

S2 primera parte

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Manejo de datos

Tipos de datos

```
class(1)
```

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

```
class("rojo")
```

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

```
class(TRUE)
```

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

```
class(FALSE)
```

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

```
class(NA)
```

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

```
class(NULL)
```

```
## [1] "NULL"
```

Operadores

```
3 + 2
```

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

Creacion de un objeto

```
x = 3
x
```

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

```
y <- 6
y
```

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

Operador aritmetico

```
y <- 2 + 2
y
```

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

```
2 - 2
```

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

```
2*2
```

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

```
2/2
```

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

```
2^3
```

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

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

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

```
sqrt(9)
```

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

logaritimo natural

```
log(10)
```

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

```
log10(10)
```

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

Operadores relacionales

```
4 < 2
```

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

```
4 > 2
```

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

```
4 <= 2
```

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

```
4 >= 2
```

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

```
4 == 2
```

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

```
4 != 2
```

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

Operadores logicos

x O y es verdadero: |, x | y

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

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

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

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

x Y y es verdadero: &, x & y

```
4 > 2 & 2 > 1
```

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

```
4 > 2 & 1 < 0
```

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

! negacion

```
4 > 2
```

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

```
!(4 > 2)
```

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

```
4 < 2
```

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

```
!(4 < 2)
```

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

Orden de operaciones

- 1) ^
- 2) • /
- 3) • -
- 4) Operadores relacionales <, >
- 5) !

Estructura de datos

Vectores

```
vector1 <- c(1,2,3,4)
```

```
vector1
```

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

```
vector2 <- c(vector1, 5)
vector2
```

```
## [1] 1 2 3 4 5
```

```
v1 <- c(1,2)
v2 <- c(7,8)
v3 <- c(v1,v2)
v1
```

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

```
v2
```

```
## [1] 7 8
```

```
v3
```

```
## [1] 1 2 7 8
```

Operaciones con vectores

```
v1 + 3
```

```
## [1] 4 5
```

```
length(v1)
```

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

```
v1 + v2
```

```
## [1] 8 10
```

Operadores relacionales

```
obj1 <- c(1:10)
obj1
```

```
## [1] 1 2 3 4 5 6 7 8 9 10
```

```
obj1 > 5
```

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

Multiplicacion

```
va <- c(5,29)
vb <- c(3,7)
```

```
va %*% vb
```

```
##      [,1]
## [1,] 218
```

Matrices

crear una matriz

```
m1 <- cbind(va,vb)
m1
```

```
##      va vb
## [1,]  5  3
## [2,] 29  7
```

```
m2 <- rbind(va,vb)
m2
```

```
##      [,1] [,2]
## va      5  29
## vb      3   7
```

```
mva <- cbind(va)
mvb <- rbind(vb)
m3 <- mva %*% mvb
m3
```

```
##      [,1] [,2]
## [1,]   15  35
## [2,]   87 203
```

```
dim(m3)
```

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

Operaciones con matrices

```
m3 + 1
```

```
##      [,1] [,2]
## [1,]   16  36
## [2,]   88 204
```

transponer

```
m3
```

```
##      [,1] [,2]
## [1,]   15  35
## [2,]   87 203
```

```
t(m3)
```

```
##      [,1] [,2]
## [1,]   15  87
## [2,]   35 203
```

```
inversa
```

```
a1 <- c(1,1)
a2 <- c(2,7)
m10 <- cbind(a1,a2)
m10
```

```
##      a1 a2
## [1,]  1  2
## [2,]  1  7
```

```
solve(m10)
```

```
##      [,1] [,2]
## a1  1.4 -0.4
## a2 -0.2  0.2
```

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
```

```
summary(iris)
```

```
##      Sepal.Length      Sepal.Width      Petal.Length      Petal.Width
## Min.      :4.300    Min.      :2.000    Min.      :1.000    Min.      :0.100
## 1st Qu.:5.100    1st Qu.:2.800    1st Qu.:1.600    1st Qu.:0.300
## Median :5.800    Median :3.000    Median :4.350    Median :1.300
## Mean   :5.843    Mean   :3.057    Mean   :3.758    Mean   :1.199
## 3rd Qu.:6.400    3rd Qu.:3.300    3rd Qu.:5.100    3rd Qu.:1.800
## Max.   :7.900    Max.   :4.400    Max.   :6.900    Max.   :2.500
##      Species
## setosa      :50
## versicolor:50
## virginica   :50
##
##
##
```

```
?iris
```

```
## starting httpd help server ... done
```