Announcements

Finishing Up

• Submit a course evaluation
  • Will get an e-mail for this
  • Part of the “participation grade” (e.g. clicker grade)
• Final, Dec 12th 2-4:30 pm
  • Study guide is posted
• Conflict with Final Exam?
  • e.g. > 2 finals in 24 hours
  • Submit conflicts TODAY

Review Sessions

• Wednesday 1-4 (Call Aud)
  • Call frames & diagramming
  • Classes, try-except
• Thursday 1-4 (Call Aud)
  • Generators, coroutines
  • Open question session
• Friday 2-5 (Call Aud)
  • Lists, recursion
  • Open question session

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  • Will get an e-mail for this
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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

Higher Level Computer Science Courses

• Programming Languages x1xx (e.g. 1110, 2110)
• Scientific Computing x2xx (e.g. 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)

CS 2800: The Other Important Course

• CS requires a lot of math
  • Analyzing code performance
  • Analyzing data
  • Proving code correctness
• Calculus is “wrong math”
  • Data is rarely “continuous”
  • Limited to specific uses (e.g. spatial data)
• “Grab-bag” course
  • All math needed for CS
  • Includes writing proofs

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

12/7/21

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 5xx courses
    • But great project courses!

12/7/21

Computation Health/Biology

• No undergrad classes
  • Used at CornellTech
  • Too much to learn
  • Once hoped for Ithaca
    • But hard to hire in CS
    • Faculty better fit for Bio
  • BSCB took over area
    • Now Dept of Comp Bio
    • But part of CIS school

12/7/21

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

12/7/21

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

12/7/21

Theory

• Analysis of Algorithms
  • What is possible?
  • What is feasible?

• Analysis of Structures
  • Social network theory
  • Complex data structures

• Cryptography
  • Theory side of security
  • Area responsible for founding dept. in 1965

12/7/21