COMP 180
Software Engineering

Introduction

Spring 2021
Why Take This Course?

- Modern software is amazingly large and complex
  - Linux: 12M LoC; Windows: 50M LoC; Google: 2B LoC repo
- How could such large code work at all???
  - Software Engineering (SE)!
    - The study and practice of how to build software
  - Intersects with
    - Programming languages, HCI, management, organizational behavior, …
- Three kinds of SE courses
  - Focus on code  ⇐ This course
  - Focus on people  ⇐ Last semester’s SE course
  - Focus on “real world” projects  ⇐ Capstone project
Important Software Properties

- Correctness
  - The system does what it is supposed to
- Efficiency
  - The system performs its work sufficiently fast
- Maintainability
  - The system can be fixed/changed/improved easily
- Security
  - The system does nothing “bad”
    - Usually means, nothing it is not supposed to
- Reliability
  - The system is robust in expected circumstances
- Other -ilities?
Exercise: Meet Your Classmates

• In your group, discuss the following
  - Introduce yourself to your classmates
  - What is your favorite CS class at Tufts so far?
    - Obviously it will be COMP 180 later!
  - What is your favorite programming language and why?
  - What are important software properties that are not on my list?
Course Goals

• At the end of this course, you should be able to
  ■ Program in Java (first topic!)
  ■ Understand core SE techniques for designing, implementing, testing, debugging, and maintaining code
  ■ Have the tools and knowledge to build systems 10x–100x larger than in COMP 40
  ■ Have the base knowledge to learn how to build systems 1,000x–100,000x
    - Note: Every very large software system is its own world, with its own concepts and internal idioms and notations, so each one requires its own study
Topics

• Java programming
• Abstract data types, modularity, information hiding
• Design patterns, including for concurrency
• Software architecture
• Program specification and verification
• Object-oriented refactoring
• Testing
• Debugging
• Concurrency?
• Special topics (TBA)
Programming Projects

- To be done in Java SE 15
  - No style guide, but you should try applying ideas from class
  - Soon: access via use comp180

- Submitted via Gradescope

- Projects due 11:59pm on due date
  - No projects accepted after that, except:
    - You have two late tokens for the whole semester, each one giving you 24 hours of additional time to submit a project

- Warning: Don’t expect projects to be perfect
  - We’ll work together to address any issues that arise
Homework

- Might have some written homework assignments
  - Planning not to but want the option just in case
- If we have any, due at **start** of class on due date
- Submitted as pdf on Gradescope
Readings

• Assignments in which you need to
  - Read a paper
  - Answer two questions about the paper
    - A typical answer will be a short paragraph; please don’t write a novel
  - Upload pdf with your text to Gradescope

• Due by **start** of class on due date
  - So we can discuss readings in class

• Readings are graded on a scale of
  - 2 - all good!
  - 1 - summary satisfactory but missed key point(s)
  - 0 - not submitted or not satisfactory
Grading

• Programming projects/homework (50%)
  ▪ Projects equally weighted
  ▪ If homework assigned, will specify weighting when assignment given out

• Readings (8%)

• Midterm (20%) - tentatively, around Wed, Mar 17

• Final (20%) - around standard final exam time

• Meet your professor (2%)

• Grades posted on Canvas (canvas.tufts.edu)
Textbook

• None

• There is no good book available that covers the right set of topics
  ▪ Use these lecture notes as a reference
  ▪ Take your own notes
Lecture Videos

• I will try to do screen captures of lecture
  ▪ Videos posted on Canvas
  ▪ **No guarantee** that videos will work
    - Technical difficulties occasionally might mean no or only partial video for that day
  ▪ You may not share videos outside of class

• **By participating in class, you consent to recording**
  ▪ If you have objections, let me know before class
  ▪ Not participating in a recorded class will not affect your grade
Other Administrivia

• Will use Gradescope for all project/homework/readings submissions

• **Announcements** and discussions on **Campuswire**
  - Do not post code or test cases on Campuswire
    - Unless otherwise permitted
  - Do not give away answers on Campuswire

• Let me know as soon as possible if you have an excused absence
  - See syllabus for details about excused absences
  - In general, you’ll have longer than you need for projects, so you can work around expected issues in your schedule

• Avoid academic dishonesty