

R Programming For Beginners

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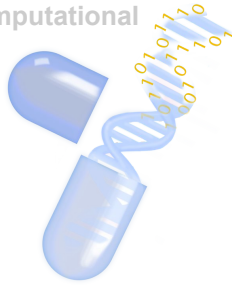
@ArvidMer



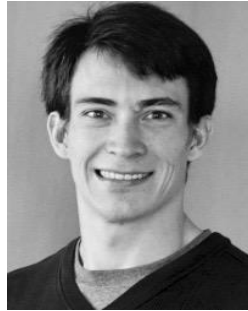
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Petr Smirnov



Ian Smith

Helping Us



Ali Madani

About This Workshop

- Aimed towards people who don't have any prior experience in programming
- R and RStudio is installed
- You will learn by doing
- Course material can be used as reference
- At the end of this workshop, you will not be an expert in R but you will be comfortable in R

Download the material from

<https://bit.ly/2ZXbTu7>

Introduction to R





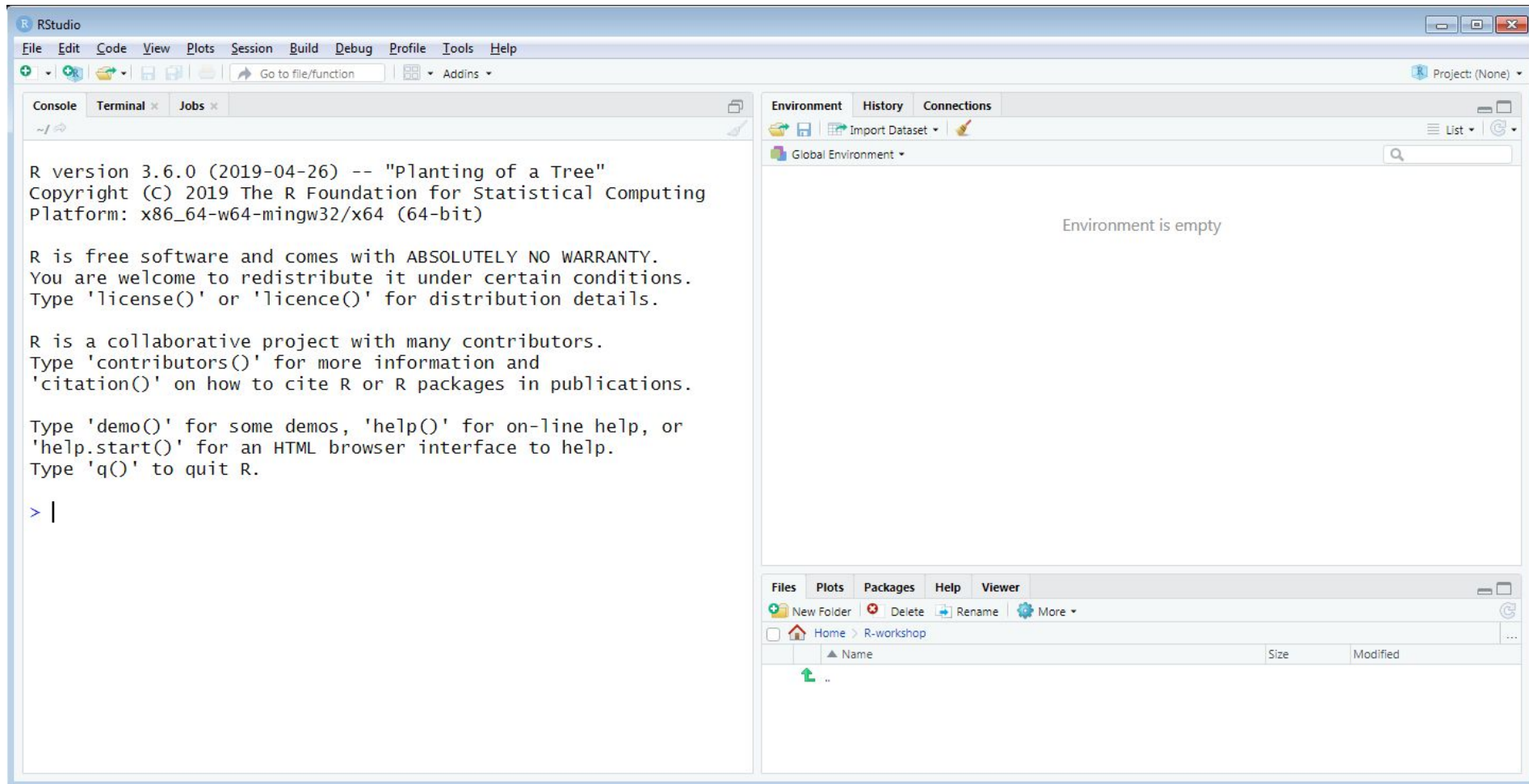
What is R?

- R is a programming language focused on statistical analysis and data visualization

Why R?

- R is great because:
 - It is 100% free
 - R codes are transparent, shareable and reproducible
 - R is interpreted type of programming language
 - R has a huge community base
 - 1000s of packages are available
 - Popular among Bioinformaticians and (Bio)Statisticians

RStudio



RStudio

Console

The screenshot displays the RStudio application window. The top menu bar includes File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, and Help. Below the menu is a toolbar with icons for file operations and a search bar. The main workspace is divided into three panels: Console, Environment, and Files.

Console Panel: This panel shows the R version 3.6.0 (2019-04-26) and the "Planting of a Tree" project. It contains the following text:

```
R version 3.6.0 (2019-04-26) -- "Planting of a Tree"
Copyright (C) 2019 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/x64 (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.

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.

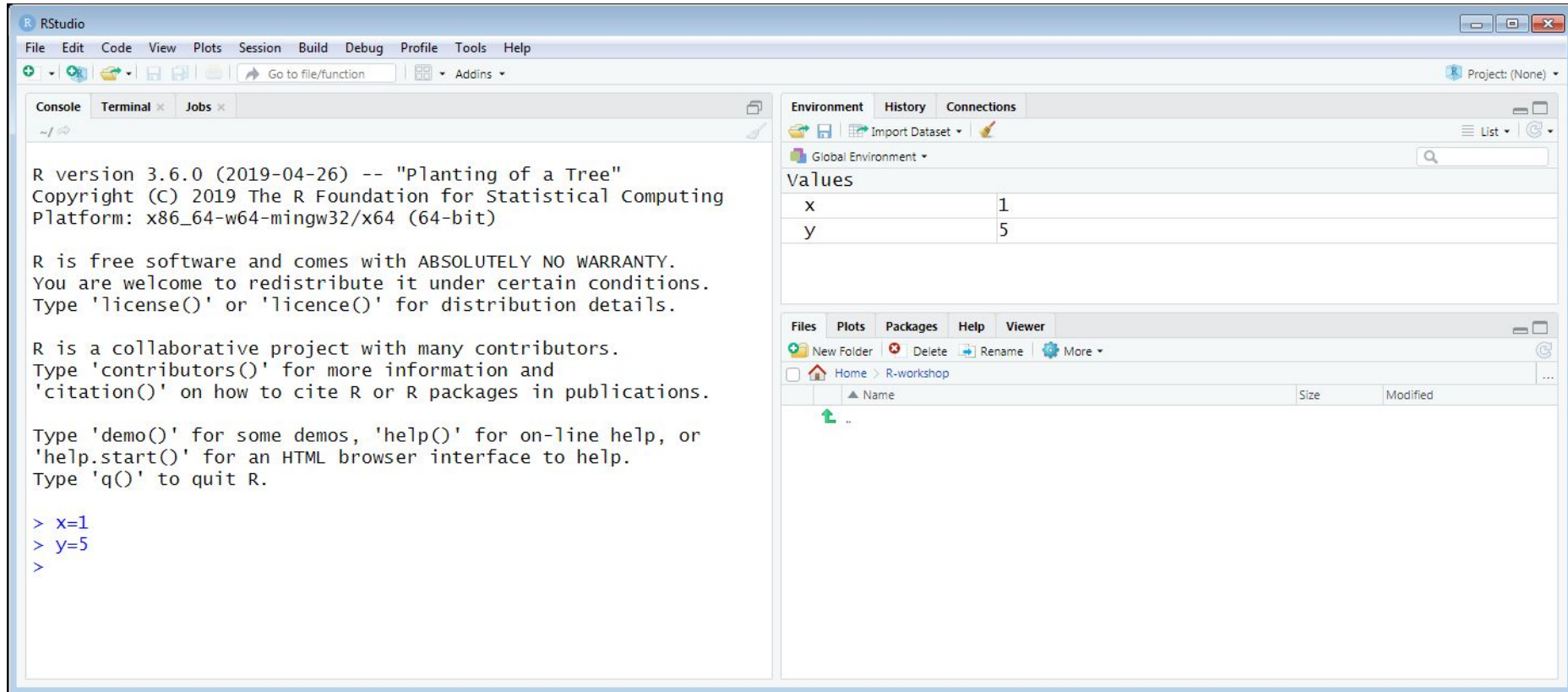
> |
```

Environment Panel: This panel shows the Global Environment, which is currently empty. The text "Environment is empty" is displayed.

Files Panel: This panel shows the file explorer. The current directory is "Home > R-workshop". The file list is empty, with a green arrow pointing to the ".." directory.

RStudio

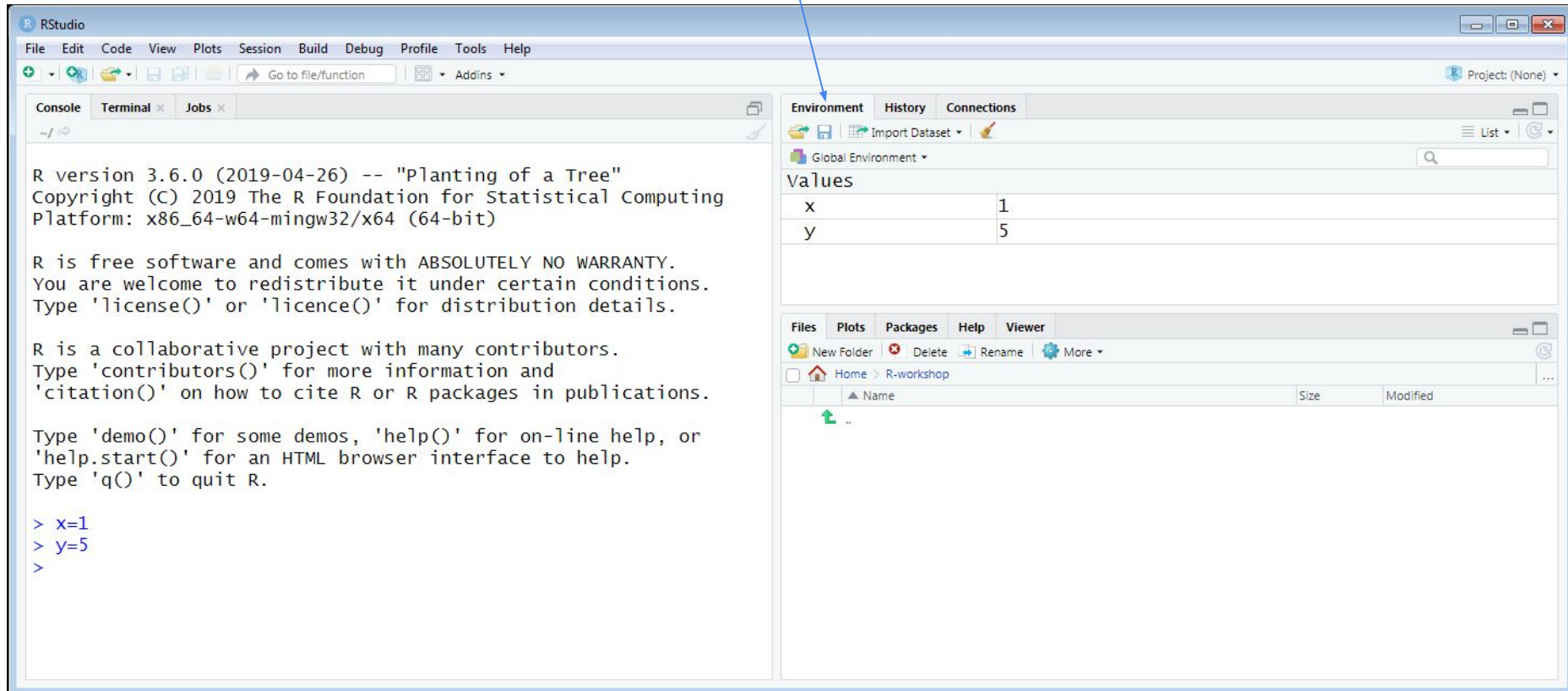
- In the Console type **x=1** and press **Enter**



RStudio

- In the Console type **x=1** and press **Enter**

Environment



The screenshot shows the RStudio application window. The top menu bar includes File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, and Help. Below the menu bar is a toolbar with various icons. The main workspace is divided into four panes: Console, Terminal, Jobs, and Environment. The Console pane on the left displays the R version (3.6.0), copyright information, and a series of commands and their outputs. The Environment pane on the right shows the Global Environment with two variables, x and y, and their respective values, 1 and 5. A blue arrow points from the 'Environment' text above to the Environment pane. The Files pane at the bottom right shows the current directory structure.

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Type 'q()' to quit R.

```
> x=1  
> y=5  
>
```

Environment

Global Environment

| Values | |
|--------|---|
| x | 1 |
| y | 5 |

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home > R-workshop

| Name | Size | Modified |
|------|------|----------|
| .. | | |

RStudio

Environment

History

The screenshot displays the RStudio application window. The top menu bar includes File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, and Help. Below the menu is a toolbar with icons for file operations and a search bar. The main workspace is divided into four panes: Console, Terminal, Jobs, and Environment/History/Connections. The Console pane on the left shows the R version (3.6.0), copyright information, and a series of commands and their outputs. The Environment pane on the right shows the Global Environment with variables x and y. The History pane shows the commands entered in the console. The Files pane at the bottom shows the current directory structure.

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```
> x=1  
> y=5  
>
```

Environment

Global Environment

| Values | |
|--------|---|
| x | 1 |
| y | 5 |

History

Files

Plots

Packages

Help

Viewer

New Folder

Delete

Rename

More

Home > R-workshop

| Name | Size | Modified |
|------|------|----------|
| .. | | |

RStudio

Environment

History

Plots

The screenshot shows the RStudio desktop environment. The top menu bar includes File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, and Help. Below the menu is a toolbar with icons for file operations and a search bar. The main workspace is divided into four panels: Console, Terminal, Jobs, and a right-hand sidebar. The Console panel on the left contains the following text:

```
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Platform: x86_64-w64-mingw32/x64 (64-bit)

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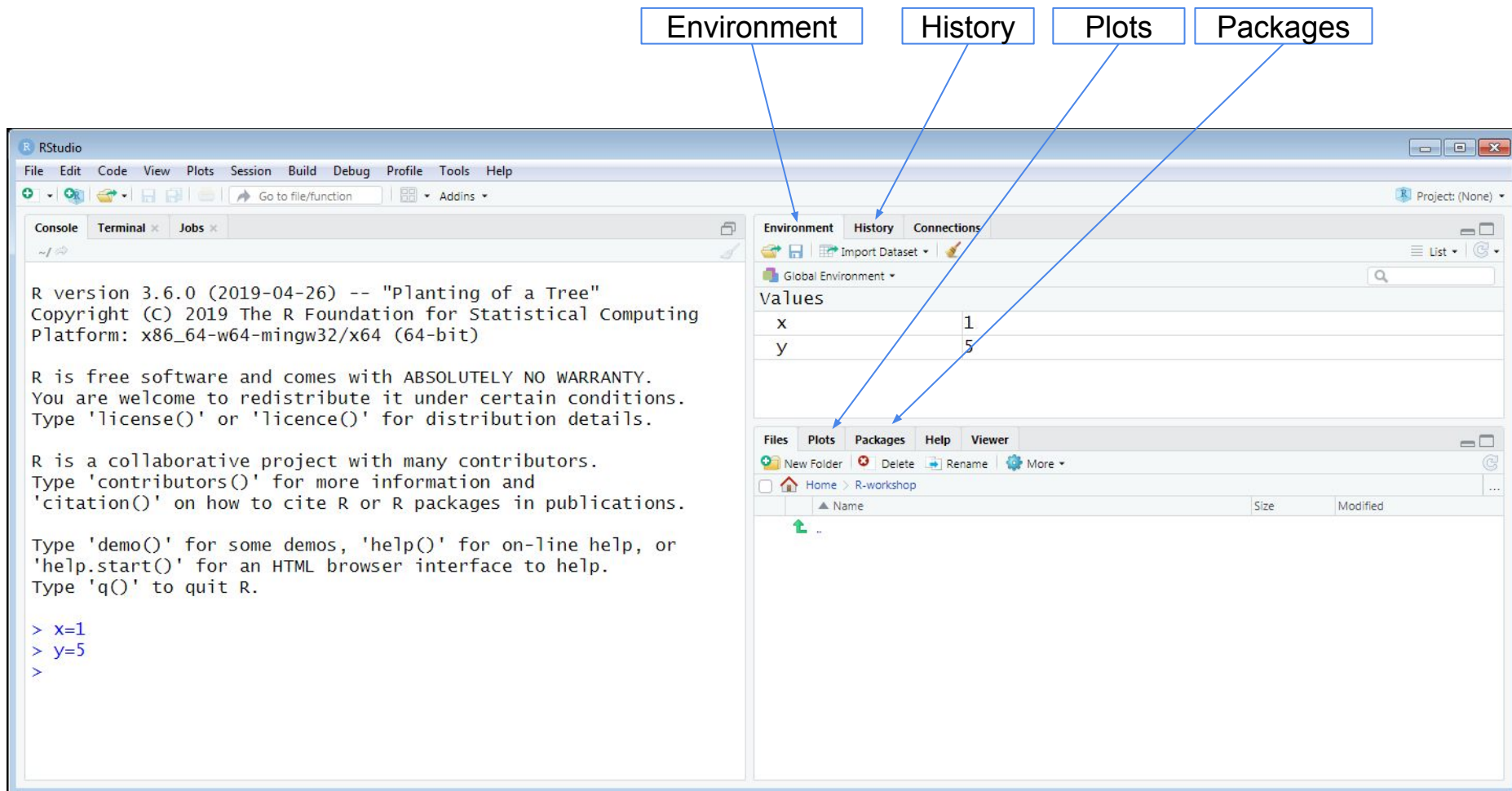
> x=1
> y=5
>
```

The right-hand sidebar has three tabs: Environment, History, and Connections. The Environment tab is active and shows the 'Global Environment' with a search bar and a table of values:

| Values | |
|--------|---|
| x | 1 |
| y | 5 |

Below the Environment tab are tabs for Files, Plots, Packages, Help, and Viewer. The Files tab is active, showing a file explorer view of the 'R-workshop' directory with columns for Name, Size, and Modified. Annotations with blue arrows point from the labels 'Environment', 'History', and 'Plots' to their respective tabs in the sidebar.

RStudio



RStudio

Environment

History

Plots

Packages

Help

The screenshot shows the RStudio desktop environment. The top menu bar includes File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, and Help. Below the menu bar is a toolbar with icons for file operations and a search bar. The main workspace is divided into several panes. On the left is the Console, which displays the R version (3.6.0), copyright information, and the results of the commands `x=1` and `y=5`. On the right side, there are five panes: Environment, History, Connections, Packages, and Help. The Environment pane shows the current environment (Global Environment) with variables `x` and `y` and their values (1 and 5). The History pane shows the command history. The Connections pane shows the current connection (None). The Packages pane shows the installed and available packages. The Help pane shows the help documentation. Blue arrows point from the labels 'Environment', 'History', 'Plots', 'Packages', and 'Help' to their respective panes in the RStudio interface.

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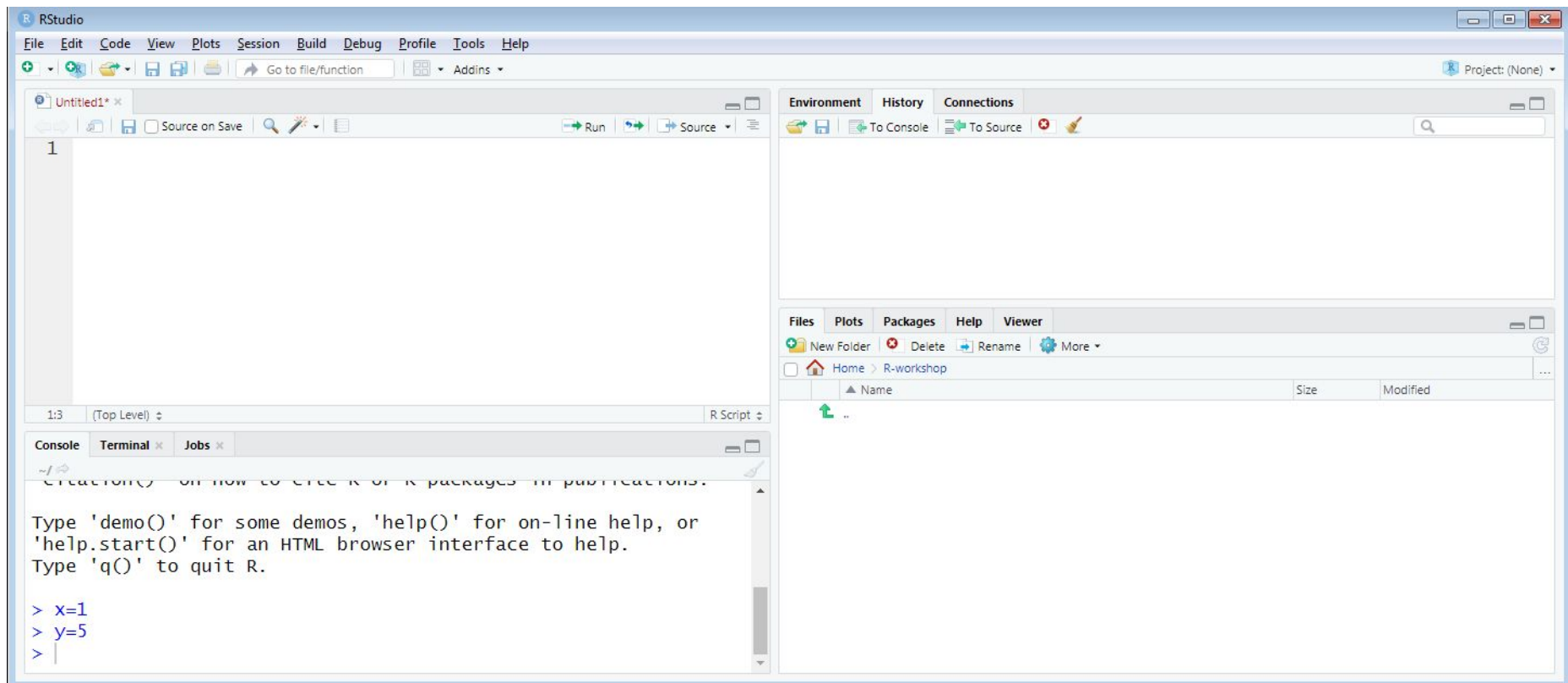
```
> x=1  
> y=5  
>
```

| Values |
|--------|
| x |
| y |

| x | 1 |
|---|---|
| y | 5 |

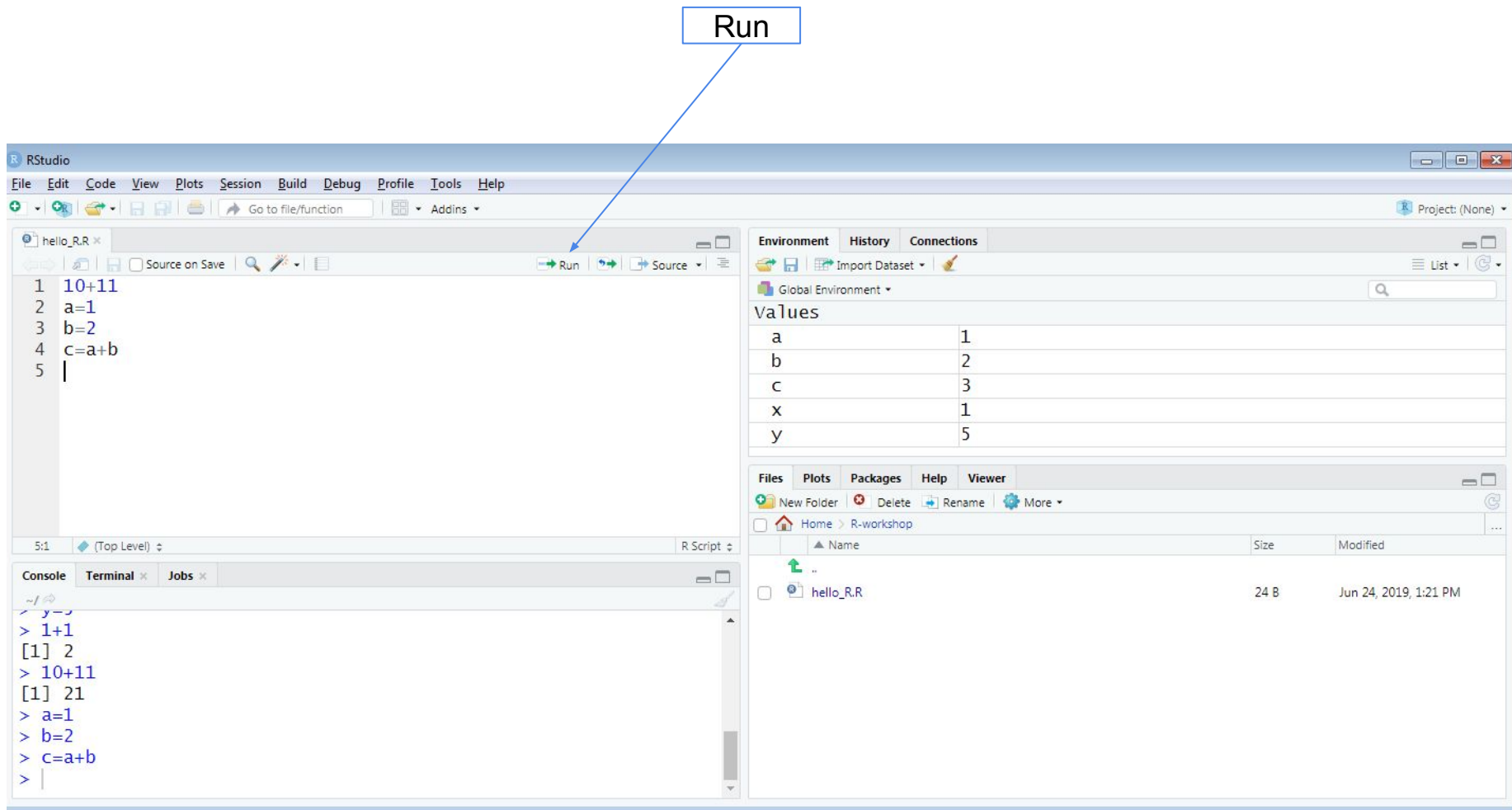
Create New File

- Go to File
- Click on “New File” > “R script”



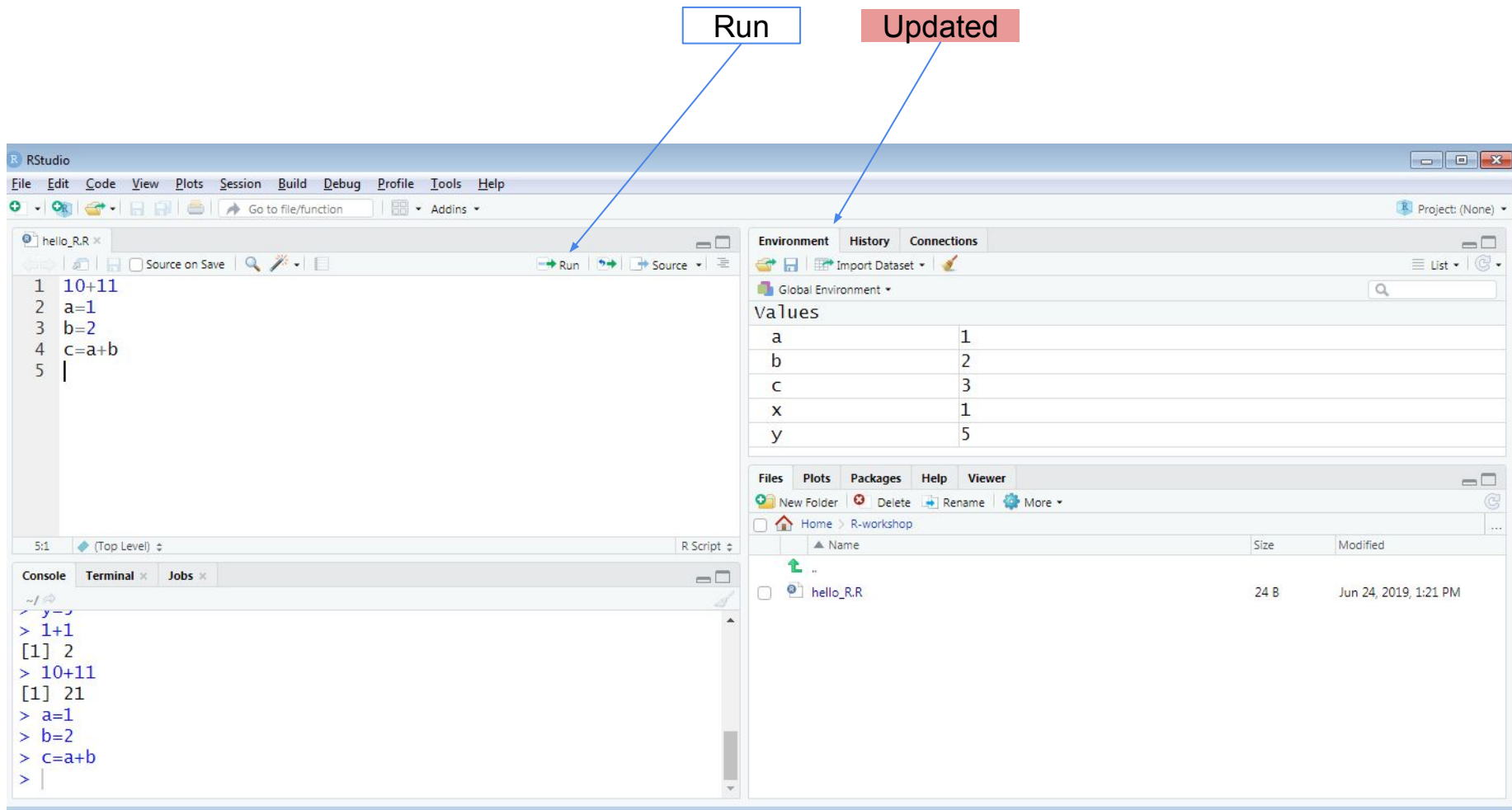
Run code

- Type few code
- Put mouse pointer on the line and click on “Run”



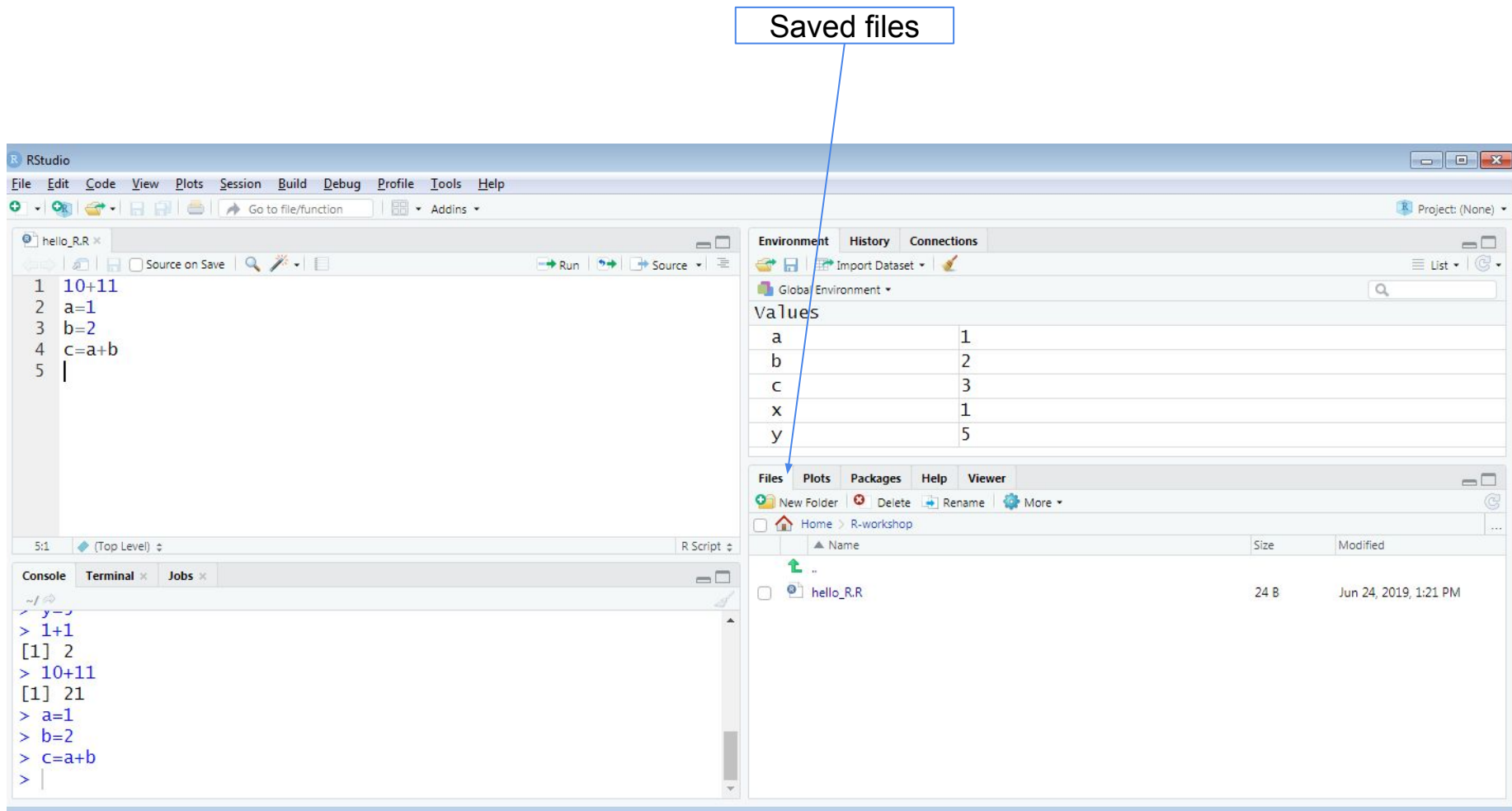
Run code

- Type few code
- Put mouse pointer on the line and click on “Run”



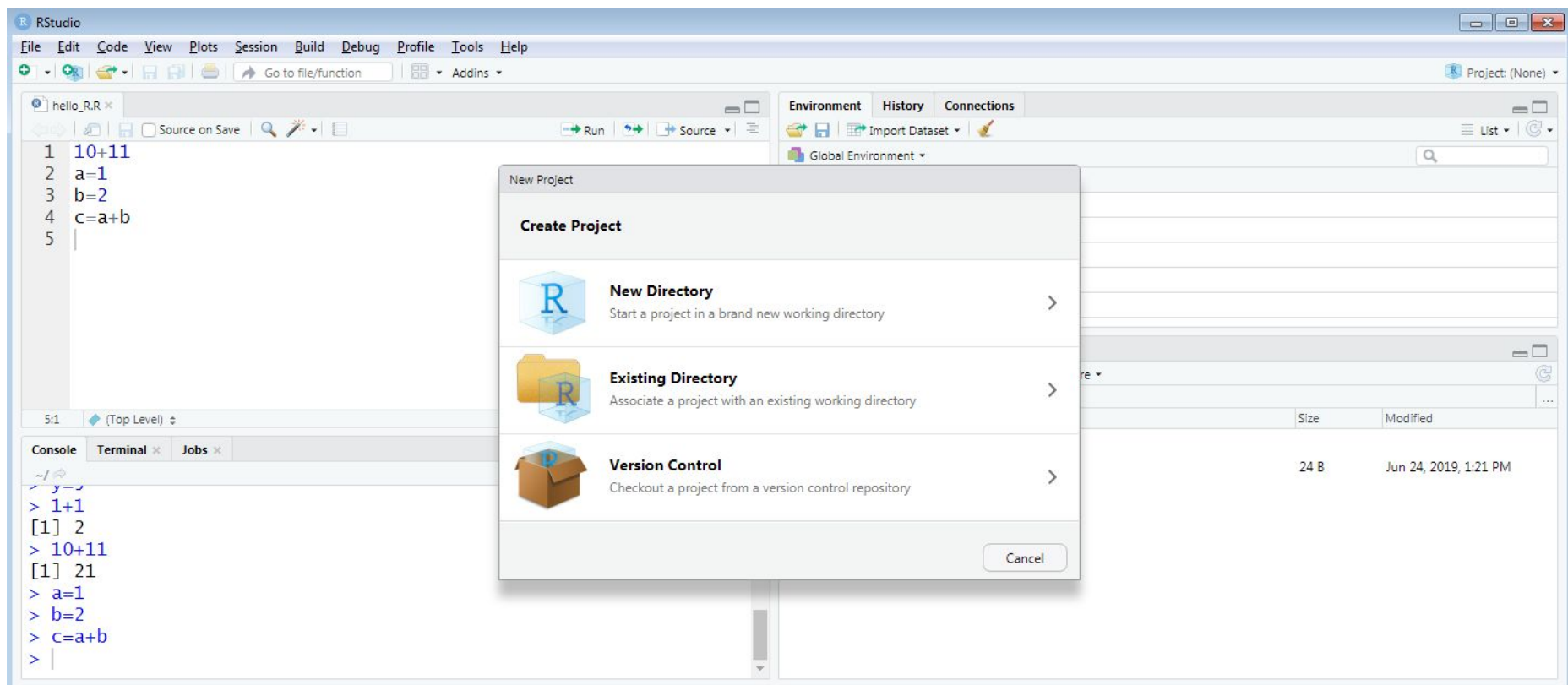
Save File

- Click on “File” and “save”



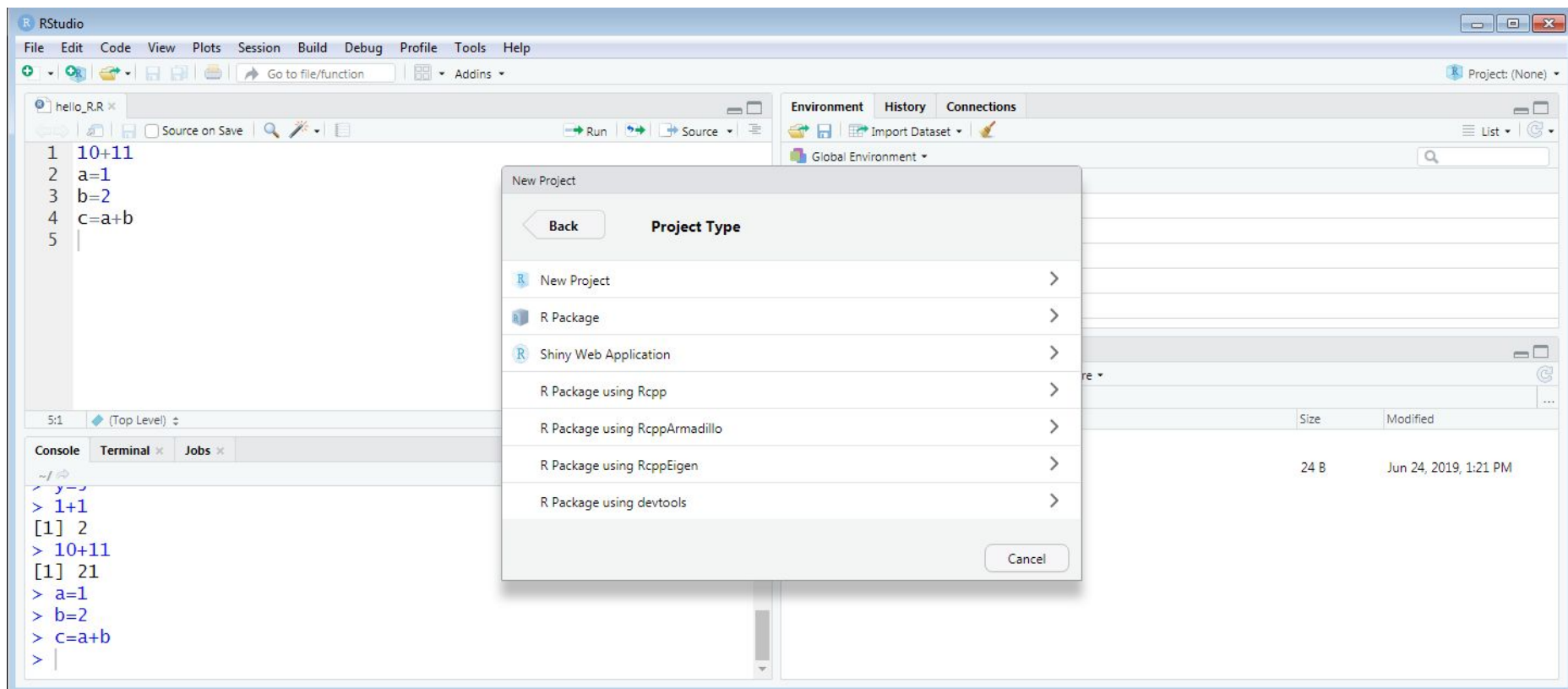
Create Project

- If you have several files related to one project it is a good idea to put all the files at one place
- History will also be saved
- To create a new project Click on:
 - File > New Project (it will ask to save old material, click on save)
 - Click on “New Directory”



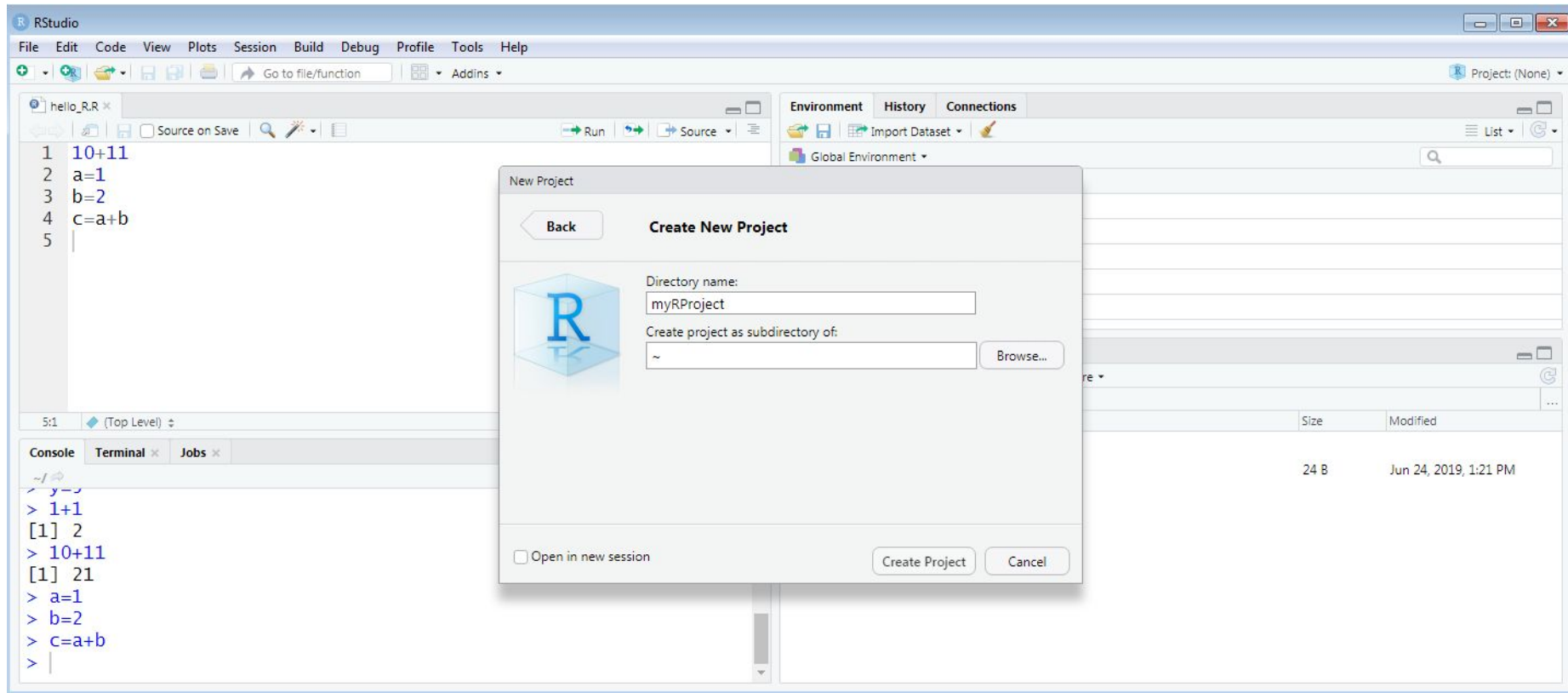
Create Project

- If you have several files related to one project it is a good idea to put all the files at one place
- History will also be saved
- To create a new project Click on:
 - File > New Project (it will ask to save old material, click on save)
 - Click on “New Directory” and then “New Project”



Create Project

- If you have several files related to one project it is a good idea to put all the files at one place
- History will also be saved
- To create a new project Click on:
 - File > New Project (it will ask to save old material, click on save)
 - Click on “New Directory” and then “New Project”
 - Give your project name “myRProject”
 - Click on “Create Project”



Create Project

- Now create a new file and save it as “hello_R”
- Notice the files in the “Files” tab.
- All R files are listed here
- If you close RStudio (or it crashes) you can open it again by going to “myRProject” folder and clicking on “myRProject.Rproj” file

