Applied Multivarate Analysis lab 1

1 Introduction to R

1.1 Print words

```
> print("Hello World!")  # print the object

[1] "Hello World!"

> for(i in 1:5) print(i)  # print answer in the loop

[1] 1
[1] 2
[1] 3
[1] 4
[1] 5
```

1.2 Use R as a simple calculator

```
> 3*(2+1)

[1] 9

> 2^3  # 2^3=2**3

[1] 8

> (1 + 1) * 2 - 2/3 + 2^3  # arithmetic operators : +, -, *, /, ^, **

[1] 11.33333

> log(2)  # ln(2) computes logarithms

[1] 0.6931472

> log10(2)  # log10(2) computes logarithms

[1] 0.30103

> exp(1)  # computes the exponential function

[1] 2.718282
```

1.3 Assign a name to object

```
> a<-1
> a

[1] 1

> b<-2
> b

[1] 2

> a+b

[1] 3

> c(1,2,5,3)  # Combine Values into a Vector

[1] 1 2 5 3

> a<-c(1,2,5,3)
> a

[1] 1 2 5 3

> a^2  # square the elements of a

[1]  1  4 25  9

> name<-c("John", "Mary", "Tom")
> name

[1] "John" "Mary" "Tom"

> x<-c(3,1,4,2,4,3,1,2,4,3)

> sort(x) # sort a vector

 [1] 1 1 2 2 3 3 3 4 4 4
```

1.4 Summary statistics

```
> a^2   # square

[1]  1  4 25  9

> summary(a)     # 5-number summary

   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
   1.00    1.75    2.50    2.75    3.50    5.00
```

```
> mean(a)    # mean

[1] 2.75

> var(a)     # variance

[1] 2.916667

> sqrt(var(a))   # standard deviation = square root of variance

[1] 1.707825

> min(a)  # minimum value in vector

[1] 1

> max(a)  # maximum value in vector

[1] 5

> range(a)  # (min, max)

[1] 1 5

> median(a)   # median

[1] 2.5

> length(a)   # number of elements in a

[1] 4

> quantile(a,.75)   # 75th percentile

75%
3.5

> sum(a)   # Sum of values in vector

[1] 11

> prod(a)   # product of values in vector

[1] 30

> (a-mean(a))/sqrt(var(a))   # compute the standard scores

[1] -1.024695 -0.439155  1.317465  0.146385

> 1:10
```

```
 [1]  1  2  3  4  5  6  7  8  9 10
> 10:1
 [1] 10  9  8  7  6  5  4  3  2  1
> a
[1] 1 2 5 3
> d<-c(2,4,
+      3,8)
> d
[1] 2 4 3 8
> a/d
[1] 0.500000 0.500000 1.666667 0.375000
> a>d
[1] FALSE FALSE  TRUE FALSE
> a[2:4]  # get the 2nd, 3rd and 4th elements in a
[1] 2 5 3
> a<3
[1]  TRUE  TRUE FALSE FALSE
> a[a<3]
[1] 1 2
> a==5
[1] FALSE FALSE  TRUE FALSE
> d[a==5]
[1] 3
> a[-3]  # delete the 3rd element in a
[1] 1 2 3
> a>2
[1] FALSE FALSE  TRUE  TRUE
> (1:4)[a>2]
[1] 3 4
```