CSC 331/631 Midterm Study Guide
Instructor: V. Paúl Pauca

Handouts

1. Architectural design

   - What is architectural design?
   - How does architectural design relate to the software engineering process?
   - What is architectural design attempting to optimize?
   - Architectural views and the 4+1 model of Krutchen
   - Architectural patterns and application architectures

   Review key points and exercises

2. Configuration management

   - Change and version management
   - Updating, committing, branching and merging
   - Configuration management systems and appropriate usage

   Review key points and exercises

3. Software testing

   - Goals of software testing
   - validation vs. verification
   - Development testing, unit testing, component testing, system testing
   - Test-driven development
   - Release testing
   - User testing

   Review key points and exercises

4. Process improvement and CMMI

   - The process improvement process
   - Process measurement
   - Process analysis and change
   - The CMMI process improvement framework

   Review key points and exercises

Slides

1. Architectural design and design patterns

   - What is the job of a system's architect?
   - What are the basic architectural patterns according to Sommerville?
   - What's a design pattern and what are its elements?
   - What does *program to an interface, not an implementation* mean?
   - What does *favor object composition over class inheritance* mean?

2. Version control and configuration management

   - What is version control and how is it used?
   - Give two examples of version control systems
   - Understand the process of working with Git

3. Model-View-Controller pattern

   - The Gamma *et al.* classification of design patterns
   - What is the purpose of the MVC pattern?
   - Applications of MVC
   - Implementation of MVC, different components and their relationships
   - MVC in Android programming

4. Software testing

   - Validation versus verification
   - Defects, software faults, failures, and errors
   - Scope, functional, and non-functional testing
   - Static vs. dynamic methods for testing code
   - Black box vs. white box testing
   - Unit, integration, and system testing
   - Using JUnit for unit testing in Java

5. Software process improvement

   - Why focus on software process improvement?
   - Capability maturity model integration
   - SW-CMM premise and strategy
   - SW-CMM levels
   - Key process areas needed to reach next maturity model
   - The ISO 9000-series standards
   - Software quality and measurement
   - Software quality attributes
   - Software size