Replacing the Calculator

How early can we introduce literate computation?

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Reproducibility Vision

- After training, students come to expect implementation details for any computation they encounter

The Problem Set

- Written part transparent and reproducible

- Computation usually obscured

My Classroom

- Wide range of calculator aptitude
- Undergraduates who don’t recognize the term scientific computation
- How do I improve their computation ability?

First Computational Tool

- Pros
  - Simple
  - Rapid
  - Order of operations and functions
  - API cheatsheet
- Drawbacks
  - No record of keystrokes or way to review
  - Opportunity for entry errors

The Jupyter Notebook

- Read Evaluate Print Loops (REPLs) and notebooks can replace calculators with minimal disruption
- Allow reproducibility
- Allow gradual introduction of variables and other abstractions

My Classroom

- I’m experimenting with Jupyter tools in early classes

- These are presented as simple extensions of calculators, not as tools that require an understanding of programming

- This allows students to document their calculations and get feedback on methods.

- Full disclosure: I’m using Julia

Lowering Barriers

- Thank you for making these tools
- try.jupyter.org
- juliabox.org
- cloud.sagemath.org
- wakari.io