CS 4530: Fundamentals of Software Engineering Module 2.1: Requirements Analysis

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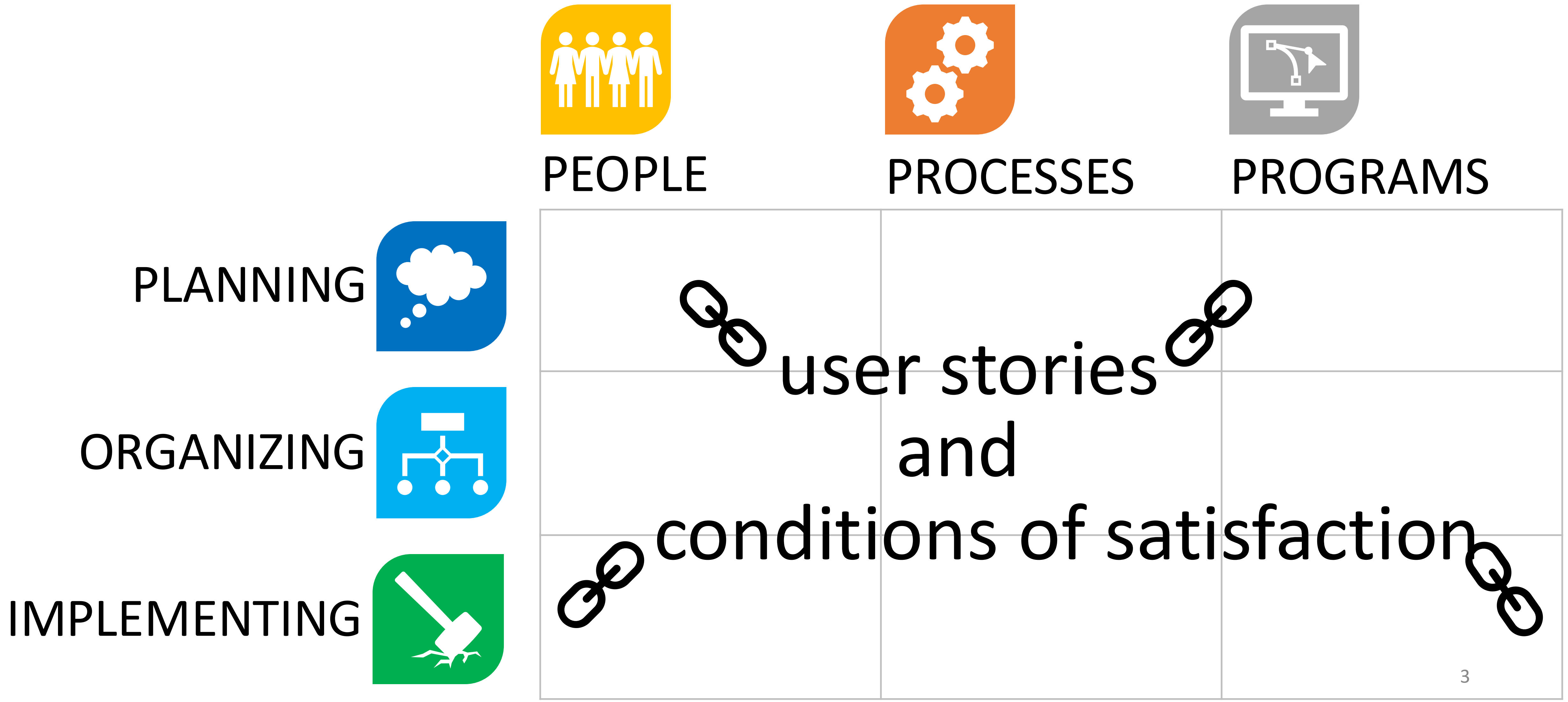
Learning Goals for this Lesson

- At the end of this lesson, you should be prepared to
  - Explain the overall purposes of requirements analysis
  - Recall the three major dimensions of risk in requirements analysis
  - Explain the connection between requirements analysis and user stories

The big picture



Part 1: Requirements analysis

PEOPLE

PROCESSES

PROGRAMS

PLANNING

ORGANIZING

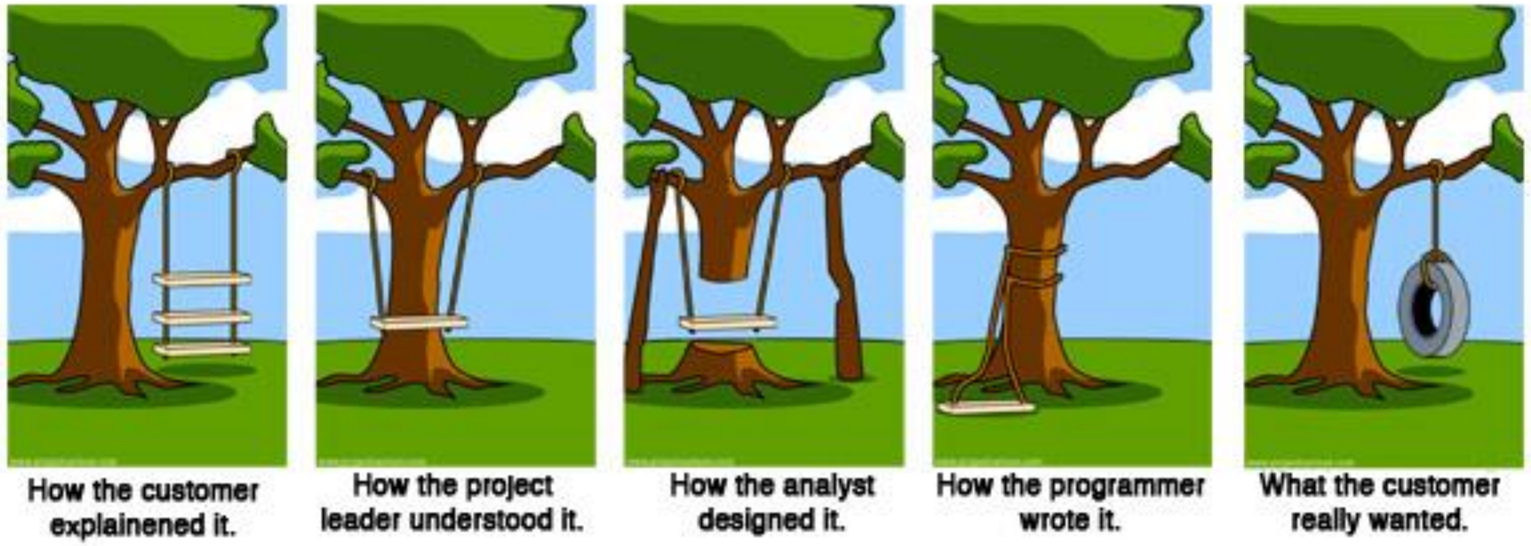
IMPLEMENTING

Requirements Analysis

User Stories

Testing Conditions of Satisfaction

Overall question: How to make sure we are building the right thing


How the customer explainened it.
How the project leader understood it.
How the analyst designed it.
How the programmer wrote it.
What the customer really wanted.

https://en.wikipedia.org/wiki/Tree_swing_cartoon

Why is requirements analysis hard?

Problems of understanding

- Do users know what they want?
- Do users know what we don't know?
- Do we know who are users even are?

Problems of scope

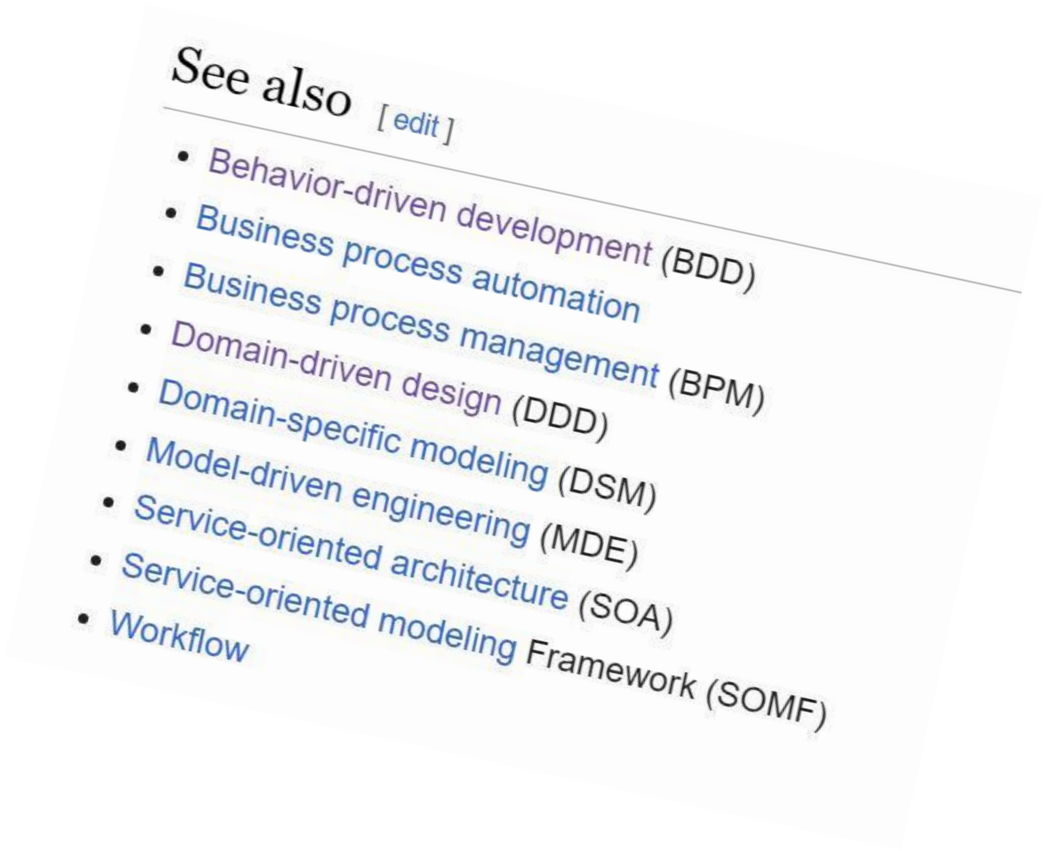
- What are we building?
- What non-functional quality attributes are included?

Problems of volatility

- Changing requirements over time

How do we capture the requirements?

- There are many methodologies for this.
- Often described as x-Driven Design (for some x)
- They differ in scope & details, but they have many features in common.



See also [edit]

- Behavior-driven development (BDD)
- Business process automation
- Business process management (BPM)
- Domain-driven design (DDD)
- Domain-specific modeling (DSM)
- Model-driven engineering (MDE)
- Service-oriented architecture (SOA)
- Service-oriented modeling Framework (SOMF)
- Workflow

Common Elements

- Meet with stakeholders
- Develop a common language
- Collect desired system behaviors that offer value
- Document the desired behaviors
- Iterate and refine!!

User stories are the least common denominator of most approaches

Requirements gathering frameworks inform the structure and priority of user stories

- Prioritizing conditions of satisfaction within a user story a complex organization activity that requires negotiation
- Prioritizing user stories is a complex *planning activity* that is constrained by resources (budget, time, personnel) and multiple (competing or incompatible) ideas about what’s important
- “Building the right thing” is necessarily a value judgment
  - (right for whom? who benefits?)

Your scientists were so preoccupied with whether or not they could, they didn't stop to think if they should."

- Ian Malcom (in *Jurassic Park*, 1993)

Requirements gathering frameworks inform the structure and priority of user stories

- Value Sensitive Design (VSD) is one framework (of many!)
- VSD guides designers and engineers to pay special attention to **stakeholders** and **human values** when writing and prioritizing user stories
- Combines **empirical**, **value**, and **technical**

VSD Example – Informed Consent

Empirical Investigation:

- ❖ Understand what we mean by informed consent, encompasses:
  - ➢ Disclosure. Do we know the pros and cons of taking an action?
  - ➢ Comprehension. Do we understand the disclosures?
  - ➢ Voluntariness. Is there coercion or manipulation?
  - ➢ Agreement. Is there a clear opportunity to consent or not?
  - ➢ Competence. Are we capable to give consent?

Values Investigation:

- ❖ Who are the direct and indirect stakeholders?
- ❖ Do the stakeholders have conflicting values?
- ❖ How can we resolve them?

Technical Investigation:

- ❖ What are the technical mechanisms for implementing informed consent.
  - ➢ One way => cookie consent management system.
  - ➢ Websites use them to obtain and manage user permission for using cookies.

Read the tutorial!

Review: Requirements analysis

- How do we make sure we are building the right thing?
- How do we learn from potential users before we start?
- Values: what even makes something the “right thing”
- Most forms of x-Driven Design could be a whole course on their own