

## Lecture 11 - R Software

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# MATRIX

**Definition:** A rectangular array of numbers is called a matrix.


**Note:**

- We shall mostly be concerned with matrices having real numbers as entries.
- The horizontal arrays of a matrix are called its rows and the vertical arrays are called its columns.
- A matrix having  $m$  rows and  $n$  columns is said to have the order  $m \times n$ .

**Remark:** Matrix is a big representation of sequence of data elements.

- Vector: 1D array of data elements.
- Matrix: 2D array of data elements.

 Matrix is an arrangement of Rows and Columns, therefore it is 2D.

 It involves one atomic vector type, that is, each column is an arrangement of same data type.

Eg: Numeric, logical, etc.

`matrix()`: It is a command to create a matrix.

**Important Note:**

- Matrix needs a vector containing the values to be placed in a matrix and atleast one matrix dimension.
- We can choose to specify Number of Rows or Number of Columns.

Let's start some examples :

## Examples:

```
> matrix(1:6, nrow = 2)
```

	[ , 1]	[ , 2]	[ , 3]
[1 , ]	1	3	5
[2 , ]	2	4	6

```
> matrix(1:6, ncol = 3)
```

	[ , 1]	[ , 2]	[ , 3]
[1 , ]	1	3	5
[2 , ]	2	4	6

**Note:** In each of the matrix, data entries are filled column by column.

**Note:** If entries are to be filled row wise, we use argument "byrow = TRUE".

```
> matrix(1:6, nrow = 2, byrow = TRUE )
```

	[ , 1]	[ , 2]	[ , 3]
[1 , ]	1	2	3
[2 , ]	4	5	6

Create a Matrix: Recycling

```
> matrix(1:3, nrow = 2, ncol = 3)
```

	[ , 1]	[ , 2]	[ , 3]
[1 , ]	1	3	2
[2 , ]	2	1	3

```
> matrix(1:4, nrow = 2, ncol = 3)
```

	[ , 1]	[ , 2]	[ , 3]
[1 , ]	1	3	1
[2 , ]	2	4	2

Warning message:

In matrix(1:4, nrow = 2, ncol = 3) :

data length [4] is not a sub-multiple or multiple of the number  
of coulmns [3]