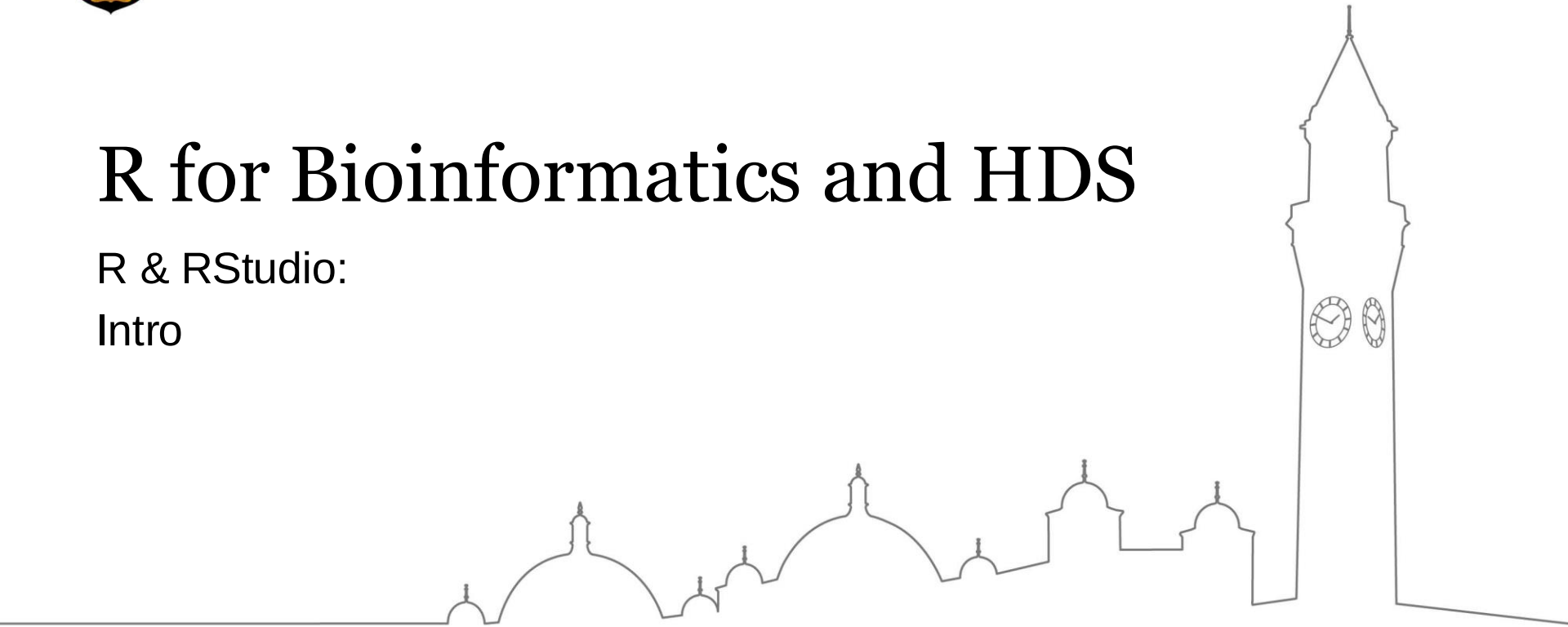
UNIVERSITY OF BIRMINGHAM

R for Bioinformatics and HDS

R & RStudio:

Intro



Vasileios Panagiotis Lenis
Laura Bravo Merodio

Course Rationale

- Introduces you to the foundational concepts of programming and provides exposure to the use of **I**ntegrated **D**evelopment **E**nvironment tools that support programming.
- Integral to the module is the focus on supporting students to develop and enhance their **problem-solving skills**.
- The subject matter addressed in this module introduces threshold concepts that provide a **firm foundation for modules taken later in the programme.**

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Course Structure

- Introduction to R & RStudio
- Syntax, Comments, Variables, Data Types and Operators
- Conditions, Loops, Functions and Data Structures
- Working with Data frames

Course Outcome

After this course you should be able to:

- Work on RStudio with confidence!
- Edit and run R code
- Write file-processing R programs that produce output to the screen and/or external files
- Create stand-alone R programs to process (biological) data
- Know how to develop farther your skills in R, after the course

What is **R**?

- R is an open-source programming/scripting language.
- Useful for statistics and data science (not only!).
- Easy to learn with relatively simple syntax.
- Superior like commercial alternatives (over 7,000 user contributed packages at this time).
- Widely used both in academia and industry.
- Available on all platforms.
- Large and growing community of peers.

R vs Python

	R	Python
Scope	Mainly for statistical modelling	For variety of purposes like web-application and data analysis
Used By	Statisticians, Analyst & Data Scientist	Developer, Data Engineers & Data Scientist
Learning curve	steep	
Available libraries	>12,000	> 183,000
Machine Learning		
Statistical analysis		
Parallel computation	GPU	GPU
C/C++ interface		
Speed		
Graphics & Visualization		

Where and How?

- How to get R:
  - http://www.r-project.org/
  - Or Simple Google: “R”
- Ways of interacting with R
  - Command line
  - GUI environment
- How to install R locally
  - https://teacherscollege.screenstepslive.com/a/1108074-install-r-and-r-studio-for-windows

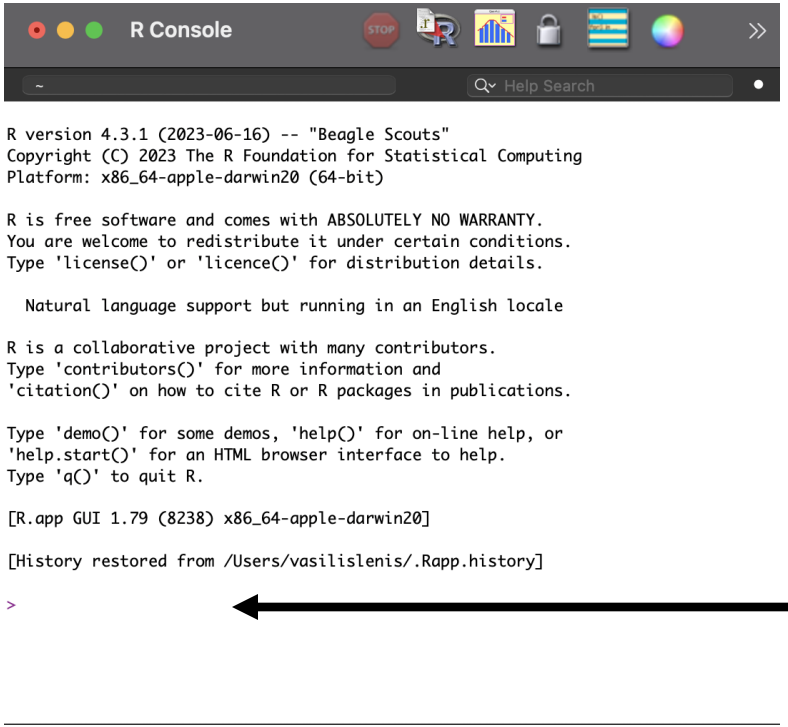
Many OS options!

Use this tutorial to find and install R & RStudio in your System!

https://www.datacamp.com/tutorial/installing-R-windows-mac-ubuntu

R Basic console

After the installation, the basic console looks like this:



Decent but poor…
What about an IDE?

You can start typing your commands!!

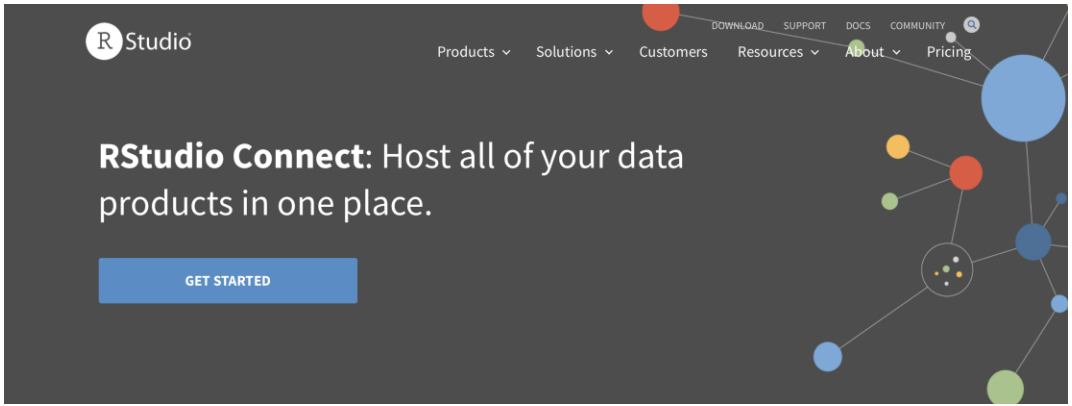
But what is an IDE?

- An integrated development environment (IDE) is software for building applications that combines common developer tools into a single graphical user interface (GUI).

- In other words, a more ”fancy” environment for coding. ☺

What is RStudio?

- RStudio is a flexible and powerful open-source IDE that is extensively used as a graphical interface to work with R.
- Also adapted to many other programming languages, such as Python or SQL.



https://www.rstudio.com

Don’t forget! RStudio is NOT R!

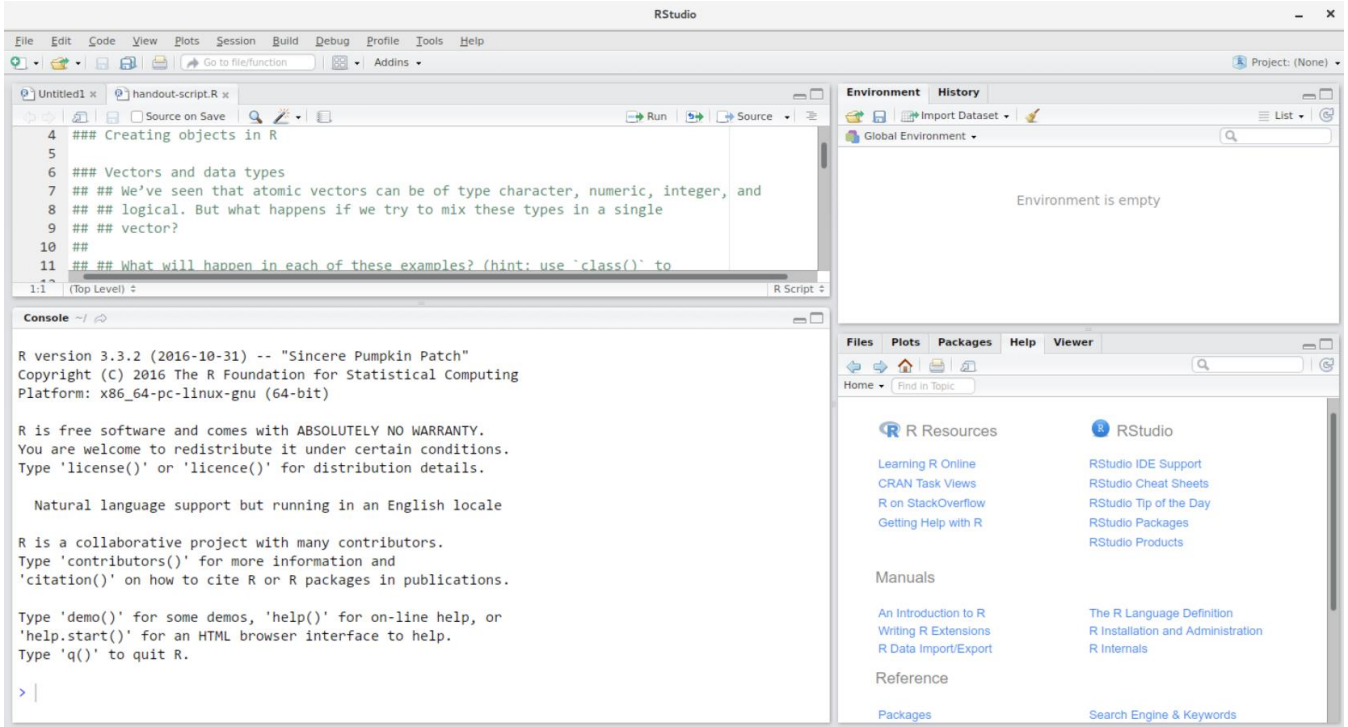
In cars analogy, we can say:

- **R** is like a car’s engine.
- **RStudio** is like a car’s dashboard.

R: engine

RStudio: dashboard

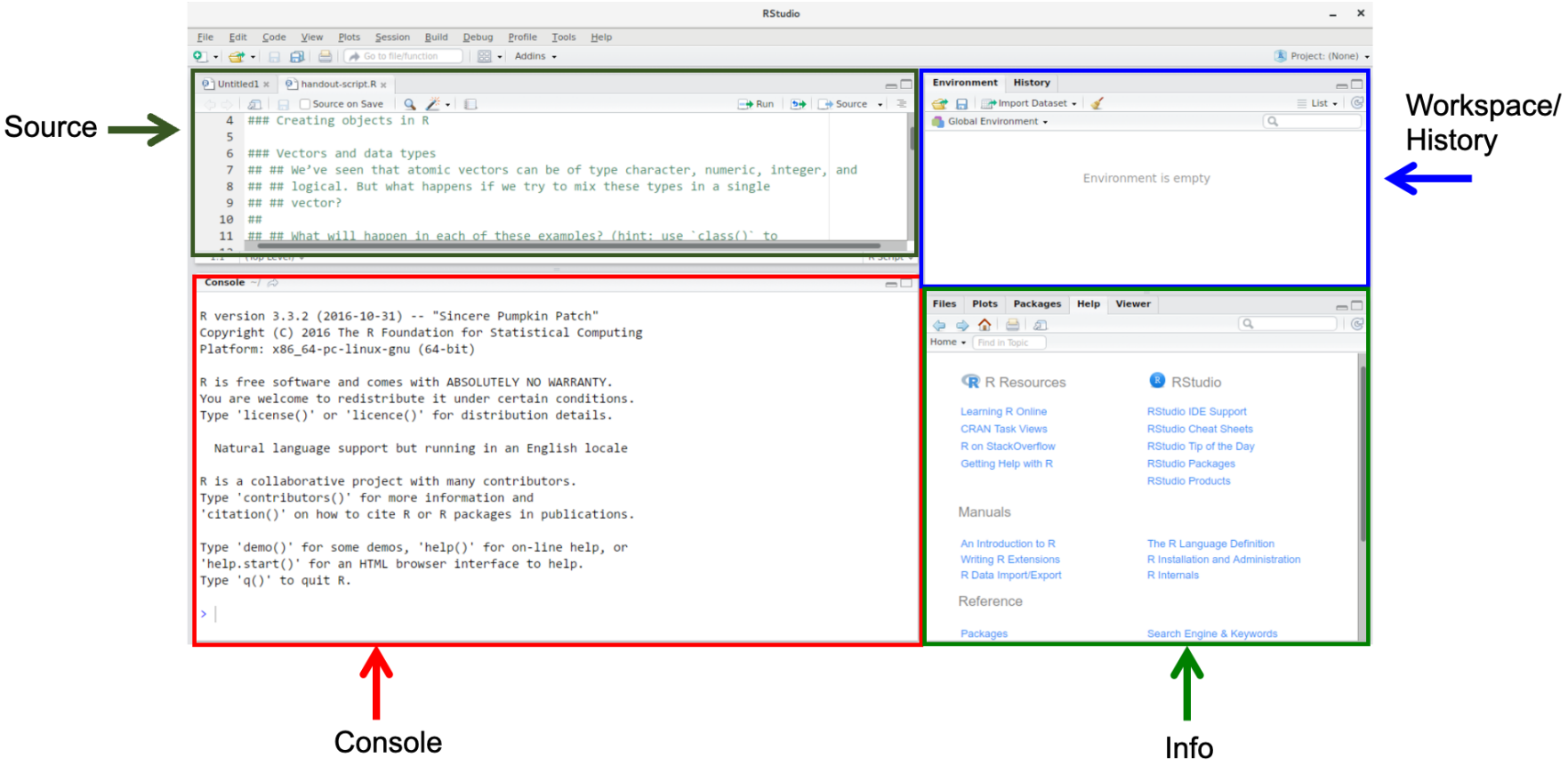
How are the RStudio looks like?



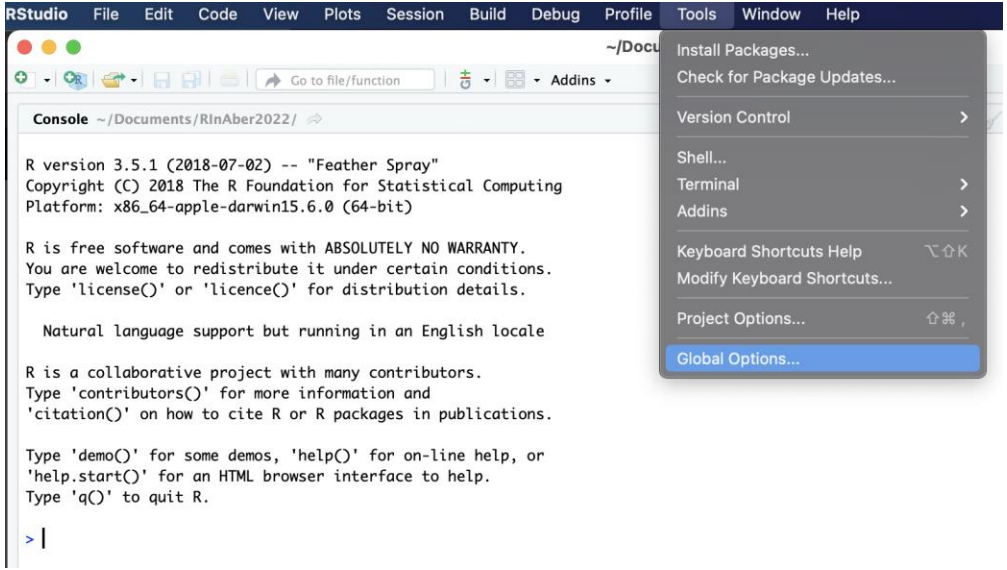
RStudio “anatomy”

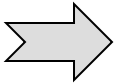
RStudio is divided into 4 “panes”:

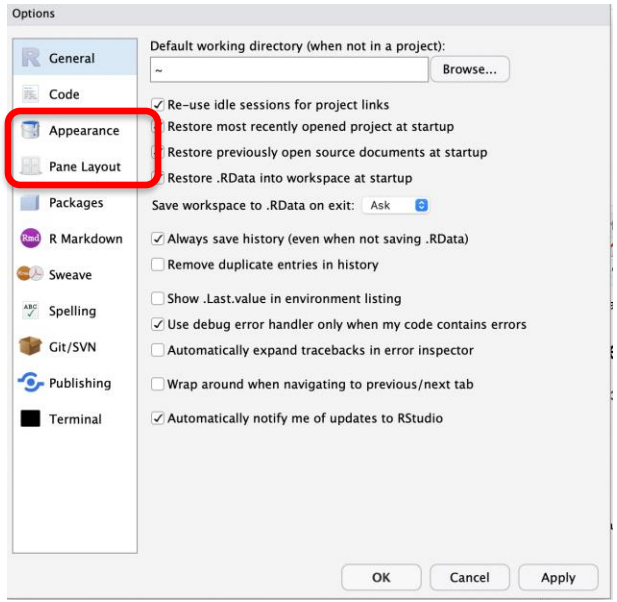
- The **Source** for your scripts and documents (top-left, in the default layout)
- Your **Environment/History** (top-right) which shows all the objects in your working space (Environment) and your command history (History)
- Your **Files/Plots/Packages/Help/Viewer** (bottom-right)
- The R **Console** (bottom-left)

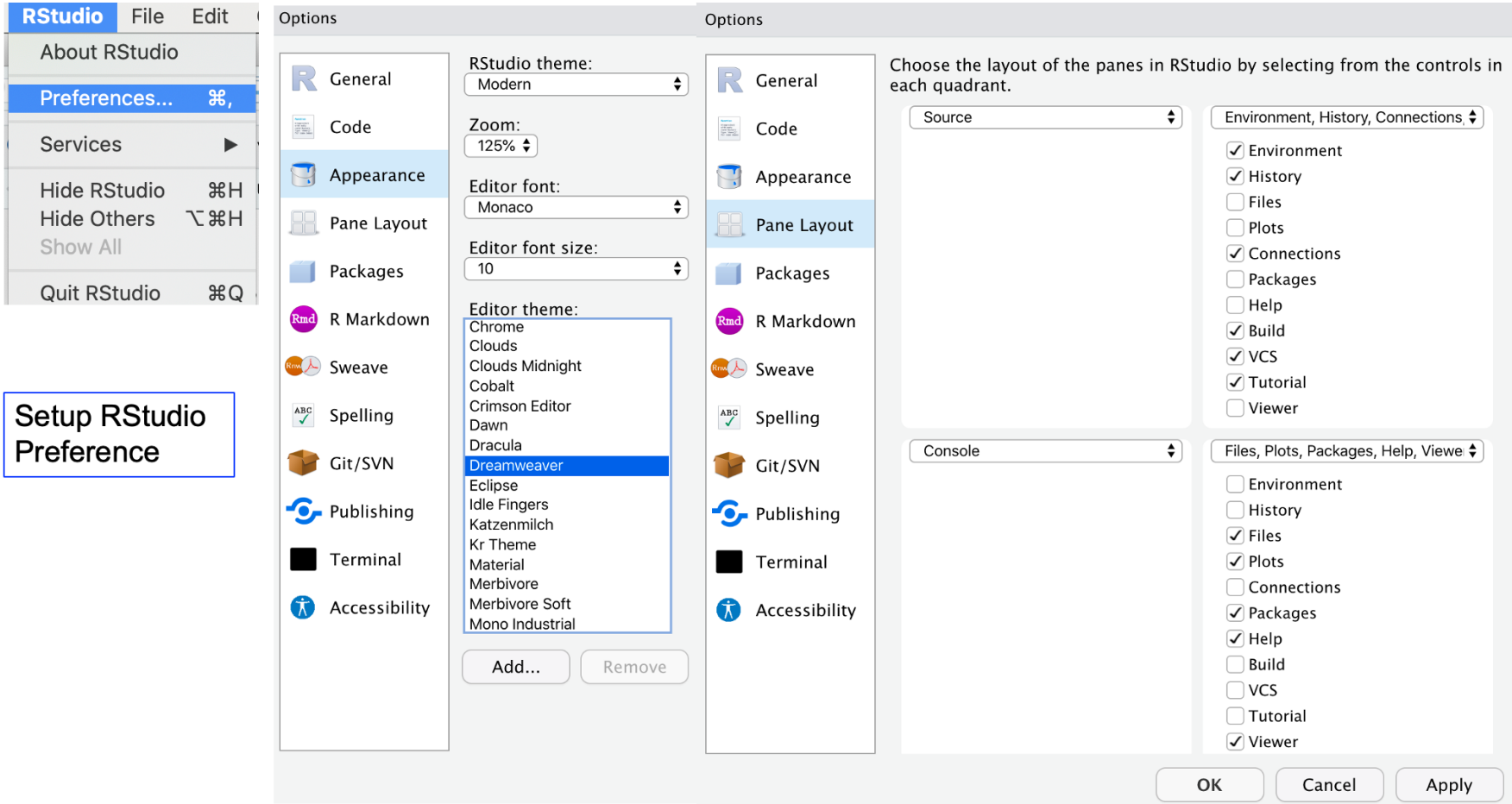

Source
RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
Untitled1
handout-script.R
Source on Save
Run
Source
4 ### Creating objects in R
5
6 ### Vectors and data types
7 ## ## We've seen that atomic vectors can be of type character, numeric, integer, and
8 ## ## logical. But what happens if we try to mix these types in a single
9 ## ## vector?
10 ##
11 ## ## What will happen in each of these examples? (hint: use `class()` to
Environment
History
Import Dataset
List
Global Environment
Environment is empty
Workspace/
History
Console
R version 3.3.2 (2016-10-31) -- "Sincere Pumpkin Patch"
Copyright (C) 2016 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.
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.
>
Files
Plots
Packages
Help
Viewer
Home
Find in Topic
R Resources
Learning R Online
CRAN Task Views
R on StackOverflow
Getting Help with R
RStudio
RStudio IDE Support
RStudio Cheat Sheets
RStudio Tip of the Day
RStudio Packages
RStudio Products
Manuals
An Introduction to R
Writing R Extensions
R Data Import/Export
The R Language Definition
R Installation and Administration
R Internals
Reference
Packages
Search Engine & Keywords
Console
Info

RStudio Customization









Setup RStudio Preference

Some help please?

Manuals

An Introduction to R
Writing R Extensions
R Data Import/Export
The R Language Definition
R Installation and Administration
R Internals

Reference

Packages
Search Engine & Keywords

Miscellaneous Material

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Resources
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Technical papers

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