

RWorksheet_Cababasay#3a

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Worksheet 3a – Using Vectors, Matrices and Arrays in R

1. Using Vectors

a. First 11 uppercase letters

```
LETTERS[1:11]

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

b. Odd-numbered letters

```
LETTERS[seq(1, 26, by = 2)]

## [1] "A" "C" "E" "G" "I" "K" "M" "O" "Q" "S" "U" "W" "Y"
```

c. Vowels in uppercase

```
LETTERS[c(1,5,9,15,21)]

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

d. Last 5 lowercase letters

```
letters[22:26]

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

e. Lowercase letters 15 to 24

```
letters[15:24]

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

2. Average April Temperatures

a. Character vector of cities

```
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"
```

b. Numeric vector of temperatures (°C)

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

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

c. Combine into data frame

```
weather <- data.frame(city, temp)
weather
```

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

d. Rename columns to City and Temperature

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

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

e. Show structure

```
str(weather)
```

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

f. Rows 3 and 4

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

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

g. Highest and lowest temperature cities

```
weather[which.max(weather$Temperature), ]
```

```
##           City Temperature
## 1 Tuguegarao City         42
```

```
weather[which.min(weather$Temperature), ]
```

```
##           City Temperature  
## 6 Davao City           27
```

3. Using Matrices

a. Matrix from 1–8 and 11–14 (4 cols \times 3 rows)

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

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

b. Multiply by 2

```
mat2 <- mat * 2  
mat2
```

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

c. Row 2 content

```
mat2[2, ]
```

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

d. Columns 3–4 of rows 1–2

```
mat2[1:2, 3:4]
```

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

e. Columns 2–3 of row 3

```
mat2[3, 2:3]
```

```
## [1] 12 22
```

f. Column 4 only

```
mat2[, 4]
```

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

g. Name rows and columns

```
rownames(mat2) <- c("isa", "dalawa", "tatlo")
colnames(mat2) <- c("uno", "dos", "tres", "quatro")
mat2
```

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

h. Reshape original matrix to 2 cols \times 6 rows

```
dim(mat) <- c(6,2)
mat
```

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

4. Using Arrays

a. Create 3-D array (4 cols \times 2 rows)

```
nums <- c(1,2,3,6,7,8,9,0,3,4,5,1)
arr <- array(rep(nums,2), dim = c(2,4,3))
arr
```

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

b. Check dimensions

```
dim(arr)
```

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

c. Name rows, columns, and dimensions

```
rownames(arr) <- letters[1:2]
colnames(arr) <- LETTERS[1:4]
dimnames(arr) <- list(
  row = letters[1:2],
  col = LETTERS[1:4],
  dim = c("1st-Dimensional Array", "2nd-Dimensional Array", "3rd-Dimensional Array")
)
arr
```

```
## , , dim = 1st-Dimensional Array
##
##      col
## row A B C D
##  a 1 3 7 9
##  b 2 6 8 0
##
## , , dim = 2nd-Dimensional Array
##
##      col
## row A B C D
##  a 3 5 1 3
##  b 4 1 2 6
##
## , , dim = 3rd-Dimensional Array
##
##      col
## row A B C D
##  a 7 9 3 5
##  b 8 0 4 1
```