

Overview

Data Wrangling, Session 1

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Code Horizons

October 2, 2024

Housekeeping

10:30am till 12:30pm US EST each day

1:30pm to 3:00pm US EST each day

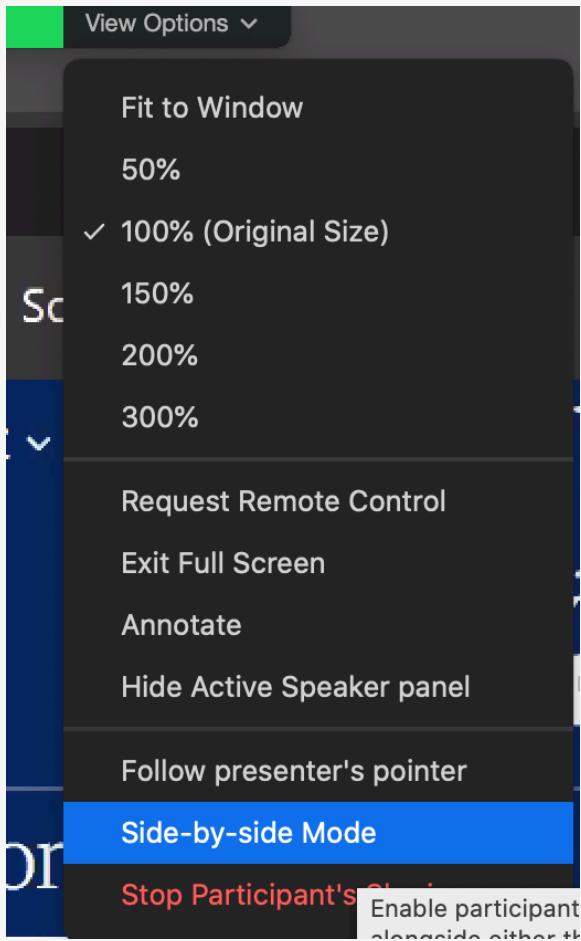
Use the Zoom chat to ask questions, or raise a hand

with 

In between class sessions



For a better Zoom experience



If you're watching in full-screen view and I'm sharing my screen, then from Zoom's "View options" menu *turn off* "Side-by-Side" mode.

My Setup and Yours

Talking, Slides, and Live-Coding in RStudio

Follow along with RStudio yourself if you can

**The course packet is also an RStudio project and the
place for your notes**

Goals for this first session

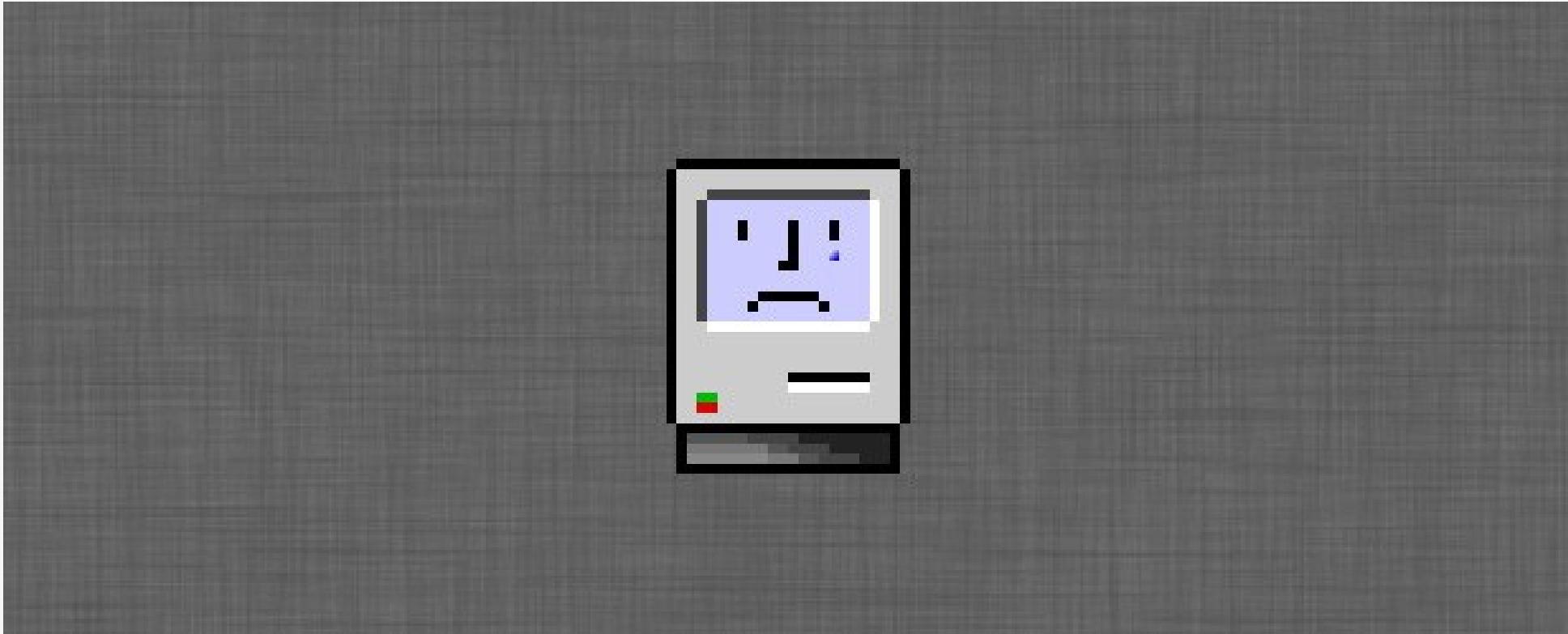
Some big-picture motivation & perspective

Getting familiar with RStudio and its relationship to R

Getting oriented to R and how it thinks

DATA ANALYSIS is mostly **DATA
WRANGLING**

Wrangling data is frustrating



Sad Mac

Can we make it **fun**?



No.

Fun data wrangling

Can we make it **fun?**



Fun data wrangling

No.

↔ Not *this* much fun, at any rate

OK but can we eliminate frustration?



Also no.

Frustration-free data wrangling

OK but can we eliminate frustration?



Frustration-free data wrangling

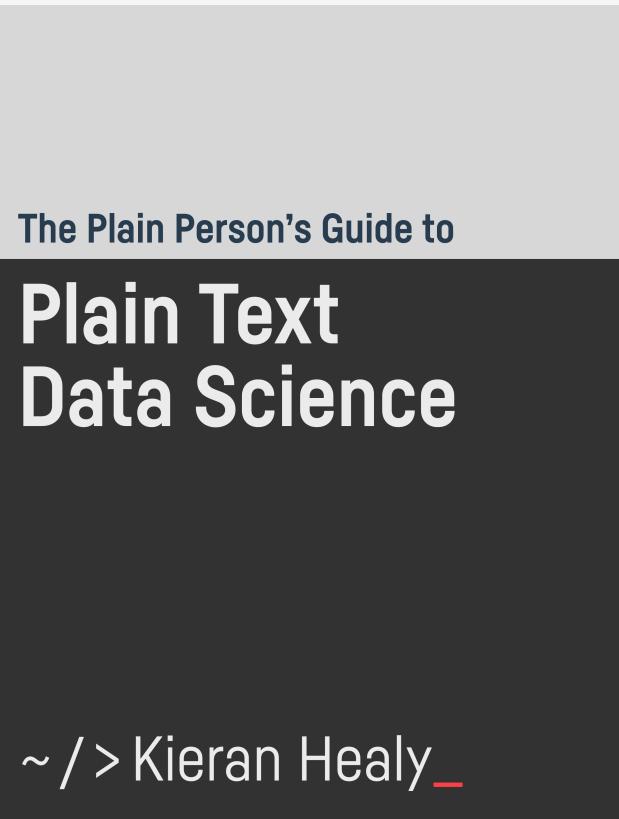
Also no.

(Sorry.)

However, we *can*
make it **work**

Also, it's weirdly satisfying once you get into it.

We take a broadly *Plain Text* approach



Using R and the Tidyverse can be understood within this broader context.

The same principles would apply to, e.g., using Python or similar tools.

The plain person's guide

Two revolutions in computing

Where the action is



iPhone and iPad

Touch-based user interface

Foregrounds a single application

Dislikes multi-tasking*

Hides the file system

“Laundry basket” model of where
things are

*Multitasking

I mean, “Making different specialized applications and resources work together in the service of a single but multi-dimensional project”, not “Checking Twitter while also listening to a talk and waiting for an update from the school nurse.”

Where statistical computing lives



Desktop and laptop

Windows and pointers.

Multi-tasking, multiple windows.

Exposes and leverages the file system.

Many specialized tools in concert.

Underneath, it's the 1970s, UNIX, and the command-line.

Plain-Text Tools for Data Analysis



Desktop and laptop

Better than they've ever been!

Free! Open! Powerful!

Friendly community! Many
resources!

But grounded in a UI paradigm that
is increasingly far away from the
everyday use of computing devices

So why do we use these tools?

Because the
research process is
intrinsically messy

“Office” vs “Engineering” approaches

Questions

What is “real” in your project?

What is the final output?

How is it produced?

How are changes managed?

Different Answers

Office model

Formatted documents are real.

Intermediate outputs are cut and pasted into documents.

Changes are tracked inside files.

Final output is often in the same format you've been working in, e.g. a Word file, or perhaps a PDF.

Different Answers

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Engineering model

Plain-text files are real.

Intermediate outputs are produced via code, often inside documents.

Changes are tracked outside files.

Final outputs are assembled programmatically and converted to a desired output format.

Different strengths and weaknesses

Office model

Everyone knows Word, Excel, or Google Docs.

“Track changes” is powerful and easy.

Hm, why can’t I remember how I made this figure?

Where did this table of results come from? Where did my file go?

Paper_Final_edits_FINAL_kh-1a.docx

Different strengths and weaknesses

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`Paper_Final_edits_FINAL_kh-1a.docx`

Engineering model

Plain text is universally portable.

Push button, recreate analysis.

Gaaah, Why can’t I make R do this simple thing?

This version control stuff is a pain.

`Object of type 'closure' is not subsettable`

Each approach generates solutions to its own problems

Office model

Make a suite of applications.

Put everything on a cloud server, not your computer.

Rely on search to find stuff.

Allow users to treat documents like plain-text (e.g. Markdown).

Put more advanced functions back in, somewhere.

Engineering model

Try to guess what the user wants and offer hints or suggestions.

Talk to version control via a GUI client.

Make help and code assistance easily available.

Allow users treat their code more like a formatted document.

Into the Kitchen



Studio[®]

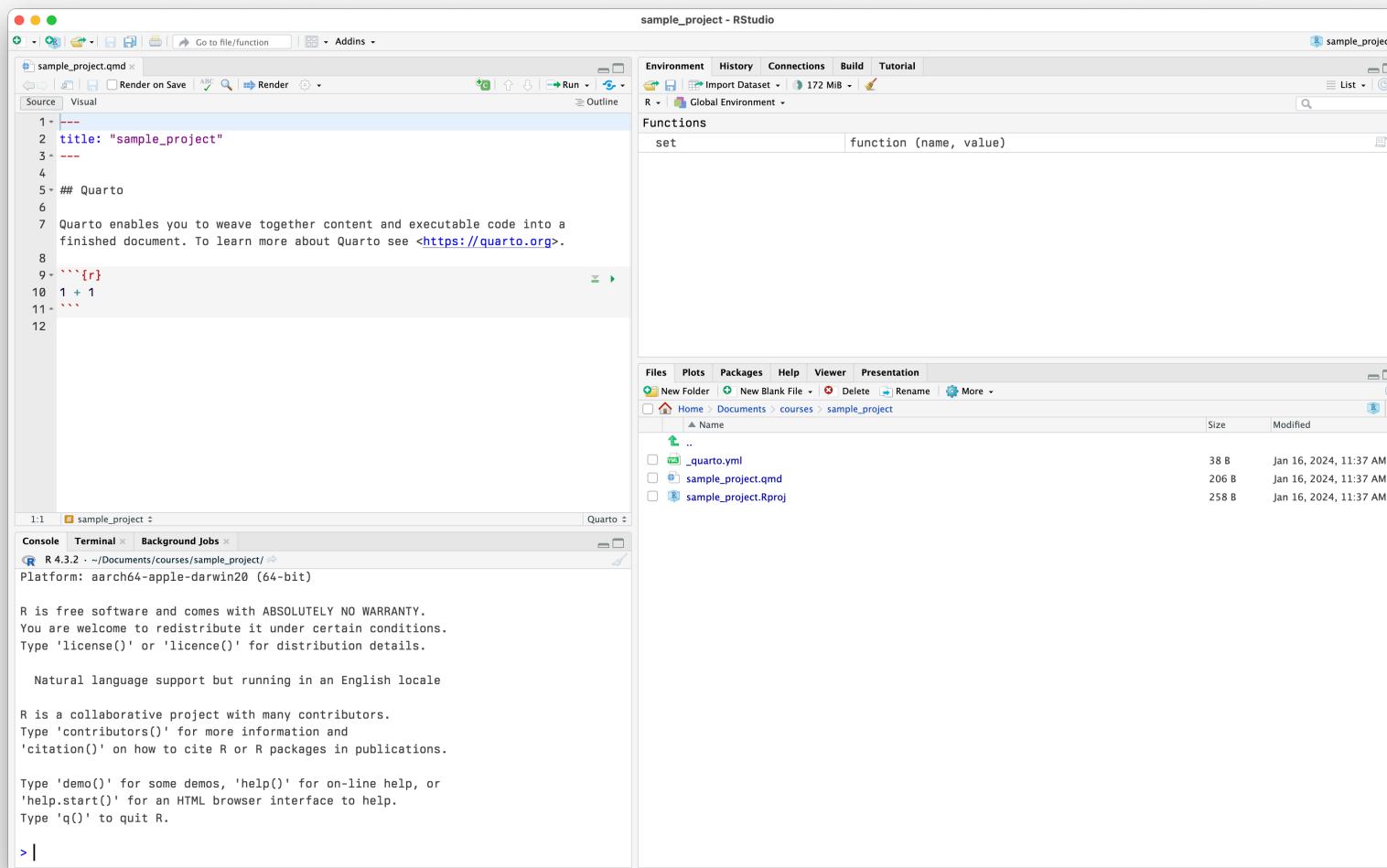
RStudio is an IDE for R



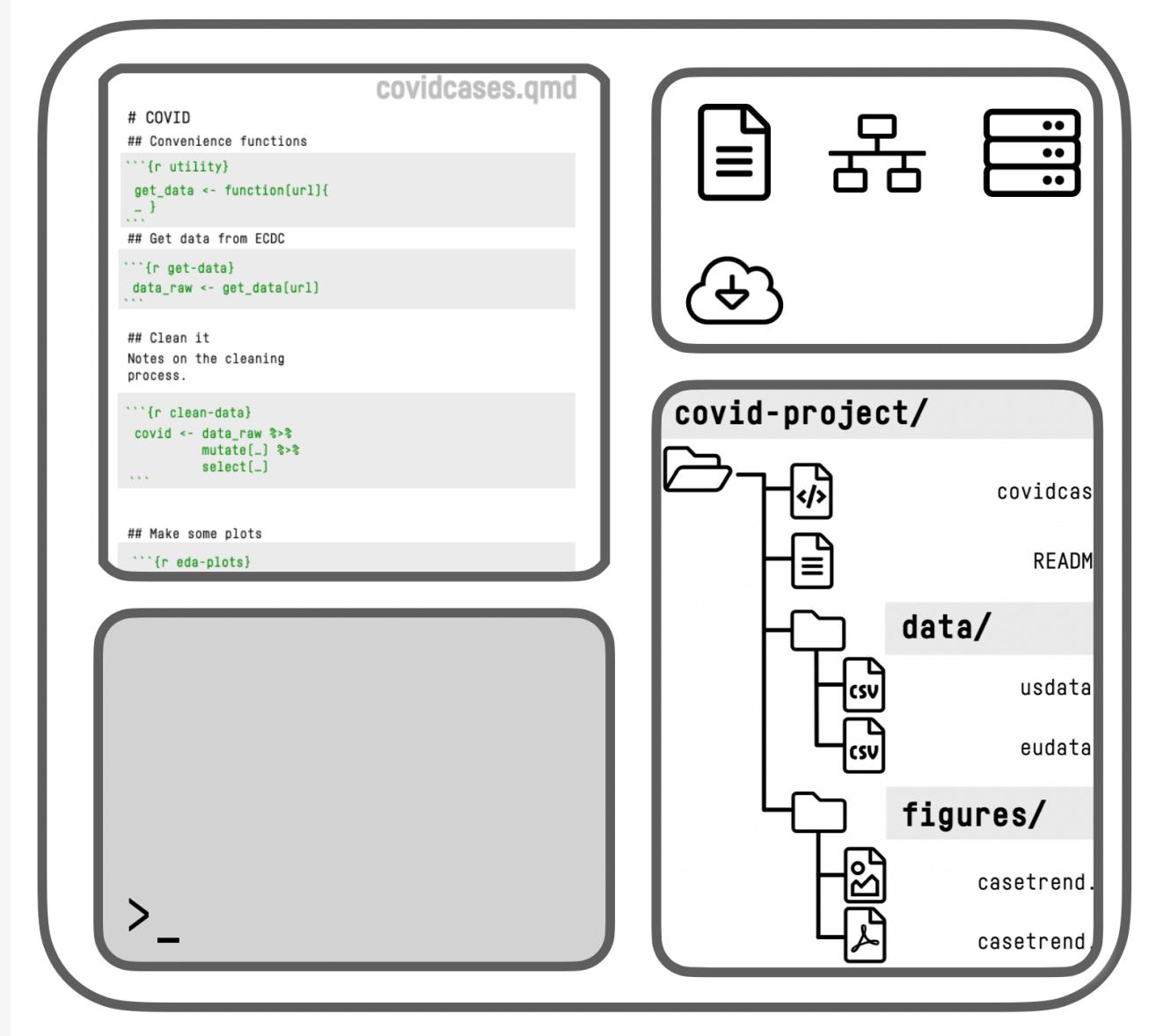
A kitchen is an IDE for Meals



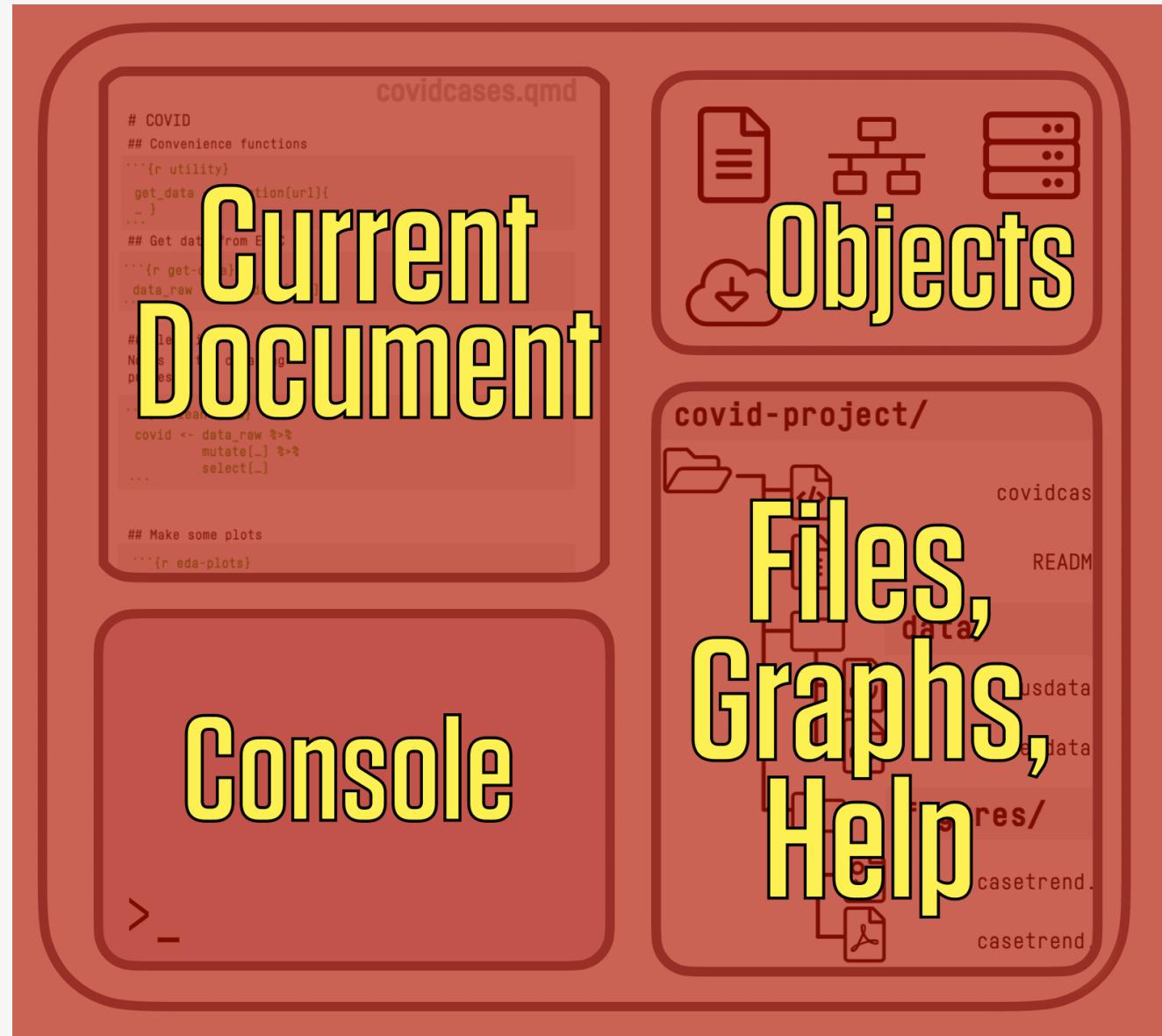
R and RStudio



RStudio at startup



RStudio schematic overview

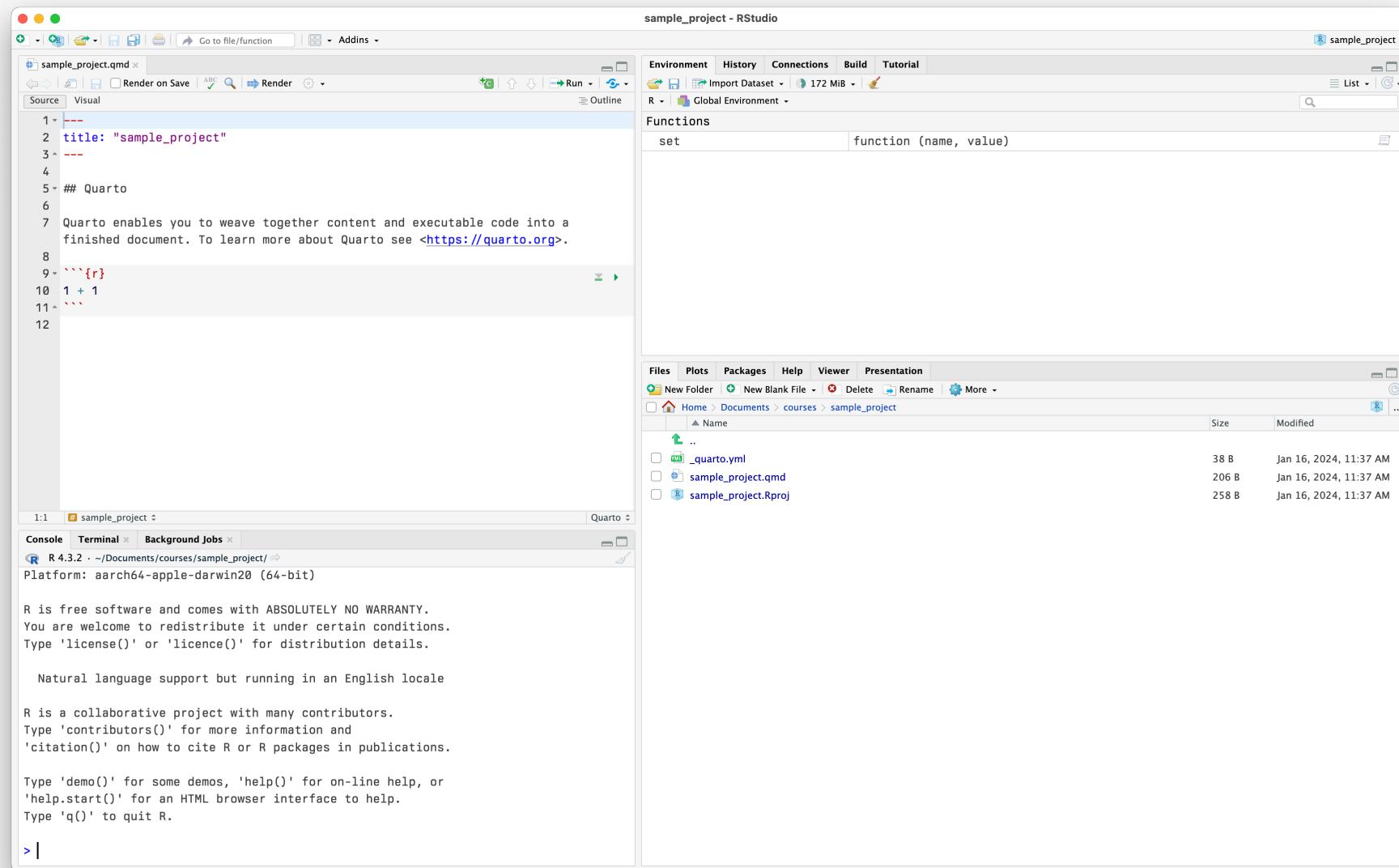


RStudio schematic overview

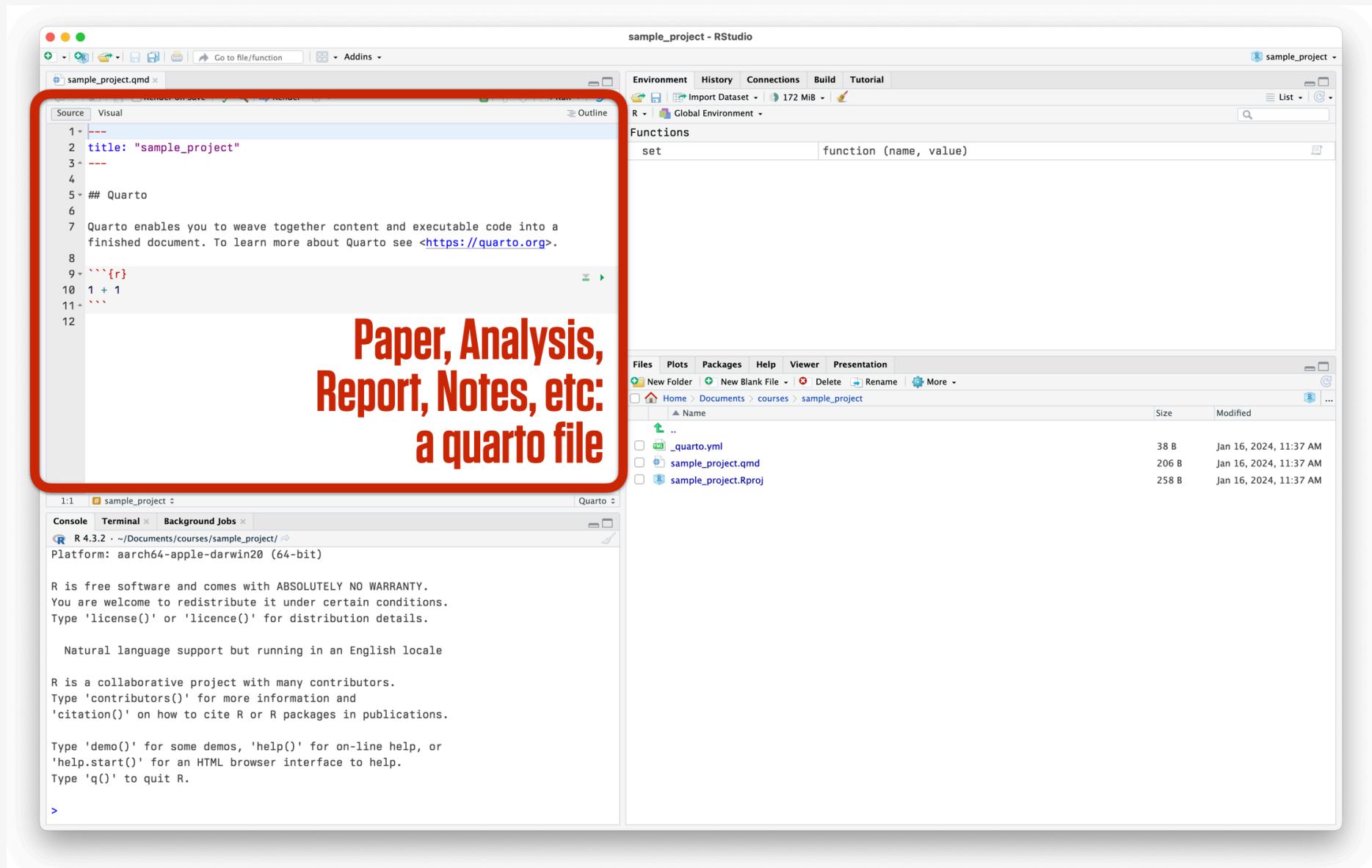
**Think in terms of Data + Transformations,
written out as code, rather than a series of
point-and-click steps**

Our starting **data** + our **code** is what's “real” in
our projects, not the final output or any
intermediate objects

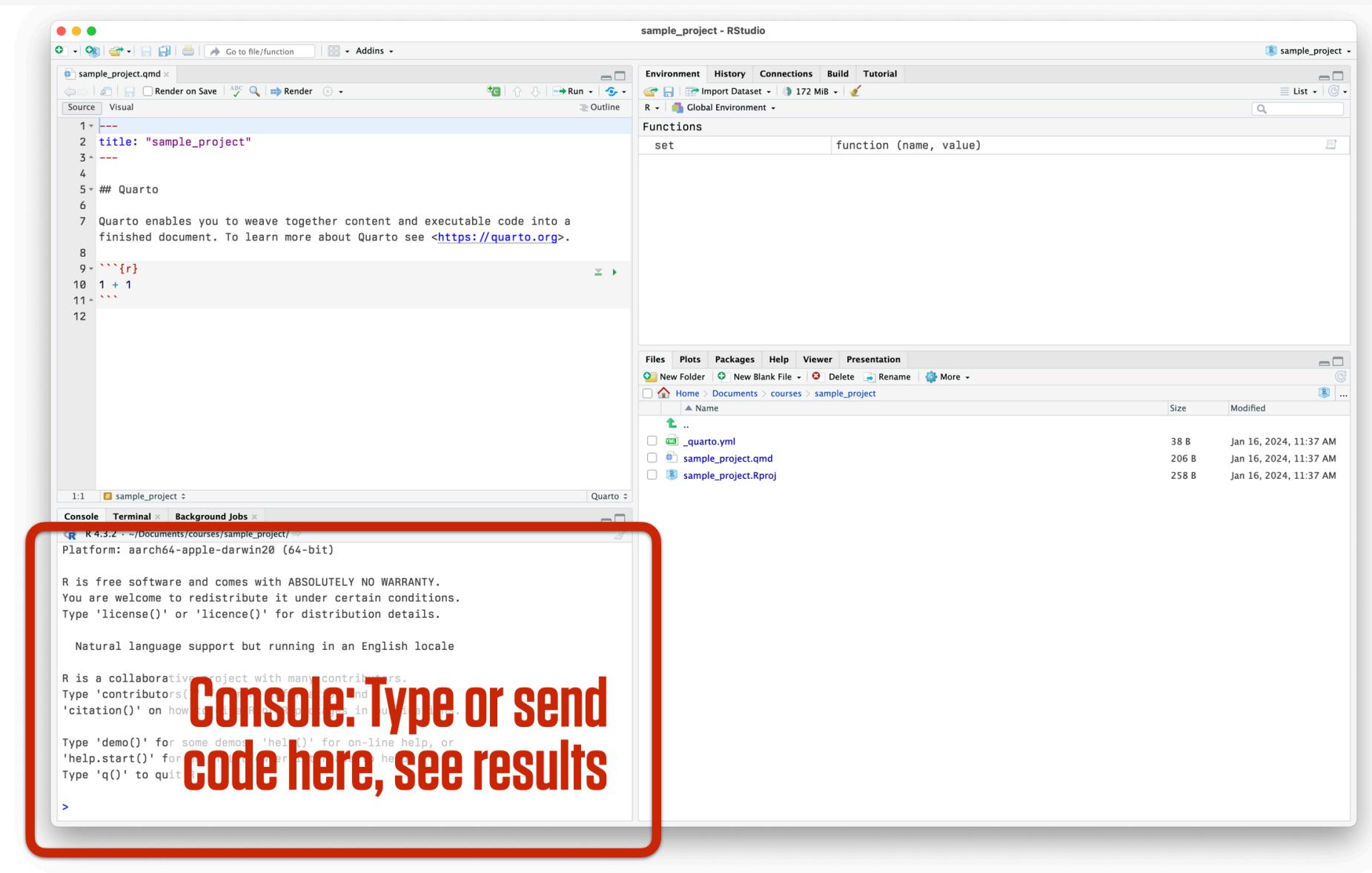
**The IDE is the thing that helps us keep track of
and control over the code we write and the
outputs we produce.**



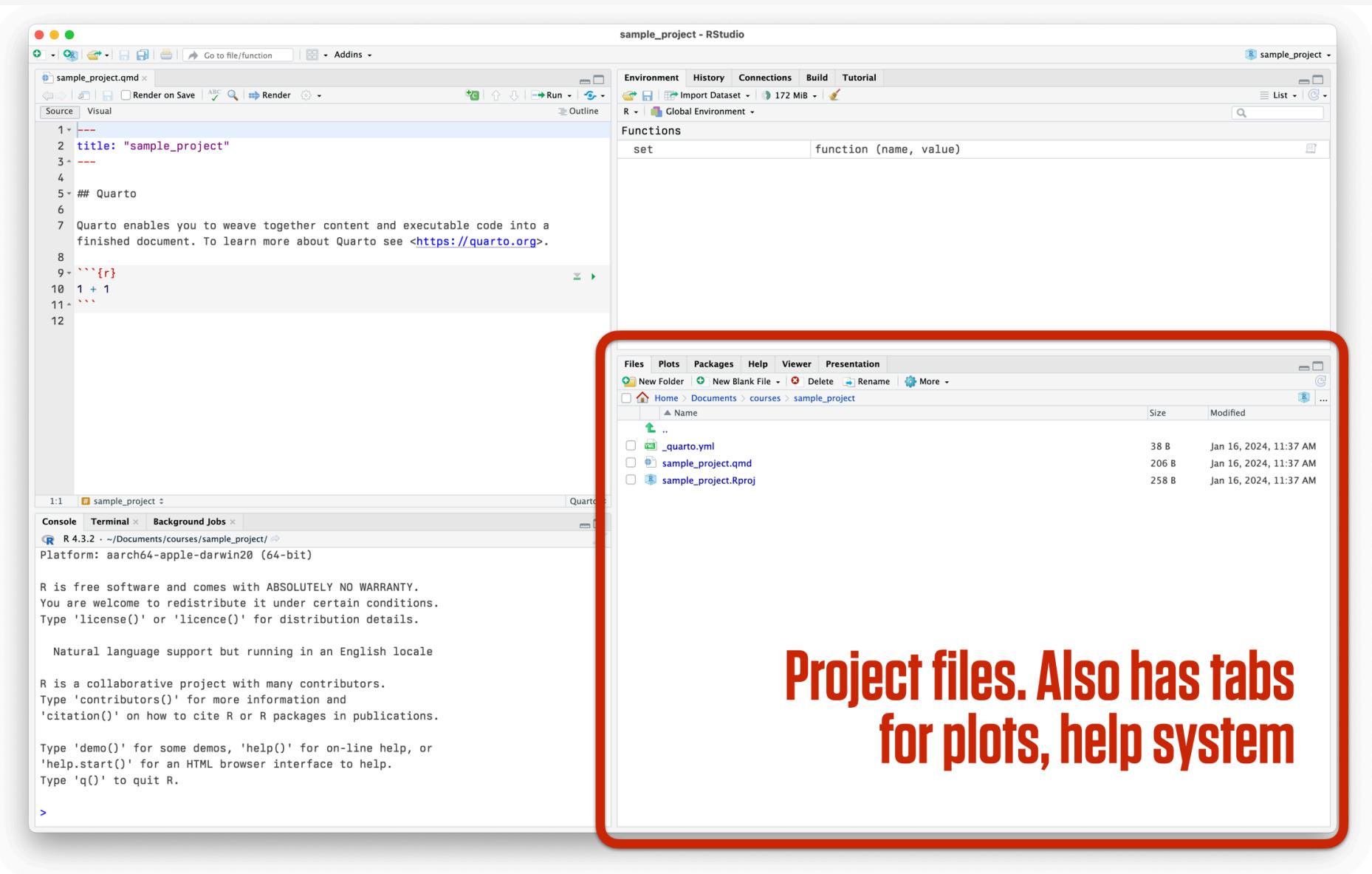
RStudio at startup



RStudio at startup

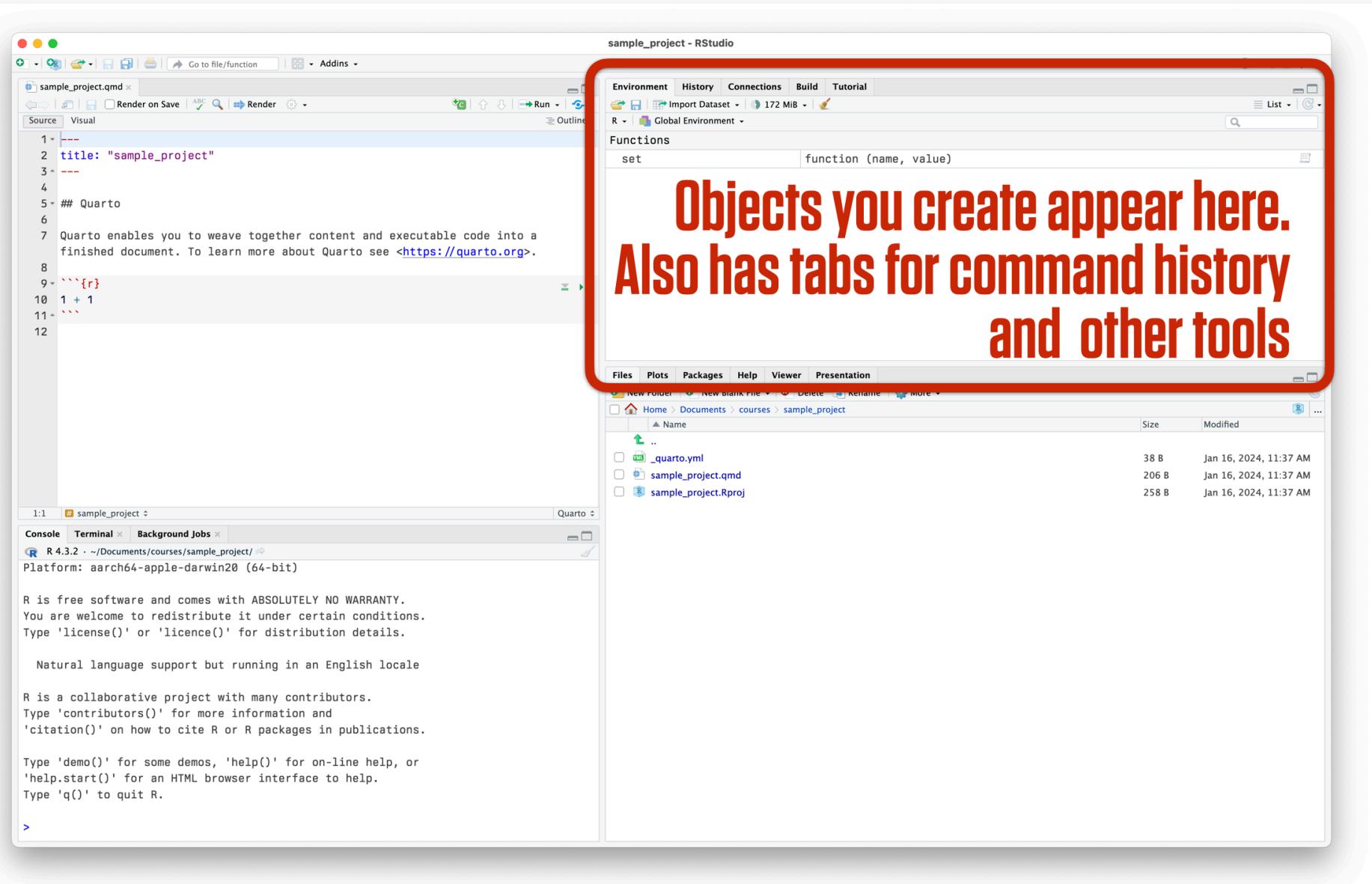


RStudio at startup



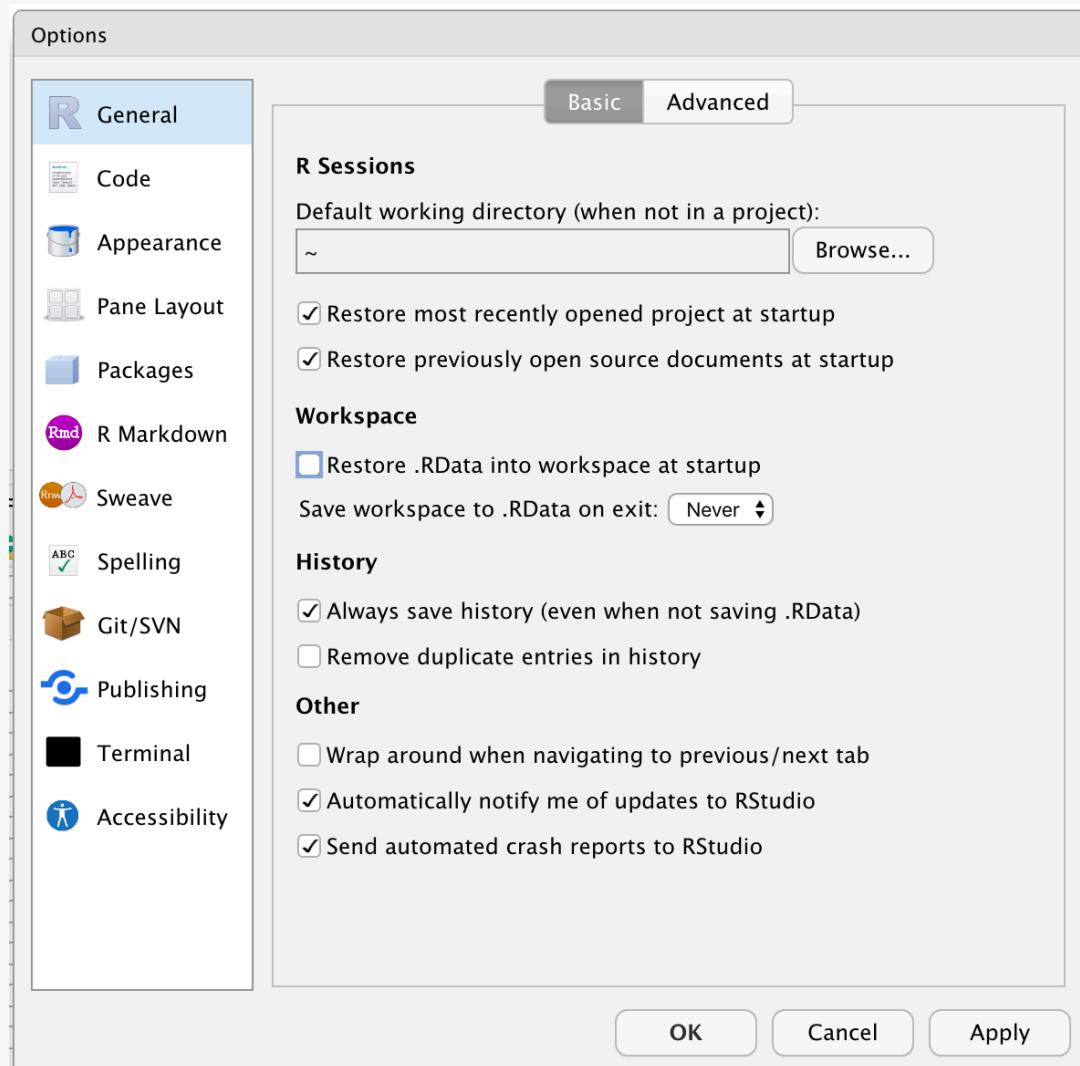
RStudio at startup

**Project files. Also has tabs
for plots, help system**



RStudio at startup

Your code is what's real in your project



Consider not showing output inline

