

# PROBABILITY AND STATISTICS

## LAB 01

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Aim: Introduction to R language and to run some basic operations

### Input:

```
#Introduction: Understanding Data Types;
```

```
# Generic data
```

```
cat("1:10\n")
```

```
a=1:10
```

```
print(a)
```

```
cat("n=c(1,3,4,9)\n")
```

```
c(1,3,4,9)
```

```
cat("n=c(1,'a',4,9)\n")
```

```
c(1,'a',4,9)
```

```
#Assign variable name to value
```

```
x=10; x <-2; 3->x;
```

```
cat("x=10; x <-2; 3->x;\n")
```

```
x
```

```
cat("\n")
```

```
a=2;a
```

```
b=3;b
```

```
#addition
```

```
cat("#addition\n")
```

```
a+b
```

```
d=c(1,2)
```

```
e=c(1,2,3,4)
```

```
d+e
```

```

d=c(3,4)
e=c(5,6,7,8,9)
d+e
#subtraction
cat("#subtraction\n")
a-b
#constant multiplication
cat("#constant multiplication\n")
5*a
cat("5*a\n")
#product
cat("#product\n")
a*b
cat("a*b\n")
#division
cat("#division\n")
a/b
cat("a/b\n")
print(a/b)
#character object is used to represent
x=5.2
x=as.character(5.2)
x+5
cat("x=5.2\nx=as.character(5.2)\nx+5\n")
# This code will result in an error because you cannot perform arithmetic operations on different data types.
#concatenation of strings
cat("#concatenation of strings\n")
paste("sri","ram")
cat('paste("sri","ram")\n')
print(paste("sri", "ram"))
#data importing
cat("#data importing\n")
#csv xls,xlsx, sav, dta, por, sas and
cat("#csv xls,xlsx, sav, dta, por, sas and \n")
#Importing data from Text and CSV files
cat("#Importing data from Text and CSV files\n")
read.csv(file.choose())
cat("read.csv(file.choose())\n")
# This line will prompt the user to choose a file so there is no fixed output for this line.
a=4
b=3
#We can use cat() and print() function to print

```

#using cat() we can print values with text

#Ex:

```
cat(a,"\n",b);
```

#With print we can use paste to concatenate 2 strings

```
a="21"
```

```
b="BPS1528"
```

```
print(paste(a,b));
```

## OUTPUT:

```
> cat("1:10\n")
1:10
> a=1:10
> print(a)
[1] 1 2 3 4 5 6 7 8 9 10
> cat("n=c(1,3,4,9)\n")
n=c(1,3,4,9)
> c(1,3,4,9)
[1] 1 3 4 9
> cat("n=c(1,'a',4,9)\n")
n=c(1,'a',4,9)
> c(1,'a',4,9)
[1] "1" "a" "4" "9"
> x=10; x <-2; 3->x;
> cat("x=10; x <-2; 3->x;\n")
x=10; x <-2; 3->x;
> x
[1] 3
> cat("\n")

> a=2;a
[1] 2
> b=3;b
[1] 3
> #addition
> cat("#addition\n")
#addition
> a+b
[1] 5
> d=c(1,2)
> e=c(1,2,3,4)
> d+e
[1] 2 4 4 6
> d=c(3,4)
> e=c(5,6,7,8,9)
> d+e
[1] 8 10 10 12 12
Warning message:
In d + e : longer object length is not a multiple of shorter object length
```

```
...
> #subtraction
> cat("#subtraction\n")
#subtraction
> a-b
[1] -1
> #constant multiplication
> cat("#constant multiplication\n")
#constant multiplication
> 5*a
[1] 10
> cat("5*a\n")
5*a
> #product
> cat("#product\n")
#product
> a*b
[1] 6
> cat("a*b\n")
a*b
> #division
> cat("#division\n")
#division
> a/b
[1] 0.6666667
> cat("a/b\n")
a/b
> print(a/b)
[1] 0.6666667
> #character object is used to represent
> x=5.2
> x=as.character(5.2)
> x+5
Error in x + 5 : non-numeric argument to binary operator
> cat("x=5.2\nx=as.character(5.2)\nx+5\n")
x=5.2
x=as.character(5.2)
x+5
> #concatenation of strings
> cat("#concatenation of strings\n")
..
```

```
> cat("#concatenation of strings\n")
#concatenation of strings
> paste("sri","ram")
[1] "sri ram"
> cat('paste("sri","ram")\n')
paste("sri","ram")
> print(paste("sri", "ram"))
[1] "sri ram"
> #data importing
> cat("#data importing\n")
#data importing
> #csv xls,xlsx, sav, dta, por, sas and
> cat("#csv xls,xlsx, sav, dta, por, sas and \n")
#csv xls,xlsx, sav, dta, por, sas and
> #Importing data from Text and CSV files
> cat("#Importing data from Text and CSV files\n")
#Importing data from Text and CSV files
> read.csv(file.choose())
Error in file.choose() : file choice cancelled
> a=4
> b=3
> #We can use cat() and print() function to print
> #using cat() we can print values with text
> #Ex:
> cat(a,"\n",b);
4
3
> #With print we can use paste to concatenate 2 strings
> a="21"
> b="BPS1528"
> print(paste(a,b));
[1] "21 BPS1528"
```

## Assignment

Aim: To try all Mathematical functions in R

### INTPUT:

#absolute function

x <- -4

cat(abs(x),"\n")

#square root

x <- 9

cat(sqrt(x))

#ceiling

x <- 4.5

cat(ceiling(x))

#floor

x <- 4.5

floor(x)

#truncate

x = c(1.5, 4.3, 2.6)

trunc(x)

#round function

x <- 4.567

round(x,1)

round(x,2)

round(x,3)

#trignometric functions

x=2.226

sin(x)

cos(x)

tan(x)

#logarithmic

x=2.71

log(x)

#logarithm with base 10

x=100

log10(x)

#logrithm with base 2

x=4

log2(x)

#exponential function

exp(x)

#factorial

x=10

factorial(10)

#Statistical functions

x=c(1,2,3,4,5,6,7,8,9,10)

mean(x)

median(x)

var(x)

sd(x)

scale(x)

quantile(x)

summary(x)

## OUTPUT

```
> #absolute function
> x <- -4
> cat(abs(x),"\n")
4
> #square root
> x <- 9
> cat(sqrt(x))
3
> #ceiling
> x <- 4.5
> cat(ceiling(x))
5
> #floor
> x <- 4.5
> floor(x)
[1] 4
> #truncate
> x = c(1.5, 4.3, 2.6)
> trunc(x)
[1] 1 4 2
> #round function
> x <- 4.567
> round(x,1)
[1] 4.6
> round(x,2)
[1] 4.57
> round(x,3)
[1] 4.567
> #trigonometric functions
> x=2.226
> sin(x)
[1] 0.7929238
> cos(x)
[1] -0.6093208
> tan(x)
[1] -1.301324
> #logarithmic
> x=2.17
> log(x)
[1] 0.7747272
```

```
> #logarithmic
> x=2.17
> log(x)
[1] 0.7747272
> #logarithmic
> x=2.71
> log(x)
[1] 0.9969486
> #logarithm with base 10
> x=100
> log10(x)
[1] 2
> x=4
> log2(x)
[1] 2
> #exponential function
> exp(x)
[1] 54.59815
> #factorial
> x=10
> factorial(10)
[1] 3628800
> #Statistical functions
> x=c(1,2,3,4,5,6,7,8,9,10)
> mean(x)
[1] 5.5
> median(x)
[1] 5.5
> var(x)
[1] 9.166667
> sd(x)
[1] 3.02765
> scale(x)
      [,1]
[1,] -1.4863011
[2,] -1.1560120
[3,] -0.8257228
[4,] -0.4954337
[5,] -0.1651446
[6,]  0.1651446
[7,]  0.4954337
[8,]  0.8257228
[9,]  1.1560120
[10,] 1.4863011
attr(,"scaled:center")
[1] 5.5
attr(,"scaled:scale")
[1] 3.02765
> |
```

\*\*\*\*\*