CS Undergrad Requirements Changes

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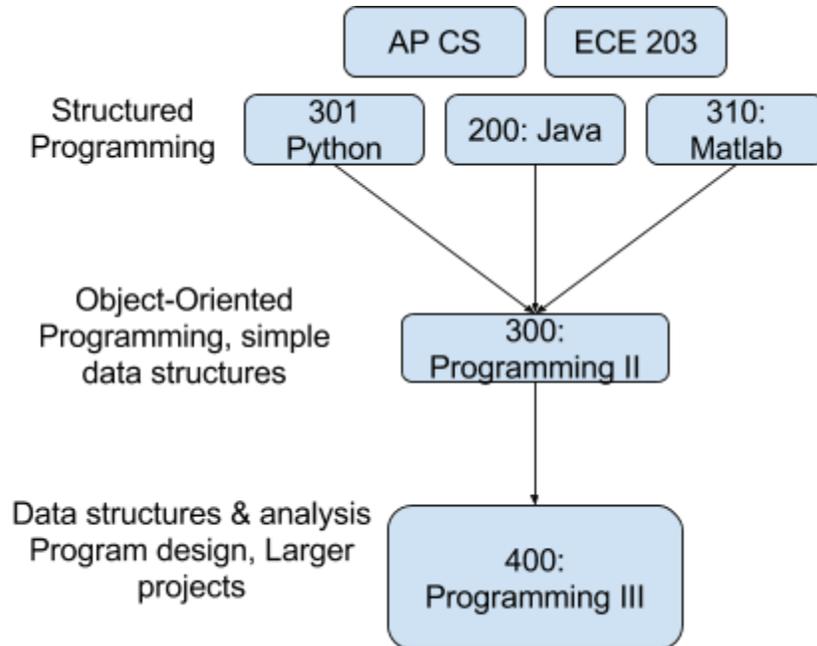
Background:

We currently have several problems in our introductory programming sequence.
- People who have taken 301 and want more CS still have to take 302. There is too much extra material to be learned for a 1-credit course, like a 368, to serve as a transition.
- Students with AP credit often have a hard time skipping right to 367, and are dissatisfied at having to take 302.
- Students often enter upper-level CS courses without enough programming experience, particular program design skills.

Proposed Changes

To address these problems, we propose revamping our introductory sequence.

AP CS   ECE 203

Structured Programming   301 Python   200: Java   310: Matlab

Object-Oriented Programming, simple data structures   300: Programming II

Data structures & analysis Program design, Larger projects   400: Programming III

The key features are:
- The sequence starts with one of three classes on structured programming: 301 in Python, 200 in Java, or 310 in Matlab. We will no longer offer CS 302 once this curriculum has been adopted. Compared to our current version of 302, CS 200 moves slower, covers less material, and does not talk much about object-oriented programming. Students with no programming experience can go into any of these courses and progress to the major. In addition, the material in this course approximates what is in AP Computer Science, so students can skip if if they have had the material in high school
- The second course is 300, which incorporates material from the current 302 and 367, and focuses on object-oriented programming and use (but not design) of data structures, such as lists, trees, priority queues, sorting. This course is suitable for students coming in with prior programming experience or with AP credit. Students can take a placement test to get into this course. Compared to the current version of 367, this course does not address how to design data structures.
- We add a new third course, tentatively number 400, which covers data structure design and analysis and program design. In incorporate material from the current 367, and additionally has a focus on more advanced data structures and more importantly program design skills: how to build larger programs, how to choose the right data structure for a program, etc. The course will incorporate a larger project and may touch on topical subjects, such as event-driven program, GUIs, web programming, mobile applications, etc. Many courses in CS that currently require 367 should switch to requiring 400.