

Basic Commands

O

R

Functions

- Inputs: supplied to the function
 - Detail how you wish to view, summarize, or manipulate an object
- Outputs: returned by the function. Often come in the following forms:
 - Summary of information in an object (e.g. mean, median)
 - Manipulated version of the object (e.g. adding column labels)
 - Completely new object (e.g. results of an analysis procedure with raw data as input)

Functions

Function name Argument name Argument value

mean (x, trim = 0.1)

Inputs/arguments and their values separated by commas

The diagram illustrates the components of a function call. The function name 'mean' is pointed to by a magenta arrow from the label 'Function name'. The argument name 'trim' is pointed to by a magenta arrow from the label 'Argument name'. The argument value '0.1' is pointed to by a magenta arrow from the label 'Argument value'. A magenta bracket underlines the entire argument list '(x, trim = 0.1)', with a label below it stating 'Inputs/arguments and their values separated by commas'.

Questions when exploring data



- What is this object?
- How big is this object?
- Are there named features of this object?
- What does this object look like?

What is this object?

class() function

```
> x <- 1:10
```

```
> class(x)
```

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

```
> y <- c(1.1, 2.2)
```

```
> class(y)
```

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

```
> class(mtcars)
```

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

str() function

```
> str(mtcars)
'data.frame':  32 obs. of  11 variables:
 $ mpg  : num  21 21 22.8 21.4 18.7 18.1 14.3 24.4 22.8 19.2 ...
 $ cyl  : num   6  6  4  6  8  6  8  4  4  6 ...
 $ disp: num  160 160 108 258 360 ...
 $ hp   : num  110 110  93 110 175 105 245  62  95 123 ...
 $ drat: num   3.9 3.9 3.85 3.08 3.15 2.76 3.21 3.69 3.92 3.92 ...
 $ wt   : num   2.62 2.88 2.32 3.21 3.44 ...
 $ qsec: num   16.5 17 18.6 19.4 17 ...
 $ vs   : num   0  0  1  1  0  1  0  1  1  1 ...
 $ am   : num   1  1  1  0  0  0  0  0  0  0 ...
 $ gear: num    4  4  4  3  3  3  3  4  4  4 ...
 $ carb: num    4  4  1  1  2  1  4  2  2  4 ...
```

Column
names

Column
classes

Previews of each column

How big is this object?

dim() function

```
> dim(mtcars)
```

```
[1] 32 11
```

```
> nrow(mtcars)
```

```
[1] 32
```

```
> ncol(mtcars)
```

```
[1] 11
```

length() function

```
> x <- c(1, 10, 3)
```

```
> length(x)
```

```
[1] 3
```

Are there named features of this object?

names () function

```
> prize_money <- c(1000, 500, 250)
> names(prize_money) <- c("first", "second",
"third")
> names(prize_money)
[1] "first" "second" "third"
```

Better to make this a two-column data frame:

```
> prize_info <- data.frame(
  money = c(1000, 500, 250),
  place = c("first", "second", "third")
)
```

colnames () and rownames () functions

```
> colnames(mtcars)
```

```
[1] "mpg"  "cyl"  "disp" "hp"    "drat" "wt"    "qsec" "vs"    "am"    "gear"  
[11] "carb"
```

```
> rownames(mtcars)
```

```
[1] "Mazda RX4"           "Mazda RX4 Wag"       "Datsun 710"  
[4] "Hornet 4 Drive"      "Hornet Sportabout"   "Valiant"  
[7] "Duster 360"          "Merc 240D"           "Merc 230"  
[10] "Merc 280"            "Merc 280C"           "Merc 450SE"  
[13] "Merc 450SL"          "Merc 450SLC"         "Cadillac Fleetwood"  
[16] "Lincoln Continental" "Chrysler Imperial"   "Fiat 128"  
[19] "Honda Civic"         "Toyota Corolla"      "Toyota Corona"  
[22] "Dodge Challenger"    "AMC Javelin"         "Camaro Z28"  
[25] "Pontiac Firebird"    "Fiat X1-9"           "Porsche 914-2"  
[28] "Lotus Europa"        "Ford Pantera L"      "Ferrari Dino"  
[31] "Maserati Bora"       "Volvo 142E"
```



**Index of first element
in the line**

What does this object look like?

print() function

```
> print(mtcars)
```

```
> mtcars
```

Both show the same output.

	mpg	cyl	disp	hp	drat	wt	qsec	vs	am	gear	carb
Mazda RX4	21.0	6	160.0	110	3.90	2.620	16.46	0	1	4	4
Mazda RX4 Wag	21.0	6	160.0	110	3.90	2.875	17.02	0	1	4	4
Datsun 710	22.8	4	108.0	93	3.85	2.320	18.61	1	1	4	1
Hornet 4 Drive	21.4	6	258.0	110	3.08	3.215	19.44	1	0	3	1
Hornet Sportabout	18.7	8	360.0	175	3.15	3.440	17.02	0	0	3	2
Valiant	18.1	6	225.0	105	2.76	3.460	20.22	1	0	3	1
Duster 360	14.3	8	360.0	245	3.21	3.570	15.84	0	0	3	4
Merc 240D	24.4	4	146.7	62	3.69	3.190	20.00	1	0	4	2
Merc 230	22.8	4	140.8	95	3.92	3.150	22.90	1	0	4	2
Merc 280	19.2	6	167.6	123	3.92	3.440	18.30	1	0	4	4
Merc 280C	17.8	6	167.6	123	3.92	3.440	18.90	1	0	4	4
Merc 450SE	16.4	8	275.8	180	3.07	4.070	17.40	0	0	3	3
Merc 450SL	17.3	8	275.8	180	3.07	3.730	17.60	0	0	3	3
Merc 450SLC	15.2	8	275.8	180	3.07	3.780	18.00	0	0	3	3
Cadillac Fleetwood	10.4	8	472.0	205	2.93	5.250	17.98	0	0	3	4
Lincoln Continental	10.4	8	460.0	215	3.00	5.424	17.82	0	0	3	4
Chrysler Imperial	14.7	8	440.0	230	3.23	5.345	17.42	0	0	3	4
Fiat 128	32.4	4	78.7	66	4.08	2.200	19.47	1	1	4	1
Honda Civic	30.4	4	75.7	52	4.93	1.615	18.52	1	1	4	2
Toyota Corolla	33.9	4	71.1	65	4.22	1.835	19.90	1	1	4	1
Toyota Corona	21.5	4	120.1	97	3.70	2.465	20.01	1	0	3	1
Dodge Challenger	15.5	8	318.0	150	2.76	3.520	16.87	0	0	3	2
AMC Javelin	15.2	8	304.0	150	3.15	3.435	17.30	0	0	3	2
Camaro Z28	13.3	8	350.0	245	3.73	3.840	15.41	0	0	3	4
Pontiac Firebird	19.2	8	400.0	175	3.08	3.845	17.05	0	0	3	2
Fiat X1-9	27.3	4	79.0	66	4.08	1.935	18.90	1	1	4	1
Porsche 914-2	26.0	4	120.3	91	4.43	2.140	16.70	0	1	5	2
Lotus Europa	30.4	4	95.1	113	3.77	1.513	16.90	1	1	5	2
Ford Pantera L	15.8	8	351.0	264	4.22	3.170	14.50	0	1	5	4
Ferrari Dino	19.7	6	145.0	175	3.62	2.770	15.50	0	1	5	6
Maserati Bora	15.0	8	301.0	335	3.54	3.570	14.60	0	1	5	8
Volvo 142E	21.4	4	121.0	109	4.11	2.780	18.60	1	1	4	2

**But be careful: a lot of text
may potentially overflow
your screen!**

head() and tail() functions

> head(mtcars) **First 6 rows**

	mpg	cyl	disp	hp	drat	wt	qsec	vs	am	gear	carb
Mazda RX4	21.0	6	160	110	3.90	2.620	16.46	0	1	4	4
Mazda RX4 Wag	21.0	6	160	110	3.90	2.875	17.02	0	1	4	4
Datsun 710	22.8	4	108	93	3.85	2.320	18.61	1	1	4	1
Hornet 4 Drive	21.4	6	258	110	3.08	3.215	19.44	1	0	3	1
Hornet Sportabout	18.7	8	360	175	3.15	3.440	17.02	0	0	3	2
Valiant	18.1	6	225	105	2.76	3.460	20.22	1	0	3	1

> tail(mtcars) **Last 6 rows**

	mpg	cyl	disp	hp	drat	wt	qsec	vs	am	gear	carb
Porsche 914-2	26.0	4	120.3	91	4.43	2.140	16.7	0	1	5	2
Lotus Europa	30.4	4	95.1	113	3.77	1.513	16.9	1	1	5	2
Ford Pantera L	15.8	8	351.0	264	4.22	3.170	14.5	0	1	5	4
Ferrari Dino	19.7	6	145.0	175	3.62	2.770	15.5	0	1	5	6
Maserati Bora	15.0	8	301.0	335	3.54	3.570	14.6	0	1	5	8
Volvo 142E	21.4	4	121.0	109	4.11	2.780	18.6	1	1	4	2

summary() function

```
> summary(iris)
```

Sepal.Length	Sepal.Width	Petal.Length	Petal.Width
Min. :4.300	Min. :2.000	Min. :1.000	Min. :0.100
1st Qu.:5.100	1st Qu.:2.800	1st Qu.:1.600	1st Qu.:0.300
Median :5.800	Median :3.000	Median :4.350	Median :1.300
Mean :5.843	Mean :3.057	Mean :3.758	Mean :1.199
3rd Qu.:6.400	3rd Qu.:3.300	3rd Qu.:5.100	3rd Qu.:1.800
Max. :7.900	Max. :4.400	Max. :6.900	Max. :2.500

Species

setosa :50
versicolor:50
virginica :50

**Summary statistics for
numeric quantities**

**Tabulations for factors
(categorical data)**

unique() function

```
> unique(mtcars$cyl)
```

```
[1] 6 4 8
```

Accesses the cyl column

```
> dat <- data.frame(a = c(1,1), b = c(2,2))
```

```
> dat
```

```
  a b
```

```
1 1 2
```

```
2 1 2
```

```
> unique(dat)
```


```
  a b
```

Unique rows of the data frame

```
1 1 2
```

```
> unique(mtca$cyl)
```

```
Error in unique(mtca$cyl) : object 'mtca' not found
```

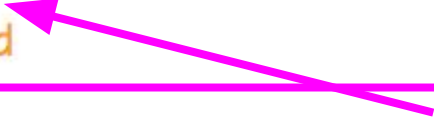


error message indicates code was not able to run successfully.



```
> unique(mtca$cyl)
Error in unique(mtca$cyl) : object 'mtca' not found
```

```
> log(-1)
[1] NaN
Warning message:
In log(-1) : NaNs produced
```



warning message indicates code was able to run but produced unexpected output.

```
> unique(mtcars$cyl)
Error in unique(mtcars$cyl) : object 'mtcars' not found
```

```
> log(-1)
[1] NaN
Warning message:
In log(-1) : NaNs produced
```

message provides you with more information about what is going on

```
> library(dplyr)

Attaching package: 'dplyr'

The following objects are masked from 'package:stats':
  filter, lag

The following objects are masked from 'package:base':
  intersect, setdiff, setequal, union
```