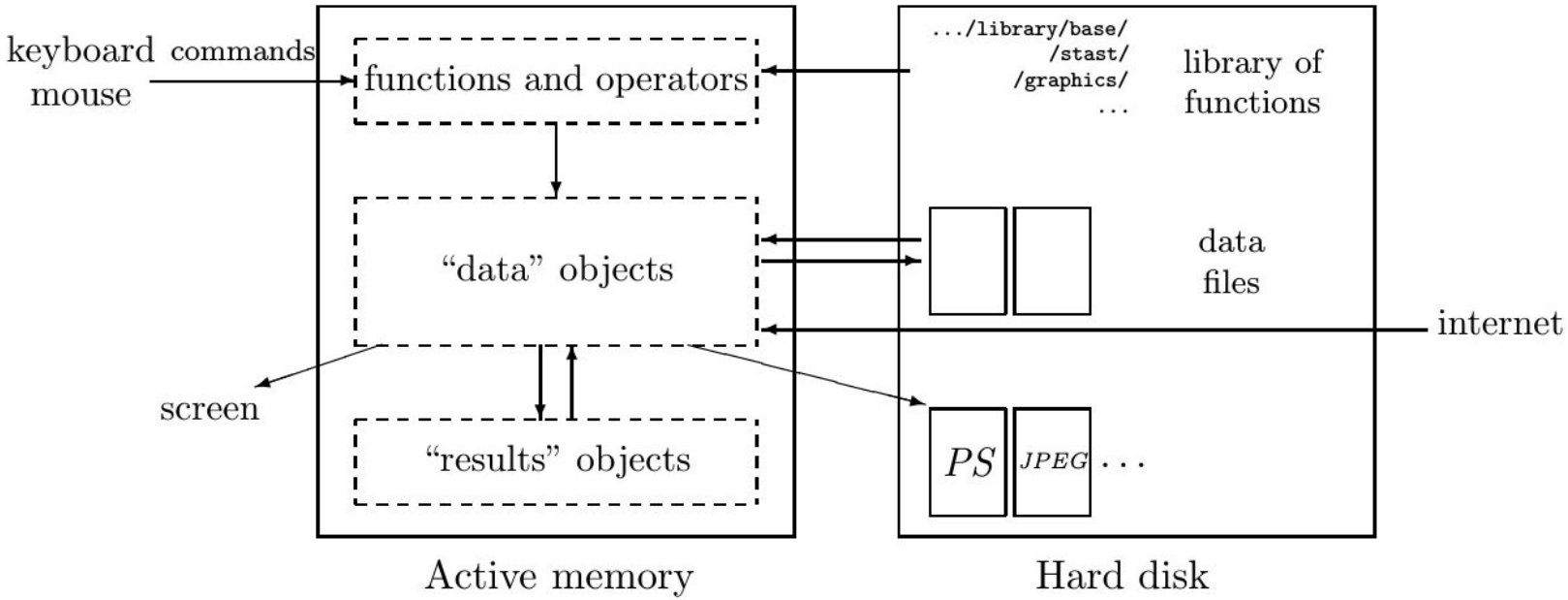
R for beginners

How R works

1. R is interpreted language, not compiled one.
2. R’s syntax is very simple and intuitive.
3. variables,data, functions, results, etc are stored in the memory in the form of objects when R is running.
4. functions available to the user are stored in a library localised on the disk in a directory called R_HOME/library.
5. The name of object must start with a letter(A-Z and a-z) and can includes letters, digits(0-9),dots(.), and underscore(_).

schematic view



‘assign’ operator

An object can be created with ”assign” operator which is written as an arrow with a minus sign and a bracket; this symbol can be oriented left-to-right or the reverse:

```
> a <- 1
> 2 -> b
> a
[1] 1
> b
[1] 2
> c <- a
> c
[1] 1
> b -> c
> c
[1] 2
```

The function ls() lists simply the objects in memory, only names of the objects are displayed.

online help

the function help(par) will searches the packages which are loaded in memory.

```
> ?ls
> help('ls')
```

Description

ls and objects return a vector of character strings giving the names of the objects in the specified environment. When invoked with no argument at the top level prompt, ls shows what data sets and functions a user has defined. When invoked with no argument inside a function, ls returns the names of the function's local variables: this is useful in conjunction withbrowser.

Usage

```
ls(name, pos = -1L, envir = as.environment(pos),
   all.names = FALSE, pattern)
objects(name, pos= -1L, envir = as.environment(pos),
        all.names = FALSE, pattern)
```

Object and Mode

object	**modes**	**several modes possible in the same object?**
vector	numeric, character, complex *or* logical	No
factor	numeric *or* character	No
array	numeric, character, complex *or* logical	No
matrix	numeric, character, complex *or* logical	No
data frame	numeric, character, complex *or* logical	Yes
ts	numeric, character, complex *or* logical	No
list	numeric, character, complex, logical, function, expression, ...	Yes

Objects

Vector. the function vector has two arguments mode and length. The data type can be defined by argument mode: 0 if number, FALSE, if logical or “” if character
Factor. A factor includes not only the values of the corresponding value,but also the different possible levels.
Matrix. A matrix is a combination of vector and dim
List. Collection of object, because list is also a kind of object, it can contain itself.

Object and Mode

The mode is the basic type of the elements of the object, there are four main modes: numeric, character, complex and logical(FALSE or TRUE). check the data type in the object by function *mode(par)*

```
> a <- "cs101"; b <- 1; c <- FALSE
> mode(c)
[1] "logical"
```

missing data are represented by NA(not available).

R correctly represents non-finite numeric values by Inf and -Inf or values that are not numbers with NaN(not a number).

math calculation

```
> a <- 10
> b <- a/3
> b
[1] 3.333333
> a/3*10+10
[1] 43.33333
> 4%%3
[1] 1
```

Data type and ‘assign’ operator

```
> n <- 15
> n
[1] 15
> 17 -> n
> n
[1] 17
> typeof(n)
[1] "double"
> s = "cs101"
> s
[1] "cs101"
> typeof(s)
[1] "character"
```

```
> compl  <- 1+5i
> typeof(compl)
[1] "complex"
> ls()
[1] "compl" "n"     "s"
> ls(pattern = 'comp')
[1] "compl"
```