



INTRODUCTION TO R

# Create and Name Matrices

# Matrix

- Vector: 1D array of data elements
- Matrix: 2D array of data elements
- Rows and columns
- One atomic vector type

# Create a matrix

## matrix()

```
> 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

> 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 columns [3]

# `rbind()`, `cbind()`

```
> cbind(1:3, 1:3)
      [,1] [,2]
[1,]    1    1
[2,]    2    2
[3,]    3    3

> rbind(1:3, 1:3)
      [,1] [,2] [,3]
[1,]    1    2    3
[2,]    1    2    3
```

# rbind(), cbind()

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

```
> rbind(m, 7:9)
```

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

```
> cbind(m, c(10, 11))
```

```
      [,1] [,2] [,3] [,4]
[1,]    1    2    3   10
[2,]    4    5    6   11
```

# Naming a matrix `rownames()`, `colnames()`

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

```
> rownames(m) <- c("row1", "row2")
```

```
> m
      [,1] [,2] [,3]
row1    1    2    3
row2    4    5    6
```

```
> colnames(m) <- c("col1", "col2", "col3")
```

```
> m
      col1 col2 col3
row1    1    2    3
row2    4    5    6
```

# Naming a matrix

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



# Naming a matrix

```
> m <- matrix(1:6, byrow = TRUE, nrow = 2,  
             dimnames = list(c("row1", "row2"),  
                             c("col1", "col2", "col3")))
```

```
> m  
      col1 col2 col3  
row1    1    2    3  
row2    4    5    6
```

# Coercion

```
> num <- matrix(1:8, ncol = 2)
> num
      [,1] [,2]
[1,]    1    5
[2,]    2    6
[3,]    3    7
[4,]    4    8
> char <- matrix(LETTERS[1:6], nrow = 4, ncol = 3)
> char
      [,1] [,2] [,3]
[1,] "A"  "E"  "C"
[2,] "B"  "F"  "D"
[3,] "C"  "A"  "E"
[4,] "D"  "B"  "F"
```

# Coercion

```
> num <- matrix(1:8, ncol = 2)
> char <- matrix(LETTERS[1:6], nrow = 4, ncol = 3)

> cbind(num, char)
      [,1] [,2] [,3] [,4] [,5]
[1,] "1"  "5"  "A"  "E"  "C"
[2,] "2"  "6"  "B"  "F"  "D"
[3,] "3"  "7"  "C"  "A"  "E"
[4,] "4"  "8"  "D"  "B"  "F"
```

Contain different types? list or data.frame



INTRODUCTION TO R

**Let's practice!**