

Final Exam Review

CS 3398
Fall 2013

Jill Seaman

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Final Exam

- Wednesday, December 11, 8:00AM to 10:30AM
- Closed book, closed notes, clean desk
- Lectures:
 - Models, Detailed Design, Implementation,
 - Chapter 8, Chapter 9
- 25% of your final grade
- I recommend using a pencil (and eraser)
- I will bring extra paper.

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Exam Format

- Multiple choice: 17 questions
- Problems: 3
 - draw a UML class diagram (or one of the other 3)
 - given a class diagram, decompose it into subsystems (loose coupling, high cohesion)
 - derive some test cases
- Written answers: 3
 - 3 to 5 sentences, generally
 - Define, explain, compare, evaluate
 - Make claims and give support
- Each question will indicate how many points it is worth (out of 100)

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System modeling

- Simple Context Model (SRS section 2.1)
- UML Models:
 - **class diagram** (SRS section 3.4)
 - **state diagram**
- Control Flow Diagrams (aka Flowcharts)

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

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Detailed Design

- Design Processes
 - Functional Decomposition (top down design)
 - Relational Database Design
 - ❖ tables, foreign keys (ER Diagrams)
 - Object-oriented design and UML
 - ❖ using class diagrams, state diagrams, etc.
 - ❖ 5 steps:
 1. Requirements elicitation
 2. Object oriented analysis
 3. System Design
 4. Object Design
 5. Implementation

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Design characteristics and metrics

- Desired Characteristics:
 - Consistency
 - Completeness
 - Simplicity
- Legacy Characteristics:
 - Halstead Complexity
 - McCabe's Cyclomatic Complexity
- Measuring simplicity:
 - Loose **coupling**
 - Strong **cohesion**

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Implementation

- Desired characteristics, and how to achieve them:
 - Readability and maintainability
 - ❖ Programming style and coding guidelines
 - ❖ Using comments well
 - ❖ Refactoring
 - Correctness
 - ❖ Testing and debugging
 - Performance
 - ❖ Optimization
- Other issues:
 - Configuration management: why version control?
 - Open source development: pros/cons, licensing issues

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Ch 8: Software Testing

- Concepts:
 - Verification and Validation
 - static vs dynamic verification
 - Failure, Fault, Test cases, Testing
 - white box vs black box testing
 - Test stubs and drivers
- Testing process
 - Development Testing
 - * Unit * Component * System
 - Release Testing
 - User Testing
 - * Alpha * Beta * Acceptance

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Ch 8: Software Testing

Deriving test cases:

- **Unit Testing**
 - Partition testing (Equivalence Class Partitioning)
 - Boundary value analysis
 - Path testing (Path Analysis)
 - State-based testing
 - Guideline-based testing
- **System + Release Testing**
 - Use case-based testing
 - Scenario testing
 - Requirements-based testing

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Ch 9: Software evolution

- **Evolution Process**
 - Spiral model: maintenance = iterative development
 - Change requests, Impact analysis, Release Planning, Change Implementation
 - Program understanding
 - Handling urgent change requests
- **3 Types of software maintenance**
 - Defect fixing, adapting to new environment, new features
- **Reengineering**
 - What, when, why (why not start from scratch?)
 - Techniques
- **Refactoring**
 - What, when, why
 - Bad smells

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Example Problems

- Assignment 5 and Assignment 6
- See the Sample Final exam on the website
- Note: read multiple choice questions carefully.

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Office Hours Finals Week

Day	Date	Time
M	12/9	12:30-1:30pm
T	12/10	9:30-10:30am
W	12/11	11:00am-12:00noon
Th	12/12	1:30-3:30pm
		and by appt.

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