Course Introduction

Jasleen Kaur

Spring 2014

Today’s Overview

- Introductions
- What is this course about?
  - What are Data Structures?
- Administrative details
  - Course requirements, policies, resources
Introduction

- Course web page – [http://comp410.web.unc.edu](http://comp410.web.unc.edu)
  - Handouts, slides, assignments, schedule, contacts
  - Please download Course Syllabus and read it carefully

- Instructor – Jasleen Kaur (me)

- TAs – to be assigned
  - Should know by next class

- You
  - Attendance
  - Non-CS majors?
  - Freshmen, Sophomores, Juniors, Seniors?

WHAT IS THIS COURSE ABOUT?
What are Data Structures? Why Do We Care?
What is a Data Structure?

- Data structure:
  - A way to organize information in order to support efficient computation over that information

- What data structures have you used?

- Data structures support certain operations, each with
  - **Semantics**: what does the operation do?
  - **Performance**: how efficiently does it do it?

- Examples:
  - **List**: with operations
  - **Stack**: with operations
  - **Queue**: with operations

Why Do We Care?

- Data structures matter !!

- Factors in picking the best data structure:
  - Does it support the operations needed?
    - e.g., insertion, deletion, finding, sorting, …
  - Does it support them efficiently?
    - Time: how long does each operation take to execute?
    - Space: how much memory does each operation take?
  - How easy is it to implement, debug, and test?
Common Trade-offs

- Time vs Space
  - May use more memory to make some operations faster
- Making one operation faster may make another operation slower!
- Providing more operations (making the data structure more general) may make some operations less efficient

What is This Course About?

- We will:
  - Introduce common data structures and their applications
  - Learn how to pick the best data structure for a given job
    - Understand the trade-offs they make
    - Analyze the efficiency of their operations (and of algorithms that use them)
  - Practice implementing and using the data structures by writing code
- Goal: You will be able to
  - Make good design choices for storing and processing common data types
  - Justify and communicate your design decisions
Course Syllabus

- Data Structures & Applications:
  - Stacks, Queues, Priority Queues, Heaps, Sorting, Binary Search Trees, Hash Tables, Disjoint sets, Graphs, ...

- Main aspects to be covered:
  - Abstraction – state (data) + behavior (operations)
  - Correctness – through pre- and post-conditions, testing
  - Efficiency – through analysis

- Focus: conceptual discussion
  - Java used mainly for illustration (Java specifics are not the focus of the course)

ADMINISTRIVIA

Requirements, Policies, Resources, …
Prerequisites

- COMP 401: Foundations of Programming
- An ability to program (immediately!) in Java
  - Please do not expect the instructor (or TA) to debug your code for you
- Familiarity with basic math concepts
  - Exponents, logarithms, series sums, proofs by induction
  - Will be reviewed briefly in class

Course Grading

- Several in-class exams: 40%
- Several programming assignments: 25-30%
- Final Exam: 30-35%
  - Apr 29 (Tuesday), 12 – 3 pm
- Class Participation:
  - Will be used to potentially bump up (or down) half a grade
    - e.g., B+ to A-, A- to A (equivalent to 5-10%)
  - Earn either in class or on Piazza
- All percentage points above are flexible by 5-10%
Course web page

- [http://comp410.web.unc.edu](http://comp410.web.unc.edu)
- Go-to resource for
  - Handouts and slides
  - Assignments and practice problems
  - Schedule (including exam dates)
- Monitor this page regularly!

Recommended Textbook

- Mark A. Weiss, Data Structures and Algorithm Analysis in Java, 3/E
  - Highly recommended text
    - Will be followed closely
- Available:
  - At UNC Student Stores
  - At the usual online retailers
Class discussion board used for:

1. Course announcements by the instructor (instead of emails)
   - Set your email delivery preference to at least once a day!

2. Discussions amongst students on lecture concepts, homework questions, Java classes/specifics
   - But NOT for anything prohibited by the honor code policy
   - Will be shared with COMP 410-001 (Prof Baruah’s section)

Intended to facilitate discussions amongst students:

- Post your questions on piazza BEFORE sending email to instructor or TA
- Respond regularly to queries posted by others
  - WILL count heavily towards in-class participation grade

All registered students were subscribed to it yesterday

- If you add/drop the course after that, send me email to update

Grades (assignments and exams) will be posted here

Will also post in-class problem-solving groups

- 25 groups with 3 students each
- Groups assigned every 2 weeks
  - Check your group # for the next 2 weeks (already assigned)
- Please sit in your assigned group space (sorry!)
  - Row 1: Group 1
  - Row 2: Groups 2-5 (left-to-right)
  - Row 3: Groups 6-9
  - Row 4: Groups 10-13
  - Row 5: Groups 14-17
  - Row 6: Groups 18-21
  - Row 7: Groups 22-25
Honor Code

- No collaboration permitted on assignments or exams
  - All exams are closed-book
  - All code submitted in assignments must be your own
    - No code from other sources may be used without the explicit permission of the instructor or TA
- Examples of honor code violations:
  - Collaboration in assignments or exams
  - Use of code not your own
- Please carefully review details of honor code in the course syllabus (linked off the course web page)

Classroom Etiquette

- Class attendance is required
- Please sit in your assigned group space
- Please arrive on time
  - Occasionally late is ok
    - Make sure you do not disrupt the class (sit in last 2 rows)
  - Habitual is NOT ok
- Please do NOT
  - Browse
  - Talk amongst yourselves (other than for assigned in-class group problem solving)
Getting Help

- **Piazza**
  - Please post on Piazza (and give time for responses)
  - BEFORE emailing instructor / TA

- **Instructor / TA office hours**
  - Highly preferable over email
  - Much fast resolution

- **Instructor Office Hours**
  - Tue, 12:15 – 2:15 pm (tentative)
  - Office: FB 136

- **TA Office Hours**
  - To be determined

QUESTIONS?

http://comp410.web.unc.edu

jasleen@cs.unc.edu