S2 en clase

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Nota importante

Cada vez que inician un nuevo trabajo, pueden notar que los objetos que crearon en otros archivos pueden (o no) seguir en el apartado de "Entorno de trabajo de RStudio" (el apartado superior que esta a la derecha), por lo cual es recomendable agregar el comando: rm(list=ls()) en el primer chunk de cada nuevo archivo, el cual limpia del entorno de trabajo, alternativamente, pueden presionar el símbolo de la escoba que se encuentra en el apartado de "Entorno de trabajo".

```
rm(list=ls())
```

Manejo de datos

Tipos de datos

Class numeric

```
3.145
```

```
## [1] 3.145
```

```
class(3.141)
```

```
## [1] "numeric"
```

```
"pi"
```

```
## [1] "pi"
```

```
class("pi")
```

```
## [1] "character"
```

logical

```
TRUE
```

```
## [1] TRUE
```

```
FALSE
```

```
## [1] FALSE
```

```
class(FALSE)
```

```
## [1] "logical"
```

```
NA
```

```
## [1] NA
```

Operadores

Operadores de asignacion

```
x = 2
```

```
x <- 3
```

Operadores aritmeticos

```
2 + 2
```

```
## [1] 4
```

```
2 - 2
```

```
## [1] 0
```

```
2*2
```

```
## [1] 4
```

```
2/2
```

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

```
2^3
```

```
## [1] 8
```

```r
y <- 5
y
```

```
## [1] 5
```

```r
y+2
```

```
## [1] 7
```

Adicional Transformaciones

Logaritmo natural

```r
log(10)
```

```
## [1] 2.302585
```

Logaritmo base 10

```r
log10(10)
```

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

Raiz cuadrada

```r
4^(1/2)
```

```
## [1] 2
```

```r
sqrt(4)
```

```
## [1] 2
```

Operadores relacionales

Output: True or False

Menor que

```r
4 < 2
```

```
## [1] FALSE
```

```r
 4 > 2
```

```
## [1] TRUE
```

```
4 <= 2
```

```
## [1] FALSE
```

```
4 >= 2
```

```
## [1] TRUE
```

```
4 == 2
```

```
## [1] FALSE
```

```
4 != 2
```

```
## [1] TRUE
```

Operadores logicos

Operador	Comparacion
x | y	x O y es verdadero
x & y	x Y y son verderos
!x	x no es verdadero

```
2 > 3 | 4 < 2
```

```
## [1] FALSE
```

```
3 > 2 | 4 < 2
```

```
## [1] TRUE
```

Orden den operaciones

i) Operadores aritmeticos
ii) Operadores relacionales
iii) operadores logicos
iv) operadores de asignacion

Podemos utilizar "()"

Estructura de datos

Vectores

```r
v <- c(1,2,3)
v
```

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

```r
class(v)
```

```
## [1] "numeric"
```

```r
is.vector(v)
```

```
## [1] TRUE
```

Modificar un vector

```r
b <- c(v,5)
b
```

```
## [1] 1 2 3 5
```

```r
a <- c(1,2)
c <- c(3,4)
z <- c(a,c)
z
```

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

Operaciones con vectores

```r
z <- z + 2
z
```

```
## [1] 3 4 5 6
```

```r
v <- c(1,3,6)
v
```

```
## [1] 1 3 6
```

```r
v <- v*2
v
```

```
## [1]  2  6 12
```

Operadores relacionales

```r
z <- c(1,2,3)
z
```

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

```r
z > 2
```

```
## [1] FALSE FALSE  TRUE
```

Multiplicacion de vectores

```r
va <- c(1,2,3)
vb <- c(1,2,3)
va %*% vb
```

```
##      [,1]
## [1,]   14
```

```r
va %*% t(vb)
```

```
##      [,1] [,2] [,3]
## [1,]    1    2    3
## [2,]    2    4    6
## [3,]    3    6    9
```

```r
ho <- c("uno","dos", "tres")
ho
```

```
## [1] "uno"  "dos"  "tres"
```

Matrices

```r
v1 <- c(1,2,3)
v2 <- c(2,2,3)
v3 <- c(3,3,3)
```

```r
m1 <- cbind(v1,v2,v3)
m1
```

```
##      v1 v2 v3
## [1,]  1  2  3
## [2,]  2  2  3
## [3,]  3  3  3
```

```r
m2 <- rbind(v1,v2,v3)
m2
```

```
##    [,1] [,2] [,3]
## v1    1    2    3
## v2    2    2    3
## v3    3    3    3
```

```
m1 %*% m2
```

```
##      [,1] [,2] [,3]
## [1,]   14   15   18
## [2,]   15   17   21
## [3,]   18   21   27
```

```
m1
```

```
##      v1 v2 v3
## [1,]  1  2  3
## [2,]  2  2  3
## [3,]  3  3  3
```

```
m1 + 2
```

```
##      v1 v2 v3
## [1,]  3  4  5
## [2,]  4  4  5
## [3,]  5  5  5
```

```
m1
```

```
##      v1 v2 v3
## [1,]  1  2  3
## [2,]  2  2  3
## [3,]  3  3  3
```

```
m1^2
```

```
##      v1 v2 v3
## [1,]  1  4  9
## [2,]  4  4  9
## [3,]  9  9  9
```

```
m1 %*% m1
```

```
##      v1 v2 v3
## [1,] 14 15 18
## [2,] 15 17 21
## [3,] 18 21 27
```

```
t(m1)
```

```
##    [,1] [,2] [,3]
## v1    1    2    3
## v2    2    2    3
## v3    3    3    3
```

matriz inversa

```
solve(m1)
```

```
##    [,1] [,2]       [,3]
## v1   -1    1  0.0000000
## v2    1   -2  1.0000000
## v3    0    1 -0.6666667
```

Dataframes

```
iris
```

```
##     Sepal.Length Sepal.Width Petal.Length Petal.Width    Species
## 1            5.1         3.5          1.4         0.2     setosa
## 2            4.9         3.0          1.4         0.2     setosa
## 3            4.7         3.2          1.3         0.2     setosa
## 4            4.6         3.1          1.5         0.2     setosa
## 5            5.0         3.6          1.4         0.2     setosa
## 6            5.4         3.9          1.7         0.4     setosa
## 7            4.6         3.4          1.4         0.3     setosa
## 8            5.0         3.4          1.5         0.2     setosa
## 9            4.4         2.9          1.4         0.2     setosa
## 10           4.9         3.1          1.5         0.1     setosa
## 11           5.4         3.7          1.5         0.2     setosa
## 12           4.8         3.4          1.6         0.2     setosa
## 13           4.8         3.0          1.4         0.1     setosa
## 14           4.3         3.0          1.1         0.1     setosa
## 15           5.8         4.0          1.2         0.2     setosa
## 16           5.7         4.4          1.5         0.4     setosa
## 17           5.4         3.9          1.3         0.4     setosa
## 18           5.1         3.5          1.4         0.3     setosa
## 19           5.7         3.8          1.7         0.3     setosa
## 20           5.1         3.8          1.5         0.3     setosa
## 21           5.4         3.4          1.7         0.2     setosa
## 22           5.1         3.7          1.5         0.4     setosa
## 23           4.6         3.6          1.0         0.2     setosa
## 24           5.1         3.3          1.7         0.5     setosa
## 25           4.8         3.4          1.9         0.2     setosa
## 26           5.0         3.0          1.6         0.2     setosa
## 27           5.0         3.4          1.6         0.4     setosa
## 28           5.2         3.5          1.5         0.2     setosa
## 29           5.2         3.4          1.4         0.2     setosa
## 30           4.7         3.2          1.6         0.2     setosa
## 31           4.8         3.1          1.6         0.2     setosa
## 32           5.4         3.4          1.5         0.4     setosa
```

```
## 33          5.2         4.1          1.5         0.1     setosa
## 34          5.5         4.2          1.4         0.2     setosa
## 35          4.9         3.1          1.5         0.2     setosa
## 36          5.0         3.2          1.2         0.2     setosa
## 37          5.5         3.5          1.3         0.2     setosa
## 38          4.9         3.6          1.4         0.1     setosa
## 39          4.4         3.0          1.3         0.2     setosa
## 40          5.1         3.4          1.5         0.2     setosa
## 41          5.0         3.5          1.3         0.3     setosa
## 42          4.5         2.3          1.3         0.3     setosa
## 43          4.4         3.2          1.3         0.2     setosa
## 44          5.0         3.5          1.6         0.6     setosa
## 45          5.1         3.8          1.9         0.4     setosa
## 46          4.8         3.0          1.4         0.3     setosa
## 47          5.1         3.8          1.6         0.2     setosa
## 48          4.6         3.2          1.4         0.2     setosa
## 49          5.3         3.7          1.5         0.2     setosa
## 50          5.0         3.3          1.4         0.2     setosa
## 51          7.0         3.2          4.7         1.4 versicolor
## 52          6.4         3.2          4.5         1.5 versicolor
## 53          6.9         3.1          4.9         1.5 versicolor
## 54          5.5         2.3          4.0         1.3 versicolor
## 55          6.5         2.8          4.6         1.5 versicolor
## 56          5.7         2.8          4.5         1.3 versicolor
## 57          6.3         3.3          4.7         1.6 versicolor
## 58          4.9         2.4          3.3         1.0 versicolor
## 59          6.6         2.9          4.6         1.3 versicolor
## 60          5.2         2.7          3.9         1.4 versicolor
## 61          5.0         2.0          3.5         1.0 versicolor
## 62          5.9         3.0          4.2         1.5 versicolor
## 63          6.0         2.2          4.0         1.0 versicolor
## 64          6.1         2.9          4.7         1.4 versicolor
## 65          5.6         2.9          3.6         1.3 versicolor
## 66          6.7         3.1          4.4         1.4 versicolor
## 67          5.6         3.0          4.5         1.5 versicolor
## 68          5.8         2.7          4.1         1.0 versicolor
## 69          6.2         2.2          4.5         1.5 versicolor
## 70          5.6         2.5          3.9         1.1 versicolor
## 71          5.9         3.2          4.8         1.8 versicolor
## 72          6.1         2.8          4.0         1.3 versicolor
## 73          6.3         2.5          4.9         1.5 versicolor
## 74          6.1         2.8          4.7         1.2 versicolor
## 75          6.4         2.9          4.3         1.3 versicolor
## 76          6.6         3.0          4.4         1.4 versicolor
## 77          6.8         2.8          4.8         1.4 versicolor
## 78          6.7         3.0          5.0         1.7 versicolor
## 79          6.0         2.9          4.5         1.5 versicolor
## 80          5.7         2.6          3.5         1.0 versicolor
## 81          5.5         2.4          3.8         1.1 versicolor
## 82          5.5         2.4          3.7         1.0 versicolor
## 83          5.8         2.7          3.9         1.2 versicolor
## 84          6.0         2.7          5.1         1.6 versicolor
## 85          5.4         3.0          4.5         1.5 versicolor
## 86          6.0         3.4          4.5         1.6 versicolor
```

```
## 87          6.7         3.1          4.7         1.5 versicolor
## 88          6.3         2.3          4.4         1.3 versicolor
## 89          5.6         3.0          4.1         1.3 versicolor
## 90          5.5         2.5          4.0         1.3 versicolor
## 91          5.5         2.6          4.4         1.2 versicolor
## 92          6.1         3.0          4.6         1.4 versicolor
## 93          5.8         2.6          4.0         1.2 versicolor
## 94          5.0         2.3          3.3         1.0 versicolor
## 95          5.6         2.7          4.2         1.3 versicolor
## 96          5.7         3.0          4.2         1.2 versicolor
## 97          5.7         2.9          4.2         1.3 versicolor
## 98          6.2         2.9          4.3         1.3 versicolor
## 99          5.1         2.5          3.0         1.1 versicolor
## 100         5.7         2.8          4.1         1.3 versicolor
## 101         6.3         3.3          6.0         2.5  virginica
## 102         5.8         2.7          5.1         1.9  virginica
## 103         7.1         3.0          5.9         2.1  virginica
## 104         6.3         2.9          5.6         1.8  virginica
## 105         6.5         3.0          5.8         2.2  virginica
## 106         7.6         3.0          6.6         2.1  virginica
## 107         4.9         2.5          4.5         1.7  virginica
## 108         7.3         2.9          6.3         1.8  virginica
## 109         6.7         2.5          5.8         1.8  virginica
## 110         7.2         3.6          6.1         2.5  virginica
## 111         6.5         3.2          5.1         2.0  virginica
## 112         6.4         2.7          5.3         1.9  virginica
## 113         6.8         3.0          5.5         2.1  virginica
## 114         5.7         2.5          5.0         2.0  virginica
## 115         5.8         2.8          5.1         2.4  virginica
## 116         6.4         3.2          5.3         2.3  virginica
## 117         6.5         3.0          5.5         1.8  virginica
## 118         7.7         3.8          6.7         2.2  virginica
## 119         7.7         2.6          6.9         2.3  virginica
## 120         6.0         2.2          5.0         1.5  virginica
## 121         6.9         3.2          5.7         2.3  virginica
## 122         5.6         2.8          4.9         2.0  virginica
## 123         7.7         2.8          6.7         2.0  virginica
## 124         6.3         2.7          4.9         1.8  virginica
## 125         6.7         3.3          5.7         2.1  virginica
## 126         7.2         3.2          6.0         1.8  virginica
## 127         6.2         2.8          4.8         1.8  virginica
## 128         6.1         3.0          4.9         1.8  virginica
## 129         6.4         2.8          5.6         2.1  virginica
## 130         7.2         3.0          5.8         1.6  virginica
## 131         7.4         2.8          6.1         1.9  virginica
## 132         7.9         3.8          6.4         2.0  virginica
## 133         6.4         2.8          5.6         2.2  virginica
## 134         6.3         2.8          5.1         1.5  virginica
## 135         6.1         2.6          5.6         1.4  virginica
## 136         7.7         3.0          6.1         2.3  virginica
## 137         6.3         3.4          5.6         2.4  virginica
## 138         6.4         3.1          5.5         1.8  virginica
## 139         6.0         3.0          4.8         1.8  virginica
## 140         6.9         3.1          5.4         2.1  virginica
```

```
## 141          6.7         3.1          5.6         2.4  virginica
## 142          6.9         3.1          5.1         2.3  virginica
## 143          5.8         2.7          5.1         1.9  virginica
## 144          6.8         3.2          5.9         2.3  virginica
## 145          6.7         3.3          5.7         2.5  virginica
## 146          6.7         3.0          5.2         2.3  virginica
## 147          6.3         2.5          5.0         1.9  virginica
## 148          6.5         3.0          5.2         2.0  virginica
## 149          6.2         3.4          5.4         2.3  virginica
## 150          5.9         3.0          5.1         1.8  virginica
```