

CSE 403

Software Engineering

Spring 2023

#5: Requirements

Project assignments are done!



Logistics

WEEK 2

04/03 L: Dev. Cycle DUE: [PP_1.1!!!](#)

04/04 T: Proposals DUE: [PP_1.2!!!](#)

04/05 L: Requirements [Project Requirements \(PR\)](#)

04/06 P: Requirements

04/07 L: Use-Cases

WEEK 3

04/10 L: SCRUM

04/11 T: DUE: [PR!!!](#)

04/12 L: Version Control [GitHub Project Setup \(GPS\)](#)

04/13 P:

04/14 LX: GIT

Requirements

Recap: Life-cycle stages

Virtually all SDLC models have the following stages:

- **Requirements ← Our focus this week**
- Design
- Implementation
- Testing
- Maintenance

Traditional models:

- Waterfall, Prototyping, Spiral, etc.

Agile models:

- *eXtreme Programming, Scrum, etc.*

Requirements in one picture



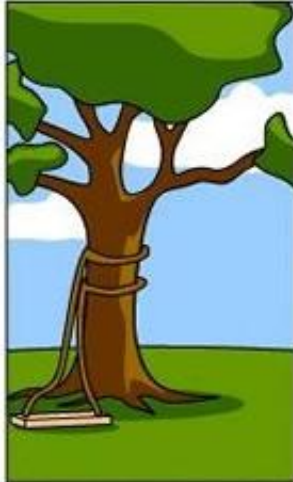
How the customer explained it



How the Project Leader understood it



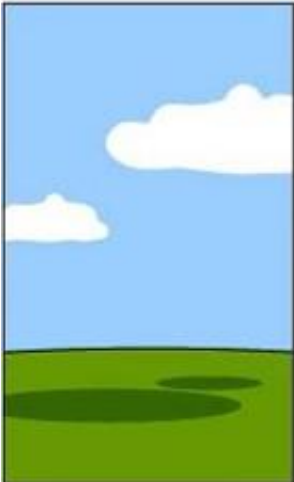
How the Analyst designed it



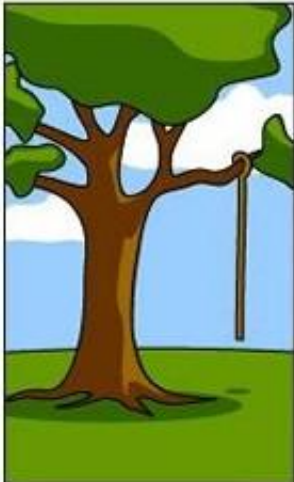
How the Programmer wrote it



How the Business Consultant described it



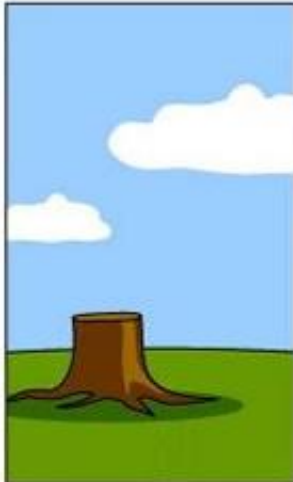
How the project was documented



What operations installed



How the customer was billed



How it was supported



What the customer really needed

Software requirements

Requirements specify what to build

- describe **what, not how**

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Let's try this out?

Software requirements

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How did it go?

“What” vs. “how” is relative

One person’s **what** is another person’s *how*:

- Search for students is the **what**
 - JS.search() is the **how**
- JS.search() is the **what**,
 - binary search is the **how**
- To implement a binary search...

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How to solve this?

Goals of Requirement elicitation

- **Understand** precisely what is required of the software.
- **Communicate** this understanding precisely to all involved parties.
- **Control** production to ensure that system meets specification.

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Example: Search for individual students on the groups page.

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Example: Search for individual students on the groups page.

The screenshot shows a web interface for managing groups. At the top, there are tabs for 'Everyone', 'Project Ideation Teams', and 'project teams'. A blue button '+ Group Set' is in the top right. Below the tabs, there are buttons for '+ Import', '+ Group', and a menu icon. The main content area is divided into two sections: 'Unassigned Students (0)' and 'Groups (37)'. The 'Unassigned Students' section is highlighted with a purple rounded rectangle and contains a search bar labeled 'Search users' and a message: 'There are currently no students in this group. Add a student to get started.' The 'Groups' section lists three groups: 'Project Ideation A' (3 students), 'Project Ideation Team 1' (2 students), and 'Project Ideation Team 2' (3 students). Each group entry has a right-pointing triangle and a vertical ellipsis menu icon.

Group Name	Number of Students
Project Ideation A	3 students
Project Ideation Team 1	2 students
Project Ideation Team 2	3 students

Requirements' Roles

- **Customers:** what should be delivered (contractual base).
- **Managers:** scheduling and monitoring (progress indicator).
- **Designers:** a spec to design the system.
- **Coders:** a range of acceptable implementations.
- **QA / Testers:** a basis for testing, verification, and validation.

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Keep the WHAT and HOW in mind!

How to elicit requirements?

Do:

- Talk to the users -- to learn how they work.
- Ask questions throughout the process -- "dig" for requirements.
- Think about why users do something in your app, not just what.
- Allow (and expect) requirements to change later.

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Don't:

- Be too specific or detailed.
- Describe complex business logic or rules of the system.
- Describe the exact user interface used to implement a feature.
- Try to think of everything ahead of time. (You will fail!)
- Add unnecessary features not wanted by the customers.

Strategies for eliciting requirements

Common strategies

- Interviews
- Observations
- **Use cases**
- Feature list
- Prototyping (e.g., UI)

Cockburn's requirements template

1. Purpose and scope
2. Terms (glossary)
3. **Use cases (the central artifact of requirements)**
4. Technology used
5. Other
 - a. Development process: participants, values (fast-good-cheap), visibility, competition, dependencies
 - b. Business rules (constraints)
 - c. Performance demands
 - d. Security, documentation
 - e. Usability
 - f. Portability
 - g. Unresolved (deferred)
6. Human factors (legal, political, organizational, training)

See [file on Canvas](#) for comprehensive write up and examples.

Requirements engineering

The process of eliciting, analyzing, documenting, and maintaining requirements.

One way to classify requirements

- **Functional requirements**
 - E.g., input-output behavior
- **Non-functional requirements**
 - E.g., security, privacy, scalability
- **Additional constraints**
 - E.g., programming language, frameworks, testing infrastructure

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Challenges and common mistakes

Challenges

- Unclear scope and unclear requirements.
- Changing/evolving requirements.
- Finding the right balance (depends on customer):
 - Comprehensible vs. detailed.
 - Graphics vs. tables and explicit and precise wording.
 - Short and timely vs. complete and late.

Common Mistakes

- Implementation details instead of requirements.
- Projection of own models/ideas.
- Feature creep/bloat.

Feature creep/bloat

Feature creep:

- Gradual accumulation of features over time.
- Often has a negative overall effect on a large software project.

Why does feature creep happen? Because features are fun!

- Developers like to code them.
- Sales teams like to brag about them.
- Users (think they) want them.

Why is it bad?

- Too many options, more bugs, more delays, less testing, ...
- "Boiled frog" analogy.

Can you think of any products that have had feature creep?

Requirement testing challenge!



What's next?

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Question, please!