Midterm Study Guide
Fall 2012

This document contains a list of the topics and skills that will be covered on the midterm. For problems that require reading/interpreting/modifying/writing code, you need not memorize the exact APIs covered, but you should be able to understand/apply the APIs if I provide you a listing of their classes and method signatures.

Development Problems and Processes

- Know/understand the problems of software development:
    - Requirements
    - Cost estimation
    - Bugs
    - Maintenance
- Know/understand what iterative development is and why we do it.
- Know/understand what agile methods are and why we use them.
    - Know the agile values from the Agile Manifesto.

Requirements

- Know the parts of a ("brief") use case and be able to write use cases.
- Understand the (UI-free) "essential style" for UCs.
    - Be able to apply the style.
    - Be able to critique UCs with respect to the style.
- Understand the "black-box" style for UCs.
    - Be able to apply the style.
    - Be able to critique UCs with respect to the style.

Servlets and JSP

- Understand how web browsers and web servers interact (i.e., HTTP).
- Know the parts of a URL.
    - Including optional parameters.
- Know the basic structure of HTTP requests and responses.
    - Know the differences between GET and POST requests.
    - Know what it means for an operation to be *idempotent*.
- Know how request/response data flows between a web browser and a servlet.
    - Understand how the container manages request/response objects.
    - Understand how the container manages threads.
- Be able to read/interpret/modify a web.xml deployment descriptor.
    - You need not memorize the exact tag names, but you should know what they mean if I show them to you.
- Be able to read/interpret/modify a Java servlet implementation.

- o Know how to print HTML from within servlet method.
- o Know how to use a ServletConfig object and what it's good for.
- o Know how to use a ServletContext object and what it's good for.
- o Know how to use a ServletContextListener object and what it's good for.
- o Know how to use a HttpSession object and what it's good for.
- Be able to read/interpret/modify a simple JSP.
  - o Know how to forward a request to a JSP from a servlet.
  - o Know how to pass data from a servlet to a JSP via the request object.
  - o Know how to use the <% … %> and <%= … %> tags.
  - o Be able to read/interpret/modify basic HTML (possibly containing a form). I will provide an HTML example that includes all tags that you will need.
- Know how to apply the Model-View-Controller architectural pattern with servlets and JSP.
- Understand the scope and lifecycle of servlets, ServletConfigs, ServletContexts, and HttpSessions.

Concurrent Programming in Java

- Know the possible states that a thread can be in.
- Understand the semantics of multithreaded execution in Java.
- Be able to read/interpret/modify/write multithreaded Java code in the context of servlets and JSP.
  - o Be able to apply the monitor pattern to synchronize a multithreaded program.
    - ▪ Understand/apply synchronized methods.
    - ▪ Understand/apply the wait(), notify(), and notifyAll() Object methods.

Subversion (SVN)

- Know the basic SVN client operations and how they affect the repository and/or your working copy.
- Be able to choose the client operation(s) to apply in a given situation or to solve a particular problem.
- Know the possible outcomes of commit and update operations when multiple developers are collaborating.

Databases

- Understand how information in a relational database is structured.
  - o Know the significance of tables, primary keys, and foreign keys.
- Be able to read/interpret/modify SQL queries.
  - o Understand the join operation.