Integrating R

into your work with Rstudio and the tidyverse

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Introduction

How today will go…

No sticky note: “I’m happily working on it”

Purple sticky note: “I’m all done and ready to move on”

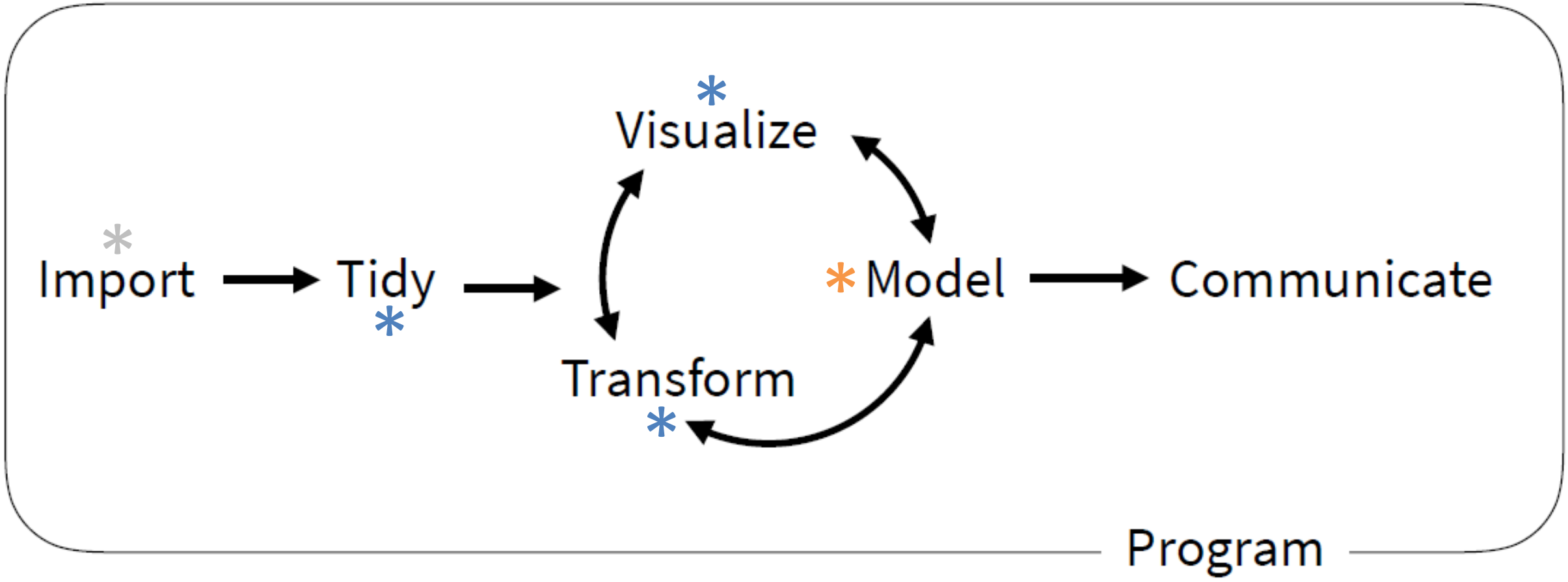
Yellow sticky note: “I’m stuck. Send help!”
(or flag us down)

Image @cwickham

Agenda:

Time	Day 1	Day 2
8:00 - 8:30	Welcome, Intros, Objectives	Day 1 recap
8:30 - 10:00	Projects and RStudio	Functions and Loops
	Visualize Data, part 1	
10:00 - 10:30	**Morning Break**	**Morning Break**
10:30 - 12:00	Visualize Data, part 2	Statistical Output basics
	Wrangle Data, part 1	
12:00 - 13:00	**Lunch**	**Lunch**
13:00 - 14:00	Wrangle Data, part 2	Setting up projects and workflows
14:00 - 15:00	Reshape Data	Challenge, Wrap-up, work with your own data
15:00 - 15:30	**Afternoon Break**	**Afternoon Break**
15:30 - 17:00	Wrap-up, Questions, Challenge	Work with your own data

(Applied) Data Science



Workflow Basics

Tips and tricks to making your R work more productive

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4. Use projects and the `here` package


here:
find your
PATH!
"/NoT/HERE"
here!
seriously, just
here.
setwd("c:\iamyournightmare!")
setwd("c:\user\ohno")
setwd("/mm/nope.csv")
non-portable
setwd("/hahaha/good/luck!")
DATA
FILES
It's ALL RIGHT HERE!
Horst '18

Workflow Basics:

Tips and tricks to making your R work more productive

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4. Use projects and the `here` package
5. Use standardized naming conventions

TL;DR - machine and human readable and plays well with default ordering (put something numeric first).

Left pad other numbers with zeros (to avoid the '10' coming before '01'). Avoid spaces in file names, punctuation, and accented characters.

Workflow Basics:

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1. Save the source, not the workspace
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4. Use projects and the `here` package
5. Use standardized naming conventions
6. Coding review

`package::function()`

`<-`

Pipes! `%>%` from the `magrittr` package

Workflow Basics:

Tips and tricks to making your R work more productive

1. Save the source, not the workspace
2. Use an IDE (integrated development environment), like RStudio
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4. Use projects and the `here` package
5. Use standardized naming conventions
6. Coding review
7. Keyboard Shortcuts: there's an RStudio Cheatsheet for that!

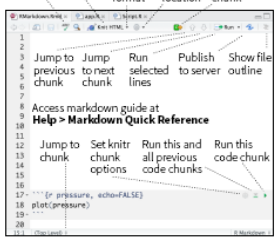
We love:

`alt+-` :for <-
`ctrl+enter` :to run one or more lines
`ctrl+shift+m` :for %>%
`ctrl+shift+c` :to comment/uncomment
`ctrl+i` :to indent prettily

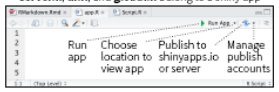
RStudio IDE : : CHEAT SHEET

Documents and Apps

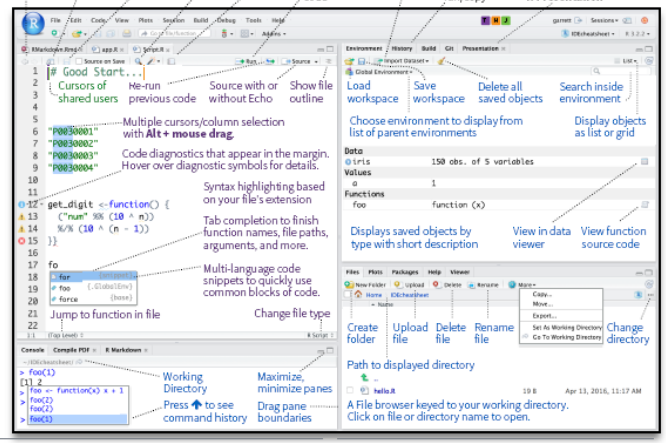
Open Shiny, R Markdown, knitr, Sweave, LaTeX, .Rd files and more in Source Pane



RStudio recognizes that files named **app.R**, **server.R**, **ui.R**, and **global.R** belong to a shiny app

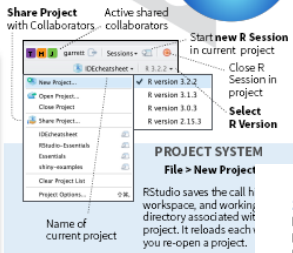


Write Code



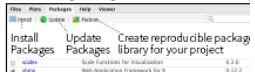
R Support

Pro Features



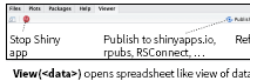
RStudio opens plots in a dedicated Plots pane

GUI Package manager lists every installed packa

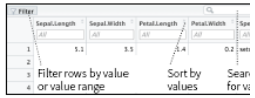


RStudio opens documentation in a dedicated Help

Viewer Pane displays HTML content, such as Shiny RMarkdown reports, and interactive visualizatio

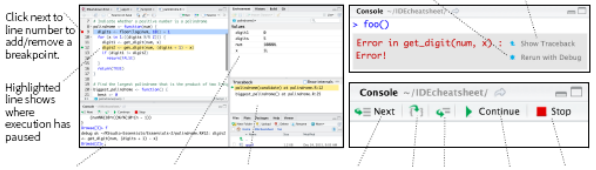


View(<data>) opens spreadsheet like view of data



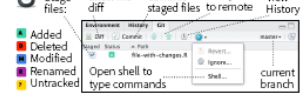
Debug Mode

Open with **debug()**, **browse()**, or a breakpoint. RStudio will open the debugger mode when it encounters a breakpoint while executing code.



Version Control with Git or SVN

Turn on at **Tools > Project Options > Git/SVN**

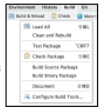


Package Writing

File > New Project > New Directory > R Package

Turn project into package,
Enable roxygen documentation with **Tools > Project Options > Build Tools**

Roxygen guide at **Help > Roxygen Quick Reference**



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1 LAYOUT

	Windows/Linux	Mac
Move focus to Source Editor	Ctrl+1	Ctrl+1
Move focus to Console	Ctrl+2	Ctrl+2
Move focus to Help	Ctrl+3	Ctrl+3
Show History	Ctrl+4	Ctrl+4
Show Files	Ctrl+5	Ctrl+5
Show Plots	Ctrl+6	Ctrl+6
Show Packages	Ctrl+7	Ctrl+7
Show Environment	Ctrl+8	Ctrl+8
Show Git/SVN	Ctrl+9	Ctrl+9
Show Build	Ctrl+0	Ctrl+0

2 RUN CODE

	Windows/Linux	Mac
Search command history	**Ctrl+↑**	**Cmd+↑**
Navigate command history	**↑/↓**	**↑/↓**
Move cursor to start of line	Home	Cmd+←
Move cursor to end of line	End	Cmd+ →
Change working directory	Ctrl+Shift+H	Ctrl+Shift+H
Interrupt current command	**Esc**	**Esc**
Clear console	**Ctrl+L**	**Ctrl+L**
Quit Session (desktop only)	Ctrl+Q	Cmd+Q
Restart R Session	**Ctrl+Shift+F10**	**Cmd+Shift+F10**
Run current line/selection	**Ctrl+Enter**	**Cmd+Enter**
Run current (retain cursor)	Alt+Enter	Option+Enter
Run from current to end	Ctrl+Alt+E	Cmd+Option+E
Run the current function	Ctrl+Alt+F	Cmd+Option+F
Source a file	Ctrl+Alt+G	Cmd+Option+G
Source the current file	**Ctrl+Shift+S**	**Cmd+Shift+S**
Source with echo	Ctrl+Shift+Enter	Cmd+Shift+Enter

3 NAVIGATE CODE

	Windows/Linux	Mac
Goto File/Function	**Ctrl+.**	**Ctrl+.**
Fold Selected	Alt+L	Cmd+Option+L
Unfold Selected	Shift+Alt+L	Cmd+Shift+Option+L
Fold All	Alt+O	Cmd+Option+O
Unfold All	Shift+Alt+O	Cmd+Shift+Option+O
Go to line	Shift+Alt+G	Cmd+Shift+Option+G
Jump to	Shift+Alt+J	Cmd+Shift+Option+J
Switch to tab	Ctrl+Shift+.	Ctrl+Shift+.
Previous tab	Ctrl+F11	Ctrl+F11
Next tab	Ctrl+F12	Ctrl+F12
First tab	Ctrl+Shift+F11	Ctrl+Shift+F11
Last tab	Ctrl+Shift+F12	Ctrl+Shift+F12
Navigate back	Ctrl+F9	Cmd+F9
Navigate forward	Ctrl+F10	Cmd+F10
Jump to Brace	Ctrl+P	Ctrl+P
Select within Braces	Ctrl+Shift+Alt+E	Ctrl+Shift+Option+E
Use Selection for Find	Ctrl+F3	Cmd+E
Find in Files	Ctrl+Shift+F	Cmd+Shift+F
Find Next	Win: F3, Linux: Ctrl+G	Cmd+G
Find Previous	W: Shift+F3, L:	Cmd+Shift+G
Jump to Word	Ctrl+ ←/→	Option+ ←/→
Jump to Start/End	Ctrl+↑/↓	Cmd+↑/↓
Toggle Outline	Ctrl+Shift+O	Cmd+Shift+O

4 WRITE CODE

	Windows/Linux	Mac
Attempt completion	**Tab or Ctrl+Space**	**Tab or Cmd+Space**
Navigate candidates	**↑/↓**	**↑/↓**
Accept candidate	Enter, Tab, or→	Enter, Tab, or→
Dismiss candidates	Esc	Esc
Undo	Ctrl+Z	Cmd+Z
Redo	Ctrl+Shift+Z	Cmd+Shift+Z
Cut	Ctrl+X	Cmd+X
Copy	Ctrl+C	Cmd+C
Paste	Ctrl+V	Cmd+V
Select All	Ctrl+A	Cmd+A
Delete Line	Ctrl+D	Cmd+D
Select	Shift+[Arrow]	Shift+[Arrow]
Select Word	Ctrl+Shift+ ←/→	Option+Shift+ ←/→
Select to Line Start	Alt+Shift+←	Cmd+Shift+←
Select to Line End	Alt+Shift+→	Cmd+Shift+→
Select Page Up/Down	Shift+PageUp/Down	Shift+PageUp/Down
Select to Start/End	Shift+Alt+↑/↓	Cmd+Shift+↑/↓
Delete Word Left	Ctrl+Backspace	Ctrl+Opt+Backspace
Delete Word Right		Option+Delete
Delete to Line End		Ctrl+K
Delete to Line Start		Option+Backspace
Indent	Tab (at start of line)	Tab (at start of line)
Outdent	Shift+Tab	Shift+Tab
Yank line up to cursor	Ctrl+U	Ctrl+U
Yank line after cursor	Ctrl+K	Ctrl+K
Insert yanked text	Ctrl+Y	Ctrl+Y
Insert <-	**Alt+-**	**Option+-**
Insert %>%	**Ctrl+Shift+M**	**Cmd+Shift+M**
Show help for function	F1	F1
Show source code	F2	F2
New document	Ctrl+Shift+N	Cmd+Shift+N
New document (Chrome)	Ctrl+Alt+Shift+N	Cmd+Shift+Opt+N
Open document	Ctrl+O	Cmd+O
Save document	Ctrl+S	Cmd+S
Close document	Ctrl+W	Cmd+W
Close document (Chrome)	Ctrl+Alt+W	Cmd+Option+W
Close all documents	Ctrl+Shift+W	Cmd+Shift+W
Extract function	Ctrl+Alt+X	Cmd+Option+X
Extract variable	Ctrl+Alt+V	Cmd+Option+V
Reindent lines	Ctrl+I	Cmd+I
(Un)Comment lines	**Ctrl+Shift+C**	**Cmd+Shift+C**
Reflow Comment	Ctrl+Shift+/	Cmd+Shift+/
Reformat Selection	Ctrl+Shift+A	Cmd+Shift+A
Select within braces	Ctrl+Shift+E	Cmd+Shift+E
Show Diagnostics	Ctrl+Shift+Alt+P	Cmd+Shift+Opt+P
Transpose Letters		Ctrl+T
Move Lines Up/Down	Alt+↑/↓	Option+↑/↓
Copy Lines Up/Down	Shift+Alt+↑/↓	Cmd+Option+↑/↓
Add New Cursor Above	Ctrl+Alt+Up	Ctrl+Option+Up
Add New Cursor Below	Ctrl+Alt+Down	Ctrl+Option+Down
Move Active Cursor Up	Ctrl+Alt+Shift+Up	Ctrl+Option+Shift+Up
Move Active Cursor Down	Ctrl+Alt+Shift+Down	Ctrl+Opt+Shift+Down
Find and Replace	Ctrl+F	Cmd+F
Use Selection for Find	Ctrl+F3	Cmd+E
Replace and Find	Ctrl+Shift+J	Cmd+Shift+J

WHY RSTUDIO SERVER PRO?

RSP extends the the open source server with a commercial license, support, and more:

- open and run multiple R sessions at once
- tune your resources to improve performance
- edit the same project at the same time as others
- see what you and others are doing on your server
- switch easily from one version of R to a different version
- Integrate with your authentication, authorization, and audit practices

Download a free 45 day evaluation at
www.rstudio.com/products/rstudio-server-pro/

5 DEBUG CODE

	Windows/Linux	Mac
Toggle Breakpoint	Shift+F9	Shift+F9
Execute Next Line	F10	F10
Step Into Function	Shift+F4	Shift+F4
Finish Function/Loop	Shift+F6	Shift+F6
Continue	Shift+F5	Shift+F5
Stop Debugging	Shift+F8	Shift+F8

6 VERSION CONTROL

	Windows/Linux	Mac
Show diff	Ctrl+Alt+D	Ctrl+Option+D
Commit changes	Ctrl+Alt+M	Ctrl+Option+M
Scroll diff view	Ctrl+↑/↓	Ctrl+↑/↓
Stage/Unstage (Git)	Spacebar	Spacebar
Stage/Unstage and move to next	Enter	Enter

7 MAKE PACKAGES

	Windows/Linux	Mac
Build and Reload	Ctrl+Shift+B	Cmd+Shift+B
Load All (devtools)	**Ctrl+Shift+L**	**Cmd+Shift+L**
Test Package (Desktop)	**Ctrl+Shift+T**	**Cmd+Shift+T**
Test Package (Web)	Ctrl+Alt+F7	Cmd+Opt+F7
Check Package	Ctrl+Shift+E	Cmd+Shift+E
Document Package	**Ctrl+Shift+D**	**Cmd+Shift+D**

8 DOCUMENTS AND APPS

	Windows/Linux	Mac
Preview HTML (Markdown, etc.)	Ctrl+Shift+K	Cmd+Shift+K
Knit Document (knitr)	**Ctrl+Shift+K**	**Cmd+Shift+K**
Compile Notebook	Ctrl+Shift+K	Cmd+Shift+K
Compile PDF (TeX and Sweave)	Ctrl+Shift+K	Cmd+Shift+K
Insert chunk (Sweave and Knitr)	Ctrl+Alt+I	Cmd+Option+I
Insert code section	Ctrl+Shift+R	Cmd+Shift+R
Re-run previous region	Ctrl+Shift+P	Cmd+Shift+P
Run current document	Ctrl+Alt+R	Cmd+Option+R
Run from start to current line	**Ctrl+Alt+B**	**Cmd+Option+B**
Run the current code section	**Ctrl+Alt+T**	**Cmd+Option+T**
Run previous Sweave/Rmd code	Ctrl+Alt+P	Cmd+Option+P
Run the current chunk	Ctrl+Alt+C	Cmd+Option+C
Run the next chunk	Ctrl+Alt+N	Cmd+Option+N
Sync Editor & PDF Preview	Ctrl+F8	Cmd+F8
Previous plot	Ctrl+Alt+F11	Cmd+Option+F11
Next plot	Ctrl+Alt+F12	Cmd+Option+F12
Show Keyboard Shortcuts	**Alt+Shift+K**	**Option+Shift+K**

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Write Code

Navigate tabs

Open in new window

Save

Find and replace

Compile as notebook

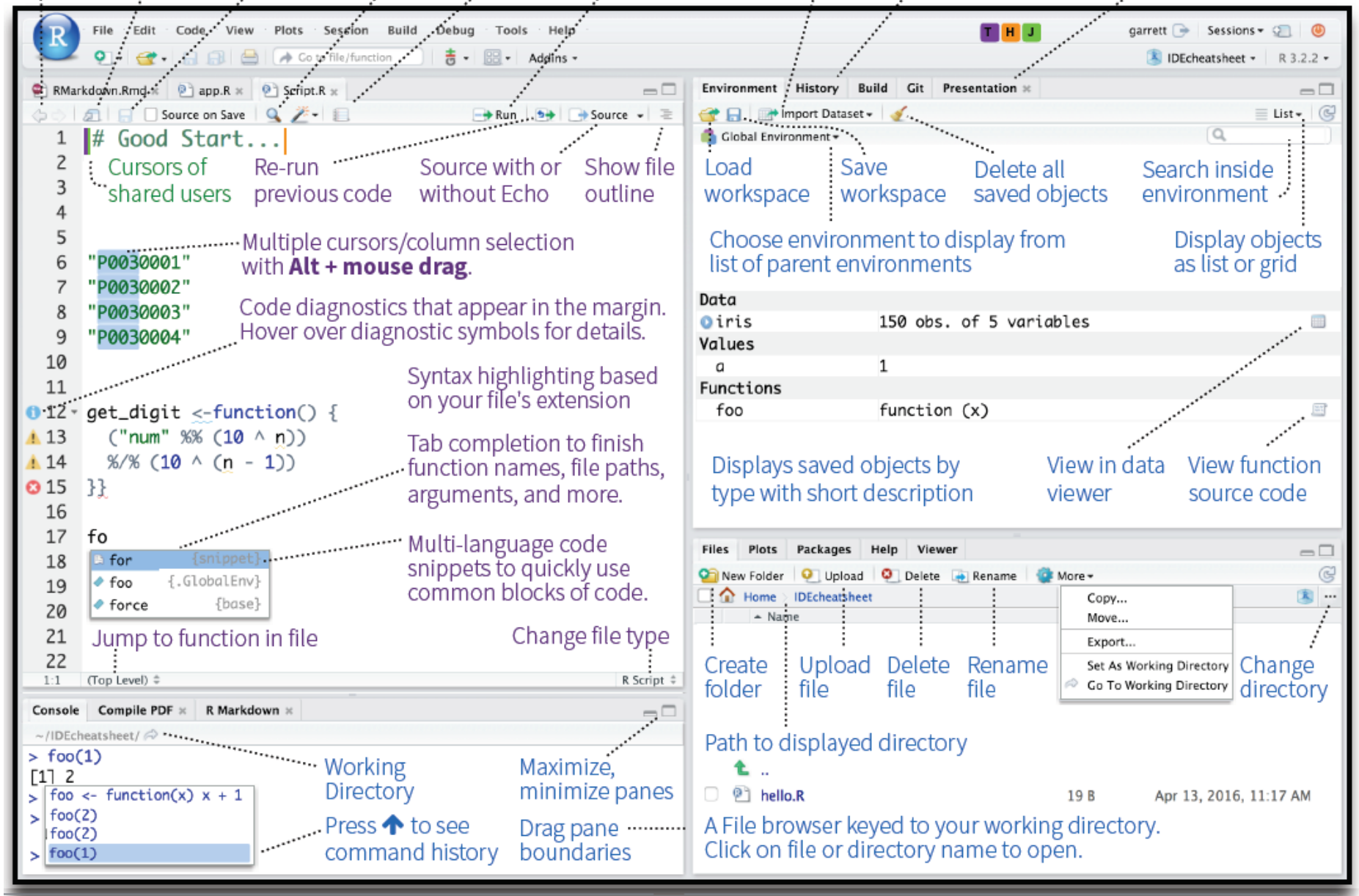
Run selected code

R Support

Import data with wizard

History of past commands to run/copy

Display .RPres slideshows **File > New File > R Presentation**



Documents and Apps

Open Shiny, R Markdown, knitr, Sweave, LaTeX, .Rd files and more in Source Pane

Check spelling
Render output
Choose output format
Choose output location
Insert code chunk

RMarkdown.Rmd | app.R | Script.R

Knit HTML | Run

Jump to previous chunk
Jump to next chunk
Run selected lines
Publish to server
Show file outline

Access markdown guide at
Help > Markdown Quick Reference

Jump to chunk
Set knitr chunk options
Run this and all previous code chunks
Run this code chunk

```{r pressure, echo=FALSE}
plot(pressure)
```

15:1 (Top Level) R Markdown

"Data comes in many formats, but R prefers just one: tidy data. "

- Garrett Grolemund

Tidy data

A data set is **tidy** if:

1. Each **variable** is in its own **column**
2. Each **observation** is in its own **row**
3. Each **value** is in its own **cell**

Also see these papers, in your "other resources" folder:

Wickham, 2014: *Tidy Data*

Broman and Woo, 2017: *Data Organization in Spreadsheets*

www.tidyverse.org