Life after CS 1110

CS 1110

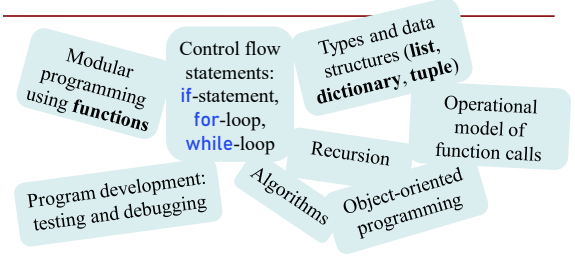
Introduction to Computing Using Python

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

Announcements

- Deadline to request alternate exam arrangement on CMS extended to tonight. Do not assume we'll be able to grant such requests. *Decisions on all pending requests are being deferred to Friday pending University guidance.*
- A6 due Friday
- Final exam study guide by Friday
- Final exam is scheduled for May 21st 1:30-4pm
- There're changes to office hours next week. Profs will have open office hours. *See the office hours calendar on course website for updates.*

You've Learned Lots in CS1110!



- Learn more through practice and using the Python API
- Learn another language?
- Take more courses?

Obvious Next Step: CS 2110

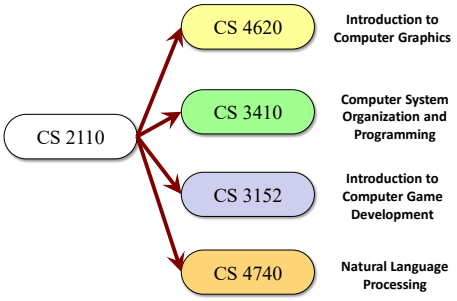
- **Programming in Java**
  - Basic Java syntax
  - Static vs. Dynamic Types
  - Adv. Java Topics (e.g. Threads)
- **OO Theory**
  - More design patterns
  - Interface vs. Implementation
- **Data Structures**
  - Binary Trees
  - Linked Lists
  - Graphs

Major CS Topic

Java Specific

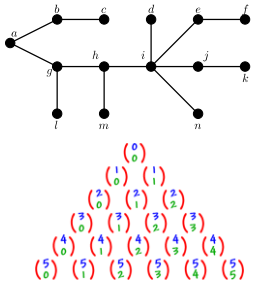
Language Independent

CS 2110 Immediately Opens your Options

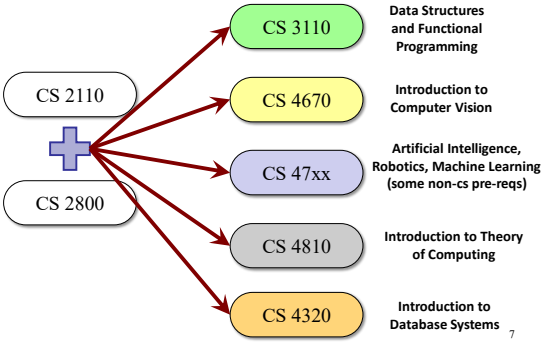


CS 2800: The Other Important Course

- 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
  - Math needed for CS
  - Includes writing proofs



CS 2110 + CS 2800 = Even More Options



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Computer Science Course Numbers

- 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. 5555)
- 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)

Level Area

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- Theory x8xx (e.g. 4810, 4820)
- Research x9xx (e.g. 4999)

Separation not perfect; there is a lot of overlap

Level Area

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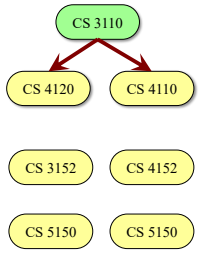
Programming Languages

- **Adv. Language Topics**
  - Functional languages
  - Streaming languages
  - Parallel programming
- **Language Theory**
  - New languages/compilers
  - Software verification
- **Software Engineering**
  - Design patterns
  - Architecture principles



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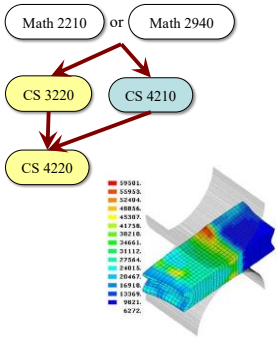
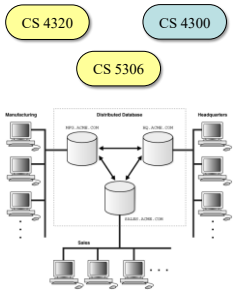
Scientific Computing

- **Computing + Calculus**
  - Problems from other science domains
  - Process with computer
- **Applications**
  - Complex simulations
  - Physics, computer graphics, robotics
- **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



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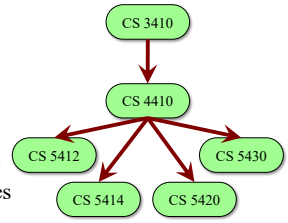
Systems

- **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!



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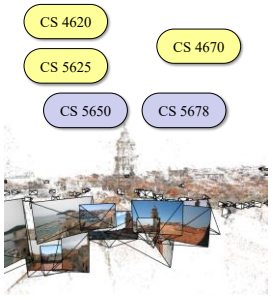
Graphics and Vision

- **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



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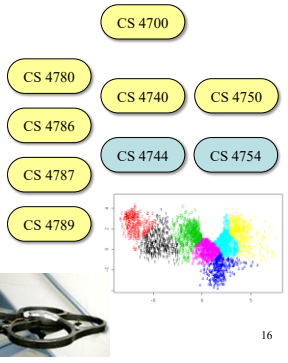
Artificial Intelligence

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



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Machine Learning

- Also in other departments as undergrad courses
  - ORIE
  - ECE
- Many grad classes
  - ASTRO
  - BME
  - MATH
  - NBA
  - SYSEN
  - and more …

Tailored to the specific areas

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Robotics

- Many classes in MAE
  - MAE 3780
  - MAE 4710
  - MAE 4780
  - MAE 67xx
- CS focus on algorithms
  - Planning/perception
  - Robot-Human interaction

There is a robotics minor!

- Take courses in MAE, CS, ECE, INFO
- Administered by MAE

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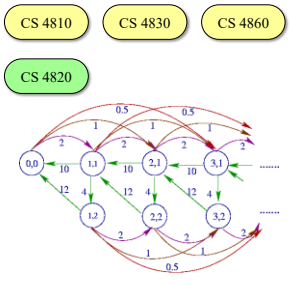
Theory

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



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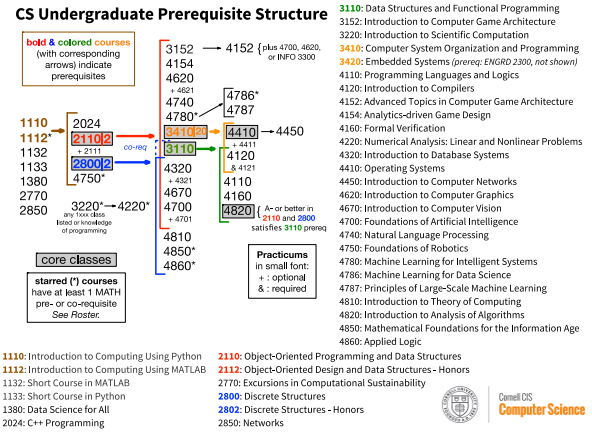
What About Games?

- 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



Computer Science not your  ?

Try one of our neighbors!

- Information Science
- Statistics and Data Science

Cornell Bowers CIS College of Computing and Information Science

- Operations Research & Information Engineering
- Electrical and Computer Engineering
  - ECE 2400 (instead of CS 2110) 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!