NA
clipr	NA
colorspace	NA
commonmark	NA
conflicted	NA
corrplot	NA
cowplot	NA
cpp11	NA
crayon	NA
credentials	NA
crul	NA
curl	NA
data.table	NA
DBI	NA
dbplyr	NA
desc	NA
diffobj	NA
digest	NA
dlookr	NA
DMwR2	NA
dplyr	NA
dtplyr	NA
ellipsis	NA
evaluate	NA
extrafont	NA
extrafontdb	NA
fansi	NA
farver	NA
fastmap	NA
fontawesome	NA
fontBitstreamVera	NA
fontLiberation	NA

fontquiver	NA
forcats	NA
foreach	NA
Formula	NA
fs	NA
gargle	NA
gdtools	"Rcpp"
generics	NA
gert	NA
gfonts	NA
ggplot2	NA
ggpubr	NA
ggrepel	"Rcpp"
ggsci	NA
ggsignif	NA
gh	NA
gitcreds	NA
glmnet	"RcppEigen, Rcpp"
glue	NA
googledrive	NA
googlesheets4	NA
gridExtra	NA
gtable	NA
haven	"cpp11"
highr	NA
hms	NA
hrbrthemes	NA
htmltools	NA
htmlwidgets	NA
httpcode	NA
httpuv	"Rcpp, later"
httr	NA
httr2	NA
ids	NA
ini	NA
inum	NA
isoband	NA
iterators	NA
jomo	NA
jquerylib	NA
jsonlite	NA
kableExtra	NA
knitr	NA

labeling	NA
later	"Rcpp"
libcoin	"mvtnorm"
lifecycle	NA
lme4	"Rcpp (>= 0.10.5), RcppEigen"
lubridate	NA
magrittr	NA
Matrix	NA
MatrixModels	NA
memoise	NA
mice	"cpp11, Rcpp"
mime	NA
minqa	"Rcpp"
mitml	NA
modelr	NA
munsell	NA
mvtnorm	NA
nloptr	"testthat"
numDeriv	NA
openssl	NA
ordinal	NA
pacman	NA
pagedown	NA
palmerpenguins	NA
pan	NA
partykit	NA
pbkrtest	NA
pillar	NA
pkgconfig	NA
pkgload	NA
polynom	NA
praise	NA
prettyunits	NA
processx	NA
progress	NA
promises	"later, Rcpp"
ps	NA
purrr	"cli"
quantmod	NA
quantreg	NA
R6	NA
ragg	"systemfonts, textshaping"
rappdirs	NA

RColorBrewer	NA
Rcpp	NA
RcppEigen	"Rcpp"
reactable	NA
reactR	NA
readr	"cpp11, tzdb (>= 0.1.1)"
readxl	"cpp11 (>= 0.4.0), progress"
rematch	NA
rematch2	NA
remotes	NA
reprer	NA
rlang	NA
rmarkdown	NA
rprojroot	NA
rstatix	NA
rstudioapi	NA
Rttf2pt1	NA
rvest	NA
sass	NA
scales	NA
selectr	NA
servr	NA
shape	NA
shiny	NA
showtext	NA
showtextdb	NA
sourcetools	NA
SparseM	NA
stringi	NA
stringr	NA
svglite	"cpp11, systemfonts"
sys	NA
sysfonts	NA
systemfonts	"cpp11 (>= 0.2.1)"
testthat	NA
textshaping	"cpp11 (>= 0.2.1), systemfonts (>= 1.0.0)"
tibble	NA
tidyr	"cpp11 (>= 0.4.0)"
tidyselect	NA
tidyverse	NA
timechange	"cpp11 (>= 0.2.7)"
tinytex	NA
triebeard	"Rcpp"

TTR	"xts"
tzdb	"cpp11 (>= 0.4.2)"
ucminf	NA
urltools	"Rcpp"
usethis	NA
utf8	NA
uuid	NA
vctrs	NA
viridisLite	NA
vroom	"cpp11 (>= 0.2.0), progress (>= 1.2.1), tzdb (>= 0.1.1)"
waldo	NA
webshot	NA
websocket	"cpp11, AsioHeaders, later"
whisker	NA
withr	NA
xfun	NA
xml2	NA
xtable	NA
xts	"zoo"
yaml	NA
zip	NA
zoo	NA
base	NA
boot	NA
class	NA
cluster	NA
codetools	NA
compiler	NA
datasets	NA
foreign	NA
graphics	NA
grDevices	NA
grid	NA
KernSmooth	NA
lattice	NA
MASS	NA
Matrix	NA
methods	NA
mgcv	NA
nlme	NA
nnet	NA
parallel	NA
rpart	NA

spatial	NA
splines	NA
stats	NA
stats4	NA
survival	NA
tcltk	NA
tools	NA
utils	NA
	Suggests
abind	NA
AsioHeaders	NA
askpass	"testthat"
backports	NA
base64enc	NA
bit	"testthat (>= 0.11.0), roxygen2, knitr, rmarkdown,\nmicrobenchmark, bit64"
bit64	NA
blob	"covr, crayon, pillar (>= 1.2.1), testthat"
bookdown	"bslib (>= 0.2.4), downlit (>= 0.4.0), htmlwidgets, jsonlite,\nrstudioapi, rmarkdown"
brio	"covr, testthat (>= 2.1.0)"
broom	"AER, AUC, bbmle, betareg, biglm, binGroup, boot, btergm (>=\n1.10.6), car, MASS, nlme, rstanarm, rstanarm"
bslib	"bsicons, curl, fontawesome, ggplot2, knitr, magrittr,\nrappdirs, rmarkdown"
cachem	"testthat"
callr	"asciicast, cli (>= 1.1.0), covr, mockery, ps, rprojroot,\nspelling, testthat"
car	"alr4, boot, coxme, effects, knitr, leaps, lmtest, Matrix,\nMatrixModels, nlme, rstanarm, rstanarm"
carData	"car (>= 3.0-0)"
cellranger	"covr, testthat (>= 1.0.0), knitr, rmarkdown"
cli	"callr, covr, crayon, digest, glue (>= 1.6.0), grDevices,\nhtmltools, htmlwidgets, jsonlite, knitr, rmarkdown, rstudioapi, rtestthat"
clipr	"covr, knitr, rmarkdown, rstudioapi (>= 0.5), testthat (>=\n2.0.0)"
colorspace	"datasets, utils, KernSmooth, MASS, kernlab, mvtnorm, vcd,\nntcltk, shiny, rtestthat"
commonmark	"curl, testthat, xml2"
conflicted	"callr, covr, dplyr, Matrix, methods, pkgload, testthat (>=\n3.0.0), withr"
corrplot	"seriation, knitr, RColorBrewer, rmarkdown, magrittr,\nprettydoc, testthat"
cowplot	"Cairo, covr, dplyr, forcats, gridGraphics (>= 0.4-0), knitr,\nlattice, magrittr, rtestthat"
cpp11	"bench, brio, callr, cli, covr, decor, desc, ggplot2, glue,\nknitr, lobster, rtestthat"
crayon	"mockery, rstudioapi, testthat, withr"
credentials	"testthat, knitr, rmarkdown"
crul	"testthat, roxygen2 (>= 7.1.1), fauxpas (>= 0.1.0), webmockr\n(>= 0.1.0), withr"
curl	"spelling, testthat (>= 1.0.0), knitr, jsonlite, rmarkdown,\nmagrittr, httpuv, rtestthat"
data.table	"bit64 (>= 4.0.0), bit (>= 4.0.4), curl, R.utils, xts,\nnanotime, zoo (>= 5.0-2)"
DBI	"blob, covr, DBItest, dbplyr, downlit, dplyr, glue, hms,\nknitr, magrittr, rtestthat"
dbplyr	"bit64, covr, knitr, Lahman, nycflights13, odbc, RMariaDB\n(>=\n1.0.2), rmarkdown, rtestthat"
desc	"callr, covr, gh, spelling, testthat, whoami, withr"
diffobj	"knitr, rmarkdown"

digest	"tinytest, simplermarkdown"
dlookr	"DBI, classInt, dbplyr, forecast (>= 8.3), Hmisc, ISLR,\nnycflights13, pps"
DMwR2	NA
dplyr	"bench, broom, callr, covr, DBI, dbplyr (>= 2.2.1), ggplot2,\nknitr, Lahman"
dtplyr	"bench, covr, knitr, rmarkdown, testthat (>= 3.1.2), tidyr (>= \n1.1.0), wa"
ellipsis	"covr, testthat"
evaluate	"covr, ggplot2, lattice, rlang, testthat (>= 3.0.0), withr"
extrafont	"fontcm"
extrafontdb	NA
fansi	"unitizer, knitr, rmarkdown"
farver	"covr, testthat (>= 3.0.0)"
fastmap	"testthat (>= 2.1.1)"
fontawesome	"covr, dplyr (>= 1.0.8), knitr (>= 1.31), testthat (>= 3.0.0),\nrsvg"
fontBitstreamVera	NA
fontLiberation	NA
fontquiver	"testthat, htmltools"
forcats	"covr, dplyr, ggplot2, knitr, readr, rmarkdown, testthat (>= \n3.0.0), withr"
foreach	"randomForest, doMC, doParallel, testthat, knitr, rmarkdown"
Formula	NA
fs	"covr, crayon, knitr, pillar (>= 1.0.0), rmarkdown, spelling,\ntestthat (>= 3.0.0)"
gargle	"aws.ec2metadata, aws.signature, covr, httpuv, knitr,\nrmarkdown, sodium, s"
gdtools	"testthat, methods"
generics	"covr, pkgload, testthat (>= 3.0.0), tibble, withr"
gert	"spelling, knitr, rmarkdown, testthat"
gfonts	"knitr, rmarkdown, testthat (>= 2.1.0), vcr, covr"
ggplot2	"covr, dplyr, ggplot2movies, hexbin, Hmisc, knitr, lattice,\nmapproj, maps"
ggpubr	"grDevices, knitr, RColorBrewer, gtable, testthat"
ggrepel	"knitr, rmarkdown, testthat, svglite, vdiff, gridExtra,\ndevelopmenttools, pretty"
ggsci	"gridExtra, knitr, ragg, reshape2, rmarkdown"
ggsignif	"knitr, rmarkdown, testthat, vdiff (>= 1.0.2)"
gh	"covr, knitr, mockery, rmarkdown, rprojroot, spelling,\ntestthat (>= 3.0.0)"
gitcreds	"codetools, covr, knitr, mockery, oskeyring, rmarkdown,\ntestthat (>= 3.0.0)"
glmnet	"knitr, lars, testthat, xfun, rmarkdown"
glue	"covr, crayon, DBI, dplyr, forcats, ggplot2, knitr, magrittr,\nmicrobenchmark"
googledrive	"curl, dplyr (>= 1.0.0), knitr, mockr, rmarkdown, spelling,\ntestthat (>= 3.0.0)"
googlesheets4	"readr, rmarkdown, spelling, testthat (>= 3.1.7)"
gridExtra	"ggplot2, egg, lattice, knitr, testthat"
gtable	"covr, ggplot2, knitr, profvis, rmarkdown, testthat (>= 3.0.0)"
haven	"covr, crayon, fs, knitr, pillar (>= 1.4.0), rmarkdown,\ntestthat (>= 3.0.0)"
highr	"knitr, markdown, testit"
hms	"crayon, lubridate, pillar (>= 1.1.0), testthat (>= 3.0.0)"
hrbrthemes	"testthat, dplyr, gridExtra, hunspell, stringi, gcookbook,\nclipr, vdiff, r"
htmltools	"markdown, testthat, withr, Cairo, ragg, shiny"

htmlwidgets	"testthat"
httpcode	"testthat"
httpuv	"testthat, callr, curl, websocket"
httr	"covr, httpuv, jpeg, knitr, png, readr, rmarkdown, testthat\n(>= 0.8.0), xm"
httr2	"askpass, bench, clipr, covr, docopt, httpuv, jose, jsonlite,\nknitr, purrr"
ids	"knitr, rcorpora, rmarkdown, testthat"
ini	"testthat"
inum	NA
isoband	"covr, ggplot2, knitr, magick, microbenchmark, rmarkdown, sf,\ntestthat, xm"
iterators	"RUnit, foreach"
jomo	"mitml"
jquerylib	"testthat"
jsonlite	"httr, vctrs, testthat, knitr, rmarkdown, R.rsp, sf"
kableExtra	"testthat, magick, formattable, sparkline"
knitr	"bslib, codetools, DBI (>= 0.4-1), digest, formatR, gifski,\ngridSVG, html"
labeling	NA
later	"knitr, rmarkdown, testthat (>= 2.1.0)"
libcoin	"coin"
lifecycle	"covr, crayon, knitr, lintr, rmarkdown, testthat (>= 3.0.1),\ntibble, tidy"
lme4	"knitr, rmarkdown, MEMSS, testthat (>= 0.8.1), ggplot2,\nmlmRev, optimx (>"
lubridate	"covr, knitr, rmarkdown, testthat (>= 2.1.0), vctrs (>= 0.5.0)"
magrittr	"covr, knitr, rlang, rmarkdown, testthat"
Matrix	"MASS, datasets, sfsmisc"
MatrixModels	NA
memoise	"digest, aws.s3, covr, googleAuthR, googleCloudStorageR, httr,\ntestthat"
mice	"broom.mixed, future, furrr, haven, knitr, lme4, MASS,\nmiceadds, pan, para"
mime	NA
minqa	NA
mitml	"mice, miceadds, Amelia, lme4, nlme, lavaan, geepack, glmmTMB,\nnsurvival, l"
modelr	"compiler, covr, ggplot2, testthat (>= 3.0.0)"
munsell	"ggplot2, testthat"
mvtnorm	"qrng, numDeriv"
nloptr	"knitr, rmarkdown, xml2, testthat (>= 3.0.0), covr"
numDeriv	NA
openssl	"curl, testthat (>= 2.1.0), digest, knitr, rmarkdown,\njsonlite, jose, sod"
ordinal	"lme4, nnet, xtable, testthat (>= 0.8), tools"
pacman	"BiocManager, knitr, lattice, testthat (>= 0.9.0), XML"
pagedown	"promises, testit, xaringan, pdftools, revealjs, covr, xml2"
palmerpenguins	"knitr, rmarkdown, tibble, ggplot2, dplyr, tidy, recipes"
pan	"mitools, lme4"
partykit	"XML, pmml, rJava, sandwich, strucchange, vcd, AER, mlbench,\nTH.data (>= "
pbkrtest	"knitr"
pillar	"bit64, DBI, debugme, DiagrammeR, dplyr, formattable, ggplot2,\nknitr, lub"

pkgconfig	"covr, testthat, disposables (>= 1.0.3)"
pkgload	"bitops, covr, mathjaxr, mockr, pak, pkgbuild, Rcpp, remotes,\nrstudioapi,
polynom	"knitr, rmarkdown"
praise	"testthat"
prettyunits	"codetools, covr, testthat"
processx	"callr (>= 3.7.3), cli (>= 3.3.0), codetools, covr, curl,\ndebugme, parallel,
progress	"Rcpp, testthat, withr"
promises	"future (>= 1.21.0), knitr, purrr, rmarkdown, spelling,\ntestthat, vembedr"
ps	"callr, covr, curl, pillar, pingr, processx (>= 3.1.0), R6,\nrlang, testthat"
purrr	"covr, dplyr (>= 0.7.8), httr, knitr, lubridate, rmarkdown,\ntestthat (>= 3.1.0),
quantmod	"DBI,RMySQL,RSQLite,timeSeries,xml2,downloader"
quantreg	"interp, rgl, logspline, nor1mix, Formula, zoo, R.rsp, conquer"
R6	"testthat, pryr"
ragg	"covr, graphics, grid, testthat"
rappdirs	"roxygen2, testthat (>= 3.0.0), covr, withr"
RColorBrewer	NA
Rcpp	"tinytest, inline, rbenchmark, pkgKitten (>= 0.1.2)"
RcppEigen	"inline, tinytest, pkgKitten, microbenchmark"
reactable	"covr, crosstalk, dplyr, fontawesome, knitr, leaflet, MASS,\nrmarkdown, shiny"
reactR	"htmlwidgets (>= 1.5.3), rmarkdown, shiny, V8, knitr, usethis,\njsonlite"
readr	"covr, curl, datasets, knitr, rmarkdown, spelling, stringi,\ntestthat (>= 3.1.0),
readxl	"covr, knitr, rmarkdown, testthat (>= 3.1.6), withr"
rematch	"covr, testthat"
rematch2	"covr, testthat"
remotes	"brew, callr, codetools, curl, covr, git2r (>= 0.23.0), knitr,\nmockery, parallel,
reprex	"covr, fortunes, miniUI, mockr, rprojroot, sessioninfo, shiny,\nspelling, testthat"
rlang	"cli (>= 3.1.0), covr, crayon, fs, glue, knitr, magrittr,\nmethods, pillar"
rmarkdown	"digest, dygraphs, fs, rsconnect, downlit (>= 0.4.0), katex\n(>= 1.4.0), knitr"
rprojroot	"covr, knitr, lifecycle, mockr, rmarkdown, testthat (>= \n3.0.0), withr"
rstatix	"knitr, rmarkdown, ggpubr, graphics, emmeans, coin, boot,\ntestthat, spelling"
rstudioapi	"testthat, knitr, rmarkdown, clipr, covr"
Rttf2pt1	NA
rvest	"covr, knitr, readr, repurrrsive, rmarkdown, spelling, stringi\n(>= 0.3.1), withr"
sass	"testthat, knitr, rmarkdown, withr, shiny, curl"
scales	"bit64, covr, dichromat, ggplot2, hms (>= 0.5.0), stringi,\ntestthat (>= 3.1.0),
selectr	"testthat, XML, xml2"
servr	"tools, later, rstudioapi, knitr (>= 1.9), rmarkdown"
shape	NA
shiny	"datasets, Cairo (>= 1.5-5), testthat (>= 3.0.0), knitr (>= \n1.6), markdown"
showtext	"knitr, rmarkdown, prettydoc, curl, jsonlite"
showtextdb	"curl"
sourcetools	"testthat"
SparseM	NA

stringi	NA
stringr	"covr, htmltools, htmlwidgets, knitr, rmarkdown, testthat (>=\n3.0.0)"
svglite	"covr, fontquiver (>= 0.2.0), htmltools, knitr, rmarkdown,\ntestthat, xml2"
sys	"unix (>= 1.4), spelling, testthat"
sysfonts	"curl, jsonlite"
systemfonts	"testthat (>= 2.1.0), covr, knitr, rmarkdown, tools"
testthat	"covr, curl (>= 0.9.5), diffviewer (>= 0.1.0), knitr,\nrmarkdown, rstudioapi"
textshaping	"covr, knitr, rmarkdown"
tibble	"bench, bit64, blob, brio, callr, cli, covr, crayon (>=\n1.3.4), Diagramme"
tidyr	"covr, data.table, knitr, readr, repurrrsive (>= 1.1.0),\nrmarkdown, testthat"
tidyselect	"covr, crayon, dplyr, knitr, magrittr, rmarkdown, stringr,\ntestthat (>= 3.0.0)"
tidyverse	"covr (>= 3.6.1), feather (>= 0.3.5), glue (>= 1.6.2), mockr\n(>= 0.2.0), r"
timechange	"testthat (>= 0.7.1.99), knitr"
tinytex	"testit, rstudioapi"
triebeard	"knitr, rmarkdown, testthat"
TTR	"RUnit"
tzdb	"covr, testthat (>= 3.0.0)"
ucminf	"numDeriv"
urltools	"testthat, knitr"
usethis	"covr, knitr, magick, pkgload, rmarkdown, roxygen2 (>= 7.1.2),\nspelling (>= 2.0.0)"
utf8	"cli, covr, knitr, rlang, rmarkdown, testthat (>= 3.0.0),\nwithr"
uuid	NA
vctrs	"bit64, covr, crayon, dplyr (>= 0.8.5), generics, knitr,\npillar (>= 1.4.4)"
viridisLite	"hexbin (>= 1.27.0), ggplot2 (>= 1.0.1), testthat, covr"
vroom	"archive, bench (>= 1.1.0), covr, curl, dplyr, forcats, fs,\nnggplot2, knitr"
waldo	"covr, R6, testthat (>= 3.0.0), withr, xml2"
webshot	"httpuv, knitr, rmarkdown, shiny, testthat (>= 3.0.0)"
websocket	"httpuv, testthat, knitr, rmarkdown"
whisker	"markdown"
withr	"callr, covr, DBI, knitr, lattice, methods, rlang, rmarkdown\n(>= 2.12), R"
xfun	"testit, parallel, codetools, rstudioapi, tinytex (>= 0.30),\nmime, markdow"
xml2	"covr, curl, httr, knitr, magrittr, mockery, rmarkdown,\ntestthat (>= 2.1.0)"
xtable	"knitr, plm, zoo, survival"
xts	"timeSeries, timeDate, tseries, chron, tinytest"
yaml	"RUnit"
zip	"covr, processx, R6, testthat, withr"
zoo	"AER, coda, chron, ggplot2 (>= 3.0.0), mondate, scales,\nstinepack, struccl"
base	"methods"
boot	"MASS, survival"
class	NA
cluster	"MASS, Matrix"
codetools	NA
compiler	NA

datasets	NA
foreign	NA
graphics	NA
grDevices	"KernSmooth"
grid	NA
KernSmooth	"MASS, carData"
lattice	"KernSmooth, MASS, latticeExtra, colorspace"
MASS	"lattice, nlme, nnet, survival"
Matrix	"MASS, expm"
methods	"codetools"
mgcv	"parallel, survival, MASS"
nlme	"Hmisc, MASS, SASmixed"
nnet	"MASS"
parallel	"methods"
rpart	"survival"
spatial	"MASS"
splines	"Matrix, methods"
stats	"MASS, Matrix, SuppDists, methods, stats4"
stats4	NA
survival	NA
tcltk	NA
tools	"codetools, methods, xml2, curl, commonmark, knitr, xfun, mathjaxr, V8"
utils	"methods, xml2, commonmark, knitr"
	Enhances
abind	NA
AsioHeaders	NA
askpass	NA
backports	NA
base64enc	"png"
bit	NA
bit64	NA
blob	NA
bookdown	NA
brio	NA
broom	NA
bslib	NA
cachem	NA
callr	NA
car	NA
carData	NA
cellranger	NA
cli	NA
clipr	NA

colorspace	NA
commonmark	NA
conflicted	NA
corrplot	NA
cowplot	NA
cpp11	NA
crayon	NA
credentials	NA
crul	NA
curl	NA
data.table	NA
DBI	NA
dbplyr	NA
desc	NA
diffobj	NA
digest	NA
dlookr	NA
DMwR2	NA
dplyr	NA
dtplyr	NA
ellipsis	NA
evaluate	NA
extrafont	NA
extrafontdb	NA
fansi	NA
farver	NA
fastmap	NA
fontawesome	NA
fontBitstreamVera	NA
fontLiberation	NA
fontquiver	NA
forcats	NA
foreach	NA
Formula	NA
fs	NA
gargle	NA
gdtools	NA
generics	NA
gert	NA
gfonts	NA
ggplot2	"sp"
ggpubr	NA
ggrepel	NA

ggsci	NA
ggsignif	NA
gh	NA
gitcreds	NA
glmnet	NA
glue	NA
googledrive	NA
googlesheets4	NA
gridExtra	NA
gtable	NA
haven	NA
highr	NA
hms	NA
hrbrthemes	NA
htmltools	"knitr"
htmlwidgets	"shiny (>= 1.1)"
httplib	NA
httpuv	NA
httr	NA
httr2	NA
ids	NA
ini	NA
inum	NA
isoband	NA
iterators	NA
jomo	NA
jquerylib	NA
jsonlite	NA
kableExtra	NA
knitr	NA
labeling	NA
later	NA
libcoin	NA
lifecycle	NA
lme4	NA
lubridate	"chron, data.table, timeDate, tis, zoo"
magrittr	NA
Matrix	"SparseM, graph"
MatrixModels	NA
memoise	NA
mice	NA
mime	NA
minqa	NA

mitml	NA
modelr	NA
munsell	NA
mvtnorm	NA
nloptr	NA
numDeriv	NA
openssl	NA
ordinal	NA
pacman	NA
pagedown	NA
palmerpenguins	NA
pan	NA
partykit	NA
pbkrtest	NA
pillar	NA
pkgconfig	NA
pkgload	NA
polynom	NA
praise	NA
prettyunits	NA
processx	NA
progress	NA
promises	NA
ps	NA
purrr	NA
quantmod	NA
quantreg	NA
R6	NA
ragg	NA
rappdirs	NA
RColorBrewer	NA
Rcpp	NA
RcppEigen	NA
reactable	NA
reactR	NA
readr	NA
readxl	NA
rematch	NA
rematch2	NA
remotes	NA
reprex	NA
rlang	"winch"
rmarkdown	NA

rprojroot	NA
rstatix	NA
rstudioapi	NA
Rttf2pt1	NA
rvest	NA
sass	NA
scales	NA
selectr	NA
servr	NA
shape	NA
shiny	NA
showtext	NA
showtextdb	NA
sourcetools	NA
SparseM	NA
stringi	NA
stringr	NA
svglite	NA
sys	NA
sysfonts	NA
systemfonts	NA
testthat	NA
textshaping	NA
tibble	NA
tidyr	NA
tidyselect	NA
tidyverse	NA
timechange	NA
tinytex	NA
triebeard	NA
TTR	"quantmod"
tzdb	NA
ucminf	NA
urltools	NA
usethis	NA
utf8	NA
uuid	NA
vctrs	NA
viridisLite	NA
vroom	NA
waldo	NA
webshot	NA
websocket	NA

whisker	NA	
withr	NA	
xfun	NA	
xml2	NA	
xtable	NA	
xts	NA	
yaml	NA	
zip	NA	
zoo	NA	
base	NA	
boot	NA	
class	NA	
cluster	NA	
codetools	NA	
compiler	NA	
datasets	NA	
foreign	NA	
graphics	NA	
grDevices	NA	
grid	NA	
KernSmooth	NA	
lattice	"chron"	
MASS	NA	
Matrix	"MatrixModels, SparseM, graph, igraph, maptools, sfsmisc, sp,\nspdep"	
methods	NA	
mgcv	NA	
nlme	NA	
nnet	NA	
parallel	"snow, Rmpi"	
rpart	NA	
spatial	NA	
splines	NA	
stats	NA	
stats4	NA	
survival	NA	
tcltk	NA	
tools	NA	
utils	NA	
	License	License_is_FOSS
abind	"LGPL (>= 2)"	NA
AsioHeaders	"BSL-1.0"	NA
askpass	"MIT + file LICENSE"	NA
backports	"GPL-2 GPL-3"	NA

base64enc	"GPL-2 GPL-3"	NA
bit	"GPL-2 GPL-3"	NA
bit64	"GPL-2 GPL-3"	NA
blob	"MIT + file LICENSE"	NA
bookdown	"GPL-3"	NA
brio	"MIT + file LICENSE"	NA
broom	"MIT + file LICENSE"	NA
bslib	"MIT + file LICENSE"	NA
cachem	"MIT + file LICENSE"	NA
callr	"MIT + file LICENSE"	NA
car	"GPL (>= 2)"	NA
carData	"GPL (>= 2)"	NA
cellranger	"MIT + file LICENSE"	NA
cli	"MIT + file LICENSE"	NA
clipr	"GPL-3"	NA
colorspace	"BSD_3_clause + file LICENSE"	NA
commonmark	"BSD_2_clause + file LICENSE"	NA
conflicted	"MIT + file LICENSE"	NA
corrplot	"MIT + file LICENSE"	NA
cowplot	"GPL-2"	NA
cpp11	"MIT + file LICENSE"	NA
crayon	"MIT + file LICENSE"	NA
credentials	"MIT + file LICENSE"	NA
crul	"MIT + file LICENSE"	NA
curl	"MIT + file LICENSE"	NA
data.table	"MPL-2.0 file LICENSE"	NA
DBI	"LGPL (>= 2.1)"	NA
dbplyr	"MIT + file LICENSE"	NA
desc	"MIT + file LICENSE"	NA
diffobj	"GPL-2 GPL-3"	NA
digest	"GPL (>= 2)"	NA
dlookr	"GPL-2 file LICENSE"	NA
DMwR2	"GPL (>= 2)"	NA
dplyr	"MIT + file LICENSE"	NA
dtplyr	"MIT + file LICENSE"	NA
ellipsis	"MIT + file LICENSE"	NA
evaluate	"MIT + file LICENSE"	NA
extrafont	"GPL-2"	NA
extrafontdb	"GPL-2"	NA
fansi	"GPL-2 GPL-3"	NA
farver	"MIT + file LICENSE"	NA
fastmap	"MIT + file LICENSE"	NA
fontawesome	"MIT + file LICENSE"	NA

fontBitstreamVera	"file LICENSE"	"yes"
fontLiberation	"file LICENSE"	"yes"
fontquiver	"GPL-3 file LICENSE"	NA
forcats	"MIT + file LICENSE"	NA
foreach	"Apache License (== 2.0)"	NA
Formula	"GPL-2 GPL-3"	NA
fs	"MIT + file LICENSE"	NA
gargle	"MIT + file LICENSE"	NA
gdtools	"GPL-3 file LICENSE"	NA
generics	"MIT + file LICENSE"	NA
gert	"MIT + file LICENSE"	NA
gfonts	"GPL-3"	NA
ggplot2	"MIT + file LICENSE"	NA
ggpubr	"GPL (>= 2)"	NA
ggrepel	"GPL-3 file LICENSE"	NA
ggsci	"GPL (>= 3)"	NA
ggsignif	"GPL-3 file LICENSE"	NA
gh	"MIT + file LICENSE"	NA
gitcreds	"MIT + file LICENSE"	NA
glmnet	"GPL-2"	NA
glue	"MIT + file LICENSE"	NA
googledrive	"MIT + file LICENSE"	NA
googlesheets4	"MIT + file LICENSE"	NA
gridExtra	"GPL (>= 2)"	NA
gtable	"MIT + file LICENSE"	NA
haven	"MIT + file LICENSE"	NA
highr	"GPL"	NA
hms	"MIT + file LICENSE"	NA
hrbrthemes	"MIT + file LICENSE"	NA
htmltools	"GPL (>= 2)"	NA
htmlwidgets	"MIT + file LICENSE"	NA
httpcode	"MIT + file LICENSE"	NA
httpuv	"GPL (>= 2) file LICENSE"	NA
httr	"MIT + file LICENSE"	NA
httr2	"MIT + file LICENSE"	NA
ids	"MIT + file LICENSE"	NA
ini	"GPL-3"	NA
inum	"GPL-2"	NA
isoband	"MIT + file LICENSE"	NA
iterators	"Apache License (== 2.0)"	NA
jomo	"GPL-2"	NA
jquerylib	"MIT + file LICENSE"	NA
jsonlite	"MIT + file LICENSE"	NA

kableExtra	"MIT + file LICENSE"	NA
knitr	"GPL"	NA
labeling	"MIT + file LICENSE Unlimited"	NA
later	"MIT + file LICENSE"	NA
libcoin	"GPL-2"	NA
lifecycle	"MIT + file LICENSE"	NA
lme4	"GPL (>= 2)"	NA
lubridate	"GPL (>= 2)"	NA
magrittr	"MIT + file LICENSE"	NA
Matrix	"GPL (>= 2) file LICENCE"	NA
MatrixModels	"GPL (>= 2)"	NA
memoise	"MIT + file LICENSE"	NA
mice	"GPL (>= 2)"	NA
mime	"GPL"	NA
minqa	"GPL-2"	NA
mitml	"GPL (>= 2)"	NA
modelr	"GPL-3"	NA
munSELL	"MIT + file LICENSE"	NA
mvtnorm	"GPL-2"	NA
nloptr	"LGPL (>= 3)"	NA
numDeriv	"GPL-2"	NA
openssl	"MIT + file LICENSE"	NA
ordinal	"GPL (>= 2)"	NA
pacman	"GPL-2"	NA
pagedown	"MIT + file LICENSE"	NA
palmerpenguins	"CC0"	NA
pan	"GPL-3"	NA
partykit	"GPL-2 GPL-3"	NA
pbkrtest	"GPL (>= 2)"	NA
pillar	"MIT + file LICENSE"	NA
pkgconfig	"MIT + file LICENSE"	NA
pkgload	"GPL-3"	NA
polynom	"GPL-2"	NA
praise	"MIT + file LICENSE"	NA
prettyunits	"MIT + file LICENSE"	NA
processx	"MIT + file LICENSE"	NA
progress	"MIT + file LICENSE"	NA
promises	"MIT + file LICENSE"	NA
ps	"MIT + file LICENSE"	NA
purrr	"MIT + file LICENSE"	NA
quantmod	"GPL-3"	NA
quantreg	"GPL (>= 2)"	NA
R6	"MIT + file LICENSE"	NA

ragg	"MIT + file LICENSE"	NA
rappdirs	"MIT + file LICENSE"	NA
RColorBrewer	"Apache License 2.0"	NA
Rcpp	"GPL (>= 2)"	NA
RcppEigen	"GPL (>= 2) file LICENSE"	NA
reactable	"MIT + file LICENSE"	NA
reactR	"MIT + file LICENSE"	NA
readr	"MIT + file LICENSE"	NA
readxl	"MIT + file LICENSE"	NA
rematch	"MIT + file LICENSE"	NA
rematch2	"MIT + file LICENSE"	NA
remotes	"MIT + file LICENSE"	NA
reprex	"MIT + file LICENSE"	NA
rlang	"MIT + file LICENSE"	NA
rmarkdown	"GPL-3"	NA
rprojroot	"MIT + file LICENSE"	NA
rstatix	"GPL-2"	NA
rstudioapi	"MIT + file LICENSE"	NA
Rttf2pt1	"file LICENSE"	"yes"
rvest	"MIT + file LICENSE"	NA
sass	"MIT + file LICENSE"	NA
scales	"MIT + file LICENSE"	NA
selectr	"BSD_3_clause + file LICENCE"	NA
servr	"GPL"	NA
shape	"GPL (>= 3)"	NA
shiny	"GPL-3 file LICENSE"	NA
showtext	"Apache License (>= 2.0)"	NA
showtextdb	"Apache License (>= 2.0)"	NA
sourcetools	"MIT + file LICENSE"	NA
SparseM	"GPL (>= 2)"	NA
stringi	"file LICENSE"	"yes"
stringr	"MIT + file LICENSE"	NA
svglite	"GPL (>= 2)"	NA
sys	"MIT + file LICENSE"	NA
sysfonts	"GPL-2"	NA
systemfonts	"MIT + file LICENSE"	NA
testthat	"MIT + file LICENSE"	NA
textshaping	"MIT + file LICENSE"	NA
tibble	"MIT + file LICENSE"	NA
tidyr	"MIT + file LICENSE"	NA
tidyselect	"MIT + file LICENSE"	NA
tidyverse	"MIT + file LICENSE"	NA
timechange	"GPL-3"	NA

tinytex	"MIT + file LICENSE"	NA
triebeard	"MIT + file LICENSE"	NA
TTR	"GPL (>= 2)"	NA
tzdb	"MIT + file LICENSE"	NA
ucminf	"GPL (>= 2)"	NA
urltools	"MIT + file LICENSE"	NA
usethis	"MIT + file LICENSE"	NA
utf8	"Apache License (== 2.0) file LICENSE"	NA
uuid	"MIT + file LICENSE"	NA
vctrs	"MIT + file LICENSE"	NA
viridisLite	"MIT + file LICENSE"	NA
vroom	"MIT + file LICENSE"	NA
waldo	"MIT + file LICENSE"	NA
webshot	"GPL-2"	NA
websocket	"GPL-2"	NA
whisker	"GPL-3"	NA
withr	"MIT + file LICENSE"	NA
xfun	"MIT + file LICENSE"	NA
xml2	"MIT + file LICENSE"	NA
xtable	"GPL (>= 2)"	NA
xts	"GPL (>= 2)"	NA
yaml	"BSD_3_clause + file LICENSE"	NA
zip	"MIT + file LICENSE"	NA
zoo	"GPL-2 GPL-3"	NA
base	"Part of R 4.3.1"	NA
boot	"Unlimited"	NA
class	"GPL-2 GPL-3"	NA
cluster	"GPL (>= 2)"	NA
codetools	"GPL"	NA
compiler	"Part of R 4.3.1"	NA
datasets	"Part of R 4.3.1"	NA
foreign	"GPL (>= 2)"	NA
graphics	"Part of R 4.3.1"	NA
grDevices	"Part of R 4.3.1"	NA
grid	"Part of R 4.3.1"	NA
KernSmooth	"Unlimited"	NA
lattice	"GPL (>= 2)"	NA
MASS	"GPL-2 GPL-3"	NA
Matrix	"GPL (>= 2) file LICENCE"	NA
methods	"Part of R 4.3.1"	NA
mgcv	"GPL (>= 2)"	NA
nlme	"GPL (>= 2)"	NA
nnet	"GPL-2 GPL-3"	NA

parallel	"Part of R 4.3.1"	NA			
rpart	"GPL-2 GPL-3"	NA			
spatial	"GPL-2 GPL-3"	NA			
splines	"Part of R 4.3.1"	NA			
stats	"Part of R 4.3.1"	NA			
stats4	"Part of R 4.3.1"	NA			
survival	"LGPL (>= 2)"	NA			
tcltk	"Part of R 4.3.1"	NA			
tools	"Part of R 4.3.1"	NA			
utils	"Part of R 4.3.1"	NA			
	License_restricts_use	OS_type	MD5sum	NeedsCompilation	Built
abind	NA	NA	NA	"no"	"4.3.0"
AsioHeaders	NA	NA	NA	"no"	"4.3.0"
askpass	NA	NA	NA	"yes"	"4.3.0"
backports	NA	NA	NA	"yes"	"4.3.0"
base64enc	NA	NA	NA	"yes"	"4.3.0"
bit	NA	NA	NA	"yes"	"4.3.0"
bit64	NA	NA	NA	"yes"	"4.3.0"
blob	NA	NA	NA	"no"	"4.3.0"
bookdown	NA	NA	NA	"no"	"4.3.0"
brio	NA	NA	NA	"yes"	"4.3.0"
broom	NA	NA	NA	"no"	"4.3.0"
bslib	NA	NA	NA	"no"	"4.3.0"
cachem	NA	NA	NA	"yes"	"4.3.0"
callr	NA	NA	NA	"no"	"4.3.0"
car	NA	NA	NA	"no"	"4.3.0"
carData	NA	NA	NA	"no"	"4.3.0"
cellranger	NA	NA	NA	"no"	"4.3.0"
cli	NA	NA	NA	"yes"	"4.3.0"
clipr	NA	NA	NA	"no"	"4.3.0"
colorspace	NA	NA	NA	"yes"	"4.3.0"
commonmark	NA	NA	NA	"yes"	"4.3.0"
conflicted	NA	NA	NA	"no"	"4.3.0"
corrplot	NA	NA	NA	"no"	"4.3.0"
cowplot	NA	NA	NA	"no"	"4.3.0"
cpp11	NA	NA	NA	"no"	"4.3.0"
crayon	NA	NA	NA	"no"	"4.3.0"
credentials	NA	NA	NA	"no"	"4.3.0"
crul	NA	NA	NA	"no"	"4.3.0"
curl	NA	NA	NA	"yes"	"4.3.0"
data.table	NA	NA	NA	"yes"	"4.3.0"
DBI	NA	NA	NA	"no"	"4.3.0"
dbplyr	NA	NA	NA	"no"	"4.3.0"

desc	NA	NA	NA	"no"	"4.3.0"
diffobj	NA	NA	NA	"yes"	"4.3.0"
digest	NA	NA	NA	"yes"	"4.3.0"
dlookr	NA	NA	NA	"no"	"4.3.0"
DMwR2	NA	NA	NA	"no"	"4.3.0"
dplyr	NA	NA	NA	"yes"	"4.3.0"
dtplyr	NA	NA	NA	"no"	"4.3.0"
ellipsis	NA	NA	NA	"yes"	"4.3.0"
evaluate	NA	NA	NA	"no"	"4.3.0"
extrafont	NA	NA	NA	"no"	"4.3.0"
extrafontdb	NA	NA	NA	NA	"4.3.0"
fansi	NA	NA	NA	"yes"	"4.3.0"
farver	NA	NA	NA	"yes"	"4.3.0"
fastmap	NA	NA	NA	"yes"	"4.3.0"
fontawesome	NA	NA	NA	"no"	"4.3.0"
fontBitstreamVera	NA	NA	NA	"no"	"4.3.0"
fontLiberation	NA	NA	NA	"no"	"4.3.0"
fontquiver	NA	NA	NA	"no"	"4.3.0"
forcats	NA	NA	NA	"no"	"4.3.0"
foreach	NA	NA	NA	"no"	"4.3.0"
Formula	NA	NA	NA	"no"	"4.3.0"
fs	NA	NA	NA	"yes"	"4.3.0"
gargle	NA	NA	NA	"no"	"4.3.0"
gdtools	NA	NA	NA	"yes"	"4.3.0"
generics	NA	NA	NA	"no"	"4.3.0"
gert	NA	NA	NA	"yes"	"4.3.0"
gfonts	NA	NA	NA	"no"	"4.3.0"
ggplot2	NA	NA	NA	"no"	"4.3.0"
ggpubr	NA	NA	NA	"no"	"4.3.0"
ggrepel	NA	NA	NA	"yes"	"4.3.0"
ggsci	NA	NA	NA	"no"	"4.3.0"
ggsignif	NA	NA	NA	"no"	"4.3.0"
gh	NA	NA	NA	"no"	"4.3.0"
gitcreds	NA	NA	NA	"no"	"4.3.0"
glmnet	NA	NA	NA	"yes"	"4.3.0"
glue	NA	NA	NA	"yes"	"4.3.0"
googledrive	NA	NA	NA	"no"	"4.3.0"
googlesheets4	NA	NA	NA	"no"	"4.3.0"
gridExtra	NA	NA	NA	"no"	"4.3.0"
gtable	NA	NA	NA	"no"	"4.3.0"
haven	NA	NA	NA	"yes"	"4.3.0"
highr	NA	NA	NA	"no"	"4.3.0"
hms	NA	NA	NA	"no"	"4.3.0"

hrbrthemes	NA	NA	NA	"no"	"4.3.0"
htmltools	NA	NA	NA	"yes"	"4.3.0"
htmlwidgets	NA	NA	NA	"no"	"4.3.0"
httpcode	NA	NA	NA	"no"	"4.3.0"
httpuv	NA	NA	NA	"yes"	"4.3.0"
httr	NA	NA	NA	"no"	"4.3.0"
httr2	NA	NA	NA	"no"	"4.3.0"
ids	NA	NA	NA	"no"	"4.3.0"
ini	NA	NA	NA	"no"	"4.3.0"
inum	NA	NA	NA	"no"	"4.3.0"
isoband	NA	NA	NA	"yes"	"4.3.0"
iterators	NA	NA	NA	"no"	"4.3.0"
jomo	NA	NA	NA	"yes"	"4.3.0"
jquerylib	NA	NA	NA	"no"	"4.3.0"
jsonlite	NA	NA	NA	"yes"	"4.3.0"
kableExtra	NA	NA	NA	"no"	"4.3.0"
knitr	NA	NA	NA	"no"	"4.3.0"
labeling	NA	NA	NA	"no"	"4.3.0"
later	NA	NA	NA	"yes"	"4.3.0"
libcoin	NA	NA	NA	"yes"	"4.3.0"
lifecycle	NA	NA	NA	"no"	"4.3.0"
lme4	NA	NA	NA	"yes"	"4.3.0"
lubridate	NA	NA	NA	"yes"	"4.3.0"
magrittr	NA	NA	NA	"yes"	"4.3.0"
Matrix	NA	NA	NA	"yes"	"4.3.0"
MatrixModels	NA	NA	NA	"no"	"4.3.0"
memoise	NA	NA	NA	"no"	"4.3.0"
mice	NA	NA	NA	"yes"	"4.3.0"
mime	NA	NA	NA	"yes"	"4.3.0"
minqa	NA	NA	NA	"yes"	"4.3.0"
mitml	NA	NA	NA	"no"	"4.3.0"
modelr	NA	NA	NA	"no"	"4.3.0"
munsell	NA	NA	NA	"no"	"4.3.0"
mvtnorm	NA	NA	NA	"yes"	"4.3.0"
nloptr	NA	NA	NA	"yes"	"4.3.0"
numDeriv	NA	NA	NA	"no"	"4.3.0"
openssl	NA	NA	NA	"yes"	"4.3.0"
ordinal	NA	NA	NA	"yes"	"4.3.0"
pacman	NA	NA	NA	"no"	"4.3.0"
pagedown	NA	NA	NA	"no"	"4.3.0"
palmerpenguins	NA	NA	NA	"no"	"4.3.0"
pan	NA	NA	NA	"yes"	"4.3.0"
partykit	NA	NA	NA	"yes"	"4.3.0"

pbkrtest	NA	NA	NA	"no"	"4.3.0"
pillar	NA	NA	NA	"no"	"4.3.0"
pkgconfig	NA	NA	NA	"no"	"4.3.0"
pkgload	NA	NA	NA	"no"	"4.3.0"
polynom	NA	NA	NA	"no"	"4.3.0"
praise	NA	NA	NA	"no"	"4.3.0"
prettyunits	NA	NA	NA	"no"	"4.3.0"
processx	NA	NA	NA	"yes"	"4.3.0"
progress	NA	NA	NA	"no"	"4.3.0"
promises	NA	NA	NA	"yes"	"4.3.0"
ps	NA	NA	NA	"yes"	"4.3.0"
purrr	NA	NA	NA	"yes"	"4.3.0"
quantmod	NA	NA	NA	"no"	"4.3.0"
quantreg	NA	NA	NA	"yes"	"4.3.0"
R6	NA	NA	NA	"no"	"4.3.0"
ragg	NA	NA	NA	"yes"	"4.3.0"
rappdirs	NA	NA	NA	"yes"	"4.3.0"
RColorBrewer	NA	NA	NA	"no"	"4.3.0"
Rcpp	NA	NA	NA	"yes"	"4.3.0"
RcppEigen	NA	NA	NA	"yes"	"4.3.0"
reactable	NA	NA	NA	"no"	"4.3.0"
reactR	NA	NA	NA	"no"	"4.3.0"
readr	NA	NA	NA	"yes"	"4.3.0"
readxl	NA	NA	NA	"yes"	"4.3.0"
rematch	NA	NA	NA	"no"	"4.3.0"
rematch2	NA	NA	NA	"no"	"4.3.0"
remotes	NA	NA	NA	"no"	"4.3.0"
reprex	NA	NA	NA	"no"	"4.3.0"
rlang	NA	NA	NA	"yes"	"4.3.0"
rmarkdown	NA	NA	NA	"no"	"4.3.0"
rprojroot	NA	NA	NA	"no"	"4.3.0"
rstatix	NA	NA	NA	"no"	"4.3.0"
rstudioapi	NA	NA	NA	"no"	"4.3.0"
Rttf2pt1	NA	NA	NA	"yes"	"4.3.0"
rvest	NA	NA	NA	"no"	"4.3.0"
sass	NA	NA	NA	"yes"	"4.3.0"
scales	NA	NA	NA	"no"	"4.3.0"
selectr	NA	NA	NA	"no"	"4.3.0"
servr	NA	NA	NA	"no"	"4.3.0"
shape	NA	NA	NA	"no"	"4.3.0"
shiny	NA	NA	NA	"no"	"4.3.0"
showtext	NA	NA	NA	"yes"	"4.3.0"
showtextdb	NA	NA	NA	"no"	"4.3.0"

sourcetools	NA	NA	NA	"yes"	"4.3.0"
SparseM	NA	NA	NA	"yes"	"4.3.0"
stringi	NA	NA	NA	"yes"	"4.3.0"
stringr	NA	NA	NA	"no"	"4.3.0"
svglite	NA	NA	NA	"yes"	"4.3.0"
sys	NA	NA	NA	"yes"	"4.3.0"
sysfonts	NA	NA	NA	"yes"	"4.3.0"
systemfonts	NA	NA	NA	"yes"	"4.3.0"
testthat	NA	NA	NA	"yes"	"4.3.0"
textshaping	NA	NA	NA	"yes"	"4.3.0"
tibble	NA	NA	NA	"yes"	"4.3.0"
tidyr	NA	NA	NA	"yes"	"4.3.0"
tidyselect	NA	NA	NA	"no"	"4.3.0"
tidyverse	NA	NA	NA	"no"	"4.3.0"
timechange	NA	NA	NA	"yes"	"4.3.0"
tinytex	NA	NA	NA	"no"	"4.3.0"
triebeard	NA	NA	NA	"yes"	"4.3.0"
TTR	NA	NA	NA	"yes"	"4.3.0"
tzdb	NA	NA	NA	"yes"	"4.3.0"
ucminf	NA	NA	NA	"yes"	"4.3.0"
urltools	NA	NA	NA	"yes"	"4.3.0"
usethis	NA	NA	NA	"no"	"4.3.0"
utf8	NA	NA	NA	"yes"	"4.3.0"
uuid	NA	NA	NA	"yes"	"4.3.0"
vctrs	NA	NA	NA	"yes"	"4.3.0"
viridisLite	NA	NA	NA	"no"	"4.3.0"
vroom	NA	NA	NA	"yes"	"4.3.0"
waldo	NA	NA	NA	"no"	"4.3.0"
webshot	NA	NA	NA	"no"	"4.3.0"
websocket	NA	NA	NA	"yes"	"4.3.0"
whisker	NA	NA	NA	"no"	"4.3.0"
withr	NA	NA	NA	"no"	"4.3.0"
xfun	NA	NA	NA	"yes"	"4.3.0"
xml2	NA	NA	NA	"yes"	"4.3.0"
xtable	NA	NA	NA	"no"	"4.3.0"
xts	NA	NA	NA	"yes"	"4.3.0"
yaml	NA	NA	NA	"yes"	"4.3.0"
zip	NA	NA	NA	"yes"	"4.3.0"
zoo	NA	NA	NA	"yes"	"4.3.0"
base	NA	NA	NA	NA	"4.3.1"
boot	NA	NA	NA	"no"	"4.3.1"
class	NA	NA	NA	"yes"	"4.3.1"
cluster	NA	NA	NA	"yes"	"4.3.1"

codetools	NA	NA	NA	"no"	"4.3.1"
compiler	NA	NA	NA	NA	"4.3.1"
datasets	NA	NA	NA	NA	"4.3.1"
foreign	NA	NA	NA	"yes"	"4.3.1"
graphics	NA	NA	NA	"yes"	"4.3.1"
grDevices	NA	NA	NA	"yes"	"4.3.1"
grid	NA	NA	NA	"yes"	"4.3.1"
KernSmooth	NA	NA	NA	"yes"	"4.3.1"
lattice	NA	NA	NA	"yes"	"4.3.1"
MASS	NA	NA	NA	"yes"	"4.3.1"
Matrix	NA	NA	NA	"yes"	"4.3.1"
methods	NA	NA	NA	"yes"	"4.3.1"
mgcv	NA	NA	NA	"yes"	"4.3.1"
nlme	NA	NA	NA	"yes"	"4.3.1"
nnet	NA	NA	NA	"yes"	"4.3.1"
parallel	NA	NA	NA	"yes"	"4.3.1"
rpart	NA	NA	NA	"yes"	"4.3.1"
spatial	NA	NA	NA	"yes"	"4.3.1"
splines	NA	NA	NA	"yes"	"4.3.1"
stats	NA	NA	NA	"yes"	"4.3.1"
stats4	NA	NA	NA	NA	"4.3.1"
survival	NA	NA	NA	"yes"	"4.3.1"
tcltk	NA	NA	NA	"yes"	"4.3.1"
tools	NA	NA	NA	"yes"	"4.3.1"
utils	NA	NA	NA	"yes"	"4.3.1"

Use following code to see if installed packages have newer version

```
old.packages()
```

	Package	LibPath
askpass	"askpass"	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"
credentials	"credentials"	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"
knitr	"knitr"	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"
minqa	"minqa"	"/cloud/lib/x86_64-pc-linux-gnu-library/4.3"
foreign	"foreign"	"/opt/R/4.3.1/lib/R/library"
KernSmooth	"KernSmooth"	"/opt/R/4.3.1/lib/R/library"
Matrix	"Matrix"	"/opt/R/4.3.1/lib/R/library"
mgcv	"mgcv"	"/opt/R/4.3.1/lib/R/library"
nlme	"nlme"	"/opt/R/4.3.1/lib/R/library"
spatial	"spatial"	"/opt/R/4.3.1/lib/R/library"

```

survival      "survival"      "/opt/R/4.3.1/lib/R/library"
              Installed Built   ReposVer
askpass       "1.1"          "4.3.0"  "1.2.0"
credentials   "1.3.2"        "4.3.0"  "2.0.1"
knitr         "1.43"         "4.3.0"  "1.44"
minqa         "1.2.5"        "4.3.0"  "1.2.6"
foreign       "0.8-84"       "4.3.1"  "0.8-85"
KernSmooth    "2.23-21"      "4.3.1"  "2.23-22"
Matrix        "1.5-4.1"      "4.3.1"  "1.6-1"
mgcv          "1.8-42"       "4.3.1"  "1.9-0"
nlme          "3.1-162"      "4.3.1"  "3.1-163"
spatial       "7.3-16"       "4.3.1"  "7.3-17"
survival      "3.5-5"        "4.3.1"  "3.5-7"
Repository
askpass       "http://rspm/default/__linux__/focal/latest/src/contrib"
credentials   "http://rspm/default/__linux__/focal/latest/src/contrib"
knitr         "http://rspm/default/__linux__/focal/latest/src/contrib"
minqa         "http://rspm/default/__linux__/focal/latest/src/contrib"
foreign       "http://rspm/default/__linux__/focal/latest/src/contrib"
KernSmooth    "http://rspm/default/__linux__/focal/latest/src/contrib"
Matrix        "http://rspm/default/__linux__/focal/latest/src/contrib"
mgcv          "http://rspm/default/__linux__/focal/latest/src/contrib"
nlme          "http://rspm/default/__linux__/focal/latest/src/contrib"
spatial       "http://rspm/default/__linux__/focal/latest/src/contrib"
survival      "http://rspm/default/__linux__/focal/latest/src/contrib"

```

To update all the packages to newer version

```
####{r} #####update.packages() ####
```

Use following to update all the insatalled packages without the confirmation

```
####{r} #####update.packages(ask=FALSE) ####
```

To find namespace/package a function belongs in your installed package, just type function name

```
mean
```

```
function (x, ...)
UseMethod("mean")
```

```
<bytecode: 0x55fce4d15f68>  
<environment: namespace:base>
```

To find help on a function

```
help(mean)
```

If package we want to use has already been made

```
RSiteSearch('neural networks')
```

A search query has been submitted to <https://search.r-project.org>
The results page should open in your browser shortly

Project and Session Management

Utilize the Project feature for effective management of your R scripts and data.

In RStudio, navigate to File > New Project to establish a new folder on your computer dedicated to your project.

Within the project folder, you can create and store multiple scripts alongside the data you're working with.

To continue your work within a project, go to File > Open Project, which restores your previous workspace.

Your project folder functions as your current working directory, where you can conveniently save your .R and .RData files.

However, it's worth noting that a .R file can also exist independently outside of a project or project folder.

Closing a Project in RStudio will shut down the current project while keeping the session active, allowing you to keep the RStudio interface open.

On the other hand, selecting Quit Session closes the current RStudio window entirely.

When dealing with long and intricate commands in the console, it can be constraining.

A more efficient approach is to input all your commands into a text file, save it, and then either:

1. Execute the series of commands using `[1] source('path_to_mycode.R')`.

2. Open mycode.R in RStudio's script tab and execute your commands from there using the Run or Source button.

- Run: Execute the code line by line.
- Source: Execute the entire script at once.

Frequently, you may need to save substantial data objects or functions for future use.

```
#####{r} #####save(my.function, mydataset, file="path_to_mysession.RData")  
#####load("path_to_mysession.RData") #####
```

Save all objects

All objects are saved in .RData file for you to load ahead in future

```
save.image()
```

use getwd() and show() in RStudio Console for current working Directory and set working directory.

R Objects and Variables

variables are fundamental components used to store and manipulate data. They serve as named containers or identifiers for holding values, which can be numbers, text, objects, or other data types. e.g. assigning number 3 to a variable.

```
var <- 3
```

To see what the var variable holds

```
var
```

```
[1] 3
```

To print variable while assigning use ()

```
(var <- 3)
```

```
[1] 3
```

More Example For Same

```
x <- 10  
y <- var*x  
y
```

```
[1] 30
```

To list the current alive variables

```
ls() # we can also use
```

```
[1] "algae"          "algae.sols"      "has_annotatons"  "test.algae"  
[5] "var"            "x"                "y"
```

```
objects()
```

```
[1] "algae"          "algae.sols"      "has_annotatons"  "test.algae"  
[5] "var"            "x"                "y"
```

Using the following command we can remove variable from the memory

```
rm(var)
```

R Functions

In R, functions are blocks of reusable code that perform specific tasks or operations. Functions are a fundamental concept in R and play a central role in data analysis, statistical modeling, and programming.

Here are some examples

```
max(10, 30, 20, 11)
```

```
[1] 30
```

```
mean(10,20,30,40,50)
```

```
[1] 10
```

```
mean(sample(1:100, 30))
```

```
[1] 45.96667
```

```
set.seed(1) #In the context of R, functions represent segments of code that can be reused  
  
rnorm(1)
```

```
[1] -0.6264538
```

```
rnorm(1)
```

```
[1] 0.1836433
```

We employ the `set.seed()` function to ensure that when running a program that involves generating random samples multiple times, we obtain consistent results for the purpose of debugging.

To initiate the creation of a new function called ‘se’ (representing the standard error of means), the initial step is to verify whether ‘se’ already exists within our present environment.

```
exists("se")
```

```
[1] FALSE
```

Now we will create the function that computes the standard error of a sample.

```
se <- function(x){  
  variance <- var(x)  
  n <- length(x)  
  return (sqrt(variance/n))  
}
```

```
}
```

```
exists("se")
```

```
[1] TRUE
```

Same way, we can create a function to convert meters to inches,feet,yards and miles.

```
convMeters <- function (x, to="inch"){  
  factor = switch(to, inch=39.3701, foot=3.28084, yard=1.09361, mile=0.000621371, NA)  
  if(is.na(factor)) stop ("unknown target unit")  
  else return (x*factor)  
}  
convMeters(40, "foot")
```

```
[1] 131.2336
```

#Note is no argument is used above 'inch' is used

Factors

In R, factor variables are a data type used to represent categorical data. Categorical data consists of distinct categories or groups and is often used to label or group data into meaningful subsets. Factor variables are essential for tasks like statistical modeling and data analysis.

We can use factor() to create factor

```
g <-c('f', 'm', 'f', 'f', 'f', 'm', 'm', 'f')  
g <- factor(g)
```

using levels

```
other.g <-factor(c('m', 'm', 'm', 'm'), levels= c('f', 'm'))  
other.g
```

```
[1] m m m m  
Levels: f m
```

We can use factor for illustrating concept of marginal frequencies or marginal distributions.

```
g <- factor(c('f', 'm', 'f', 'f', 'f', 'm', 'm', 'f'))
table(g)
```

```
g
f m
5 3
```

```
a <- factor(c('adult', 'juvenile','adult', 'juvenile','adult', 'juvenile','juvenile', 'juv
table(a, g)
```

```
      g
a      f m
adult  3 0
juvenile 2 3
```

```
a <- factor(c('adult', 'juvenile','adult', 'juvenile','adult', 'juvenile','juvenile', 'juv
t <- table(a, g)
t
```

```
      g
a      f m
adult  3 0
juvenile 2 3
```

```
a <- factor(c('adult', 'juvenile','adult', 'juvenile','adult', 'juvenile','juvenile', 'juv
t <- table(a, g)
t
```

```
      g
a      f m
adult  3 0
juvenile 2 3
```

Find marginal frequency of a factor


```
margin.table(t, 1)#1 refers to the first factor, a (age)
```

```
a
  adult juvenile
    3         5
```

```
margin.table(t, 2)# now find the marginal freq of the second factor g
```

```
g
f m
5 3
```

To find relative frequency

```
prop.table(t, 1) #use the margin generated for the 1st factor a
```

```
      g
a      f  m
adult  1.0 0.0
juvenile 0.4 0.6
```

```
prop.table(t, 2)
```

```
      g
a      f  m
adult  0.6 0.0
juvenile 0.4 1.0
```

```
prop.table(t) #overall
```

```
      g
a      f  m
adult  0.375 0.000
juvenile 0.250 0.375
```

```
prop.table(t) * 100
```

	g		
a	f	m	
adult	37.5	0.0	
juvenile	25.0	37.5	

R Data Structures

Vectors

In R, a vector is one of the fundamental data structures used to store and manipulate collections of data. Vectors are a versatile and important concept in R programming.

To create a vector

```
v <- c(2, 5, 3, 4)
length(v)
```

```
[1] 4
```

To know the data type of a vector

```
mode(v)
```

```
[1] "numeric"
```

If Strings and numbers are mixed it will show data type as character.

```
v <- c(2, 5, 3, 4, 'me')
mode(v)
```

```
[1] "character"
```

```
v
```

```
[1] "2" "5" "3" "4" "me"
```

Boolean Vector

```
vec <- c(TRUE,TRUE,NA,FALSE)
mode(vec)
```

```
[1] "logical"
```

```
vec
```

```
[1] TRUE TRUE NA FALSE
```

In vector elements are indexed starting from 1

```
vec[4]
```

```
[1] FALSE
```

We can update a vector to a specific index

```
vec[4] <- TRUE
vec
```

```
[1] TRUE TRUE NA TRUE
```

Even we can add any values anywhere at any index as vectors are elastic.

```
vec[7] <- TRUE
vec
```

```
[1] TRUE TRUE NA TRUE NA NA TRUE
```

we can create a empty vector

```
e <-vector()
mode(e)
```

```
[1] "logical"
```

```
e <- c()
mode(e)
```

```
[1] "NULL"
```

```
length(e)
```

```
[1] 0
```

Using a vector element we can create another vector

```
vec2 <-c(vec[1], vec[3], vec[5])
vec2
```

```
[1] TRUE  NA  NA
```

To find square root of all elements

```
v <- c(10,20,30,40,50)
sqrt(v)
```

```
[1] 3.162278 4.472136 5.477226 6.324555 7.071068
```

Vector Arithmetic

```
v1 <- c(3, 6, 9)
v2 <- c(1, 4, 8)
v1+v2 #addition
```

```
[1] 4 10 17
```

```
v1*v2 #dot product
```

```
[1] 3 24 72
```

```
v1-v2 #subtraction
```

```
[1] 2 2 1
```

```
v1/v2 #divsion
```

```
[1] 3.000 1.500 1.125
```

#In vectors arithmetic operations with different vector size is allowed.

```
v3 <- c(1, 4)
v1+v3#the recycling rule makes v3 [1, 4, 1]
```

Warning in v1 + v3: longer object length is not a multiple of shorter object length

```
[1] 4 10 10
```

a single value is vector too

```
2*v1
```

```
[1] 6 12 18
```

PART II

If we know the distribution we can generate vectors.

```
(x <-1:10)
```

```
[1] 1 2 3 4 5 6 7 8 9 10
```

```
(x <-10:1)
```

```
[1] 10  9  8  7  6  5  4  3  2  1
```

#Note : operator have higher precedence tahn arithmetic operator

```
10:15-1
```

```
[1]  9 10 11 12 13 14
```

```
(seq(from=1, to=5, length=4)) # 4 values between 1 and 5 inclusive, even intervals/steps
```

```
[1] 1.000000 2.333333 3.666667 5.000000
```

```
(seq(length=10, from=-2, by=0.5)) #10 values, starting from 2, interval/step = 0.5
```

```
[1] -2.0 -1.5 -1.0 -0.5  0.0  0.5  1.0  1.5  2.0  2.5
```

```
(rep(5, 10))
```

```
[1] 5 5 5 5 5 5 5 5 5 5
```

```
(rep("hi", 3))
```

```
[1] "hi" "hi" "hi"
```

```
(rep(1:2, 3))
```

```
[1] 1 2 1 2 1 2
```

```
(rep(TRUE:FALSE, 3))
```

```
[1] 1 0 1 0 1 0
```

```
(rep(1:2, each=3))
```

```
[1] 1 1 1 2 2 2
```

```
gl(3, 5) #three levels, each repeat 5 times
```

```
[1] 1 1 1 1 1 2 2 2 2 2 3 3 3 3 3  
Levels: 1 2 3
```

```
gl(2, 5, labels= c('female', 'male'))#two levels, each level repeat 5 times
```

```
[1] female female female female female male   male   male   male   male  
Levels: female male
```

```
#first argument 2 says two levels.  
#second argument 1 says repeat once  
#third argument 20 says generate 20 values  
gl(2, 1, 20, labels=c('female', 'male'))#10 alternating female and male pairs, a total of
```

```
[1] female male   female male   female male   female male   female male  
[11] female male   female male   female male   female male   female male  
Levels: female male
```

We can use `factor()` to convert number sequence to factor level labels.

```
n <- rep(1:2, each=3)  
(n <- factor(n,  
             levels = c(1, 2),  
             labels = c('female','male'))
```

```
))
```

```
[1] female female female male    male    male  
Levels: female male
```

```
n
```

```
[1] female female female male    male    male  
Levels: female male
```

generating random number using rnorm

```
(rnorm(10, mean=10, sd=3))
```

```
[1]  7.493114 14.785842 10.988523  7.538595 11.462287 12.214974 11.727344  
[8]  9.083835 14.535344 11.169530
```

```
(rt(10, df=5)) #10 values following a Student T distribution with degree of freedom of 5
```

```
[1] -3.20099075 -0.42241451 -0.86409523 -1.50276529  0.85199410 -1.82436807  
[7] -0.06641194 -1.41288461 -0.32612422  0.44183505
```

Exercise:

(1) Generate a random sample of normally distributed data of size 100, with a mean of 20 and standard deviation 4

```
(rnorm(100, mean=20, sd=4))
```

```
[1] 24.60765 23.96864 18.28195 24.95322 18.88261 27.03161 22.24298 18.18886  
[9] 16.67183 15.33372 15.73764 13.74487 24.62615 23.32819 19.09069 21.06455  
[17] 18.49319 29.76546 16.81864 19.78049 21.00057 22.47297 19.30951 11.10440  
[25] 14.94554 21.43492 19.95582 16.23740 19.53670 16.74013 20.96905 14.29961  
[33] 21.46376 20.99365 20.26115 20.07663 21.02935 17.40396 19.52332 22.65654  
[41] 24.40388 20.57509 19.52899 16.35173 14.24966 16.81164 25.01633 23.08857  
[49] 19.12194 18.30076 18.32408 23.98795 18.89689 25.02408 22.58670 25.19725
```



```
[57] 16.50695 20.03348 16.47651 22.38504 20.47887 18.87130 25.82395 20.91608
[65] 23.98618 23.12744 16.89289 17.53604 20.18632 15.47846 22.30688 14.87700
[73] 26.50179 17.99721 26.71319 18.34992 16.11085 20.10153 20.10990 13.27927
[81] 24.21500 15.52160 21.34247 21.97918 20.55221 19.52483 20.79074 15.72523
[89] 16.78715 15.54494 26.32037 25.99128 21.05058 15.06840 19.98511 26.04669
[97] 18.09721 23.19167 16.10399 22.75749
```

```
dataset <- (rnorm(100, mean=20, sd=4))
len <- length(dataset)
sem <- dataset/ sqrt(len)
sem
```

```
[1] 1.617664 1.507317 1.617243 1.652087 1.635728 2.296511 2.027405 1.870500
[9] 1.565399 1.593628 1.692884 1.552112 1.820730 2.188695 1.527804 2.588103
[17] 1.475432 1.961390 2.947888 2.356251 1.899127 1.653694 2.233034 1.994988
[25] 1.850058 2.127154 1.804478 3.063463 2.672111 2.311834 2.285296 1.782847
[33] 2.354311 1.860562 1.596778 2.753273 1.628412 1.882321 1.754020 1.621170
[41] 2.239590 1.390554 1.917524 1.770282 1.443934 1.971833 1.827648 1.763110
[49] 2.392446 2.212964 1.963818 2.062596 1.705075 1.919464 2.440871 1.993301
[57] 2.064715 2.809905 1.718522 2.384317 2.716194 1.574334 2.007055 1.844037
[65] 1.803667 1.581713 1.641515 2.507755 2.237536 2.310254 2.622948 1.853839
[73] 2.326623 1.975746 1.799449 2.370425 2.014775 1.573520 1.904617 2.598089
[81] 2.468863 1.416917 2.038022 2.339066 1.350254 2.563425 1.783296 2.111466
[89] 1.922411 2.630463 1.409781 1.942157 1.618719 2.162617 2.891705 1.394201
[97] 1.975317 1.941092 2.616637 1.607258
```

Sub-Setting

```
x <- c(0, -3, 4, -1, 45, 90, -5)
#select all elements that is greater than 0
(gtzero <- x[x>0])
```

```
[1] 4 45 90
```

```
x <- c(0, -3, 4, -1, 45, 90, -5)
(x[x<=-2 | x>5])
```

```
[1] -3 45 90 -5
```

```
(x[x>40 & x<100])
```

```
[1] 45 90
```

```
x <- c(0, -3, 4, -1, 45, 90, -5)
(x[c(4, 6)])#select the 4th and 6th elements in the vector
```

```
[1] -1 90
```

```
(y<-c(4,6)) #same as above
```

```
[1] 4 6
```

```
(x[y])
```

```
[1] -1 90
```

```
(x[1:3]) #select the 1st to the 3rd elements in the vector
```

```
[1] 0 -3 4
```

```
x <- c(0, -3, 4, -1, 45, 90, -5)
(x[-1]) #select all but the first element
```

```
[1] -3 4 -1 45 90 -5
```

```
(x[-c(4, 6)])
```

```
[1] 0 -3 4 45 -5
```

```
(x[-(1:3)])
```

```
[1] -1 45 90 -5
```

Named Elements

We can assign names to vector elements

```
x <- c(0, -3, 4, -1, 45, 90, -5)
names(x) <- c('s1', 's2', 's3', 's4', 's5', 's6', 's7')
x
```

```
s1 s2 s3 s4 s5 s6 s7
0 -3 4 -1 45 90 -5
```

```
(pH <- c(area1=4.5, area2=5.7, area3=9.8, mud=7.2))
```

```
area1 area2 area3 mud
4.5 5.7 9.8 7.2
```

```
pH['mud']
```

```
mud
7.2
```

```
pH[c('area1', 'mud')]
```

```
area1 mud
4.5 7.2
```

#Note we can not use elements directly to exclude

eg # x["s1"] results in error

Empty index means to select all

```
pH[]
```

```
area1 area2 area3 mud
  4.5   5.7   9.8  7.2
```

```
pH
```

```
area1 area2 area3 mud
  4.5   5.7   9.8  7.2
```

We can reset a vector using following

```
pH[] <- 0
pH
```

```
area1 area2 area3 mud
    0     0     0    0
```

```
pH<- 0
pH
```

```
[1] 0
```

More R Data Structures

Matrices and Array

A matrix is a two-dimensional data structure in R, similar to a table or spreadsheet. It consists of rows and columns, and all elements within a matrix must be of the same data type

An array is a multi-dimensional data structure in R that extends beyond the two dimensions of a matrix. It can have multiple dimensions, making it suitable for storing and analyzing data with higher complexity.

Creating a Matrix

```
m <- c(45, 23, 66, 77, 33, 44, 56, 12, 78, 23)
is.vector(m)
```

```
[1] TRUE
```

```
is.matrix(m)
```

```
[1] FALSE
```

```
is.array(m)
```

```
[1] FALSE
```

```
dim(m) <-c(2, 5)#make the vector a 2 by 5 matrix, 2x5 must = lenght of the vector
m
```

	[,1]	[,2]	[,3]	[,4]	[,5]
[1,]	45	66	33	56	78
[2,]	23	77	44	12	23

```
is.vector(m)
```

```
[1] FALSE
```

```
is.matrix(m)
```

```
[1] TRUE
```

```
is.array(m)
```

```
[1] TRUE
```

Exercise

Create a matrix with two columns:

First columns hold age data for a group of students 11, 11, 12, 13, 14, 9, 8, and second columns hold grades 5, 5, 6, 7, 8, 4, 3.

```
test <-matrix(c(11, 11, 12, 13, 14, 9, 8, 5, 5, 6, 7, 8, 4, 3), 7, 2)
test
```

```
      [,1] [,2]
[1,]    11    5
[2,]    11    5
[3,]    12    6
[4,]    13    7
[5,]    14    8
[6,]     9    4
[7,]     8    3
```

```
m <- c(45, 23, 66, 77, 33, 44, 56, 12, 78, 23)
#then 'organize' the vector as a matrix
dim(m) <- c(2, 5)#make the vector a 2 by 5 matrix, 2x5 must = lenght of the vector
m
```

```
      [,1] [,2] [,3] [,4] [,5]
[1,]    45    66    33    56    78
[2,]    23    77    44    12    23
```

```
m[2, 3]#the element at row 2 and column 3
```

```
[1] 44
```

```
(s<- m[2, 1]) # select one value
```

```
[1] 23
```

```
(m<- m [c(1,2), -c(3, 5)]) #select 1st row and 1st, 2nd, and 4th columns: result is a vect
```

```
      [,1] [,2] [,3]  
[1,]   45   66   56  
[2,]   23   77   12
```

```
(m [1, ]) #select complete row or column: 1st row, result is a vector
```

```
[1] 45 66 56
```

```
(m [1, ]) #select complete row or column: 1st row, result is a vector
```

```
[1] 45 66 56
```

```
is.vector(m)
```

```
[1] FALSE
```

```
is.matrix(m)
```

```
[1] TRUE
```

```
is.vector(v)
```

```
[1] TRUE
```

```
is.matrix(v)
```

```
[1] FALSE
```

To keep results as matrix use `drop = FALSE`

```
m <- matrix(c(45, 23, 66, 77, 33, 44, 56, 12, 78, 23), 2, 5)
(m<-m [, 2, drop = FALSE])
```

```
      [,1]
[1,]    66
[2,]    77
```

```
is.matrix(m)
```

```
[1] TRUE
```

```
is.vector(m)
```

```
[1] FALSE
```

```
cbind (c(1,2,3), c(4, 5, 6))
```

```
      [,1] [,2]
[1,]     1     4
[2,]     2     5
[3,]     3     6
```

```
rbind (c(1,2,3), c(4, 5, 6))
```

```
      [,1] [,2] [,3]
[1,]     1     2     3
[2,]     4     5     6
```

```
m <- matrix(c(45, 23, 66, 77, 33, 44, 56, 12, 78, 23), 2, 5)
(a <- rbind (c(1,2,3,4,5), m))
```

```
      [,1] [,2] [,3] [,4] [,5]
[1,]     1     2     3     4     5
[2,]    45    66    33    56    78
[3,]    23    77    44    12    23
```



```
is.array(a)
```

```
[1] TRUE
```

```
is.matrix(a)
```

```
[1] TRUE
```

Exercise

```
#m1 <- matrix(rep(10, 9), 3, 3)
#m2 <- cbind (c(1,2,3), c(4, 5, 6))
#m3 <- cbind (m1[,1], m2[2,])
#m4 <- cbind (m1[,1], m2[,2])
# Gives Error
```

```
sales <- matrix(c(10, 30, 40, 50, 43, 56, 21, 30), 2, 4, byrow=TRUE)
colnames(sales) <- c('1qrt', '2qrt', '3qrt', '4qrt')
rownames(sales) <- c('store1', 'store2')
sales
```

	1qrt	2qrt	3qrt	4qrt
store1	10	30	40	50
store2	43	56	21	30

Exercise

```
sales['store1', '1qrt']
```

```
[1] 10
```

```
sales['store2', c('1qrt', '4qrt')]
```

1qrt	4qrt
43	30

Arrays

```
a <- array(1:48, dim= c(4, 3, 2))  
a
```

```
, , 1
```

	[,1]	[,2]	[,3]
[1,]	1	5	9
[2,]	2	6	10
[3,]	3	7	11
[4,]	4	8	12

```
, , 2
```

	[,1]	[,2]	[,3]
[1,]	13	17	21
[2,]	14	18	22
[3,]	15	19	23
[4,]	16	20	24

```
a [1, 3, 2]
```

```
[1] 21
```

```
a [1, , 2]
```

```
[1] 13 17 21
```

```
a [1, , 2, drop=FALSE]
```

```
, , 1
```

	[,1]	[,2]	[,3]
[1,]	13	17	21

```
a [4, 3, ]
```

```
[1] 12 24
```

```
a [c(2, 3), , -2]
```

```
      [,1] [,2] [,3]
[1,]     2     6    10
[2,]     3     7    11
```

Assigning Names To Dimensions of array

```
dimnames(a)[[1]] <-c("1qrt", "2qrt", "3qrt", "4qrt")
dimnames(a)[[2]] <-c("store1", "store2", "store3")
dimnames(a)[[3]] <-c("2017", "2018")
a
```

```
, , 2017
```

```
      store1 store2 store3
1qrt      1      5      9
2qrt      2      6     10
3qrt      3      7     11
4qrt      4      8     12
```

```
, , 2018
```

```
      store1 store2 store3
1qrt     13     17     21
2qrt     14     18     22
3qrt     15     19     23
4qrt     16     20     24
```

```
ar <- array(data      = 1:27,
             dim       = c(3, 3, 3),
             dimnames = list(c("a", "b", "c"),
                             c("1", "2", "3"),
                             c("1", "2", "3")),
             ar
```

```
, , g
```

```
  d e f  
a 1 4 7  
b 2 5 8  
c 3 6 9
```

```
, , h
```

```
  d e f  
a 10 13 16  
b 11 14 17  
c 12 15 18
```

```
, , i
```

```
  d e f  
a 19 22 25  
b 20 23 26  
c 21 24 27
```

Splitting array into matrices

```
matrix1 <- ar[,,g]
```

```
matrix1 <- ar[,, 'g']  
matrix1
```

```
  d e f  
a 1 4 7  
b 2 5 8  
c 3 6 9
```

```
matrix2 <- ar[,, 'h']  
matrix2
```

```
  d e f  
a 10 13 16  
b 11 14 17  
c 12 15 18
```

```
sum <-matrix1 + matrix2
sum
```

```
      d e f
a 11 17 23
b 13 19 25
c 15 21 27
```

```
matrix1*3
```

```
      d e f
a 3 12 21
b 6 15 24
c 9 18 27
```

```
matrix1
```

```
      d e f
a 1 4 7
b 2 5 8
c 3 6 9
```

```
matrix1*c(2, 3)
```

Warning in matrix1 * c(2, 3): longer object length is not a multiple of shorter object length

```
      d e f
a 2 12 14
b 6 10 24
c 6 18 18
```

```
matrix1*c(2,3,2,3,2,3,2,3,2)
```

```
      d e f
a 2 12 14
b 6 10 24
c 6 18 18
```

```
matrix1*c(1, 2, 3)
```

```
      d e f
a 1  4  7
b 4 10 16
c 9 18 27
```

```
matrix1/c(1, 2, 3)
```

```
      d e f
a 1 4.0 7
b 1 2.5 4
c 1 2.0 3
```

```
matrix1/c(1, 2, 3, 1, 2, 3, 1, 2, 3)
```

```
      d e f
a 1 4.0 7
b 1 2.5 4
c 1 2.0 3
```

Lists

A list is a versatile and flexible data structure used to store a collection of different data types (such as vectors, matrices, other lists, or even functions) within a single object. Lists provide a way to organize and manipulate heterogeneous data.

```
mylist <- list(stud.id=34453,
               stud.name="John",
               stud.marks= c(13, 3, 12, 15, 19)
               )
```

```
mylist$stud.id
```

```
[1] 34453
```

```
mylist[1]
```

```
$stud.id  
[1] 34453
```

```
mylist[[1]]
```

```
[1] 34453
```

```
mylist["stud.id"]
```

```
$stud.id  
[1] 34453
```

#Note [is used to extract subset
#Note [[is used to extract one item
#Note \$ is a special case of [[

```
mylist <- list(stud.id=34453,  
               stud.name="John",  
               stud.marks= c(13, 3, 12, 15, 19)  
               )  
mylist$stud.marks
```

```
[1] 13  3 12 15 19
```

```
mylist$stud.marks[2]
```

```
[1] 3
```

```
names(mylist)
```

```
[1] "stud.id"      "stud.name"    "stud.marks"
```

```
names(mylist) <- c('id','name','marks')
```

```
names(mylist)
```

```
[1] "id"      "name"    "marks"
```

```
mylist
```

```
$id
```

```
[1] 34453
```

```
$name
```

```
[1] "John"
```

```
$marks
```

```
[1] 13  3 12 15 19
```

Adding a new component

```
mylist$parents.names <- c('Ana', "Mike")
```

```
mylist
```

```
$id
```

```
[1] 34453
```

```
$name
```

```
[1] "John"
```

```
$marks
```

```
[1] 13  3 12 15 19
```

```
$parents.names
```

```
[1] "Ana"  "Mike"
```


To concatenate two list use c()

```
newlist <- list(age=19, sex="male");  
expandedlist <-c(mylist, newlist)  
expandedlist
```

```
$id  
[1] 34453
```

```
$name  
[1] "John"
```

```
$marks  
[1] 13  3 12 15 19
```

```
$parents.names  
[1] "Ana"  "Mike"
```

```
$age  
[1] 19
```

```
$sex  
[1] "male"
```

```
length(expandedlist)
```

```
[1] 6
```

Exercise

```
expandedlist <- expandedlist[-5]  
expandedlist <- expandedlist[c(-1,-5)]  
expandedlist$parents.names <- NULL  
expandedlist[['marks']] <- NULL
```

```
mylist
```

```

$id
[1] 34453

$name
[1] "John"

$marks
[1] 13  3 12 15 19

$parents.names
[1] "Ana" "Mike"

```

```

unlist(mylist)

```

id	name	marks1	marks2	marks3
"34453"	"John"	"13"	"3"	"12"
marks4	marks5	parents.names1	parents.names2	
"15"	"19"	"Ana"	"Mike"	

```

mode(mylist)

```

```

[1] "list"

```

```

mode(unlist(mylist))

```

```

[1] "character"

```

```

is.vector(unlist(mylist)) #atomic list with names

```

```

[1] TRUE

```

```

is.list(mylist)

```

```

[1] TRUE

```

```
is.atomic(mylist)
```

```
[1] FALSE
```

```
is.list(unlist(mylist))
```

```
[1] FALSE
```

Data Frames

A data frame is a fundamental data structure used to store and manipulate structured data in a tabular format, similar to a spreadsheet or database table. Data frames are especially useful for handling real-world data, where you have rows representing observations or cases and columns representing variables or attributes.

#Creating a Data Frame

```
my.dataframe <- data.frame(site=c('A', 'B', 'A','A', 'B'),  
                           season=c('winter', 'summer', 'summer', 'spring', 'fall'),  
my.dataframe
```

	site	season	ph
1	A	winter	7.4
2	B	summer	6.3
3	A	summer	8.6
4	A	spring	7.2
5	B	fall	8.9

Exercise

```
my.dataframe <- data.frame(site=c('A', 'B', 'A','A', 'B'),  
                           season=c('winter', 'summer', 'summer', 'spring', 'fall'),  
my.dataframe[3, 2]
```

```
[1] "summer"
```

```
my.dataframe[['site']]
```

```
[1] "A" "B" "A" "A" "B"
```

```
my.dataframe['site']
```

```
site
1    A
2    B
3    A
4    A
5    B
```

```
my.dataframe[my.dataframe$ph>7, ]
```

```
site season  ph
1    A winter 7.4
3    A summer 8.6
4    A spring 7.2
5    B   fall 8.9
```

```
my.dataframe[my.dataframe$ph>7, c('site', 'ph')]
```

```
site  ph
1    A 7.4
3    A 8.6
4    A 7.2
5    B 8.9
```

For querying a data frame

```
subset(my.dataframe, ph>7)
```

```

  site season  ph
1    A winter 7.4
3    A summer 8.6
4    A spring 7.2
5    B   fall 8.9

```

```
subset(my.dataframe, ph>7, c("site", "ph"))
```

```

  site  ph
1    A 7.4
3    A 8.6
4    A 7.2
5    B 8.9

```

```
subset(my.dataframe[1:2,], ph>7, c(site, ph))
```

```

  site  ph
1    A 7.4

```

```
my.dataframe[my.dataframe$season=='summer', 'ph'] <- my.dataframe[my.dataframe$season=='summer', 'ph'] + 2
```

```
[1] 7.3 9.6
```

```
my.dataframe[my.dataframe$season=='summer' & my.dataframe$ph>8, 'ph'] <- my.dataframe[my.dataframe$season=='summer' & my.dataframe$ph>8, 'ph'] + 2
```

```
[1] 7.3 10.6
```

#Add a column

```
my.dataframe$NO3 <- c(234.5, 123.4, 456.7, 567.8, 789.0)
my.dataframe
```

	site	season	ph	N03
1	A	winter	7.4	234.5
2	B	summer	7.3	123.4
3	A	summer	10.6	456.7
4	A	spring	7.2	567.8
5	B	fall	8.9	789.0

```
#my.dataframe$N03<-NULL
my.dataframe <- my.dataframe[, -4]
my.dataframe
```

	site	season	ph
1	A	winter	7.4
2	B	summer	7.3
3	A	summer	10.6
4	A	spring	7.2
5	B	fall	8.9

```
str(my.dataframe)
```

```
'data.frame':  5 obs. of  3 variables:
 $ site  : chr  "A" "B" "A" "A" ...
 $ season: chr  "winter" "summer" "summer" "spring" ...
 $ ph    : num  7.4 7.3 10.6 7.2 8.9
```

```
nrow(my.dataframe)
```

```
[1] 5
```

```
ncol(my.dataframe)
```

```
[1] 3
```

```
dim(my.dataframe)
```

```
[1] 5 3
```

```
#“{r} # edit(my.dataframe) #this brings up a data editor
```

**View(my.dataframe) #this brings up a uneditable tab that display
#the data for you to view.**

```
#“
```

```
names(my.dataframe)
```

```
[1] "site"    "season"  "ph"
```

```
names(my.dataframe) <- c('area', 'season', 'P.h.')
my.dataframe
```

```
area season P.h.
1    A winter  7.4
2    B summer  7.3
3    A summer 10.6
4    A spring  7.2
5    B  fall   8.9
```

```
names(my.dataframe)[3] <- 'ph'
my.dataframe
```

```
area season  ph
1    A winter  7.4
2    B summer  7.3
3    A summer 10.6
4    A spring  7.2
5    B  fall   8.9
```

Tibbles

a tibble is a modern data frame implementation introduced by the tidyverse.

```
install.packages("tibble")
```

Installing package into '/cloud/lib/x86_64-pc-linux-gnu-library/4.3'
(as 'lib' is unspecified)

```
library(tibble)
```

#Creating a Tibble

```
my.tibble <- tibble(TempCels = sample(-10:40, size=100, replace=TRUE),  
                    TempFahr = TempCels*9/5+32,  
                    Location = rep(letters[1:2], each=50))  
  
my.tibble
```

```
# A tibble: 100 x 3  
  TempCels TempFahr Location  
    <int>    <dbl> <chr>  
1      -6     21.2 a  
2      31     87.8 a  
3      33     91.4 a  
4      24     75.2 a  
5      12     53.6 a  
6      18     64.4 a  
7      24     75.2 a  
8      25     77 a  
9       -2     28.4 a  
10     24     75.2 a  
# i 90 more rows
```

Using Dataset

```
install.packages("palmerpenguins")
```

Installing package into '/cloud/lib/x86_64-pc-linux-gnu-library/4.3'
(as 'lib' is unspecified)


```
library(palmerpenguins)
data(penguins)
dim(penguins)
```

```
[1] 344    8
```

```
class(penguins)
```

```
[1] "tbl_df"      "tbl"        "data.frame"
```

```
penguins
```

```
# A tibble: 344 x 8
  species island bill_length_mm bill_depth_mm flipper_length_mm body_mass_g
  <fct>   <fct>         <dbl>         <dbl>         <int>         <int>
1 Adelie Torgersen     39.1           18.7           181           3750
2 Adelie Torgersen     39.5           17.4           186           3800
3 Adelie Torgersen     40.3           18            195           3250
4 Adelie Torgersen     NA            NA            NA            NA
5 Adelie Torgersen     36.7           19.3           193           3450
6 Adelie Torgersen     39.3           20.6           190           3650
7 Adelie Torgersen     38.9           17.8           181           3625
8 Adelie Torgersen     39.2           19.6           195           4675
9 Adelie Torgersen     34.1           18.1           193           3475
10 Adelie Torgersen     42            20.2           190           4250
# i 334 more rows
# i 2 more variables: sex <fct>, year <int>
```

Converting data frame to tibble

```
pe <-as_tibble(penguins)
class(pe)
```

```
[1] "tbl_df"      "tbl"        "data.frame"
```

pe

```
# A tibble: 344 x 8
  species island bill_length_mm bill_depth_mm flipper_length_mm body_mass_g
  <fct>    <fct>         <dbl>         <dbl>         <int>         <int>
1 Adelie  Torgersen         39.1          18.7          181          3750
2 Adelie  Torgersen         39.5          17.4          186          3800
3 Adelie  Torgersen         40.3           18          195          3250
4 Adelie  Torgersen         NA           NA           NA           NA
5 Adelie  Torgersen         36.7          19.3          193          3450
6 Adelie  Torgersen         39.3          20.6          190          3650
7 Adelie  Torgersen         38.9          17.8          181          3625
8 Adelie  Torgersen         39.2          19.6          195          4675
9 Adelie  Torgersen         34.1          18.1          193          3475
10 Adelie Torgersen         42           20.2          190          4250
# i 334 more rows
# i 2 more variables: sex <fct>, year <int>
```

Mode and Class

The mode function returns the internal storage mode of an R object. It indicates how the data is stored in memory. The modes in R include “numeric,” “character,” “logical,” “complex,” “raw,” and “list,” among others.

The class function returns the class or data type of an R object. It indicates how R treats and interacts with the data. In R, an object can belong to one or more classes, which defines its behavior in various operations and functions.

```
x <- 1:16
mode(x)
```

```
[1] "numeric"
```

```
dim(x) <- c(4,4)
class(x)
```

```
[1] "matrix" "array"
```

```
is.numeric(x)
```

```
[1] TRUE
```

```
mode(x) <- "character"  
mode(x)
```

```
[1] "character"
```

```
class(x)
```

```
[1] "matrix" "array"
```

Even if mode changes class remains same

```
x <- factor(x)  
class(x)
```

```
[1] "factor"
```

```
mode(x)
```

```
[1] "numeric"
```

```
is.array(x)
```

```
[1] FALSE
```

```
is.list(x)
```

```
[1] FALSE
```

```
is.data.frame(x)
```

```
[1] FALSE
```

```
is.matrix(x)
```

```
[1] FALSE
```

```
is_tibble(x)
```

```
[1] FALSE
```

```
is.vector(x)
```

```
[1] FALSE
```

```
typeof(x)
```

```
[1] "integer"
```

Subsetting a tibble in smaller tibble

```
class(pe[1:15, c("bill_length_mm", "bill_depth_mm")])
```

```
[1] "tbl_df"      "tbl"        "data.frame"
```

```
class(penguins[1:15, c("bill_length_mm", "bill_depth_mm")])
```

```
[1] "tbl_df"      "tbl"        "data.frame"
```

```
class(pe[1:15, c("bill_length_mm")])
```

```
[1] "tbl_df"      "tbl"        "data.frame"
```

```
class(penguins[1:15, c("bill_length_mm")])
```

```
[1] "tbl_df"      "tbl"        "data.frame"
```

#Note filter() and select()

```
install.packages("dplyr")
```

Installing package into '/cloud/lib/x86_64-pc-linux-gnu-library/4.3'
(as 'lib' is unspecified)

```
library(dplyr)
```

```
select(filter(pe, species=="Adelie"), bill_length_mm, bill_depth_mm)
```

```
# A tibble: 152 x 2
  bill_length_mm bill_depth_mm
      <dbl>         <dbl>
1         39.1         18.7
2         39.5         17.4
3         40.3          18
4          NA          NA
5         36.7         19.3
6         39.3         20.6
7         38.9         17.8
8         39.2         19.6
9         34.1         18.1
10         42          20.2
# i 142 more rows
```

```
filter(select(pe, bill_length_mm, bill_depth_mm, species), species=="Adelie")
```

```
# A tibble: 152 x 3
  bill_length_mm bill_depth_mm species
      <dbl>         <dbl> <fct>
1         39.1         18.7 Adelie
2         39.5         17.4 Adelie
3         40.3          18  Adelie
4          NA          NA  Adelie
5         36.7         19.3 Adelie
6         39.3         20.6 Adelie
7         38.9         17.8 Adelie
8         39.2         19.6 Adelie
9         34.1         18.1 Adelie
10        42          20.2 Adelie
# i 142 more rows
```

Exercise

```
pe
```

```
# A tibble: 344 x 8
  species island bill_length_mm bill_depth_mm flipper_length_mm body_mass_g
  <fct>   <fct>         <dbl>         <dbl>         <int>         <int>
1 Adelie Torgersen         39.1         18.7          181          3750
2 Adelie Torgersen         39.5         17.4          186          3800
3 Adelie Torgersen         40.3          18          195          3250
4 Adelie Torgersen          NA          NA           NA           NA
5 Adelie Torgersen         36.7         19.3          193          3450
6 Adelie Torgersen         39.3         20.6          190          3650
7 Adelie Torgersen         38.9         17.8          181          3625
8 Adelie Torgersen         39.2         19.6          195          4675
9 Adelie Torgersen         34.1         18.1          193          3475
10 Adelie Torgersen         42          20.2          190          4250
# i 334 more rows
# i 2 more variables: sex <fct>, year <int>
```

```
pe[pe$species=='Adelie', c("bill_length_mm", "bill_depth_mm")]
```

```
# A tibble: 152 x 2
  bill_length_mm bill_depth_mm
      <dbl>         <dbl>
1         39.1         18.7
2         39.5         17.4
3         40.3          18
4          NA          NA
5         36.7         19.3
6         39.3         20.6
7         38.9         17.8
8         39.2         19.6
9         34.1         18.1
10        42          20.2
# i 142 more rows
```

```
subset(pe, pe$species=='Adelie', c("bill_length_mm", "bill_depth_mm"))
```

```
# A tibble: 152 x 2
  bill_length_mm bill_depth_mm
      <dbl>         <dbl>
1         39.1         18.7
2         39.5         17.4
3         40.3          18
4          NA          NA
5         36.7         19.3
6         39.3         20.6
7         38.9         17.8
8         39.2         19.6
9         34.1         18.1
10        42          20.2
# i 142 more rows
```

```
select(pe, bill_length_mm, bill_depth_mm, species) |> filter(species=="Adelie")
```

```
# A tibble: 152 x 3
  bill_length_mm bill_depth_mm species
      <dbl>         <dbl> <fct>
1         39.1         18.7 Adelie
2         39.5         17.4 Adelie
```

```

3          40.3          18  Adelie
4          NA           NA  Adelie
5          36.7          19.3 Adelie
6          39.3          20.6 Adelie
7          38.9          17.8 Adelie
8          39.2          19.6 Adelie
9          34.1          18.1 Adelie
10         42           20.2 Adelie
# i 142 more rows

```

Exercise

```
filter(pe, species=="Adelie") |> select(bill_length_mm, bill_depth_mm, species)
```

```

# A tibble: 152 x 3
  bill_length_mm bill_depth_mm species
      <dbl>         <dbl> <fct>
1          39.1          18.7 Adelie
2          39.5          17.4 Adelie
3          40.3          18   Adelie
4          NA           NA   Adelie
5          36.7          19.3 Adelie
6          39.3          20.6 Adelie
7          38.9          17.8 Adelie
8          39.2          19.6 Adelie
9          34.1          18.1 Adelie
10         42           20.2 Adelie
# i 142 more rows

```

Create a data object to hold student names (Judy, Max, Dan) and their grades ('78,85,99')
 Convert number grades to letter grades:90-100:A;80-89:B;70-79:C; \<70:F'

```

students <- list(names=c("Judy", "Max", "Dan"),
                 grades=c(78, 85, 99))
print ("before:")

```

```
[1] "before:"
```



```
students
```

```
$names
```

```
[1] "Judy" "Max"  "Dan"
```

```
$grades
```

```
[1] 78 85 99
```

```
gradeConvertor<- function (grade){  
  grade = as.numeric(grade)  
  if(grade > 100 | grade < 0) print ("grade out of the range")  
  else if(grade >= 90 & grade <= 100) return ("A")  
  else if(grade >= 80 & grade < 90) return ("B")  
  else if(grade >= 70 & grade < 80) return ("C")  
  else return ("F")  
}  
  
#students$grades <-sapply(students$grades, gradeConvertor)  
  
for(i in 1:length(students$grades)){  
  students$grades[i] = gradeConvertor(students$grades[i])  
}  
  
print ("after:")
```

```
[1] "after:"
```

```
students
```

```
$names
```

```
[1] "Judy" "Max"  "Dan"
```

```
$grades
```

```
[1] "C" "B" "A"
```