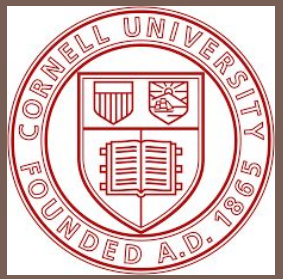
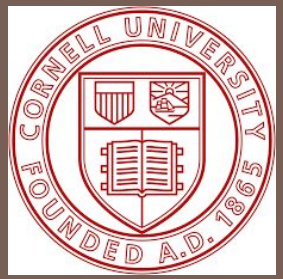
Object-oriented programming and data-structures

Natacha Crooks



CS/ENGRD 2110 SUMMER 2018



Lecture 0: Overview

http://courses.cs.cornell.edu/cs2110/2018su

CS2110 (ENGRD 2110)

- **Object-oriented Programming Principles**
  - Reasoning about complex problems
- **Algorithmic Principles**
  - Algorithmic complexity, analysing algorithms

- **Data structures**
  - Linked lists, trees, hash tables, graphs, etc.
- **Good programming practices**
  - Testing tools, coding styles

Is CS2110 right for you?

- Knowledge of Java not required
  - Only ~30% of you know Java –others know Matlab, Python …
  - Requirement: comfort with some programming language, on the level of CS1110 (Python based) and CS1112 (Matlab based).

    Prior knowledge of OO not required.
  - We assume you do not know Java!
  - If you know Java, the first 3 weeks will be easier for you but you STILL have to learn things, probably unlearn what you learned

Course Staff

Instructor Natacha Crooks

CS Undergrad -> Cambridge (UK)

PhD Student -> Cornell U. & UT Austin

Research Interests ->

Distributed Systems/ Databases

Teaching Assistants

Chris Mulvaney (Sophomore, ChemEng Major)

Juliet Zhong (Sophomore CS Major)

Hyun Kyo Jung (Junior CS Major)

Lectures and Office Hours

- TR 10:00-11.15 am, (in **Hollister Hall 110**)
  - Attendance mandatory
  - Send me an email if you can't make it
  - Please ask questions!

- Office Hours (**in G13**)
  - Natacha (nsc36) Every day 12-13
  - Hyun (hj283) Mon, Thur: 7-8pm
  - Juliet (lz246): Fri: 9-10 am
  - Chris (cmm435): Wed: 6-7pm
  - Avoid emails, come to OH -> we want to meet you!

Coursework

- 5-6 programming assignments (40 %)
- Final exam (30 %)
- Mid-class quiz (10 %)
- Daily Homeworks (14 %)
- Class Participation (5 %)
- Course evaluation (1 %)

Formula will change as course progresses and we make changes in assignments, give quizzes, etc.

A word of warning!

- This is not a regular format for a class.
- Pace is intense. Don’t fall behind!
- Review and revise material every day!
- Strong support network. Ask for help **early** if you are struggling.

Rough Schedule

- Assignments Due on **Wednesday** 10 AM.
  - Released 1 week before.

- Short **daily** homeworks. Due next day 10 AM.
  - Help you learn the course as you go along
  - Warn us if you fall behind.
  - You will almost always get full credit. Don't worry.

Course Websites

- **CMS**
  - Assignments & homeworks posted there.
  - Assignments must be submitted to CMS

- **Piazza**
  - Ask questions! Clarify misunderstandings
  - Students, TAs, Instructor will reply.
  - Post anonymously if necessary

- Should have received links to both. See me after class if not.

Assignments & Homeworks

- Assignments
  - 5-6 total. Teams of 2. Finding a partner: choose your own or contact your TA. Piazza can be helpful.
  - Released once a week. Do not leave the assignment until the last minute. Work on it a little every day!
- Homeworks
  - Daily and alone. To help you check that you understand the material.
- Grading policy: 3 points the first day, 4 the second, and 5 each day thereafter

Academic Integrity… Trust but verify!

- 98% of you are honest and don't try to cheat.
- We use artificial intelligence tools to check each homework assignment, so catch the other 2%
  - Software is accurate! Tests your code and 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
- If in doubt **ASK!**

Java Resources

- JavaHyperText.
  - Curated by Prof. Gries. Contains tutorials and explanations on most topics in course.
  - http://www.cs.cornell.edu/courses/JavaAndDS/
- Java Documentation
  - online materials at Oracle JDK web site
  - https://docs.oracle.com/javase/8/
  - Tutorial (my favourite): https://docs.oracle.com/javase/tutorial/java/
- Textbooks
  - No Mandatory Textbooks
  - Thinking in Java 3rd Edition is quite good.

Obtaining Java and Eclipse

- Follow instructions on our Resources web page
  - Make sure you have Java JDK 1.8, if not download and install. We explain how on the web page.
  - Then download and install the Eclipse IDE

- Test it out: launch Eclipse and click “new>Java Project”
  - This is one of a few ways Java can be used
  - When program runs, output is visible in a little console window

Homework 0

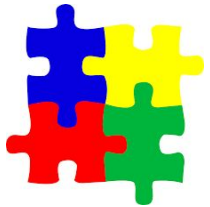
- Come to one of my office hours **this week** to introduce yourself and say Hi.
- Rest of homework released on CMS.
- Install and run your first program in Eclipse.
- Due before tomorrow's class 10 AM

Rough Course Outline

- First Week: Java Fundamentals and Object-Oriented Principles.
- Second Week: Testing and advanced Java features
- Third Week: Algorithmic Complexity & Analysis
- Fourth/Fifth Week: Data-structures (Linked Lists, Heaps, Trees, Graphs)
- Sixth Week: Concurrency & Security

Look out in slides for

- Principles
  - These principles hold independently of the language.



- Java Features
  - Java-specific functionality that are useful to know

- Good Programming Principles
  - Conventions, and habits to start acquiring early!