

# CS/ENGRD 2110

## SPRING 2013

Lecture 1: Overview  
<http://courses.cs.cornell.edu/cs2110>

## Welcome to CS2110!

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- We'll be learning about...
  - OO, abstract data types, generics, queries on Java collections, other cool Java features
  - Reasoning about complex problems, analysis of the algorithms we create to solve them, and implementing those tricky algorithms with elegant, easy to understand, correct code
  - Recursion on graphs and other linked structures
  - Algorithmic complexity
  - (+ lectures on cloud computing & quantum computing)

## Is CS2110 right for you?

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- Knowledge of Java not required
  - About 40% of students know Java
  - Others know Matlab, Python, ...
  - Requirement: comfort with some programming language. Prior knowledge of OO and "strong typing" not required.
- Don't take cs1110 just because you are worried that your high school programming experience won't do
- **We recommend against skipping directly to cs3110. cs3110 requires permission from both Prof Birman and Prof Joachims!**

## Lectures

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- TR 10:10-11am, Statler auditorium
  - Attendance is mandatory
  - Old videonotes from 2010 are available but the course has evolved since then ...
- ENGRD 2110 or CS 2110?
  - **Same course!** We call it CS 2110 in online materials
  - Non-engineers sign up for CS 2110
  - Engineers sign up for ENGRD 2110



## Sections

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- Like lecture, attendance is mandatory
- Usually review, help on homework
- Sometimes new material
- Section numbers are different for CS and ENGRD
- Each section led by member of the teaching staff
- No permission needed to switch sections, but do register for whichever one you attend



## CS2111

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- New!
  - An "enrichment" course
  - Aimed at students who want slightly more help understanding core ideas behind Java, objects, and programming
  - Taught by Professor Gries, 1 credit S/U, only for students who also take CS2110.
- We hope to help students who might otherwise feel overwhelmed by CS2110



<h2>Academic Excellence Workshops</h2> <p>7</p> <ul style="list-style-type: none"> <li>□ Two-hour labs: students work together in cooperative setting</li> <li>□ One credit S/U course based on attendance</li> <li>□ Time and location TBA</li> <li>□ See website for more info:</li> </ul> <p><a href="http://www.engineering.cornell.edu/student-services/learning/academic-excellence-workshops/">www.engineering.cornell.edu/student-services/ learning/academic-excellence-workshops/</a></p>	<h2>Resources</h2> <p>8</p> <ul style="list-style-type: none"> <li>□ Book: Frank M. Carrano, <i>Data Structures and Abstractions with Java</i>, 3<sup>rd</sup> ed., Prentice Hall       <ul style="list-style-type: none"> <li>▫ Note: 2<sup>nd</sup> edition is okay</li> </ul> </li> <li>□ Sharing textbook: fantastic idea. You don't need a personal copy. You do need access to it from time to time</li> <li>□ Copies on reserve in Engr Library</li> <li>□ Additional material on Prentice Hall website       <ul style="list-style-type: none"> <li>▫ "e-Book" not required</li> </ul> </li> <li>□ Great Java resource: online materials at Oracle JDK web site. Google has it indexed.</li> </ul>
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<h2>Obtaining Java</h2> <p>9</p> <ul style="list-style-type: none"> <li>□ Follow instructions on our « resources » web page       <ul style="list-style-type: none"> <li>▫ Make sure you have Java JDK 1.6 or 1.7, if not download and install. We explain how on the page.</li> <li>▫ Then download and install the Eclipse Juno « IDE » for Java developers from Eclipse IDE for Java Developers</li> </ul> </li> <li>□ Test it out: launch Eclipse and click “new&gt;Java Project”       <ul style="list-style-type: none"> <li>▫ This is one of a few ways Java can be used</li> <li>▫ When program runs, output will be visible in a little console window</li> </ul> </li> </ul>	 <p>Eclipse IDE</p> <p>10</p> <ul style="list-style-type: none"> <li>□ IDE: Integrated Development Environment       <ul style="list-style-type: none"> <li>▫ Helps you write your code</li> <li>▫ Protects against many common mistakes</li> <li>▫ At runtime, helps with debugging</li> </ul> </li> <li>□ Follow “Resources” link to download</li> </ul>   <p><i>In my country of Kazakhstan everyone is use Eclipse and Java! Java 1.7 is best for hack American web site and steal credit card.</i></p>
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<h2>Learning Java</h2> <p>11</p> <ul style="list-style-type: none"> <li>□ CS 2110 assumes that students are totally new to Java —we'll teach you the language</li> <li>□ We assume you are comfortable programming in some other language, so we'll teach Java at a pretty fast pace</li> <li>□ By end of course, you'll have seen some “extreme Java” capabilities...        </li> </ul>	<h2>Coursework</h2> <p>12</p> <ul style="list-style-type: none"> <li>□ 5 assignments involving both programming and written answers (45%)</li> <li>□ Two prelims (15% each)</li> <li>□ Final exam (20%)</li> <li>□ Course evaluation (1%)</li> <li>□ Possible surprise in-class quizzes (4%)</li> </ul>
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## Assignments

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- A1 and A5: do by yourself
- A2-A4: teams of one or two (not more than two)
  - A1 will be posted soon on CMS
  - We encourage you to do them by yourself and have considered making this the rule
  - Finding a partner: choose your own or contact your TA. Piazza is incredibly helpful.

## Piazza

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- Click link on our web page to register
- Incredible resource for 24x7 help with anything
- We keep an eye on it, but people help each other out too.



## Academic Integrity... Trust but verify!

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- We use artificial intelligence tools to check each homework assignment
  - The software is very accurate!
  - It tests your code and also notices similarities between code written by different people
- Sure, you can fool this software
  - ... but it's easier to just do the assignments
  - ... and if you try to fool it and screw up, you might fail the assignment or even the whole course.

## What's CS 2110 about?

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- Computational tools are “universal” but the key is to master computational thinking.
  - Looking at problems in ways that lead naturally to highly effective, correct, computational solutions
  - There are many ways to do anything, but some are way better than others
- Mastery of computational thinking will help you become a master of the universe!
- Also: Great job prospects with high salaries...

## Example (we'll see it again in April...)

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- Suppose you wanted to build a massive database of pictures of people and stuff about them
 
- ... then create smart eyeglasses
- In the past a concept like this was crazy...
  - Today, it can be solved with “cloud computing” + Java programs to search huge image databases fast...
  - ... With CS2110 you'll be about 1/3 of the way there
    - Also: Snavely's vision course + Ken's cloud computing course

## A class declaration defines

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- Format/content of **objects**, which can contain variables and functions/procedures
- Variables and functions/procedures for which only ONE copy exists
 

Circle@75ab39f2
radius 10.2
setRadius(double)
diameter()

Circle@75ab302b
radius 3.4
setRadius(double)
diameter()

PI 3.1459      area(Circle)

A class defines the form and behavior of some type of objects.  
But your program needs to explicitly create them.

## World's simplest Java program

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- Writing “Hello world” in Java using Eclipse
- Running it
- Understanding line by line exactly what it says

*Let's launch Eclipse and see these steps in action*

## Next steps?

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- Attend a recitation section this week
- Repeat what we just did but do it yourself
  - Try making mistakes and see what Eclipse “says”
  - Try making it a little fancier
- Drop in to see what CS2111 is about this afternoon (two times, on Tuesday)