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

  > Know goals and methods of each sub-discipline

- 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
  - ModelViewController
  - Layered
  - Client-Server
  - Pipe & Filter
  - Repository

  > Know when to use each one, and some advantages.
  > Be able to draw them.

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.