

# Estatística descritiva utilizando o R e R commander

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Departamento de Estatística



I workshop Nacional de Educação Estatística



Instituto Anísio Teixeira

# The R Project for Statistical Computing

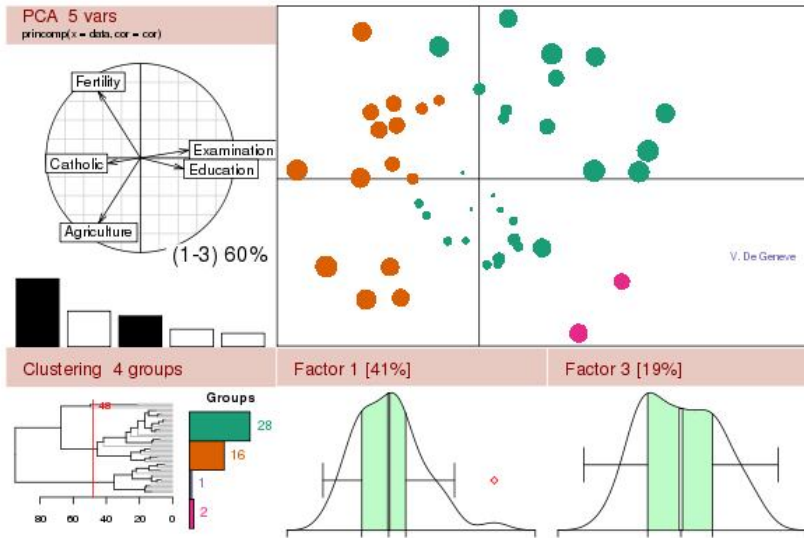


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## Getting Started:

- R is a free software environment for statistical computing and graphics. It compiles and runs on a wide variety of UNIX platforms, Windows and MacOS. To [download R](#), please choose your preferred [CRAN mirror](#).
- If you have questions about R like how to download and install the software, or what the license terms are, please read our [answers to frequently asked questions](#) before you send an email.

## News:

- **R version 3.1.1 (Sock it to Me)** has been released on 2014-07-10.
- **R version 3.0.2 (Warm Pudding)** has been released on 2014-02-06.



### CRAN Mirrors

The Comprehensive R Archive Network is available at the following URLs, please choose a location close to you. Some statistics on the status of the mirrors can be found here: [main page](#), [windows release](#), [windows old release](#).

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0-Cloud	<a href="http://cran.rstudio.com/">http://cran.rstudio.com/</a>	Rstudio, automatic redirection to servers worldwide
Argentina	<a href="http://mirror.fcaglp.unlp.edu.ar/CRAN/">http://mirror.fcaglp.unlp.edu.ar/CRAN/</a> <a href="http://r.mirror.mendoza-conicet.gob.ar/">http://r.mirror.mendoza-conicet.gob.ar/</a>	Universidad Nacional de La Plata CONICET Mendoza
Australia	<a href="http://cran.csiro.au/">http://cran.csiro.au/</a> <a href="http://cran.ms.unimelb.edu.au/">http://cran.ms.unimelb.edu.au/</a>	CSIRO University of Melbourne
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Belgium	<a href="http://www.freeststatistics.org/cran/">http://www.freeststatistics.org/cran/</a>	K.U.Leuven Association
Brazil	<a href="http://nbcgib.uesc.br/mirrors/cran/">http://nbcgib.uesc.br/mirrors/cran/</a> <del><a href="http://cran-r.c3sl.ufpr.br/">http://cran-r.c3sl.ufpr.br/</a></del> <a href="http://cran.fiocruz.br/">http://cran.fiocruz.br/</a> <a href="http://www.vps.fmvz.usp.br/CRAN/">http://www.vps.fmvz.usp.br/CRAN/</a> <a href="http://brieger.esalq.usp.br/CRAN/">http://brieger.esalq.usp.br/CRAN/</a>	Center for Comp. Biol. at Universidade Estadual de Santa Cruz Universidade Federal do Parana Oswaldo Cruz Foundation, Rio de Janeiro University of Sao Paulo, Sao Paulo University of Sao Paulo, Piracicaba
Canada	<a href="http://cran.stat.sfu.ca/">http://cran.stat.sfu.ca/</a> <a href="http://mirror.its.dal.ca/cran/">http://mirror.its.dal.ca/cran/</a> <a href="http://cran.utstat.utoronto.ca/">http://cran.utstat.utoronto.ca/</a> <a href="http://cran.skazkaforyou.com/">http://cran.skazkaforyou.com/</a> <a href="http://cran.america.com/">http://cran.america.com/</a>	Simon Fraser University, Burnaby Dalhousie University, Halifax University of Toronto iWeb, Montreal iWeb, Montreal



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### Download and Install R

Precompiled binary distributions of the base system and contributed packages, **Windows and Mac** users most likely want one of these versions of R:

- [Download R for Linux](#)
- [Download R for \(Mac\) OS X](#)
- [Download R for Windows](#)

R is part of many Linux distributions, you should check with your Linux package management system in addition to the link above.

### Source Code for all Platforms

Windows and Mac users most likely want to download the precompiled binaries listed in the upper box, not the source code. The sources have to be compiled before you can use them. If you do not know what this means, you probably do not want to do it!

- The latest release (2014-07-10, Sock it to Me) [R-3.1.1.tar.gz](#), read [what's new](#) in the latest version.
- Sources of [R alpha and beta releases](#) (daily snapshots, created only in time periods before a planned release).
- Daily snapshots of current patched and development versions are [available here](#). Please read about [new features and bug fixes](#) before filing corresponding feature requests or bug reports.
- Source code of older versions of R is [available here](#).
- Contributed extension [packages](#)

### Questions About R

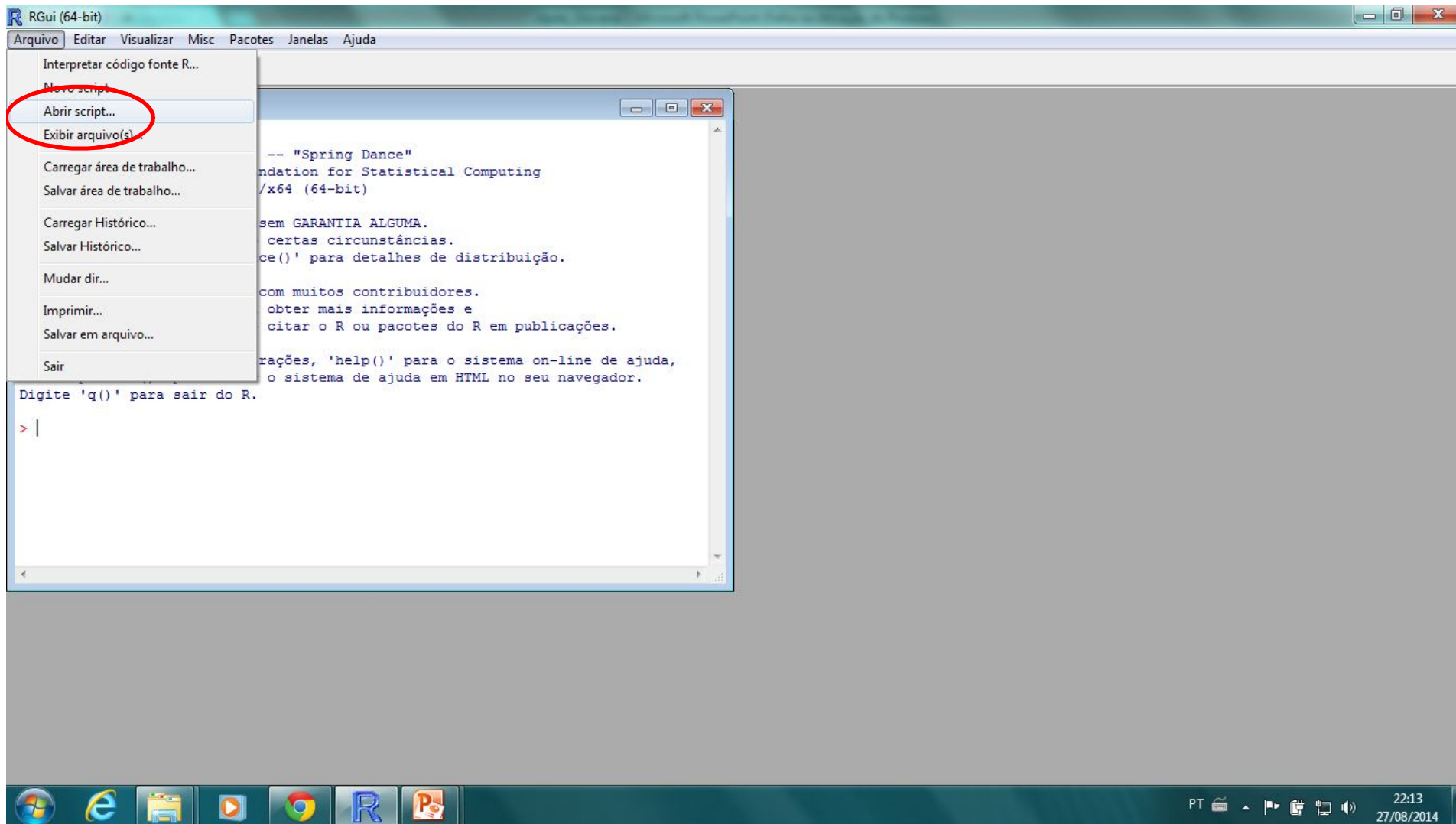
- If you have questions about R like how to download and install the software, or what the license terms are, please read our [answers to frequently asked questions](#) before you send an email.

What are R and CRAN?



```
R Console  
  
R version 3.1.0 (2014-04-10) -- "Spring Dance"  
Copyright (C) 2014 The R Foundation for Statistical Computing  
Platform: x86_64-w64-mingw32/x64 (64-bit)  
  
R é um software livre e vem sem GARANTIA ALGUMA.  
Você pode redistribuí-lo sob certas circunstâncias.  
Digite 'license()' ou 'licence()' para detalhes de distribuição.  
  
R é um projeto colaborativo com muitos contribuidores.  
Digite 'contributors()' para obter mais informações e  
'citation()' para saber como citar o R ou pacotes do R em publicações.  
  
Digite 'demo()' para demonstrações, 'help()' para o sistema on-line de ajuda,  
ou 'help.start()' para abrir o sistema de ajuda em HTML no seu navegador.  
Digite 'q()' para sair do R.  
  
> |
```





RGui (64-bit)

Arquivo Editar Pacotes Janelas Ajuda

R Console

```
R version 3.1.0 (2014-04-10) -- "Spring Dance"
Copyright (C) 2014 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/x64 (64-bit)

R é um software livre e vem sem GARANTIA ALGUMA.
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'citation()' para saber como citar o R ou pacotes do R em publicações.

Digite 'demo()' para demonstrações, 'help()' para o sistema on-line de ajuda,
ou 'help.start()' para abrir o sistema de ajuda em HTML no seu navegador.
Digite 'q()' para sair do R.

> |
```

H:\WNEE\script.R - Editor R

```
#Abrir página do R e mostrar pacotes

#Operações Básicas

2+2

5-3

4*5

20/2

sqrt(81)

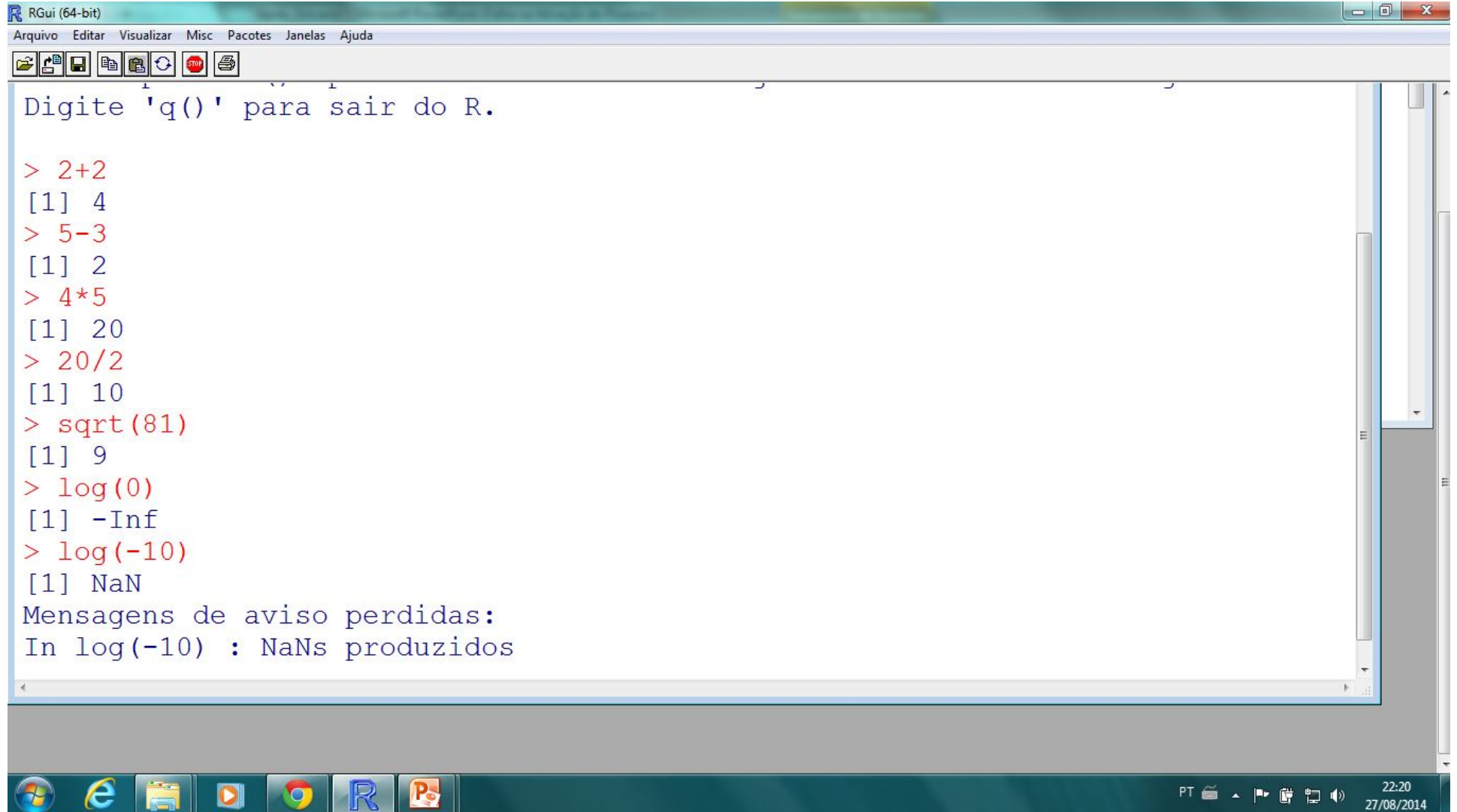
log(0)

log(-10)

#Armazenando dados

notas1<-c(10,9,6,8,7,9)
```

PT 22:16 27/08/2014

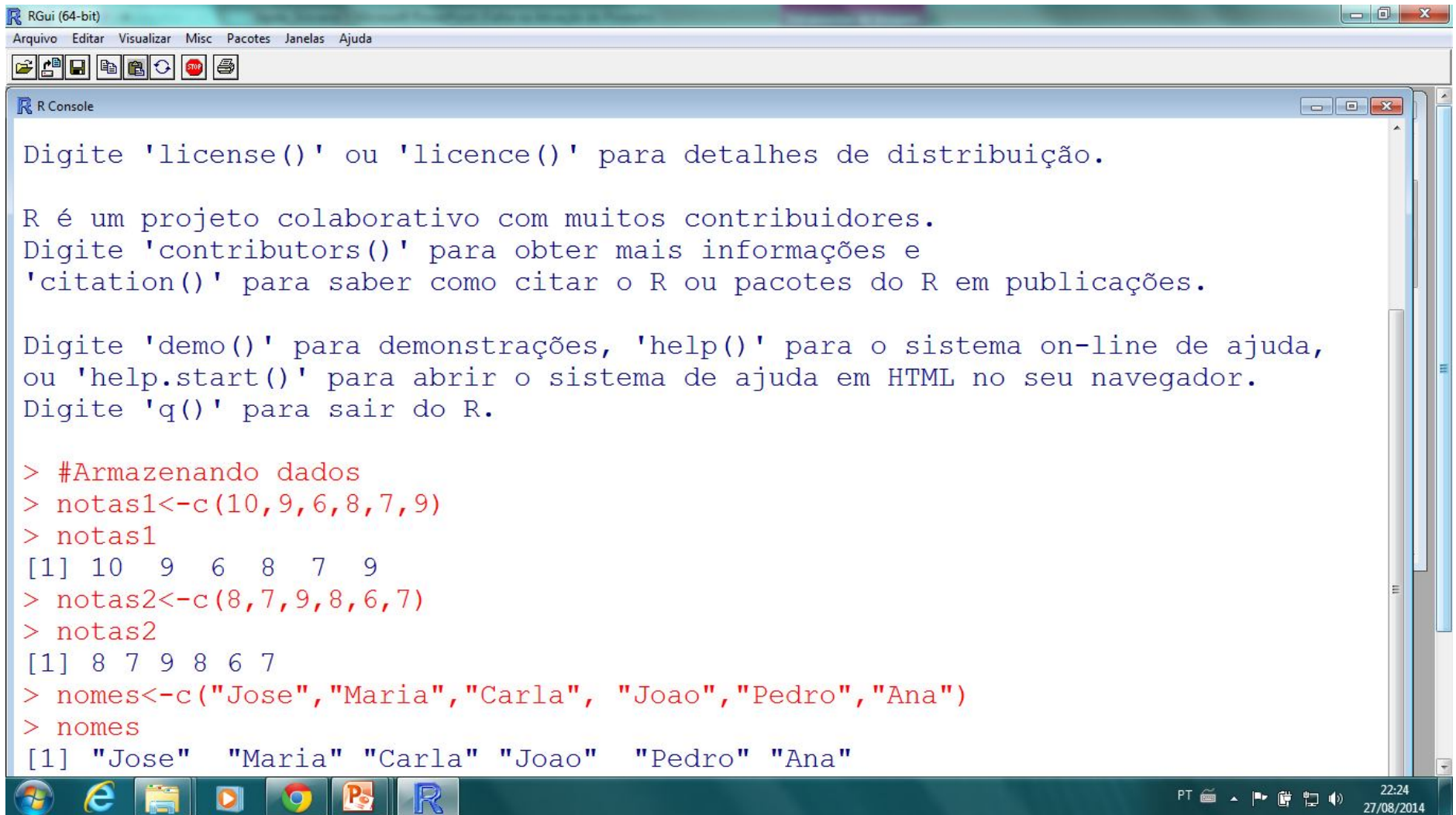


The image shows a screenshot of the RGui (64-bit) window. The window title bar reads "RGui (64-bit)". The menu bar includes "Arquivo", "Editar", "Visualizar", "Misc", "Pacotes", "Janelas", and "Ajuda". The toolbar contains icons for file operations and execution. The main console area displays the following text:

```
Digite 'q()' para sair do R.  
  
> 2+2  
[1] 4  
> 5-3  
[1] 2  
> 4*5  
[1] 20  
> 20/2  
[1] 10  
> sqrt(81)  
[1] 9  
> log(0)  
[1] -Inf  
> log(-10)  
[1] NaN  
Mensagens de aviso perdidas:  
In log(-10) : NaNs produzidos
```

The Windows taskbar at the bottom shows the Start button, taskbar icons for Internet Explorer, File Explorer, VLC, Google Chrome, R, and PowerPoint. The system tray on the right shows the language "PT", system icons, and the time "22:20" and date "27/08/2014".





Digite 'license()' ou 'licence()' para detalhes de distribuição.

R é um projeto colaborativo com muitos contribuidores.  
Digite 'contributors()' para obter mais informações e  
'citation()' para saber como citar o R ou pacotes do R em publicações.

Digite 'demo()' para demonstrações, 'help()' para o sistema on-line de ajuda,  
ou 'help.start()' para abrir o sistema de ajuda em HTML no seu navegador.  
Digite 'q()' para sair do R.

```
> #Armazenando dados
> notas1<-c(10,9,6,8,7,9)
> notas1
[1] 10  9  6  8  7  9
> notas2<-c(8,7,9,8,6,7)
> notas2
[1] 8 7 9 8 6 7
> nomes<-c("Jose","Maria","Carla", "Joao","Pedro","Ana")
> nomes
[1] "Jose"  "Maria" "Carla" "Joao"  "Pedro" "Ana"
```

The screenshot shows the RGui (64-bit) application window. The title bar reads 'RGui (64-bit)'. The menu bar includes 'Arquivo', 'Editar', 'Visualizar', 'Misc', 'Pacotes', 'Janelas', and 'Ajuda'. The toolbar contains icons for file operations and help. The main window is titled 'R Console' and contains the text and code shown above. The Windows taskbar at the bottom shows the Start button, icons for Internet Explorer, File Explorer, VLC, Google Chrome, Photoshop, and R. The system tray on the right shows the language 'PT', system icons, and the date and time '22:24 27/08/2014'.

```
RGui (64-bit) - [R Console]
Arquivo Editar Visualizar Misc Pacotes Janelas Ajuda
>
>
>
>
>
>
>
>
>
>
>
> final<-data.frame(notas1,notas2,nomes)
> final
  notas1 notas2 nomes
1      10      8  Jose
2       9      7 Maria
3       6      9  Carla
4       8      8  Joao
5       7      6 Pedro
6       9      7   Ana
> |
```

```
RGui (64-bit)
Arquivo  Editar  Visualizar  Misc  Pacotes  Janelas  Ajuda
[Icons]
>
> final<-data.frame(notas1,notas2,nomes)
>
> final
  notas1 notas2 nomes
1      10      8  Jose
2       9      7 Maria
3       6      9  Carla
4       8      8  Joao
5       7      6 Pedro
6       9      7   Ana
> final[1,1]
[1] 10
> final[1:3,1]
[1] 10  9  6
> final[1:3,4:6]
Erro em `[.data.frame`(final, 1:3, 4:6) : undefined columns selected
> final[1:3,3]
[1] Jose  Maria Carla
Levels: Ana Carla Joao Jose Maria Pedro
> |
```

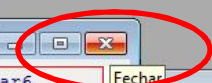




```
R Console  
R version 3.1.0 (2014-04-10) -- "Spring Dance"  
Copyright (C) 2014 The R Foundation for Statistical Computing  
Platform: x86_64-w64-mingw32  
  
R é um software livre e vem com uma licença livre.  
Você pode redistribuí-lo sob condições que você quiser, com ou sem  
modificações.  
Digite 'license()' ou 'licence()' para ver o texto da licença.  
  
R é um projeto colaborativo. Digite 'contributors()' para ver a lista de  
'citation()' para saber como citar R.  
  
Digite 'demo()' para demonstrar o R.  
ou 'help.start()' para abrir o site de ajuda.  
Digite 'q()' para sair do R.  
  
> final<-edit(data.frame())
```

Editor de dados

	notas1	notas2	nomes	var4	var5	var6
1	5	8	Ana			
2	6	9	Joao			
3	7	8	Pedro			
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						



```
read.csv2("dados_formados.csv",header=TRUE,sep=";") #mudar diretório
```

```
RGui (64-bit)
Arquivo Editar Visualizar Misc Pacotes Janelas Ajuda
> #Dados do Excel ou Bloco de notas
>
> read.csv2("dados_formados.csv",header=TRUE,sep=";") #mudar diretório
  Censura Sexo Coeficiente.de.Rendimento Idade.Inicial Tempo.semestral
1         2   M                6.0             19             10
2         2   M                5.1             25             10
3         2   F                4.2             30             16
4         2   F                6.7             39             15
5         2   F                5.3             18             10
6         2   M                0.3             40             10
7         2   F                5.2             28             10
8         2   F                6.2             19             10
9         2   F                5.0             24             12
10        2   F                4.6             23             12
11        2   M                2.1             32             14
12        2   F                3.7             24             14
13        2   F                4.6             19             14
14        2   M                4.6             19             15
15        2   F                5.5             17             18
16        1   F                6.2             24             16
17        2   M                4.3             19             21
```

```
RGui (64-bit)
Arquivo Editar Visualizar Misc Pacotes Janelas Ajuda
[Icons]
> alunos<-read.csv2("dados_formados.csv",header=TRUE,sep=";") #mudar diretório
> attach(alunos)
> names(alunos)
[1] "Censura"          "Sexo"
[3] "Coeficiente.de.Rendimento" "Idade.Inicial"
[5] "Tempo.semestral"
> mean(Idade.Inicial) #calcula média
[1] 21.52778
> sd(Idade.Inicial) #calcula desvio padrão
[1] 6.109268
> summary(Idade.Inicial)
  Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
16.00  18.00   19.00   21.53  23.00   49.00
>
>
>
>
>
>
>
> |
```







```
RGui (64-bit)
Arquivo Editar Visualizar Misc Pacotes Janelas Ajuda
[Icons]
>
>
>
>
>
> require(fdth) #instalar pacote
Carregando pacotes exigidos: fdth
Mensagens de aviso perdidas:
package 'fdth' was built under R version 3.1.1
> tab=fdt(Idade.Inicial)
> print(tab)
Class limits  f   rf  rf(%)  cf   cf(%)
 [15.8,20)  45 0.62 62.50 45   62.50
 [20,24.3)  16 0.22 22.22 61   84.72
 [24.3,28.5)  5 0.07  6.94 66   91.67
 [28.5,32.7)  2 0.03  2.78 68   94.44
 [32.7,36.9)  0 0.00  0.00 68   94.44
 [36.9,41.1)  3 0.04  4.17 71   98.61
 [41.1,45.3)  0 0.00  0.00 71   98.61
 [45.3,49.5)  1 0.01  1.39 72  100.00
> |
```

RGui (64-bit)

Arquivo Histórico Redimensionar Janelas

```
>
>
>
>
> require(fdth) #instalar pacote
Carregando pacotes exigidos: fdth
Mensagens de aviso perdidas:
package 'fdth' was built under R version 3.1
> tab=fdt(Idade.Inicial)
> print(tab)
Class limits  f    rf rf(%) cf  cf(%)
 [15.8,20)  45 0.62 62.50 45  62.50
 [20,24.3)  16 0.22 22.22 61  84.72
 [24.3,28.5)  5 0.07  6.94 66  91.67
 [28.5,32.7)  2 0.03  2.78 68  94.44
 [32.7,36.9)  0 0.00  0.00 68  94.44
 [36.9,41.1)  3 0.04  4.17 71  98.61
 [41.1,45.3)  0 0.00  0.00 71  98.61
 [45.3,49.5)  1 0.01  1.39 72 100.00
> plot(tab)
> |
```

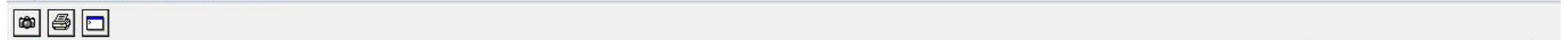
R Graphics: Device 2 (ACTIVE)

Class limits	Frequency
[15.8, 20)	45
[20, 24.3)	16
[24.3, 28.5)	5
[28.5, 32.7)	2
[32.7, 36.9)	0
[36.9, 41.1)	3
[41.1, 45.3)	0
[45.3, 49.5)	1

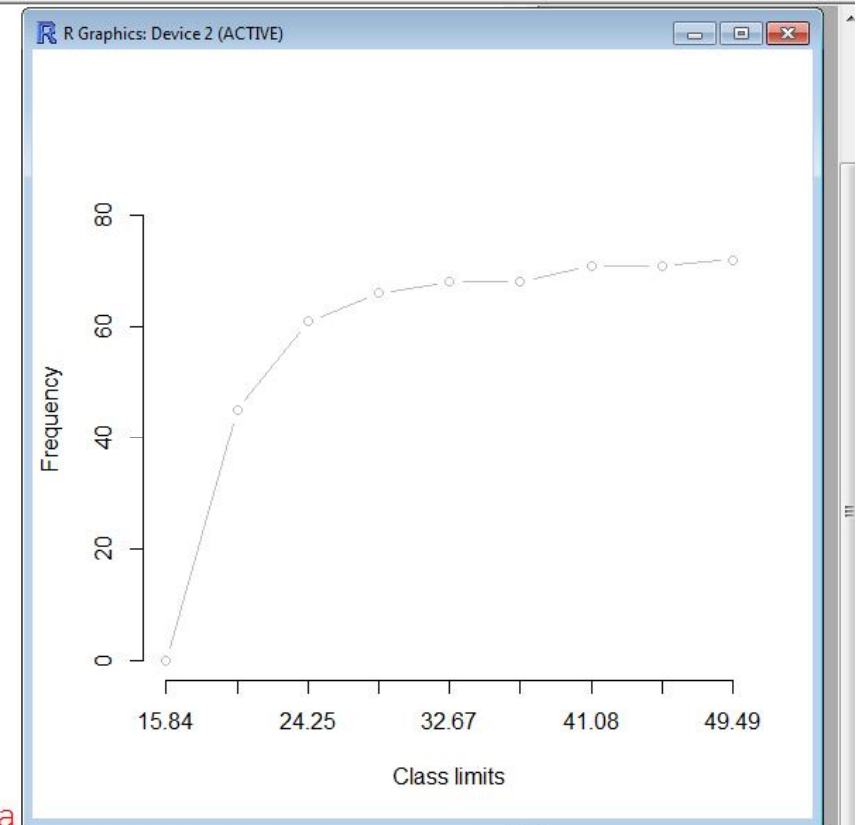
Frequency

Class limits

22:47  
27/08/2014



```
>
>
>
> require(fdth) #instalar pacote
Carregando pacotes exigidos: fdth
Mensagens de aviso perdidas:
package 'fdth' was built under R version 3.1.1
> tab=fdt(Idade.Inicial)
> print(tab)
Class limits  f    rf rf(%)  cf   cf(%)
 [15.8,20)  45 0.62 62.50 45   62.50
 [20,24.3)  16 0.22 22.22 61   84.72
 [24.3,28.5)  5 0.07  6.94 66   91.67
 [28.5,32.7)  2 0.03  2.78 68   94.44
 [32.7,36.9)  0 0.00  0.00 68   94.44
 [36.9,41.1)  3 0.04  4.17 71   98.61
 [41.1,45.3)  0 0.00  0.00 71   98.61
 [45.3,49.5)  1 0.01  1.39 72  100.00
> plot(tab)
> plot(tab,type='cfp') #polígono de frequência
> |
```



RGui (64-bit)

Arquivo Histórico Redimensionar Janelas

```
>
>
> require(fdth) #instalar pacote
Carregando pacotes exigidos: fdth
Mensagens de aviso perdidas:
package 'fdth' was built under R version 3.1.1
> tab=fdt(Idade.Inicial)
> print(tab)
Class limits  f    rf  rf(%)  cf   cf(%)
 [15.8,20)   45 0.62 62.50 45   62.50
 [20,24.3)   16 0.22 22.22 61   84.72
 [24.3,28.5)  5 0.07  6.94 66   91.67
 [28.5,32.7)  2 0.03  2.78 68   94.44
 [32.7,36.9)  0 0.00  0.00 68   94.44
 [36.9,41.1)  3 0.04  4.17 71   98.61
 [41.1,45.3)  0 0.00  0.00 71   98.61
 [45.3,49.5)  1 0.01  1.39 72  100.00
> plot(tab)
> plot(tab,type='cfp') #polígono de frequência
> plot(tab,type='rfp') #ogiva
> |
```

R Graphics: Device 2 (ACTIVE)

Class limits	f
[15.8,20)	45
[20,24.3)	16
[24.3,28.5)	5
[28.5,32.7)	2
[32.7,36.9)	0
[36.9,41.1)	3
[41.1,45.3)	0
[45.3,49.5)	1

PT 22:50 27/08/2014

RGui (64-bit)

Arquivo Editar Pacotes Janelas Ajuda

```
Carregando pacotes exigidos: lathn
Mensagens de aviso perdidas:
package 'fdth' was built under
> tab=fdt(Idade.Inicial)
> print(tab)
Class limits  f   rf rf(%) c
 [15.8,20)  45 0.62 62.50 45
 [20,24.3)  16 0.22 22.22 61
 [24.3,28.5)  5 0.07  6.94 66
 [28.5,32.7)  2 0.03  2.78 68
 [32.7,36.9)  0 0.00  0.00 68
 [36.9,41.1)  3 0.04  4.17 71
 [41.1,45.3)  0 0.00  0.00 71
 [45.3,49.5)  1 0.01  1.39 72
> plot(tab)
> plot(tab,type='cfp') #polígono
> plot(tab,type='rfp') #ogiva
> #Help
> ?hist
starting httpd help server ...
> |
```

R Graphics: Device 2 (ACTIVE)

http://127.0.0.1:23128/li

R: Histograms

bing

MSN Notícias MSN Entrete... MSN Esportes Entrar

### hist {graphics}

R Documentation

## Histograms

### Description

The generic function `hist` computes a histogram of the given data values. If `plot = TRUE`, the resulting object of class "histogram" is plotted by `plot.histogram`, before it is returned.

### Usage

```
hist(x, ...)
```

## Default S3 method:

```
hist(x, breaks = "Sturges",
     freq = NULL, probability = !freq,
     include.lowest = TRUE, right = TRUE,
     density = NULL, angle = 45, col = NULL, border = NULL,
     main = paste("Histogram of" , xname),
     xlim = range(breaks), ylim = NULL,
     xlab = xname, ylab,
     axes = TRUE, plot = TRUE, labels = FALSE,
     nclass = NULL, warn.unused = TRUE, ...)
```

### Arguments