Common Coding Issues and How to Debug

David Gerard

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Learning Objectives

- Practice reading common error messages.
- Learn good strategies to debugging.

Strategies to Debug

- Run your code often so that you can spot errors early. Don't try to code everything at once and then run the whole thing. The earlier you spot a mistake, the easier it will be to debug.

- Read the error message very carefully. I know, there's a lot there and it's hard to weed out the important info from the excess text, but the more you practice the better you'll get at it!

- Run code one line at a time until you triangulate the location of the bug. Don't run the whole pipeline or ggplot sequence. Run it in parts.

- Do not run the whole chunk.

- Try restarting R with Session > Restart R. Sometimes, the error is caused because you changed something important (like redefining an important function by mistake).

- If you are having trouble Knitting:

    - Knit often so that you can spot errors early. The earlier you spot a bug the easier it will be to fix.
    - **Restart R** and *then* run the code one line at a time. When you knit, it will start from a blank R environment, so you want to reproduce that behavior to triangulate the bug.
    - Comment out sections of the document until it starts knitting. Uncomment sections until you find the issue.

Common Bugs

- Missing/extra Parentheses.

- Missing/extra commas

- Missing + (for ggplot)

- Missing pipe %>%

- Misspelled a function/variable name (using a lot of tab-completion helps limit the occurrence of this bug.)

- **Exercise**: Spot all of the errors below and fix the code.

```
library(tidyverse)
data("mpg")
```

```r
mpg %>%
  filter(fl %in% c("p", "r"))
  group_by(year) %>%
  summarize(mean_hwy = mean(hwy),
            mean_cty = mean(cty))

pl <- ggplot(mpg, aes(x = hwy,
                      y = cty,
                      color = drv)) +
  geom_point() +
  geom_smooth(method = lm) +
  xlab("Highway MPG") +
  ylab(City MPG) +
  ggtitle("Highway vs City MPG")
pl
```

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mpg %>%
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            mean_cty = mean(cty))

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mpg %>%
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```
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  group_by(year) %>%
  summarize(mean_hwy  mean(hwy),
            mean_cty = mean(cty))

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                      y = cty,
                      color = drv)) +
  geom_point() +
  geom_smooth(method = lm) ++
  xlab("Highway MPG") +
  ylab("City MPG") +
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  group_by(year) %>%
  summarize(mean_hwy = mean(hwy),
            mean_cty = mean(cty))

pl <- ggplot(aes(x = hwy
                 y = cty,
                 color = drv)) +
  geom_point() +
  geom_smooth(method = lm) +
  xlab("Highway MPG") +
```

```
  ylab("City MPG") +
  ggtitle("Highway vs City MPG")
pl
```

```
mpg %>%
  filter(fl %in% c("p", "r"))) %>%
  group_by(year) %>%
  summarize(mean_hwy = mean(hwy),
            mean_cty = mean(cty))

pl <- ggplot(mpg, aes(x = hwy,
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                      color = drv)) +
  geom_point() +
  geom_smooth(method = lm) +
  xlab("Highway MPG") +
  ylab("City MPG") +
  ggtitle("Highway vs City MPG""")
pl
```