

S Cheatsheet

Compiled by:

Barry W. Brown
 Department of Biomathematics, Box 237
 University of Texas M. D. Anderson Cancer Center
 1515 Holcombe Blvd
 Houston, TX 77030

bwb@mdaali.cancer.utexas.edu

□

I. S EXPRESSIONS

- A. Literals

number	1 1.1 1.1e10
string	'string' or "string"
name	
comment	# string.
function (formals) expr	function(args){defn}
- B. Calls

expr infix expr
expr %anything% expr
unary expr
expr (arglist)
expr [arglist]
expr [[arglist]]
expr \$ fname
- C. Assignment

expr <- expr	
expr_expr	
expr -> expr	
expr <<- expr	Forces write to disk from within a function
- D. Conditional

if (expr) expr
if (expr) expr else expr
- E. Iteration

repeat expr

```

while ( expr ) expr
for ( Name in expr ) expr

```

```

F.  Flow
    break
    next
    return ( expr )
    ( expr )
    { exprlist }

```

□

II. ARITHMETIC OPERATORS

```

*    Multiply
+    Add
-    Subtract
/    Divide
^    Exponentiation
%%   Remainder or modulo operator
%*%  Matrix multiplication operator
%/%  Integer divide
%c%  crossproduct           m1 %c% m2 is t(m1) %*% m2
%o%  Outer Product

```

III. RELATIONAL OPERATORS

```

!=   Not-equal-to
<    Less-than
<=   Less-than-or-equal-to
==   Equal
>    Greater-than
>=   Greater-than-or-equal-to

```

□

IV. LOGICAL OPERATORS

```

!    Not
|    Or (Use with arrays or matrices)
||   Shortcut Or (Don't use with arrays or matrices)
&    And (Use with arrays or matrices)
&&   Shortcut And (Don't use with arrays or matrices)

```

V. SUBSCRIPTS

```

[ ]      Vector subscript
[[ ]]    list subscript - can only identify
         a single element
$        Named component selection from a list

```

V. SUBSCRIPT FORMS

```

logical          extracts or selects T component
positive numbers  extracts or selects specified indices
negative numbers  deletes specified indices
NA or out of range extends dimensions gives value NA

```

VI. SEQUENCE AND REPETITION

```

          seq (from, to, by, length, along)
also      :      as in 1:10

          rep(x, times, length)

```

□

VII. ARITHMETIC OPERATORS AND FUNCTIONS

```

abs(x)
acos(x)
acosh(x)
asin(x)
asinh(x)
atan(x)
atan(x, y)
atanh(x)
ceiling(x)
cos(x)
cosh(x)
exp(x)
floor(x)
gamma(x)
lgamma(x)
log(x, base=exp(1))
log10(x)
max(...)           elementwise
min(...)           elementwise
pmax(...)          parallel
pmin(...)          parallel
sin(x)
sinh(x)
sqrt(x)
tan(x)
tanh(x)
trunc(x)

```

VIII. TYPES

Can be used in `as.<type>` and `is.<type>` and `<type>(length=n calls.`

```
array
category           is, as only
character
complex
double
integer
list
logical
matrix
null               is, as only
numeric
```

□

IX. IN AND OUT OF S

A. Data In

```
scan(file="", what=numeric(), n, sep,
multi.line = F, flush = F, append = F)
```

Example: `data <- matrix(scan("data.file"),ncol=5,byrow=T)`

B. Command File In

```
source(file, local = F)
```

C. Screen Output to File

```
sink(file)
sink( )           restores output to screen
```

D. Write and Read Objects

```
dput(x, file)
dget(file)

write(t(matrix),file,ncol=ncol(matrix),append=FALSE)

dump(list, fileout="dumpdata")
restore(file)
```

E. Make Things (Including Help) Available or Unavailable

```
assign("name", value, frame, where)
```

```
attach(file, pos=2)
detach(what=2)
```

```
library( )
library(help=section)
```

```
library(section, first=FALSE)
library.dynam(section, file)
```

```
help(name="help", offline=F)
args(name="help")
```

□

X. REDUCTION OPERATORS

```
all(...)
any(...)
length(x)
max(...)
mean(x, trim=0)
median(x)
```

```

min(...)
mode(x)
prod(...)
quantile(x, probs=c(0,.25,.5,.75,1))
sum(...)
var(x,y)
cor(x,y,trim=0)

```

XI. STATISTICAL DISTRIBUTIONS

```

d<dist>(x,<parameters>)          density at x
p<dist>(x,<parameters>)          cumulative distn fn to x
q<dist>(p,<parameters>)          inverse cdf
r<dist>(n,<parameters>)          generates n random numbers from distn

```

+-----+-----+-----+-----+-----+				
+-----+-----+-----+-----+-----+				
<dist>	Distribution	Parameters	Defaults	
beta	beta	shapel, shape2	-, -	
cauchy	Cauchy	loc, scale	0, 1	
chisq	chi-square	df	-	
exp	exponential	-	-	
f	F	df1, df2	-, -	
gamma	Gamma	shape	-	
lnorm	log-normal	mean, sd (of log)	0, 1	
logis	logistic	loc, scale	0, 1	
norm	normal	mean, sd	0, 1	
stab	stable	index, skew	-, 0	
t	Student's t	df	-	
unif	uniform	min, max	0, 1	
+-----+-----+-----+-----+-----+				

XII. PLOTTING

A. Starting and Stopping Plotting

```

<device-specification function>
graphics.off()

```

B. Device-Specification Functions

```

hp2623(ask=F, file="")

hpgl(width=10, height=7.25, ask=!auto,
auto=F, color=2, speed=400, rotated=F, file="")

postscript(file, command, horizontal=F, width,
height, rasters, pointsize=14, font=1,
preamble=ps.preamble, fonts=ps.fonts)

printer(width=80, height=64, file="", command="")
show()

tek4014(ask=F, file)

sun(ask=FALSE, color=FALSE)

```

C. Some Plot Parameters

```

log='<x|y|xy>'           Logarithmic axes

main='title'

new=<logical>             T forces addition to current plot

sub='bottom title'

type='<l|p|b|n>'         Line, points, both, none
lty=n                    Line type
pch='.'                  Plot character

xlab='x-axis label'
ylab='y-axis label'

xlim=c(xlo.value,xhi.value)
ylim=c(ylo.value,yhi.value)

```

□

D. One-Dimension Plots

```

barplot(height)          #simple form
barplot(height, width, names, space=.2, inside=TRUE,
             beside=FALSE, horiz=FALSE, legend, angle,
             density, col, blocks=TRUE)

boxplot(..., range, width, varwidth=FALSE,
         notch=FALSE, names, plot=TRUE)

hist(x, nclass, breaks, plot=TRUE, angle,
     density, col, inside)

```

E. Two-Dimension Plots

```

lines(x, y, type="l")
points(x, y, type="p")

matplot(x, y, type="p", lty=1:5, pch=, col=1:4)
matpoints(x, y, type="p", lty=1:5, pch=, col=1:4)
matlines(x, y, type="l", lty=1:5, pch=, col=1:4)

plot(x, y, type="p", log="")

abline(coef)
abline(a, b)
abline(reg)
abline(h=)
abline(v=)

qqplot(x, y, plot=TRUE)
qqnorm(x, datax=FALSE, plot=TRUE)

```

F. Three-Dimension Plots

```

contour(x, y, z, v, nint=5, add=FALSE, labex)

interp(x, y, z, xo, yo, ncp=0, extrap=FALSE)

persp(z, eye=c(-6,-8,5), ar=1)

```

G. Multiple Plots Per Page (Example)

```

par(mfrow=(nrow, ncol), oma=c(0, 0, 4, 0))
mtext(side=3, line=0, cex=2, outer=T,
      "This is an Overall Title For the Page")

```