Midterm Exam Review

CS 3398  
Spring 2014  
Jill Seaman

Midterm Exam

• Wednesday/Thursday, March 5/March 6  
• Closed book, closed notes, clean desk  
• Chapters 1 through 4 and 6  
• 100 points total  
• 25% of your final grade  
• I recommend using a pencil (and eraser)  
• I will provide extra paper.

Exam Format

• Multiple choice: 17 questions  
• Problems: 3  
  - write (or modify) some requirements or give a scenario or use case  
  - draw a use case diagram  
  - draw the architecture of a system using an arch. pattern.  
• Written answers: 3  
  - 3 to 5 sentences, generally  
  - Define, explain, compare, evaluate  
  - Make a claim and support it.  
  - Requires memorization of topics and issues  
• Each question will indicate how many points it is worth

Ch 1: Introduction

• Software Engineering: what is it?  
  - Why do we need it? Project and Product failures  
• Essential attributes of good software  
  - Functional Correctness, Maintainability, Dependability, Efficiency, Acceptability  
• Two kinds of software products  
  - Generic vs customized software  
• Application types:
  - Stand-alone applications
  - Interactive transaction-based apps
  - Embedded control systems
  - Batch processing systems
  - Entertainment systems
  - Systems for modeling+simulation
  - Data collection systems
  - Systems of systems
Ch 2: Software Processes

- **Software process**
  - What are they, why do we have them?
- **Software process activities**
  - specification (requirements)
  - development (design and implementation)
  - validation (testing and reviews)
  - evolution (maintenance)
- **Software process models**
  - Waterfall model
  - Incremental development model
  - Spiral model
  - Reuse-oriented software engineering

Know advantages and disadvantages of each.

Ch 2: Software Processes

- **Coping with change:**
  - change avoidance and prototyping
    - how prototyping is used
  - change tolerance and incremental delivery
    - pros and cons
- **Rational Unified Process**
  - UP is a generic framework, RUP is a commercial product
  - Must be specialized for each project
  - 6 disciplines over 4 phases
    - each phase has goals, complete before next phase
    - each phase has iterations
    - each phase involves all the disciplines, in varying amounts.

Ch 3: Agile Processes

- **Agile development:**
  - why needed?
  - manifesto, principles
- **Extreme programming (12 practices)**
  - Planning Game: story cards, task list
  - Testing: test-first development, automatic testing
  - Pair programming, continuous integration
  - Refactoring, team code ownership, sustainable pace
- **Scrum**
  - Project management method for incremental dev
  - Roles, events, artifacts.
- **Scaling Agile to larger projects**
- **Choosing a process (pros+cons of agile)**

Ch 4: Requirements Engineering

- **Requirements (definition)**
  - Levels: Business, user, system
  - Functional vs non-functional
  - Desired qualities: correct, unambiguous, complete, consistent, verifiable
  - Be able to write user and system level requirements
- **Software Requirements Specification Doc**
  - General contents (outline)
  - Users and uses
  - Good practices
Ch 4: Requirements Engineering

- Requirements Engineering
  - Elicitation,
  - Analysis,
  - Specification,
  - Validation
  - Management

- Tools and methods of each sub-discipline
  - Interviews, elicitation workshop, ethnography
  - Scenarios, use cases, use case diagrams
  - Prototypes, requirements review, generate test cases
  - Natural language specification, pros and cons

Ch 6: Application architecture

- Introduction
  - Terms: Architectural design, component, subsystem, service, subsystem interface
  - Using box and line diagrams to represent architecture
  - Design goals: simplicity and independence

- Architectural patterns
  - Model-View-Controller
  - Layered
  - Client-Server
  - Pipe & Filter
  - Repository

Example Problems

- Assignment 1, Assignment 3
- Assignment 4: Architectural models and use case diagrams (questions and solutions on TRACS resources folder)

- See the Sample Midterm exam on the website.