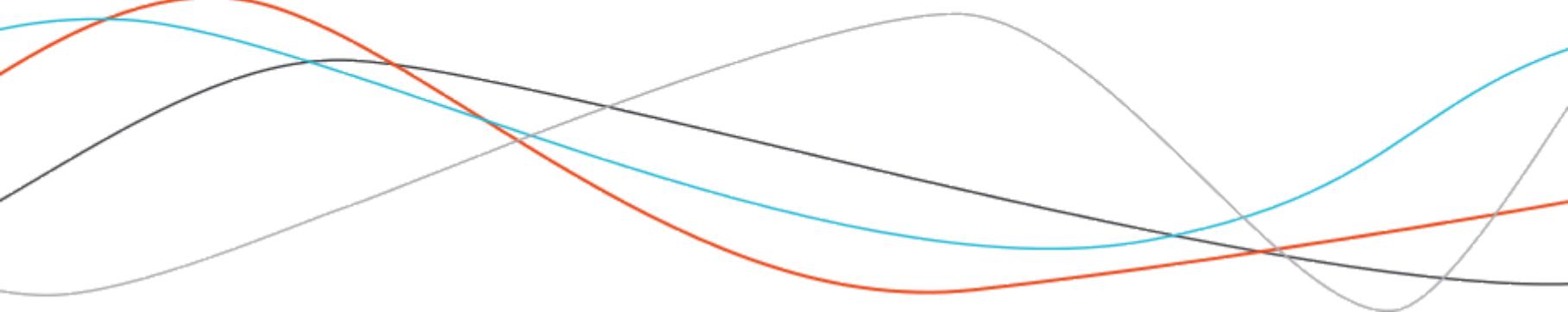




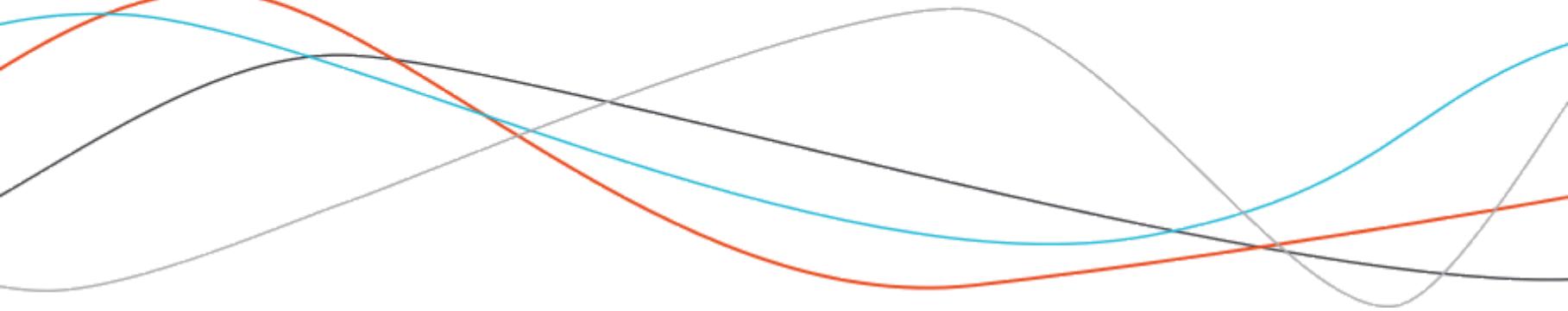
Building Successful Shiny Apps with {golem}

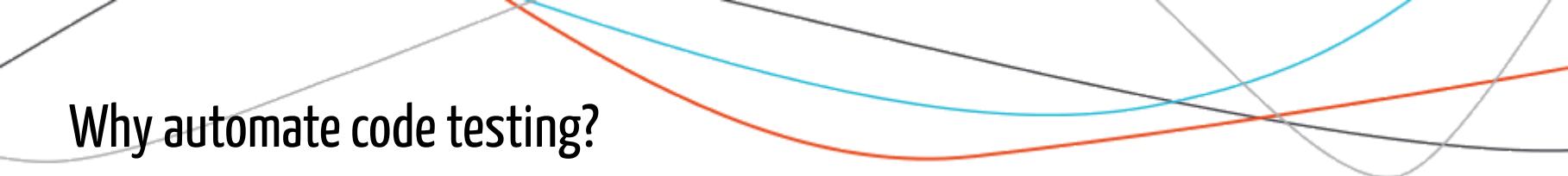
Colin Fay - ThinkR

PART 04 TEST AND SEND



*Everything which is not tested will, at last,
break.*

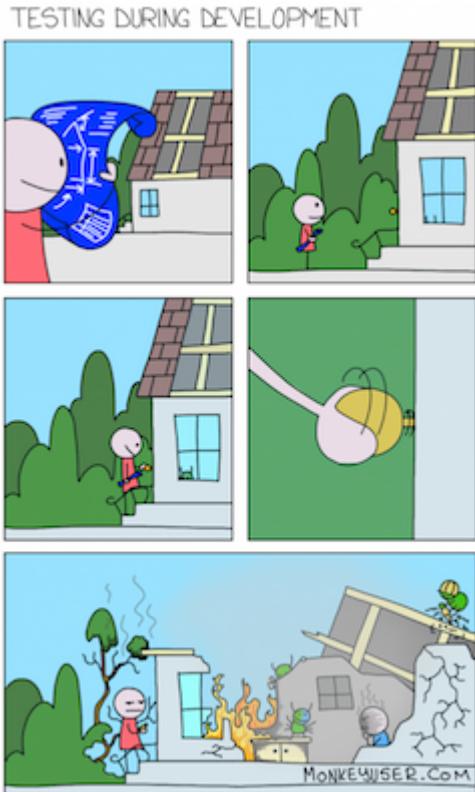




Why automate code testing?

- To save time!
- Work with others
- Transfer the project
- Long term stability

Write tests before it's too late



Use test in a "defensive programming" approach to prevent bugs.

Don't trust yourself in 6 months.

Be sure to send in production a package with minimum bugs.

Good news: you're already writing test, you just didn't know that before.

What do we test

- Focus on business logic testing: it's more important to test that the algorithm is still accurate than testing the UI
- As we've separated business logic from application logic, we use package development testing tools
- We'll use the `{testthat}` 

01_start.R

```
## Init Testing Infrastructure ----  
## Create a template for tests  
golem::use_recommended_tests()
```

Recommended tests

02_dev.R

```
## Tests ----  
## Add one line by test you want to create  
usethis::use_test( "app" )
```

Add custom test

Writing custom tests

```
test_that( "details series 1", {  
  test1a  
  test1b  
}  
)  
  
test_that("details series 2", {  
  test2a  
  test2b  
}  
)
```

Test functions

- Start with `expect_*`
- Take two elements: Actual result & the expected result.
- If the test is not passed, the function returns an error. If the test passes, the function returns nothing.

```
library(testthat, warn.conflicts = FALSE)

expect_equal(10, 10)

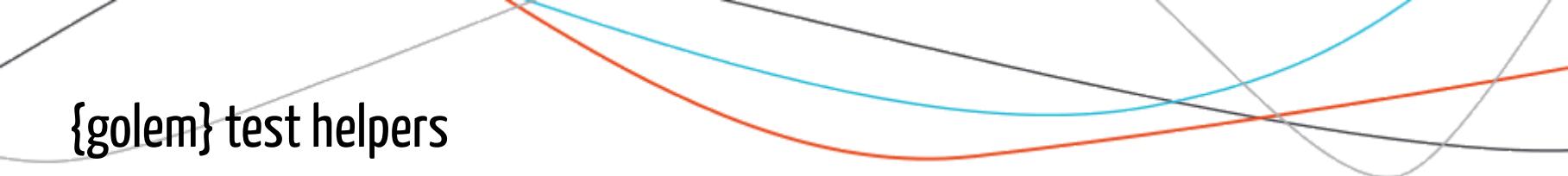
a <- sample(1:10, 1)
b <- sample(1:10, 1)
expect_equal(a+b, 200)
```

Error: a + b not equal to 200.
1/1 mismatches
[1] 4 - 200 == -196

{testthat} expectations

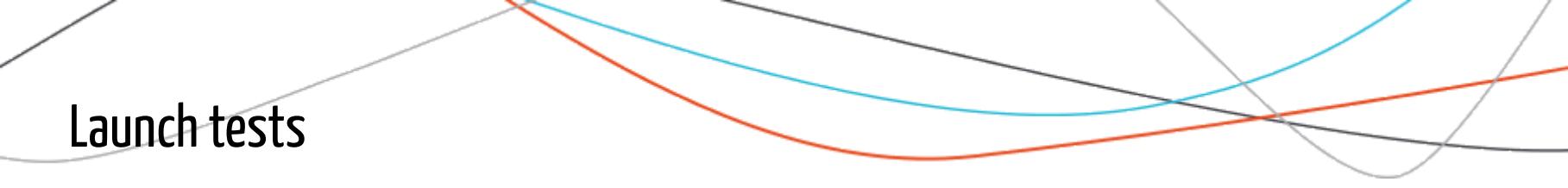
```
library(testthat)
grep("expect", ls(package:testthat), value = TRUE)
```

```
[1] "expect"                      "expect_condition"
[3] "expect_cpp_tests_pass"        "expect_equal"
[5] "expect_equal_to_reference"    "expect_equivalent"
[7] "expect_error"                 "expect_failure"
[9] "expect_false"                 "expect_gt"
[11] "expect_gte"                   "expect_identical"
[13] "expect_invisible"             "expect_is"
[15] "expect_known_failure"         "expect_known_hash"
[17] "expect_known_output"          "expect_known_value"
[19] "expect_length"                "expect_less_than"
[21] "expect_lt"                     "expect_lte"
[23] "expect_mapequal"              "expect_match"
[25] "expect_message"               "expect_more_than"
[27] "expect_named"                 "expect_null"
[29] "expect_output"                 "expect_output_file"
[31] "expect_reference"              "expect_s3_class"
[33] "expect_s4_class"               "expect_setequal"
[35] "expect_silent"                  "expect_success"
[37] "expect_that"                   "expect_true"
[39] "expect_type"                   "expect_vector"
```



{golem} test helpers

- `golem::expect_html_equal()`
- `golem::expect_shinytag()`
- `golem::expect_shinytaglist()`



Launch tests

```
devtools::test()
```

Launches only the tests infrastructure

```
devtools::check()
```

Launches the tests + a series of default tests

R CMD check

To test the code more globally, in the command line (i.e. in the terminal): R CMD check.

Or simply the `devtools::check()` function in your R session.

More tests are performed with `check` than with `devtools::test()`, which "only" performs the tests in the test folder.

This command runs around 50 different tests.

Is performed when you click the "Check" button on the Build tab of RStudio.

Test with rhub

{rhub} is a package that allows you to test for several OS:

```
library(rhub)  
ls("package:rhub")
```

```
[1] "check"                      "check_for_cran"  
[3] "check_on_centos"            "check_on_debian"  
[5] "check_on_fedora"             "check_on_linux"  
[7] "check_on_macos"              "check_on_solaris"  
[9] "check_on_ubuntu"               "check_on_windows"  
[11] "check_with_rdevel"            "check_with_roldrel"  
[13] "check_with_rpatched"          "check_with_rrelease"  
[15] "check_with_sanitizers"        "check_with_valgrind"  
[17] "get_check"                   "last_check"  
[19] "list_my_checks"                "list_package_checks"  
[21] "list_validated_emails"         "local_check_linux"  
[23] "local_check_linux_images"      "platforms"  
[25] "validate_email"
```

Test with rhub

```
remotes::install_github("r-hub/rhub")
# or
install.packages("rhub")
# verify your email
library(rhub)
validate_email()
```

```
— Choose email address to (re)validate (or 0 to exit)

1: colin@thinkr.fr
2: New email address

Selection: 1
Please check your emails for the r-hub access token.
Token:
```

Test with rhub

```
rhub::check()
```

Which platforms are supported?

```
rhub::platforms()
```

debian-clang-devel:

 Debian Linux, R-devel, clang, ISO-8859-15 locale

debian-gcc-devel:

 Debian Linux, R-devel, GCC

debian-gcc-devel-nold:

 Debian Linux, R-devel, GCC, no long double

debian-gcc-patched:

 Debian Linux, R-patched, GCC

debian-gcc-release:

 Debian Linux, R-release, GCC

fedora-clang-devel:

 Fedora Linux, R-devel, clang, gfortran

fedora-gcc-devel:

 Fedora Linux, R-devel, GCC

linux-x86_64-centos6-epel:



CentOS 6, stock R from EPEL

Test with rhub

```
> rhub::check()  
  
— Choose build platform  
  
1: Debian Linux, R-devel, GCC (debian-gcc-devel)  
2: Debian Linux, R-patched, GCC (debian-gcc-patched)  
3: Debian Linux, R-release, GCC (debian-gcc-release)  
4: Fedora Linux, R-devel, clang, gfortran (fedora-clang-devel)  
5: Fedora Linux, R-devel, GCC (fedora-gcc-devel)  
6: CentOS 6, stock R from EPEL (linux-x86_64-centos6-epel)  
7: CentOS 6 with Redhat Developer Toolset, R from EPEL (linux-x86_64-centos6-epel-rdt)  
8: Debian Linux, R-devel, GCC ASAN/UBSAN (linux-x86_64-rocker-gcc-san)  
9: macOS 10.11 El Capitan, R-release (experimental) (macos-elcapitan-release)  
10: macOS 10.9 Mavericks, R-oldrel (experimental) (macos-mavericks-oldrel)  
11: Oracle Solaris 10, x86, 32 bit, R-patched (experimental) (solaris-x86-patched)  
12: Ubuntu Linux 16.04 LTS, R-devel, GCC (ubuntu-gcc-devel)  
13: Ubuntu Linux 16.04 LTS, R-release, GCC (ubuntu-gcc-release)  
14: Ubuntu Linux 16.04 LTS, R-devel with rchk (ubuntu-rchk)  
15: Windows Server 2008 R2 SP1, R-devel, 32/64 bit (windows-x86_64-devel)  
16: Windows Server 2008 R2 SP1, R-oldrel, 32/64 bit (windows-x86_64-oldrel)  
17: Windows Server 2008 R2 SP1, R-patched, 32/64 bit (windows-x86_64-patched)  
18: Windows Server 2008 R2 SP1, R-release, 32/64 bit (windows-x86_64-release)  
  
Selection: 19  
Enter an item from the menu, or 0 to exit  
Selection: 10  
  
- Building package  
- Uploading package  
- Preparing build, see status at  
  http://builder.r-hub.io/status/attempt_0.1.1.tar.gz-94cfafe4db974ff4b99759ce65f47823  
- Build started  
  
> |
```

r-hub Builder Email not verified

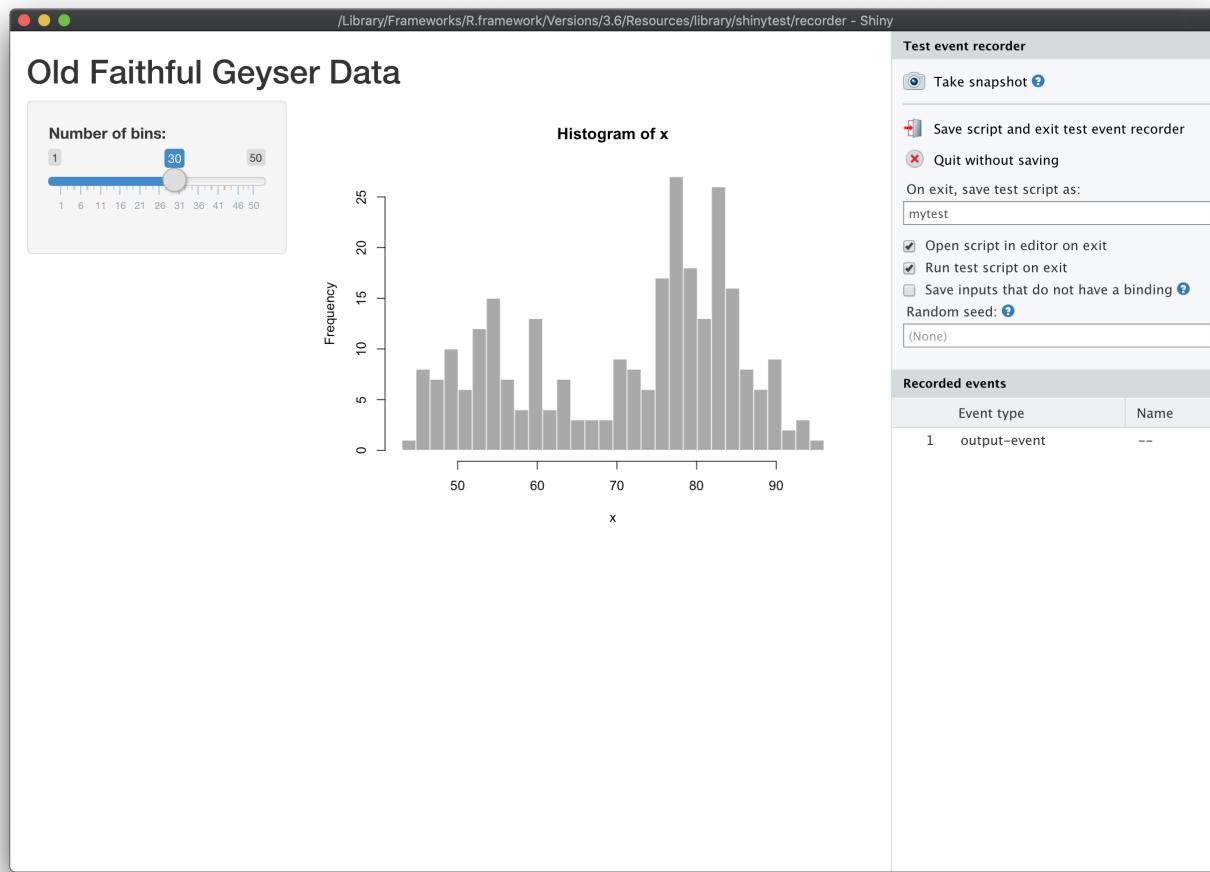
```
1: #> * checking for code/documentation mismatches ... OK  
12: #> * checking Rd usage sections ... OK  
125: #> * checking Rd contents ... OK  
126: #> * checking for unstated dependencies in examples ... OK  
127: #> * checking installed files from 'inst/doc' ... OK  
128: #> * checking files in 'vignettes' ... OK  
129: #> * checking examples ... OK  
130: #> * checking for unstated dependencies in 'tests' ... OK  
131: #> * checking tests ...  
132: #> Running 'testthat.R'  
133: #> OK  
134: #> * checking for unstated dependencies in vignettes ... OK  
135: #> * checking package vignettes in 'inst/doc' ... OK  
136: #> * checking running R code from vignettes ...  
137: #> * attempt.Rnd' using 'UTF-8' ... OK  
138: #> * building vignettes ... OK  
139: #> * checking re-building of vignette outputs ... OK  
140: #> * checking PDF version of manual ... OK  
141: #> * DONE  
142: #> Status: OK  
143: #> Saving artifacts  
144: #> Cleaning up user and home directory  
145: #> SSH: Connecting from host [macos-Mac-2.local]  
146: #> SSH: Connecting with configuration [files] ...  
147: #> SSH: Disconnecting configuration [files] ...  
148: #> SSH: Transferred 0 file(s)  
149: #> Build step 'Send files or execute commands over SSH' changed build result to SUCCESS  
150: #> Pinging https://builder.r-hub.io/build/SUCCESS/attemp_0.1.1.tar.gz-94cfafe4db974ff4b99759ce65f47823/2018-01-16T07:31:53Z  
151: #> {"status":"ok"}  
152: #> Finished: SUCCESS
```

Terms of use - R consortium

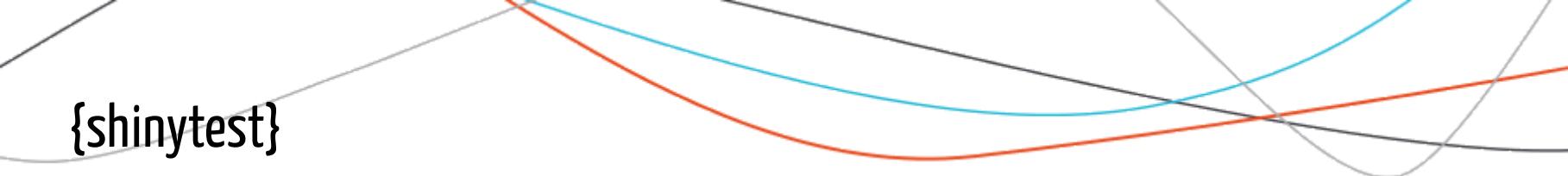
{shinytest}

```
golem::add_rstudioconnect_file()  
shinytest::recordTest("...")
```

{shinytest}



{shinytest}



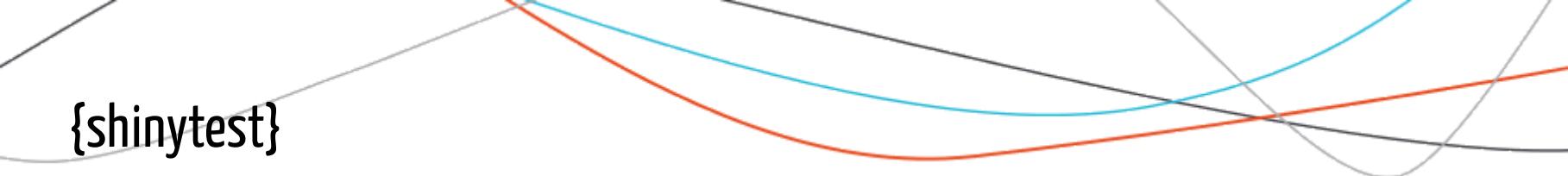
A screenshot of the RStudio interface showing the execution of a shinytest script. The console output indicates the setup of a Shiny application and the running of a test named mytest.R. The test is successful, reporting no changes.

```
~/Seafile/documents_colin/R/thinkrinternals/supports/inst/exos/r6-shiny/4-logbig/applogcorrection - master - RStudio
app_server.R mod_admin.R app.R mytest.R app.R mytest.R r6.R Compare Results Run Tests
Console Terminal
~/Seafile/documents_colin/R/thinkrinternals/supports/inst/exos/r6-shiny/4-logbig/applogcorrection - master - RStudio
C> Listening on http://127.0.0.1:6906
Saved test code to /Users/colin/Seafile/documents_colin/R/thinkrinternals/supports/inst/exos/r6-shiny/4-logbig/applogcorrection/plop/tests/mytest.R
Running mytest.R
==== Comparing mytest...
No existing snapshots at mytest-expected/. This is a first run of
Updating baseline results at plop/tests/mytest-expected...
Renaming plop/tests/mytest-current
=> plop/tests/mytest-expected.
> | 
Environment Files Plots Packages Help Build Viewer
Install and Restart Check More
==> Testing Shiny application using 'shinytest'
Running mytest.R
==== Comparing mytest... No changes.
Test complete
```

1:1 (Top Level) R Script

History Connections Git

{shinytest}

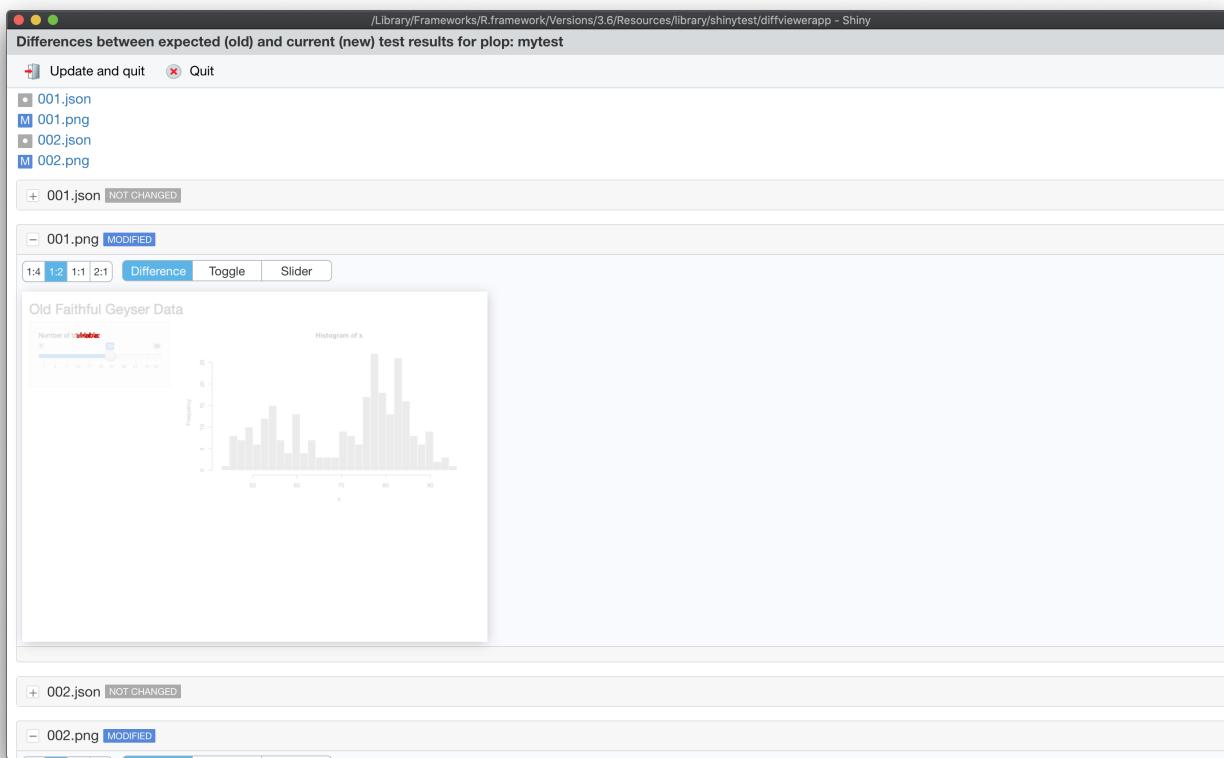


A screenshot of the RStudio IDE interface. The title bar shows the path: ~/Seafile/documents_colin/R/thinkrinternals/supports/inst/exos/r6-shiny/4-logbig/applogcorrection - master - RStudio. The top menu bar includes File, Edit, View, Insert, Tools, Plots, Packages, Help, and Build. The left sidebar lists several R files: app_server.R, mod_admin.R, app.R, mytest.R, r6.R, Compare Results, and Run Tests. The main workspace contains the following R code:

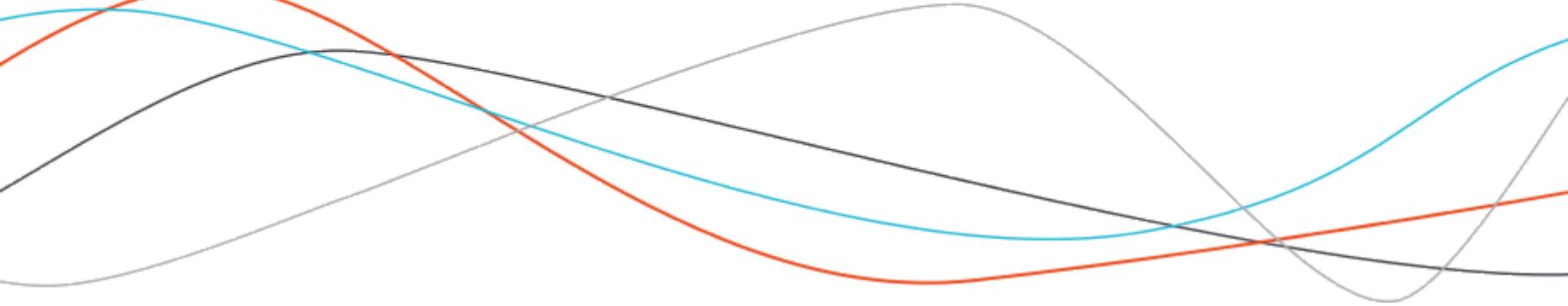
```
1 app <- ShinyDriver$new("../")
2 app$snapshotInit("mytest")
3
4 app$snapshot()
5 app$setInputs(bins = 1)
6 app$setInputs(bins = 36)
7 app$snapshot()
```

The right pane is divided into two sections: Console and Terminal. The Console section shows the output of running mytest.R, which includes messages about listening on port 6906, saving test code, running mytest, and updating baseline results. The Terminal section shows the command plop/tests/mytest-current => plop/tests/mytest-expected. The status bar at the bottom indicates "Line 0 Differences detected in mytest." The bottom navigation bar includes History, Connections, Git, and R Script.

{shinytest}



SEND TO PRODUCTION



Send to prod

- Once everything is tested, you can send to prod using `{golem}`
- Deploy on a server, or build as a `tar.gz` with `pkgbuild::build()`

```
## RStudio ----  
## If you want to deploy on RStudio  
related platforms  
golem::add_rstudioconnect_file()  
golem::add_shinyappsioc_file()  
golem::add_shinyserver_file()
```

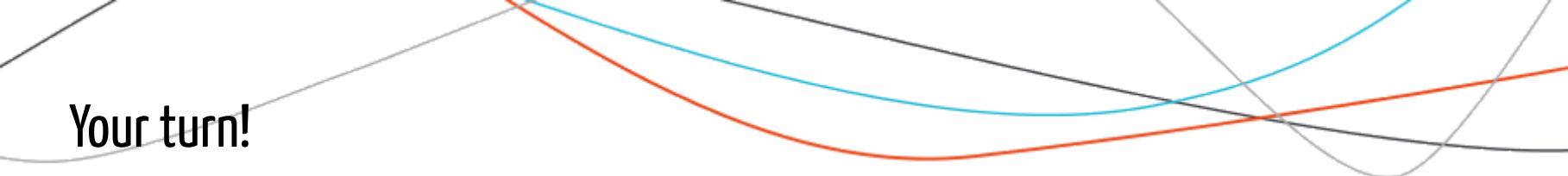
```
## Docker ----  
## If you want to deploy via a  
generic Dockerfile  
golem::add_dockerfile()  
## If you want to deploy to  
ShinyProxy  
golem::add_dockerfile_shinyproxy()  
## If you want to deploy to Heroku  
golem::add_dockerfile_heroku()
```

Demo time 



LIVE CODING?

I TOO LIKE TO LIVE DANGEROUSLY.



Your turn!

<https://github.com/ColinFay/golem-joburg/tree/master/exo-part-4>