Tópico 01

Saturday, May 8, 2021 10:46 AM

--alterar prompt para exibir mensagens em inglês

```
Sys.setenv(LANGUAGE = "en")
```

-- comando para carregar a bibilioteca a ser utitilizada.

```
library(ggplot2)
```

-- alterar o prompt

```
options(prompt="\nR> ")
```

-- função log

```
log(x, base = exp(1))
logb(x, base = exp(1))
log10(x)
log2(x)
```

-- atribuir valor. Utilizar o sinal <-

```
x <- 10 ou x = 10
```

-- criar vetor

```
vetor <- c(1,3,9,8.5,10)
```

-- O R não aceita vetor com elementos de diferentes tipos

Ex.:

```
vetor2 <- c(1,3,9,"a","b")
[1] "1" "3" "9" "a" "b" (transforma tudo para string).
```

-- comando para limpar lista de elementos

```
R> rm(lista)
R> rm(list = ls()) --remove todos os elementos
```

-- sequencia de numeros

```
R> 10 : -1
[1] 10  9  8  7  6  5  4  3  2  1  0 -1

R> seq(from=3,to=30,by=3)
[1]  3  6  9 12 15 18 21 24 27 30
```

1 : 10 equivale a seq(from=1,to=10,by=1)

```
seq(from=1,to=10,length.out=20)
```

-- sequencia com repetição

```
rep(10,12)
[1] 10 10 10 10 10 10 10 10 10 10 10 10

rep(c(1,2,3), each=2)
[1] 1 1 2 2 3 3

rep(c(1,2,3), each=2, times=3)
[1] 1 1 2 2 3 3 1 1 2 2 3 3 1 1 2 2 3 3
```

-- alterar elemento do vetor

```
R> z
[1] 1 1 2 2 3 3 1 1 2 2 3 3 1 1 2 2 3 3
R> z[10] <- 9
R> z
[1] 1 1 2 2 3 3 1 1 2 9
```

-- incrementar vetor

```
R> z2 <- c(z,80,90,100)

R> z2
[1]   1   1   2   2   3   3   1   1   2   9   3   3   1   1   2   2   3   3  80  90 100
```

- ordenar vetor

```
crescente: R> sort(z) --> [1] 1 1 1 1 1 1 2 2 2 2 2 2 3 3 3 3 3 3 9
descrescente: R> sort(z,decreasing=TRUE)-->[1] 9 3 3 3 3 3 3 2 2 2 2 2 2 1 1 1 1 1 1
z <- sort(z)
```

-- tamanho do vetor

```
length(z)
```

-- retirar elemento do vetor

```
R> z[-10]
[1]   1   2   3   4   5   6   7   8   9  11  12 (excluiu o 10)
```

-- operação em todos os elementos do vetor 1

```
R> z
[1]  1 19 99 21  4

R> z+1
[1]   2  20 100  22   5
```

-- operação em todos os elementos do vetor 2

```
R> x
[1]  1  2  3  4  5  6  7  8  9 10

R> y
[1] 11 12 13 14 15 16 17 18 19 20

R> x+y
[1] 12 14 16 18 20 22 24 26 28 30
```

-- somatório

```
x <- 1:10
sum(x)
sum(x^2)
```

-- produtório

```
prod(x)
```

-- MATRIZES --

```
R> A <- matrix((1:12),nrow=3,ncol=4)

R> A
     [,1] [,2] [,3] [,4]
[1,]    1    4    7   10
[2,]    2    5    8   11
[3,]    3    6    9   12

R> B <- matrix((1:12),nrow=3,ncol=4,byrow=TRUE)

R> B
     [,1] [,2] [,3] [,4]
[1,]    1    2    3    4
[2,]    5    6    7    8
[3,]    9   10   11   12
```

-- soma e subtração de matrizes

```
R> A+B
    [,1] [,2] [,3] [,4]
[1,]    2    6   10   14
[2,]    7   11   15   19
[3,]   12   16   20   24
```

```
R> A-B
    [,1] [,2] [,3] [,4]
[1,]    0    2    4    6
[2,]   -3   -1    1    3
[3,]   -6   -4   -2    0
```

-- multiplicação de matrizes

```
R> A*B
    [,1] [,2] [,3] [,4]
[1,]    1    8   21   40
[2,]   10   30   56   88
[3,]   27   60   99  144
R> A+B
    [,1] [,2] [,3] [,4]
[1,]    2    6   10   14
[2,]    7   11   15   19
[3,]   12   16   20   24
```

-- selecionar uma linha ou uma coluna da matriz

```
R> B[1,]
[1] 1 2 3 4
```

```
R> B[,4]
[1]  4  8 12
```

-- selecionar mais de um alinha ou coluna (B(linha,coluna)) da matriz

```
R> B
    [,1] [,2] [,3] [,4]
[1,]    1    2    3    4
[2,]    5    6    7    8
[3,]    9   10   11   12
```

```
R> B[1:2,] (coluna)
    [,1] [,2] [,3] [,4]
[1,]    1    2    3    4
[2,]    5    6    7    8
```

```
R> B[c(1,3),] (coluna)
    [,1] [,2] [,3] [,4]
[1,]    1    2    3    4
[2,]    9   10   11   12
```

```
R> B[c(1,3),c(2,4)]
    [,1] [,2]
[1,]    2    4
[2,]   10   12
```

-- selecionar elementos da diagonal da matriz

```
R> diag(B)
[1]  1  6 11
```

-- substituição de elementos da matriz

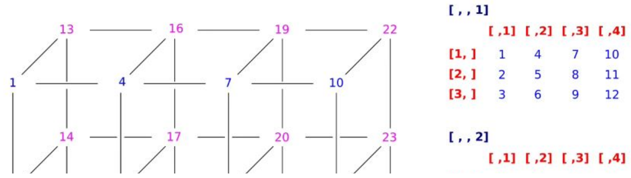
```
R> B
```

```
     [,1] [,2] [,3] [,4]
[1,]    1    2    3    4
[2,]    5    6    7    8
[3,]    9   10   11   12

R> B[1,] <- c(0,0,0,0)

R> B
     [,1] [,2] [,3] [,4]
[1,]    0    0    0    0
[2,]    5    6    7    8
[3,]    9   10   11   12

R> B[,2] <- c(0,0,0)

R> B
     [,1] [,2] [,3] [,4]
[1,]    0    0    0    0
[2,]    5    0    7    8
[3,]    9    0   11   12

-- transposta
R> t(B)
     [,1] [,2] [,3]
[1,]    0    5    9
[2,]    0    0    0
[3,]    0    7   11
[4,]    0    8   12

-- ARRAY --
R> A <- array(1:24,dim=c(3,4,2))     --dim = c(linha,coluna,qnt dimensões)

R> A
, , 1

     [,1] [,2] [,3] [,4]
[1,]    1    4    7   10
[2,]    2    5    8   11
[3,]    3    6    9   12

, , 2

     [,1] [,2] [,3] [,4]
[1,]   13   16   19   22
[2,]   14   17   20   23
[3,]   15   18   21   24

-- selecionar uma linha ou uma coluna do array

R> A
, , 1

     [,1] [,2] [,3] [,4]
[1,]    1    4    7   10
[2,]    2    5    8   11
[3,]    3    6    9   12

, , 2

     [,1] [,2] [,3] [,4]
[1,]   13   16   19   22
[2,]   14   17   20   23
[3,]   15   18   21   24
```

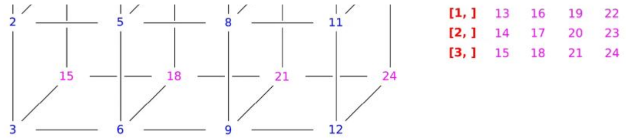
```
R> A[,1,2]    --todas as linhas da segunda coluna da segunda dimensão
[1] 13 14 15

R> A[,c(1,3),2]
     [,1] [,2]
[1,]   13   19
[2,]   14   20
[3,]   15   21
```

-- Array multidimensional(subdimensão)

```
R> B <- array(1:3*3*2*3,dim=(c(3,4,2,3)))     --dim=(linha,coluna,subdimensão,dimensão principal)
R> B
, , 1, 1

     [,1] [,2] [,3] [,4]
[1,]   18   18   18   18
[2,]   36   36   36   36
[3,]   54   54   54   54

, , 2, 1

     [,1] [,2] [,3] [,4]
[1,]   18   18   18   18
[2,]   36   36   36   36
[3,]   54   54   54   54

, , 1, 2

     [,1] [,2] [,3] [,4]
[1,]   18   18   18   18
[2,]   36   36   36   36
[3,]   54   54   54   54

, , 2, 2

     [,1] [,2] [,3] [,4]
[1,]   18   18   18   18
[2,]   36   36   36   36
[3,]   54   54   54   54

, , 1, 3

     [,1] [,2] [,3] [,4]
[1,]   18   18   18   18
[2,]   36   36   36   36
[3,]   54   54   54   54

, , 2, 3

     [,1] [,2] [,3] [,4]
[1,]   18   18   18   18
[2,]   36   36   36   36
[3,]   54   54   54   54
```



```
[ , , 1]
      [ ,1] [ ,2] [ ,3] [ ,4]
[1, ]    1     4     7    10
[2, ]    2     5     8    11
[3, ]    3     6     9    12

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



```
[1, ]  13  16  19  22
[2, ]  14  17  20  23
[3, ]  15  18  21  24
```

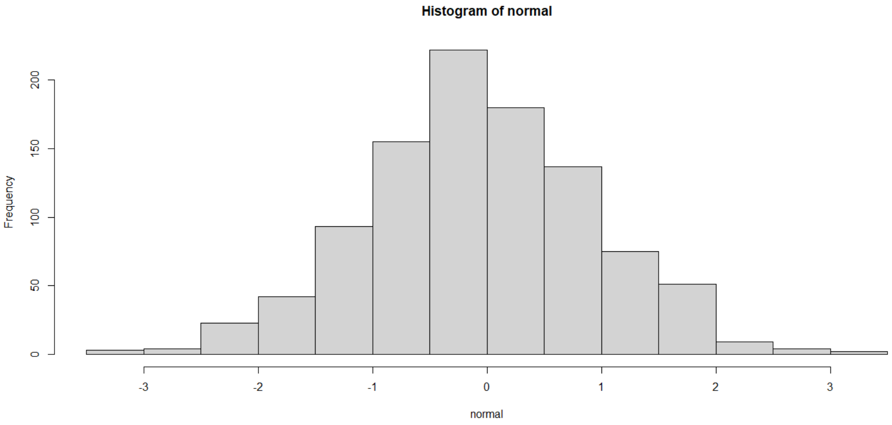
-- Operações de comparação

```
R> z <- c(1,5,8,3,90,33,1,2,4,100,37)
R> z<5
[1]  TRUE FALSE FALSE  TRUE FALSE FALSE  TRUE  TRUE  TRUE FALSE FALSE
R> z[z<5]
[1] 1 3 1 2 4
 R> z>50
[1] FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE  TRUE FALSE
 R> z[(z<5) & (z>50)]      --and
numeric(0)
 R> z[(z<5) | (z>50)]        --or
[1]   1   3  90   1   2   4 100
```

```
R> sexo <- rep(c("M","F"),times=50)
R> sexo
  [1] "M" "F" "M" "F" "M" "F" "M" "F" "M" "F" "M" "F" "M" "F" "M" "F" "M" "F" "M" "F" "M" "F" "M" "F"
"M" "F" "M" "F" "M" "F" "M" "F" "M" "F" "M" "F" "M" "F" "M" "F"
[41] "M" "F" "M" "F" "M" "F" "M" "F" "M" "F" "M" "F" "M" "F" "M" "F" "M" "F" "M" "F" "M" "F" "M" "F"
"M" "F" "M" "F" "M" "F" "M" "F" "M" "F" "M" "F" "M" "F" "M" "F"
[81] "M" "F" "M" "F" "M" "F" "M" "F" "M" "F" "M" "F" "M" "F" "M" "F" "M" "F" "M" "F"
```

```
R> sexo=="M"
  [1]  TRUE FALSE  TRUE FALSE  TRUE FALSE  TRUE FALSE  TRUE FALSE  TRUE FALSE  TRUE FALSE  TRUE
FALSE  TRUE FALSE  TRUE FALSE  TRUE FALSE  TRUE FALSE  TRUE FALSE  TRUE
[28] FALSE  TRUE FALSE  TRUE FALSE  TRUE FALSE  TRUE FALSE  TRUE FALSE  TRUE FALSE  TRUE FALSE
TRUE FALSE  TRUE FALSE  TRUE FALSE  TRUE FALSE  TRUE FALSE  TRUE FALSE
[55]  TRUE FALSE  TRUE FALSE  TRUE FALSE  TRUE FALSE  TRUE FALSE  TRUE FALSE  TRUE FALSE  TRUE
FALSE  TRUE FALSE  TRUE FALSE  TRUE FALSE  TRUE FALSE  TRUE FALSE  TRUE
[82] FALSE  TRUE FALSE  TRUE FALSE  TRUE FALSE  TRUE FALSE  TRUE FALSE  TRUE FALSE  TRUE FALSE
TRUE FALSE  TRUE FALSE
```

```
R> normal <- rnorm(1000)
R> hist(normal)
```



```
 R> mean(normal)   ---media
[1] -0.06459687
```

```
 R> sd(normal)      --desvio padrão
[1] 0.9879491
```

```
cbind(sexo,normal)    ---associa os vetores
```

```
R> normal[sexo=="M"]
  [1]  2.679834190  0.251048535 -0.483643102  1.329074495  0.463889062 -0.896451929 -0.456439360
0.841597653  0.668026444  2.008281430  1.391833602  0.462910672
```

```
[13]  0.395700057  0.431280070 -0.104209857 -0.751524230  0.759877314  0.448545815  0.773864036
-0.174996804 -0.395001738 -1.438194271  0.759474957 -2.437359886

[25]  0.380682991  0.272138377  0.173837290  0.481202078  0.764575179 -0.523236622  1.043974206
-0.001807678 -0.071941432 -1.184357176 -1.170335743 -0.275889191

[37]  0.291406289  0.060016259 -0.406752018  0.705072682 -0.124035717 -0.312876676  1.633157514
0.918729513 -1.087566578 -0.953550147 -0.839382358 -1.364319463

[49] -0.762995311  0.423714357 -0.202330388 -2.082984620 -1.025763856  1.997661416
-0.340573570  0.346461491 -0.290131574  2.087013076  1.071552508 -0.887058810

[61] -0.144154713 -1.469708381  0.548610621  0.326047829  1.836510666  0.695013650 -1.329022407
-0.391148720 -1.023677719  1.801565237  0.146427462 -2.408259411

[73]  0.615867945 -0.965849638 -0.750593586 -0.232670817  0.104141912  0.560485691
-0.400837119  1.039799043 -1.420217999 -1.217505876  1.729034699  0.166673679

[85] -0.348073955 -1.180742059  1.189543943 -0.549563803  0.524401627  0.159076463  0.495394739
-0.394365052  0.582599570 -1.877367061 -0.596327209 -1.407742718

[97] -0.252195158 -0.530165924 -0.032300437  1.330753699 -0.274354459  1.705904000 -0.719611611
-1.935083052 -0.005434502 -0.109198483  0.812982411 -1.101887992

[109]  0.046715667 -1.063970188  0.444460104  1.700852691 -0.026091107 -0.981462010
0.452722337 -1.582889963 -0.670281225  1.054627607 -0.374276407  0.662508544

[121] -1.575753270  0.363772735  1.299734009  1.983051761  0.073641998  0.789223452
0.613016967  0.524862298  0.149688209  1.578215901  0.471247851 -0.062184357

[133] -0.138603119 -0.239241413 -0.499884427 -0.424586407 -0.359192428 -0.007823394
0.591122343 -0.840234158 -0.869716438 -0.004267941 -0.987468266 -0.243438337

[145]  0.148678448 -0.102552515 -0.873078709  1.422244007  1.286063690 -0.994476990
0.324521274  1.205847475 -0.462213506  2.031214099 -0.871167350  0.386977515

[157]  0.104098585  0.301157289 -0.668830464 -0.607706321 -0.269552499  1.319135500
-0.738530153  0.607913071 -1.218470197 -1.172777329 -0.013949342 -1.086534609

[169] -1.518790636  0.256818331  0.524949917 -1.030300597 -1.788295541  0.937167965
-0.823735094  0.047450240  0.438557610 -0.612348416 -0.948645970 -1.513208470

[181] -1.393934986  3.027679073  0.624409407 -0.821908089 -0.415156037 -0.171339765
-1.825870860 -1.981142952  0.334629373  0.780958388 -2.631527611  0.369108674

[193] -0.248162994 -1.454131692  0.658987750  1.154893968  1.397046567 -1.127752468
-1.521002855 -0.251472920 -0.360222032 -0.674184268 -0.465985852 -0.617244239

[205] -1.211404138  1.646960501 -0.472307119 -0.381651466 -0.081376296  0.585018307
-0.975462618  0.634809030 -2.822831001 -0.525070142  0.993026827 -0.342849411

[217]  0.400324388  0.024883415 -0.038880033 -1.014725514  0.125661222 -3.055448231
-0.246156365  0.724102697  1.633758543 -0.992171731  0.356252783 -1.596131378

[229]  0.321437422  1.248960647 -0.094352282 -0.499497836  0.081951420 -0.269905179
-1.041764151 -0.898705611 -1.584866245  0.369998858  0.117663298 -1.161829230

[241] -0.759637677  0.844783299  1.482197110 -0.391092683  0.009504557  0.466024345
-0.222632789 -1.144134659  0.289658941  0.810293537 -0.851000621 -0.117172475

[253]  1.110015294  0.810507279 -0.526473790  1.018635491 -0.707168119 -0.746743539
-1.782506868  0.770802296  1.770938553 -0.692239375 -1.362813814 -0.722973051

[265] -0.072012253 -1.462649957 -1.075005995  0.745723023 -0.002048652 -1.455718995
-0.620783286  0.432793128  0.182855862 -0.433364603 -0.259056956 -1.130039303

[277]  0.515647633  0.320021001 -0.508988805 -0.192046517  1.957644013  0.940799246
-0.049938719 -1.885690847 -0.711214964 -0.496375460  0.036059584 -0.189095395

[289]  1.346771322  0.019793123  3.273604006  1.719420521 -0.323584209 -1.491799768
-0.020423033  0.770973354 -0.761934695  0.148562174 -1.485304779 -0.073706425

[301] -1.255424199  0.519375943  1.408916822  0.707483906  1.168042171 -0.372672978
-1.308940717  0.418930531 -2.174159661 -0.307251596  0.974730599 -1.135793148

[313] -0.007328788 -0.444999123  0.498938960 -0.077636630 -0.162591907  0.603818402
0.565944458  1.059075976 -1.213889550  0.569023072  0.174997893 -1.259103840

[325]  0.703643527 -0.463958381  0.580789623 -0.559922961  0.381587915  0.536208095
-1.099333424 -0.933696458 -1.095126292 -0.477960187  0.106977999  2.262691912

[337] -1.356329549  0.231478887  0.558922321 -1.008740405  0.329479725  0.116917925
-1.416260536 -0.620595251 -0.641656698 -0.494313422 -0.101282007 -0.370622930

[349] -0.116947122 -0.868062930  0.962580462 -0.908643953  1.208752881  1.035993401
1.025452162  1.291094182 -0.873127586 -2.509338914 -1.704274405  0.503376333

[361] -0.104010547 -0.530186384  0.136650038  0.360776372 -1.030250033 -1.147172622
0.318180987 -1.077820444 -0.636490178  0.774831939 -0.030263719 -0.591388283

[373]  0.574145774  1.735124276 -0.198188093 -1.764101081 -0.080154927 -0.129836470
-0.274848735  1.389736884  0.199193353 -0.503383919  1.210640428  0.135069019

[385] -1.155029300 -0.943933690 -0.373515479 -0.151050228  0.172391120 -0.371407827
-0.584866602  0.752112216 -0.504763768 -0.425817994  1.387368975 -0.656220632

[397]  0.971969629  0.258763548  1.659901381  0.069424817 -1.463635538  1.504648473
0.457508889  1.215809925 -0.057374345  1.398726046 -1.093276383  0.848844087

[409]  0.561220476  1.312321926 -0.013958846  0.585940239 -1.564388490  0.534944319
0.430188135 -0.773320092  0.010687817  1.080689095 -1.188961242  0.378324456

[421]  0.003841503 -0.071709957 -1.661824724  1.002645017 -0.811293679  0.488560129
-1.967085220  1.973223844  0.416886905  0.051556728 -1.405140997 -0.944675886

[433] -0.171379496  0.953559960 -0.355730884  0.605213251  0.291781223 -0.708208564
-0.298166962 -1.128753242 -0.136525841  1.966504698  1.343105510  1.738372970
```

```
[445] -2.006883624  0.614345293 -0.145930381  0.513882682  0.259127276  0.786056701
-2.093626037 -1.794734092  0.489774751  0.775764487 -1.899068522  0.382618312

[457] -0.067068894  0.534075312  0.250956078  1.606783753  0.289378024  0.169643720
-0.702391006  0.228041879  0.190097731  0.152801688  0.691223453  0.071104361

[469] -1.944099307 -0.397427341  0.424596236 -0.327243900  0.717117707 -0.424280510
-2.184245215  1.562520641 -0.590691288 -0.144082751 -1.500343938  1.541332521

[481]  0.408713944  0.947561636 -0.465708455 -0.482907810  1.510488604 -1.239513846
-1.111419279  2.723567843  0.103138756 -0.058529234 -1.726074978 -0.312589471

[493]  1.137090151 -0.090050749 -1.299323031 -0.833411525  1.693190349 -0.672865406
-0.772197201 -0.626874124
```

```
R> normal[sexo=="M"] & (normal > 0)

   [1]  TRUE  TRUE  TRUE  TRUE FALSE FALSE  TRUE FALSE  TRUE  TRUE FALSE FALSE FALSE FALSE  TRUE
FALSE  TRUE  TRUE  TRUE FALSE  TRUE  TRUE  TRUE  TRUE  TRUE FALSE

  [27]  TRUE FALSE FALSE FALSE FALSE  TRUE  TRUE  TRUE  TRUE FALSE  TRUE  TRUE FALSE  TRUE FALSE
TRUE FALSE FALSE  TRUE FALSE FALSE FALSE  TRUE  TRUE  TRUE  TRUE

  [53]  TRUE  TRUE  TRUE FALSE  TRUE FALSE FALSE FALSE  TRUE  TRUE FALSE FALSE FALSE  TRUE FALSE
FALSE FALSE FALSE FALSE  TRUE  TRUE  TRUE  TRUE FALSE FALSE FALSE

  [79]  TRUE FALSE FALSE  TRUE FALSE  TRUE  TRUE  TRUE  TRUE FALSE FALSE  TRUE FALSE FALSE FALSE
FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE  TRUE FALSE  TRUE

[105] FALSE  TRUE  TRUE FALSE FALSE  TRUE  TRUE FALSE FALSE  TRUE  TRUE FALSE  TRUE  TRUE FALSE
FALSE FALSE  TRUE FALSE FALSE  TRUE  TRUE  TRUE FALSE  TRUE FALSE

[131]  TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE  TRUE  TRUE FALSE  TRUE  TRUE
TRUE FALSE  TRUE FALSE FALSE FALSE  TRUE  TRUE  TRUE  TRUE FALSE

[157] FALSE FALSE  TRUE FALSE FALSE  TRUE FALSE FALSE  TRUE FALSE  TRUE  TRUE FALSE FALSE FALSE
TRUE  TRUE  TRUE FALSE FALSE  TRUE  TRUE  TRUE FALSE  TRUE  TRUE

[183] FALSE  TRUE  TRUE FALSE FALSE FALSE FALSE  TRUE FALSE  TRUE FALSE  TRUE FALSE FALSE FALSE
TRUE  TRUE  TRUE FALSE  TRUE  TRUE  TRUE FALSE FALSE FALSE  TRUE

[209] FALSE  TRUE FALSE  TRUE  TRUE  TRUE FALSE FALSE  TRUE FALSE FALSE  TRUE  TRUE FALSE  TRUE
FALSE FALSE  TRUE FALSE  TRUE  TRUE FALSE FALSE  TRUE FALSE  TRUE

[235]  TRUE FALSE FALSE FALSE  TRUE  TRUE FALSE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE FALSE  TRUE
FALSE  TRUE FALSE  TRUE  TRUE  TRUE FALSE  TRUE FALSE  TRUE  TRUE

[261]  TRUE  TRUE FALSE  TRUE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE
FALSE  TRUE  TRUE FALSE  TRUE FALSE FALSE FALSE  TRUE FALSE FALSE

[287] FALSE  TRUE  TRUE FALSE FALSE  TRUE FALSE  TRUE  TRUE FALSE  TRUE  TRUE FALSE FALSE  TRUE
FALSE  TRUE FALSE FALSE  TRUE  TRUE FALSE FALSE FALSE  TRUE FALSE

[313]  TRUE  TRUE  TRUE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE  TRUE
TRUE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE  TRUE FALSE  TRUE

[339]  TRUE FALSE  TRUE  TRUE FALSE FALSE FALSE  TRUE  TRUE FALSE FALSE FALSE  TRUE  TRUE  TRUE
TRUE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE  TRUE  TRUE

[365]  TRUE  TRUE FALSE  TRUE FALSE  TRUE FALSE  TRUE FALSE FALSE FALSE FALSE  TRUE FALSE  TRUE
FALSE FALSE  TRUE  TRUE  TRUE FALSE  TRUE FALSE FALSE  TRUE FALSE

[391]  TRUE FALSE  TRUE FALSE FALSE FALSE FALSE  TRUE FALSE  TRUE FALSE FALSE FALSE  TRUE FALSE
TRUE FALSE  TRUE FALSE  TRUE  TRUE  TRUE FALSE  TRUE FALSE  TRUE

[417] FALSE FALSE  TRUE  TRUE FALSE FALSE  TRUE FALSE FALSE  TRUE FALSE  TRUE  TRUE FALSE FALSE
FALSE  TRUE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE

[443] FALSE FALSE FALSE FALSE  TRUE FALSE  TRUE FALSE FALSE  TRUE  TRUE FALSE FALSE FALSE  TRUE
FALSE  TRUE FALSE FALSE FALSE FALSE  TRUE  TRUE FALSE FALSE FALSE

[469] FALSE  TRUE FALSE FALSE FALSE FALSE  TRUE FALSE  TRUE FALSE FALSE FALSE FALSE  TRUE  TRUE
FALSE  TRUE FALSE FALSE FALSE  TRUE FALSE  TRUE  TRUE FALSE FALSE

[495] FALSE  TRUE  TRUE FALSE  TRUE  TRUE FALSE  TRUE FALSE FALSE  TRUE FALSE  TRUE  TRUE FALSE
TRUE  TRUE FALSE FALSE  TRUE FALSE FALSE FALSE  TRUE  TRUE  TRUE

[521]  TRUE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE  TRUE
FALSE FALSE FALSE FALSE FALSE FALSE  TRUE  TRUE  TRUE  TRUE  TRUE

[547] FALSE  TRUE FALSE  TRUE FALSE  TRUE  TRUE  TRUE  TRUE  TRUE FALSE  TRUE FALSE FALSE  TRUE
TRUE  TRUE  TRUE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE  TRUE

[573]  TRUE FALSE FALSE  TRUE  TRUE  TRUE  TRUE FALSE  TRUE FALSE  TRUE FALSE FALSE  TRUE FALSE
FALSE FALSE  TRUE  TRUE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE

[599] FALSE  TRUE FALSE FALSE  TRUE FALSE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE FALSE FALSE FALSE
FALSE  TRUE  TRUE FALSE  TRUE FALSE  TRUE  TRUE FALSE FALSE FALSE

[625] FALSE  TRUE FALSE  TRUE  TRUE  TRUE FALSE  TRUE FALSE  TRUE  TRUE FALSE  TRUE FALSE  TRUE
FALSE FALSE  TRUE  TRUE FALSE  TRUE FALSE FALSE  TRUE  TRUE  TRUE

[651] FALSE FALSE  TRUE  TRUE FALSE  TRUE  TRUE FALSE  TRUE  TRUE FALSE FALSE FALSE FALSE FALSE
TRUE FALSE FALSE  TRUE  TRUE  TRUE FALSE FALSE  TRUE  TRUE FALSE

[677]  TRUE  TRUE FALSE FALSE  TRUE FALSE  TRUE FALSE FALSE  TRUE FALSE FALSE FALSE  TRUE FALSE
TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE

[703] FALSE FALSE  TRUE FALSE  TRUE FALSE  TRUE FALSE  TRUE  TRUE FALSE  TRUE FALSE  TRUE FALSE
FALSE  TRUE FALSE FALSE  TRUE FALSE FALSE  TRUE  TRUE  TRUE FALSE

[729] FALSE  TRUE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE
FALSE  TRUE  TRUE  TRUE  TRUE FALSE  TRUE FALSE FALSE FALSE FALSE
```

```
[755] FALSE FALSE FALSE  TRUE  TRUE FALSE  TRUE  TRUE FALSE FALSE  TRUE FALSE  TRUE FALSE FALSE
TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE

[781] FALSE  TRUE  TRUE FALSE FALSE FALSE FALSE  TRUE  TRUE  TRUE FALSE  TRUE  TRUE FALSE  TRUE
TRUE  TRUE  TRUE  TRUE FALSE FALSE  TRUE  TRUE  TRUE  TRUE FALSE

[807]  TRUE  TRUE FALSE FALSE  TRUE FALSE FALSE  TRUE  TRUE  TRUE  TRUE FALSE  TRUE FALSE FALSE
FALSE  TRUE FALSE FALSE FALSE  TRUE  TRUE  TRUE FALSE FALSE FALSE

[833]  TRUE  TRUE  TRUE  TRUE FALSE FALSE  TRUE  TRUE  TRUE  TRUE FALSE FALSE FALSE FALSE  TRUE
FALSE FALSE  TRUE  TRUE  TRUE FALSE  TRUE  TRUE FALSE  TRUE FALSE

[859]  TRUE  TRUE FALSE  TRUE FALSE  TRUE FALSE  TRUE  TRUE  TRUE FALSE FALSE  TRUE  TRUE  TRUE
FALSE FALSE  TRUE FALSE  TRUE FALSE  TRUE FALSE FALSE  TRUE FALSE

[885]  TRUE FALSE  TRUE FALSE FALSE  TRUE  TRUE FALSE FALSE  TRUE  TRUE FALSE  TRUE FALSE  TRUE
FALSE FALSE  TRUE FALSE FALSE  TRUE FALSE  TRUE  TRUE FALSE  TRUE

[911]  TRUE FALSE FALSE FALSE  TRUE FALSE  TRUE FALSE  TRUE  TRUE  TRUE FALSE  TRUE  TRUE FALSE
TRUE  TRUE  TRUE  TRUE FALSE  TRUE FALSE  TRUE FALSE  TRUE FALSE

[937] FALSE FALSE FALSE FALSE  TRUE  TRUE FALSE FALSE  TRUE FALSE FALSE  TRUE FALSE  TRUE  TRUE
FALSE FALSE FALSE FALSE FALSE FALSE  TRUE  TRUE FALSE  TRUE FALSE

[963]  TRUE  TRUE FALSE FALSE FALSE  TRUE  TRUE FALSE FALSE FALSE FALSE  TRUE  TRUE FALSE  TRUE
TRUE FALSE FALSE FALSE FALSE FALSE  TRUE  TRUE  TRUE FALSE FALSE

[989] FALSE FALSE FALSE  TRUE  TRUE FALSE FALSE  TRUE FALSE  TRUE FALSE  TRUE
```

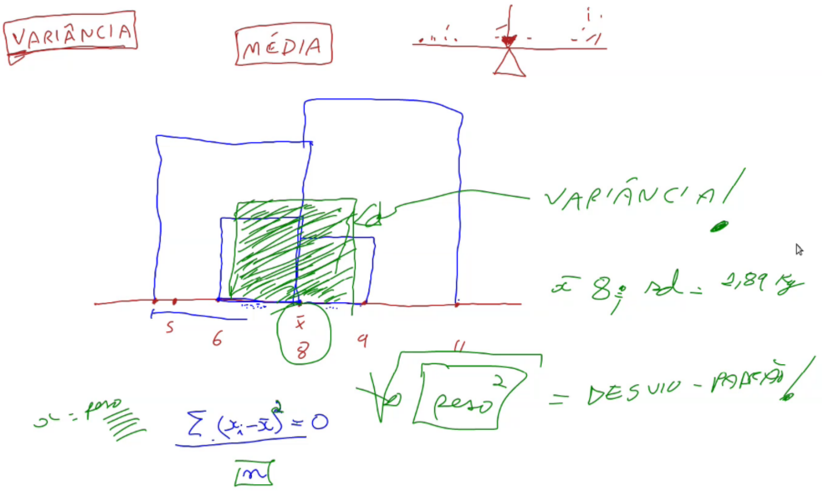
```
R> meses <- c("JAN","FEV","MAR","ABR","MAI","JUN","JUL","AGO","SET","OUT","NOV","DEZ")
 R> meses.f1 <- factor(meses, ordered=TRUE)
 R> meses.f1 <- factor(meses)
 R> str(meses.f1)
Factor w/ 12 levels "ABR","AGO","DEZ",..: 5 4 9 1 8 7 6 2 12 11 ...
```

-- Data Frame (RStudio)

```
#----------- Analise de dados ------------

# Cria variavel com distribuicao normal
x <- rnorm(100)

# Mostra histograma da var x
hist(x)

# Cria data frame inicial
df <- data.frame(nome = c("Abrantes","Davi","Henry","Vilma","Ricardo"),
             idade = c(48,25,28,25,30),
             sexo = c("M","M","M","F","M"))

# Media da variavel idade
mean(df$idade)

#Selecionar uma coluna
df$idade
df[,2]

# Selecinoar uma linha
df[1,]

# Selecinar varias colunas
df[2,c("nome","idade")]
df[df$idade < 30,]
df[df$idade < 30,c("nome","idade")]

# Incluir variavel no data frame
df$peso <- c(140,70,72,65,76)

# Lendo arquivo
bugs <- read.table("bugs.txt",header=TRUE)
```

```
# Boxplot de peso por sexo
bugs$sexo.f <- factor(bugs$SEX)
boxplot(bugs$WEIGHT ~ bugs$SEX,
      main="Boxplot de peso por sexo")


bugs2 <- read.table("bugs.txt",header=TRUE,
              stringsAsFactors=FALSE)
#0: M
#1: F

# Valores randomicos
set.seed(123)
x <- rnorm(2)

# Calcular media dos pesos dos bugs
mean(bugs$WEIGHT)

# Mediana dos pesos dos bugs
median(bugs$WEIGHT)

#Desvio padrao dos pesos dos bugs
sd(bugs$WEIGHT)

#Variancia dos pesos dos bugs
sd(bugs2)
```

-- Variância: desvio quadrático médio



$\bar{x}$ 8; sd = 2,89 kg

x = peso

$$\frac{\sum (x_i - \bar{x})^2 = 0}{\boxed{n}}$$

$\sqrt{\boxed{peso^2}}$ = DESVIO-PADRÃO/