EDS 221: Scientific Programming Essentials

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2021-03-17

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Chapter 1

Scientific programming essentials for environmental data science

As nicely summarized in the title of a 2018 NCEAS post: *"The next generation of environmental scientists are data scientists"*.

Over the next year in MEDS you'll build skills to responsibly apply advanced methods in environmental modeling, spatial data analysis, and machine learning to investigate and solve environmental problems.

To get there, however, you'll need a strong foundation in programming basics like: understanding types and structures of data, basic data wrangling and visualization, algorithm development with functions, loops, and conditionals, and how to troubleshoot. While working in the weeds of programming, we'll also learn and reinforce transferable habits for reproducible workflows, robust file paths, version control, data organization, and more.

Upon these building blocks established in EDS 221, you'll be able to incrementally grow your advanced environmental data science toolkit to enter the workplace at the leading edge of quantitative methods in the field.

Chapter 2

Setup

Intro to programming and the tools we're using.

Chapter 3

Data types and structures

Data structures info...

Chapter 4

Methods

We describe our methods in this chapter.

Chapter 5

Iteration

Iteration

Chapter 6

Conditionals

Chapter 7

Logicals

Chapter 8

Functions

Chapter 9

Tidy data

Chapter 10

Data wrangling & viz in the tidyverse

Chapter 11

Troubleshooting