

INF 117 Project in Software Engineering

Lecture Notes ~ Winter Quarter,
2008

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Set 5 - System Architecture
*some slides adapted from Ping Wang

Announcements

- K Due (next week) 2/4
 - Requirements Iteration (Final)
 - Design Iteration #1
 - Project Plan #2
- K Project Plan #1 – would like by Thursday
- K Have Requirements approved ASAP (no later than 2/5)
- K Keep your team sites up to date
 - Include Minutes from meetings
 - Meeting Schedules
 - Calendar
 - Updates on what is going on
- K Reminder – Have regularly scheduled meetings

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Today

- K Team Roles
- K Use Case Based Testing

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What is your role?

- K Team should define roles
 - Equal distribution of workload
 - Work together (labs, laptops, etc...)
 - What should the Lead do? Roughly...
 - ▣ Organize meetings
 - ▣ Define agenda
 - ▣ ... beyond that is team dependent
 - ▣ Everyone else should be contributing to ideas and whatnot --- take turns in the meeting
- K Some will have all members work equally throughout... others may not.
 - ... all should be involved at some level in each phase

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Meetings

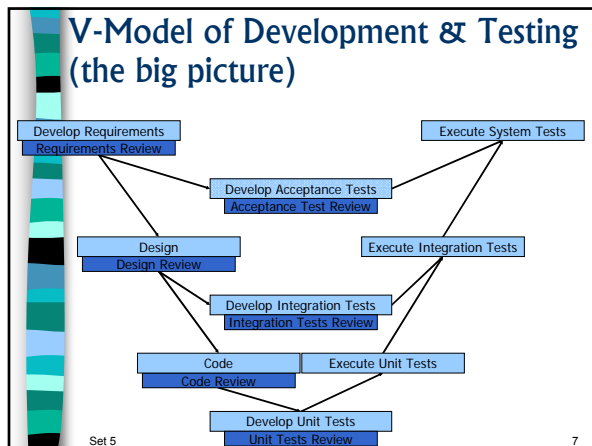
- K Always have an agenda
 - What is the objective of the meeting?
 - Main discussion points
 - ▣ Level of detail is up to you
- K Minutes
 - Include who was present
 - Ideas discussed – who contributed what?
 - Include a variety of ideas
 - Best to make up a simple template to fill out
 - One person (not the lead) should take minutes

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Example Minutes

- K Present
 - Axxxx
 - Bxxxx
 - Cxxx (Lead)
 - Dxxxxx
 - *Absent
- K Agenda
 - Xxxx xxxxx xxxxxxx xxxxx
- K Discussion, decisions, assignments
 - First agenda item.
XX
xxxxx.
 - Second agenda item
XX
- K Tentative agenda for the next meeting
 - XXXXXXXXXXXXXXXXXXXX XXXXX XXXXXXXXXXXXXXX

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Acceptance Test Plan

- Accompanies a requirements specification
- Specifies, in an operational way, consistency between the requirements specification and the system that will be delivered
- Binds a customer to accept the delivered system if it passes all the tests
- Covers all aspects of the requirements specification

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Motivation

- Test planning reveals ambiguities and defects early
 - Many defects originate in requirements phase
 - Much less costly if caught early
 - Must verify requirements document
- System/ acceptance testing
 - Specify what is required of the system
 - Based on scenarios/flows

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Questions to answer

- Is the requirements specification *complete*?
- Is each of the requirements *understandable*?
- Is each of the requirements *unambiguous*?
- Are any of the requirements *in conflict*?
- Can each of the requirements be *verified*?
- Are all terms and concepts *defined*?
- Is the requirements specification *unbiased*?

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Verification & Validation

- Verification
 - “Are we building the product right?”
- What about validation?
 - “Are we building the right product?”
 - Ensure software meets customer’s intent
 - External consistency
- How can we do it?
 - Prototypes
 - Observing the customers

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Where Use Cases Are Used

- Requirements:
 - Collect
 - Clarify
 - Validate
- Analysis & design
 - Object modeling
 - Interface design
 - Object interaction diagrams
- Test
 - Verify needs are met

Use cases are often used to describe possible user interaction (input)

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Use Case Based Testing

- K Develop a naming convention
 - Match the test to the use case to test cases
 - Name the actors
- K For each test case
 - Identify the actors involved
 - Identify the use case it covers
 - Identify pre-reqs and inputs
 - Remember to test the boundary cases!
 - Define expected output
 - Based on the scenarios!

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Use Case Based Testing

- K There are often tool support
 - Automatically generate test suites with specified coverage criteria
- K Enhance use case diagrams with
 - Inputs from actors
 - Output to the actors
 - How the system's state changes
 - Can also describe flows between use cases
- K Useful for integration, system testing

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ReadySET

- K Open source S/E tools
- K <http://www.tigris.org>
- K <http://requirements.tigris.org>
- K <http://readyset.tigris.org>

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ReadySET: Test Case Format

Unique test case ID: Test Case Title	
Purpose	Short sentence about the aspect of the system
Prereq	Assumptions that must be satisfied prior to running the test case
Test Data	List of variables and their values. Can be exact values or ranges.
Steps	Steps to carry out the test (brief list here but detailed explanations below)
Notes and Questions	Extra notes or questions

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ReadySET: Example Steps

- K Login Test
 1. visit LoginPage
 2. enter userID
 3. enter password
 4. click login
 5. see the terms of use page
 6. click agree radio button at page bottom
 7. click submit button
 8. see PersonalPage
 9. verify that welcome message is correct

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ReadySET: Example Steps

- K login [as ROLE-OR-USER]
 - Log into the system with a given user or a user of the given type. Usually only stated explicitly when the test case depends on the permissions of a particular role or involves a workflow between different users.
- K visit LOCATION
 - Visit a page or screen. For web applications, LOCATION may be a hyperlink. The location should be a well-known starting point (e.g., the Login screen), drilling down to specific pages should be part of the test.

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ReadySET: Example Steps

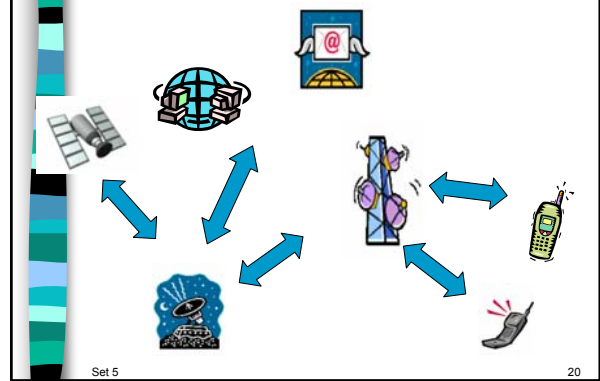
K enter FIELD-NAME [as VALUE] [in SCREEN-LOCATION]

- Fill in a named form field. VALUE can be a literal value or the name of a variable defined in the "Test Data" section. The FIELD-NAME itself can be a variable name when the UI field for that value is clear from context, e.g., "enter password".

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System Architecture



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Software Architecture: Essentials

K Components

- What are the main parts?
- What aspects of the requirements do they correspond to? Where did they come from?
- Examples: filters, databases, GUIs, interpreters

K Connections

- How do components communicate?
- Examples: procedure calls, messages, pipes, event broadcast

K Topology

- How are the components and connections organized topologically?

K Constraints (including constraints on change)

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