Stevens Institute of Technology

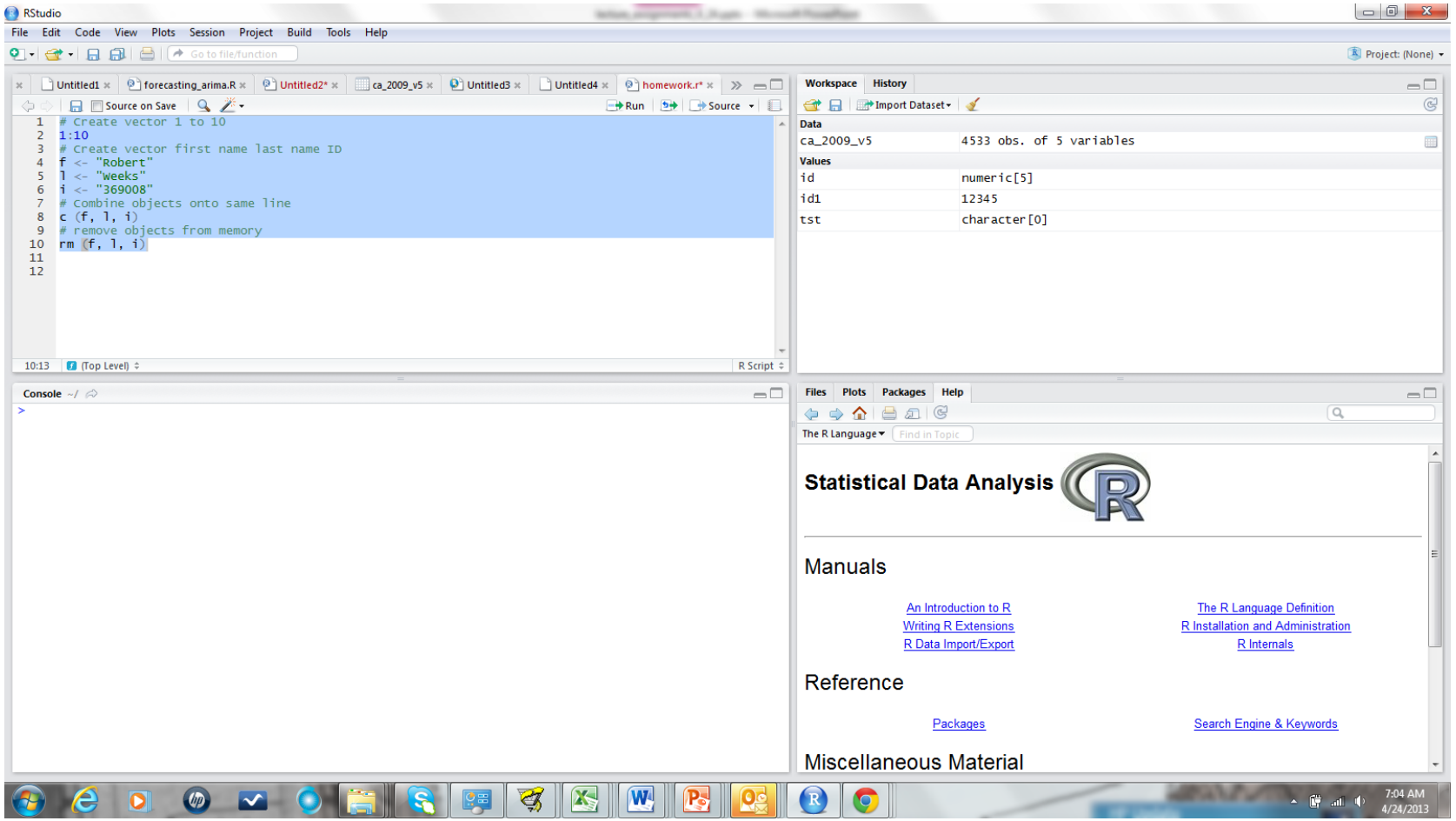
Khasha Dehnad

R and R Studio Download

http://www.r-project.org/

http://www.rstudio.com/ide/download/

Intro to R: R-Studio



Intro to R Help

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Intro to R: Help

- Online Manuals
  - http://127.0.0.1:40040/doc/html/index.html
- Google

Intro to R:

- R at heart is a FUNCTIONAL langauage
- Case sensitive -- A and a are different
- All alphanumeric symbols and ‘.’ , ‘_’
- ‘;’ is a separator

Intro to R: Elements in R

- Simple Data Types
- Operators
- Vectors
- Functions
- List and Data Frame
- Expressions
- Packages and Libraries

Intro to R: Simple data types

- Most Common SIMPLE data types in R:
  - Integer
  - Float
  - Double
  - Booleans
  - Characters
  - Complex
  - NA

Intro to R: Comments

- # this is a Line Comment

- # Course : My course
- # First Name : Khasha
- # Last Name : Dehnad
- # Id : 12345

Intro to R: Operators

- Default prompt

  >

  +

- Operators

  +

  -

  *

  /

  ^

- Assignment operator

  <-

  = We use '=' for passing parameters or assigning names only

Intro to R: Vector

- Vector is the simplest structure in R.
- The elements in a vector are the same data type.

Intro to R: Some Vector Constructors

- C()
  - x<-c(10,5,6,6,6,7)
  - y<-c('My First Name','My last Name')
- seq() and :
  - seq(1,4,0.5)
  - 1:10
- rep()
  - > rep(5,10)

Intro to R: Help Functions

- R Built-in Help Functions
  - >help(xxx)
  - >?xxx
  - >help.start()
  - > example(xxx)

Intro to R: Functions

Some vector and mathematical functions

`sort(x)`	Sort the elements of `x`.
`rev(x)`	Reverse the order of the elements of `x`.
`rank(x)`	Ranks of the elements of `x`.
`log(x,base)`	The logarithms of all elements of `x` in base `base`.
`exp(x)`	The exponentials of the elements of `x`.
`sqrt(x)`	The square roots of the elements of `x`.
`abs(x)`	The absolute value of the elements of `x`.
`round(x,n)`	Rounds all elements of `x` to `n` decimal places.
`cumsum(x)`	Returns a vector where the ith element is the sum from $x[1]$ to $x[i]$.
`cumprod(x)`	The same for the product.
`match(x,s)`	Returns a vector with the same length as `x`, with the elements of `x` that are contained in `s`. The ones that do not belong to `s` have the value NA.
`union(x,y)`	Returns a vector with the union of vectors `x` and `y`.
`intersect(x,y)`	Returns a vector with the intersection of vectors `x` and `y`.
`setdiff(x,y)`	Returns a vector resulting from removing the elements of `y` from `x`.
`is.element(x,y)`	Return TRUE if `x` is contained in vector `y`.
`choose(n,k)`	Calculates the number of combinations of `k` `n` to `n`.

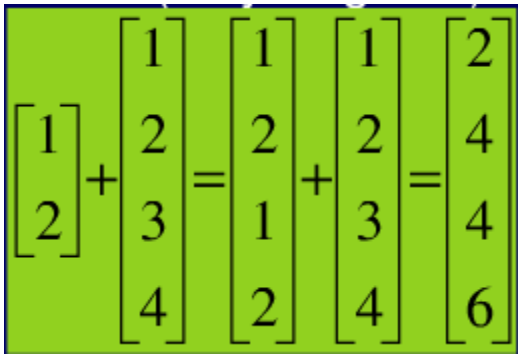
Intro to R: Functions

Some basic statistics

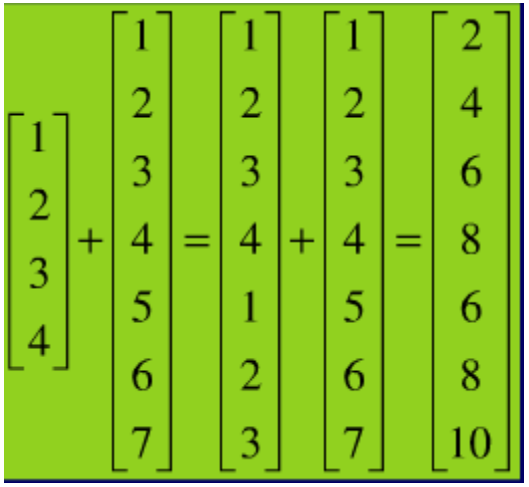
`sum(x)`	Sum of the elements of `x`.
`max(x)`	Largest value of the elements in `x`.
`min(x)`	Smallest value of the elements in `x`.
`which.max(x)`	The index of the largest value in `x`.
`which.min(x)`	The index of the smallest value in `x`.
`range(x)`	The range of values in `x` (has the same result as `c(min(x),max(x))`).
`length(x)`	The number of elements of `x`.
`mean(x)`	The mean value of the elements of `x`.
`median(x)`	The median value of the elements of `x`.
`sd(x)`	The standard deviation of the elements of `x`.
`var(x)`	The variance of the elements of `x`.
`quantile(x)`	The quantiles of `x`.
`scale(x)`	Standardizes the elements of `x`, *i.e.* subtracts the mean and divides by the standard deviation. Results in a vector with zero mean and unit standard deviation. Also works with data frames (column-wise and only with numeric data!).

Intro to R : Vector Recycling Rule

- **>1:2+1:4**



- **>1:4+1:7**



Intro to R: Managing the environment

- mode()
- length()
- ls()
- library()
- installed.packages()
- rm ()
- setdiff()

Intro to R: List

- Lists consist of an ordered collection of other objects known as its components.

- These components do not need to be of the same type, mode or length

```
my.lst <- list(stud.id=34453, stud.name="John",
stud.marks=c(14.3,12,15,19))
```

Intro to R : Dataframe

- Dataframe is a list of vectors of equal length

```
my.dataset <- data.frame(site=c('A','B','A','A','B'),
season=c('Winter','Summer','Summer','Spring','Fall'),
pH = c(7.4,6.3,8.6,7.2,8.9))

my.dataset <-
read.table("path",Header=T,sep='/t')

my.dataset<-
read.csv("http://www.math.smith.edu/sasr/datasets/help.csv")
```