```r
LETTERS <- c("A", "B", "C", "D", "E", "F", "G", "H", "I", "J", "K", "L", "M", "N", "O", "P", "Q", "R",
LETTERS
```

```
##  [1] "A" "B" "C" "D" "E" "F" "G" "H" "I" "J" "K" "L" "M" "N" "O" "P" "Q" "R" "S"
## [20] "T" "U" "V" "W" "X" "Y" "Z"
```

```r
letters <- c("a", "b", "c", "d", "e", "f", "g", "h", "i", "j", "k", "l", "m", "n", "o", "p", "q", "r",
letters
```

```
##  [1] "a" "b" "c" "d" "e" "f" "g" "h" "i" "j" "k" "l" "m" "n" "o" "p" "q" "r" "s"
## [20] "t" "u" "v" "w" "x" "y" "z"
```

```r
first11L <- head(LETTERS, 11)
first11L
```

```
##  [1] "A" "B" "C" "D" "E" "F" "G" "H" "I" "J" "K"
```

```r
vowels <- LETTERS[c(1, 5, 9, 15, 21)]
vowels
```

```
## [1] "A" "E" "I" "O" "U"
```

```r
last5l <- tail(letters, 5)
last5l
```

```
## [1] "v" "w" "x" "y" "z"
```

```r
bet15n24 <- letters[c(15:24)]
bet15n24
```

```
##  [1] "o" "p" "q" "r" "s" "t" "u" "v" "w" "x"
```

```r
city <- c("Tuguegarao City", "Manila", "Iloilo City", "Tacloban","Samal Island", "Davao City")
city
```

```
## [1] "Tuguegarao City" "Manila"          "Iloilo City"     "Tacloban"
## [5] "Samal Island"    "Davao City"
```

```r
temp <- c(42, 39, 34, 34, 30, 27)
temp
```

```
## [1] 42 39 34 34 30 27
```

```r
citytemp <- data.frame(city, temp)
citytemp
```

```
##              city temp
## 1 Tuguegarao City   42
## 2          Manila   39
## 3     Iloilo City   34
## 4        Tacloban   34
## 5    Samal Island   30
## 6      Davao City   27
```

```
names(citytemp) <- c("City", "Temperature")
citytemp
```

```
##              City Temperature
## 1 Tuguegarao City          42
## 2          Manila          39
## 3     Iloilo City          34
## 4        Tacloban          34
## 5    Samal Island          30
## 6      Davao City          27
```

```
str(citytemp)
```

```
## 'data.frame':    6 obs. of  2 variables:
##  $ City       : chr  "Tuguegarao City" "Manila" "Iloilo City" "Tacloban" ...
##  $ Temperature: num  42 39 34 34 30 27
```

```
citytemp[c(3,4), ]
```

```
##          City Temperature
## 3 Iloilo City          34
## 4    Tacloban          34
```

```
citytemp[c(1,6), ]
```

```
##              City Temperature
## 1 Tuguegarao City          42
## 6      Davao City          27
```

```
matrix(c(5,6,7,4,3,2,1,2,3,7,8,9),nrow = 2)
```

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

```
matrix(data = c(3,4,5,6,7,8,3,2),nrow = 3, ncol = 2)
```

```
## Warning in matrix(data = c(3, 4, 5, 6, 7, 8, 3, 2), nrow = 3, ncol = 2): data
## length [8] is not a sub-multiple or multiple of the number of rows [3]
```

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

```
diag(1,nrow = 6, ncol = 5)
```

```
##      [,1] [,2] [,3] [,4] [,5]
## [1,]    1    0    0    0    0
## [2,]    0    1    0    0    0
## [3,]    0    0    1    0    0
## [4,]    0    0    0    1    0
## [5,]    0    0    0    0    1
## [6,]    0    0    0    0    0
```

```
diag(6)
```

```
##      [,1] [,2] [,3] [,4] [,5] [,6]
## [1,]    1    0    0    0    0    0
## [2,]    0    1    0    0    0    0
## [3,]    0    0    1    0    0    0
## [4,]    0    0    0    1    0    0
## [5,]    0    0    0    0    1    0
## [6,]    0    0    0    0    0    1
```

```
matrix(c(1:8, 11:14), nrow = 3, ncol = 4)
```

```
##      [,1] [,2] [,3] [,4]
## [1,]    1    4    7   12
## [2,]    2    5    8   13
## [3,]    3    6   11   14
```

```
matrix(c(1:8, 11:14), nrow = 3, ncol = 4) * 2
```

```
##      [,1] [,2] [,3] [,4]
## [1,]    2    8   14   24
## [2,]    4   10   16   26
## [3,]    6   12   22   28
```

```
matrix <- matrix(c(1:8, 11:14), nrow = 3, ncol = 4) * 2
matrix[2, ]
```

```
## [1]  4 10 16 26
```

```
matrix[c(1, 2), c(3,4)]
```

```
##      [,1] [,2]
## [1,]   14   24
## [2,]   16   26
```

```r
matrix[ ,4]
```

```
## [1] 24 26 28
```

```r
rownames(matrix) <- c("isa", "dalawa", "tatlo")
colnames(matrix) <- c("uno", "dos", "tres", "quatro")
as.table(matrix)
```

```
##        uno dos tres quatro
## isa      2   8   14     24
## dalawa   4  10   16     26
## tatlo    6  12   22     28
```

```r
dim(matrix) <- c(nrow= 6, ncol= 2)
matrix
```

```
##      [,1] [,2]
## [1,]    2   14
## [2,]    4   16
## [3,]    6   22
## [4,]    8   24
## [5,]   10   26
## [6,]   12   28
```

```r
array_dta <- array(c(1:24), c(3,4,2))
array_dta
```

```
## , , 1
##
##      [,1] [,2] [,3] [,4]
## [1,]    1    4    7   10
## [2,]    2    5    8   11
## [3,]    3    6    9   12
##
## , , 2
##
##      [,1] [,2] [,3] [,4]
## [1,]   13   16   19   22
## [2,]   14   17   20   23
## [3,]   15   18   21   24
```

```r
dim(array_dta)
```

```
## [1] 3 4 2
```

```r
length(array_dta)
```

```
## [1] 24
```

```r
vectorA <- c(1:24)
an_Array <- array(vectorA, dim = c(3,4,2))
an_Array
```

```
## , , 1
##
##      [,1] [,2] [,3] [,4]
## [1,]    1    4    7   10
## [2,]    2    5    8   11
## [3,]    3    6    9   12
##
## , , 2
##
##      [,1] [,2] [,3] [,4]
## [1,]   13   16   19   22
## [2,]   14   17   20   23
## [3,]   15   18   21   24
```

```r
vectorB <- c(1, 2, 3, 6, 7, 8, 9, 0, 3, 4, 5, 1)
an_array <- array(c(rep(vectorB), each = 2), dim= c(2,4,3))
an_array
```

```
## , , 1
##
##      [,1] [,2] [,3] [,4]
## [1,]    1    3    7    9
## [2,]    2    6    8    0
##
## , , 2
##
##      [,1] [,2] [,3] [,4]
## [1,]    3    5    2    2
## [2,]    4    1    1    3
##
## , , 3
##
##      [,1] [,2] [,3] [,4]
## [1,]    6    8    0    4
## [2,]    7    9    3    5
```

```r
dimnames(an_array) <- list(c("a","b"),c("A","B","C","D"), c("1st-Dimensional Array", "2nd-Dimensional A
an_array
```

```
## , , 1st-Dimensional Array
##
##   A B C D
## a 1 3 7 9
## b 2 6 8 0
##
## , , 2nd-Dimensional Array
##
```

```
##   A B C D
## a 3 5 2 2
## b 4 1 1 3
##
## , , 3rd-Dimensional Array
##
##   A B C D
## a 6 8 0 4
## b 7 9 3 5
```