Postlude

Done with CS 1110
Where to Next?
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 7th 9:00-11:30am
  ▪ Study guide is posted
• Conflict with Final Exam?
  ▪ e.g. > 2 finals in 24 hours
  ▪ Submit conflicts TODAY

Review Sessions

• Sunday 2-5 (Olin 155)
  ▪ Call frames & diagramming
  ▪ Classes, try-except
• Monday 1-4 (Olin 155)
  ▪ Lists, recursion
  ▪ Open question session
• Tuesday 1-4 (Olin 155)
  ▪ Invariants, algorithms
  ▪ Open question session

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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

11/30/17
CS 2110 Immediately Opens your Options

CS 2110

CS 4620

CS 3410

CS 3152
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

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CS 2110 + CS 2880 = Even More Options

CS 2110

CS 2800

CS 3110

CS 4670

CS 47xx

CS 4810
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)
Higher Level Computer Science Courses

- Programming Languages x1xx (e.g. 1110, 2110)
- Scientific Computing x2xx (e.g. 4210)
- Data Management x3xx (e.g. 1300, 2320)
- Systems x4xx (e.g. 1410, 2410)
- Computational Biology x5xx (e.g. 4540)
- 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)

Separation not perfect; there is a lot of overlap
Programming Languages

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

• **Language Theory**
  - New languages/compilers
  - Software verification

• **Software Engineering**
  - Design patterns
  - Architecture principles

Future Courses

- CS 3110
- CS 4120
- CS 4110
- CS 3152
- CS 4152
- CS 5150
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?

Future Courses

- CS 1132
- Math 2220
- CS 4210
- CS 4220
- CS 5643

11/30/17
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!

11/30/17
Computation Biology

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

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

• Hoping to improve…
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

Future Courses

- CS 4700
- CS 4740
- CS 4750
- CS 4758

11/30/17
Theory

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

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

• **Cryptography**
  - Theory side of security

• Perhaps the most famous group in the department
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
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- Final: public showcase

Software Engineering
Games and the Designer Track

- Coding not your thing?
- **INFO 3152** (co-meets)
  - Artists/designer track
  - No formal training needed
  - Submit me a portfolio
- **Recommend: INFO 2450**
  - Start of the HCI sequence
  - How design effects the user experience
  - Fall course; no prereqs
Good Bye!