Grading Interactive Tutorials in R

A Lightning Talk

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Daniel Chen

- PhD Student at Virginia Tech (Genetics, Bioinformatics, and Computational Biology)

  - Studying and creating materials for medical practitioners (MD, DO, NP, RN, PA, etc) data science skills

- Intern at RStudio

  - Worked with Garrett Grolemund and Barret Schloerke
  - Education Team
  - `{ gradethis }` package
  - Grading tools for teachers to use with `{ learnr }`

Interactive Tutorials for R

The `learnr` package turns any R Markdown document into an interactive tutorial

- https://rstudio.github.io/learnr/

You can now add sections in a tutorial to reinforce or access learning objectives.

1. Narrative, figures, illustrations, and equations.
2. Videos (supported services include YouTube and Vimeo).
3. Interactive Shiny components.
4. **Code exercises (R code chunks that users can edit and execute directly).**
5. **Quiz questions.**

Examples:

1. https://jjallaire.shinyapps.io/learnr-tutorial-01-data-basics/
2. https://jjallaire.shinyapps.io/learnr-tutorial-03a-data-manip-filter
3. https://jjallaire.shinyapps.io/learnr-tutorial-03c-data-manip-summarise/

Modify this code so that it prints only the first 5 rows of the `mtcars` dataset:

```
1  head(mtcars, n = 5)
2
3
```

mpg <dbl>	cyl <dbl>	disp <dbl>	hp <dbl>	drat <dbl>	wt <dbl>	qsec <dbl>	vs <dbl>	am <dbl>	gear <dbl>
21.0	6	160	110	3.90	2.620	16.46	0	1	4
21.0	6	160	110	3.90	2.875	17.02	0	1	4
22.8	4	108	93	3.85	2.320	18.61	1	1	4
21.4	6	258	110	3.08	3.215	19.44	1	0	3
18.7	8	360	175	3.15	3.440	17.02	0	0	3

5 rows | 1-10 of 11 columns

Modify this plot to use the `cyl` variable rather than the `wt` variable:
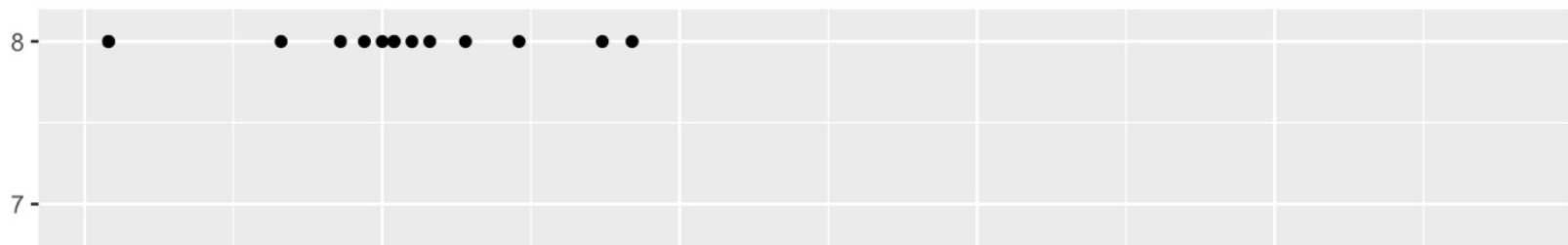
Exercise   💡 Hint   ▶ Run Code   ☑ Submit Answer

```
1  library(ggplot2)
2  qplot(mpg, cyl, data = mtcars)
3
```

Grading student submitted answers

{ gradethis }

- https://github.com/rstudio-education/gradethis
- https://rstudio-education.github.io/gradethis/

Not just tell you the solution is wrong, but gives a way for

1. The instructor to give feedback
2. Give you a hint where your code is incorrect
    - You used `tidyr::spread` where I expected a call to `tidyr::pivot_wider`
    - You passed in 3 where I expected 2

Demo

https://github.com/rstudio-education/gradethis/tree/vignettes

Thanks

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Gradethis: https://github.com/rstudio-education/gradethis

Learnr: https://rstudio.github.io/learnr/