Name: Mithun G

USN: 19BTRCR006

LAB PROGRAM 12

1. Create a table with the entries “S.No.”, “Name”, “Sub1Marks”, “Sub2Marks”, “Sub3Marks”, and “Sub4Marks” for 25 students of a class. And save it in a .csv format file.

In [125]:

```
name <- LETTERS[1:25]
table <- data.frame("S.no"=1:25,"name" = name, "Sub1Marks"=c(sample(0:100,5,replace=F)),"Su
table[0:5,]
```

A data.frame: 5 × 6

	S.no	name	Sub1Marks	Sub2Marks	Sub3Marks	Sub4Marks
	<int>	<fct>	<int>	<int>	<int>	<int>
1	1	A	72	91	45	6
2	2	B	99	97	68	19
3	3	C	2	2	57	15
4	4	D	58	38	88	72
5	5	E	0	55	100	74

In [23]:

```
write.csv(table,file="Students_lab.csv",row.names = T)
getwd()
```

'/home/jovyan'

2. Apply statistical commands such as summary(), str(), Names(), Rownames(), Columnnames(), and Dimensions() for the data of file and observe the outcomes.

In [24]:

```
# summary
summary(table)
```

```
      S.no          name      Sub1Marks       Sub2Marks       Sub3Marks    
 Min.   : 1   A       : 1   Min.   :27.0   Min.   :16.0   Min.   : 1  
 1st Qu.: 7   B       : 1   1st Qu.:28.0   1st Qu.:23.0   1st Qu.:14  
 Median :13   C       : 1   Median :48.0   Median :45.0   Median :25  
 Mean   :13   D       : 1   Mean   :47.4   Mean   :52.8   Mean   :21  
 3rd Qu.:19   E       : 1   3rd Qu.:57.0   3rd Qu.:83.0   3rd Qu.:31  
 Max.   :25   F       : 1   Max.   :77.0   Max.   :97.0   Max.   :34  
              (Other):19                                             
   Sub4Marks    
 Min.   :42.0  
 1st Qu.:68.0  
 Median :73.0  
 Mean   :70.8  
 3rd Qu.:81.0  
 Max.   :90.0  
```

In [26]:

```
#str()
str(table)
```

```
'data.frame':   25 obs. of  6 variables:
 $ S.no     : int  1 2 3 4 5 6 7 8 9 10 ...
 $ name     : Factor w/ 25 levels "A","B","C","D",..: 1 2 3 4 5 6 7 8 9 10
...
 $ Sub1Marks: int  28 77 57 48 27 28 77 57 48 27 ...
 $ Sub2Marks: int  97 16 83 23 45 97 16 83 23 45 ...
 $ Sub3Marks: int  34 1 25 14 31 34 1 25 14 31 ...
 $ Sub4Marks: int  90 68 73 42 81 90 68 73 42 81 ...
```

In [28]:

```
# names
names(table)
```

'S.no' · 'name' · 'Sub1Marks' · 'Sub2Marks' · 'Sub3Marks' · 'Sub4Marks'

In [29]:

```
# rownames
rownames(table)
```

'1' · '2' · '3' · '4' · '5' · '6' · '7' · '8' · '9' · '10' · '11' · '12' · '13' · '14' · '15' ·
'16' · '17' · '18' · '19' · '20' · '21' · '22' · '23' · '24' · '25'

In [33]:

```
# column names
colnames(table)
```

'S.no' · 'name' · 'Sub1Marks' · 'Sub2Marks' · 'Sub3Marks' · 'Sub4Marks'

In [34]:

```
# dimensions
dim(table)
```

25 · 6

3. Find log for each value in the data set with log() command and perform the summary() command.

In [42]:

```
log(table$Sub1Marks)
log(table$Sub2Marks)
log(table$Sub3Marks)
log(table$Sub4Marks)
```

3.3322045101752 · 4.34380542185368 · 4.04305126783455 · 3.87120101090789 · 3.29583686600433 · 3.3322045101752 · 4.34380542185368 · 4.04305126783455 · 3.87120101090789 · 3.29583686600433 · 3.3322045101752 · 4.34380542185368 · 4.04305126783455 · 3.87120101090789 · 3.29583686600433 · 3.3322045101752 · 4.34380542185368 · 4.04305126783455 · 3.87120101090789 · 3.29583686600433 · 3.3322045101752 · 4.34380542185368 · 4.04305126783455 · 3.87120101090789 · 3.29583686600433

4.57471097850338 · 2.77258872223978 · 4.4188406077966 · 3.13549421592915 · 3.80666248977032 · 4.57471097850338 · 2.77258872223978 · 4.4188406077966 · 3.13549421592915 · 3.80666248977032 · 4.57471097850338 · 2.77258872223978 · 4.4188406077966 · 3.13549421592915 · 3.80666248977032 · 4.57471097850338 · 2.77258872223978 · 4.4188406077966 · 3.13549421592915 · 3.80666248977032

3.52636052461616 · 0 · 3.2188758248682 · 2.63905732961526 · 3.43398720448515 · 3.52636052461616 · 0 · 3.2188758248682 · 2.63905732961526 · 3.43398720448515 · 3.52636052461616 · 0 · 3.2188758248682 · 2.63905732961526 · 3.43398720448515 · 3.52636052461616 · 0 · 3.2188758248682 · 2.63905732961526 · 3.43398720448515 · 3.52636052461616 · 0 · 3.2188758248682 · 2.63905732961526 · 3.43398720448515

```
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max. 
  3.738   4.220   4.290   4.228   4.394   4.500 
```

In [44]:

```
summary(log(table$Sub1Marks), log(table$Sub2Marks),log(table$Sub2Marks),log(table$Sub3Marks
```

```
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max. 
  3.296   3.332   3.871   3.777   4.043   4.344 
```

4. Apply the quantile() command and set the 4-quantile, 5-quantile, and 9-quantile values on the above data set.

In [59]:

```
quantile(table$Sub1Marks, type=4)
quantile(table$Sub1Marks, type=5)
quantile(table$Sub1Marks, type=9)
```

0%: 27 **25%:** 28 **50%:** 48 **75%:** 57 **100%:** 77

0%: 27 **25%:** 28 **50%:** 48 **75%:** 57 **100%:** 77

0%: 27 **25%:** 28 **50%:** 48 **75%:** 57 **100%:** 77

5. Perform the cumulative operation on different variables of data set with Cumsum(), Cummax(), Cummin(), and Cumprod() commands.

In [73]:

```
cumsum(table$Sub1Marks)
cummax(table$Sub1Marks)
cummin(table[['Sub1Marks']])
cumprod(table[['Sub1Marks']])
```

28 · 105 · 162 · 210 · 237 · 265 · 342 · 399 · 447 · 474 · 502 · 579 · 636 · 684 · 711 · 739 · 816 · 873 · 921 · 948 · 976 · 1053 · 1110 · 1158 · 1185

28 · 77 · 77 · 77 · 77 · 77 · 77 · 77 · 77 · 77 · 77 · 77 · 77 · 77 · 77 · 77 · 77 · 77 · 77 · 77 · 77 · 77 · 77 · 77 · 77 · 77

28 · 28 · 28 · 28 · 27 · 27 · 27 · 27 · 27 · 27 · 27 · 27 · 27 · 27 · 27 · 27 · 27 · 27 · 27 · 27 · 27 · 27 · 27 · 27 · 27

28 · 2156 · 122892 · 5898816 · 159268032 · 4459504896 · 343381876992 · 19572766988544 · 939492815450112 · 25366306017153024 · 710256568480284672 · 5468975572981919744 · 3.11731607905997e+21 · 1.49631171794879e+23 · 4.04004163846172e+24 · 1.13121165876928e+26 · 8.71032977252347e+27 · 4.96488797033838e+29 · 2.38314622576242e+31 · 6.43449480955854e+32 · 1.80165854667639e+34 · 1.38727708094082e+36 · 7.90747936136268e+37 · 3.79559009345408e+39 · 1.0248093252326e+41

6. Perform special summary commands for different rows and columns such as rowmeans(), rowsums(), colmeans(), and colsums() commands. Also observe the difference with apply() command.

In [103]:

```
Sub1marks <- table$Sub1Marks
Sub2marks <- table$Sub2Marks
Sub3marks <- table$Sub3Marks
Sub4marks <- table$Sub4Marks
```

In [104]:

```
x <- cbind(Sub1marks,Sub2marks,Sub3marks,Sub4marks)
rowMeans(x, na.rm = T)
group<-c(sample(0:25,1))
rowSums(x,na.rm = T)
colMeans(x,na.rm = T)
colSums(x, na.rm = T)
apply(x,2,sum)
```

62.25 · 40.5 · 59.5 · 31.75 · 46 · 62.25 · 40.5 · 59.5 · 31.75 · 46 · 62.25 · 40.5 · 59.5 · 31.75 · 46 · 62.25 · 40.5 · 59.5 · 31.75 · 46 · 62.25 · 40.5 · 59.5 · 31.75 · 46

249 · 162 · 238 · 127 · 184 · 249 · 162 · 238 · 127 · 184 · 249 · 162 · 238 · 127 · 184 · 249 · 162 · 238 · 127 · 184 · 249 · 162 · 238 · 127 · 184

Sub1marks: 47.4 **Sub2marks:** 52.8 **Sub3marks:** 21 **Sub4marks:** 70.8

Sub1marks: 1185 **Sub2marks:** 1320 **Sub3marks:** 525 **Sub4marks:** 1770

Sub1marks: 1185 **Sub2marks:** 1320 **Sub3marks:** 525 **Sub4marks:** 1770

7. Explore the descriptive statistics in R for Matrix object.

In [80]:

```
mat <- matrix(1:9, 3)
mat
```

A matrix:
3 × 3 of
type int

1	4	7
2	5	8
3	6	9

In [81]:

```
class(mat)
```

'matrix'

In [106]:

```
mean(mat)
median(mat)
sd(mat)
var <- sd(mat)*sd(mat)
var
```

5

5

2.73861278752583

7.5

8. Explore the descriptive statistics in R for lists.

In [111]:

```
lit <- list(1:9, c(10:17))
print(lit)
```

```
[[1]]
[1] 1 2 3 4 5 6 7 8 9

[[2]]
[1] 10 11 12 13 14 15 16 17
```

In [116]:

```
summary(lit)
```

```
     Length Class  Mode
[1,] 9      -none- numeric
[2,] 8      -none- numeric
```

In [121]:

```
mean(lit[[1]])
median(lit[[1]])
sd(lit[[1]])
var(lit[[1]])
```

5

5

2.73861278752583

7.5