The Program In Computing Future Developments with DataX

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PIC 1 - Motivation and Inspiration

- Many PIC 10A students struggle with file management
- Two main groups of 10A students
  - Some learn the coding and the C++ rules and syntax
  - Others also new to the problem solving integrated with 10A
- Summer Bridge Program for Physical Sciences
  - Develops problem solving skills
  - Generates enthusiasm for learning and problem solving
  - Includes a successful short introduction to coding that I helped develop

PIC 1 - from Spreadsheets to Programming

- Hope to eventually be a GE class

- Some topics
  - File management
    - files, file extensions, directories
    - an organized report with data (csv), images (jpg), video (mp4)

  - Spreadsheets (Google sheets, Excel, and/or Numbers)
    - Storing data
    - Turning math to spreadsheet formulae
    - An assignment that is solved well using a Spreadsheet, where one extra task necessitates a complete rewrite to motivate...

  - Basic Python
    - ints, floats, string, lists
    - loops and functions, simple games
    - csv files, matplotlib
    - rewrite spreadsheet assignment more flexibly

PIC 16 - a Python-only track

- Currently...
  - three C++ classes: PIC 10A, PIC 10B, PIC 10C
  - two Python classes: PIC 16A, PIC 16B
  - PIC 10A is a prerequisite for PIC 16A
  - PIC 16A is the only prerequisite for PIC 16B

- Goal...
  - three Python classes: PIC 16A, PIC 16B, PIC 16C
  - PIC 10A is a **not** a prerequisite for PIC 16A
  - PIC 16B is a prerequisite for PIC 16C,
    as are Math 32A and 33A (perhaps others)

PIC 16 - a Python-only track

- PIC 16A
  - cover less
  - to distinguish it from PIC 10A
    - reading and writing CSV files
    - matplotlib and data visualization
    - NumPy
- PIC 16B
  - Include some of the more advanced current 16A topics...
    - GUIs to teach reading documentation
    - Regular expressions to encourage care when self-teaching
  - ...as well as some current 16B topics
- PIC 16C
  - Stronger focus on Machine Learning
    (hence the math prerequisites)

General Improvements to the Program

- Already headed towards a more standardized curriculum
  - Andrews wrote a PIC 10A textbook
  - Burnett and Andrews developed TA resources for PIC 10A
- Desire similar resources for other classes...
  - PIC 16A, PIC 10B, PIC 16B,
    PIC 20A, PIC 40A, PIC 16C, PIC 10C
- Need to assess modes of delivery
  - flipped classroom where appropriate
  - more structured activity led discussions
    - some existing resources for PIC 16A
      need review and development
    - use of learning assistants (LAs)
- New servers for internet programming class(!)