Midterm Study Guide

The Midterm may consist of open-ended short answer questions, multiple choice, true-false, and/or coding problems. For coding problems, you may be given a program and asked to produce its output, a class or program and asked to fill in the blanks, or you may be given a prompt with specifications and asked to write a method or class to fulfill those specifications.

Topics

- Object-Oriented Programming (in Java)
  - Classes & Objects
    - Defining Classes
    - Variable Scope – local vs. instance
    - Static methods and variables
  - Inheritance
    - Overridden methods
      - What is the difference between overridden and overloaded methods?
    - Abstract classes and methods
      - Why write an abstract method? What are the requirements on subclasses which inherit an abstract method?
    - Interfaces
      - What are interfaces and what is required of subclasses of an interface?
    - Polymorphism
      - What is polymorphism? What is an example case where polymorphism is useful?
  - Generics
    - What does using generics allow us to do?
    - Why use generics rather than using more mundane inheritance to accomplish the same thing?
- General Software Development
  - Software Testing
    - Unit Testing
      - What is unit testing? What are the "units"?
    - Test driven development
      - What are the benefits of Test-Driven Implementation over Implementation-Driven Testing?
  - Documentation
    - UML Diagrams
      - Be able to interpret or generate UML diagrams for given classes
- Abstract Data Types
  - Big-Oh Analysis
    - What is Big-Oh Analysis? What is being analyzed? Why do we care?
  - Various Data Structures: Stacks, Queues, Binary Search Trees
    - Be able to work with any of these data structures.

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        - For example, you may be given code with a stack or a queue and asked to produce its output. Or you may be given an input sequence and asked to produce the BST that would result from inserting that sequence one element at a time.
    - Be able to determine the runtimes of the operations for these structures.

Study Resources

- Lab Assignments
    - Great resource for reviewing material that has been stressed in the course and that you have already put in mental effort to understand and complete
- Quizzes
    - Use to mine important topics and for example questions
- ZyBooks
    - Use to revisit material and fill in gaps in your knowledge uncovered through your review of the resources above

Recommendations

Review the syllabus calendar and if there is a topic that you are uncertain about, revisit it to fill in gaps in your knowledge.

Go through the labs and the quizzes. Topics that have been stressed in these two mediums should be starred as important. For example, Lab 3 was largely about abstract classes. You should be able to explain what an abstract class is, how one fits into an inheritance hierarchy (and what the requirements are for subclasses of abstract classes), and why a developer would choose to make a class abstract. Consider the other labs and the quizzes in the same manner.

Use the zybook as your resource to review all material that you are either uncertain about or have starred as important.