Final Exam Review

CS 3398
Fall 2012
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Final Exam

• Wednesday, Dec 12 (8am-10:30am)
• Closed book, closed notes, clean desk
• Chapters 5 through 9 (and some of 4)
• 25% of your final grade
• I recommend using a pencil (and eraser)
• I will bring extra paper.

Exam Format

• Multiple choice questions (ch 5-9)
• Problems
  - write or modify some requirements (ch 4, SRS)
  - draw some diagrams/models: in the context of
    - system models (ch 5),
    - system architecture (ch 6) and/or
    - design+implementation (ch 7)
• Written answers (ch 5-9, maybe SRS)
  - 3 to 5 sentences, generally
  - Define, explain, compare, evaluate
  - Support with three reasons, unless stated otherwise

Example Problems

• See TRACS for the in-class modeling exercises (solutions to follow).
• Note: read multiple choice questions carefully.
  - Treat a question like the following as a series of T/F questions

Which of the following is NOT a characteristic of the Scrum method?
(a) There is no real project manager, the team makes its own decisions.
(b) The stakeholders select the features for each sprint cycle.
(c) There are daily meetings where each developer gives a short report about their work.
(d) The scrum master assigns the tasks to the developers at the beginning of the sprint cycle.

Each question will indicate how many points it is worth (out of 100)
Ch 4: Requirements engineering

- Requirements
  - Business, user, system
  - Functional vs non-functional
  - Qualities: complete, correct, clear, unambiguous, verifiable
  - Know how to write them

- Software Requirements Specification
  - Sections (generally)
  - Uses
  - Be familiar with yours

Ch 5: System modeling

- UML Models:
  - activity diagram
  - use case diagram
  - sequence diagram
  - class diagram (Aggregation and generalization)
  - state diagram

- How models are used
  - Requirements development, design and implementation

- Be able to
  - Recognize the models
  - Draw simple versions of the models

Ch 6: Application architecture

- Introduction
  - Terms: Architectural design, Software architecture
  - Using box and line diagrams (simple context diagrams)

- Design decisions
  - questions to ask
  - how architecture affects non-functional requirements

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

- Application architectures
  - Transaction processing systems
  - Language processing systems

Ch 7: Design and implementation

- Object oriented design activities
  - Define system context and interactions (external!!!)
  - Design system architecture
  - Identify principal objects
  - Develop design models: class, sequence, state (as needed)
  - Specify interfaces

- Design patterns
  - What are they, how described, why used?
  - Observer pattern: be familiar with this one

- Remaining issues:
  - Reuse: benefits+costs,
  - Configuration management: why version control?
  - Open source development: pros/cons, licensing issues
Ch 8: Software Testing

- Verification and Validation
  - static vs dynamic verification
  - validation vs defect testing
- Stages and types
  - Development
    - Unit
    - Component
    - System
  - Release
  - User
    - Alpha
    - Beta
    - Acceptance
- Techniques for choosing test cases
  - Partition
  - Guideline-based
  - Requirements-based
  - Scenario testing
- Test-driven development + Regression testing

Ch 9: Software evolution

- Evolution Process
  - Spiral model: iterative development
  - Driven by change requests
  - Program understanding
- 3 Types of software maintenance
  - Defect fixing, adapting to new environment, new features
- Reengineering
  - What, when, why
  - Techniques
- Refactoring
  - What, when, why
  - Bad smells

Office Hours

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