

ECOG 315 / ECON 181, Summer 2025
Advanced Research Methods and Statistical Programming
Week 2 Lecture Slides

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June 6, 2025

Week 2 Administrivia

- ▶ If you did not successfully issue a PR for your survey, please do that
 - ▶ Luke
 - ▶ Clinton
 - ▶ Phillippe?
 - ▶ Alejandra
- ▶ If you aren't on Discord, please accept invite
- ▶ If you are on Discord, please keep tabs on it; only means of reaching you

Actually Working with Python: Spyder

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- ▶ There are a lot of panes; I close all of them except console and editor
- ▶ Can open them later from View menu, Panes option
- ▶ Console pane: live Python environment, can run code commands one by one
- ▶ Editor pane: file editor; write scripts / programs, run with green arrow in toolbar

How to Learn Python (Outside of Class)

- ▶ We will give you hands-on instruction with Python, don't worry
- ▶ If you want to learn on your own, I recommend Kevin Sheppard's notes
- ▶ There's a copy in `/materials/setup/KevinSheppardPython.pdf`
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- ▶ It's from four years ago; current Python versions are 3.10 to 3.13
- ▶ Recommended reading order: Ch 1, 2, 4, 9, 10, 12, 18, 3, 6, 7, 5, 11, 15, 29
- ▶ Data operations: Ch 8, 16, 14, 17, 23
- ▶ More math stuff: Ch 19, 20, 21, 22
- ▶ General coding: Ch 13, 24, 25, 26, 28

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- ▶ In repo: `/code/ProcessSurveys.py` is code example to get started
- ▶ Will go over here, but I encourage you to play with and edit it

Python Programming Mentality (1/2)

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- ▶ And so on until it gets to the top-level scope– there's no more “up”!
- ▶ If it can't find the name there, then Python will throw an error

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- ▶ Python has automatic memory allocation and garbage collection
- ▶ Never need to declare memory space in advance
- ▶ Memory freed automatically when there are no “references” to object
- ▶ Can manually delete objects, but that’s rarely needed

Basic Data Structure: List

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- ▶ Exactly what it means in English: ordered list with repetition allowed
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- ▶ You can have a list as an element of a list: `C = [A, B]`
- ▶ Addition on lists is concatenation: `D = A + B`

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- ▶ Important! Index actually points *between* elements
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- ▶ Can take all elements after or before an index: `A[2:]` or `A[:3]`
- ▶ Can index from *end* of list with negative numbers

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- ▶ Can also import your own files from the same directory

Example Python Code: Processing Student Surveys

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- ▶ Written to show you a bunch of commonly useful things

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- ▶ Cells can be run individually with `Shift+Enter`

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- ▶ Manage each separately, switch between them with a single command
- ▶ We probably won't use this much, but will install more packages
- ▶ Open up Anaconda Prompt (from Windows start menu, e.g.); terminal will open

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- ▶ HARK is now available for use on your computer
- ▶ But we won't be working with it yet

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- ▶ If you want slides on Tues, you must submit them **as a PR by 1pm Tuesday**
- ▶ Please put them in PDF form (export to PDF); I do not have PowerPoint

Advice for Giving a Research Pitch

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- ▶ Slides are a memory tool and/or visual guide, not a script

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- ▶ Then state your research question **very specifically**

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- ▶ What's your angle? Why is this new, as far as you know?

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- ▶ Do you have some ideas for where to look? Only feasible if you can get the data!

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- ▶ At most **one or two** equations / econometric specifications
- ▶ What are your current concerns about this strategy? Why might it not be valid?
- ▶ Don't worry if you have none, the audience will tell you their concerns!