



**TIJUANA INSTITUTE OF TECHNOLOGY
ACADEMIC**

**DEPARTMENT SYSTEMS AND COMPUTING DEPARTMENT
COMPUTER SYSTEMS ENGINEERING**

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SUBJECT

BDD-1703SC9C Data Mining

Activity

Practice #2

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Function 1.- The rnorm(1) function

generates random data samples from a normal distribution with mean 0 and variance 1.

```
> n <- 10 + 2  
> n  
[1] 12  
> n <-3 + rnorm(1)  
> n  
[1] 4.0876  
> |
```

Function 2.- ls function

It is simply a list of objects in memory : Only their names are displayed

```
> name <- "carmen"; n1 <- 10; n2 <- 100; m <- 0.5  
> ls()  
[1] "m"    "n"    "n1"   "n2"   "name"  
> |
```

Function 3.- Function ls.str()

shows some details of the objects in memory

```
>  
> ls.str()  
m : num 0.5  
n : num 4.09  
n1 : num 10  
n2 : num 100  
name : chr "carmen"  
> |
```

Function 4.- Function seq

can generate sequences of real numbers:

```
[Workspace loaded from ~/Rdata]  
> seq(1, 5, 0.5)  
[1] 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0  
> |
```

Function 5.- Function rep

creates a vector with identical elements:

```
R 3.6.2 : ~//~  
> rep(1, 30)  
[1] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  
> |
```

Function 6.- Function sequence

creates a series of sequences of integers where each sequence ends in the number (or numbers) specified as argument (s)

```
>  
> sequence(4:5)  
[1] 1 2 3 4 1 2 3 4 5  
> sequence(c(10,5))  
[1] 1 2 3 4 5 6 7 8 9 10 1 2 3 4 5  
> |
```

Function 7.- Function gl

is in the form `gl(k, n)` where k is the number of levels (or classes), and n is the number of replicas in each level.

```
> gl (3, 5)
[1] 1 1 1 1 1 2 2 2 2 3 3 3 3 3
Levels: 1 2 3
> gl (3, 5, length = 30)
[1] 1 1 1 1 1 2 2 2 2 3 3 3 3 3 1 1 1 1 1 2 2 2 2 2
[26] 3 3 3 3 3
Levels: 1 2 3
> gl (2, 6, labels =c("Macho", "Hembra"))
[1] Macho Macho Macho Macho Macho Macho Hembra
[8] Hembra Hembra Hembra Hembra Hembra
Levels: Macho Hembra
> gl (2, 10)
[1] 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2
Levels: 1 2
> gl (2, 1, length = 20)
[1] 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2
Levels: 1 2
> |
```

Function 8.- Function expand.grid()

creates a data frame with all the combinations of vectors or factors provided as arguments:

```
> expand.grid(a=c(60,80), p=c(100, 300), sexo=c("Macho", "Hembra"))
   a   p sexo
1 60 100 Macho
2 80 100 Macho
3 60 300 Macho
4 80 300 Macho
5 60 100 Hembra
6 80 100 Hembra
7 60 300 Hembra
8 80 300 Hembra
> |
```

Function 9.- Function levels

extracts the possible levels of a factor:

```
>
> ff <- factor(c(2, 4), levels=2:5)
> ff
[1] 2 4
Levels: 2 3 4 5
> levels(ff)
[1] "2" "3" "4" "5"
> |
```

Function 10.- Function ts

The function ts creates an object of class "ts" (time series) from a vector (single time series) or a matrix (multivariate series).

```
> ts(1:10, start = 1959)
Time Series:
Start = 1959
End = 1968
Frequency = 1
[1] 1 2 3 4 5 6 7 8 9 10
> ts(1:10, frequency = 4, start = c(1959, 2))
   Qtr1 Qtr2 Qtr3 Qtr4
1959      1    2    3
1960      4    5    6    7
1961      8    9   10
>
> ts(matrix(rpois(36, 5), 12, 3), start=c(1961, 1), frequency=12)
   Series 1 Series 2 Series 3
Jan 1961     8      2      5
Feb 1961     3      7      4
Mar 1961     3      5      4
Apr 1961     3      5      3
May 1961     5      5      3
Jun 1961     7      6      2
Jul 1961     7      5      6
Aug 1961     7      2      6
Sep 1961    10      4      2
Oct 1961     6      4      6
Nov 1961     9      3     12
Dec 1961     7      5      6
> |
```

Function 11.- Function expression

Evaluates an expression

```
> x <- 3; y <- 2.5; z <- 1
> exp1 <- expression(x / (y + exp(z)))
> eval(exp1)
expression(x/(y + exp(z)))
> eval(exp1)
[1] 0.5749019
>
```

Function 12.- Function rbind() and cbind()

bind matrices with respect to their rows or columns respectively:

```
> m1 <- matrix(1, nr = 2, nc = 2)
> m2 <- matrix(2, nr = 2, nc = 2)
> rbind(m1, m2)
 [,1] [,2]
[1,] 1 1
[2,] 1 1
[3,] 2 2
[4,] 2 2
> cbind(m1, m2)
 [,1] [,2] [,3] [,4]
[1,] 1 1 2 2
[2,] 1 1 2 2
>
```

Function 13.- Function diag

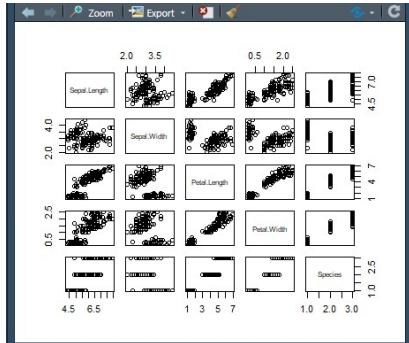
can be used to extract or modify the diagonal of a matrix or to build a diagonal matrix:

```
> diag(m1)
[1] 10 10
> diag(rbind(m1, m2)) %*% cbind(m1, m2)
[1] 101 101 8 8
>
> diag(m1) <- 10
> m1
 [,1] [,2]
[1,] 10 10
[2,] 1 10
> diag(3)
 [,1] [,2] [,3]
[1,] 1 0 0
[2,] 0 1 0
[3,] 0 0 1
> v <- c(10, 20, 30)
> diag(v)
 [,1] [,2] [,3]
[1,] 10 0 0
[2,] 0 20 0
[3,] 0 0 30
> diag(2, 1, nr = 3, nc = 5)
 [,1] [,2] [,3] [,4] [,5]
[1,] 2.1 0.0 0.0 0.0 0.0
[2,] 0.0 2.1 0.0 0.0 0.0
[3,] 0.0 0.0 2.1 0.0 0.0
>
```

Function 14.- iris table

```
> print(iris)
   Sepal.Length Sepal.Width Petal.Length Petal.Width Species
1          5.1         3.5          1.4         0.2  setosa
2          4.9         3.0          1.4         0.2  setosa
3          4.7         3.2          1.3         0.2  setosa
4          4.6         3.1          1.5         0.2  setosa
5          5.0         3.6          1.4         0.2  setosa
6          5.4         3.9          1.7         0.4  setosa
7          4.6         3.4          1.4         0.3  setosa
8          5.0         3.4          1.5         0.2  setosa
9          4.4         2.9          1.4         0.2  setosa
10         4.9         3.1          1.5         0.1  setosa
11         5.4         3.7          1.5         0.2  setosa
12         4.8         3.4          1.6         0.2  setosa
13         4.8         3.0          1.4         0.1  setosa
14         4.3         3.0          1.1         0.1  setosa
15         5.8         4.0          1.2         0.2  setosa
16         5.7         4.4          1.5         0.4  setosa
17         5.4         3.9          1.3         0.4  setosa
18         5.1         3.5          1.4         0.3  setosa
19         5.7         3.8          1.7         0.3  setosa
20         5.1         3.8          1.5         0.3  setosa
21         5.4         3.4          1.7         0.2  setosa
22         5.1         3.7          1.5         0.4  setosa
23         4.6         3.6          1.0         0.2  setosa
24         5.1         3.3          1.7         0.5  setosa
25         4.8         3.4          1.9         0.2  setosa
26         5.0         3.0          1.6         0.2  setosa
27         5.0         3.4          1.6         0.4  setosa
28         5.2         3.5          1.5         0.2  setosa
29         5.2         3.4          1.4         0.2  setosa
30         4.7         3.7          1.6         0.2  setosa
31         4.8         3.1          1.6         0.2  setosa
32         5.4         3.4          1.5         0.4  setosa
33         5.2         4.1          1.5         0.1  setosa
34         5.5         4.2          1.4         0.2  setosa
35         4.9         3.1          1.5         0.2  setosa
36         5.0         3.2          1.2         0.2  setosa
37         5.5         3.5          1.3         0.2  setosa
38         4.9         3.6          1.4         0.1  setosa
```

Function 15.- plot function (iris) Iris graph



Function 16.- nrow function (iris)

Show only a number of rows

```
> nrow(iris)
[1] 150
> |
```

Function 17.- colnames function (iris)

Show the names of the rows

```
> colnames(iris)
[1] "Sepal.Length" "Sepal.Width" "Petal.Length" "Petal.Width" "Species"
> |
```

Function 18.- Function ncol(iris)

Shows the number of columns

```
> ncol(iris)
[1] 5
> |
```

Function 19.- Function summary(iris)

Statistical summary of the columns

```
> summary(iris)
   Sepal.Length   Sepal.Width   Petal.Length   Petal.Width      Species
Min.   :4.300   Min.   :2.000   Min.   :1.000   Min.   :0.100   setosa    :50
1st Qu.:5.100  1st Qu.:2.800  1st Qu.:1.600  1st Qu.:0.300  versicolor:50
Median :5.800  Median :3.000  Median :3.057  Median :0.300  virginica :50
Mean   :5.843  Mean   :3.057  Mean   :3.758  Mean   :0.199
3rd Qu.:6.400  3rd Qu.:3.300  3rd Qu.:5.100  3rd Qu.:1.800
Max.   :7.900  Max.   :4.400  Max.   :6.900  Max.   :2.500
> |
```

Function 20.- Function Log

The function log calculates a logarithm of a given numerical value :

```
>
> log10(3)
[1] 0.4771213
>
> |
```

References

Paradis, E. (nd). *R for Beginners*. Retrieved March 06, 2022, from

https://cran.r-project.org/doc/contrib/rdebut_es.pdf