

# Lecture 2.4 – Scripting & Troubleshooting Compound Code

## Specific Learning Objectives:

**3.5 – Think and work independently with code.**

**3.5.1 – Learn basic skills in debugging and troubleshooting error messages.**

**3.5.2 – Search for effective solutions and tools using online resources.**

# Up Until Now...



- We've been focusing on the basic functions of R and running single lines of code.
- The **real power** of computing is in getting the computer to do complex things for you, which often requires more than one line of code to work together in sequence.
- We'll call this **compound code** because each line compounds the next to produce a new analysis.
- Scripting (or writing) compound code is difficult, but like writing a long paper, it helps to know some strategies for how to start and build on your code!

# Data Explains Scripting Compound Code

- The **key to creating complex, compound code** is to start simple and build on it!
  - Absolutely NO ONE writes 1,000 lines of code top to bottom on the first try.
  - The more experience you have, the easier it will be to structure the code you write (what you should work on first, second, last, etc).
  - Everyone starts with *a simple thing that works* and builds on that example.
- We've already been practicing this through the first few assignments in Unit 2. Today, we'll formalize it a bit more to create a longer chunk of code.

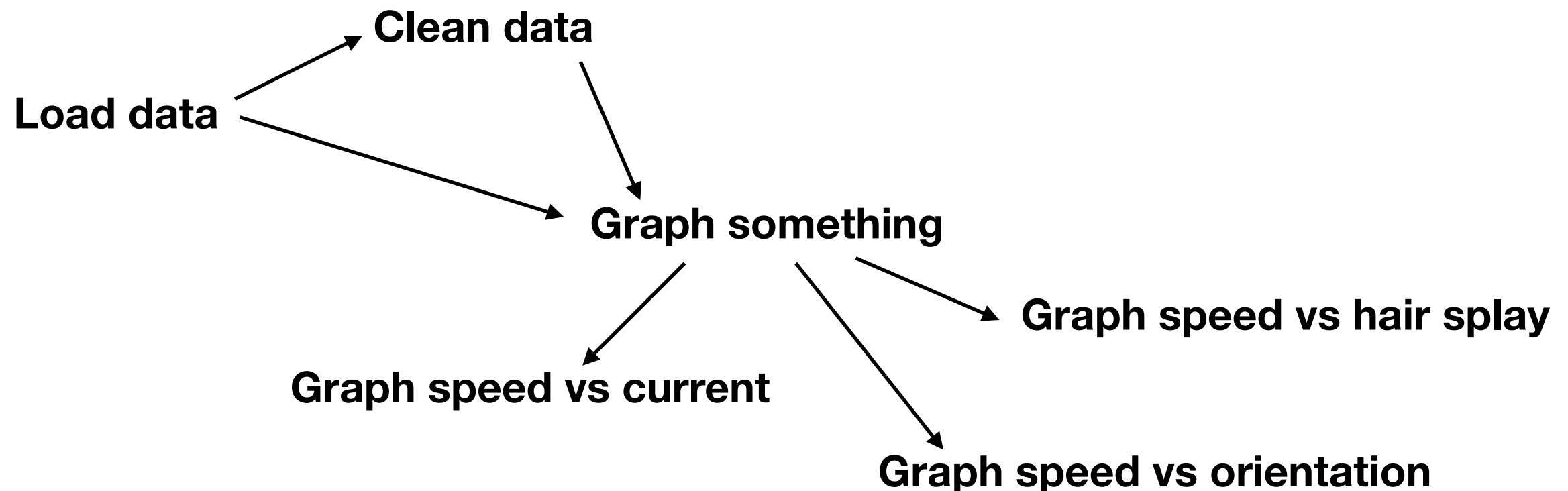


# Example Problem Walkthrough

In my dissertation, I made models of crab antennae hair arrays and measured fluid speed through the spaces in between the hairs. I had a bunch of conditions: splayed or clumped arrays, backward or forward facing, and how fast external fluid was moving.

I need to visualize these data and decide which factors are important. The data are in `bluecrab.csv` in the data zip.

**How should we approach this problem? Where to start?**

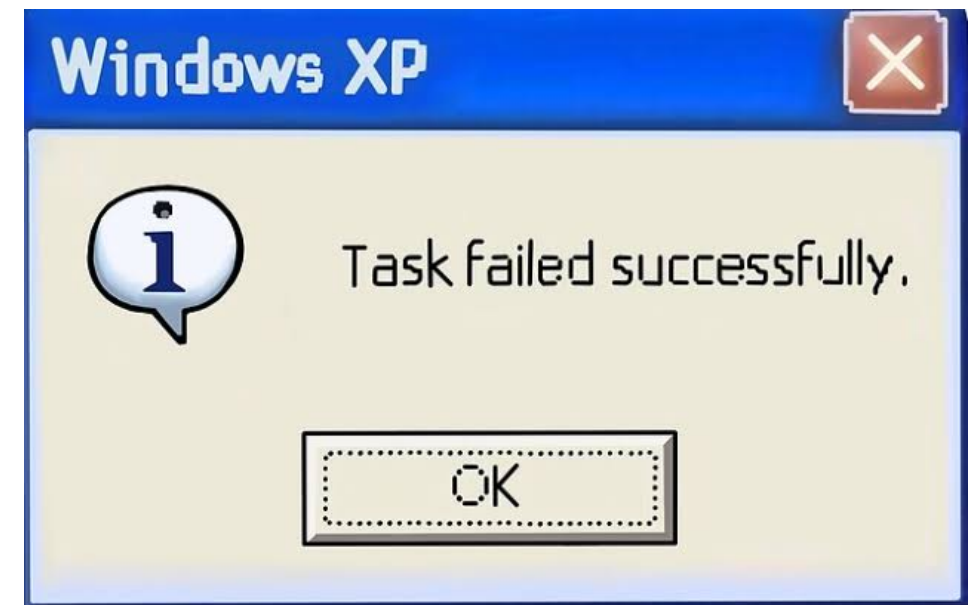


# Check Your Understanding

**Import the data set in `tomatohaul2021.csv` as `tomato.data`. Graph tomato harvest (in lbs) versus date. Make the paste tomatoes blue and the heirloom tomatoes red. Be sure there are both points and lines on the graph. Include a legend. Add an additional element!**

# What if things break?

- The best part of compounding code is that you know the spot when things worked – and then when they stopped working.



- Building code layer-by-layer and running it/fixing it at each layer will give you a good idea of what is working and what is not (usually the thing you just added).
- Be sure to SAVE your script regularly so if things break (and R Studio crashes) you won't lose progress.
- Don't forget about our 4 steps of debugging (spelling, case, syntax, environment)!
- If those don't work, split the code until you find the issue. (There may be more than one error!)
- Focus on the code you suspect doesn't work, but always be willing to sanity-check stuff you think works!

# What if things break?

- What happens if you STILL can't figure out the problem?? Try searching the error message online.
- Use part of error message that is general (not specific)
- Read several results from your search (not just one)
- Read to make sure the error and solution are close to what your problem is.
- Be sure you understand why the fix works.
- Try several solutions and check the output to see if it what you want.





# Action Items

1. **Complete Assignment 2.3 using R Markdown.**
2. **Read Davies Chapter 8 and Chang Chapters 1-2 for next time.**



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Accurate!



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