

Introdução ao R

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Nov/2016

Questões a serem respondidas

- 1) Qual é o problema a ser resolvido? E é para quem?
- 2) Como resolvo isso hoje?
- 3) Como isso afetará de forma benéfica o meu negócio?
- 4) Quais são os outputs desejados? Como são gerados hoje?

O Software R

- O R é uma linguagem e um ambiente de desenvolvimento integrado para cálculos estatísticos e gráficos;
- O programa permite realizar operações matemáticas simples e funções mais complexas;
- É um software gratuito sob uma licença referida no **CRAN** (Comprehensive R Archive Network) e está disponível em <http://cran.r-project.org/>.

Por que escolher o R?

Programadores em R estão entre os maiores salários pagos em 2014

O'Reilly Media

R is Still Hot - and Getting Hotter

Revolution Analytics

R is Ready for Business

Revolution Analytics

Por que o R é cada vez mais usado por Data analysts e Empresas?

O R foi desenvolvido, especialmente por Analistas Estatísticos, o que significa que os códigos em R requerem poucas linhas de comando (logo, menos trabalho) que códigos escritos em java, Python ou C++;

O R é um projeto "aberto", o que significa ser continuamente melhorado, atualizado e expandido pela comunidade global de desenvolvedores e usuários incrivelmente apaixonados.

David Smith, Chief Community Officer, Revolution Analytics

Por que usar o R?

IEEE Spectrum ranks























Google search rankings and trends

Social media chatter

GitHub and StackOverflow

Job opportunities

Academic citations

Language Rank	Types	Spectrum Ranking
1. C	  	100.0
2. Java	  	98.1
3. Python	 	98.0
4. C++	  	95.9
5. R		87.9
6. C#	  	86.7
7. PHP		82.8
8. JavaScript	 	82.2
9. Ruby	 	74.5
10. Go	 	71.9

Companies Using R



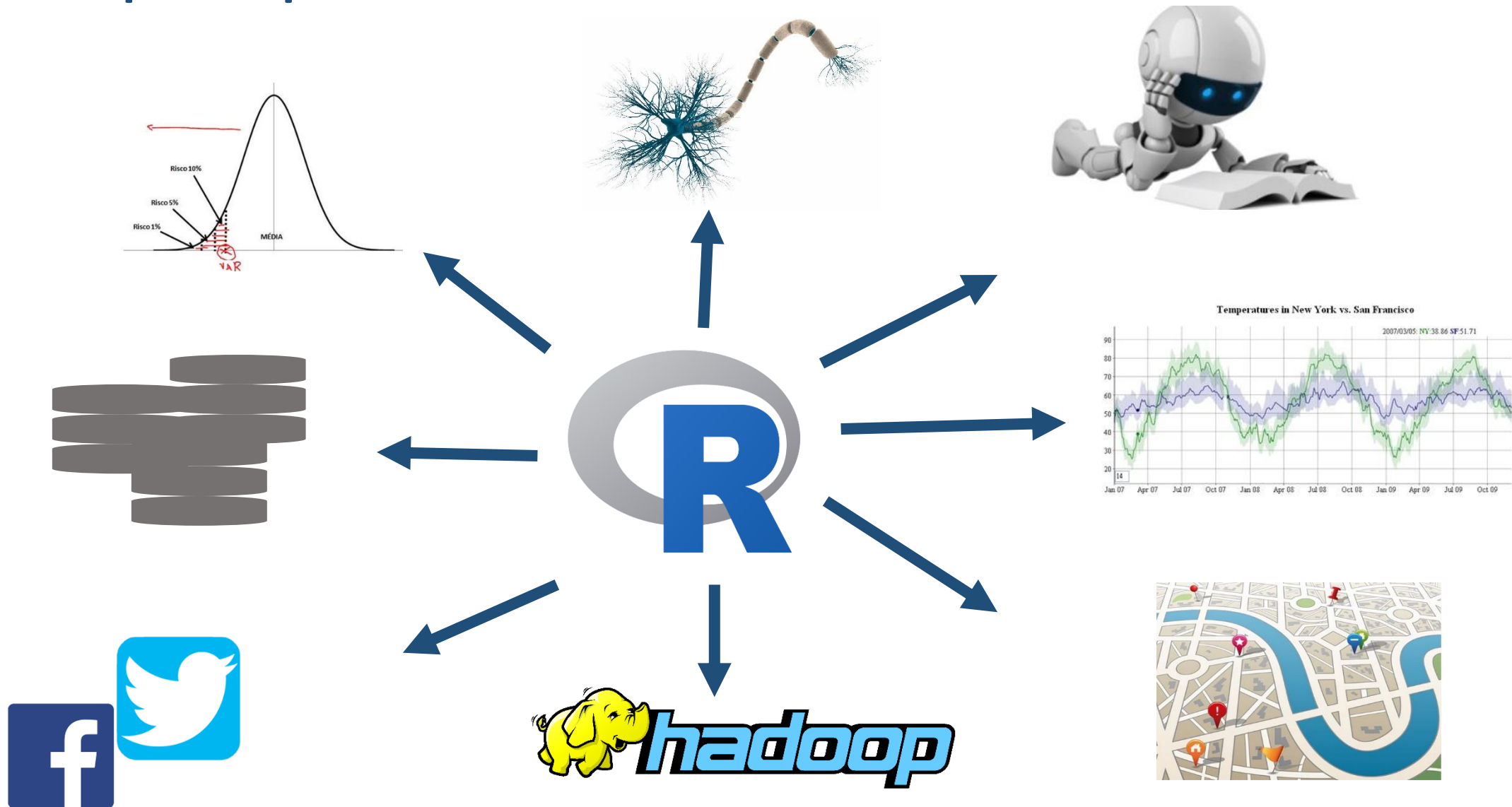
O que usaremos no curso



O que usaremos no curso

- ➔ O RStudio é um ambiente de desenvolvimento integrado (IDE, sigla em inglês) para o R, que funciona com a versão padrão do R;
- ➔ Inclui recursos que permite: aumentar a produtividade e é executado em todas as principais plataformas;
- ➔ Sua interface facilita o uso do R.

Afinal, por que essa aula?



R Packages

➔ Pacotes de Séries Temporais:

<https://cran.r-project.org/web/views/TimeSeries.html>

➔ Desenvolvido por Rob J Hyndman;

➔ Para ver como funciona alguns desses pacotes leia o **Capítulo 4** do livro:

Análise de Séries Temporais em R: um curso introdutório

<https://pedroferreira.shinyapps.io/SeriesTemporais/>

Instalando o R

1) Vá no site: <https://cran.r-project.org>

R-3.3.1 for Windows (32/64 bit)

[Download R 3.3.1 for Windows](#) (70 megabytes, 32/64 bit)

[Installation and other instructions](#)

[New features in this version](#)

If you want to double-check that the package you have downloaded exactly matches the package distributed by R, you can compare the [md5sum](#) of the .exe to the [true fingerprint](#). You will need a ver md5sum for windows: both [graphical](#) and [command line versions](#) are available.

Frequently asked questions

- [Does R run under my version of Windows?](#)
- [How do I update packages in my previous version of R?](#)
- [Should I run 32-bit or 64-bit R?](#)

Please see the [R FAQ](#) for general information about R and the [R Windows FAQ](#) for Windows-specific information.

Other builds

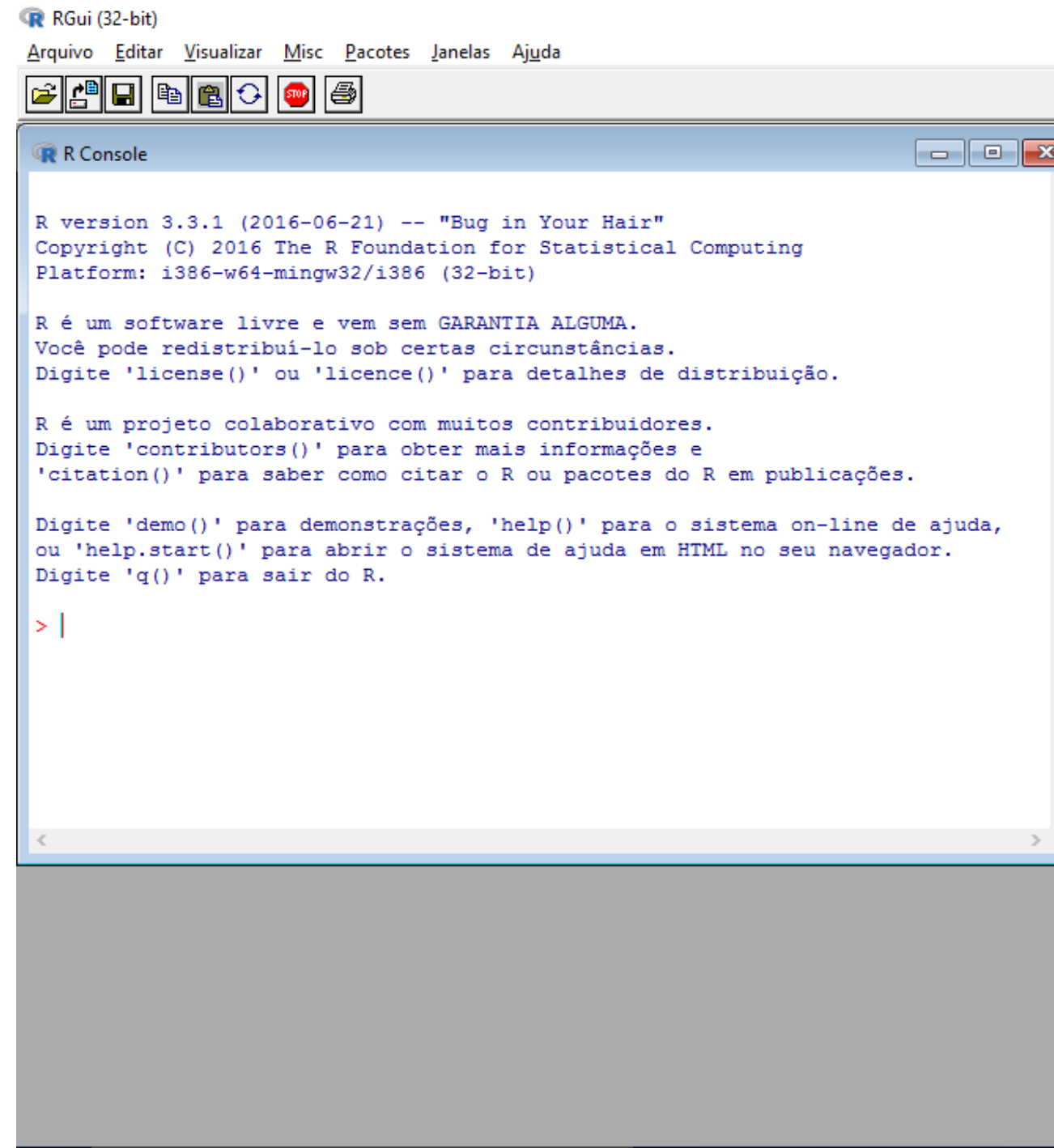
- Patches to this release are incorporated in the [r-patched snapshot build](#).

Instalação

Instalando o R

2) Faça o download do Arquivo

3) Clique em executar



Instalando o RStudio

- 1) Vá no site <https://www.rstudio.com/home/>
- 2) Clique em download


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**Welcome to RStudio -
Open source and enterprise-ready
professional software for R**

[Download RStudio](#)[Discover Shiny](#)[shinyapps.io Login](#)

Instalando o RStudio

3) Escolha o free

← → ↻ <https://www.rstudio.com/products/rstudio/download3/> 

Products Resources Pricing About Us **Blog** 

Multiple Concurrent Sessions				✓
Administrative Dashboard				✓
Load Balancing and Resource Management				✓
License	AGPL	Commercial	AGPL	Commercial
Pricing	FREE	\$995/yr*	FREE	\$9,995/yr*
	DOWNLOAD	BUY NOW	DOWNLOAD	DOWNLOAD
	Learn More	Learn More	Learn More	Learn More (45 Day Free Trial)

Instalando o RStudio

2) Faça o download do Arquivo

3) Clique em executar

Conhecendo o RStudio

The screenshot displays the RStudio integrated development environment (IDE) with the following components:

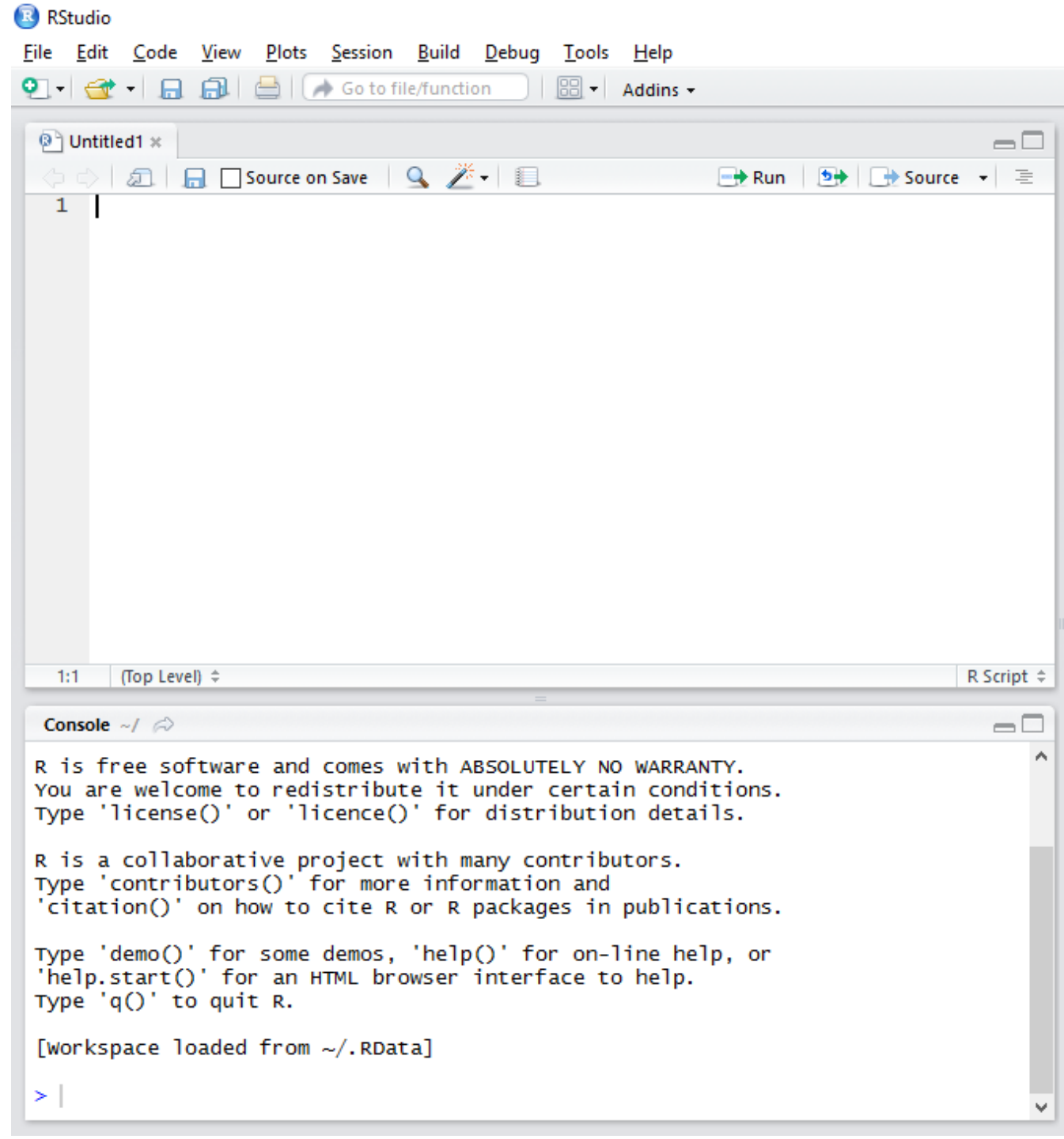
- Top Menu Bar:** File, Edit, Code, View, Plots, Session, Build, Debug, Tools, Help.
- Toolbar:** Includes icons for saving, running, and other development actions, along with a search bar labeled "Go to file/function".
- Source Editor:** The main workspace for writing R code, currently showing an "Untitled1" file with a single line of code at line 1.
- Environment Pane:** Located on the right, it shows the "Global Environment" and indicates that the environment is empty.
- File Explorer:** Also on the right, it displays the file system structure, including folders like ".RData", ".Rhistory", and "Modelos Personalizados do Office", and files like "nameoffile2.png", "para_camila_18.csv", "para_camila_18.rds", "para_camila_18.xlsx", and "R".
- Console:** At the bottom, it shows the output of R commands, including the R license text and instructions on how to use R.

Console Output:

```
R is free software and comes with ABSOLUTELY NO WARRANTY.  
You are welcome to redistribute it under certain conditions.  
Type 'license()' or 'licence()' for distribution details.  
  
R is a collaborative project with many contributors.  
Type 'contributors()' for more information and  
'citation()' on how to cite R or R packages in publications.  
  
Type 'demo()' for some demos, 'help()' for on-line help, or  
'help.start()' for an HTML browser interface to help.  
Type 'q()' to quit R.
```

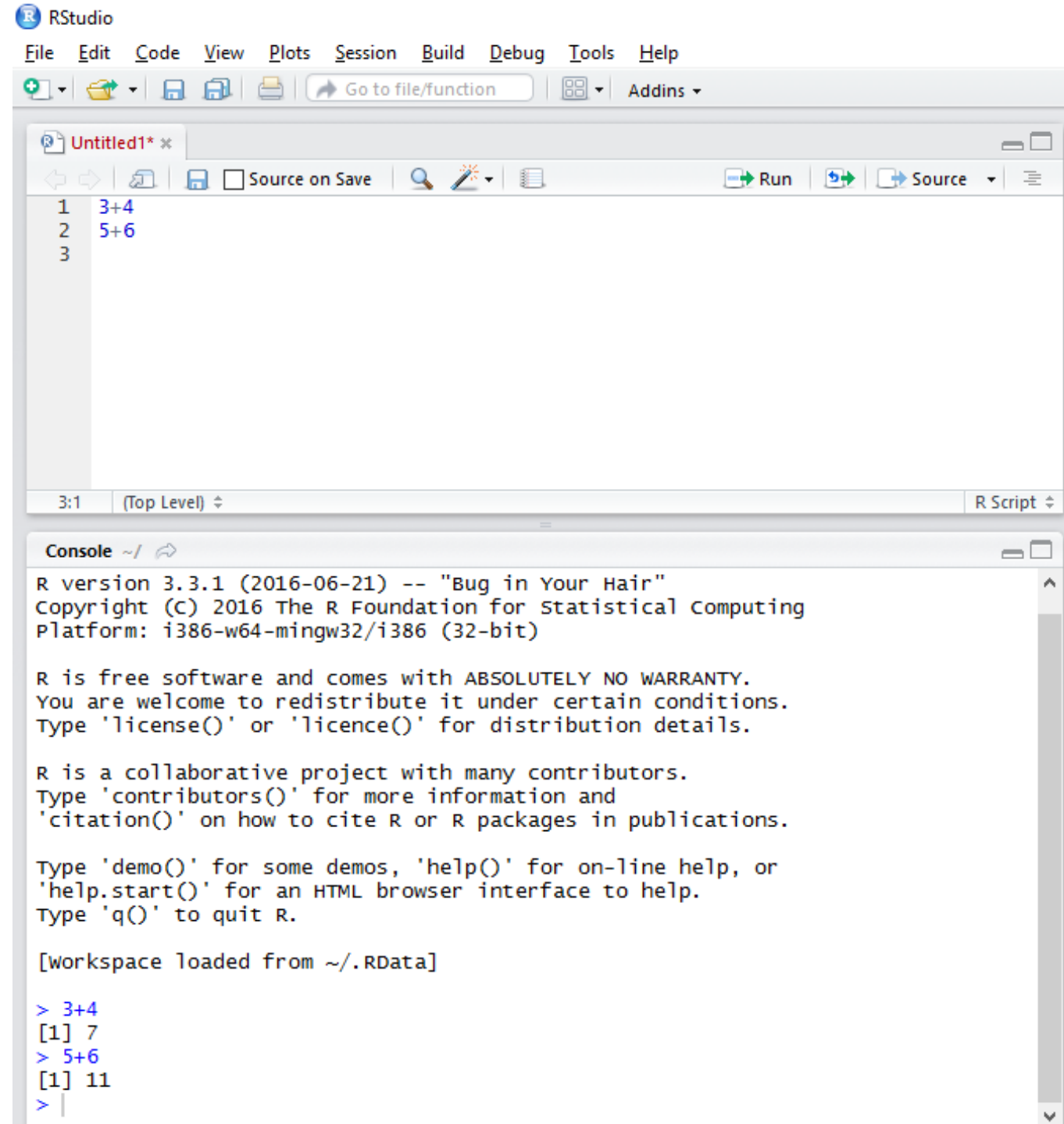
Primeira tela

Tela destinada a armazenar os seus códigos/scripts, para outros usos.



Segunda tela

Tela destinada a compilar
os seus comandos



The screenshot displays the RStudio application window. The top menu bar includes File, Edit, Code, View, Plots, Session, Build, Debug, Tools, and Help. Below the menu is a toolbar with icons for file operations and a search bar labeled 'Go to file/function'. The main editor area shows a file named 'Untitled1*' with three lines of R code: `1 3+4`, `2 5+6`, and `3`. The status bar at the bottom of the editor indicates '3:1 (Top Level)' and 'R Script'. Below the editor is the Console pane, which shows the R startup message: 'R version 3.3.1 (2016-06-21) -- "Bug in Your Hair"', copyright information, and platform details. It also displays the R license notice and instructions for using help and quitting. At the bottom of the console, the workspace is loaded from '~/.RData', and the results of the code execution are shown: `> 3+4` resulting in `[1] 7`, and `> 5+6` resulting in `[1] 11`. The prompt `>` is currently at the end of a new line.

```
R version 3.3.1 (2016-06-21) -- "Bug in Your Hair"
Copyright (C) 2016 The R Foundation for Statistical Computing
Platform: i386-w64-mingw32/i386 (32-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

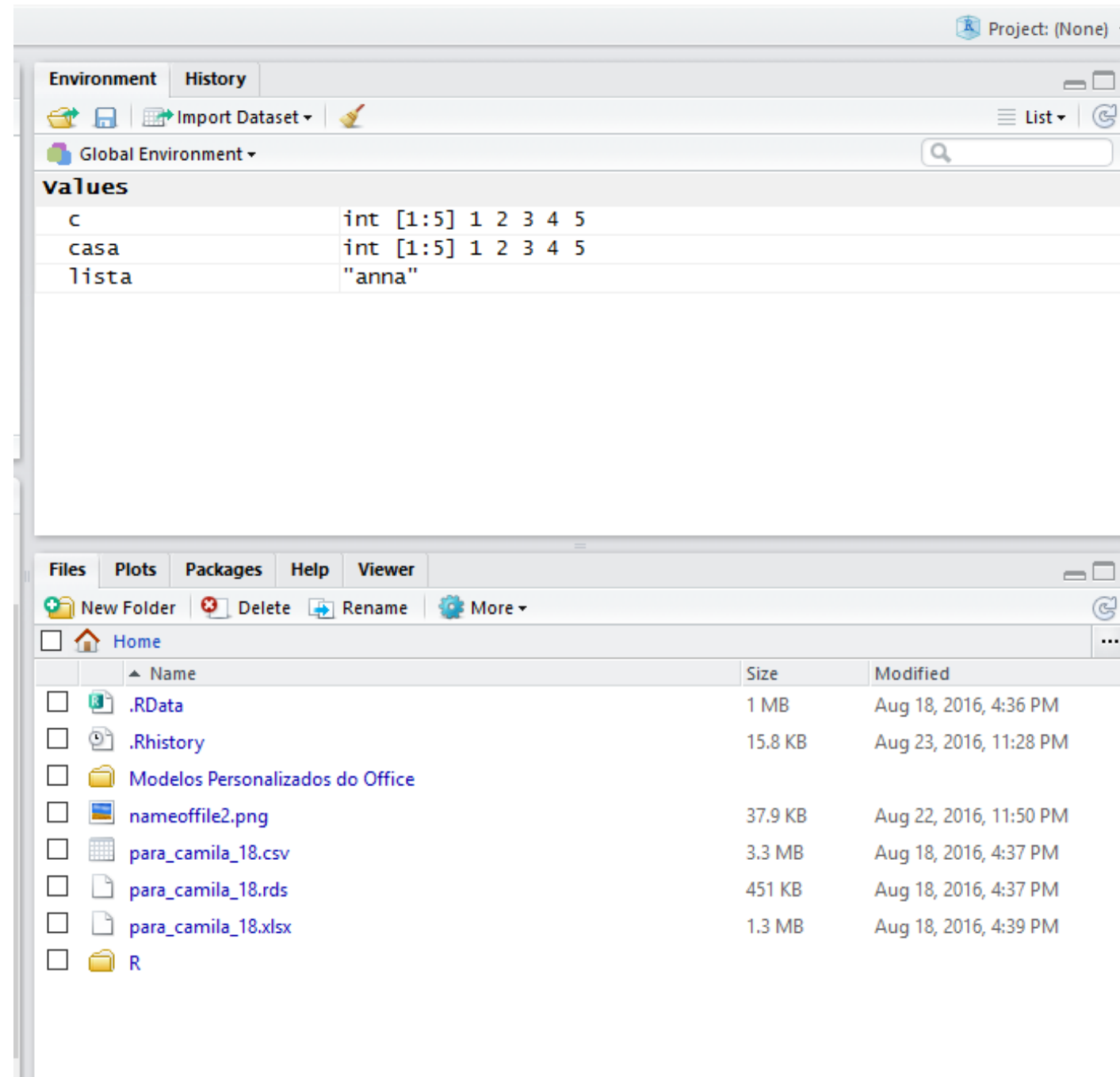
Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

[workspace loaded from ~/.RData]

> 3+4
[1] 7
> 5+6
[1] 11
> |
```

Terceira tela

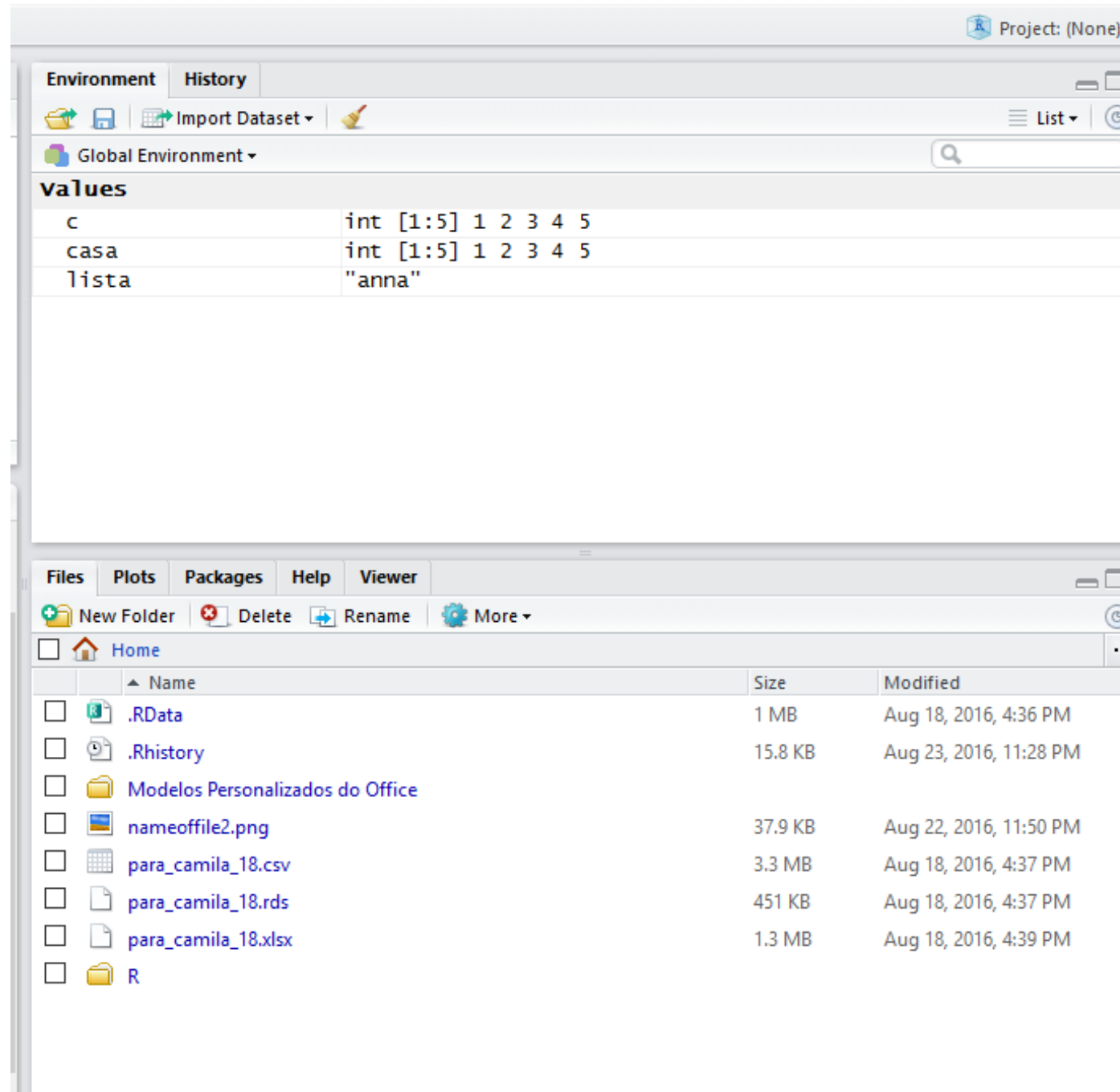
Tela destinada a armazenar suas variáveis



Quarta tela

Tela destinada:

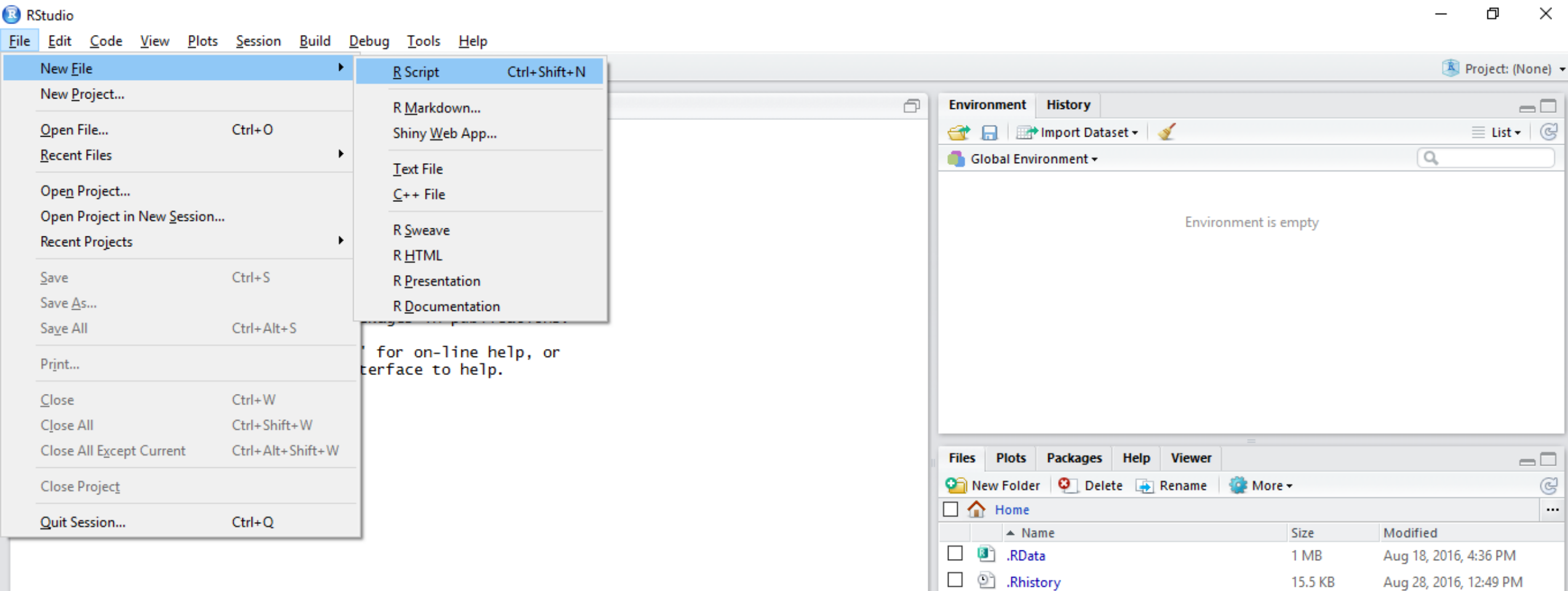
- Arquivos em seu diretório
- Plotar arquivos
- Help do R



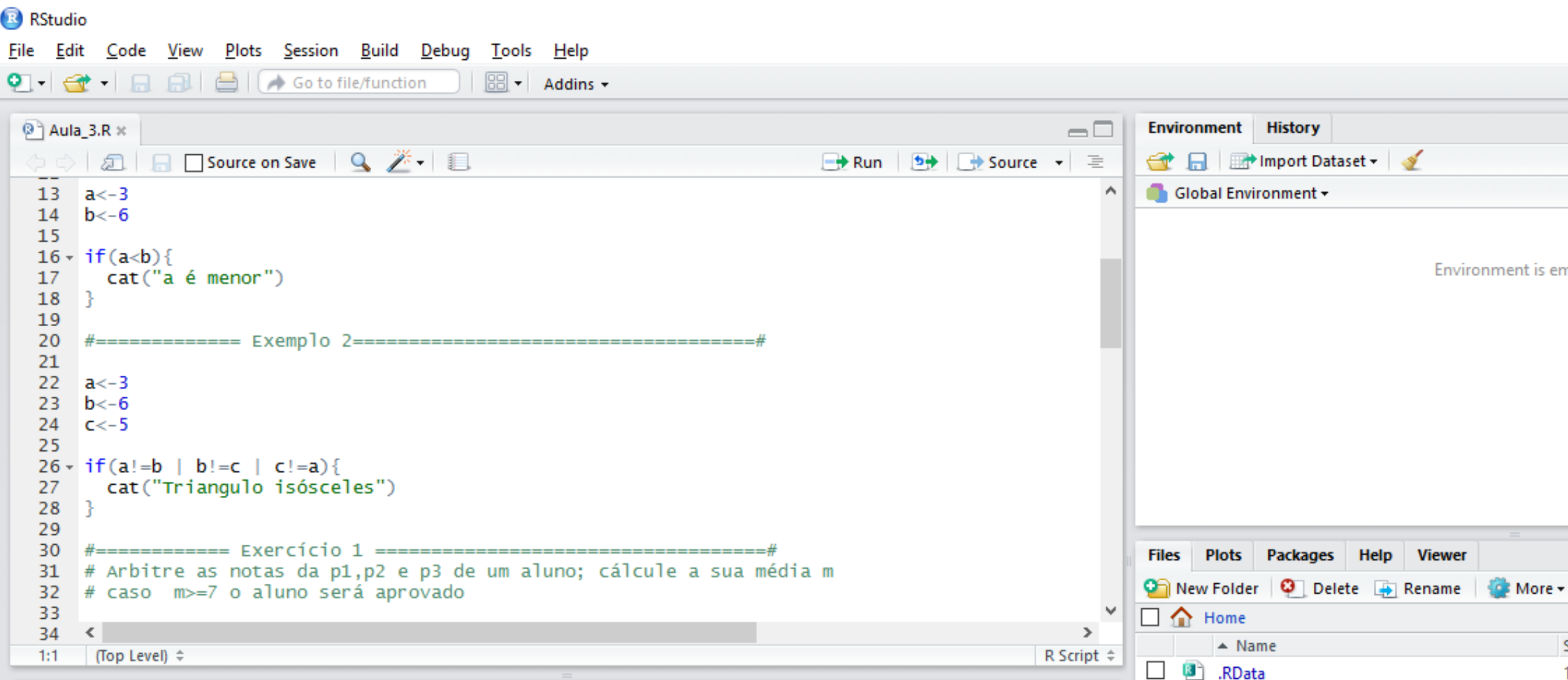
Primeiros Passos no R

Criando um Script

File >> New File >> RScript



Exemplo de um Script

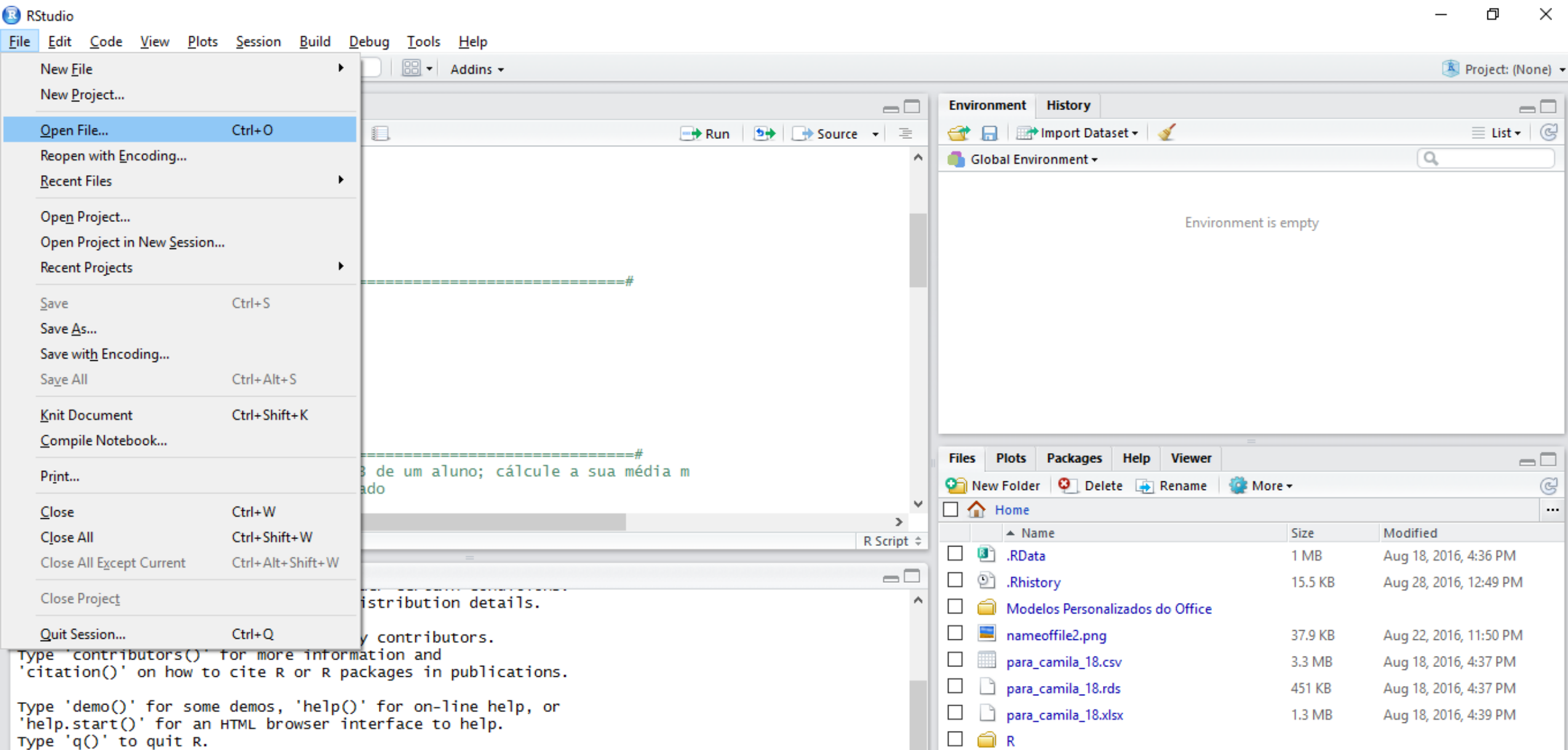


The screenshot displays the RStudio interface with the following components:

- Menu Bar:** File, Edit, Code, View, Plots, Session, Build, Debug, Tools, Help.
- Toolbar:** Includes icons for file operations (new, open, save, print) and a search bar labeled "Go to file/function".
- Source Editor:** Contains the R script "Aula_3.R" with the following code:

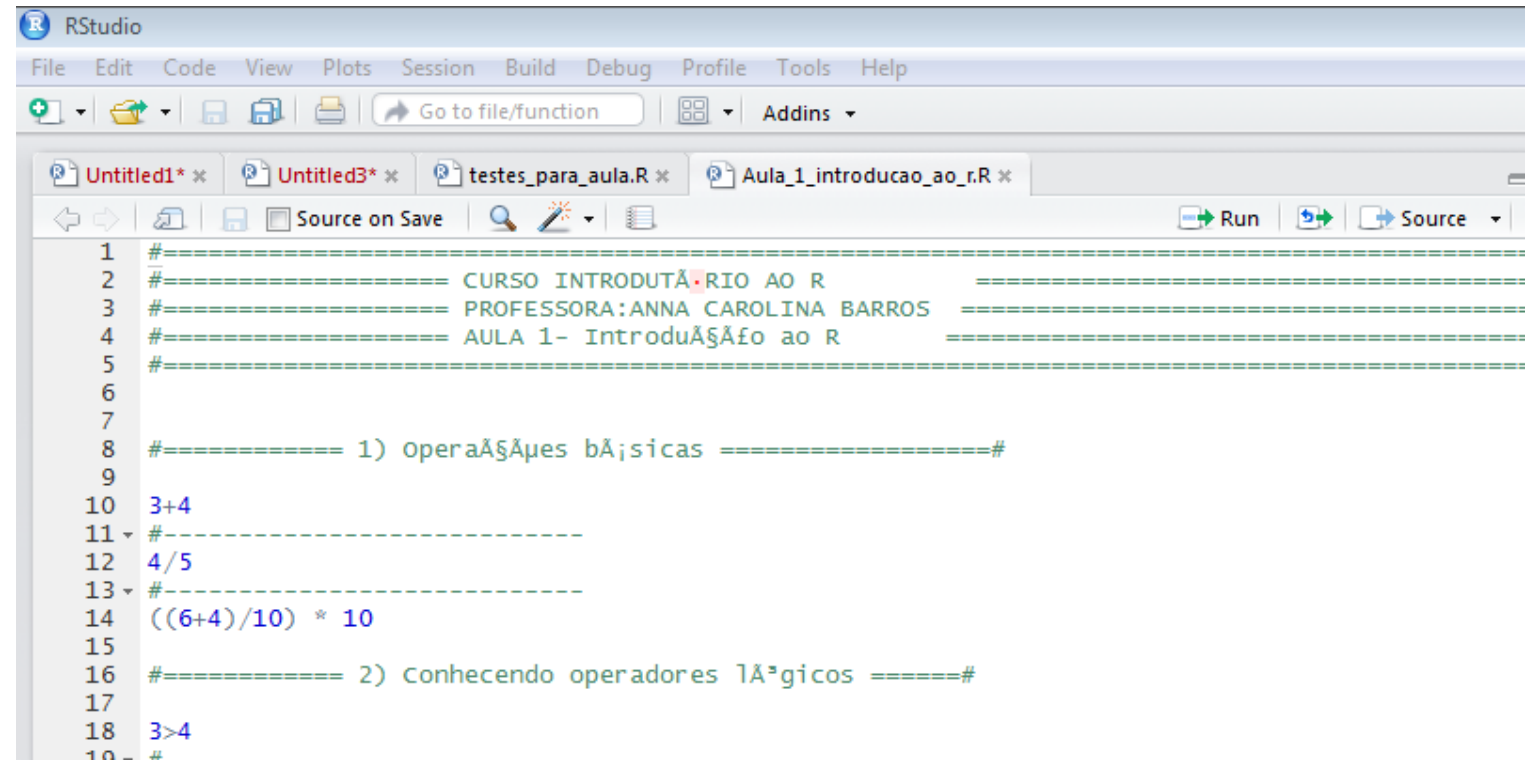
```
13 a<-3
14 b<-6
15
16 if(a<b){
17   cat("a é menor")
18 }
19
20 #===== Exemplo 2=====#
21
22 a<-3
23 b<-6
24 c<-5
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26 if(a!=b | b!=c | c!=a){
27   cat("Triangulo isósceles")
28 }
29
30 #===== Exercício 1 =====#
31 # Arbitre as notas da p1,p2 e p3 de um aluno; calcule a sua média m
32 # caso m>=7 o aluno será aprovado
33
34 <
```
- Environment Panel:** Shows "Global Environment" with the message "Environment is empty".
- Files Panel:** Displays a file explorer with "Home" and ".RData" files.
- Status Bar:** Shows "1:1 (Top Level)" and "R Script".

Recuperando um Script



Objetivo

Evitar abrir arquivos
com caracteres
especiais corrompidos.



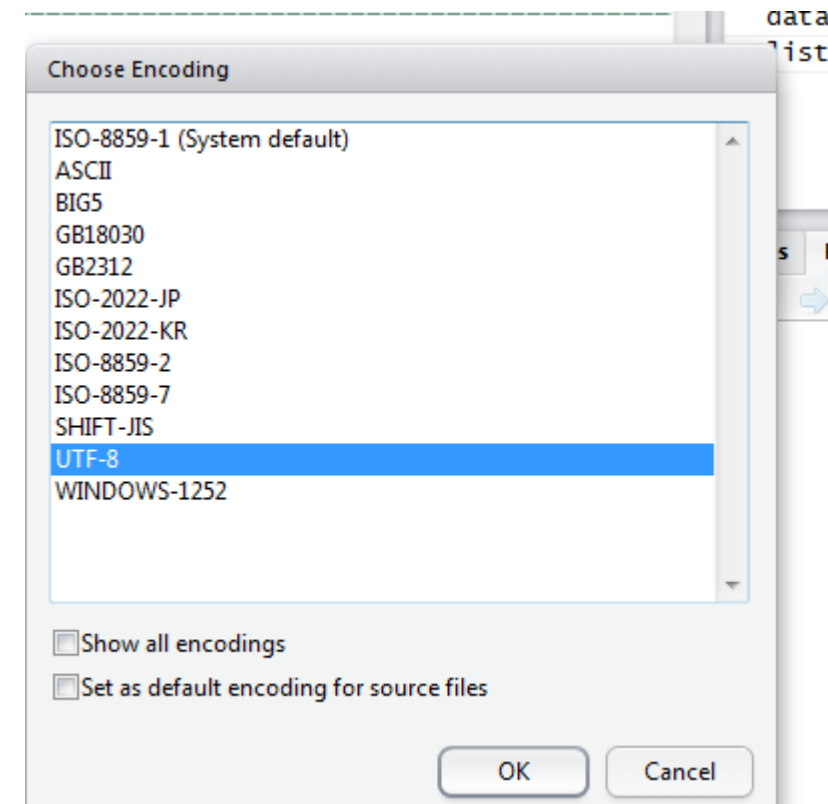
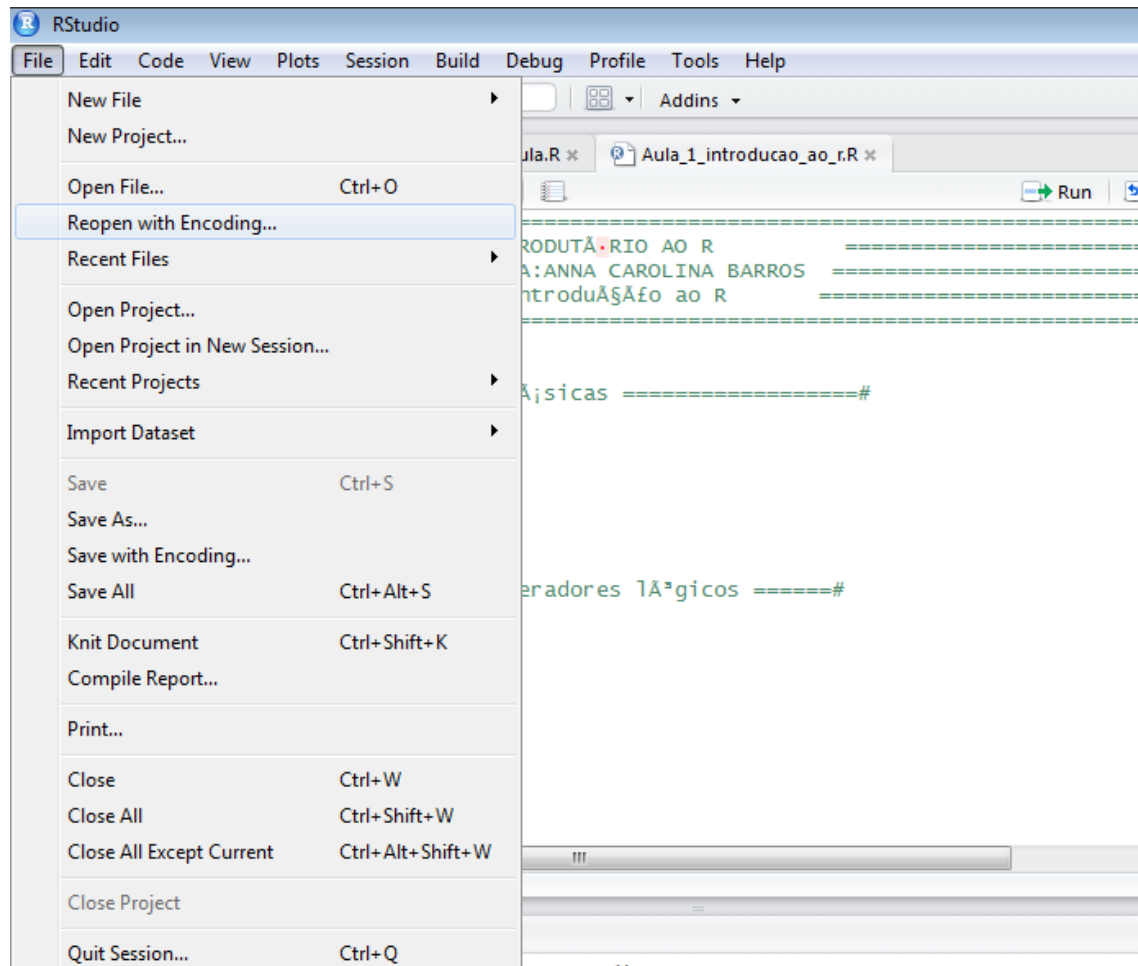
```
1 #===== CURSO INTRODUTÓRIO AO R =====
2 #===== PROFESSORA:ANNA CAROLINA BARROS =====
3 #===== AULA 1- Introdução ao R =====
4 #=====
5 #=====
6
7
8 #===== 1) operações básicas =====#
9
10 3+4
11 #-----
12 4/5
13 #-----
14 ((6+4)/10) * 10
15
16 #===== 2) conhecendo operadores lógicos =====#
17
18 3>4
19 #
```

Primeira Forma – “Reopen with encoding”

Corrige de imediato o problema, mas a correção é pontual.

File >> Reopen with Encoding >> UTF-8

Primeira Forma – “Reopen with encoding”



Segunda forma– “tools”

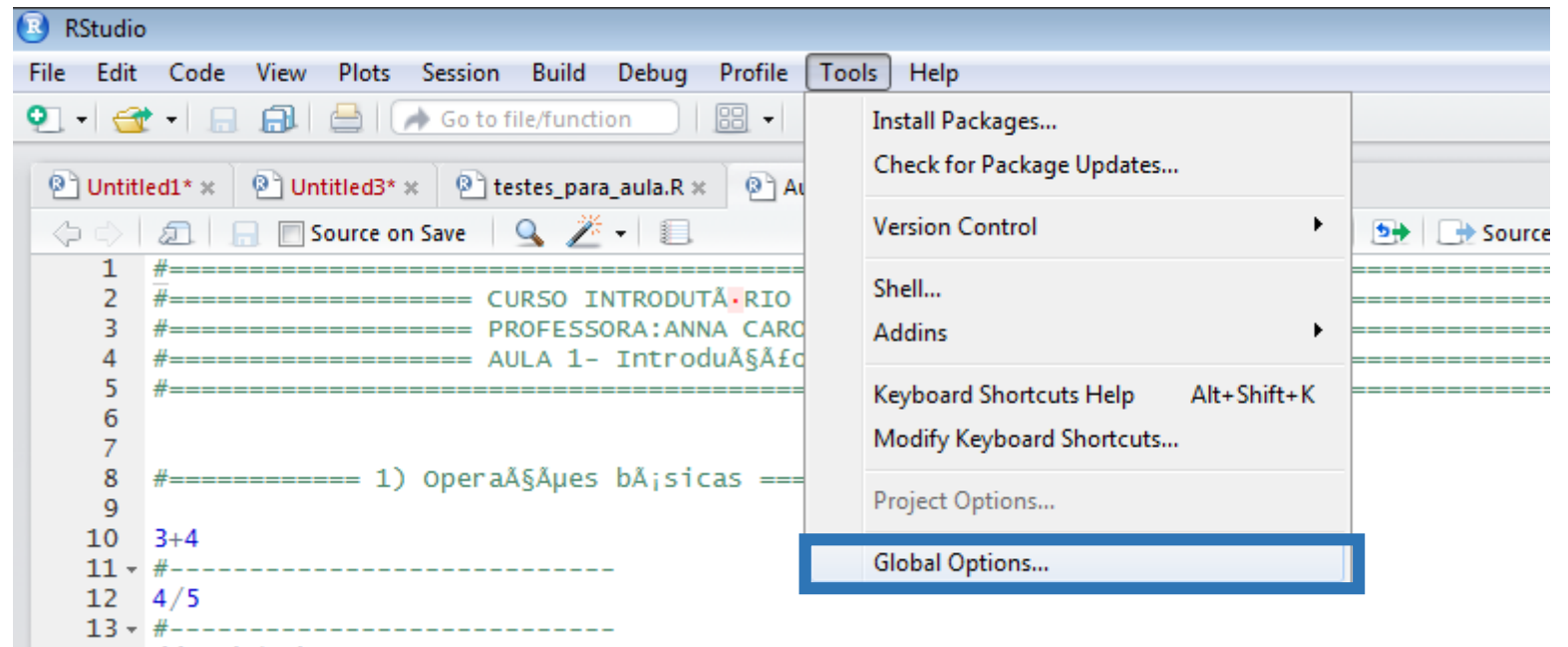
Exige que feche e reabra o Rstudio, a solução porém é definitiva.

```
Tools>> global Options >> Code  
      >>Saving>> Change >> UTF-8
```

Segunda forma– “tools”

1) Clique no Menu Tools

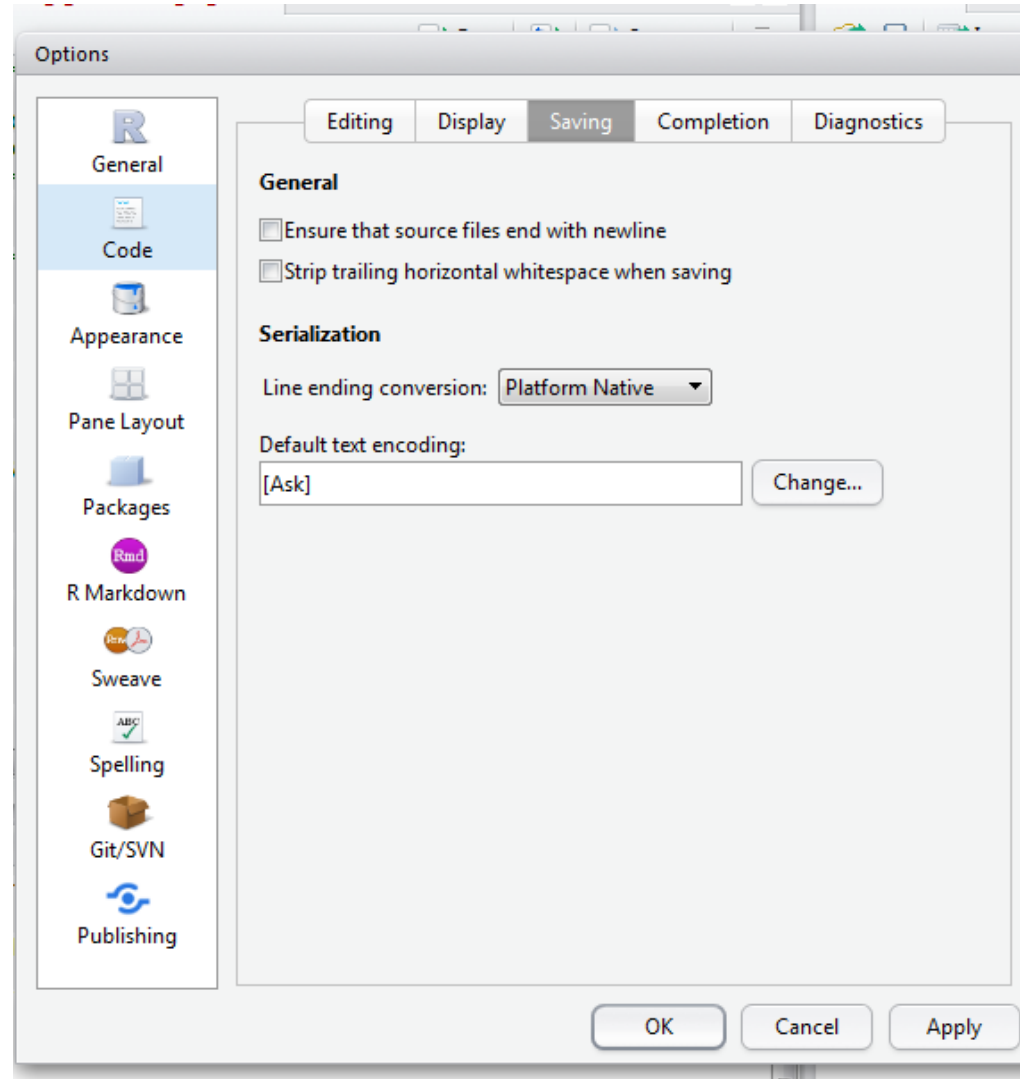
2) Clique em global Options



Segunda forma– “tools”

3) Vá em Code

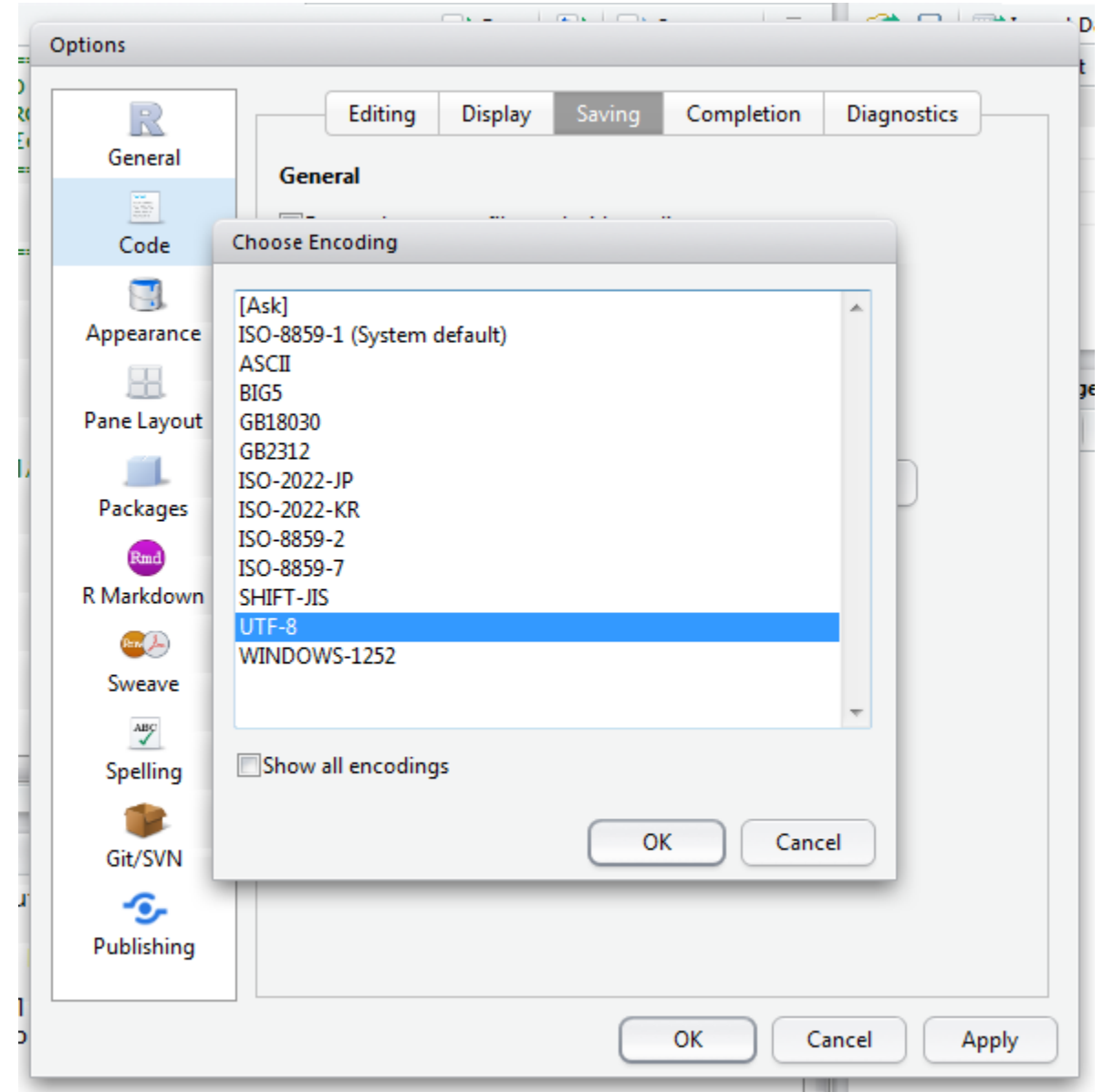
4) Vá em Saving



Segunda forma– “tools”

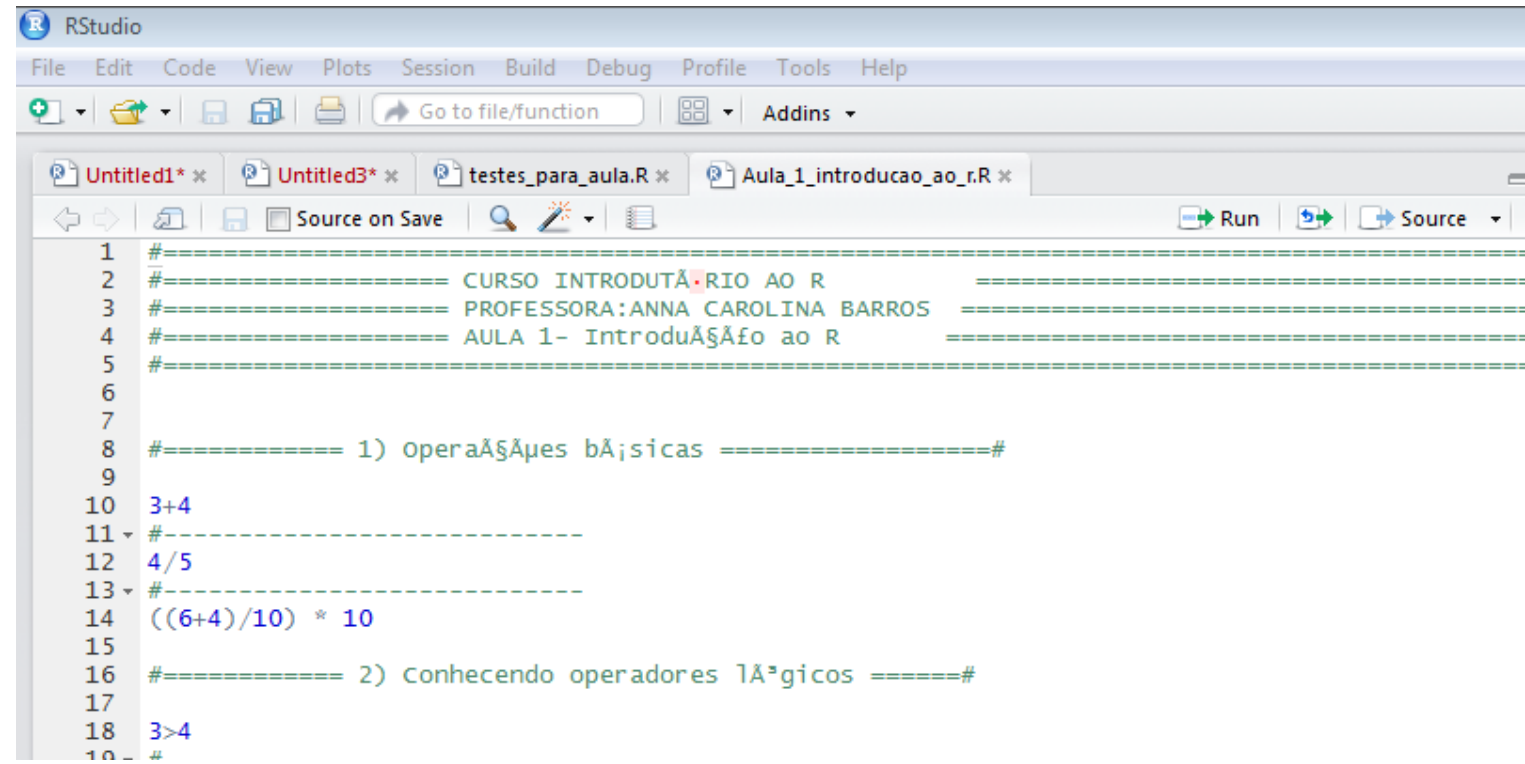
5) Default Text Encoding

5) Change >> UTF-8



Objetivo

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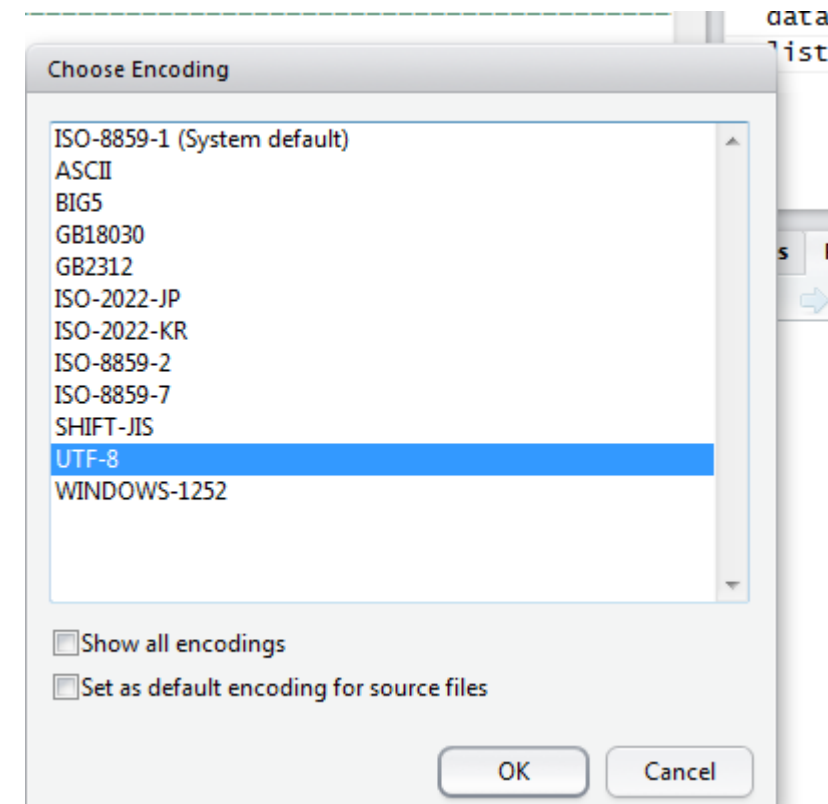
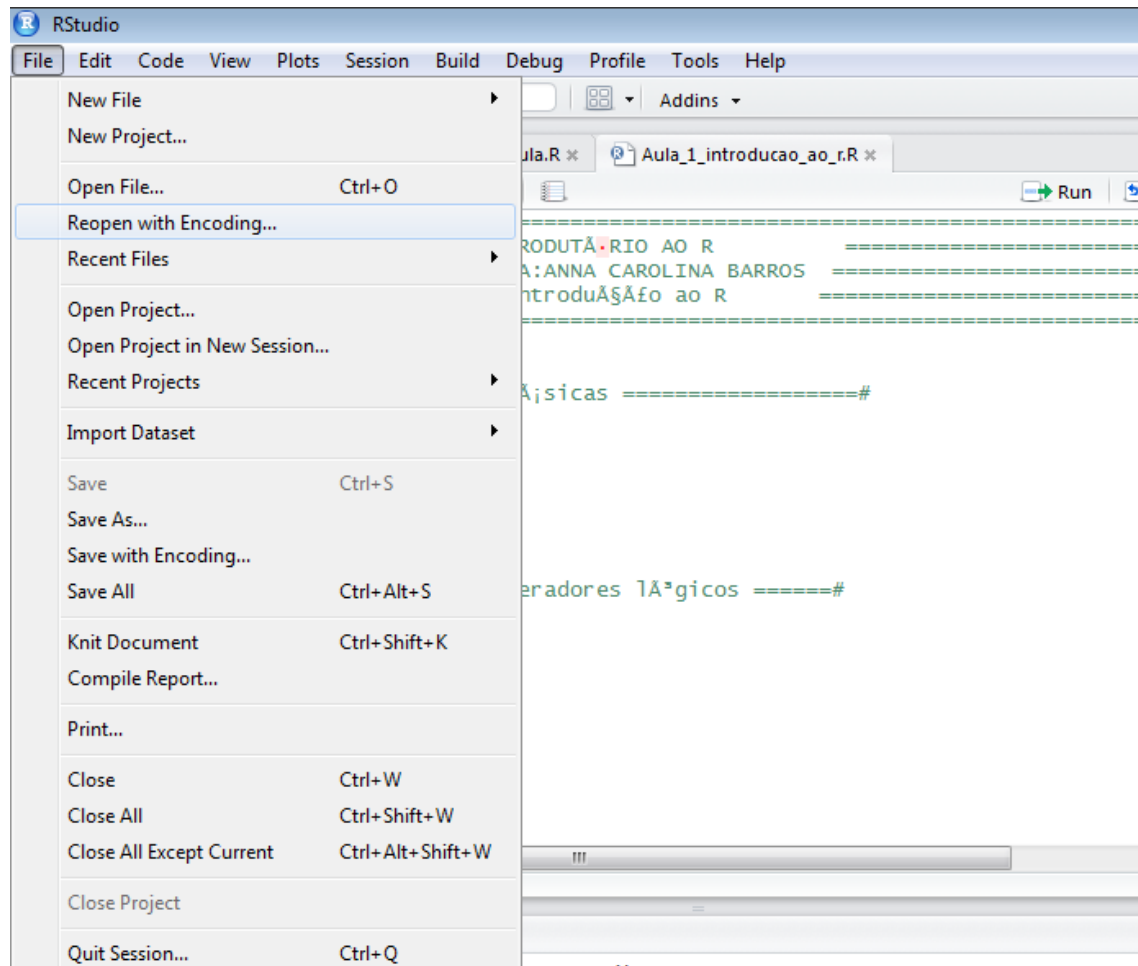
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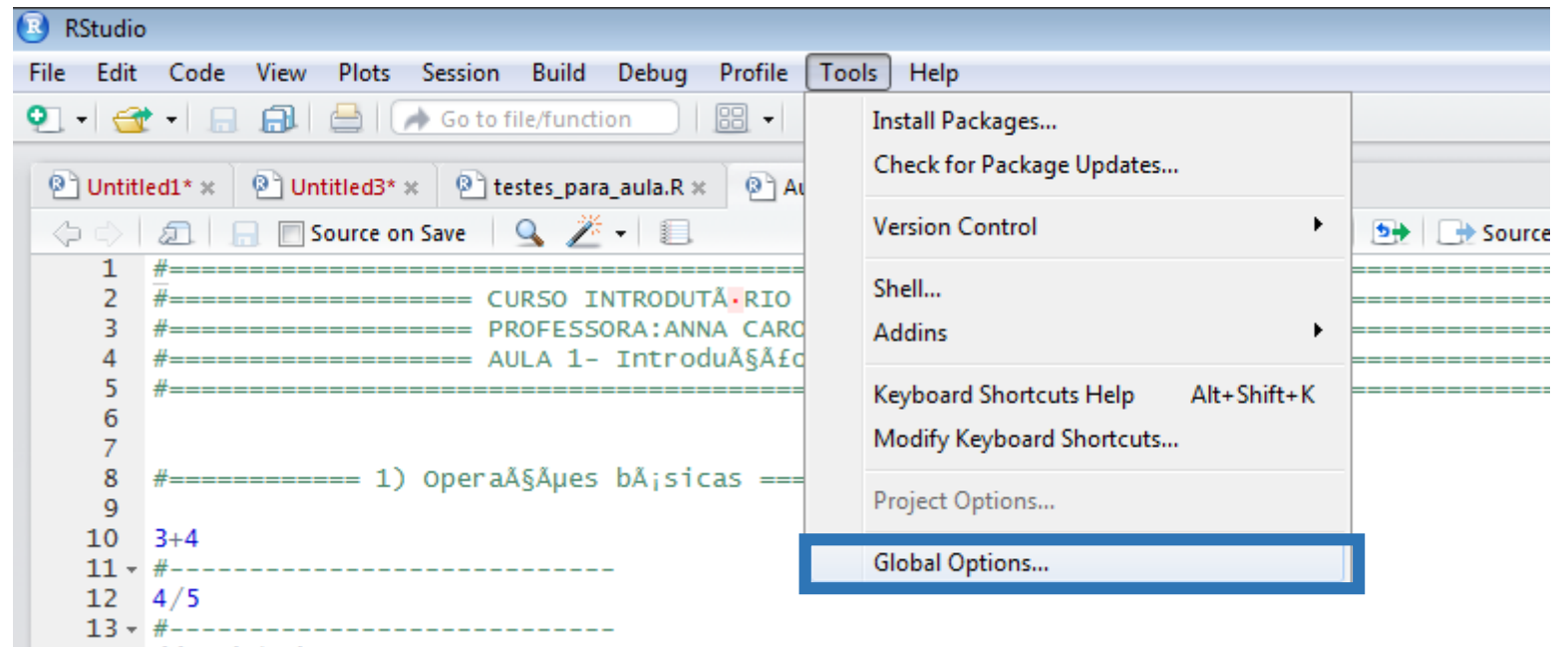
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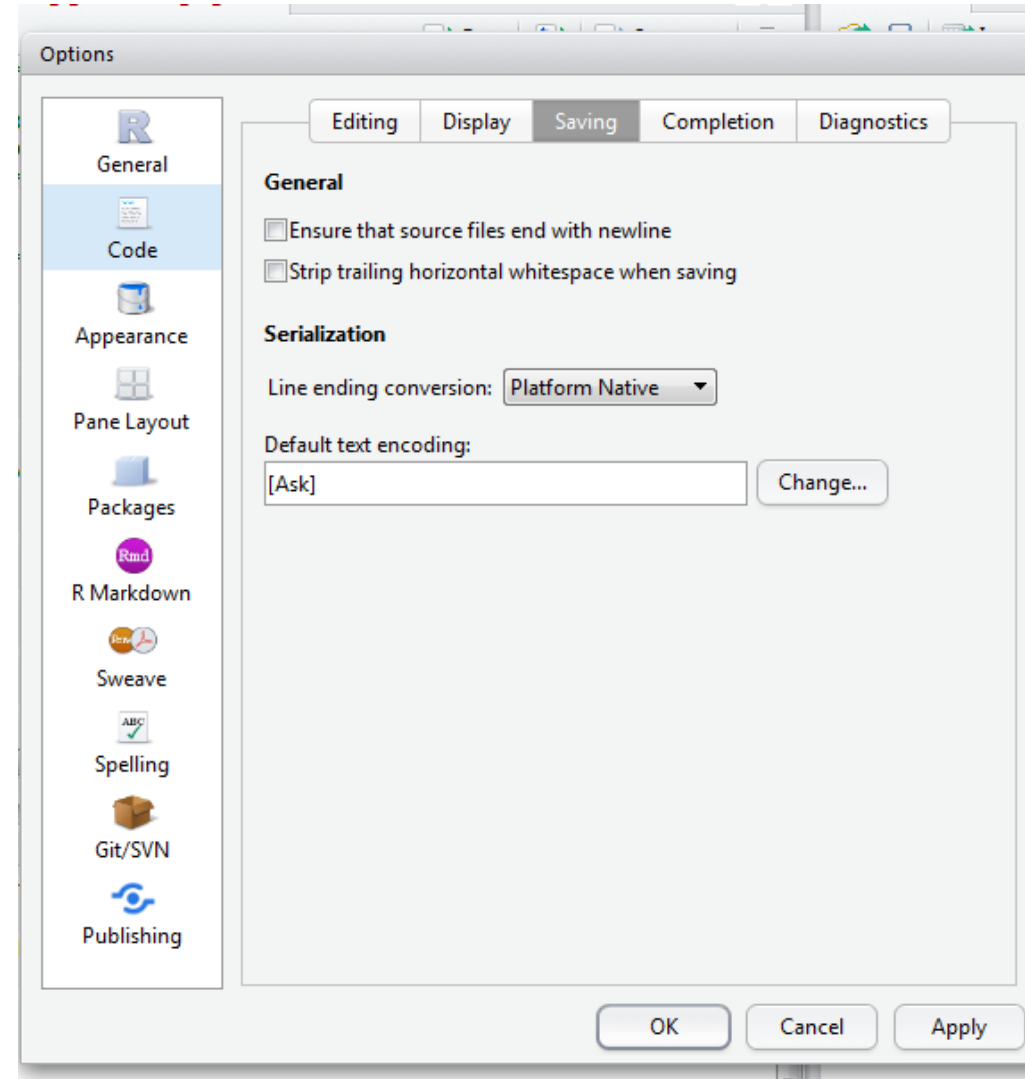
2) Clique em global Options



Segunda forma– “tools”

3) Vá em Code

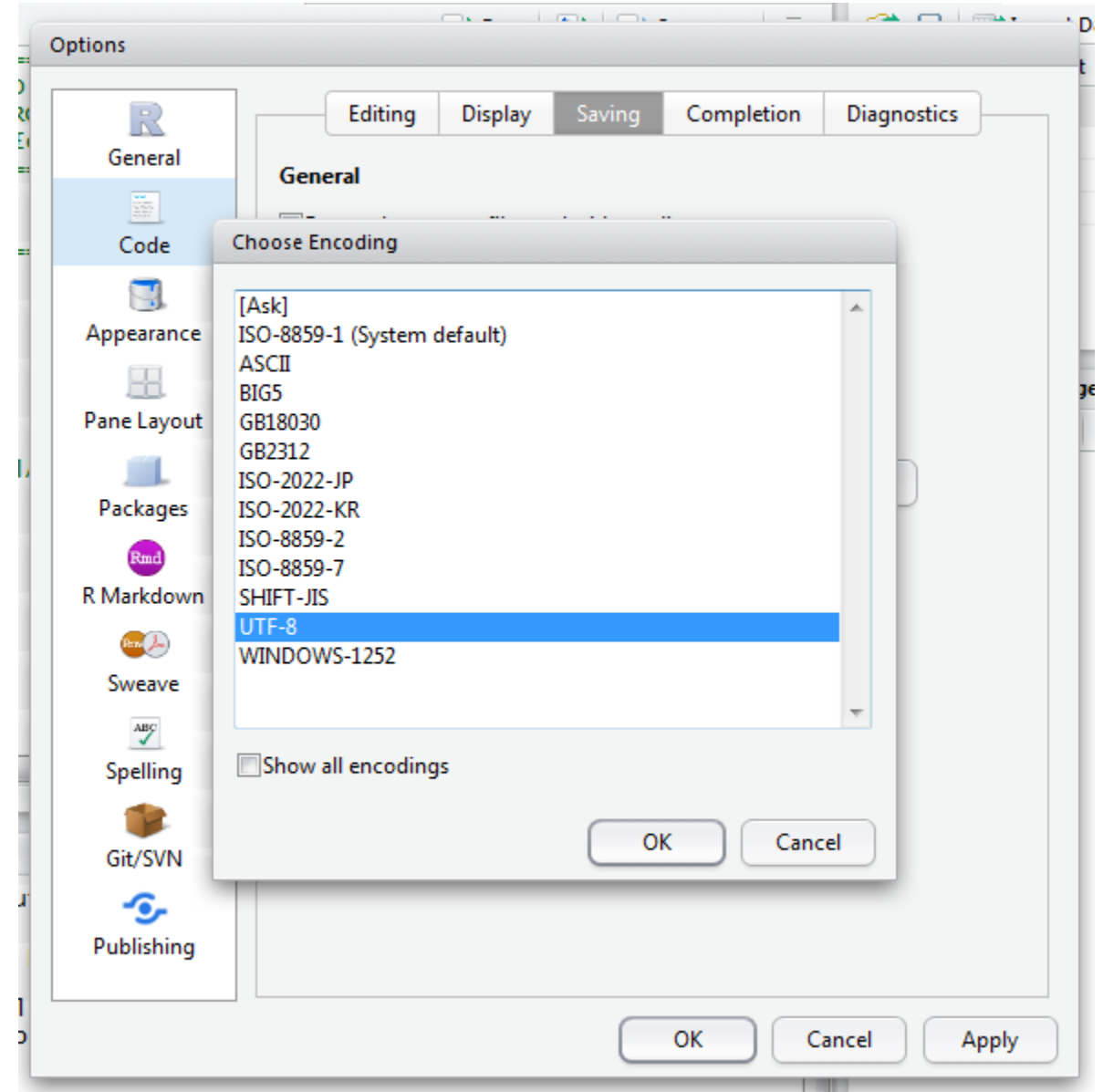
4) Vá em Saving



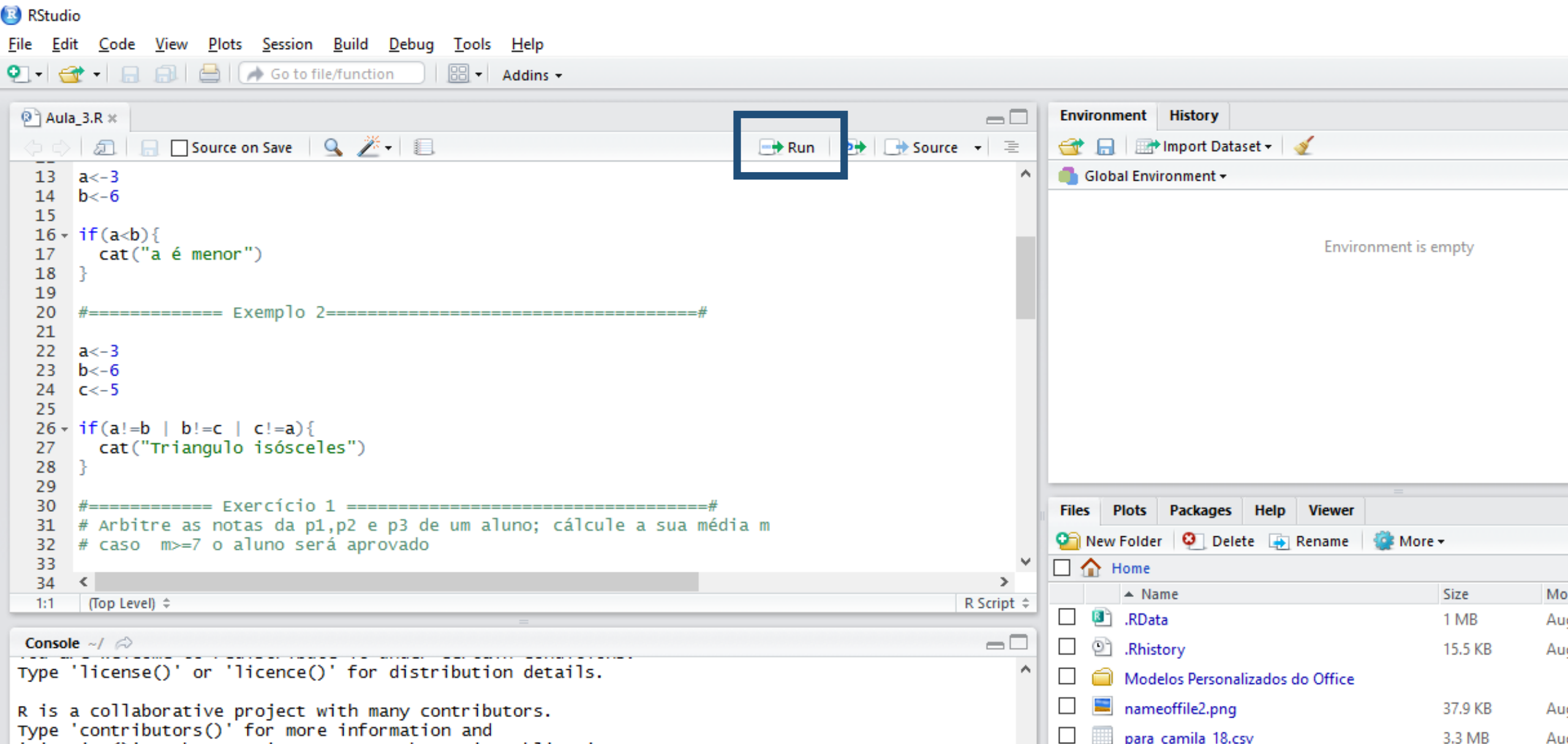
Segunda forma– “tools”

5) Default Text Encoding

5) Change >> UTF-8



Executando um Script



The screenshot displays the RStudio environment with the following components:

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31 # Arbitre as notas da p1,p2 e p3 de um aluno; calcule a sua média m
32 # caso m>=7 o aluno será aprovado
33
34 <
```
- Environment Panel:** Shows "Global Environment" and states "Environment is empty".
- Files Panel:** Displays a file explorer view with the following files and folders:

	Name	Size	Mo
<input type="checkbox"/>	.RData	1 MB	Au
<input type="checkbox"/>	.Rhistory	15.5 KB	Au
<input type="checkbox"/>	Modelos Personalizados do Office		
<input type="checkbox"/>	nameoffile2.png	37.9 KB	Au
<input type="checkbox"/>	para_camila 18.csv	3.3 MB	Au
- Console:** Displays the output of the R script execution:

```
Type 'license()' or 'licence()' for distribution details.

R is a collaborative project with many contributors.
Type 'contributors()' for more information and
```

Mas...

... Usem o Ctrl +r !!!

Operações Básicas

Fazem contas e retornam valores

Soma	+
Subtração	-
Multiplicação	*
Divisão	/
Potência	a**b
Raiz quadrada	sqrt()
Módulo	%%

Operações Lógicas

Retornam valores booleanos TRUE ou FALSE

Maior	>
Menor	<
Igual	==
Diferença	!=
Contém	%in%

Próximos Passos

➔ The [swirl](#) R package makes it fun and easy to learn R programming and data science.

```
install.packages("swirl")  
library(swirl)  
swirl()
```

Próximos Passos

- ➔ [Working book](#): Ferreira, P. C., Mattos, D. M., Almeida, D. C., Oliveira, I. C., \& Pereira, R. J. (2016). Análise de Séries Temporais em R - um curso introdutório. Rio de Janeiro.
- ➔ Vídeo Aulas: Núcleo de Métodos Estatísticos e Computacionais ([NMEC](#))

OBRIGADA!

Contatos



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