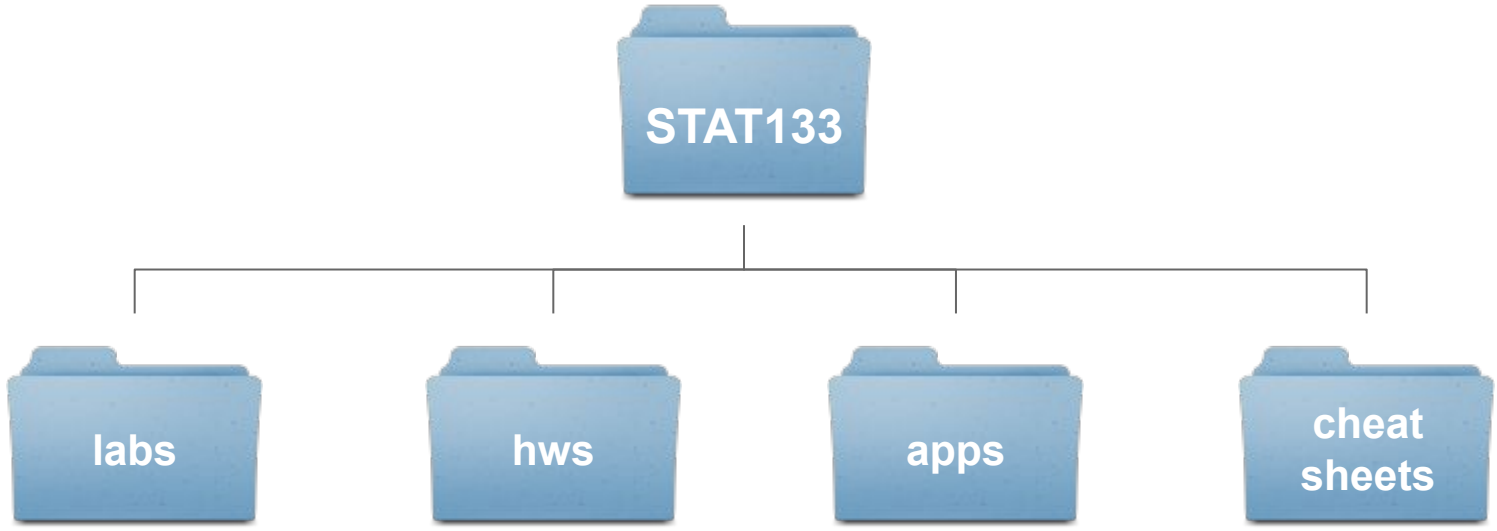
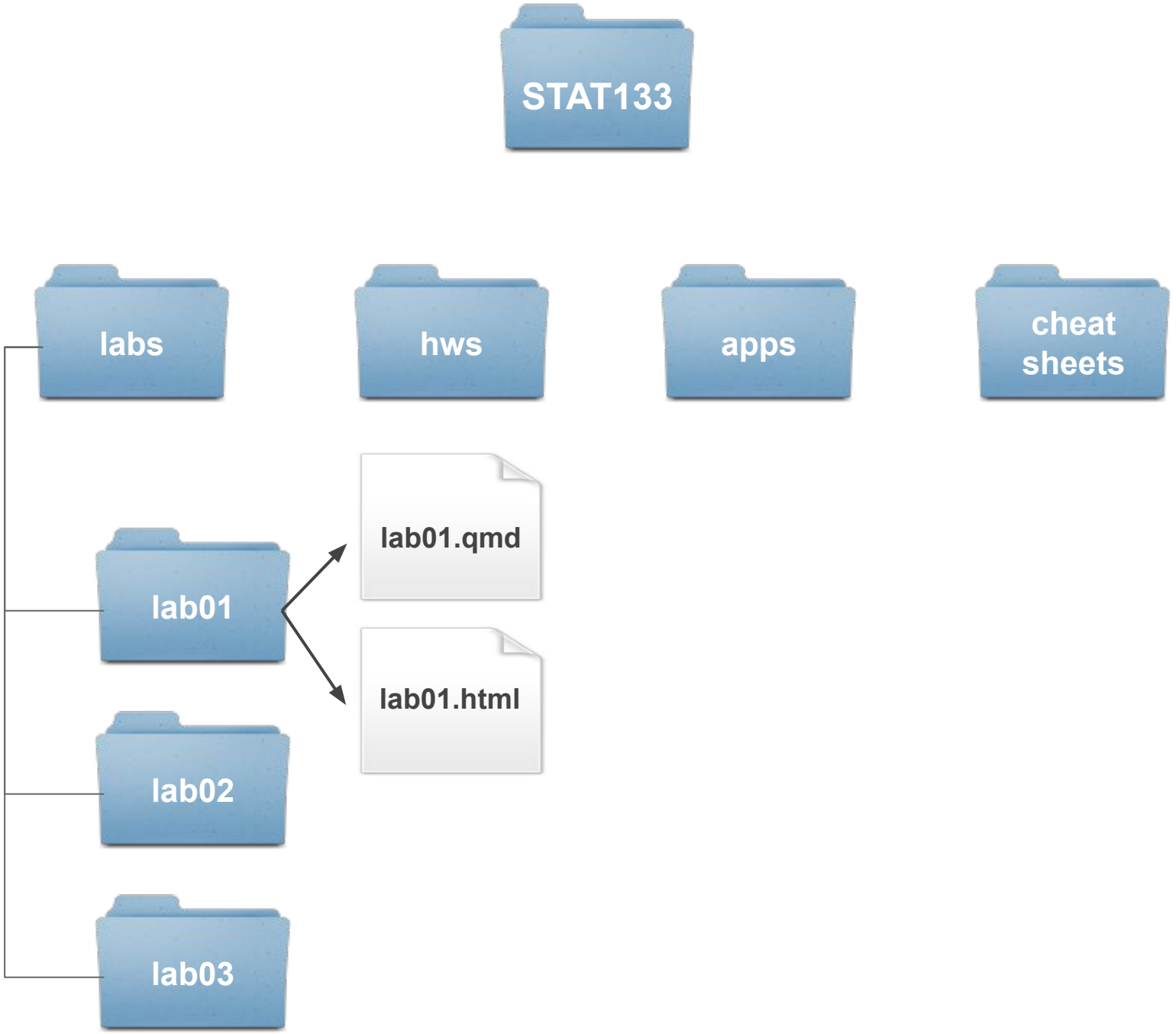
Getting Started with R and RStudio

Stat 133 with Gaston Sanchez

STAT 133
Folder

Create a dedicated folder (i.e. directory) to save all the work you'll do in Stat 133


STAT133
labs
hws
apps
cheat sheets


STAT133
labs
hws
apps
cheat sheets
lab01
lab01.qmd
lab01.html
lab02
lab03

First contact with R via RStudio

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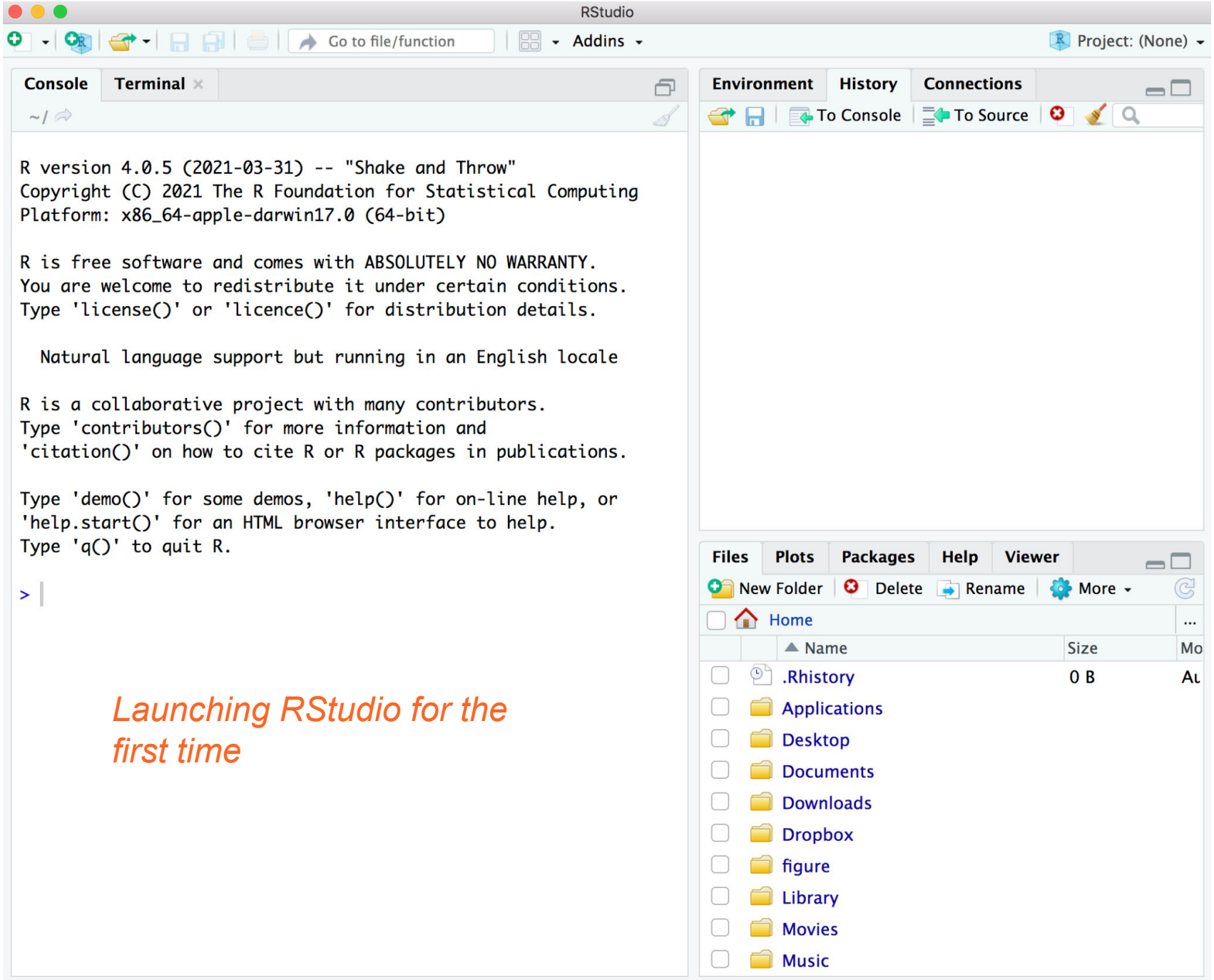
Studio

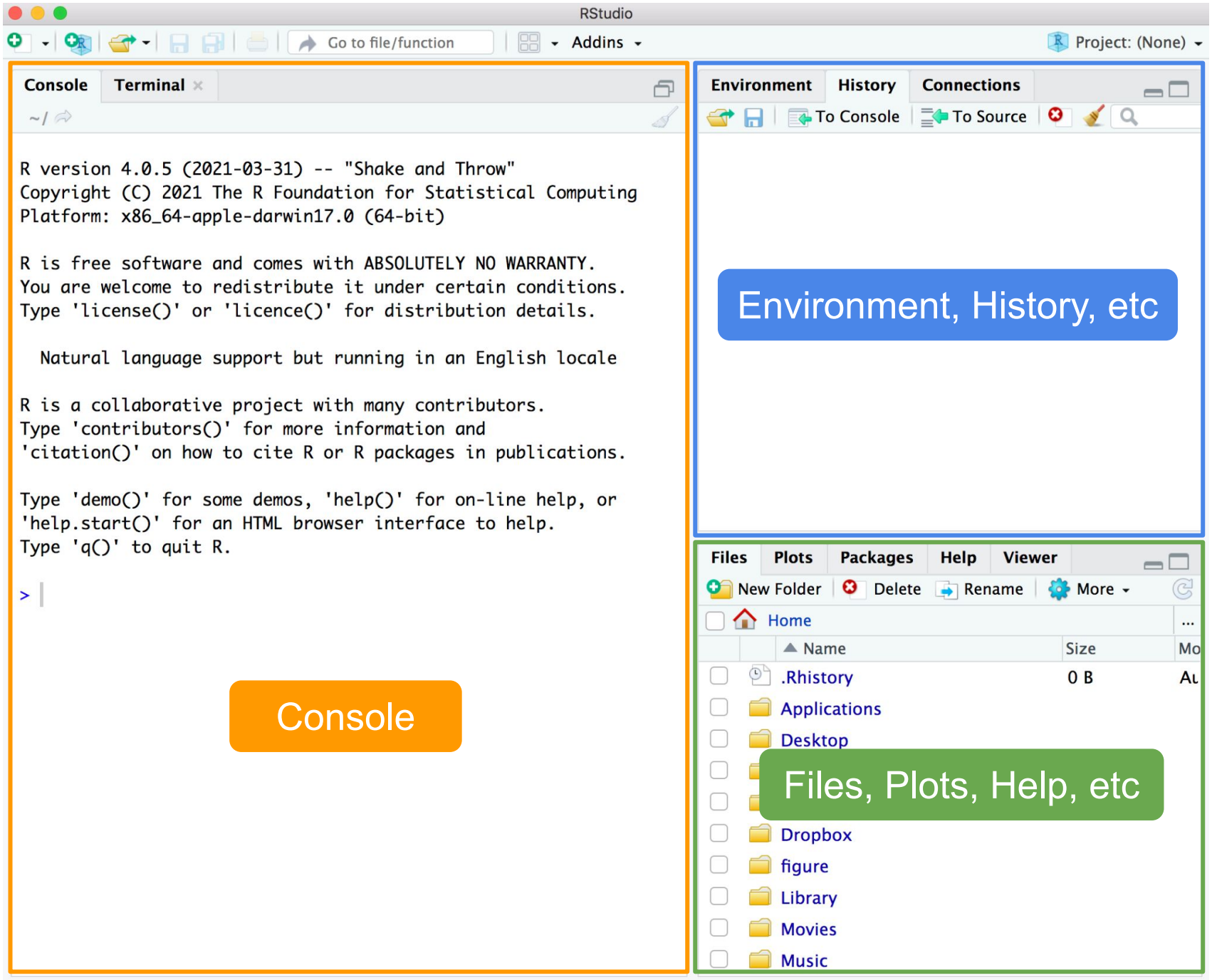
Studio

Think of **R** as the computational engine (core)

Think of **RStudio** as a convenient workbench to interact with R, your file-system, and other tools



Launching RStudio for the first time


RStudio
Go to file/function
Addins
Project: (None)
Console
Terminal
~/
R version 4.0.5 (2021-03-31) -- "Shake and Throw"
Copyright (C) 2021 The R Foundation for Statistical Computing
Platform: x86_64-apple-darwin17.0 (64-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.
Natural language support but running in an English locale
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.
>
Console
Environment
History
Connections
To Console
To Source
Environment, History, etc
Files
Plots
Packages
Help
Viewer
New Folder
Delete
Rename
More
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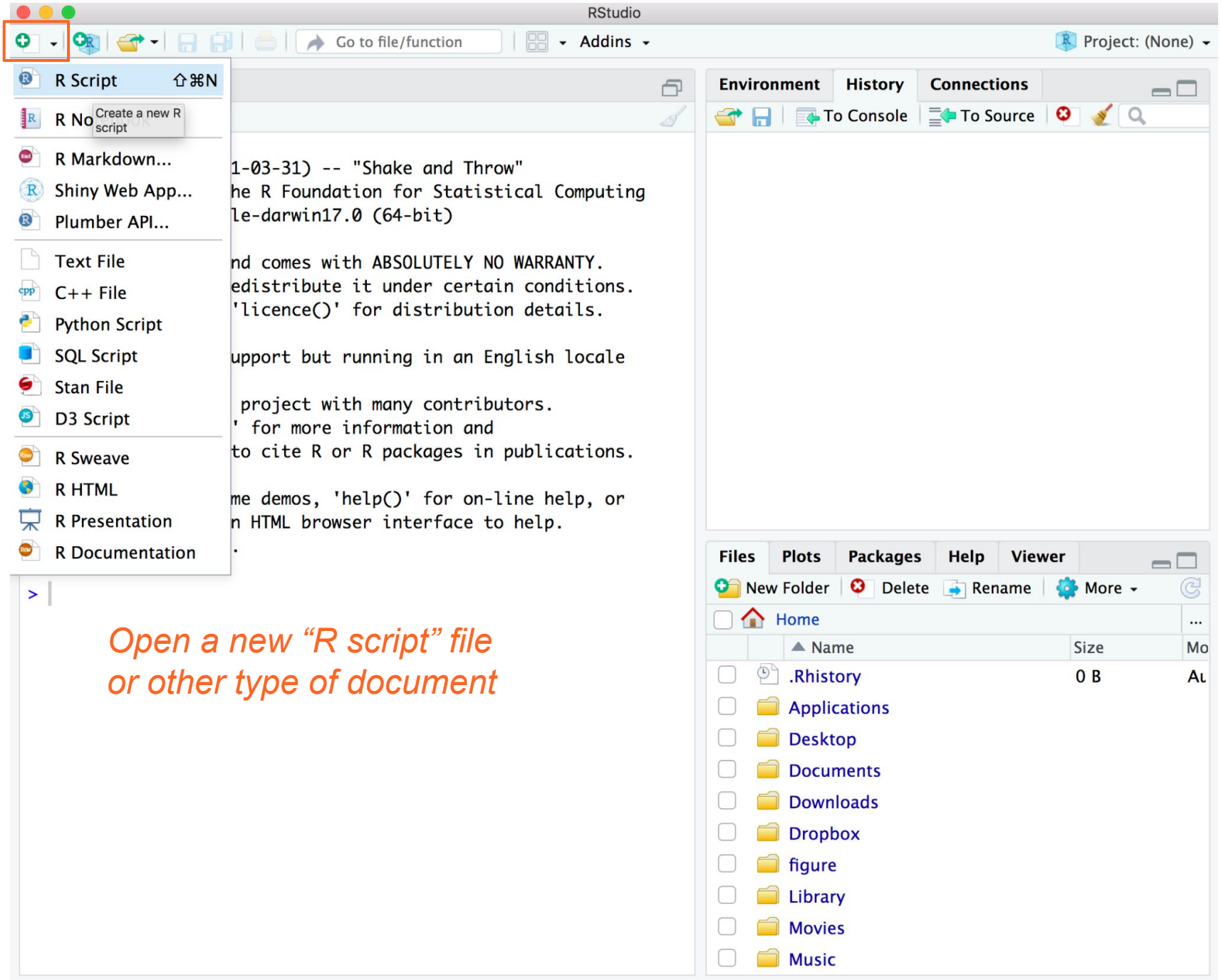
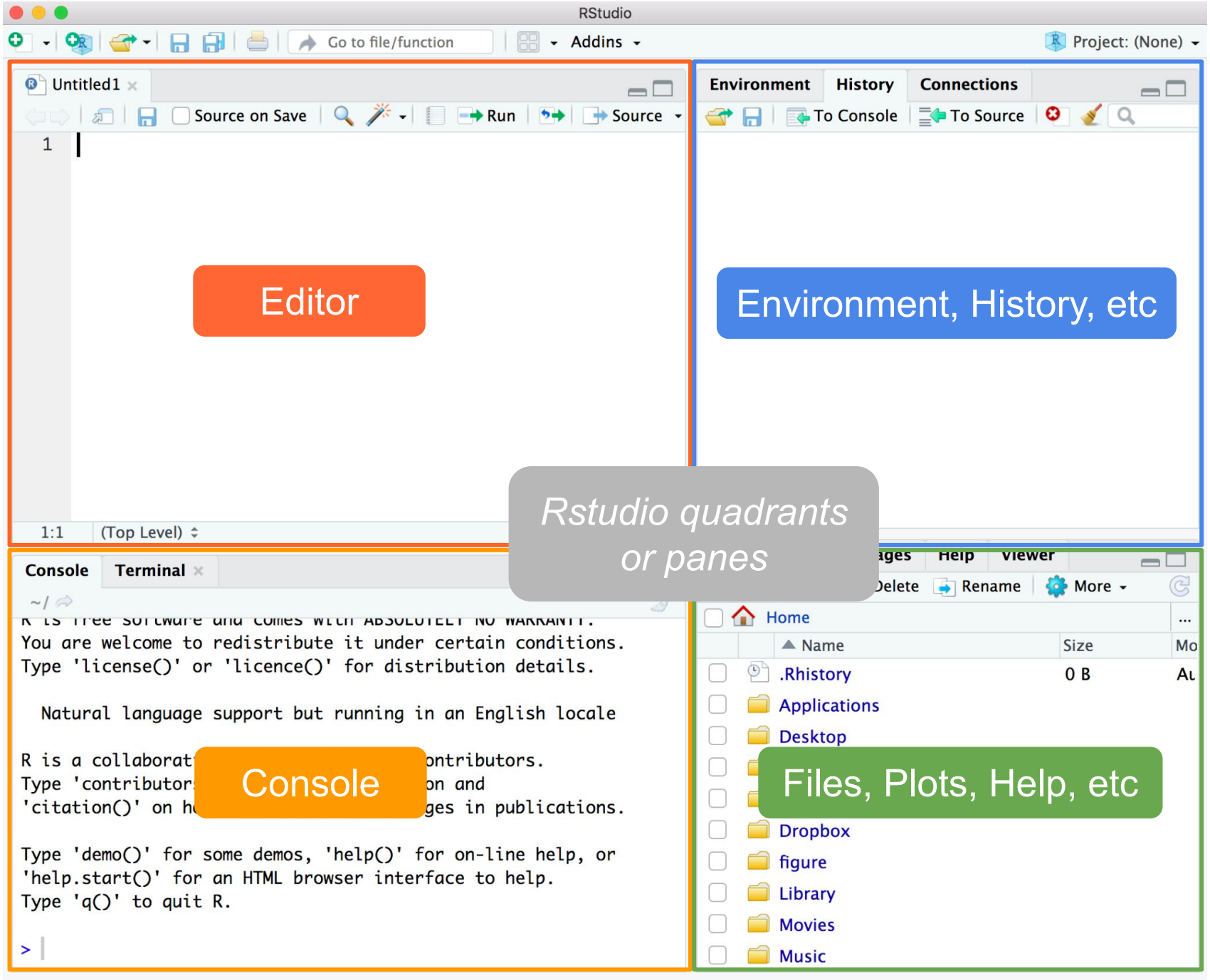
Applications
Desktop
Dropbox
figure
Library
Movies
Music
Files, Plots, Help, etc



Open a new "R script" file or other type of document

Quadrants or Panes


RStudio
Go to file/function
Addins
Project: (None)
Untitled1
Source on Save
Run
Source
1
Editor
1:1
(Top Level)
Environment
History
Connections
To Console
To Source
Environment, History, etc
Rstudio quadrants or panes
Console
Terminal
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Console
Help
Viewer
Delete
Rename
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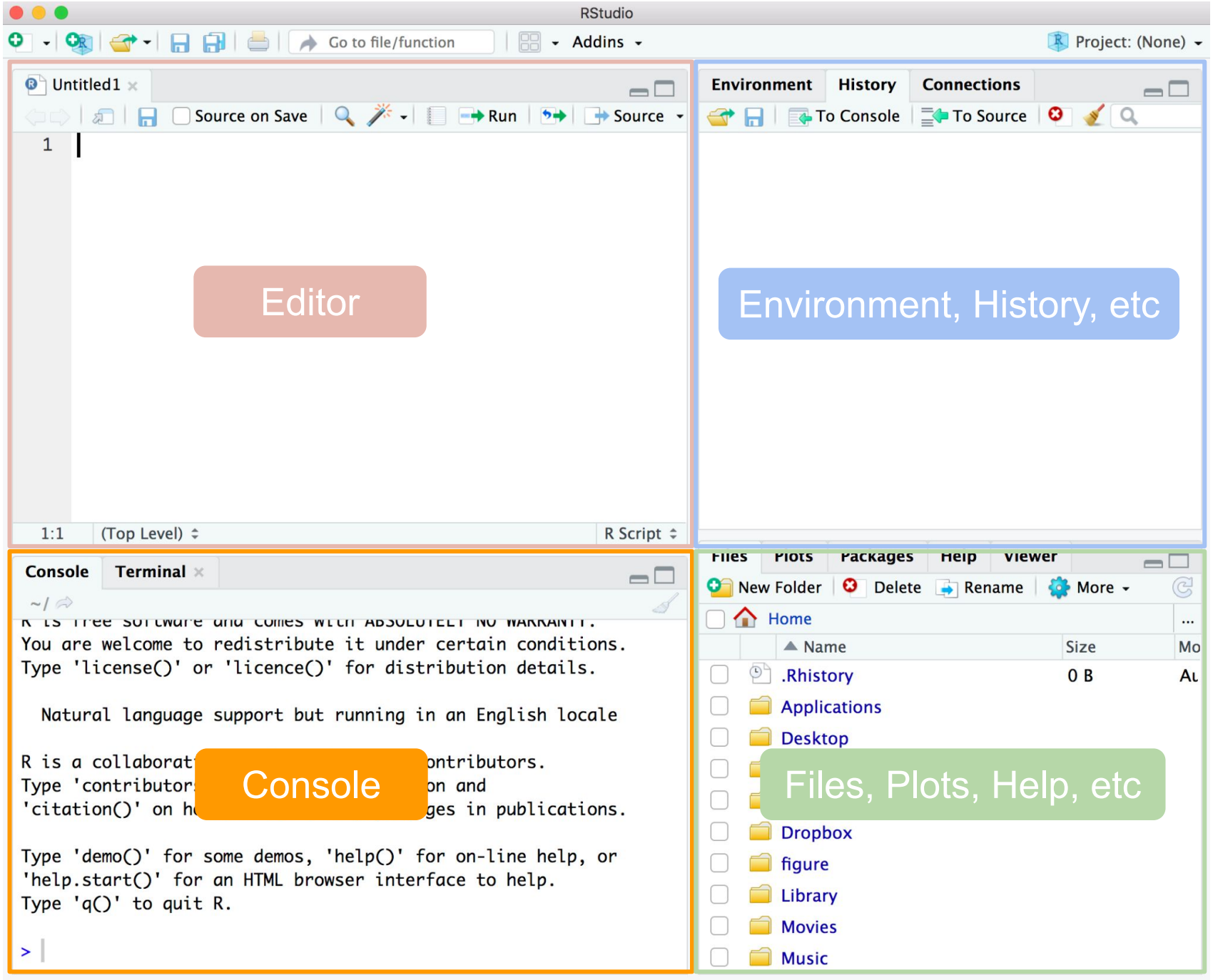
Size
.Rhistory
0 B
Applications
Desktop
Dropbox
figure
Library
Movies
Music
Files, Plots, Help, etc


RStudio
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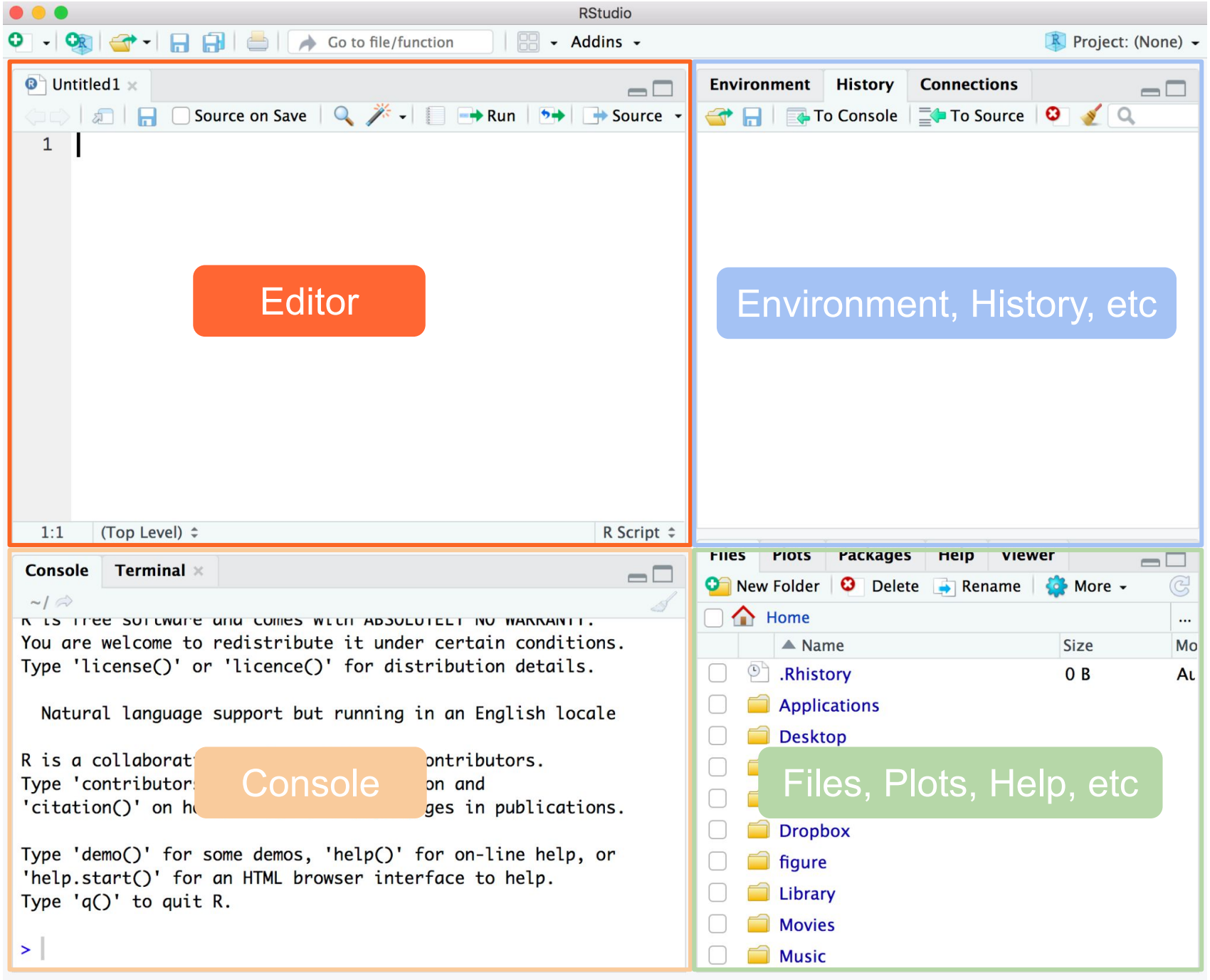
Console pane

- This is where you can directly interact with R
- You can type commands, get numeric output
- Good for running short-&-simple commands for exploratory purposes, trial-&-error
- In reality, you won't be using this pane that much (instead, you'll use the **editor** pane)

About R's Console

- It is always associated to a **working directory**
- By default, the working directory is your home directory
- But you can customize it temporarily or permanently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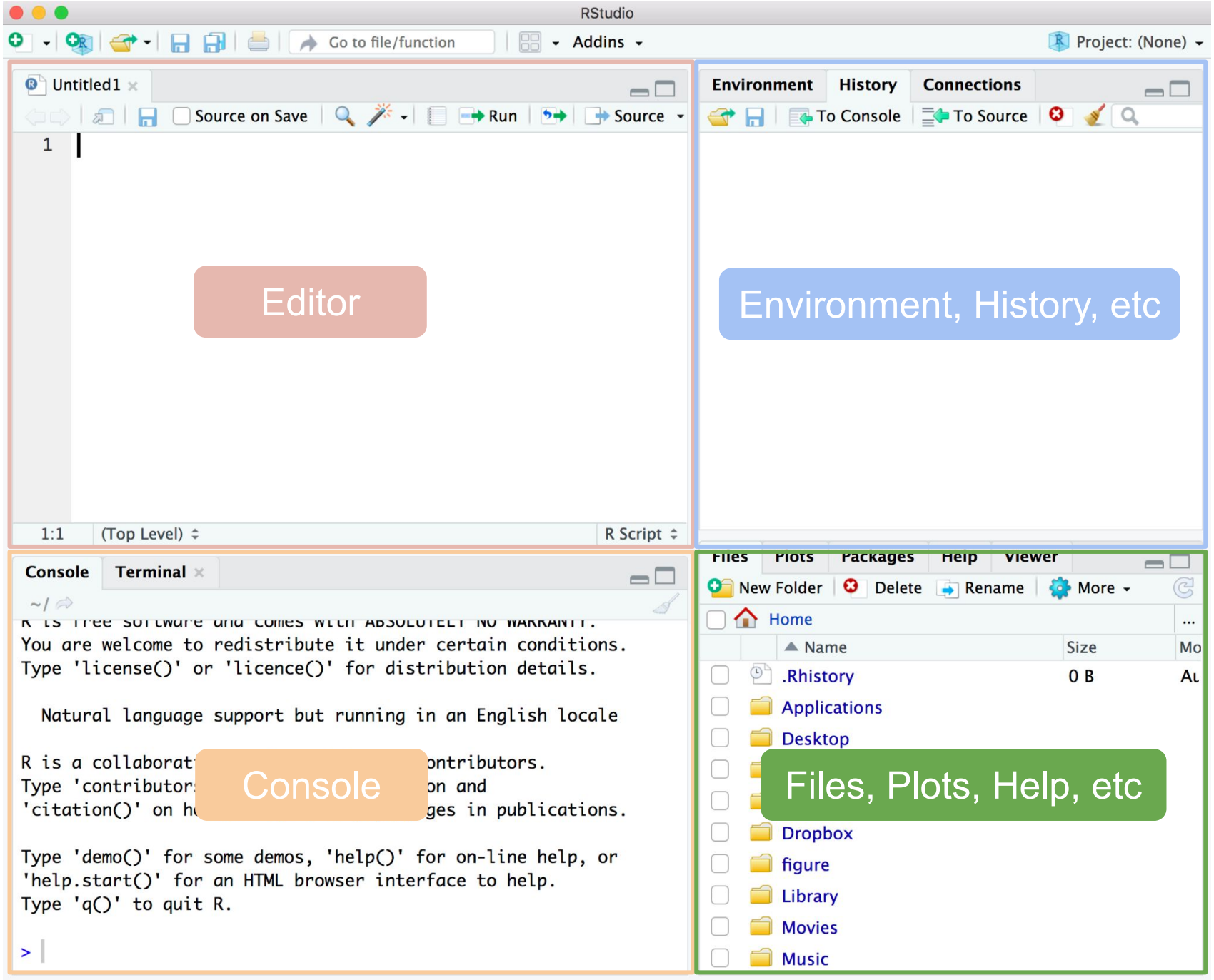
Editor (or source pane)

- Where you work with source documents
- e.g. R script files, markdown files, etc
- This is where you'll be working most of the time
- Depending on the source file, you may write only R commands, or other text that follows a different syntax (e.g. markdown, latex, html)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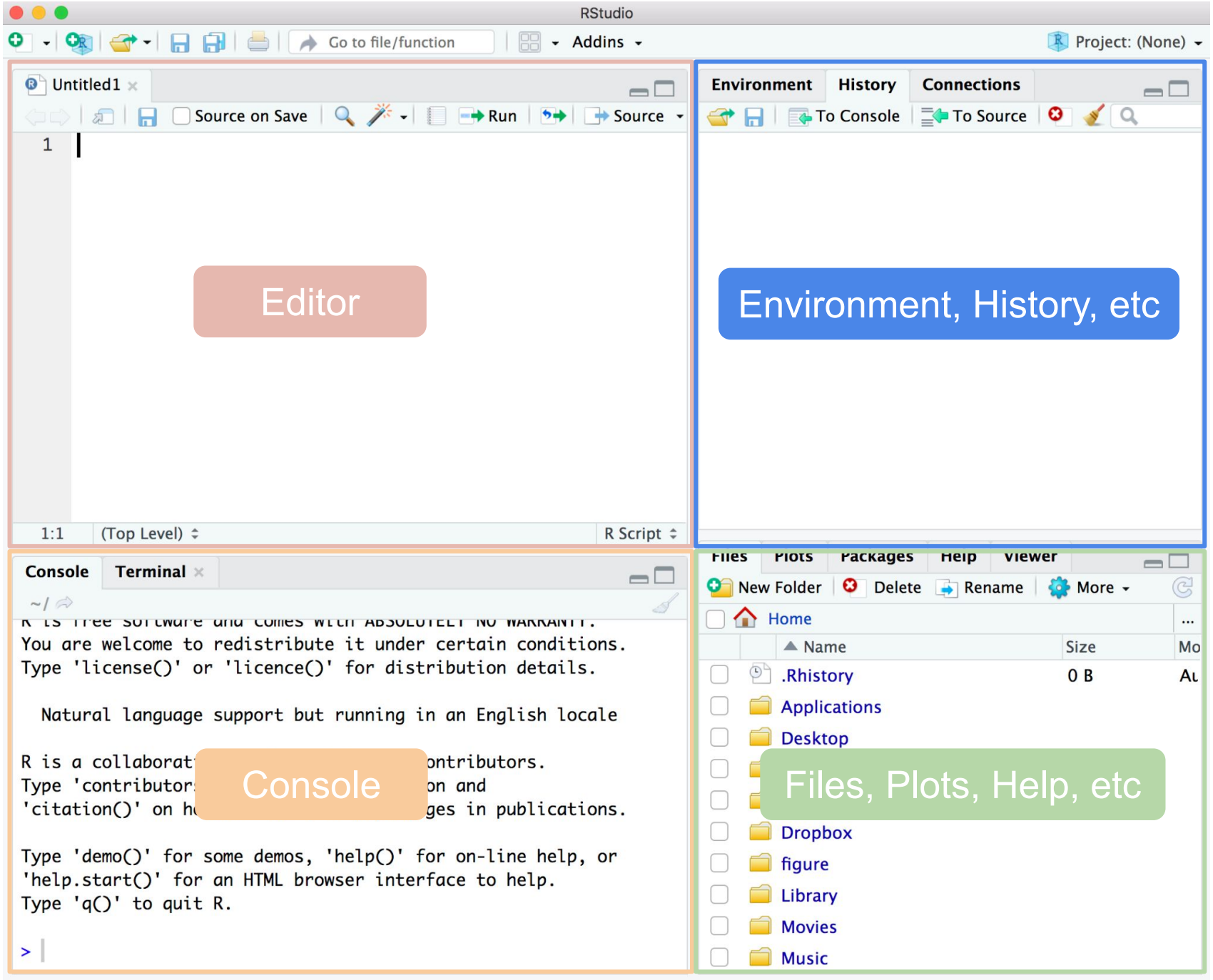
Music
Files, Plots, Help, etc

Files, Plots, Packages, Help, etc … pane

- **Files tab**: allows you to interact with your file-system
- **Plots**: to display graphics
- **Packages**: to manage R packages
- **Help**: to read supporting (help) documentation
- **Viewer**: additional window to visualize certain outputs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Environment, History, Connections pane

- **Environment tab**: allows you to see the objects created in your workspace
- **History tab**: lets you see all the commands that you've used *(unless you delete such log)*
- **Connections tab**: to manage connections *(advanced topic for working with files; you will very rarely use this in practice)*

History tab, and .Rhistory file

- The very first time you launch R (via Rstudio), it will create a *(hidden)* text file called **.Rhistory**
- This file is located in the working directory.
- When you close a session, all the commands in your **History** will be saved to this file.
- It's good to know that you can always check the history file to *"go back in time"* and see what commands you used.

About the Environment

- When you create objects; e.g. `x = 10`, they live in what is called the **Global Environment**.
- The set of objects created (in the Global Environment) during a session are part of your **workspace**
- When you quit R, it will ask you whether you want to save all the objects (your workspace) in a *(binary)* file called **.RData**

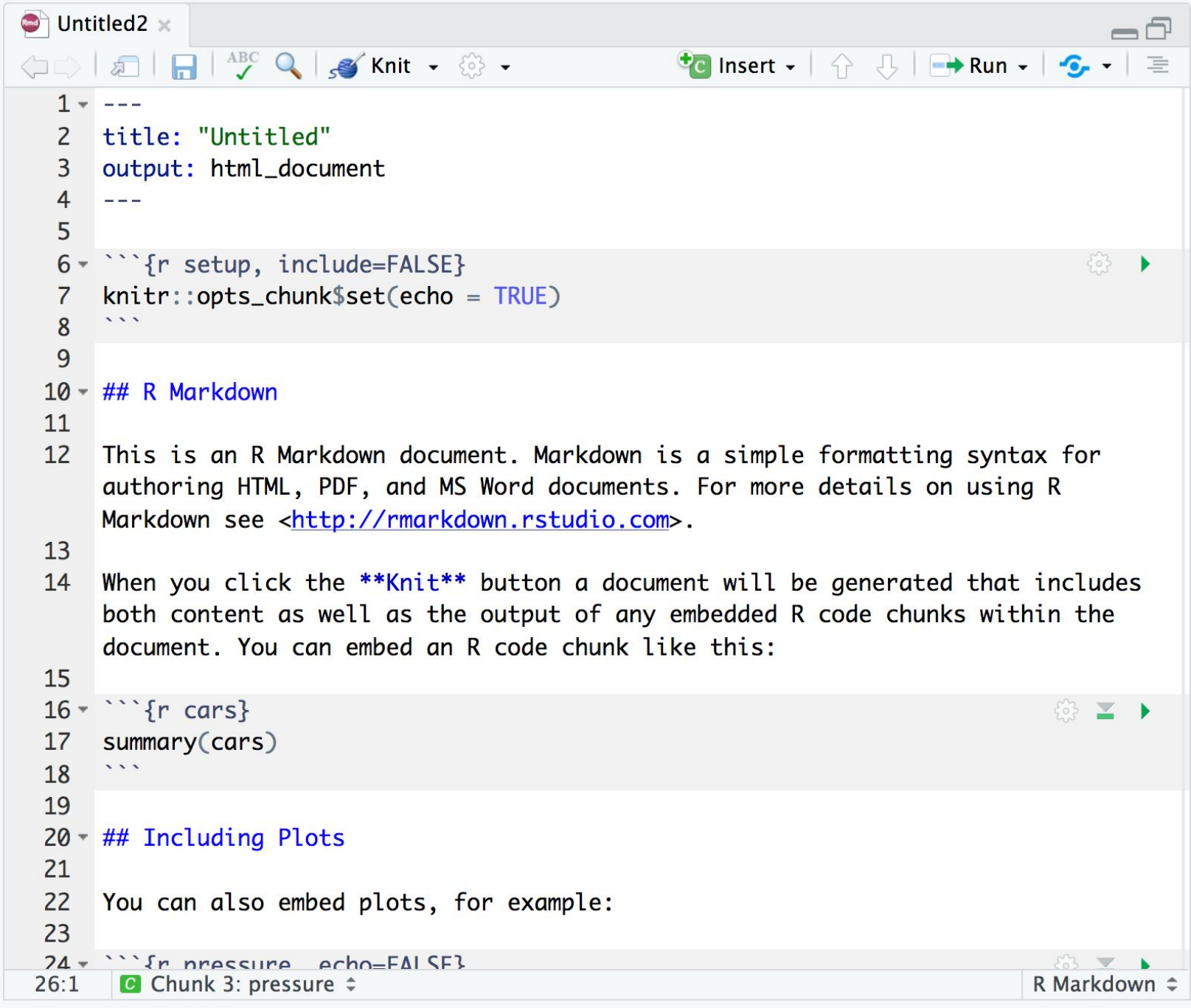
About the Environment (cont'd)

- If you save your workspace in the **.RData** file, next time you open a session those objects will be available.
- This can be good or bad depending on what you are doing or what you are working on.
- Personally, I tend to not save my workspace. Instead, I prefer to create my own .RData files when I need them.

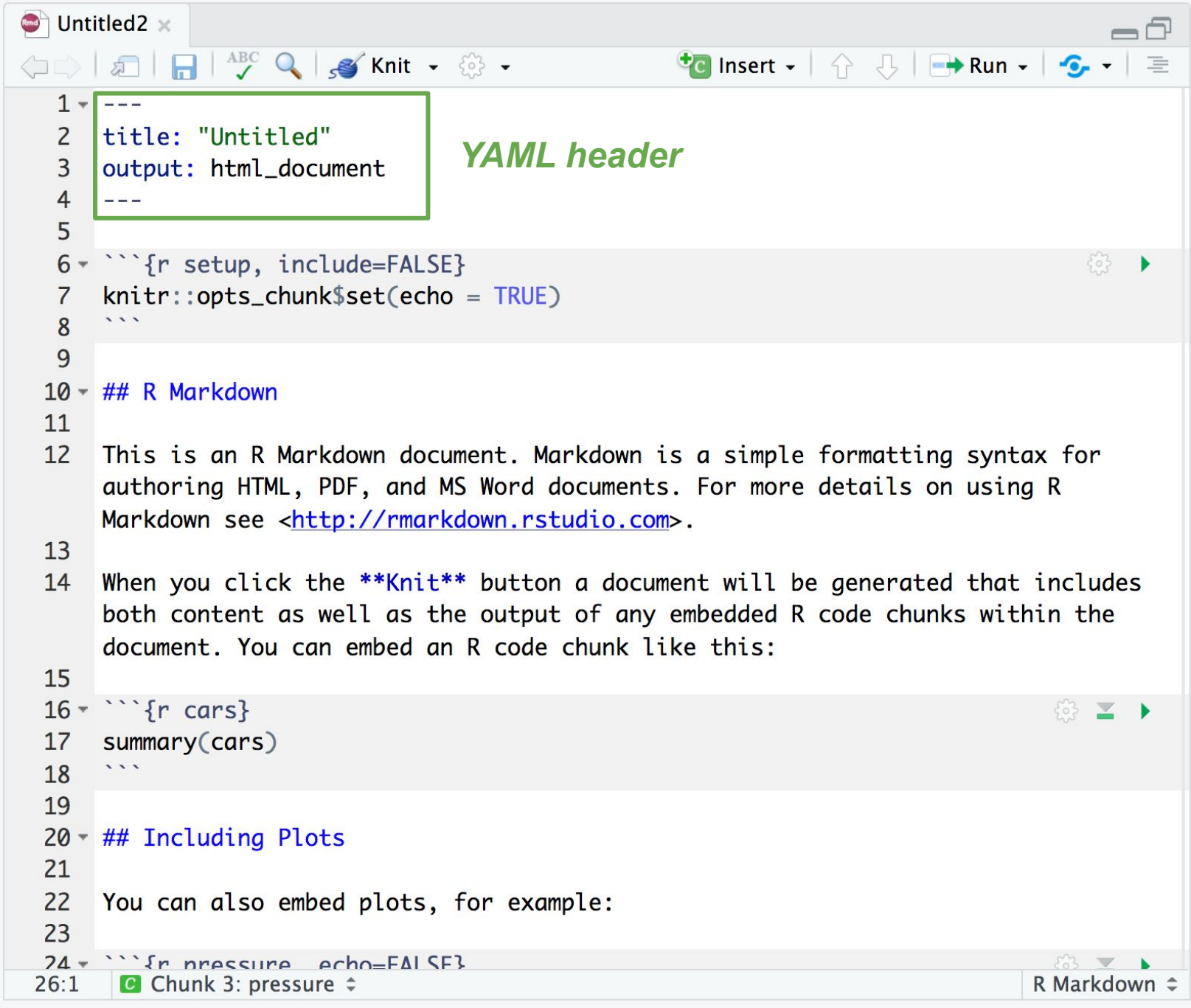
Quarto Markdown Files

About quarto and markdown files

- Quarto notebooks or “qmd” files are known as dynamic documents or computational documents
- This type of documents allow you to combine code and narrative in a single place
- You can use markdown syntax, HTML, latex (for math equations), R code, and other programming syntaxes.


Untitled2
Knit
Insert
Run
---
title: "Untitled"
output: html_document

```{r setup, include=FALSE}
knitr::opts_chunk$set(echo = TRUE)
```
R Markdown
This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.
When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:
```{r cars}
summary(cars)
```
Including Plots
You can also embed plots, for example:
26:1
Chunk 3: pressure
R Markdown


Untitled2
Knit
Insert
Run
---
title: "Untitled"
output: html_document

YAML header
```{r setup, include=FALSE}
knitr::opts_chunk$set(echo = TRUE)
```
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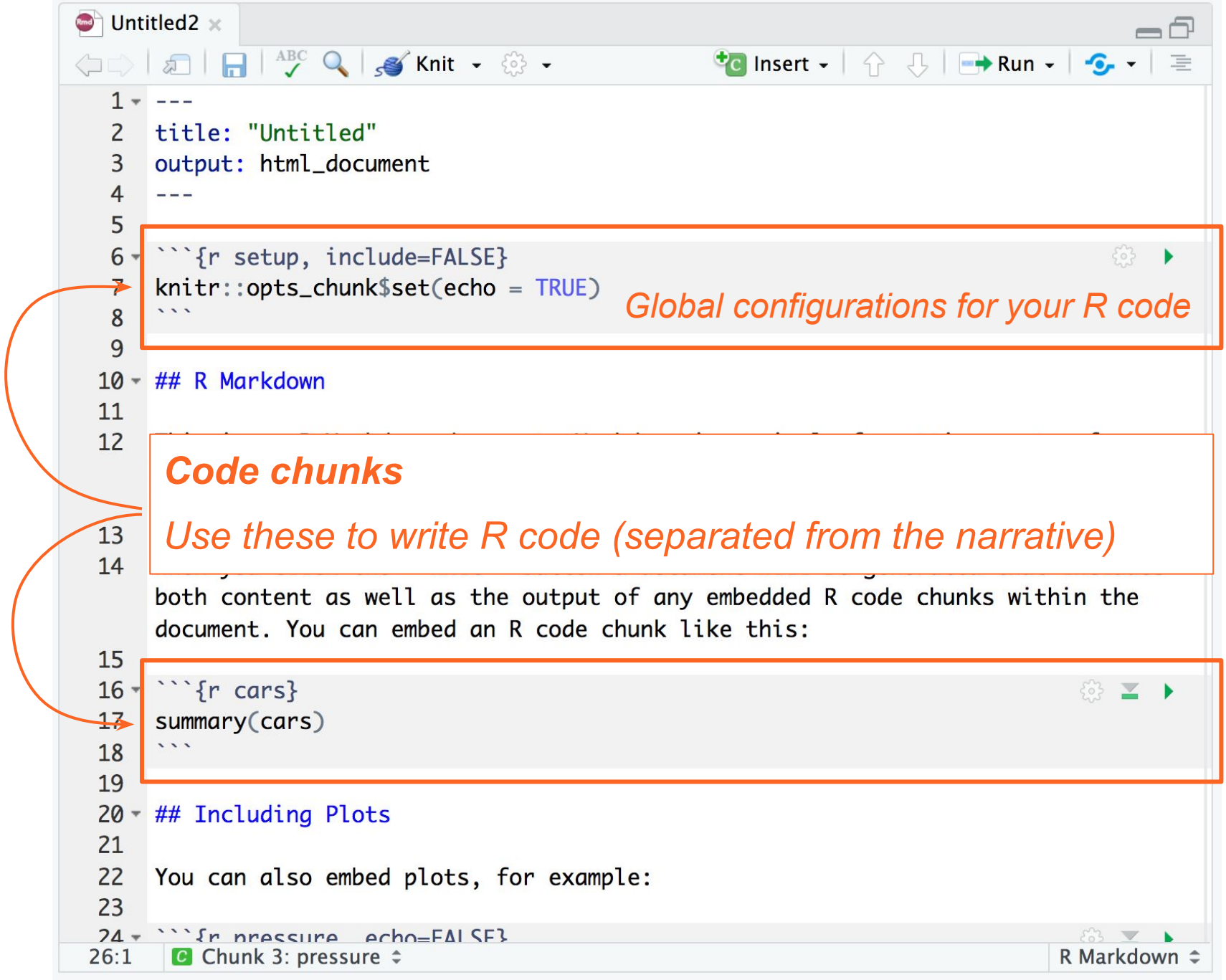
Untitled2
Knit
Insert
Run
---
title: "Untitled"
output: html_document

```{r setup, include=FALSE}
knitr::opts_chunk$set(echo = TRUE)
```
Global configurations for your R code
R Markdown
Code chunks
Use these to write R code (separated from the narrative)
both content as well as the output of any embedded R code chunks within the
document. You can embed an R code chunk like this:
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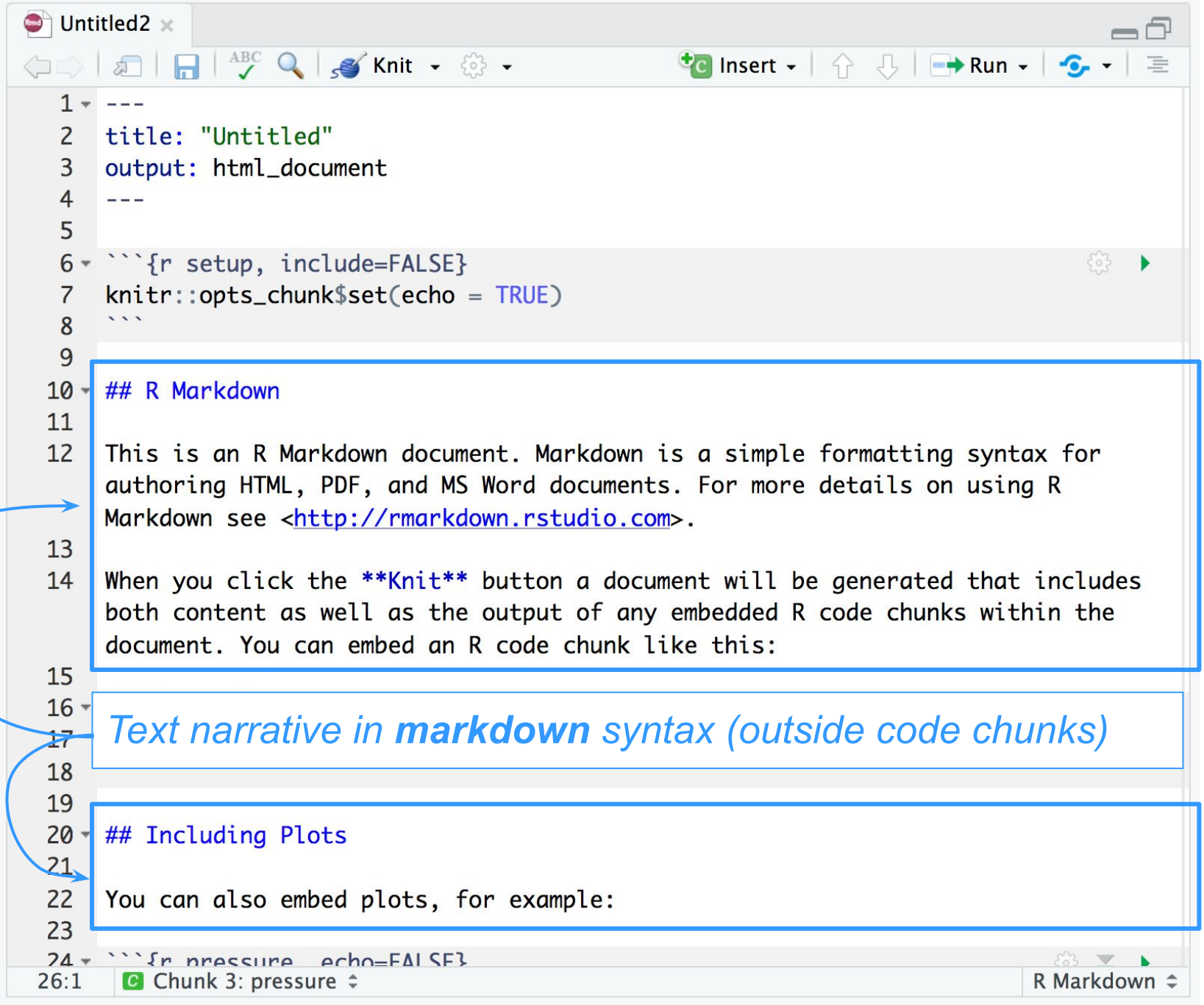
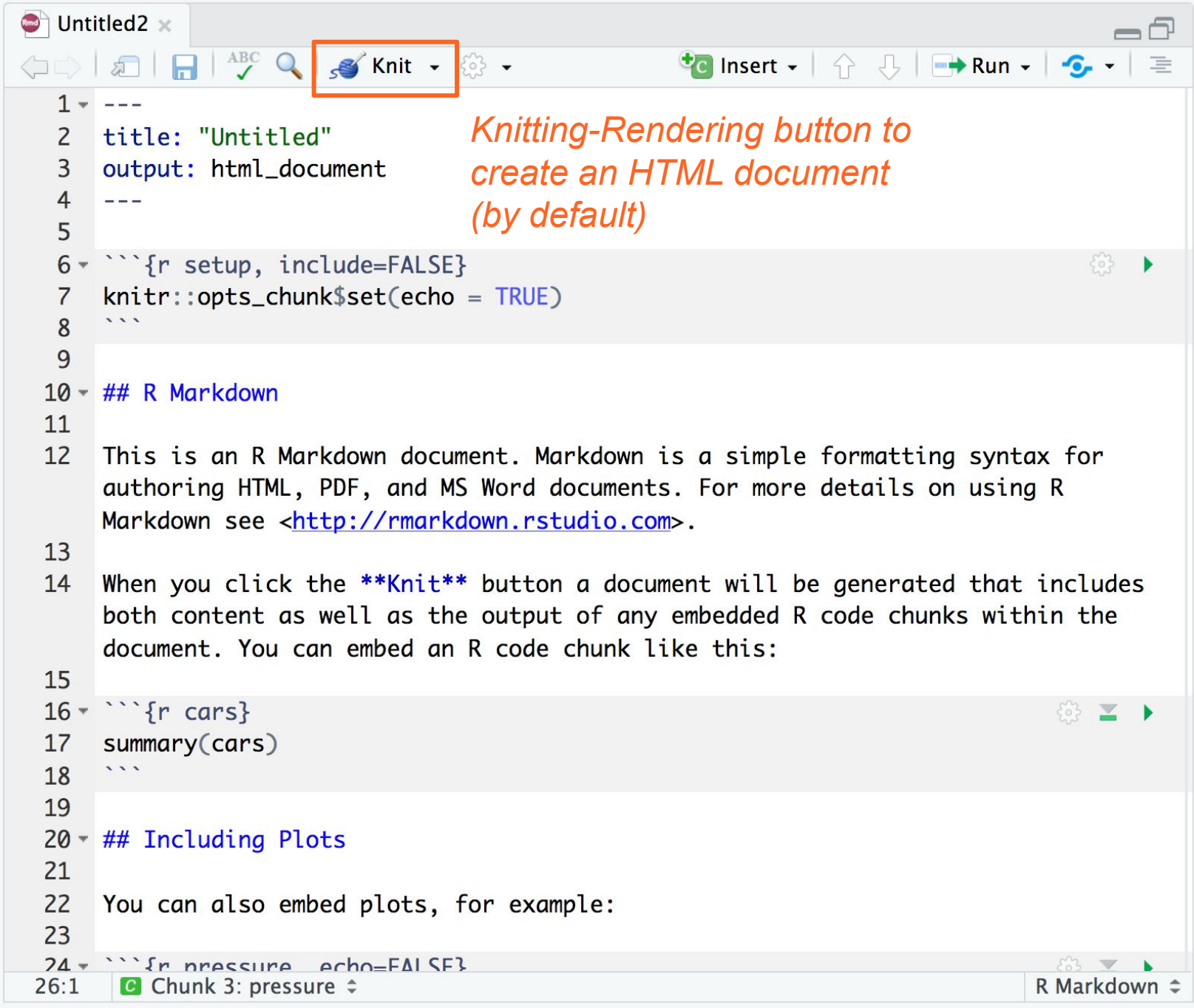
```
Including Plots
You can also embed plots, for example:
26:1
Chunk 3: pressure
R Markdown


Untitled2
Knit
Insert
Run
1 ---
2 title: "Untitled"
3 output: html_document
4 ---
5
6 ```{r setup, include=FALSE}
7 knitr::opts_chunk$set(echo = TRUE)
8 ```
9
10 ## R Markdown
11
12 This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.
13
14 When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:
15
16
17
18
19
20 ## Including Plots
21
22 You can also embed plots, for example:
23
24 ```{r pressure, echo=FALSE}
Text narrative in **markdown** syntax (outside code chunks)
26:1
Chunk 3: pressure
R Markdown


Untitled2
Knit
Insert
Run
---
title: "Untitled"
output: html_document

Knitting-Rendering button to create an HTML document (by default)
```{r setup, include=FALSE}
knitr::opts_chunk$set(echo = TRUE)
```
R Markdown
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R Markdown

~/Desktop/rmd-doc.html

rmd-doc.html | Open in Browser | Find | Publish

Untitled

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```
summary(cars)
```

```
##      speed           dist
##  Min.   : 4.0   Min.   :  2.00
##  1st Qu.:12.0   1st Qu.: 26.00
##  Median :15.0   Median : 36.00
##  Mean   :15.4   Mean   : 42.98
##  3rd Qu.:19.0   3rd Qu.: 56.00
##  Max.   :25.0   Max.   :120.00
```

Including Plots

You can also embed plots, for example:

HTML documented (created after knitting Rmd file)