

TOOL

# Manipulating Matrices and Dataframes

## Creating a Matrix

The `matrix()` function is used to make a matrix. Its first argument is a data vector.

```
matrix(data, nrow = 1, ncol = 1, byrow = FALSE)
```

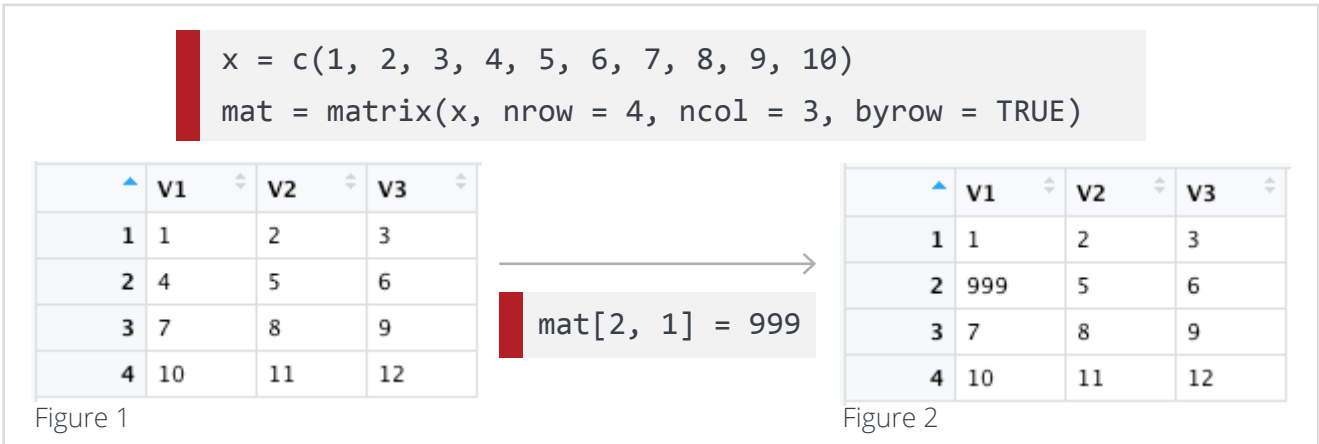
The other arguments the `matrix()` function takes are:

nrow	The <b>nrow</b> argument indicates the number of rows in the matrix. In Figure 1, the matrix has four rows, and <b>nrow</b> is set to 4.
ncol	The <b>ncol</b> argument indicates the number of columns in the matrix. In Figure 1 below, the matrix has three columns, and <b>ncol</b> is set to 3.
byrow	The <b>byrow</b> argument indicates how the matrix is filled with the data values. If <b>byrow</b> = <b>TRUE</b> , the matrix is filled from the top row to the bottom row, left to right. If <b>byrow</b> = <b>FALSE</b> , the matrix is filled from the left column to the right column, top to bottom.

## Referencing a Matrix

To change an entry in a matrix, reference the element by its row and column. Use the name of the matrix followed by square brackets. Inside the brackets, include the row number, followed by the column number, in the form: `matrixName[row#, column#]`. In Figure 2, the element in the second row and first column is changed to 999.

### Matrix example



## Referencing a Data Frame

A data frame is an object used to hold data. A data frame looks like a matrix in that it holds data in a grid with rows and columns. Each column represents data from a different variable. Each column can only hold one type of data. Each row corresponds to an individual subject or observation.

### Referencing a column in a data frame

The column number is determined by counting from left to right starting at 1. There are two ways to reference an entire column of a data frame:

1. `DataframeName$ColumnName`

2. `DataframeName[[ Column# ]]`

### Referencing a row in a data frame

The row number is determined by counting from top to bottom starting at 1. There is one way to reference an entire row of a data frame:

1. `DataframeName[ Row#, ]`

### Referencing an individual element in a data frame

You can change elements in a data frame by referencing the cell or column and assigning a different value to it. There are two ways to reference an element in a data frame:

1. `DataframeName$ColumnName[ Row# ]`

2. `DataframeName[ Row# , Column#]`

