CMSC 132: Object-Oriented Programming II

Course Introduction

Department of Computer Science
University of Maryland, College Park

Course Catalog Description

- Introduction to use of computers to solve problems using software engineering principles
- Design, build, test, and debug medium-size software systems. Learn to use relevant tools
- Use object-oriented methods to create effective and efficient problem solutions
- Use and implement application programming interfaces (APIs)
- Programming done in Java
Things You Will Learn

- Object-oriented software development
  - Modern software development techniques
  - Object-oriented design

- Algorithms & data structures
  - Lists, trees, graphs

- Programming skills
  - Java API, IDE, testing, debugging

Why Object-Oriented Programming?

- Coding is small part of software development

- Estimated % of time
  - 35% Specification, design
  - 20% Coding, debugging
  - 30% Testing, reviewing, fixing
  - 15% Documentation, support

- Object-oriented approach makes other parts of software development easier
Course Is Not Just About Java

- May seem to focus on Java
  - All programming in Java
  - Many interesting Java language features

- Lessons intended to be general
  - Principles should apply to all languages
    - Ways of thinking about design
    - General ideas about software
  - Can translate skills to other languages

Assume You Already Know

- Coding
  - Variables, operators, loops, arrays

- Basic object-oriented programming
  - Classes, methods, inheritance

- Java
  - Class libraries, exceptions

- Tools
  - Eclipse IDE, debugger
Where does 132 fit in?

- CMSC 131
  - Basic programming skills
- CMSC 132
  - Software design & basic algorithms
- CMSC 212
  - Low-level programming
- CMSC 250
  - Discrete math & logic
- CMSC 351
  - Analysis of algorithms

Organization

- Personnel
  - Instructors
    - Nelson Padua-Perez
    - Chau-Wen Tseng
  - Teaching assistants
    - Yee Lin Tan...
- Classes
  - Lectures
  - Labs
  - Office hours
Textbook

Required

- “Objects, Abstractions, Data Structures and Design Using Java (version 5.0)”
  By Elliot Koffman and Paul Wolfgang

Textbook (cont.)

Recommended

- “Java Precisely (2nd Edition)”
  By Peter Sestoft
Projects

- 8 projects
  - Evaluate design, coding, testing skills
  - Tries to involve interesting application areas
    - Networking, user interfaces, data compression

- Late policy
  - Projects due at 6 pm
  - 20% penalty, up to 9am the next morning
  - Plan to complete all projects on time

- Good faith attempt
  - Must attempt all projects to pass

Projects (cont.)

- Environment
  - Eclipse IDE

- Automated submission & testing
  - Submit server
    - https://submit.cs.umd.edu
  - Maintains record of submissions
    - CVS repository
    - May use for research
  - Release testing
    - Can evaluate project using real test cases
Grading

- Based on
  - Projects, homework exercises, quizzes, midterms, final

- Point distribution (roughly)
  - 40% Projects
  - 6% Homework Exercises
  - 14% Quizzes
  - 10% Midterm #1
  - 10% Midterm #2
  - 20% Final Exam

- Available on-line
  - https://grades.cs.umd.edu

Course Bulletin Board

- Bulletin Board (Forum)

- Policy on project postings
  - Can ask about specification, setup, tools, etc.
  - Do not ask about design, implementation, etc.
  - Violators may face penalty for academic dishonesty
**Academic Honesty**

- All individual assignments & exams must be done individually (except "open" assignments)
- Do not copy (or allow others to copy) your work in any way
- Submissions will be compared to submissions from current and previous semesters
- Cases of academic dishonesty will be referred to the University's Office of Judicial Programs
- Visit Student Honor Council website for more detailed explanation of academic dishonesty

**Excused Absences**

- Students must apply in writing and furnish documentary support for excused absences
- Support should explicitly indicate the dates or times the student was incapacitated
- Excused absence does not typically translate into project extensions
- Students requesting reasonable academic accommodations due to a disability must provide a letter from the Office of Disability Support Services
Course Advice

- Start projects early
- Ask questions
- Read book
- Attend lectures
- Attend labs
- Attend office hours

Topics Preview

- Algorithms & data structures
  - Asymptotic efficiency
  - Lists, stacks, queues
  - Trees, tries, heaps
  - Sets, maps, graphs
  - Recursion
Topics Preview

Object-oriented software development

- Software life cycle
- Requirements & specifications
- Designing objects & classes
- Testing & code coverage
- Unified Modeling Language (UML)
- Programming paradigms
- Design patterns

Topics Preview

Programming skills

- Java collection framework
- Exceptions
- Threads, synchronization
- Java APIs
  - Networking
  - Graphics User Interfaces (GUI)