Intro to R/Python and Quarto

What is R?

What is R?

R is a programming language designed originally for *statistical analyses*.

R was created by Ross Ihaka and Robert Gentleman in 1993.

(Their names are why it's called R, which is also a joke about the predecessor being called S.)

R was formally released by the R Core Group in 1997.

https://www.r-project.org/contributors.html

This group of 20-ish volunteers are the *only* people who can change the base (built-in) functionality of R.

What is python?

python is a general-purpose programming language, that is popular in everything from web development to data science.

python was created in 1981 by Guido van Rossum

It was designed to emphasize code readability and clarity.

R and python are popular and growing!

Jun 2020	Jun 2019	Change	Programming Language	Ratings	Change
1	2	^	C	17.19%	+3.89%
2	1	v	Java	16.10%	+1.10%
3	3		Python	8.36%	-0.16%
4	4		C++	5.95%	-1.43%
5	6	^	C#	4.73%	+0.24%
6	5	v	Visual Basic	4.69%	+0.07%
7	7		JavaScript	2.27%	-0.44%
8	8		PHP	2.26%	-0.30%
9	**22**	^^	**R**	**2.19%**	**+1.27%**
10	9	v	SQL	1.73%	-0.50%

Strengths

R's strengths are...

... handling data with lots of different types of variables.

... making nice and complex data visualizations.

... having cutting-edge statistical methods available to users.

Strengths

python's strengths are...

... more efficient computation, especially of big data.

... general purpose use that goes beyond statistics/data science.

... more strict computer science principles.

But wait!

Packages

The heart and soul of R and python are packages (sometimes called "libraries").

These are "extra" sets of code that add new functionality when installed.

"Official" R packages live on the *Comprehensive R Archive Network*, or CRAN

"Official" python packages live on the *Python Package Index*, or PyPi

Open-Source

Importantly, R and python are *open-source*.

There is no company that owns these languages, like there is for *SAS* or *Matlab*.

This means nobody can sell their R or python code!

- (but you can sell "helpers" like RStudio and Anaconda)
- (and you can keep code private within an organization or company)

Packages are created by users like you and me!

Open Source

Being a good open-source citizen means...

... sharing your code publicly when possible.

(I encourage you to use *GitHub*!)

... contributing to public projects and packages, as you are able.

... creating your own packages, if you can.

... using coding tools for ethical and respectful projects.

Intro to RStudio

What is RStudio?

What is RStudio?

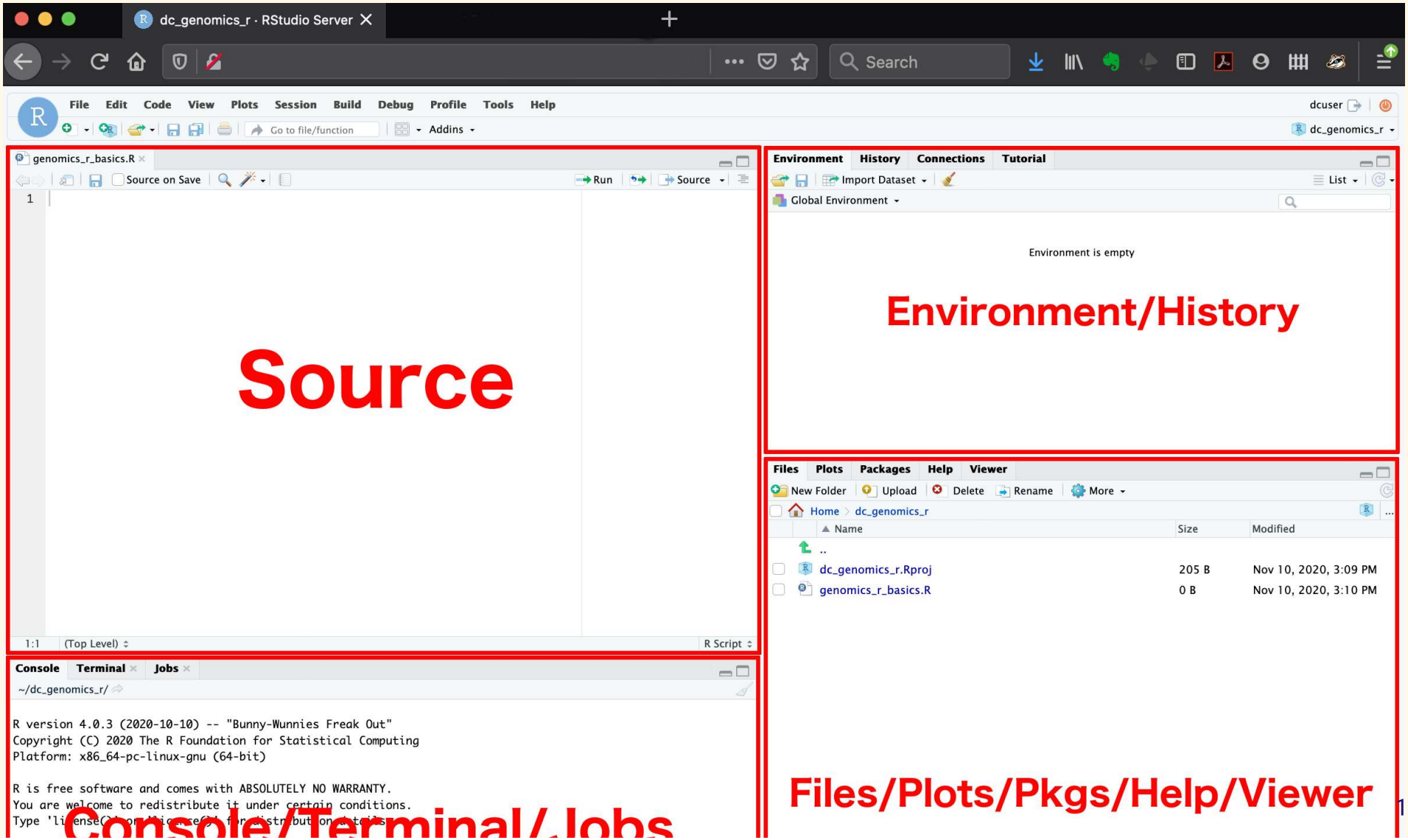
RStudio is an IDE (*Integrated Developer Environment*).

This means it is an application that makes it easier for you to interact with R and python.

History of RStudio

RStudio was released in 2011 by J.J. Allaire.

They make money off the IDE and other helper software.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205 B
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Files/Plots/Pkgs/Help/Viewer
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~/dc_genomics_r/
R version 4.0.3 (2020-10-10) -- "Bunny-Wunnies Freak Out"
Copyright (C) 2020 The R Foundation for Statistical Computing
Platform: x86_64-pc-linux-gnu (64-bit)
R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Console/Terminal/Jobs

Let's try it!

Intro to R Markdown and Quarto

What is Markdown?

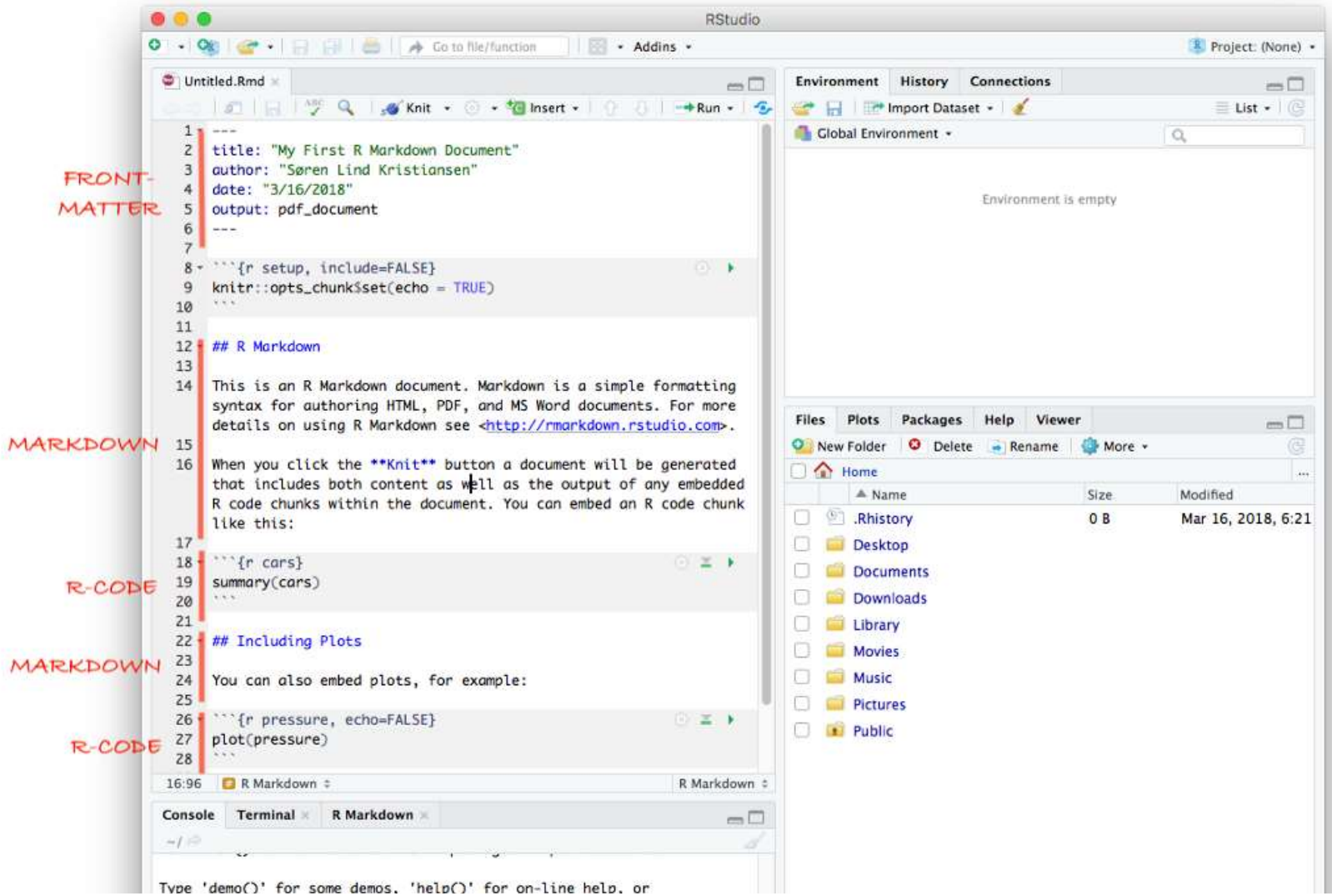
Markdown (without the "R") is a *markup language*. This means special symbols and formatting to pretty documents.

Markdown files have the .md extension.

What is R Markdown?

R Markdown (with the "R") uses regular markdown, plus it can run and display R and python code.

R Markdown files have the .Rmd extension.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Library
Movies
Music
Pictures
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FRONT-MATTER
MARKDOWN
R-CODE
MARKDOWN
R-CODE
Console
Terminal
R Markdown
Type 'demo()' for some demos, 'help()' for on-line help, or

What is Quarto?

Quarto is a *brand spanking new* version of R Markdown that can do a lot more cool stuff!

Most notably, it can handle python code much more easily.

It looks very similar to R Markdown.

We'll try it out today!

Let's try it!