

## Getting Started

### RGUI

Starting an R session

double click RGUI shortcut then set working directory  
double click .Rdata file

Configuring the R session

getwd() # get fully qualified name of working directory  
setwd() # or, from the RGUI menu 'File > change dir'  
options()

Saving the state of an R session

save.image() # .Rdata file  
save('filename', ...)

Ending an R session

q()

The help system

help(name) or ?name # when you know exactly what you're looking for  
help.search('string') # a 'fuzzier' search  
apropos('string') # actually, a regular expression  
help.start()  
args(F) # show the arguments accepted by function F  
methods(F) # show the methods supported by generic function F

### Optional Libraries

finding and installing libraries (aka 'packages')  
<http://cran.wustl.edu/> (click on 'packages' at left and scroll down )  
.packages(all=T) # (.packages())  
install.packages() # or, from the RGUI menu do 'Packages > install package(s)'  
  
update.packages() # or, from the RGUI menu do 'Packages > update packages'  
  
### CRAN Task Views package  
install.packages('gplots')

```
install.packages('ctv'); library(ctv);  
install.views(c('SocialSciences', 'Graphics'))
```

making libraries available in the current session

```
library(), require() # or from the RGUI menu do 'Packages  
> load package'
```

Other ways to interact with R

```
JGR() ( install.package('JGR') )  
emacs/ess
```

## Basic Interaction with the system: R objects and simple operations

arithmetic and assignment

```
+, -, *, /, ^  
%% modulus  
%%/ integer division  
<-, ->, =, assign(), _
```

matrix operations

```
%*% matrix multiplication  
%o% outer product
```

logical operators

```
&&, || # short circuit  
&, |, !, <, <=, >, >=, ==, !=, %in% # vector
```

managing objects in an R session

```
rm(x) # remove x from the workspace  
ls(), objects() # list objects in the workspace  
str(), ls.str() # show structure of x  
exists('x') # see if x exists  
search() # show the search path  
find('x') # where on the search path is x
```

vectors

```
integer, character, numeric, logical  
:, c(), seq(), rep(), is.vector()  
is.integer(), is.character(), is.numeric(), is.logical(), class()  
sort()  
length()
```

```

names()                # accessor function
str(), head(), tail()

vectorized math functions
abs(), sign(), log(), log10(), sqrt(), exp(), sin(), cos(), tan(), acos(), asin(),
atan(), cosh(), sinh()

factors
factor(), is.factor(), levels(), unique()
f1 <- gl(3,4, labels=letters[1:3])
contrasts()
C()
options('contrasts')
model.matrix(~f1)

matrices, arrays
matrix(), array()
is.matrix(), is.array()
cbind(), rbind(), diag(), upper.tri(), lower.tri()
dim()
order()
colnames(), rownames() # cf names()
recycling
summary functions
sum(), prod(), mean(), var(), length(), min(), max(), range(), summary()

apply(), lapply(), sapply(), tapply(), by()

indexing (section 2.3)
[]
integer indices, positive and negative
logical indices
character indices (named vectors/matrices)

lists, data.frames (section 3.2)
list(), data.frame(),
[[], $
merge()
summary()

attributes of objects

```

```

class(),
attributes(x), attr(x, "attr_name")
names(), rownames(), colnames() # accessor functions

```

```

Getting data into and out of R
read.table("filename") # read space delimited text files into data.frame
read.csv("filename")  # same, but with defaults set for
                        comma-delimited files
read.delim("filename") # same, with defaults set for tab-delimited files
read.fwf()             # read fixed width formatted data into a
                        data.frame

```

```

write.table()         # write data to a text file in tabular format

```

```

Examining and cleaning data
summary(df)          # summary info for each variable in a dataframe
str(df)              # structure of a dataframe
edit(), fix()        # edit an R object interactively
replace()            # contingent replacement of vector elements
hist(df$v1)          # histogram
plot(density(df$v1)) # kernel density estimate
pairs(df)             # pairwise bivariate plot of all vars in df
coplot(df)           # similar
table(F)             # tabulate levels of factor F

```

```

basic general linear models
lm(formula = , data = , subset= )
aov()
summary()
plot()

```

```

Interacting with the operating system
dir()                # names of files in current directory
shell('command')    # run a shell command or start a program
system('command')    # same

```