Life after CS 1110

CS 1110
Introduction to Computing Using Python

[E. Andersen, A. Brazy, D. Fan, D. Gries, L. Lee,
S. Marschner, C. Van Loan, W. White]

Obvious Next Step: CS 2110

• Programming in Java
  • Basic Java syntax
  • Static vs. Dynamic Types
  • Adv. Java Topics (e.g. Threads)

• OO Theory
  • More design patterns
  • Interface vs. Implementation

• Data Structures
  • Binary Trees
  • Linked Lists
  • Graphs

Java Specific
Language Independent

Major CS Topic

CS 2110 Immediately Opens your Options

CS 2800: The Other Important Course

• CS requires a lot of math
  • Analyzing code performance
  • Analyzing data
  • Proving code correctness
• Calculus not the only math
  • Data often not “continuous”
  • Limited to specific uses
    (e.g. spatial data)
• “Grab-bag” course
  • All math needed for CS
  • Includes writing proofs

CS 2800: The Other Important Course

• Programming Languages
  x1xx (e.g. 1110, 2110)
• Scientific Computing
  x2xx (e.g. 3220, 4210)
• Data Management
  x3xx (e.g. 3300, 4320)
• Systems
  x4xx (e.g. 3410, 4410)
• Computational Biology
  x5xx (e.g. 3555)
• Graphics and Vision
  x6xx (e.g. 4620)
• Artificial Intelligence
  x7xx (e.g. 4758, 4700)
• Theory
  x8xx (e.g. 4810, 4820)
• Research
  x9xx (e.g. 4999)

Computer Science Course Numbers
Computer Science Course Numbers

- Programming Languages $x1xx$ (e.g. 1110, 2110)
- Scientific Computing $x2xx$ (e.g. 3220, 4210)
- Data Management $x3xx$ (e.g. 3320, 4320)
- Systems $x4xx$ (e.g. 4410)
- Computer Graphics $x5xx$ (e.g. 4620)
- Artificial Intelligence $x6xx$ (e.g. 4758, 4700)
- Theory $x8xx$ (e.g. 4810, 4820)
- Research $x9xx$ (e.g. 4999)

Programming Languages

- Adv. Language Topics
  - Functional languages
  - Streaming languages
  - Parallel programming

- Language Theory
  - New languages/compilers
  - Software verification

- Software Engineering
  - Design patterns
  - Architecture principles

Scientific Computing

- Calculus + Computing
  - Problems from other science domains
  - Process with computer
- Applications
  - Complex simulations
  - Physics (games!)
- Challenge: Performance
  - Programs can run for days!
  - How do we make faster?

Data Management

- Modern Web Apps
  - Storing user/session data
  - Coordinating users

- Databases
  - Query languages
  - Database optimization
  - Organizing your data

- Information Retrieval
  - Searching
  - Data analysis

Systems

- Building BIG software
  - Operating systems
  - Distributed applications (e.g. online, networked)
  - Cloud computing
- Also System Security
  - Though that is spread about
  - Senior/masters level classes
    - Bulk of the 5xxx courses
    - But great project courses!

Computational Health/Biology

- No undergrad classes
  - Too much to learn
  - Masters/PhD level

- Undergrad options
  - BTRY 4840: Comp. Genomics
  - BSCB department

- Stay tuned for more…
Graphics and Vision
• Not modeling/art!
• Rendering & Animation
  • Illumination/reflection
  • Cloth/hair simulation
  • Water and fluids
• Processing Images
  • Recognizing shapes
  • Assembling 3D models from 2D pictures
  • Smart cameras

Artificial Intelligence
• Not sentient computers
• Machine learning
  • Discovering patterns
  • Making predictions
• Natural Language Proc.
  • Automatic translation
  • Searching text/books
  • Voice-control interfaces
• Robotics
  • Autonomous control

Theory
• Analysis of Algorithms
  • What is possible?
  • What is feasible?
• Analysis of Structures
  • Social network theory
  • Complex data structures
• Cryptography
  • Theory side of security

What About Games?
• CS 3152, Spring only
  • Prereq: CS 2110
  • But CS 3110 a big help
  • Build game from scratch
  • Want it to be innovative
  • You own the IP
  • Interdisciplinary teams
    • 5 to 6 people on a team
    • With artists/designers
  • Final: public showcase

Games and the Designer Track
• Coding not your thing?
• INFO 3152 (co-meets)
  • Artists/designer track
  • No formal training needed
  • Submit a portfolio
• Recommend: INFO 2450
  • Start of the HCI sequence
  • How design affects the user experience
  • Fall course; no prereqs
Computer Science not your ☕️?  

Try one of our neighbors!  
- Information Science  
- Statistics  
- Operations Research & Information Engineering  
- Electrical and Computer Engineering  
  - ECE 2400 is a good next step

It's been a challenging semester given the state of the world and everyone’s individual situation.

Thank you for persevering!!!

Hope you’ve found some parts of CS1110 interesting and will find some parts useful in the future!