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 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

Obvious Next Step: CS 2110

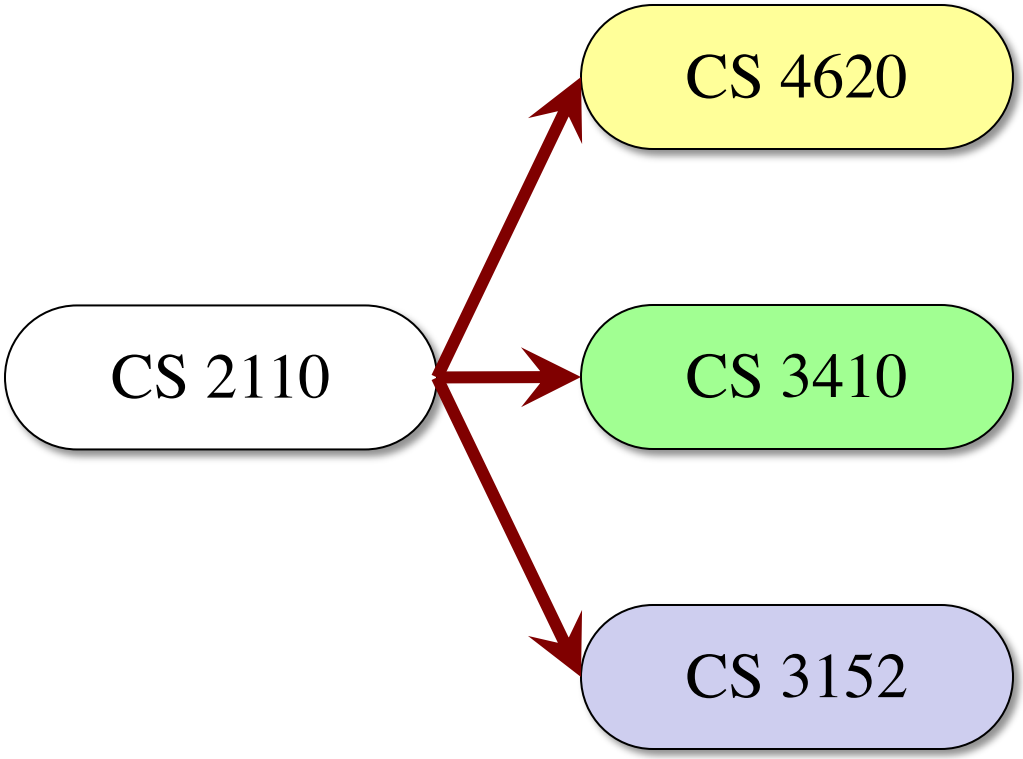
- **Programming in Java**
  - Basic Java syntax
  - Static vs. Dynamic Types
  - Adv. Java Topics (e.g. Threads)
- **OO Theory**
  - More design patterns
  - Interface vs. Implementation
- **Data Structures**
  - Binary Trees
  - Linked Lists
  - Graphs

Major CS Topic

Java Specific

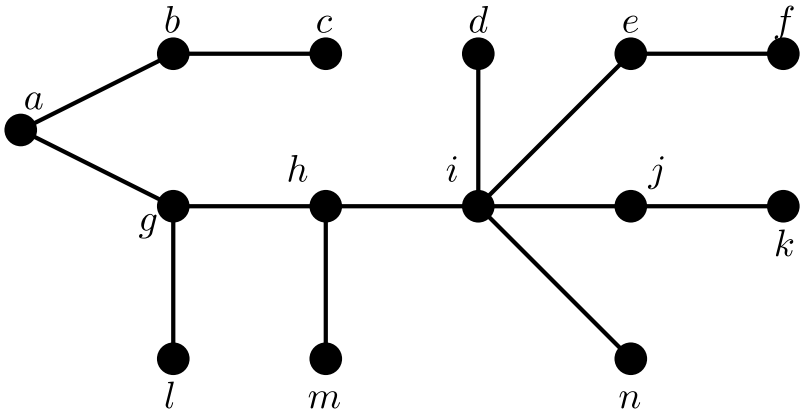
Language Independent

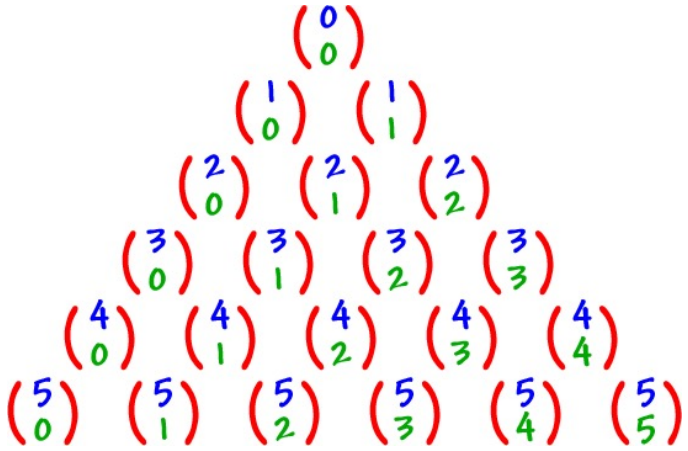
CS 2110 Immediately Opens your Options



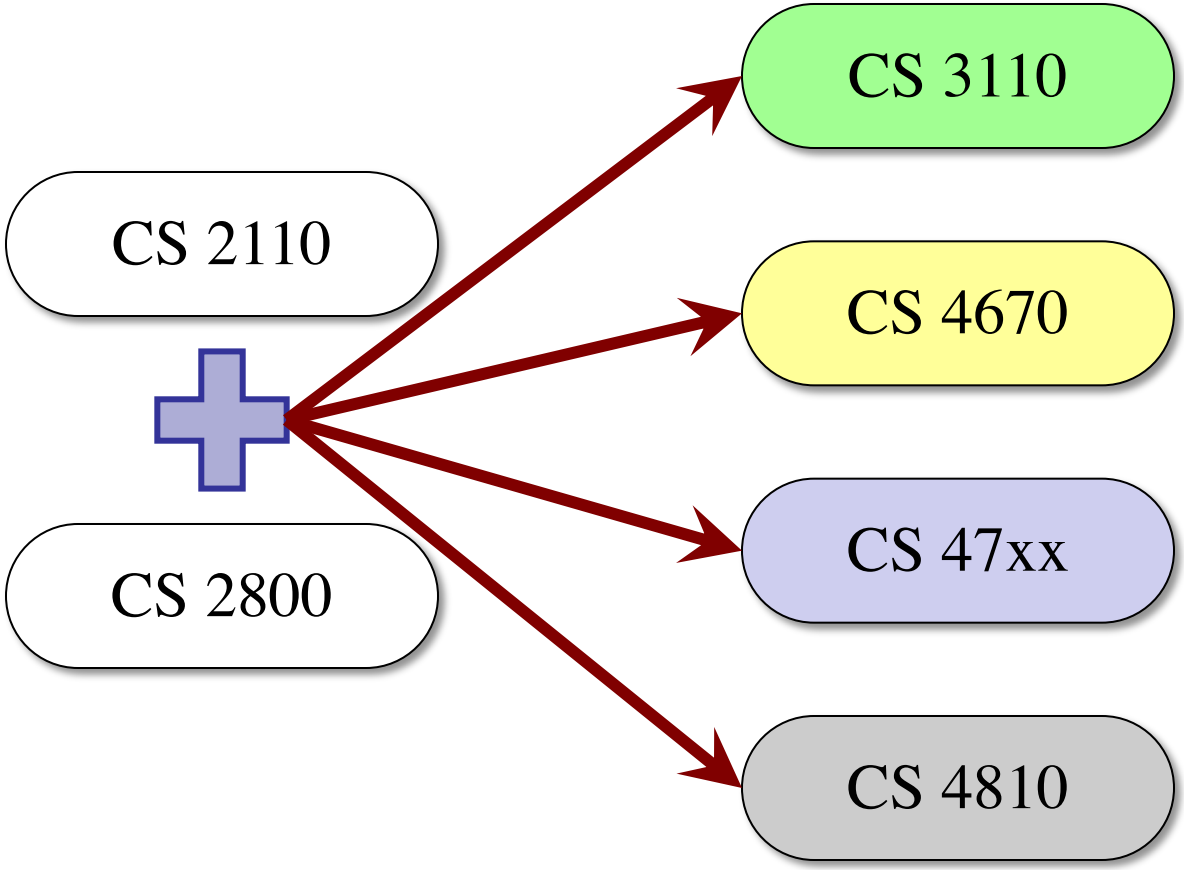
CS 2800: The Other Important Course

- CS requires a lot of math
  - Analyzing code performance
  - Analyzing data
  - Proving code correctness
- Calculus 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**





CS 2110 + CS 2880 = Even More Options



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)

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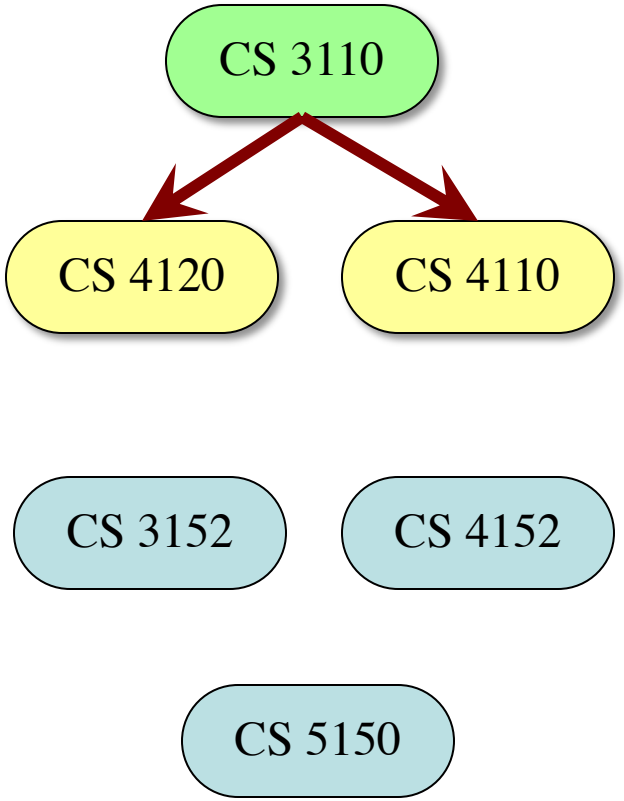
Separation not perfect;
there is a lot of overlap

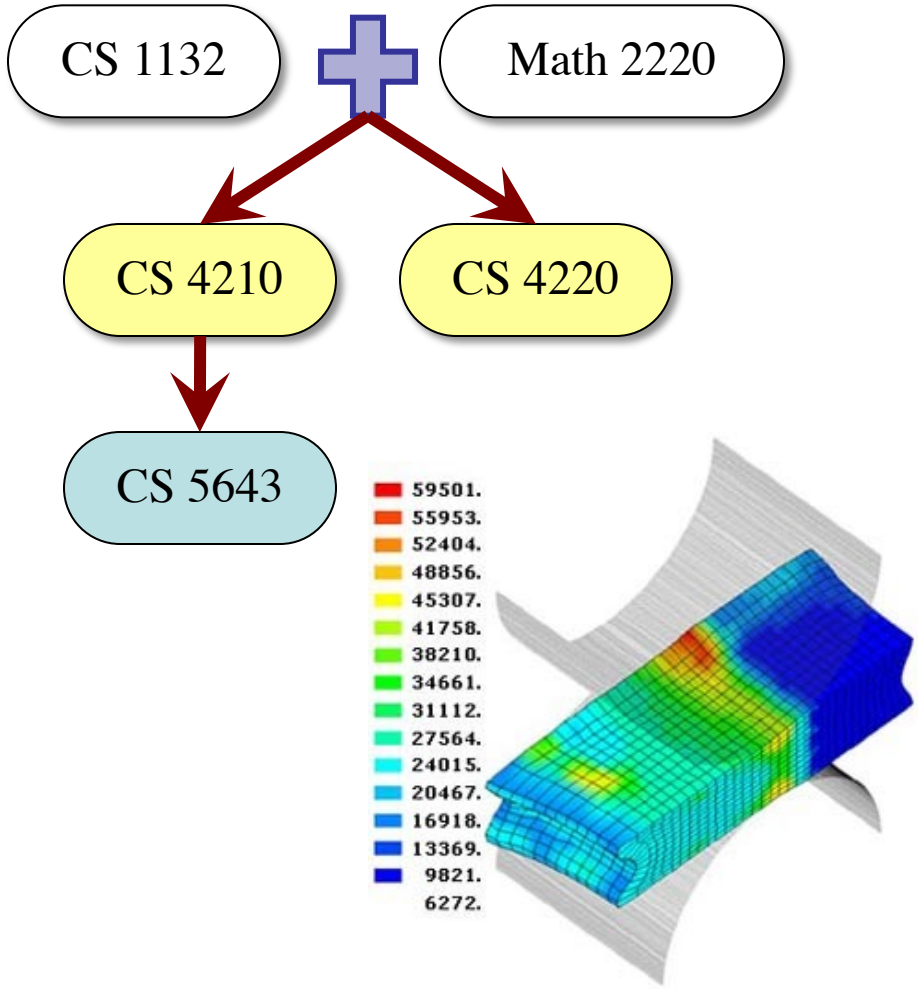
Programming Languages

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



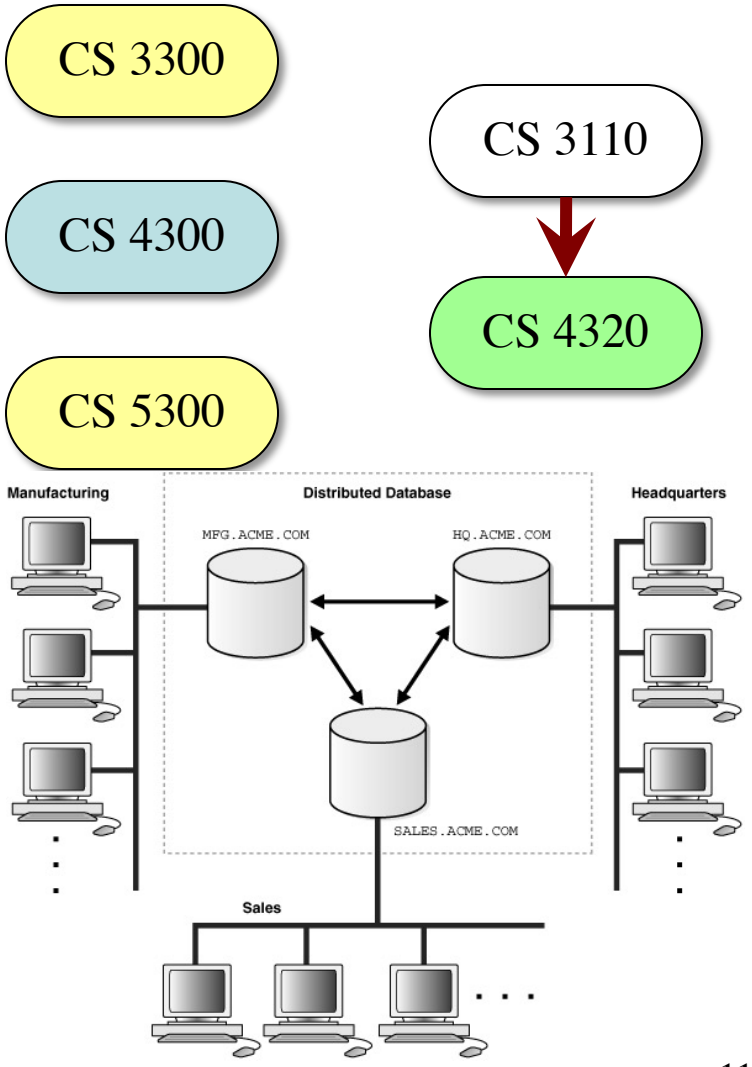
Scientific Computing

- **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



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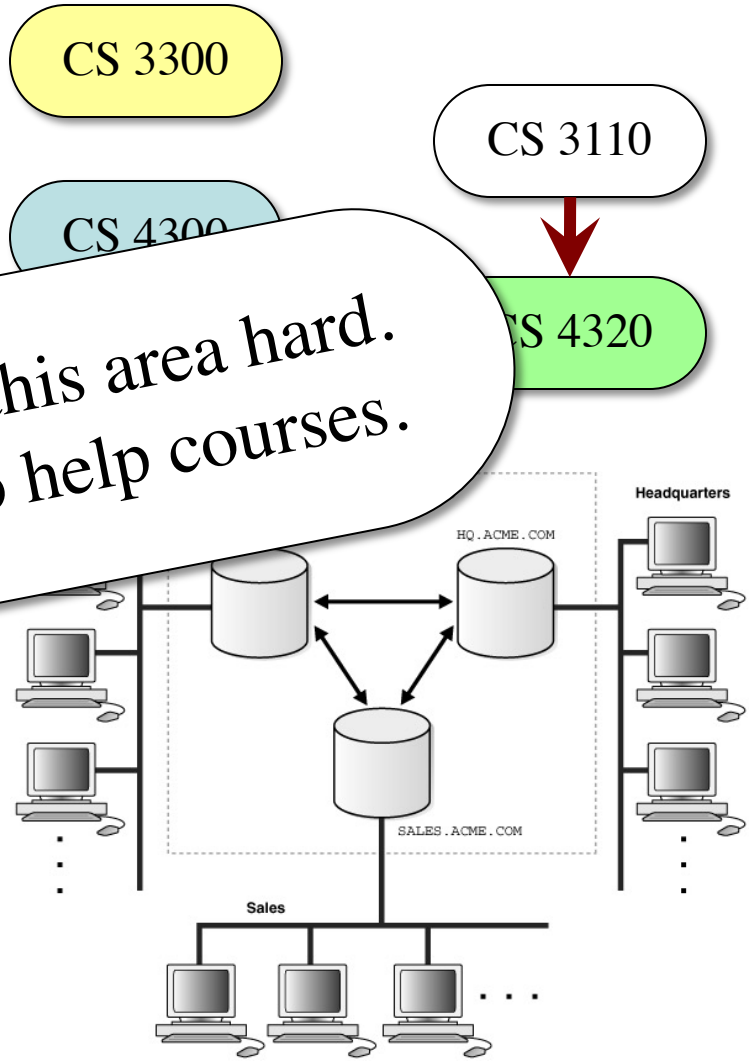

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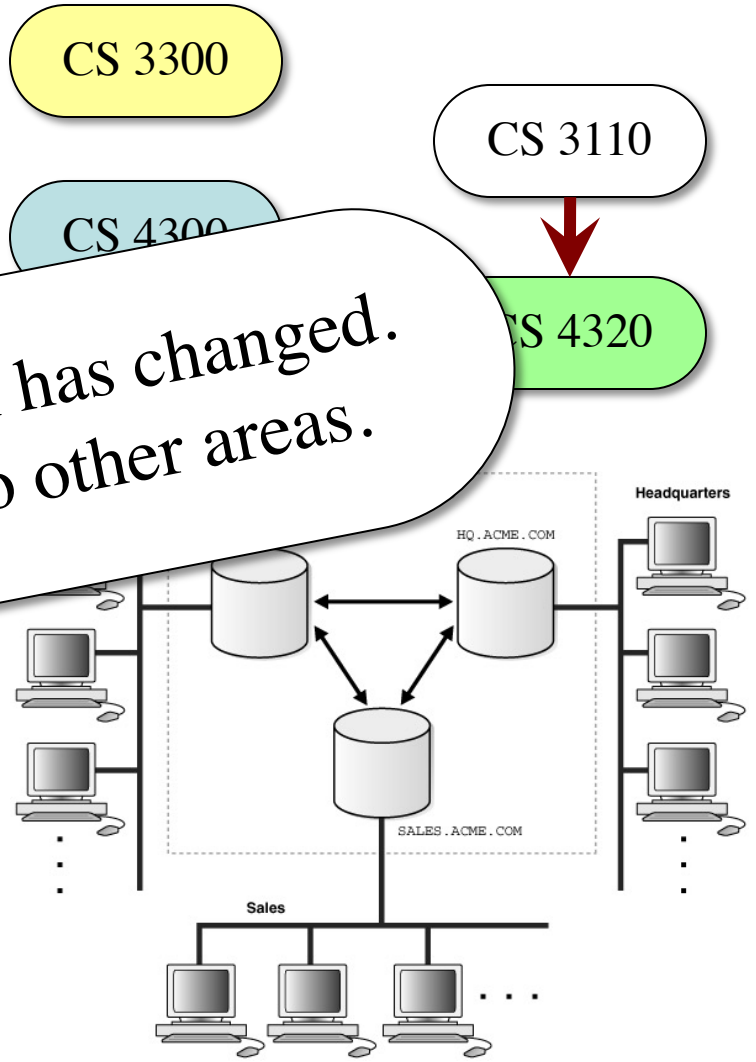
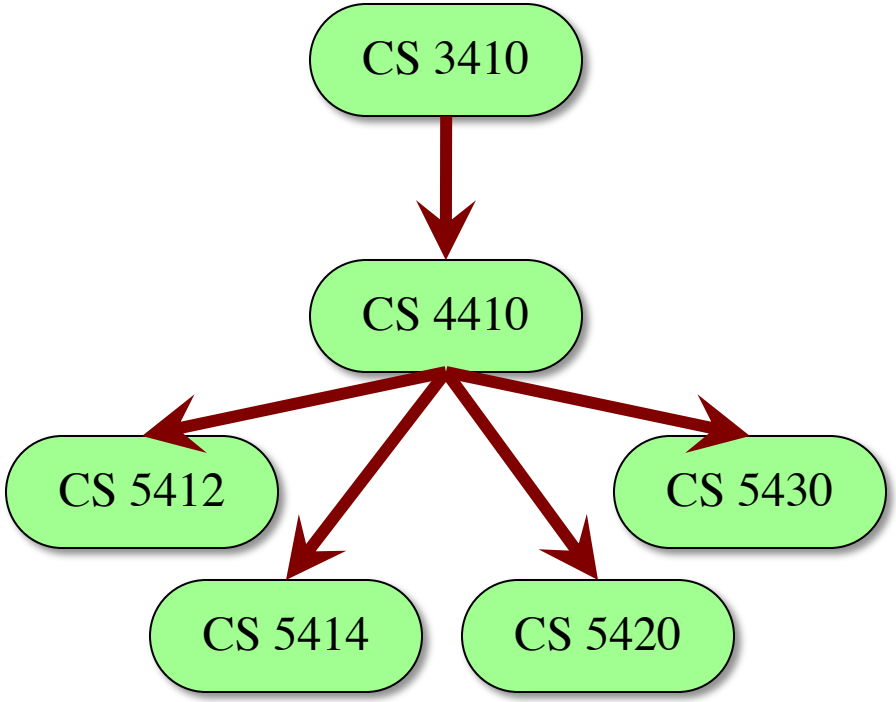


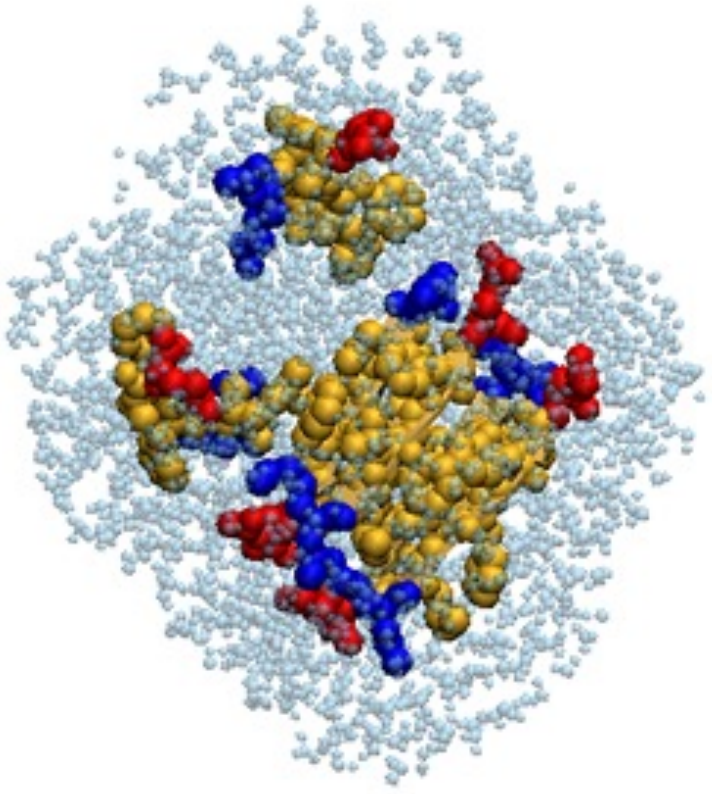
Systems

- **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!



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



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

CS 4620

CS 5625

CS 4670

CS 5643

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

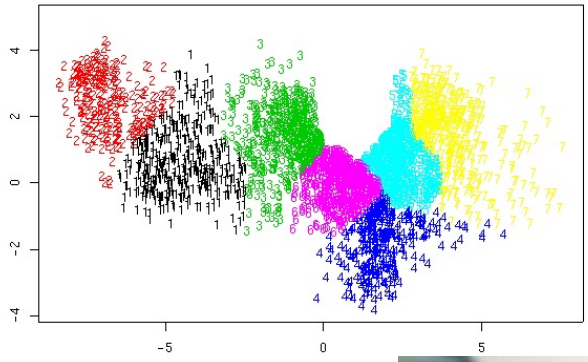
CS 4700

CS 4750

CS 4740

CS 4780

CS 4758



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CS 4700

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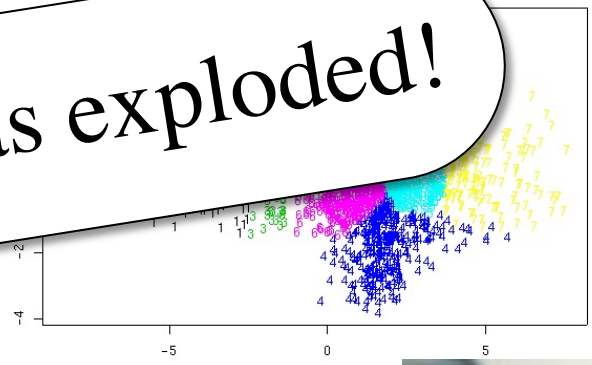
CS 4758

This area has exploded!



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Primary reason for the increase

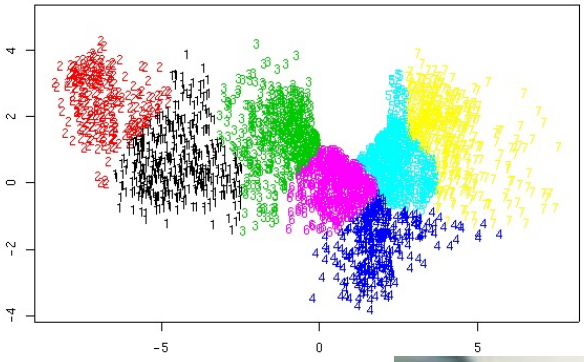
CS 4700

CS 4750

CS 4740

CS 4780

CS 4758



Machine Learning

- Also in other depts.
  - ORIE 3120
  - ECE 4200

Tailored to those areas

- Many grad classes
  - ASTRO 6523
  - BME 5310
  - MATH 7740
  - NBA 4920
  - SYSEN 5880
  - And more…

Narrow in scope

General-purpose classes are almost all in CS dept.

Robotics

- More classes in MAE
  - MAE 3780
  - MAE 4710
  - MAE 4780
  - MAE 67xx

Pure MAE
Not cross-listed

- CS focus on algorithms
  - Planning/perception
  - Also human interaction
  - (though latter is in IS)

New minor available!
Offered through MAE

Robotics

- More classes in MAE
  - M 3780
  - MAE 4710
  - MAE 4780
  - MAE 67xx

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Theory

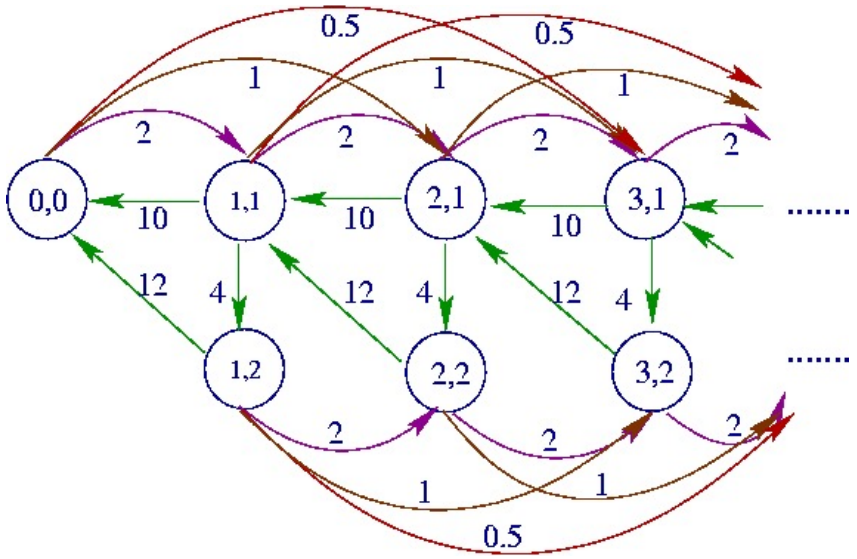
- **Analysis of Algorithms**
  - What is *possible*?
  - What is *feasible*?
- **Analysis of Structures**
  - Social network theory
  - Complex data structures
- **Cryptography**
  - Theory side of security
- Area responsible for founding dept. in 1965

CS 4810

CS 4830

CS 4860

CS 4820



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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Software Engineering

You Own Your IP

Underhand

- Strategic card game
- Inspired by *Reigns*
- 1 million Android downloads

Family Style

- Multiplayer Coop
- Featured on App Store!
- 20k daily users

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!