Welcome To CS15!

1/22

Welcome to CS 15 in Salomon 101!

- We encourage you to download the PowerPoint slide deck before lecture and bring your laptop – lets you see clearly and annotate
  - http://cs.brown.edu/courses/cs015/

- We record and give you web access to every lecture
  - for review
  - in case you have to miss a lecture
  - PowerPoint slides come with associated recording

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Our Hardware

- The Sunlab: 80 PCs running Debian Linux

- File Servers
  - terabytes of disk space for your programs

- Can work from your dorm room on your own computer
  - there will be a Working From Home session
  - help slides from session will be posted online!

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CS15 is All That

- Teaches Object-Oriented Programming (OOP)
  - most common current programming methodology
  - Brown was earliest to switch to Java for intro courses more than a decade ago
  - still a dominant web programming language (e.g., Google's Android)
- Teaches fundamental *problem solving skills* useful in all disciplines
- Provides introduction to computer science concepts
- Is **intense,** but fun**,** especially with interactive graphics
- Uses games as a domain, but teaches skills applicable across domains
  - not a game design course (we have those too, 2D and 3D game engine design)

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Who is CS15 For?

- Students with varying levels of programming experience, including *NONE!*
  - however, CS15 still requires a serious commitment

- Most students have little or no programming experience, including the TAs and HTAs when they took the course!

- Prospective CS concentrators, who will go on to CS16

- This is **not a weeding-out course,** but is still very difficult
  - don't worry!! We expect lots of confusion in the beginning. All 50 TAs are here to help you!

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Diversity & Inclusion in CS15

- CS15 welcomes all, helps you succeed, and aims to build community. These additional groups are also here for you:
- Mosaic+ mosaic.plus.brown@gmail.com
  - *"created to foster Community, inspire Innovation, and provide opportunity to underrepresented minority students."*
- Women In Computer Science (WiCS) wics@lists.cs.brown.edu
  - *"formed by female undergraduate students at Brown in the late 1980s, The goal of WiCS is to increase the participation of women in the field of Computer Science."*
- Women in Science & Engineering (WiSE) WiSE@brown.edu
  - *"to encourage women who study in all science and engineering fields, by building a community of like-minded scholars that provides peer support on their journey to becoming successful scientists at Brown and beyond."*
- Our own CS15 mentorship program!
  - more on this later

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Why Java

- Supports interactive OOP

- Syntax similar to C++ but simpler, cleaner, and more beginner-friendly

- Allows platform-independence: write once, run everywhere (in principle)

- One of the most prevalent languages in industry today, e.g., Android, web servers (others include C, C++, C#, Python, Ruby, etc.)

- Note: *not* the same as JavaScript, a less purely object-oriented language used commonly in web applications

- OOP is one of several programming paradigms – CS17 uses ReasonML and Racket for "functional programming"

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Course Mechanics (1/4)

- *No* quizzes or exams!
  - no exam time pressure
  - no "grading on a curve": you do the work, you get the grade you deserve! Thus A is by far the most common grade

- 9 Assignments
  - 8 programming assignments, some of which have a design component
  - from brief homework to Tetris and beyond!
  - choose from a selection of final projects, or create your own "indy" project
  - all programs must meet a baseline level of functionality to receive credit, lots of room for "bells and whistles" for fun and extra credit
  - all programs must be handed in with baseline functionality by end-of-semester!

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Course Mechanics (2/4)

- Assignments are graded on a hand-in schedule
  - most assignments have early, on-time, and late hand-in
  - early hand-in: 2% increase to your grade
  - late hand-in: 8% decrease from your grade
  - all assignments must be handed in before the end of the course

- TopHat "clicker" questions during lecture
  - interactive question platform to improve engagement and comprehension
  - accounts for 5% of your final grade

- Weekly discussion/lab sections
  - graded on mini-assignments and participation
  - accounts for 12% of your final grade

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Course Mechanics (3/4)

- Keys to success
  - increase in program size and complexity throughout the semester
  - you can't procrastinate and then cram, unlike in some other courses
  - start early, start today, start yesterday!!!
  - other courses don't teach you to tackle programs of this complexity

- TA Hours
  - 45 TAs and 5 Head TAs
  - 180+ TA hours of personalized help per week!!!
    - more than in any other course!
    - everyone struggles sooner or later, including the TAs – part of the learning process
    - we strongly encourage you all to go to hours and get to know the TAs - it is integral to the course (and NOT a sign of weakness!)

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Course Mechanics (4/4)

- CS15 thrives on your feedback
- Questions *highly* encouraged during lecture! And we will add TopHat questions next week…
- We provide a lot of written material; YOU are responsible for digesting all of it

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Major Changes This Year (1/2)

- Scheduled Conceptual Hours
  - resource for students to talk about course material
  - work on mini assignments for section
  - hopefully gives you the tools to solve your own bug!

Being next on TA hour lines > Pretzel Day

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Major Changes This Year (2/2)

- Weekly Diagnostics
  - self-diagnostics at the end of every week
  - make sure students comprehend the material seen
  - go over answers at Conceptual Hours

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Alternatives to CS15 (1/3)

For Concentrators & Non-concentrators:
- CS17 (fall semester) – John Hughes
  - also, no prior experience required
  - multiple programming paradigms
  - multiple programming languages
    - Racket, ReasonML in CS17; then Java, Scala in CS18
  - mastery, not mystery → no magic
  - focus on problem-solving skills/strategies
    - emphasis on *abstraction* and *scale*
  - integrate programming with analysis of algorithms
  - multiple application areas (AI, databases, etc.)
  - pair programming for labs and projects
  - for more information on other CS courses:
    http://cs.brown.edu/degrees/undergrad/whatcourse/

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Summary of CS15/17 Choice

- Both will adequately prepare you for upper-level courses
- No prior experience needed for either, similar work loads
- Different material covered
  - CS15 - Object-Oriented Programming, CS17 – Functional Programming
  - CS15 is more practice-oriented, CS17 is more foundations-oriented
  - CS15 celebrates magic, while CS17 emphasizes no magic
    - CS15 has little reliance on TA support code, but uses JavaFX extensively
- CS15 allows collaboration on:
  - mini-assignments, sections, labs
- No pair programming on projects
  - but no tests
- CS15: games and skits
- Pick based on your taste and what works for you

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Alternatives to CS15 (2/3)

For Concentrators & Non-concentrators:
- CS0111 (Fall + Spring) – Doug Woos
  - no prior experience required
  - the first in a new introductory computing sequence that spreads the foundational concepts over three courses rather than two
    - *"allow more time to combine CS with other studies & mastering the fundamentals"*
  - functional programming and imperative programming
    - learn Pyret and Python
  - integrates programming with data science and discussion of use of digital information
  - less intensive workload
  - capped at 60 Students, only sequence that is currently capped
  - fill out this form to be added to waitlist:
    https://docs.google.com/forms/d/e/1FAIpQLScIgNtQgzQxSytrtsBU1FaKlSMKtmW1axFsNbEod6SjByRWEg/viewform

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Alternatives to CS15 and CS17/19

For Non-concentrators:
- CS10: Data Fluency for All (Fall) - Amy Greenwald
  - introduce data literacy, basics of statistics, machine learning, data communication
  - hands on experience using statistical tools such as 'R' to analyze real world data sets, and 'ggplot' to visualize them.
- CS20: The Digital World (Fall) - Donald Stanford
  - introduction to computing; little emphasis on programming
  - discusses computing topics such as artificial intelligence, IT security, and digital media
  - a small introduction to HTML, Photoshop, Access, and Python
- CS60: Practical System Skills(Fall) – Leonhard Spiegelberg
  - introduction to develop hands-on-computing necessary skills to work in a UNIX-like operating system
  - operating the shell, file system, bash scripting, SSH, version control via git, user and file permissions
  - locally develop, deploy, and publish a website

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Collaboration (1/5)

- Brown's Academic Code
  - *"Academic achievement is evaluated on the basis of work that a student produces independently. A student who obtains credit for work, words, or ideas that are not the products of his or her own effort is dishonest and in violation of Brown's Academic Code. Such dishonesty undermines the integrity of academic standards of the University. Infringement of the Academic Code entails penalties ranging from reprimand to suspension, dismissal, or expulsion from the University."*

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Collaboration (2/5)

- CS15 Collaboration Guidelines
  - Lectures
    - **always** allowed to review and discuss with your peers!
  - Mini-assignments
    - collaboration and discussion are allowed and encouraged
  - Lab Section
    - collaboration and discussion are allowed and encouraged
  - Programming Assignments
    - discussion allowed only in Design Section and Conceptual Hours!

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Collaboration (3/5)

- MOSS (Measure of Software Similarity)
  - Stanford-hosted AI software used to detect plagiarism - it signals undue similarity and we hand-check the code
  - used across industries in multi-million dollar lawsuits to protect intellectual property
  - every year, MOSS finds multiple collaboration violations (we check multiple years!)
  - last year, 14 cases with 2 or more students each
  - punishments typically directed NC, parental notification
  - MOSS is *very good* at what it does - don't even think of trying to outwit it! (which is more work than doing the assignment!)
  - we also check the web

If ever in doubt about what is allowed, ask a TA!
Better to NC an assignment or even the course than being accused (and likely convicted)!
Note we have a Regret Policy

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Collaboration (4/5)

The issue of collaboration in intro courses has been in the news in past years:

Possible cheating uncovered in popular Harvard computer class
By Travis Andersen and Brian MacQuarrie Globe Staff May 05, 2017

The Boston Globe

As Computer Coding Classes Swell, So Does Cheating
By JESS BIDGOOD and • MAY 29, 2017

The New York Times

Competitive environment drives culture of cheating in computer science classes
BY KATE HUANGPU | FEBRUARY 22, 2018, 3:43 AM

COLUMBIA SPECTATOR

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Collaboration (5/5)

- Collaboration is **not** worth the risk
  - start early and get help when you need it! Lots of resources available to help you succeed in this course

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