Matrices

1) Matrices are two dimensional array that can store homogeneous (same data type) data.

2) Matrices are created using matrix function **matrix()**

Creating matrix from a vector

In [18]:
```
v <- 1:10
```

In [19]:
```
print(v)
```

```
 [1]  1  2  3  4  5  6  7  8  9 10
```

In [20]:
```
m1 <- matrix(v)
```

In [10]:
```
print(m1)
```

```
      [,1]
 [1,]    1
 [2,]    2
 [3,]    3
 [4,]    4
 [5,]    5
 [6,]    6
 [7,]    7
 [8,]    8
 [9,]    9
[10,]   10
```

Mention number of rows and columns using **nrow** and **ncol** arguments

In [21]:
```
m2 <- matrix(v,nrow=2)
```

In [22]:
```
print(m2)
```

```
     [,1] [,2] [,3] [,4] [,5]
[1,]    1    3    5    7    9
[2,]    2    4    6    8   10
```

In [26]:
```
m3 <- matrix(v,ncol=5)
```

In [27]:
```
print(m3)
```

```
     [,1] [,2] [,3] [,4] [,5]
[1,]    1    3    5    7    9
[2,]    2    4    6    8   10
```

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1) In a matrix,data is filled column wise by default.

2) This is because of **byrow** argument which is **FALSE** by default

matrix(v,byrow=False)

In [33]:
```
m4 <- matrix(v,byrow=FALSE,nrow=2)
```

In [34]:
```
print(m4)
```

```
     [,1] [,2] [,3] [,4] [,5]
[1,]    1    3    5    7    9
[2,]    2    4    6    8   10
```

In [35]:
```
#Filling data row wise

m5 <- matrix(v,byrow=TRUE,nrow=2)
```

In [36]:
```
print(m5)
```

```
     [,1] [,2] [,3] [,4] [,5]
[1,]    1    2    3    4    5
[2,]    6    7    8    9   10
```

Naming rows and columns of matrix

Let's create two vectors that consist of scores of two student in various subjects

In [37]:
```
v1 <- c(56,78,81)
v2 <- c(79,67,86)
```

In [38]:
```
# Combine both vectors
scores <- c(v1,v2)
```

In [40]:
```
print(scores)
```

```
[1] 56 78 81 79 67 86
```

In [43]:
```
# Convert the vector into matrix with nrow=2, since we have 2 students
# Fill the matrix with rows, with byrow=TRUE

mat <- matrix(scores, nrow=2, byrow=TRUE)
```

In [45]:
```
print(mat)
```

```
     [,1] [,2] [,3]
[1,]   56   78   81
[2,]   79   67   86
```

In [47]:
```
# Let's create two vectors for row and col names

subjects <- c('Math','Science','English')

students <- c('Jack','John')
```

name rows and columns using **rownames()** and **colnames()** function

In [48]:
```
rownames(mat) <- students
colnames(mat) <- subjects
```

In [49]:
```
print(mat)
```

```
     Math Science English
Jack   56      78      81
John   79      67      86
```