# R4H2O Cheat Sheet

## Scope

This cheatsheet summarises the various function mentioned during the course. For more comprehensive resources, refer to the Tidyverse or Rstudio websites.

## **Getting Help**

### Accessing the help files

#### ?mean

Get help of a particular function.

help.search('weighted mean')
Search the help files for a word or phrase.

help (package = 'dplyr')
Find help for a package.

## **Using Packages**

install.packages (``tidyverse'')
Download and install a package from CRAN.

#### library(tdyverse)

Load the package into the session, making all its functions available to use.

## **Working Directory**

#### getwd()

Find the current working directory (where inputs are found and outputs are sent).

setwd('C://file/path')

Change the current working directory.

Use projects in RStudio to set the working directory to the folder you are working in.

## **Vectors**

### **Creating Vectors**

```
    c(2, 4, 6)
    2 4 6
    Join elements into a vector

    2:6
    2 3 4 5 6
    An integer sequence sequence

    seq(2, 3, by=0.5)
    2.0 2.5 3.0
    A complex sequence sequence

    rep(1:2, times=3)
    1 2 1 2 1 2
    Repeat a vector

    rep(1:2, each=3)
    1 1 1 2 2 2
    Repeat of a vector
```

## Vectors Functions

sort(x) rev(x)

Return x sorted. Return x reversed.

table(x) unique(x)

See counts of values. See unique values.

#### **Selecting Vector Elements**

#### By Position

 $\times$  [4] The fourth element.

 $\times [-4]$  All but the fourth.

 $\times [2:4]$  Elements two to four.

 $\times [-(2:4)]$  All elements except two to four.

 $\times [c(1, 5)]$  Elements one and five.

### By Value

x[x == 10] Element which are equal to 10.

x [which (x==10)] Element which are equal to 10.

x[x < 0] All elements less than zero.

x[x%in%c(1,2,5)] Elements in the set  $\{1,2,5\}.$ 

#### **Named Vectors**

x['apple']

Element with name 'apple".

## **Programming**

#### For Loop

```
for (variable in sequence) {
    Do something
}
```

#### Example

```
for (i in 1:4) {
    j <- i + 10
    print(j)
}
```

## Functions

Example

While Loop

while (condition) {

while (i < 5) {

print(i)

Do something

```
funct_name <- function(var) {
    Do something
    return(new_variable)
}</pre>
```

### Example

```
square <- function(x) {
    squared <- x*x
    return(squared)
}</pre>
```

## If Statement

```
if (condition) {
    Do something
} else {
    Do something
}
```

#### Example

```
if (i > 3) {
    printf('Yes')
} else {
    printf('No')
}
```

## **Reading and Writing Data**

## Also see the **readr** package.

Input	Output	Description
df <-read.table('file	write.table(df, 'file	Read and write a delimited text
.txt')	.txt')	file.
		Read and write a comma
df <-read.csv('file.	write.csv(df, 'file.	separated value file. This is a
csv')	csv')	special case of
		read.table/write.table.
] 1/15:] - DD-+-1)	save(df, file = 'file	Read and write a n R data file, a
load('file.RData')	.RData')	file type special for R.



a == b	Are equal	a > b	Greater than	a >= b	Greater than or equal to	is.na(a)	Is missing
a !=b	Not equal	a < b	Less than	a <= b	Less than or equal to	is.null(a)	Is null

## **Types**

Converting between common data types in R. Can always go from a higher value in the table to a lower value.

as.logical	TRUE, FALSE, TRUE	Boolean values (TRUE or FALSE)
as.numeric	1, 0, 1	Integer or floating point numbers
as.character	'1', '0', '1'	Character strings. Generally preferred to factors
as.factor	'1', '0', '1' levels: '1', '0'	Character strings with preset levels. Needed for some statistical models

## **Maths Functions**

Naturai iog.	sum(x)	Sum.
Exponential.	mean(x)	Mean.
Largest element.	median(x)	Median.
Smallest element.	quantile(x)	Percentage quantiles.
Round to n decimal places.	rank(x)	Rank of elements.
Round to n significant figures.	var(x)	The variance.
Correlation.	sd(x)	The standard deviation.
	Exponential. Largest element. Smallest element. Round to n decimal places. Round to n significant figures.	Exponential. mean(x) Largest element. median(x)  Smallest element. quantile(x)  Round to n decimal places.  Round to n significant figures. var(x)

## Variable Assignment

> a <- 'apple' > a [1] 'apple'

## The Environment

**1s**() List all variables in the environment. rm(X) Remove x from the environment. Remove all variables from the envirm(list = ls()) ronment.

> You can use the environment panel in RStudio to browse variables in your environment.

## Lists

1 < -1ist(x = 1:5, y = c('a', 'b'))

A list is a collection of elements which can be of different types.

1[[2]] Second

element of I.

1[1] New list with

only the first

element.

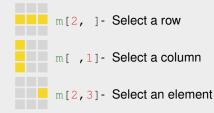
**Flement** named x.

1\$x

l['y']

New list with only element named y.

## **Matrices**



t (m) Transpose m %\*%n Matrix Multiplication solve(m, n)Find x in m\*x = n

## Data Frames

Also see the **dplyr** package.

df < -data.frame(x = 1:3, y = c('a', 'b', 'c'))A special case of a list where all elements are the same length.

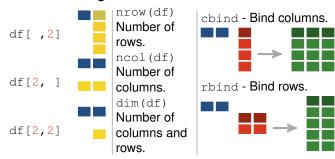
# 1 а 2 3 С



Understanding a data frame See the full data frame. view(df)

See the first 6 rows.

### Matrix subsetting



head(df)

## **Strings**

paste(x, y, sep = '')

paste(x, collapse = '')

grep(pattern, x)

gsub(pattern, replace, x)

toupper(x)

Also see the **stringr** package.

Join multiple vectors together.

Join elements of a vector together. Find regular expression matches in x.

Replace matches in x with a string.

Convert to uppercase.

tolower(x) Convert to lowercase.

nchar(x) Number of characters in a string.

### **Factors**

factor(x)

Turn a vector into a factor. Can set the levels of the factor and the order.

cut(x, breaks = 4)Turn a numeric vector into a factor by 'cutting' into sections.

### **Statistics**

 $lm(y \sim x, data=df)$ Linear model.

 $glm(v \sim x, data=df)$ Generalized linear model.

summary

Get more detailed information: out a model.

t.test(x, y) Perform a t-test for difference between means.

pairwise.t.test Perform a t-test for paired data.

prop.test Test for a difference between proportions.

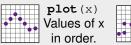
aov Analysis of variance.

## **Distributions**

	Random Variates	Density Function	Cumulative Distribution	Quantile
Normal	rnorm	dnorm	pnorm	qnorm
Poisson	rpois	dpois	ppois	qpois
Binomial	rbinom	dbinom pbinom		qbinom
Uniform	runif	dunif	punif	qunif

## **Plotting**

## Also see the ggplot2 package.



plot(x, y) Values of x against v.



Histogram of x.

**Dates** 

See the **lubridate** package.