

Midterm Exam Review

CS 3398
Fall 2013

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Midterm Exam

- Wednesday, October 16
- Closed book, closed notes, clean desk
- Chapters 1 through 4 and 6
- 25% of your final grade
- I recommend using a pencil (and eraser)
- I will provide extra paper.

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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.
- Each question will indicate how many points it is worth (out of 100)

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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	Entertainment systems
Interactive transaction-based apps	Systems for modeling+simulation
Embedded control systems	Data collection systems
Batch processing systems	Systems of systems

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Ch 2: Software Processes

- Software process
 - A structured set of activities used to develop a software system/product.
- Software process activities
 - specification (requirements)
 - development (design and implementation)
 - validation (testing and reviews)
 - evolution (maintenance)

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Ch 2: Software Processes

- Software process models
 - Waterfall model
 - ❖ separate stages, sequential
 - ❖ main drawback: response to change
 - Incremental development model
 - ❖ series of incomplete versions
 - ❖ refactoring
 - Spiral model
 - ❖ risks are explicitly assessed and resolved in each loop
 - Reuse-oriented software engineering
 - ❖ web services vs frameworks vs COTS

Know advantages and disadvantages of each.

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Ch 2: Software Processes

- Coping with change:
 - change avoidance and prototyping
 - ❖ how prototyping is used
 - change tolerance and incremental delivery
 - ❖ how different from incremental development
 - ❖ pros and cons

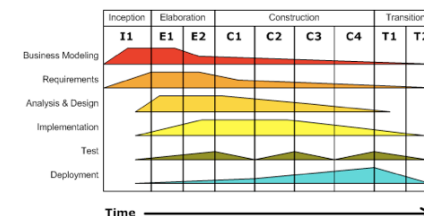
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Ch 2: Rational Unified Process

A hybrid model

- UP is a generic framework, RUP is a refinement of UP and 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
 - one phase devoted to deployment

disciplines correspond to the process activities



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
 - Scrum master, sprint cycle, scrum team meeting
- Choosing a process (pros+cons of agile)

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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
 - Users and uses

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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

Know goals and some methods of each sub-discipline

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Ch 6: Application architecture

- Introduction
 - Terms: Architectural design, subsystem, service, subsystem interface
 - Using box and line diagrams to represent architecture
- Architectural patterns
 - ModelViewController
 - Layered
 - Client-Server
 - Pipe & Filter
 - Repository
 - Layered + client-server

Know when to use each one, and some advantages.

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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.