assignment la1

2023-05-15

help()-Brings up a help entry for the specified command

help.start()-Opens the help system in the browser

apropos()-shows all the commands that contain the “partword”

install.packages(“pkg”)-Installs a library of commands from the CRAN website

install.packages()-Shows a list of packages that are installed.

library(pkg)-Loads a package of commands,making them available for use

search()-Shows a list of packages that are available and loaded for use

example()-View some examples on the use of a command

ls()-Lists memory of contents

ls.str(pattern=‘data’)-This lists all the objects with “data” in their name and shows you the structure of each.

ls(pattern=‘b’)-Here the pattern looks for everything containing a “b”

ls(pattern=“^be”)-If you want to search for objects beginning with a certain letter you use the ^ character

ls(pattern=‘[1]’)-letters are enclosed in square brackets the square brackets is to isolate the letters; each is treated as a separate item, hence objects beginning with “b” or “e” are matched

ls(pattern=‘m$’)-To find objects ending with a specific character you use a dollar sign at the end

ls(pattern=‘a.e’)-You can use the period as a wildcard and R will match any character

class()-You can obtain information about the type of object

sort()-The sort() function is used to sort the elements of a vector or a data frame in ascending order. It returns a new vector or data frame with the elements arranged in ascending order.

rank()-The rank() function computes the ranks of the elements in a vector. It assigns a unique rank to each element based on its value, where the smallest element receives a rank of 1.

method(): The method() function is not a built-in R function. The term “method” typically refers to a specific implementation or algorithm for solving a problem in R.

row.names()-function in R is used to retrieve or set the row names of a matrix or a data frame.

history()-You can view the current list of the history items

savehistory(file=‘.Rhistory’)-You can save the current history to a desk

loadhistory(file=‘.Rhistory’)-You can load the file from the history

c(),scan()-Enter data manually to a vector in R

rep()-Make Vector of repeated values

seq()-Make arithmetic progression vector

View()-View dataset in a spreadsheet-type format

data()-Load built-in dataset

dim()-See dimensions(rows/columns)of a dataframe

str()-Display internal structure of an R-object

read.csv(),read.table()-load into data frame an existing datafile

require()-Make available an R add-oon package

names()-List names of variables in a data frame

length()-Give length of a vector

rm()-removes an item from memory

hist()-Command for producing a histogram

histogram()-Lattice command for producing a histogram

table()-List all values of a variables with frequencies

stem()-Make a stem plot

xtabs()-Cross tabulation tables using formulas

mosaicplot()-Make a mosaicplot

cut()-Group values of a variable into larger bins

median()-Identify “center” of distrubtion

mean()-To find the avg of the given data

by()-Apply function to a column split by factors

summary()-Display 5-number summary and mean

var()-To find the variance of a given values

sd()-To find the standard variation of the given values in the vector

sum()-Add up all vlaues in vector

quantile()-Find the position of a quantile in a dataset

barplot()-Produce a bargraph

barchart()-Lattice command for producing bar graphs

boxplot()-Produce a boxplot

bwplot()-Lattice command for producing boxplots

plot()-To produce a scatter plot

xyplot()-Lattice command for producing a scatter plot

lm()-Determine the least-squares regression line

anova()-Analyzing of variance

predict()-Obtained predicted values from linear model

nls()-Estimate the parameters of the nonlinear model

residuals()-Gives for a model-fit to data

sample()-Take a smaple from vector of data

replicate()-repeat process a set number of times

cumsum()-produce running total of values for an input vector

ecdf()-Buitls empricial cumulative distribution function

dbinom()-Tools for binomial distribution

dpois()-Tools for poisson distribution

pnorm()-Tools for normal distribution

qt()-Tools for student t distributtions

pchisq()-Tools for chi-square test distributions

binom.test()-Hypothesis test and confident interval for one proportion

prop.test()-inferencce for one portion using normal approx

chisq.tset()-Carries out a chi-square test

fisher.test()-Fisher test for contigency table

t.test()-Studnet t test for inference on population mean

qqnorm(),qqline()-Tools for checking normality

addmargins()-Add marginal sums to an existing table

prop.table()-Compute proportions from a contigency table

par()-query and edit graphical settings

power.t.test()-power calculations for one and two sample t test

```
apropos("partword")
```

```
## character(0)
```

```
installed.packages()
```

```
##               Package
## base64enc    "base64enc"
## bslib        "bslib"
## cachem       "cachem"
## callranger   "callranger"
```

```
## cellranger    "cellranger"
## cli           "cli"
## commonmark    "commonmark"
## cpp11         "cpp11"
## crayon        "crayon"
## digest        "digest"
## ellipsis      "ellipsis"
## evaluate      "evaluate"
## fansi         "fansi"
## fastmap       "fastmap"
## fontawesome   "fontawesome"
## fs            "fs"
## glue          "glue"
## highr         "highr"
## hms           "hms"
## htmltools     "htmltools"
## jquerylib     "jquerylib"
## jsonlite      "jsonlite"
## knitr         "knitr"
## lifecycle     "lifecycle"
## magrittr      "magrittr"
## markdown      "markdown"
## memoise       "memoise"
## mime          "mime"
## pillar        "pillar"
## pkgconfig     "pkgconfig"
## prettyunits   "prettyunits"
## progress      "progress"
## R6            "R6"
## rappdirs      "rappdirs"
## Rcpp          "Rcpp"
## readxl        "readxl"
## rematch       "rematch"
## rlang         "rlang"
## rmarkdown     "rmarkdown"
## sass          "sass"
## stringi       "stringi"
## stringr       "stringr"
## tibble        "tibble"
## tinytex       "tinytex"
## utf8          "utf8"
## vctrs         "vctrs"
## xfun          "xfun"
## yaml          "yaml"
## 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"
## translations "translations"
## utils         "utils"
##              LibPath                                          Version
## base64enc    "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "0.1-3"
## bslib        "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "0.4.2"
## cachem       "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "1.0.8"
## cellranger   "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "1.1.0"
```

```
## cellranger   C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "1.1.0
## cli          "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "3.6.1"
## commonmark   "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "1.9.0"
## cpp11        "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "0.4.3"
## crayon       "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "1.5.2"
## digest       "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "0.6.31"
## ellipsis     "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "0.3.2"
## evaluate     "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "0.21"
## fansi        "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "1.0.4"
## fastmap      "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "1.1.1"
## fontawesome  "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "0.5.1"
## fs           "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "1.6.2"
## glue         "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "1.6.2"
## highr        "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "0.10"
## hms          "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "1.1.3"
## htmltools    "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "0.5.5"
## jquerylib    "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "0.1.4"
## jsonlite     "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "1.8.4"
## knitr        "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "1.42"
## lifecycle    "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "1.0.3"
## magrittr     "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "2.0.3"
## markdown     "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "1.6"
## memoise      "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "2.0.1"
## mime         "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "0.12"
## pillar       "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "1.9.0"
## pkgconfig    "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "2.0.3"
## prettyunits  "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "1.1.1"
## progress     "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "1.2.2"
## R6           "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "2.5.1"
## rappdirs     "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "0.3.3"
## Rcpp         "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "1.0.10"
## readxl       "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "1.4.2"
## rematch      "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "1.0.1"
## rlang        "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "1.1.1"
## rmarkdown    "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "2.21"
## sass         "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "0.4.6"
## stringi      "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "1.7.12"
## stringr      "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "1.5.0"
## tibble       "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "3.2.1"
## tinytex      "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "0.45"
## utf8         "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "1.2.3"
## vctrs        "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "0.6.2"
## xfun         "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "0.39"
## yaml         "C:/Users/jayam tulasi/AppData/Local/R/win-library/4.3" "2.3.7"
## base         "C:/Program Files/R/R-4.3.0/library"                    "4.3.0"
## boot         "C:/Program Files/R/R-4.3.0/library"                    "1.3-28.1"
## class        "C:/Program Files/R/R-4.3.0/library"                    "7.3-21"
## cluster      "C:/Program Files/R/R-4.3.0/library"                    "2.1.4"
## codetools    "C:/Program Files/R/R-4.3.0/library"                    "0.2-19"
## compiler     "C:/Program Files/R/R-4.3.0/library"                    "4.3.0"
## datasets     "C:/Program Files/R/R-4.3.0/library"                    "4.3.0"
## foreign      "C:/Program Files/R/R-4.3.0/library"                    "0.8-84"
## graphics     "C:/Program Files/R/R-4.3.0/library"                    "4.3.0"
## grDevices    "C:/Program Files/R/R-4.3.0/library"                    "4.3.0"
## grid         "C:/Program Files/R/R-4.3.0/library"                    "4.3.0"
## KernSmooth   "C:/Program Files/R/R-4.3.0/library"                    "2.23-20"
## lattice      "C:/Program Files/R/R-4.3.0/library"                    "0.21-8"
## MASS         "C:/Program Files/R/R-4.3.0/library"                    "7.3-58.4"
## Matrix       "C:/Program Files/R/R-4.3.0/library"                    "1.5-4"
## methods      "C:/Program Files/R/R-4.3.0/library"                    "4.3.0"
## mgcv         "C:/Program Files/R/R-4.3.0/library"                    "1.8-42"
## nlme         "C:/Program Files/R/R-4.3.0/library"                    "3.1-162"
## nnet         "C:/Program Files/R/R-4.3.0/library"                    "7.3-18"
## parallel     "C:/Program Files/R/R-4.3.0/library"                    "4.3.0"
## rpart        "C:/Program Files/R/R-4.3.0/library"                    "4.1.19"
## spatial      "C:/Program Files/R/R-4.3.0/library"                    "7.3-16"
## splines      "C:/Program Files/R/R-4.3.0/library"                    "4.3.0"
## stats        "C:/Program Files/R/R-4.3.0/library"                    "4.3.0"
## stats4       "C:/Program Files/R/R-4.3.0/library"                    "4.3.0"
## survival     "C:/Program Files/R/R-4.3.0/library"                    "3.5-5"
## tcltk        "C:/Program Files/R/R-4.3.0/library"                    "4.3.0"
## tools        "C:/Program Files/R/R-4.3.0/library"                    "4.3.0"
## translations "C:/Program Files/R/R-4.3.0/library"                    "4.3.0"
## utils        "C:/Program Files/R/R-4.3.0/library"                    "4.3.0"
##              Priority      Depends
## base64enc    NA            "R (>= 2.9.0)"
## bslib        NA            "R (>= 2.10)"
## cachem       NA            NA
```

```
## cellranger   NA            "R (>= 3.0.0)"
## cli          NA            "R (>= 3.4)"
## commonmark   NA            NA
## cpp11        NA            NA
## crayon       NA            NA
## digest       NA            "R (>= 3.3.0)"
## ellipsis     NA            "R (>= 3.2)"
## evaluate     NA            "R (>= 3.0.2)"
## fansi        NA            "R (>= 3.1.0)"
## fastmap      NA            NA
## fontawesome  NA            "R (>= 3.3.0)"
## fs           NA            "R (>= 3.4)"
## glue         NA            "R (>= 3.4)"
## highr        NA            "R (>= 3.3.0)"
## hms          NA            NA
## htmltools    NA            "R (>= 2.14.1)"
## jquerylib    NA            NA
## jsonlite     NA            "methods"
## knitr        NA            "R (>= 3.3.0)"
## lifecycle    NA            "R (>= 3.4)"
## magrittr     NA            "R (>= 3.4.0)"
## markdown     NA            "R (>= 2.11.1)"
## memoise      NA            NA
## mime         NA            NA
## pillar       NA            NA
## pkgconfig    NA            NA
## prettyunits  NA            NA
## progress     NA            NA
## R6           NA            "R (>= 3.0)"
## rappdirs     NA            "R (>= 3.2)"
## Rcpp         NA            NA
## readxl       NA            "R (>= 3.5)"
## rematch      NA            NA
## rlang        NA            "R (>= 3.5.0)"
## rmarkdown    NA            "R (>= 3.0)"
## sass         NA            NA
## stringi      NA            "R (>= 3.1)"
## stringr      NA            "R (>= 3.3)"
## tibble       NA            "R (>= 3.4.0)"
## tinytex      NA            NA
## utf8         NA            "R (>= 2.10)"
## vctrs        NA            "R (>= 3.5.0)"
## xfun         NA            NA
## yaml         NA            NA
## base         "base"        NA
## boot         "recommended" "R (>= 3.0.0), graphics, stats"
## class        "recommended" "R (>= 3.0.0), stats, utils"
## cluster      "recommended" "R (>= 3.5.0)"
## codetools    "recommended" "R (>= 2.1)"
## compiler     "base"        NA
## datasets     "base"        NA
## foreign      "recommended" "R (>= 4.0.0)"
## graphics     "base"        NA
## grDevices    "base"        NA
## grid         "base"        NA
## KernSmooth   "recommended" "R (>= 2.5.0), stats"
## lattice      "recommended" "R (>= 4.0.0)"
## MASS         "recommended" "R (>= 4.3.0), grDevices, graphics, stats, utils"
## Matrix       "recommended" "R (>= 3.5.0), methods"
## methods      "base"        NA
## mgcv         "recommended" "R (>= 3.6.0), nlme (>= 3.1-64)"
## nlme         "recommended" "R (>= 3.5.0)"
## nnet         "recommended" "R (>= 3.0.0), stats, utils"
## parallel     "base"        NA
## rpart        "recommended" "R (>= 2.15.0), graphics, stats, grDevices"
## spatial      "recommended" "R (>= 3.0.0), graphics, stats, utils"
## splines      "base"        NA
## stats        "base"        NA
## stats4       "base"        NA
## survival     "recommended" "R (>= 3.5.0)"
## tcltk        "base"        NA
## tools        "base"        NA
## translations NA            NA
## utils        "base"        NA
##              Imports

## base64enc    NA
```

bslib "grDevices, htmltools (>= 0.5.4), jsonlite, sass (>= 0.4.0),\njquerylib (>= 0.1.3), rlang, cachem, memoise (>= 2.0.1),\nbase64enc, mime"

cachem "rlang, fastmap (>= 1.1.1)"

cellranger "rematch, tibble"

cli "utils"

commonmark NA

cpp11 NA

crayon "grDevices, methods, utils"

digest "utils"

ellipsis "rlang (>= 0.3.0)"

evaluate "methods"

fansi "grDevices, utils"

fastmap NA

fontawesome "rlang (>= 1.0.6), htmltools (>= 0.5.1.1)"

fs "methods"

glue "methods"

highr "xfun (>= 0.18)"

hms "lifecycle, methods, pkgconfig, rlang (>= 1.0.2), vctrs (>=\n0.3.8)"

htmltools "utils, digest, grDevices, base64enc, rlang (>= 0.4.10),\nfastmap (>= 1.1.0), ellipsis"

jquerylib "htmltools"

jsonlite NA

knitr "evaluate (>= 0.15), highr, methods, yaml (>= 2.1.19), xfun (>=\n0.34), tools"

lifecycle "cli (>= 3.4.0), glue, rlang (>= 1.0.6)"

magrittr NA

markdown "utils, commonmark (>= 1.9.0), xfun (>= 0.38)"

memoise "rlang (>= 0.4.10), cachem"

mime "tools"

pillar "cli (>= 2.3.0), fansi, glue, lifecycle, rlang (>= 1.0.2), utf8\n(>= 1.1.0), utils, vctrs (>= 0.5.0)"

pkgconfig "utils"

prettyunits NA

progress "hms, prettyunits, R6, crayon"

R6 NA

rappdirs NA

Rcpp "methods, utils"

readxl "cellranger, tibble (>= 2.0.1), utils"

rematch NA

rlang "utils"

rmarkdown "bslib (>= 0.2.5.1), evaluate (>= 0.13), fontawesome (>=\n0.5.0), htmltools (>= 0.5.1), jquerylib, jsonlite, knitr (>=\n1.22), methods, stringr (>= 1.2.0), tinytex (>= 0.31), tools,\nutils, xfun (>= 0.36), yaml (>= 2.1.19)"

sass "fs, rlang (>= 0.4.10), htmltools (>= 0.5.1), R6, rappdirs"

stringi "tools, utils, stats"

```
## stringr       "cli, glue (>= 1.6.1), lifecycle (>= 1.0.3), magrittr, rlang\n(>= 1.0.0), stringi (>= 1.5.3), vctrs"
## tibble        "fansi (>= 0.4.0), lifecycle (>= 1.0.0), magrittr, methods,\npillar (>= 1.8.1), pkgconfig, rlang (>= 1.0.2), utils, vctrs\n(>= 0.4.2)"
## tinytex       "xfun (>= 0.29)"
## utf8          NA
## vctrs         "cli (>= 3.4.0), glue, lifecycle (>= 1.0.3), rlang (>= 1.1.0)"
## xfun          "stats, tools"
## yaml          NA
## 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
## translations NA
## utils         NA
##               LinkingTo
## base64enc     NA
## bslib         NA
## cachem        NA
```

```
## cellranger   NA
## cli          NA
## commonmark   NA
## cpp11        NA
## crayon       NA
## digest       NA
## ellipsis     NA
## evaluate     NA
## fansi        NA
## fastmap      NA
## fontawesome  NA
## fs           NA
## glue         NA
## highr        NA
## hms          NA
## htmltools    NA
## jquerylib    NA
## jsonlite     NA
## knitr        NA
## lifecycle    NA
## magrittr     NA
## markdown     NA
## memoise      NA
## mime         NA
## pillar       NA
## pkgconfig    NA
## prettyunits  NA
## progress     NA
## R6           NA
## rappdirs     NA
## Rcpp         NA
## readxl       "cpp11 (>= 0.4.0), progress"
## rematch      NA
## rlang        NA
## rmarkdown    NA
## sass         NA
## stringi      NA
## stringr      NA
## tibble       NA
## tinytex      NA
## utf8         NA
## vctrs        NA
## xfun         NA
## yaml         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
## translations NA
## utils        NA
##             Suggests

## base64enc    NA
```

```
## bslib        "shiny (>= 1.6.0), rmarkdown (>= 2.7), thematic, knitr,\ntestthat, withr, rappdirs, curl, magrittr, fontawesome, bsicons"

## cachem       "testthat"

## cellranger   "covr, testthat (>= 1.0.0), knitr, rmarkdown"

## cli          "callr, covr, crayon, digest, glue (>= 1.6.0), grDevices,\nhtmltools, htmlwidgets, knitr, methods, mockery, processx, ps\n(>= 1.3.4.9000), rlang (
>= 1.0.2.9003), rmarkdown, rprojroot,\nrstudioapi, testthat, tibble, whoami, withr"

## commonmark   "curl, testthat, xml2"

## cpp11        "bench, brio, callr, cli, covr, decor, desc, ggplot2, glue,\nknitr, lobstr, mockery, progress, rmarkdown, scales, Rcpp,\ntestthat, tibble, utils, vct
rs, withr"
## crayon       "mockery, rstudioapi, testthat, withr"

## digest       "tinytest, simplermarkdown"

## ellipsis     "covr, testthat"

## evaluate     "covr, ggplot2, lattice, rlang, testthat (>= 3.0.0), withr"

## fansi        "unitizer, knitr, rmarkdown"

## fastmap      "testthat (>= 2.1.1)"

## fontawesome  "covr, dplyr (>= 1.0.8), knitr (>= 1.31), testthat (>= 3.0.0),\nrsvg"

## fs           "covr, crayon, knitr, pillar (>= 1.0.0), rmarkdown, spelling,\ntestthat (>= 3.0.0), tibble (>= 1.1.0), vctrs (>= 0.3.0), withr"

## glue         "covr, crayon, DBI, dplyr, forcats, ggplot2, knitr, magrittr,\nmicrobenchmark, R.utils, rmarkdown, rprintf, RSQLite, stringr,\ntestthat (>= 3.0.0), v
ctrs (>= 0.3.0), waldo (>= 0.3.0), withr"
## highr        "knitr, markdown, testit"

## hms          "crayon, lubridate, pillar (>= 1.1.0), testthat (>= 3.0.0)"

## htmltools    "markdown, testthat, withr, Cairo, ragg, shiny"

## jquerylib    "testthat"

## jsonlite     "httr, vctrs, testthat, knitr, rmarkdown, R.rsp, sf"

## knitr        "markdown (>= 1.3), formatR, testit, digest, rgl (>=\n0.95.1201), codetools, rmarkdown, htmlwidgets (>= 0.7),\nwebshot, tikzDevice (>= 0.10), t
inytex, reticulate (>= 1.4),\nJuliaCall (>= 0.11.1), magick, png, jpeg, gifski, xml2 (>=\n1.2.0), httr, DBI (>= 0.4-1), showtext, tibble, sass, bslib,\nragg, gridSV
G, styler (>= 1.2.0), targets (>= 0.6.0)"
## lifecycle    "covr, crayon, knitr, lintr, rmarkdown, testthat (>= 3.0.1),\ntibble, tidyverse, tools, vctrs, withr"

## magrittr     "covr, knitr, rlang, rmarkdown, testthat"

## markdown     "knitr, rmarkdown (>= 2.18), yaml, RCurl"

## memoise      "digest, aws.s3, covr, googleAuthR, googleCloudStorageR, httr,\ntestthat"

## mime         NA

## pillar       "bit64, DBI, debugme, DiagrammeR, dplyr, formattable, ggplot2,\nknitr, lubridate, nanotime, nycflights13, palmerpenguins,\nrmarkdown, scale
s, stringi, survival, testthat (>= 3.1.1),\ntibble, units (>= 0.7.2), vdiffr, withr"

## pkgconfig    "covr, testthat, disposables (>= 1.0.3)"

## prettyunits  "codetools, covr, testthat"

## progress     "Rcpp, testthat, withr"

## R6           "testthat, pryr"

## rappdirs     "roxygen2, testthat (>= 3.0.0), covr, withr"

## Rcpp         "tinytest, inline, rbenchmark, pkgKitten (>= 0.1.2)"

## readxl       "covr, knitr, rmarkdown, testthat (>= 3.1.6), withr"

## rematch      "covr, testthat"

## rlang        "cli (>= 3.1.0), covr, crayon, fs, glue, knitr, magrittr,\nmethods, pillar, rmarkdown, stats, testthat (>= 3.0.0), tibble,\nusethis, vctrs (>= 0.2.3), wit
hr"
## rmarkdown    "digest, dygraphs, fs, rsconnect, downlit (>= 0.4.0), katex\n(>= 1.4.0), sass (>= 0.4.0), shiny (>= 1.6.0), testthat (>=\n3.0.3), tibble, vctrs, wi
thr (>= 2.4.2)"
## sass         "testthat, knitr, rmarkdown, withr, shiny, curl"
```

stringi NA

stringr "covr, htmltools, htmlwidgets, knitr, rmarkdown, testthat (>=\n3.0.0)"

tibble "bench, bit64, blob, brio, callr, cli, covr, crayon (>=\n1.3.4), DiagrammeR, dplyr, evaluate, formattable, ggplot2,\nhere, hms, htmltools, knitr, lubridate, mockr, nycflights13,\npkgbuild, pkgload, purrr, rmarkdown, stringi, testthat (>=\n3.0.2), tidyr, withr"

tinytex "testit, rstudioapi"

utf8 "cli, covr, knitr, rlang, rmarkdown, testthat (>= 3.0.0),\nwithr"

vctrs "bit64, covr, crayon, dplyr (>= 0.8.5), generics, knitr,\npillar (>= 1.4.4), pkgdown (>= 2.0.1), rmarkdown, testthat (>=\n3.0.0), tibble (>= 3.1.3), waldo (>= 0.2.0), withr, xml2,\nzeallot"
xfun "testit, parallel, codetools, rstudioapi, tinytex (>= 0.30),\nmime, markdown (>= 1.5), knitr (>= 1.42), htmltools, remotes,\npak, rhub, renv, curl, jsonlite, magick, yaml, rmarkdown"
yaml "RUnit"

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 "expm, MASS"

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,\nmathjaxr, V8"

translations NA

utils "methods, xml2, commonmark, knitr"

```
##             Enhances
## base64enc    "png"
## bslib        NA
## cachem       NA
## cellranger   NA
## cli          NA
## commonmark   NA
## cpp11        NA
## crayon       NA
## digest       NA
## ellipsis     NA
## evaluate     NA
## fansi        NA
## fastmap      NA
## fontawesome  NA
## fs           NA
## glue         NA
## highr        NA
## hms          NA
## htmltools    "knitr"
## jquerylib    NA
## jsonlite     NA
## knitr        NA
## lifecycle    NA
## magrittr     NA
## markdown     NA
## memoise      NA
## mime         NA
## pillar       NA
## pkgconfig    NA
## prettyunits  NA
## progress     NA
## R6           NA
## rappdirs     NA
## Rcpp         NA
## readxl       NA
## rematch      NA
## rlang        "winch"
## rmarkdown    NA
## sass         NA
## stringi      NA
## stringr      NA
## tibble       NA
## tinytex      NA
## utf8         NA
## vctrs        NA
## xfun         NA
## yaml         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, graph, SparseM, sfsmisc, igraph, maptools, 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
## translations NA
## utils        NA
```

```
##              License                                License_is_FOSS
## base64enc    "GPL-2 | GPL-3"                        NA
## bslib        "MIT + file LICENSE"                   NA
## cachem       "MIT + file LICENSE"                   NA
## cellranger   "MIT + file LICENSE"                   NA
## cli          "MIT + file LICENSE"                   NA
## commonmark   "BSD_2_clause + file LICENSE"          NA
## cpp11        "MIT + file LICENSE"                   NA
## crayon       "MIT + file LICENSE"                   NA
## digest       "GPL (>= 2)"                           NA
## ellipsis     "MIT + file LICENSE"                   NA
## evaluate     "MIT + file LICENSE"                   NA
## fansi        "GPL-2 | GPL-3"                        NA
## fastmap      "MIT + file LICENSE"                   NA
## fontawesome  "MIT + file LICENSE"                   NA
## fs           "MIT + file LICENSE"                   NA
## glue         "MIT + file LICENSE"                   NA
## highr        "GPL"                                  NA
## hms          "MIT + file LICENSE"                   NA
## htmltools    "GPL (>= 2)"                           NA
## jquerylib    "MIT + file LICENSE"                   NA
## jsonlite     "MIT + file LICENSE"                   NA
## knitr        "GPL"                                  NA
## lifecycle    "MIT + file LICENSE"                   NA
## magrittr     "MIT + file LICENSE"                   NA
## markdown     "GPL-2"                                NA
## memoise      "MIT + file LICENSE"                   NA
## mime         "GPL"                                  NA
## pillar       "MIT + file LICENSE"                   NA
## pkgconfig    "MIT + file LICENSE"                   NA
## prettyunits  "MIT + file LICENSE"                   NA
## progress     "MIT + file LICENSE"                   NA
## R6           "MIT + file LICENSE"                   NA
## rappdirs     "MIT + file LICENSE"                   NA
## Rcpp         "GPL (>= 2)"                           NA
## readxl       "MIT + file LICENSE"                   NA
## rematch      "MIT + file LICENSE"                   NA
## rlang        "MIT + file LICENSE"                   NA
## rmarkdown    "GPL-3"                                NA
## sass         "MIT + file LICENSE"                   NA
## stringi      "file LICENSE"                         "yes"
## stringr      "MIT + file LICENSE"                   NA
## tibble       "MIT + file LICENSE"                   NA
## tinytex      "MIT + file LICENSE"                   NA
## utf8         "Apache License (== 2.0) | file LICENSE" NA
## vctrs        "MIT + file LICENSE"                   NA
## xfun         "MIT + file LICENSE"                   NA
## yaml         "BSD_3_clause + file LICENSE"          NA
## base         "Part of R 4.3.0"                      NA
## boot         "Unlimited"                            NA
## class        "GPL-2 | GPL-3"                        NA
## cluster      "GPL (>= 2)"                           NA
## codetools    "GPL"                                  NA
## compiler     "Part of R 4.3.0"                      NA
## datasets     "Part of R 4.3.0"                      NA
## foreign      "GPL (>= 2)"                           NA
## graphics     "Part of R 4.3.0"                      NA
## grDevices    "Part of R 4.3.0"                      NA
## grid         "Part of R 4.3.0"                      NA
## KernSmooth   "Unlimited"                            NA
## lattice      "GPL (>= 2)"                           NA
## MASS         "GPL-2 | GPL-3"                        NA
## Matrix       "GPL (>= 2) | file LICENCE"            NA
## methods      "Part of R 4.3.0"                      NA
## mgcv         "GPL (>= 2)"                           NA
## nlme         "GPL (>= 2)"                           NA
## nnet         "GPL-2 | GPL-3"                        NA
## parallel     "Part of R 4.3.0"                      NA
## rpart        "GPL-2 | GPL-3"                        NA
## spatial      "GPL-2 | GPL-3"                        NA
## splines      "Part of R 4.3.0"                      NA
## stats        "Part of R 4.3.0"                      NA
## stats4       "Part of R 4.3.0"                      NA
## survival     "LGPL (>= 2)"                          NA
## tcltk        "Part of R 4.3.0"                      NA
## tools        "Part of R 4.3.0"                      NA
## translations "Part of R 4.3.0"                      NA
## utils        "Part of R 4.3.0"                      NA
```

```
##               License_restricts_use OS_type MD5sum NeedsCompilation Built
## base64enc     NA                    NA      NA     "yes"            "4.3.0"
## bslib         NA                    NA      NA     "no"             "4.3.0"
## cachem        NA                    NA      NA     "yes"            "4.3.0"
## cellranger    NA                    NA      NA     "no"             "4.3.0"
## cli           NA                    NA      NA     "yes"            "4.3.0"
## commonmark    NA                    NA      NA     "yes"            "4.3.0"
## cpp11         NA                    NA      NA     "no"             "4.3.0"
## crayon        NA                    NA      NA     "no"             "4.3.0"
## digest        NA                    NA      NA     "yes"            "4.3.0"
## ellipsis      NA                    NA      NA     "yes"            "4.3.0"
## evaluate      NA                    NA      NA     "no"             "4.3.0"
## fansi         NA                    NA      NA     "yes"            "4.3.0"
## fastmap       NA                    NA      NA     "yes"            "4.3.0"
## fontawesome   NA                    NA      NA     "no"             "4.3.0"
## fs            NA                    NA      NA     "yes"            "4.3.0"
## glue          NA                    NA      NA     "yes"            "4.3.0"
## highr         NA                    NA      NA     "no"             "4.3.0"
## hms           NA                    NA      NA     "no"             "4.3.0"
## htmltools     NA                    NA      NA     "yes"            "4.3.0"
## jquerylib     NA                    NA      NA     "no"             "4.3.0"
## jsonlite      NA                    NA      NA     "yes"            "4.3.0"
## knitr         NA                    NA      NA     "no"             "4.3.0"
## lifecycle     NA                    NA      NA     "no"             "4.3.0"
## magrittr      NA                    NA      NA     "yes"            "4.3.0"
## markdown      NA                    NA      NA     "no"             "4.3.0"
## memoise       NA                    NA      NA     "no"             "4.3.0"
## mime          NA                    NA      NA     "yes"            "4.3.0"
## pillar        NA                    NA      NA     "no"             "4.3.0"
## pkgconfig     NA                    NA      NA     "no"             "4.3.0"
## prettyunits   NA                    NA      NA     "no"             "4.3.0"
## progress      NA                    NA      NA     "no"             "4.3.0"
## R6            NA                    NA      NA     "no"             "4.3.0"
## rappdirs      NA                    NA      NA     "yes"            "4.3.0"
## Rcpp          NA                    NA      NA     "yes"            "4.3.0"
## readxl        NA                    NA      NA     "yes"            "4.3.0"
## rematch       NA                    NA      NA     "no"             "4.3.0"
## rlang         NA                    NA      NA     "yes"            "4.3.0"
## rmarkdown     NA                    NA      NA     "no"             "4.3.0"
## sass          NA                    NA      NA     "yes"            "4.3.0"
## stringi       NA                    NA      NA     "yes"            "4.3.0"
## stringr       NA                    NA      NA     "no"             "4.3.0"
## tibble        NA                    NA      NA     "yes"            "4.3.0"
## tinytex       NA                    NA      NA     "no"             "4.3.0"
## utf8          NA                    NA      NA     "yes"            "4.3.0"
## vctrs         NA                    NA      NA     "yes"            "4.3.0"
## xfun          NA                    NA      NA     "yes"            "4.3.0"
## yaml          NA                    NA      NA     "yes"            "4.3.0"
## base          NA                    NA      NA     NA               "4.3.0"
## boot          NA                    NA      NA     "no"             "4.3.0"
## class         NA                    NA      NA     "yes"            "4.3.0"
## cluster       NA                    NA      NA     "yes"            "4.3.0"
## codetools     NA                    NA      NA     "no"             "4.3.0"
## compiler      NA                    NA      NA     NA               "4.3.0"
## datasets      NA                    NA      NA     NA               "4.3.0"
## foreign       NA                    NA      NA     "yes"            "4.3.0"
## graphics      NA                    NA      NA     "yes"            "4.3.0"
## grDevices     NA                    NA      NA     "yes"            "4.3.0"
## grid          NA                    NA      NA     "yes"            "4.3.0"
## KernSmooth    NA                    NA      NA     "yes"            "4.3.0"
## lattice       NA                    NA      NA     "yes"            "4.3.0"
## MASS          NA                    NA      NA     "yes"            "4.3.0"
## Matrix        NA                    NA      NA     "yes"            "4.3.0"
## methods       NA                    NA      NA     "yes"            "4.3.0"
## mgcv          NA                    NA      NA     "yes"            "4.3.0"
## nlme          NA                    NA      NA     "yes"            "4.3.0"
## nnet          NA                    NA      NA     "yes"            "4.3.0"
## parallel      NA                    NA      NA     "yes"            "4.3.0"
## rpart         NA                    NA      NA     "yes"            "4.3.0"
## spatial       NA                    NA      NA     "yes"            "4.3.0"
## splines       NA                    NA      NA     "yes"            "4.3.0"
## stats         NA                    NA      NA     "yes"            "4.3.0"
## stats4        NA                    NA      NA     NA               "4.3.0"
## survival      NA                    NA      NA     "yes"            "4.3.0"
## tcltk         NA                    NA      NA     "yes"            "4.3.0"
## tools         NA                    NA      NA     "yes"            "4.3.0"
## translations  NA                    NA      NA     NA               "4.3.0"
## utils         NA                    NA      NA     "yes"            "4.3.0"
```

```
search()
```

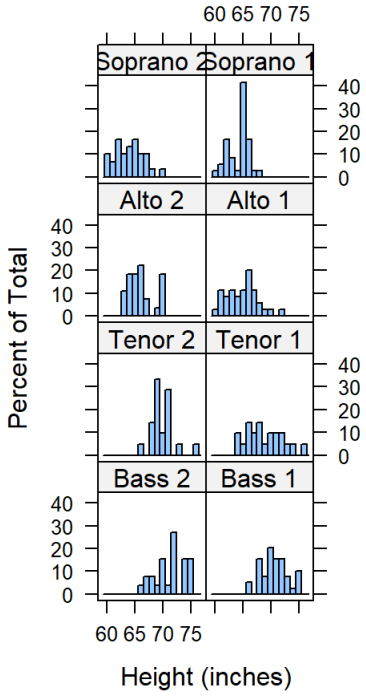
```
## [1] ".GlobalEnv"        "package:stats"     "package:graphics"
## [4] "package:grDevices" "package:utils"     "package:datasets"
## [7] "package:methods"   "Autoloads"         "package:base"
```

```
require(lattice)
```

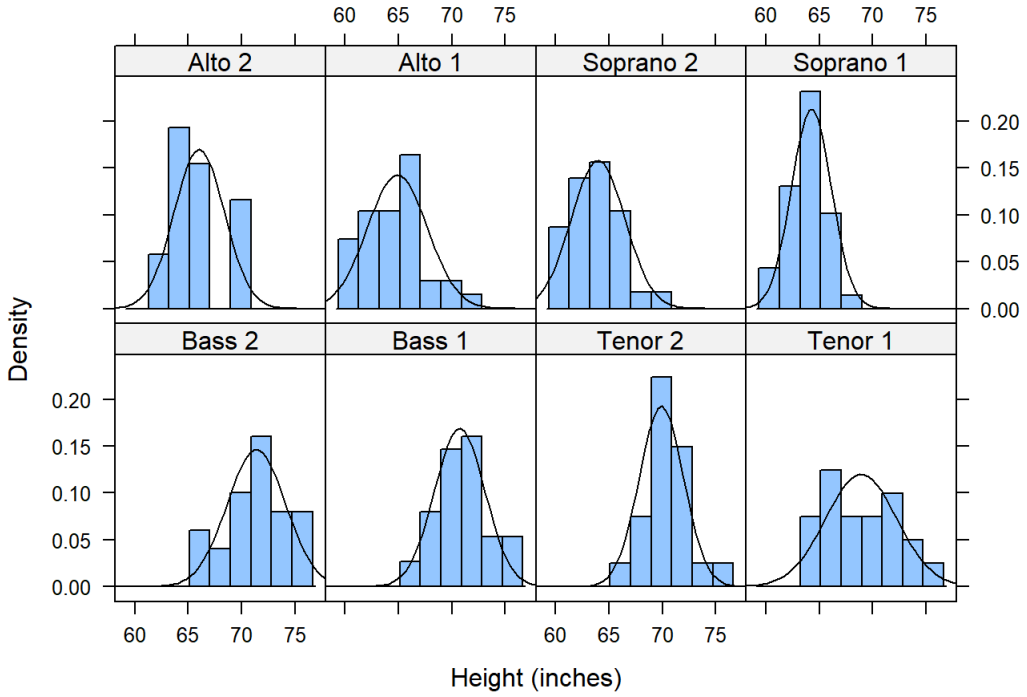
```
## Loading required package: lattice
```

```
example(histogram)
```

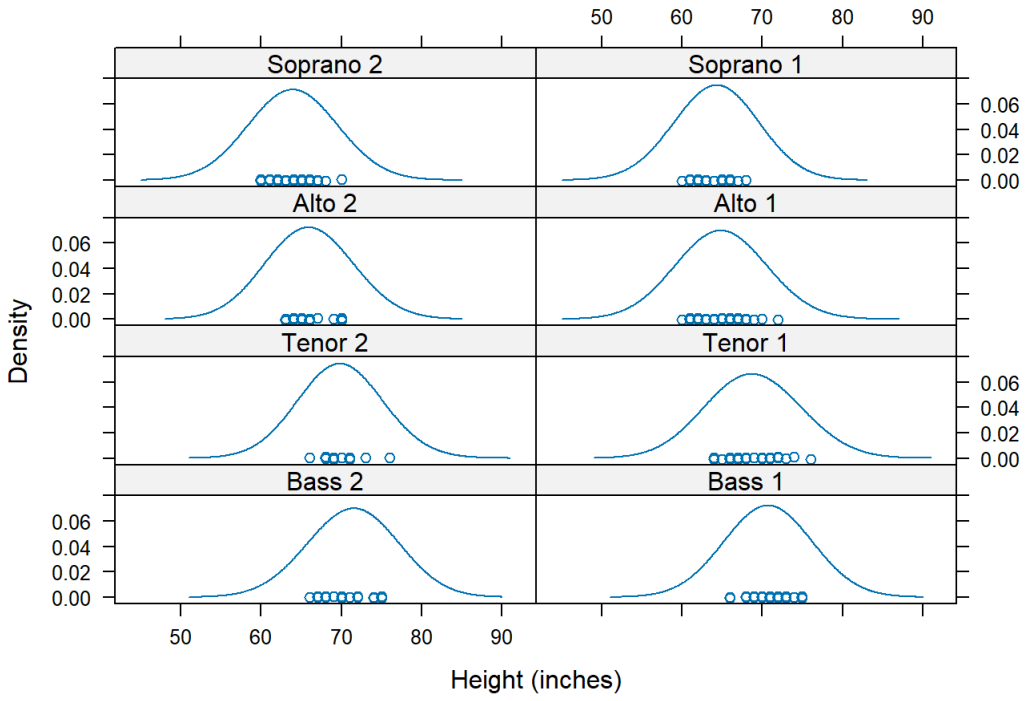
```
##
## hstgrm> require(stats)
##
## hstgrm> histogram( ~ height | voice.part, data = singer, nint = 17,
## hstgrm+           endpoints = c(59.5, 76.5), layout = c(2,4), aspect = 1,
## hstgrm+           xlab = "Height (inches)")
```




```
##
## hstgrm> histogram( ~ height | voice.part, data = singer,
## hstgrm+           xlab = "Height (inches)", type = "density",
## hstgrm+           panel = function(x, ...) {
## hstgrm+               panel.histogram(x, ...)
## hstgrm+               panel.mathdensity(dmath = dnorm, col = "black",
## hstgrm+                                 args = list(mean=mean(x),sd=sd(x)))
## hstgrm+           } )
```




```
##
## hstgrm> densityplot( ~ height | voice.part, data = singer, layout = c(2, 4),
## hstgrm+             xlab = "Height (inches)", bw = 5)
```




```
ls()
```

```
## character(0)
```

```
x=c(1,4,5,4,6,8)
x
```

```
## [1] 1 4 5 4 6 8
```

```
names=c("Book","Pen","Bat","Biscuit","Lake")
names
```

```
## [1] "Book"    "Pen"     "Bat"     "Biscuit" "Lake"
```

```
example=c(rep(1,14),rep(7,22))
example
```

```
##  [1] 1 1 1 1 1 1 1 1 1 1 1 1 1 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7
```

```
res=seq(9,19,1)
res
```

```
##  [1]  9 10 11 12 13 14 15 16 17 18 19
```

```
data(trees)
names(trees)
```

```
## [1] "Girth"  "Height" "Volume"
```

```
dim(trees)
```

```
## [1] 31  3
```

```
str(trees)
```

```
## 'data.frame':    31 obs. of  3 variables:
##  $ Girth : num  8.3 8.6 8.8 10.5 10.7 10.8 11 11 11.1 11.2 ...
##  $ Height: num  70 65 63 72 81 83 66 75 80 75 ...
##  $ Volume: num  10.3 10.3 10.2 16.4 18.8 19.7 15.6 18.2 22.6 19.9 ...
```

```
View(trees)
```

```
train=read.csv(file.choose())

names(train)
```

```
## [1] "id"                "vendor_id"         "passenger_count"
## [4] "pickup_longitude"  "pickup_latitude"   "dropoff_longitude"
## [7] "dropoff_latitude"  "store_and_fwd_flag" "trip_duration"
```

```
x=train$vendor_id
mean(x,na.rm=T)
```

```
## [1] 1.534503
```

```
median(x,na.rm=T)
```

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

```
summary(x)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   1.000   1.000   2.000   1.535   2.000   2.000
```

```
sd(x,na.rm=T)
```

```
## [1] 0.4988084
```

```
var(x,na.rm=T)
```

```
## [1] 0.2488098
```

```
quantile(x,probs=seq(0,1,0.5),na.rm=T)
```

```
##   0%  50% 100%
##    1    2    2
```

```
add=train$passenger_count
sum(add)
```

```
## [1] 1745229
```

stem()

```
stem(train$pickup_latitude)
```

```
##
##   The decimal point is at the |
##
##   34 | 47
##   35 | 13
##   36 | 01
##   37 | 89
##   38 | 999
##   39 | 48
##   40 | 22333444444444555555555555555566666666666666666666666666666666666666+1048407
##   41 | 00000000000000000000000000000000000000001111111111111111122222333333334
##   42 | 5
##   43 | 059
##   44 |
##   45 |
##   46 |
##   47 |
##   48 |
##   49 |
##   50 |
##   51 | 9
```

table()

```
table(train$store_and_fwd_flag)
```

```
##
##       N       Y
## 1042766    5809
```

```
table(train$store_and_fwd_flag,train$passenger_count)
```

```
##
##         0     1     2     3     4     5     6     7     8     9
##   N    38 738485 150235  42840  20214  56249  34700     3     1     1
##   Y     1   4647    843    193    122      3     0     0     0     0
```

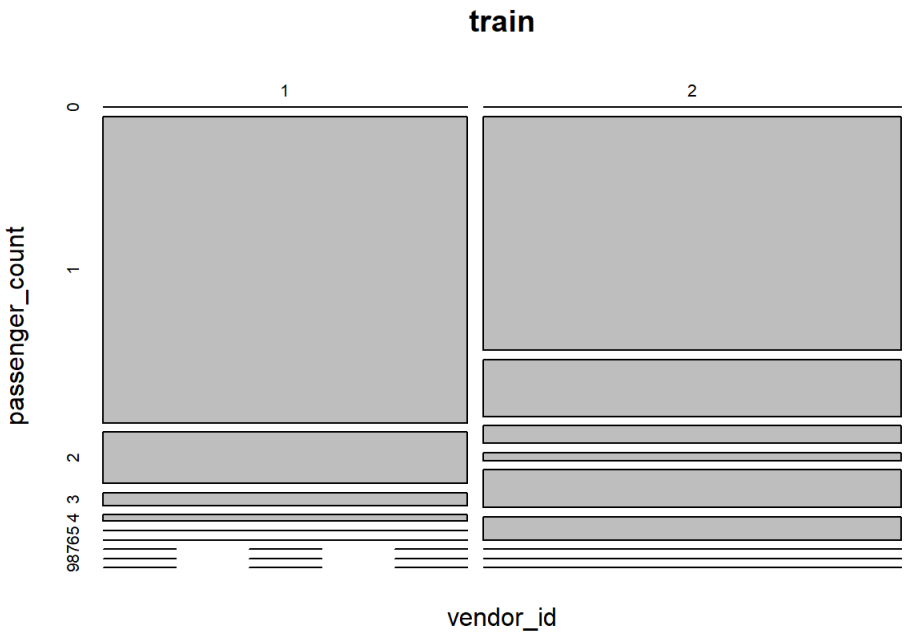
```
xtabs(~store_and_fwd_flag,data=train)
```

```
## store_and_fwd_flag
##       N       Y
## 1042766    5809
```

```
xtabs(~passenger_count+store_and_fwd_flag,data=train)
```

```
##                store_and_fwd_flag
## passenger_count      N      Y
##               0     38      1
##               1 738485   4647
##               2 150235    843
##               3  42840    193
##               4  20214    122
##               5  56249      3
##               6  34700      0
##               7      3      0
##               8      1      0
##               9      1      0
```

```
mosaicplot(~vendor_id+passenger_count,data=train)
```




```
table(train$passenger_count)
```

```
##
##     0     1     2     3     4     5     6     7     8     9
##    39 743132 151078  43033  20336  56252  34700     3     1     1
```

```
xtabs(~passenger_count,data=train)
```

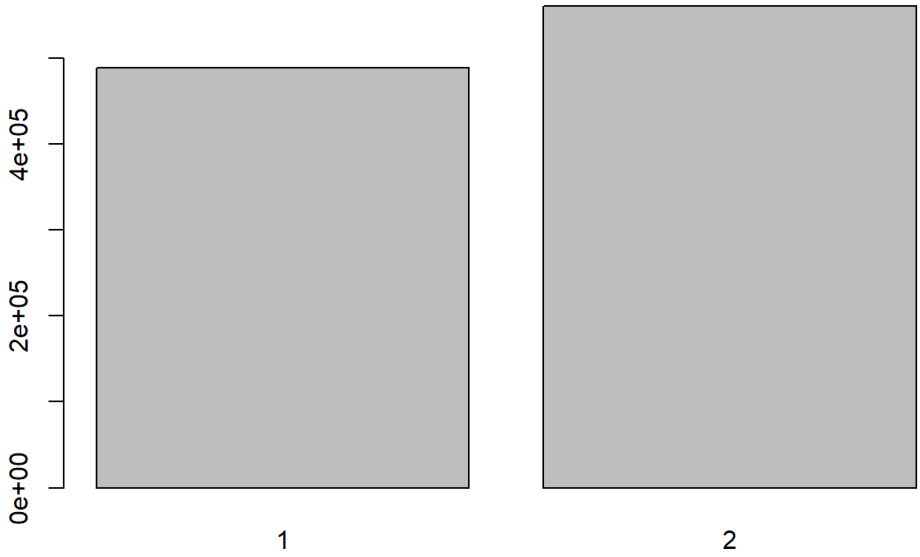
```
## passenger_count
##     0     1     2     3     4     5     6     7     8     9
##    39 743132 151078  43033  20336  56252  34700     3     1     1
```

```
levels=cut(train$passenger_count,breaks=seq(0,60,10))
xtabs(~levels)
```

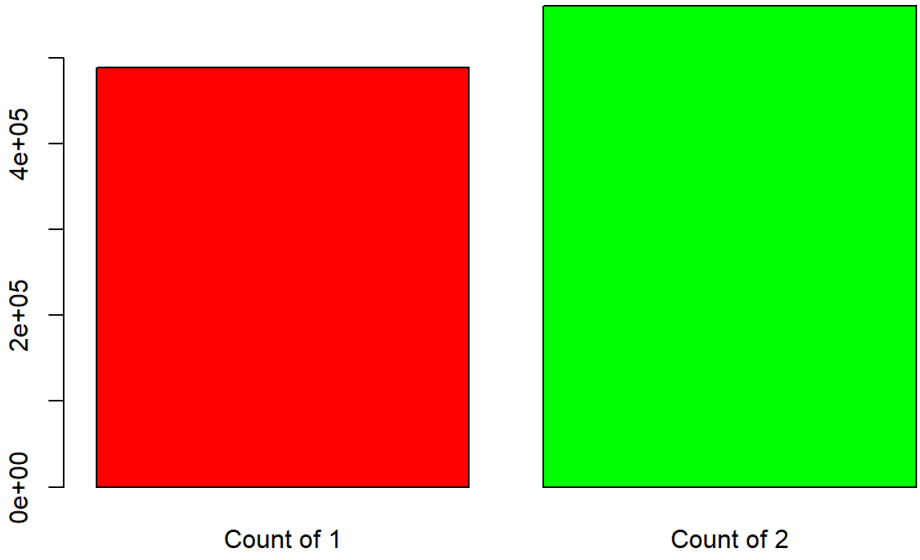
```
## levels
##  (0,10] (10,20] (20,30] (30,40] (40,50] (50,60]
## 1048536       0       0       0       0       0
```

barplot()

```
barplot(table(train$vendor_id))
```



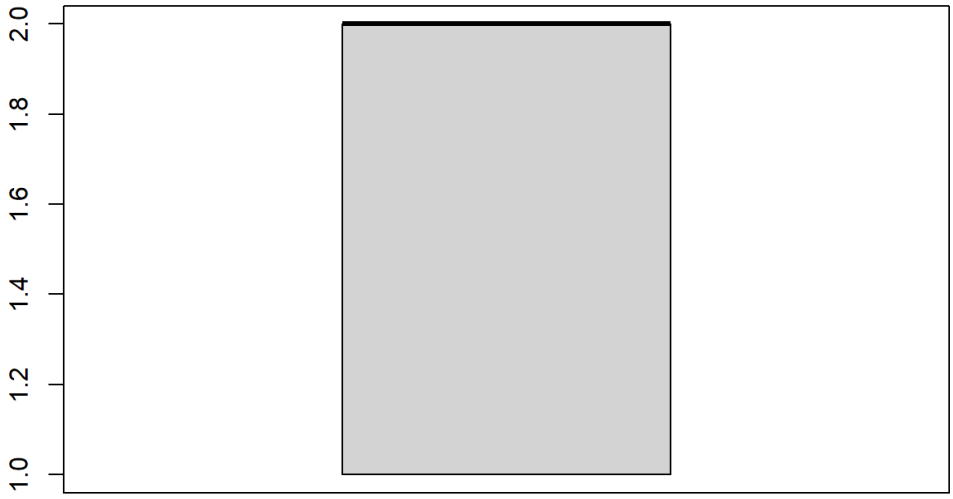

```
barplot(table(train$vendor_id),col=c("red","green"),names=c("Count of 1","Count of 2"))
```



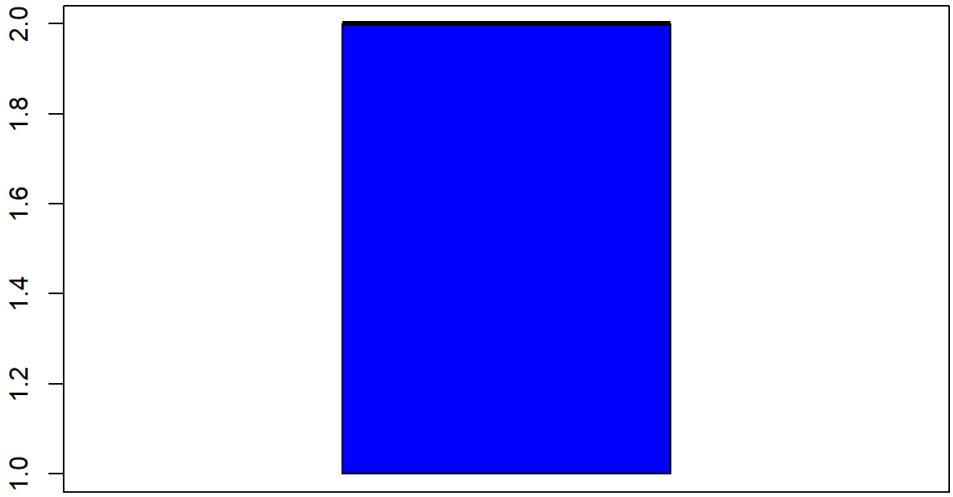

```
data(train)
```

```
## Warning in data(train): data set 'train' not found
```

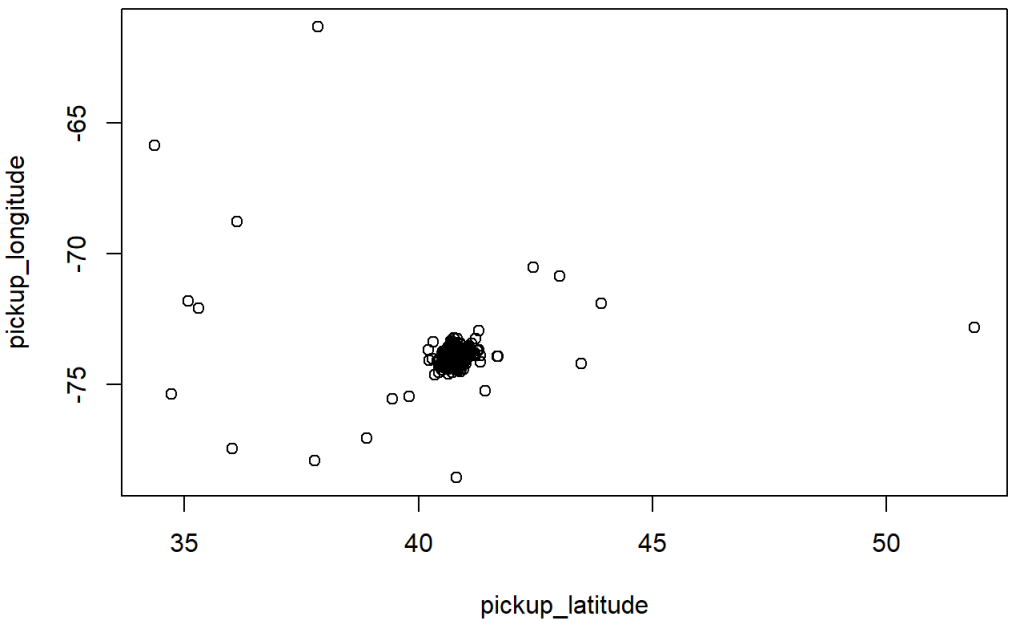
```
boxplot(train$vendor_id)
```



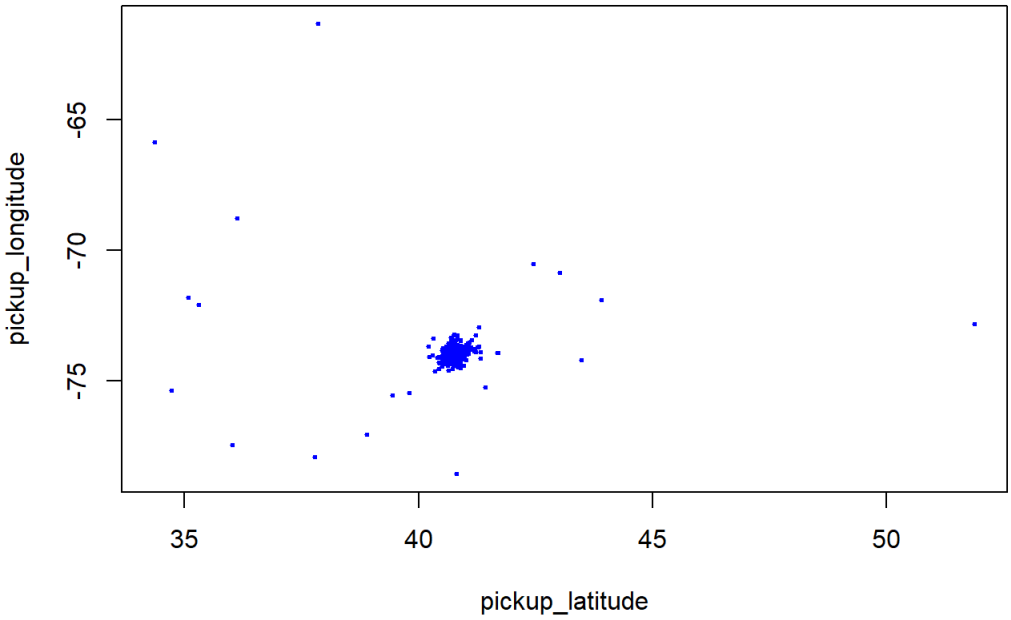

```
boxplot(train$vendor_id,col="blue")
```




```
plot(pickup_longitude~pickup_latitude,data=train)
```




```
plot(pickup_longitude~pickup_latitude,data=train,cex=0.5,pch=20,col="blue")
```




```
sample(c("rows,columns"),size=1)
```

```
## [1] "rows,columns"
```

```
sample(c("rows","columns"),size=20,replace=T)
```

```
##  [1] "columns" "rows"    "rows"    "columns" "rows"    "rows"    "columns"
##  [8] "columns" "columns" "rows"    "rows"    "columns" "rows"    "rows"
## [15] "rows"    "columns" "rows"    "rows"    "rows"    "rows"
```

```
sample(c(0,1),size=20,replace=T)
```

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

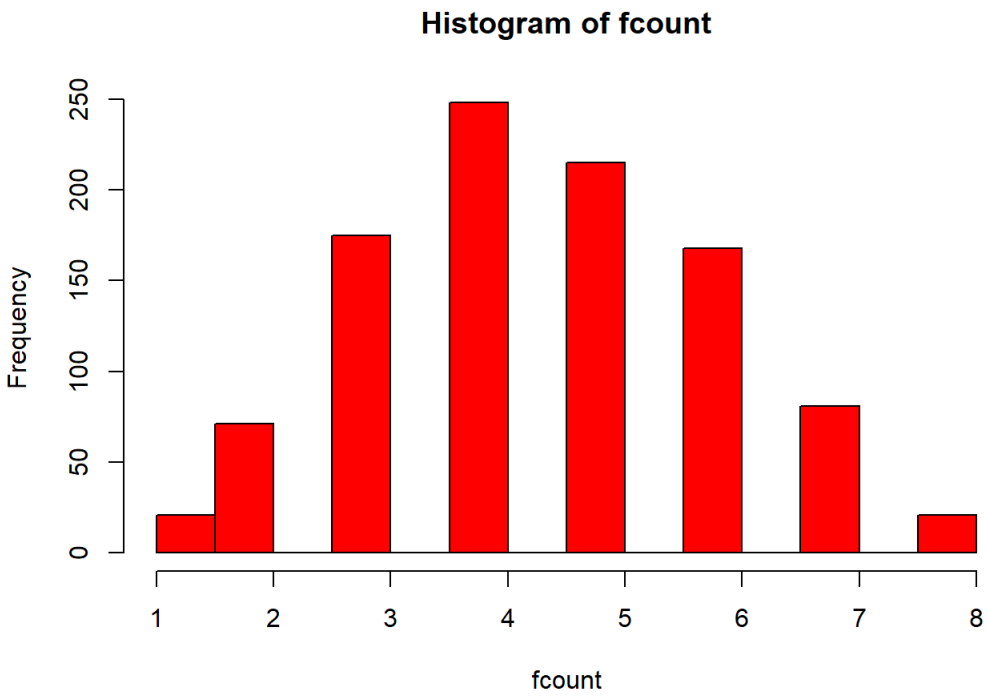
```
sample(c("rows","columns"),2,replace=T)
```

```
## [1] "columns" "columns"
```

```
replicate(10,sample(c("rows","columns"),2,replace=T))
```

```
##      [,1]   [,2]      [,3]      [,4]      [,5]      [,6]      [,7]
## [1,] "rows" "columns" "rows"    "columns" "rows"    "columns" "columns"
## [2,] "rows" "rows"    "columns" "rows"    "columns" "rows"    "columns"
##      [,8]      [,9]      [,10]
## [1,] "columns" "rows"    "rows"
## [2,] "columns" "columns" "rows"
```

```
fcount=replicate(1000,sum(sample(c(0,1),10,rep=T,prob=c(.5,.4))))
hist(fcount,col="red")
```




```
dbinom(1,6,0.4) #probability of 1 heads in 6 flips
```

```
## [1] 0.186624
```

```
dbinom(0:6,6,0.4)#full probability dist for 6 flips
```

```
## [1] 0.046656 0.186624 0.311040 0.276480 0.138240 0.036864 0.004096
```

```
sum(dbinom(0:3,6,0.4))#probability of 3 or fewer heads in 6 flips
```

```
## [1] 0.8208
```

```
pbinom(3,6,0.4)
```

```
## [1] 0.8208
```

```
passenger_count=replicate(1000,sum(sample(c("H","T"),5,rep=T)=="H"))
table(passenger_count)/1000
```

```
## passenger_count
##     0     1     2     3     4     5
## 0.027 0.149 0.335 0.299 0.169 0.021
```

```
table(rbinom(1000,5,0.5))/1000
```

```
##
##     0     1     2     3     4     5
## 0.025 0.139 0.302 0.325 0.167 0.042
```

```
qbinom(seq(0,2,0.3),40,0.1) #quantiles in binom distirbution
```

```
## Warning in qbinom(seq(0, 2, 0.3), 40, 0.1): NaNs produced
```

```
## [1]   0   3   4   6 NaN NaN NaN
```

```
pchisq(4.13,df=4,lower.tail = F)  #gives P-value associated with X-squared stat 4.13 when df=4
```

```
## [1] 0.3886981
```

```
qchisq(c(0.001,0.005,0.99),2,lower.tail = F)  #gives critical values
```

```
## [1] 13.81551056 10.59663473  0.02010067
```

```
values=c(35,65,76,34,98,87)
probability=c(0.13,0.13,0.14,0.16,0.24,0.20)
chisq.test(values,p=probability) #to find the chi-square test
```

```
##
##  Chi-squared test for given probabilities
##
## data:  values
## X-squared = 30.992, df = 5, p-value = 9.401e-06
```

```
t=table(train$vendor_id,train$store_and_fwd_flag)#to add both row/colums
addmargins(t)
```

```
##
##            N       Y     Sum
##   1    482300    5809  488109
##   2    560466       0  560466
##   Sum 1042766    5809 1048575
```

```
addmargins(t,1)#to add oly column totals
```

```
##
##            N       Y
##   1    482300    5809
##   2    560466       0
##   Sum 1042766    5809
```

```
addmargins(t,2)#to add oly row totals
```

```
##
##         N      Y    Sum
##   1 482300   5809 488109
##   2 560466      0 560466
```

```
my_data <- data.frame(
  gender = c("Male", "Male", "Female", "Female", "Female", "Male", "Male"),
  age = c(25, 30, 35, 40, 45, 50, 55)
)

summary(my_data)
```

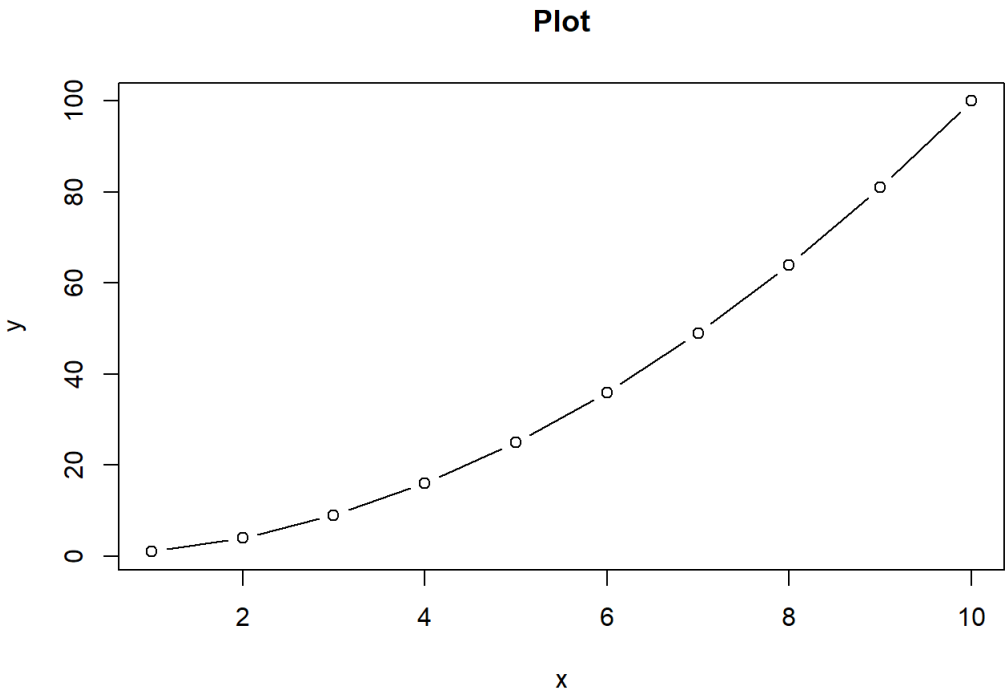
```
##     gender               age
##  Length:7           Min.   :25.0
##  Class :character   1st Qu.:32.5
##  Mode  :character   Median :40.0
##                     Mean   :40.0
##                     3rd Qu.:47.5
##                     Max.   :55.0
```

```
gender_table <- table(my_data$gender)
gender_prop <- prop.table(gender_table)
gender_prop
```

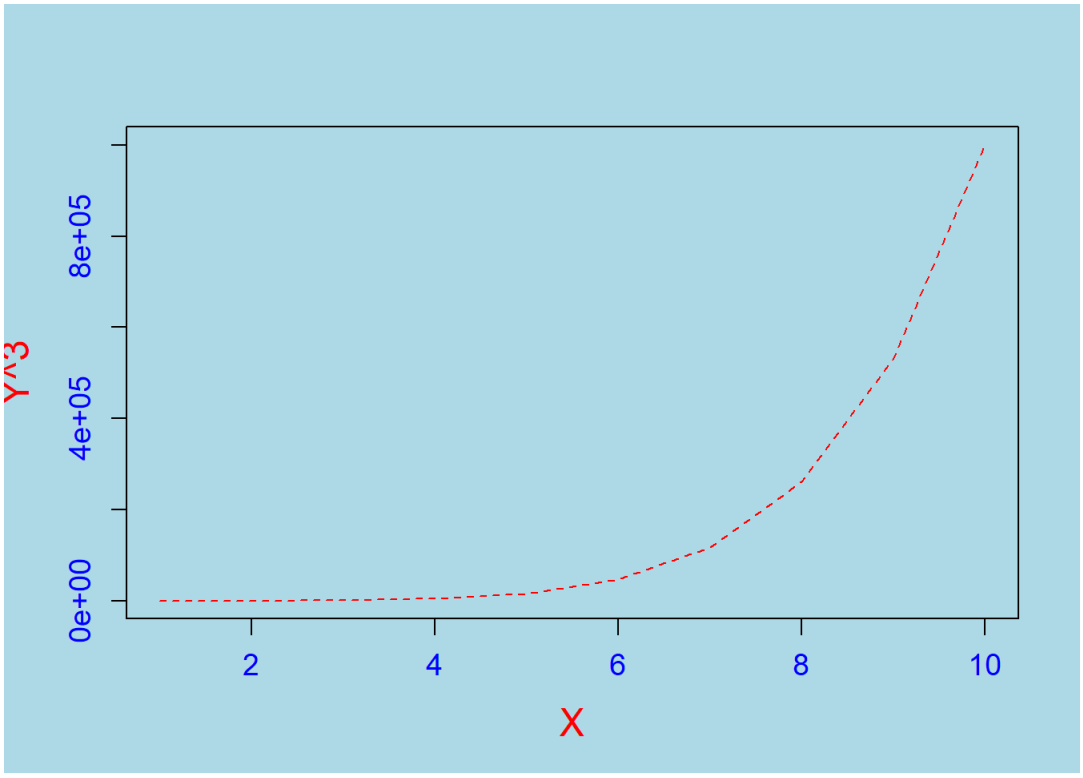
```
##
##    Female      Male
## 0.4285714 0.5714286
```

```
barplot(gender_prop,legend=T,beside=T,main="Status of men and women")
```


```
x <- 1:10
y <- x^2
plot(x, y, type = "b", main = "Plot")
```




```
par(
  mar = c(5, 4, 4, 2),      # Set the margin size
  col.axis = "blue",        # Set the color of the axes
  col.lab = "red",          # Set the color of the labels
  cex.axis = 1.2,           # Set the size of the axis text
  cex.lab = 1.5,            # Set the size of the label text
  pch = 16,                 # Set the plotting symbol
  lty = 2,                  # Set the line type
  bg = "lightblue"          # Set the background color
)


plot(x, y^3, type = "l", col = "red", xlab = "X", ylab = "Y^3")
```




```
contingency_table <- matrix(c(10, 20, 30, 40), nrow = 2)
rownames(contingency_table) <- c("Group A", "Group B")
colnames(contingency_table) <- c("Success", "Failure")
contingency_table
```

```
##         Success Failure
## Group A      10      30
## Group B      20      40
```

```
result <- fisher.test(contingency_table)

result
```

```
##
##  Fisher's Exact Test for Count Data
##
## data:  contingency_table
## p-value = 0.5045
## alternative hypothesis: true odds ratio is not equal to 1
## 95 percent confidence interval:
##  0.2420054 1.7643388
## sample estimates:
## odds ratio
##  0.6693434
```

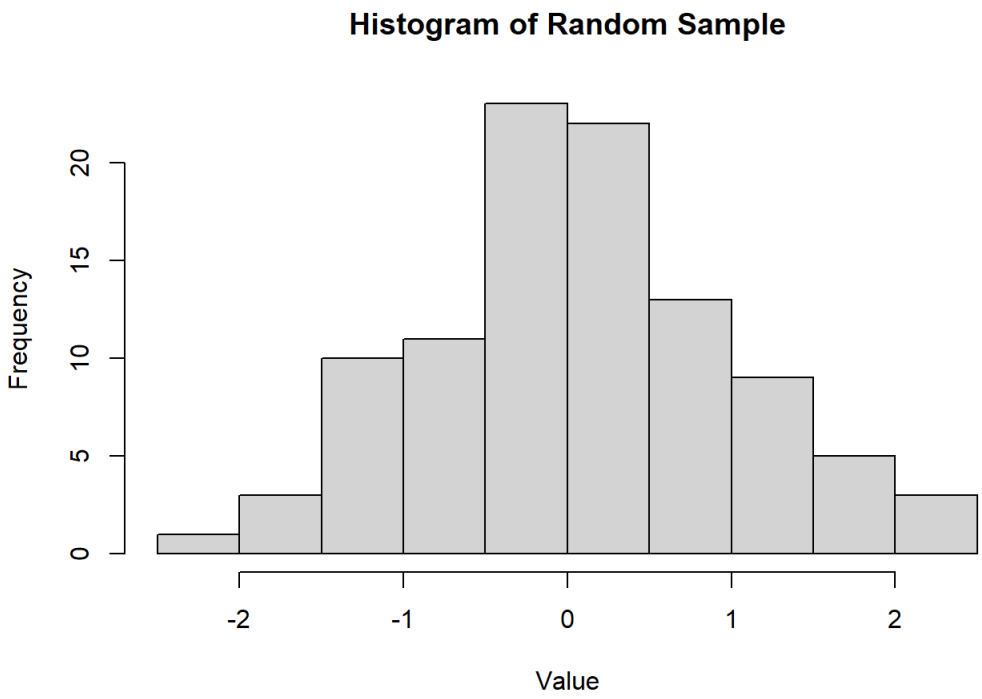
```
# Calculate the PMF of the Poisson distribution
lambda <- 2   # Mean parameter for the Poisson distribution
x <- 0:10     # Values at which to evaluate the PMF

pmf <- dpois(x, lambda)

# Display the PMF
print(pmf)
```

```
##  [1] 1.353353e-01 2.706706e-01 2.706706e-01 1.804470e-01 9.022352e-02
##  [6] 3.608941e-02 1.202980e-02 3.437087e-03 8.592716e-04 1.909493e-04
## [11] 3.818985e-05
```

```
# Calculate the CDF of the Poisson distribution
lambda <- 2   # Mean parameter for the Poisson distribution
x <- 0:10     # Values at which to evaluate the CDF

cdf <- ppois(x, lambda)

# Display the CDF
print(cdf)
```

```
##  [1] 0.1353353 0.4060058 0.6766764 0.8571235 0.9473470 0.9834364 0.9954662
##  [8] 0.9989033 0.9997626 0.9999535 0.9999917
```

```
# Generate a random sample from a normal distribution
set.seed(123)  # Set seed for reproducibility
sample <- rnorm(100, mean = 0, sd = 1)

# Create a histogram of the sample
hist(sample, main = "Histogram of Random Sample", xlab = "Value")
```




```
# Calculate the probability of values below a certain threshold
threshold <- 1.5
probability <- pnorm(threshold, mean = 0, sd = 1)

# Calculate the value corresponding to a given quantile
quantile <- 0.75
value <- qnorm(quantile, mean = 0, sd = 1)

# Calculate the probability density at a given value
density <- dnorm(value, mean = 0, sd = 1)

# Display the results
print(probability)
```

```
## [1] 0.9331928
```

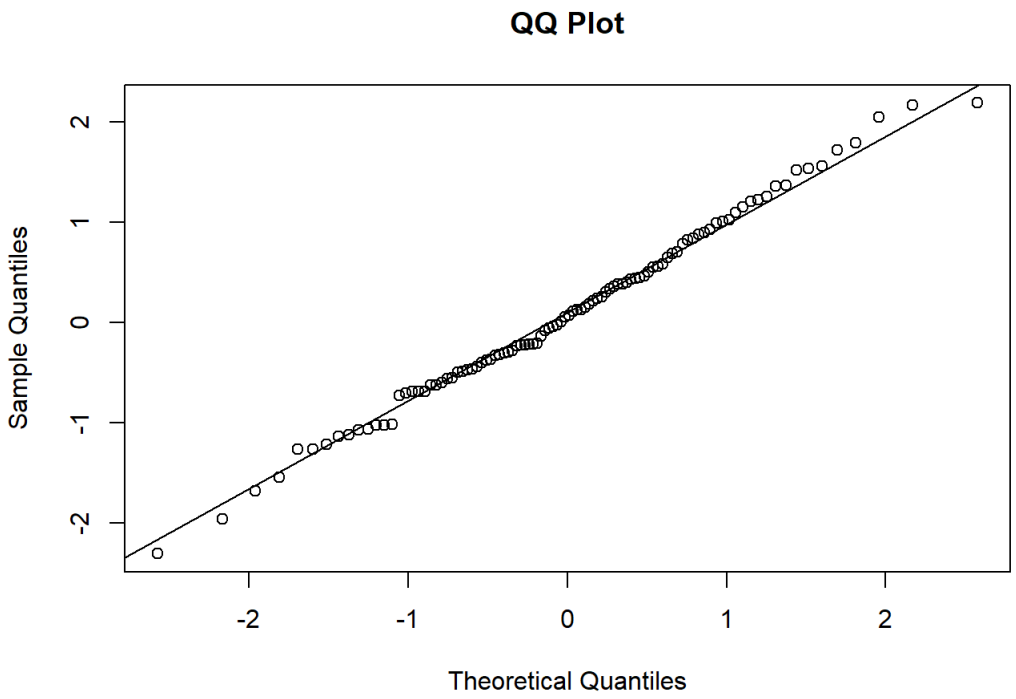
```
print(value)
```

```
## [1] 0.6744898
```

```
print(density)
```

```
## [1] 0.3177766
```

```
# Generate a random sample from a normal distribution
set.seed(123)  # Set seed for reproducibility
sample <- rnorm(100, mean = 0, sd = 1)

# Create a QQ plot
qqnorm(sample, main = "QQ Plot")
qqline(sample)
```




```
# Calculate the probability of values below a certain threshold
threshold <- 1.5
probability <- pnorm(threshold, mean = 0, sd = 1)

# Calculate the value corresponding to a given quantile
quantile <- 0.75
value <- qnorm(quantile, mean = 0, sd = 1)

# Calculate the probability density at a given value
density <- dnorm(value, mean = 0, sd = 1)

# Display the results
print(probability)
```

```
## [1] 0.9331928
```

```
print(value)
```

```
## [1] 0.6744898
```

```
print(density)
```

```
## [1] 0.3177766
```

```
# Generate two independent samples
set.seed(123)  # Set seed for reproducibility
sample1 <- rnorm(50, mean = 5, sd = 2)
sample2 <- rnorm(50, mean = 7, sd = 2)

# Perform a two-sample t-test
result <- t.test(sample1, sample2)

# Display the t-test result
print(result)
```

```
##
##  Welch Two Sample t-test
##
## data:  sample1 and sample2
## t = -6.0718, df = 97.951, p-value = 2.406e-08
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -2.950897 -1.497122
## sample estimates:
## mean of x mean of y
##  5.068807  7.292817
```

```r
# Perform a power analysis for a two-sample t-test
effect_size <- 0.5   # Expected effect size
n <- 50              # Sample size per group
alpha <- 0.05        # Significance level

power <- power.t.test(n = n, delta = effect_size, sd = 2, sig.level = alpha, type = "two.sample")

# Display the power analysis result
print(power)
```

```
##
##      Two-sample t test power calculation
##
##               n = 50
##           delta = 0.5
##              sd = 2
##       sig.level = 0.05
##           power = 0.2350874
##     alternative = two.sided
##
## NOTE: n is number in *each* group
```

```r
# Create a linear regression model
set.seed(123)  # Set seed for reproducibility
x <- 1:10
y <- 2*x + rnorm(10)
model <- lm(y ~ x)

# Generate new values for prediction
new_x <- 11:15

# Make predictions using the model
predictions <- predict(model, newdata = data.frame(x = new_x))

# Display the predictions
print(predictions)
```

```
##       1       2       3       4       5
## 21.62378 23.54181 25.45984 27.37787 29.29590
```

```r
# Example data
x <- c(1, 2, 3, 4, 5)
y <- c(1.5, 3.5, 6, 9, 13)

# Define a nonlinear function to fit
model <- function(x, a, b, c) {
  a * x^2 + b * x + c
}

# Fit the nonlinear model using nls()
fit <- nls(y ~ model(x, a, b, c), start = list(a = 1, b = 1, c = 1))

# Print the model summary
summary(fit)
```

```
##
## Formula: y ~ model(x, a, b, c)
##
## Parameters:
##   Estimate Std. Error t value Pr(>|t|)
## a  0.32143    0.03194  10.062  0.00973 **
## b  0.92143    0.19535   4.717  0.04213 *
## c  0.30000    0.25635   1.170  0.36246
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.1195 on 2 degrees of freedom
##
## Number of iterations to convergence: 1
## Achieved convergence tolerance: 1.145e-07
```

```
# Get the residuals from the fitted model
residuals <- residuals(fit)

# Print the residuals
print(residuals)
```

```
## [1] -0.04285714  0.07142857  0.04285714 -0.12857143  0.05714286
## attr(,"label")
## [1] "Residuals"
```

```
# Example data
x <- c(1, 2, 3, 4, 5)

# Calculate the cumulative sum using cumsum()
cumulative_sum <- cumsum(x)

# Print the cumulative sum
print(cumulative_sum)
```

```
## [1]  1  3  6 10 15
```

```
# Calculate the empirical cumulative distribution function (ECDF) using ecdf()
ecdf_func <- ecdf(x)

# Evaluate the ECDF at specific values
probability_2 <- ecdf_func(2)
probability_4 <- ecdf_func(4)

# Print the probabilities
print(probability_2)
```

```
## [1] 0.4
```

```
print(probability_4)
```

```
## [1] 0.8
```

```
class(train)
```

```
## [1] "data.frame"
```

```
x <- c(5, 2, 9, 1, 7)
sorted_x <- sort(x)
print(sorted_x)
```

```
## [1] 1 2 5 7 9
```

```
x <- c(5, 2, 9, 1, 7)
ranked_x <- rank(x)
print(ranked_x)
```

```
## [1] 3 2 5 1 4
```

```
# Create a data frame
df <- data.frame(x = c(1, 2, 3), y = c("A", "B", "C"))

# Display the row names
print(row.names(df))
```

```
## [1] "1" "2" "3"
```

---

1. be↩