R Programming - II

Control Structures

Control Structures

- Control structures allow you to control the flow of the execution of the program
- if, else: testing a condition
- for: execute a loop certain no. of times
- while: execute a loop while a condition is TRUE
- repeat: execute an infinite loop
- break: stop the execution of a loop
- next: skip an iteration of a loop

if, else

```
if (condition 1) {
        ## do task 1
} else if (condition 1) {
        ## do task 2
} else {
        ## do task 3
}
```

* else clause is not necessary

for

```
for (variable in sequence) {
        ## do task 1
}
```

*for loops can be nested (for loop inside a for loop)

while

```
while (condition is true) {
        ## do task 1
}
```

*for loops can be nested (for loop inside a for loop)

repeat, break

```
repeat {
        ## do task 1
        if (condition) {
        Break
        }
}
```

- ‘Repeat’ runs an infinite loop
- Only way is to stop ‘Repeat’ is to user ‘Break’

next

```
for (condition) {
        ## do task 1
        if (condition) {
        next
        }
}
```

- ‘next’ is used to skip a step or iteration
- Can be used with any control structure (for, while, if)

Functions

functions

```
myfunction <- function (arg1,arg2,....){
  statements
  return(object)
}
```

- Arguments
- Body

functions

Exercise:

- Write a function to find the n^{th} root of a number
- Write a function to find the sum of a numeric vector
- Write a function to calculate the roots of a quadratic equation

Loop Functions

Loops: apply

- When a function has to be applied to the columns or rows of a matrix or array, apply command can be used
- For e.g. in a matrix if we want to find out the maximum value in every columns, apply command can be used

Loops: lapply

- Applies a function to all the elements of aa list
- Returns a list of the same length
- l1 <- list (c (1:5) , c (11, 2, 343, 2, 23, 3), c (1.3, 4.5, 1, 4.32, 6.8))
- lapply l1 <- list(c(1:5), c(11, 2, 343, 2, 23, 3), c(1.3, 4.5, 1, 4.32, 6.8))
- lapply(l1,mean)

Loops: sapply

- Similar to lapply
- Returns a vector or matrix whichever is possible
- Other loop functions are:
  - mapply
  - tapply
  - rapply
  - eapply

Loops: by

- The command by is used to subset a data frame by a factor column
- The function is applied to each subset

Debugging in R

Debugging

- The main functions used for debugging in R are:
  - traceback
  - debug
  - browser

Warning and Error

- R reports problems in executing a function or command in two ways:
  - Warning
  - Error
- Warning doesn't halt the execution of the function. It just gives a message that something unusual has happened
- Error is a fatal problem and stops the execution of the function or command