Lab 1 & 2: Getting started with R

Problem statement:

- Perform basic mathematics operations on variable such as (addition/substation/multiplication division/power/modulo operator). Also perform relational and logical operations.
- Create vector and perform various operations.
- Create numerical vector.
- Operation between scalar and vector.
- Operations between vectors.
- Text variable and vector.
- Create matrices.
- Manage the workspace (setw() and getw()).
- Understand data data frames and list.
- How to import and export the data.
- How to read and write CSV/text files.
- Installation and loading packages.
- Perform various loop and conditional statement.
- How function works in R.
- Practice plotting and charting.
- Understand the factor variable.

Source Code:

```
#Author: Ashish Upadhyay
#Branch: Computer Science and Engineering
#Enrollment Number: 15100007
#Semester: 6th
#Dr. SP Mukherjee International Institute of Information Technology, Naya Raipur
#Subject: Machine Learning Lab 1 & 2
#Task: Getting started with R

#Perform basic mathematics operations on variable such as (addition/substation/multiplication division/power/modulo
operator). Also perform relational and logical operations.
x=12
y=6
12+6
12-6
12*6
12/6
12**6
12%%6
x<y
x>y
x == 12
x != 5
x|y
x&y


#Create vector and perform various operations
#Create numerical vector
```

```r
x <- c(2,8,3)
y <- c(6,6,1)

#Operation between scalar and vector
x <- c(2,8,3)
z = 1
x + z
x - z

#Operations between vectors
x+y
x>y

#Text variable and vector
s = c ('p','q','r')
length(s)
nchar(s)
t = c(n,s)
t

#Create matrices
B = matrix (c(1,2,3,4,5,6),nrow=3,ncol=2)
B

#Manage the workspace (setw() and getw())
getwd()
setwd("C:/Users/Ashish Upadhyay/Documents/Semester6/MachineLearning/Lab")
getwd()

#Understand data data frames and list.
n = c(1, 2, 3)
s = c("abc","def","ghi")
df = data.frame(n,s)
df

n = c(1, 2, 3)
s = c("abc","def","ghi")
l = list(n,s)
l

#How to import and export the data.
testdata <- read.table ("C:/Users/Ashish Upadhyay/Documents/Semester6/MachineLearning/Lab/drug2.csv", header=TRUE,
sep=",")

#How to read and write CSV/text files.
drug = read.csv("drug2.csv")
head(drug)
write.csv(drug, file = "drug3.csv")

#Installation and loading packages.
install.packages("e1071")
```

```
library(e1071)

#Perform various loop and conditional statement.
for(i in 1:10) {
 print(i)
 }


#How function works in R.
add <- function(x,y){
 x= 10
 y= 1
 result <-x+y
 print(result)
}
add()

#Practice plotting and charting.
val <- c(1, 3, 6, 4, 9)
plot(val)

#Understand the factor variable.
data = c(1,2,2,3,1,2,3,3,1,2,3,3,1)
fdata = factor(data)
fdata
```

Output:

```
#Author: Ashish Upadhyay
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#Enrollment Number: 15100007
#Semester: 6th
#Dr. SP Mukherjee International Institute of Information Technology, Naya Raipur
#Subject: Machine Learning Lab 1 & 2
#Task: Introduction to R

> #Perform basic mathematics operations on variable such as (addition/substation/multiplication division/power/modulo
operator). Also #perform relational and logical operations.
> x=12
> y=6
> 12+6
[1] 18
>
> 12-6
[1] 6
>
> 12*6
[1] 72
>
> 12/6
[1] 2
>
```

```
> 12**6
[1] 2985984
>
> 12%%6
[1] 0
>
> x<y
[1] FALSE
>
> x>y
[1] TRUE
>
> x == 12
[1] TRUE
>
> x != 5
[1] TRUE
>
> x|y
[1] TRUE
>
> x&y
[1] TRUE
>
> #Create vector and perform various operations
> #Create numerical vector
> x <- c(2,8,3)
> y <- c(6,6,1)
>
> #Operation between scalar and vector
> x <- c(2,8,3)
> z = 1
> x + z
[1] 3 9 4
>
> x - z
[1] 1 7 2
>
> #Operations between vectors
> x+y
[1]  8 14  4
>
> x>y
[1] FALSE  TRUE  TRUE
>
> #Text variable and vector
> s = c ('p','q','r')
> length(s)
[1] 3
>
> nchar(s)
[1] 1 1 1
> #Create matrices
> B = matrix (c(1,2,3,4,5,6),nrow=3,ncol=2)
> B
```

```
     [,1] [,2]
[1,]   1   4
[2,]   2   5
[3,]   3   6
>
> #Manage the workspace (setw() and getw())
> getwd()
[1] "C:/Users/Ashish Upadhyay/Documents/Semester6/MachineLearning/Lab Programs"
> setwd("C:/Users/Ashish Upadhyay/Documents/Semester6/MachineLearning/Lab")
> getwd()
[1] "C:/Users/Ashish Upadhyay/Documents/Semester6/MachineLearning/Lab"
>
> #Understand data data frames and list.
> n = c(1, 2, 3)
> s = c("abc","def","ghi")
> df = data.frame(n,s)
> df
 n s
1 1 abc
2 2 def
3 3 ghi
>
> n = c(1, 2, 3)
> s = c("abc","def","ghi")
> l = list(n,s)
> l
[[1]]
[1] 1 2 3

[[2]]
[1] "abc" "def" "ghi"

> #How to import and export the data.
> testdata <- read.table ("C:/Users/Ashish Upadhyay/Documents/Semester6/MachineLearning/Lab/drug2.csv", header=T
RUE, sep=",")

> #How to read and write CSV/text files.
> drug = read.csv("drug2.csv")
> head(drug)
  sex dose response
1  1 0.1   13.75
2  1 0.2   12.90
3  1 0.3   19.26
4  1 0.4   20.34
5  1 0.5   19.97
6  1 0.6   26.80
> write.csv(drug, file = "drug3.csv")
>
> #Installation and loading packages.
> install.packages("e1071")
Installing package into 'C:/Users/Ashish Upadhyay/Documents/R/win-library/3.4'
(as 'lib' is unspecified)
trying URL 'https://cran.rstudio.com/bin/windows/contrib/3.4/e1071_1.6-8.zip'
Content type 'application/zip' length 894861 bytes (873 KB)
downloaded 873 KB
```

package 'e1071' successfully unpacked and MD5 sums checked

The downloaded binary packages are in
          C:\Users\Ashish Upadhyay\AppData\Local\Temp\RtmpYV25hi\downloaded_packages

```
> library(e1071)
Warning message:
package 'e1071' was built under R version 3.4.4
>
> #Perform various loop and conditional statement.
> for(i in 1:10) {
+   print(i)
+   }
[1] 1
[1] 2
[1] 3
[1] 4
[1] 5
[1] 6
[1] 7
[1] 8
[1] 9
[1] 10
>
> #How function works in R.
> add <- function(x,y){
+   x= 10
+   y= 1
+   result <-x+y
+   print(result)
+ }
> add()
[1] 11
>
> #Practice plotting and charting.
> val <- c(1, 3, 6, 4, 9)
> plot(val)
```
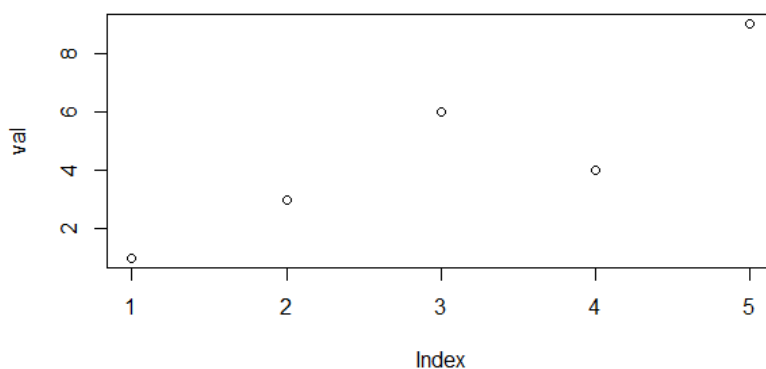
> #Understand the factor variable.
> data = c(1,2,2,3,1,2,3,3,1,2,3,3,1)
> fdata = factor(data)
> fdata
 [1] 1 2 2 3 1 2 3 3 1 2 3 3 1
Levels: 1 2 3

Lab 3: R Functions

Problem statement:

- Measures of central tendency
- Mean, Median, Trimmed mean, Mode etc.
- Measures of variability.
- Range, Percentile, Interquartile range, variance, standard deviation, mean absolute deviation, Median absolute deviation.

Source Code:

```
#Author: Ashish Upadhyay
#Branch: Computer Science and Engineering
#Enrollment Number: 15100007
#Semester: 6th
#Dr. SP Mukherjee International Institute of Information Technology, Naya Raipur
#Subject: Machine Learning Lab 3
#Task: R functions

#Creating a vector
lst<-c(2,5,7,8,4,8,2,3,9,5,6,4,3,2,2,2)

#Mean, Trimmed mean, Median and Mode calculation
mean(lst)
median(lst)
mean(lst, trim=0.40)
mode <- function(v) {
  uniqv <- unique(v)
  uniqv[which.max(tabulate(match(v, uniqv)))]
}
mode(lst)

#Other mathematical functions
range(lst)
quantile(lst)
IQR(lst)
var(lst)
sd(lst)
mad(lst,center = mean(lst))
mad(lst)
```

Output:

```
> #Author: Ashish Upadhyay
> #Branch: Computer Science and Engineering
> #Enrollment Number: 15100007
> #Semester: 6th
> #Dr. SP Mukherjee International Institute of Information Technology, Naya Raipur
> #Subject: Machine Learning Lab 3
> #Task: R functions
>
> #Creating a vector
> lst<-c(2,5,7,8,4,8,2,3,9,5,6,4,3,2,2,2)
>
> #Mean, Trimmed mean, Median and Mode calculation
> mean(lst)
[1] 4.5
> median(lst)
[1] 4
> mean(lst, trim=0.40)
[1] 4
> mode <- function(v) {
+   uniqv <- unique(v)
+   uniqv[which.max(tabulate(match(v, uniqv)))]
+ }
> mode(lst)
[1] 2
>
> #Other mathematical functions
> range(lst)
[1] 2 9
> quantile(lst)
  0%  25%  50%  75% 100%
2.00 2.00 4.00 6.25 9.00
> IQR(lst)
[1] 4.25
> var(lst)
[1] 6
> sd(lst)
[1] 2.44949
> mad(lst,center = mean(lst))
[1] 3.7065
> mad(lst)
[1] 2.9652
```