BIM A+

European Master in
Building Information Modelling

Agile methodologies

Topic 2: Fundamentals of programming

BIM A+3: Parametric Modelling in BIM

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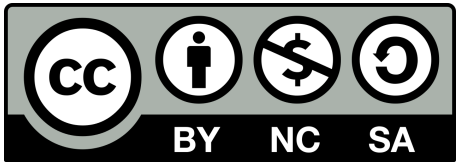
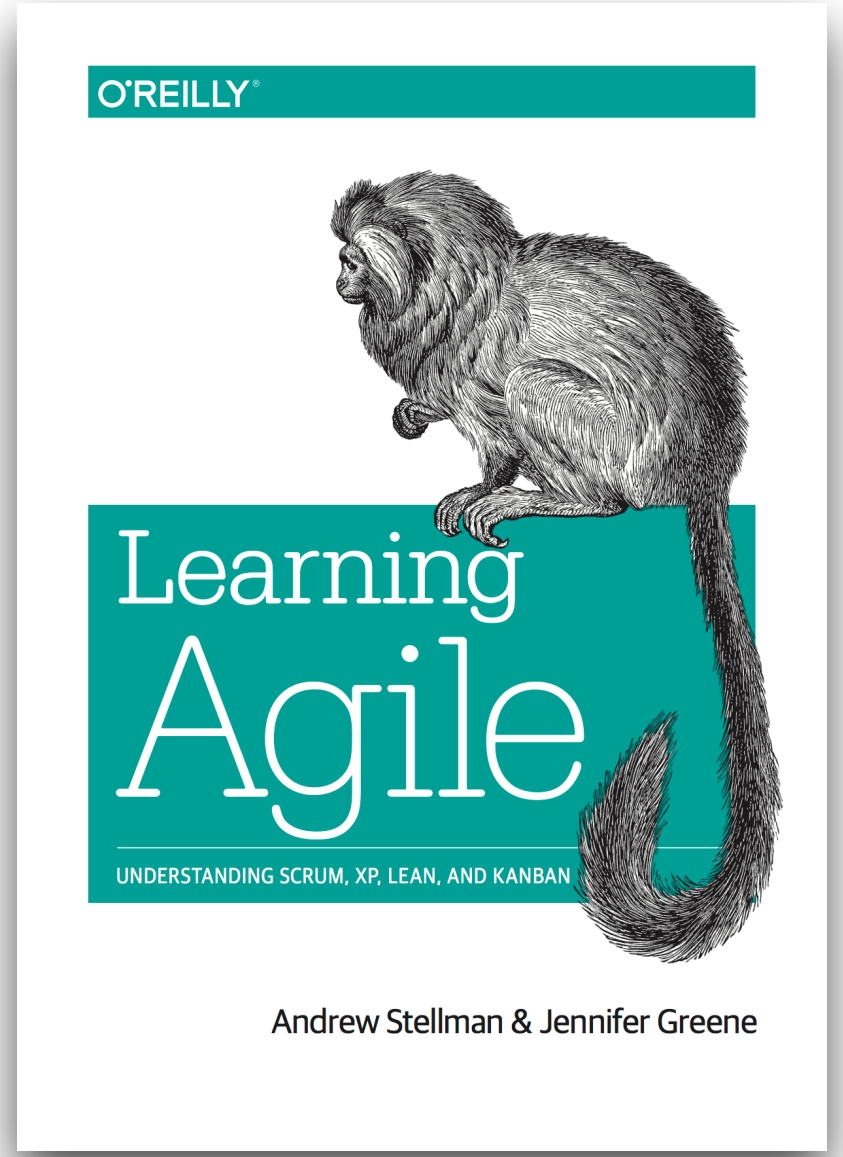
Erasmus+



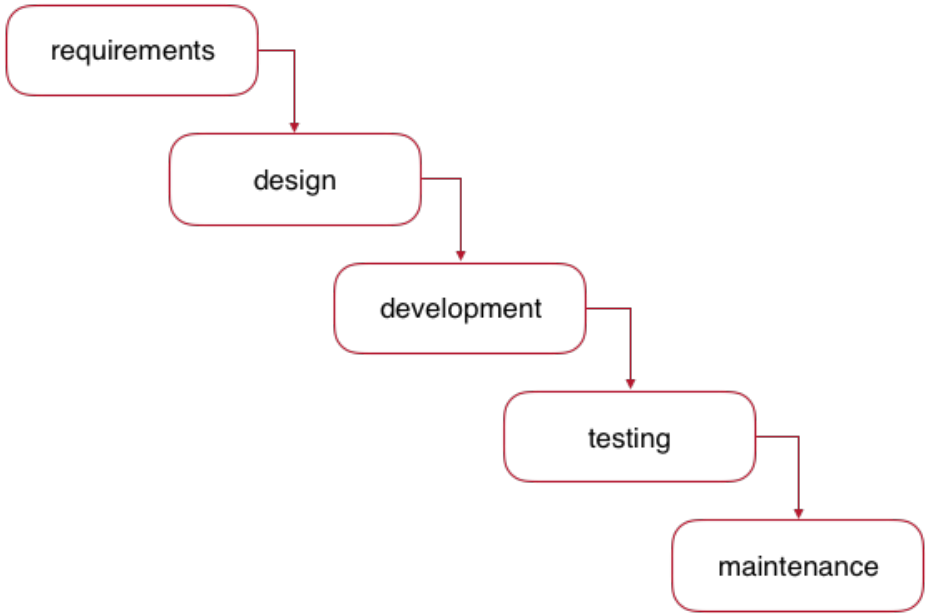
Outline

- Classic project management
- Agile methodologies
  - Scrum
  - eXtreme Programming (XP)
  - Lean
  - Kanban



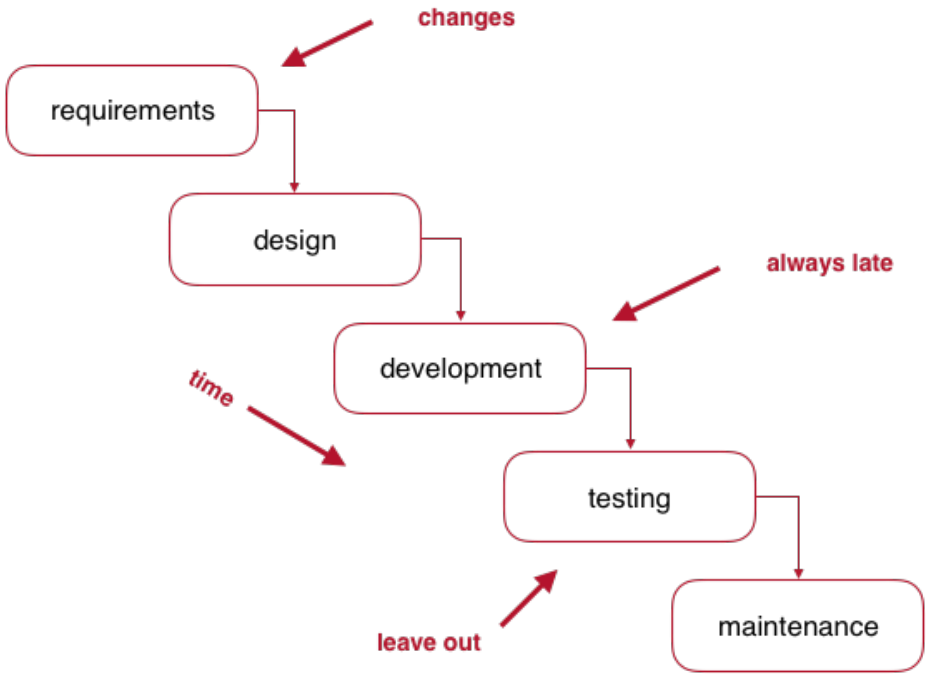
Waterfall model

- Characteristics
  - Sequential execution of steps
  - Rarely returning to previous steps
  - Emphasis on being right/complete in first step



Waterfall model

- Characteristics
  - Sequential execution of steps
  - Rarely returning to previous steps
  - Emphasis on being right/complete in first step
- Problems
  - Product delivered at the end
  - Testing late in the process
  - Late validation (usually too late)



Software development using
waterfall model has
many shortcomings, it is usually more **expensive** and
less efficient then development using
agile methodology

SPEED **flexibility**

AGILE methodologies

cooperation **QUALITY** **iterative**

It is not a process, It is more like a **philosophy** and a **set of values**

Agile manifest

We are uncovering better ways of developing software by doing it and helping others do it.
Through this work we have come to value:

Individuals and interactions	over processes and tools
Working software	over comprehensive documentation
Customer collaboration	over contract negotiation
Responding to change	over following a plan

Twelve Principles of Agile Software

Our highest priority is to satisfy the customer through early and continuous delivery of valuable software.

Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.

Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.

Business people and developers must work together daily throughout the project.

Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.

The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.

Working software is the primary measure of progress.

Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.

Continuous attention to technical excellence and good design enhances agility.

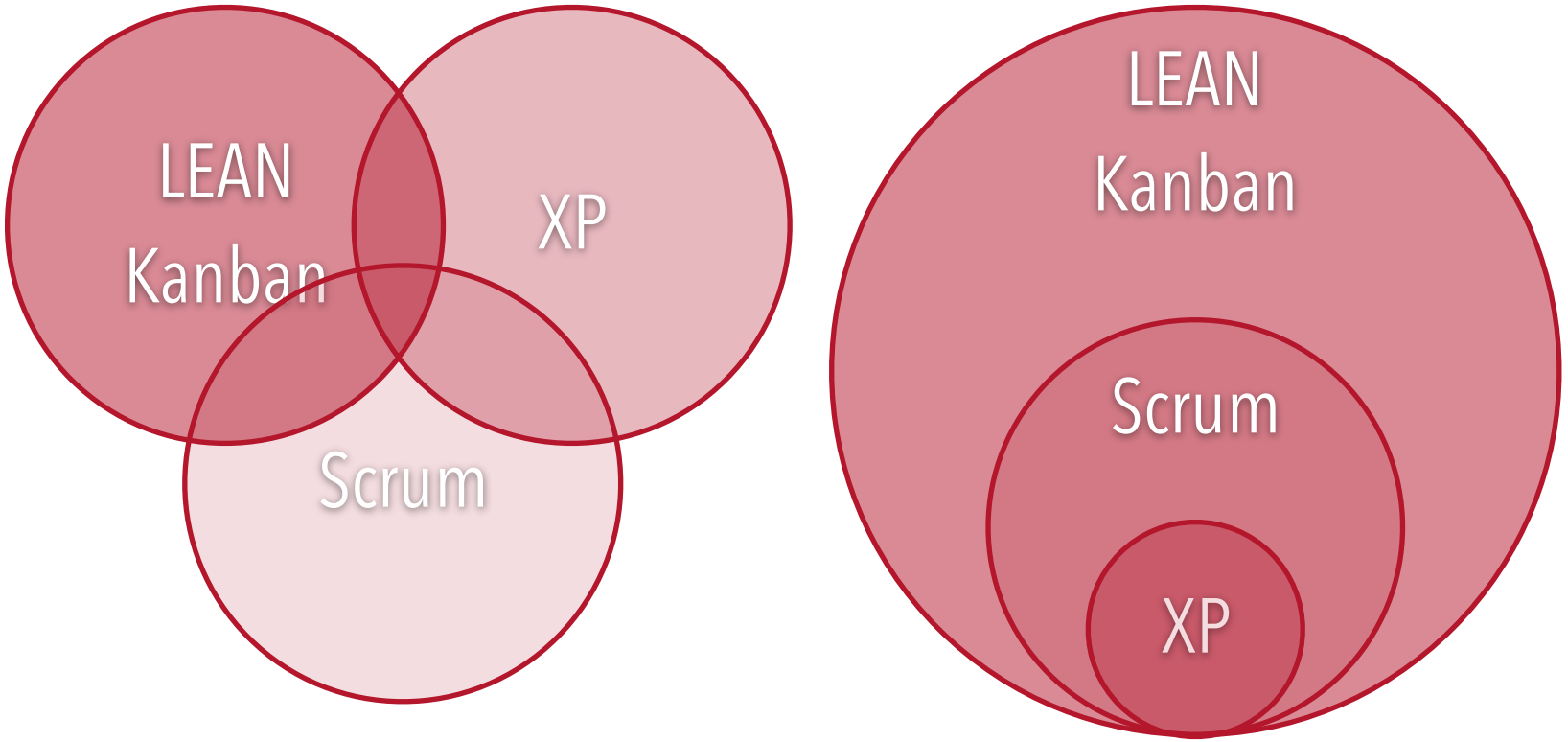
Simplicity--the art of maximizing the amount of work not done--is essential.

The best architectures, requirements, and designs emerge from self-organizing teams.

At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly.

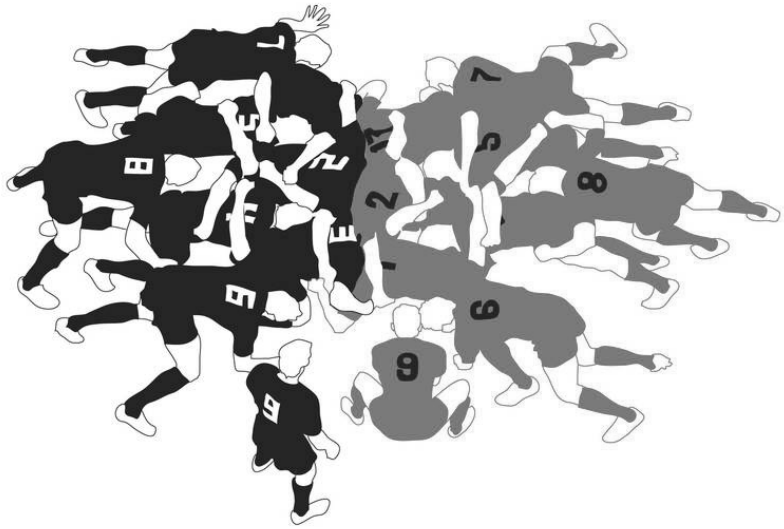
Manifesto for Agile Software Development, https://agilemanifesto.org

Different agile methodologies



Values from Agile manifesto are shared between different agile methodologies.

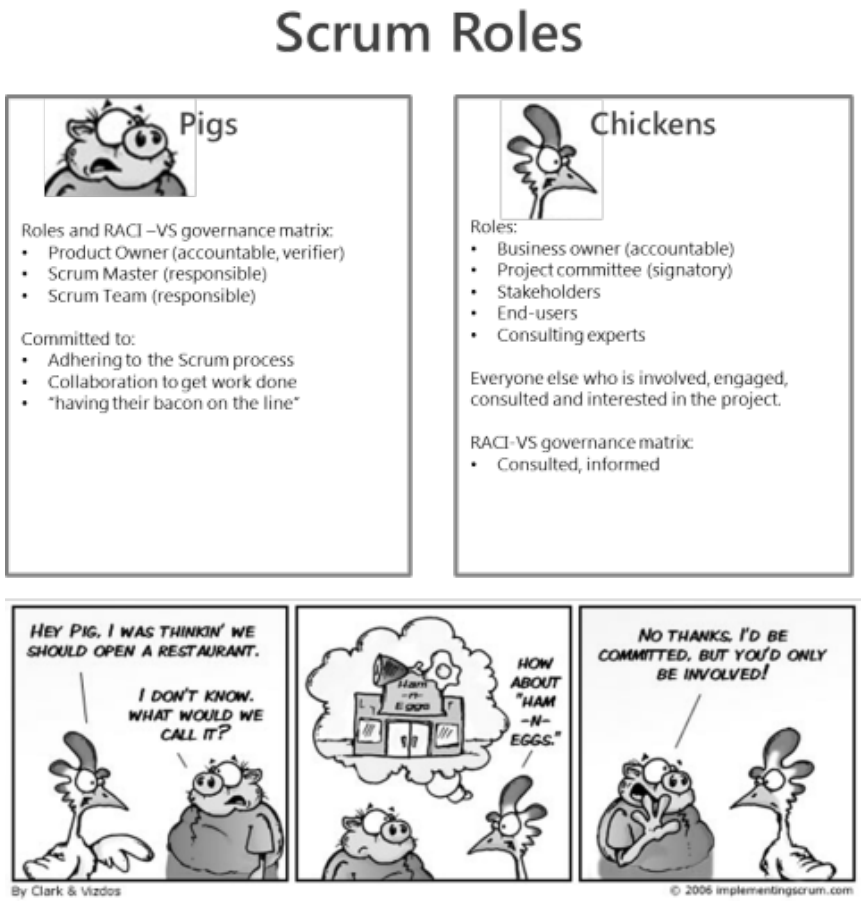
Scrum is a framework within which people can address complex adaptive problems, while **productively** and **creatively** delivering products of the **highest possible value**.



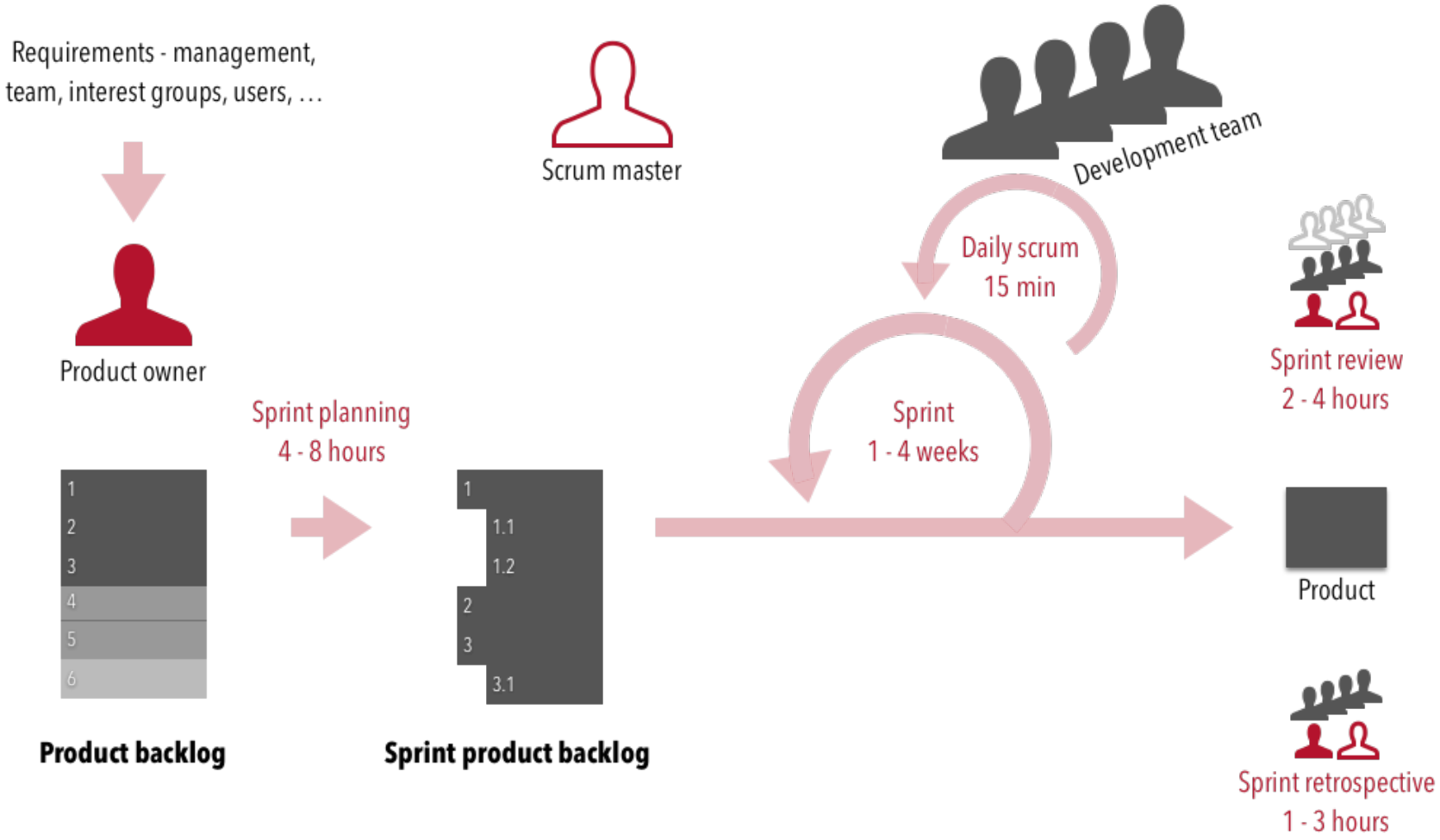
http://scrum.org
Scrum guides, https://www.scrumguides.org

Scrum foundation

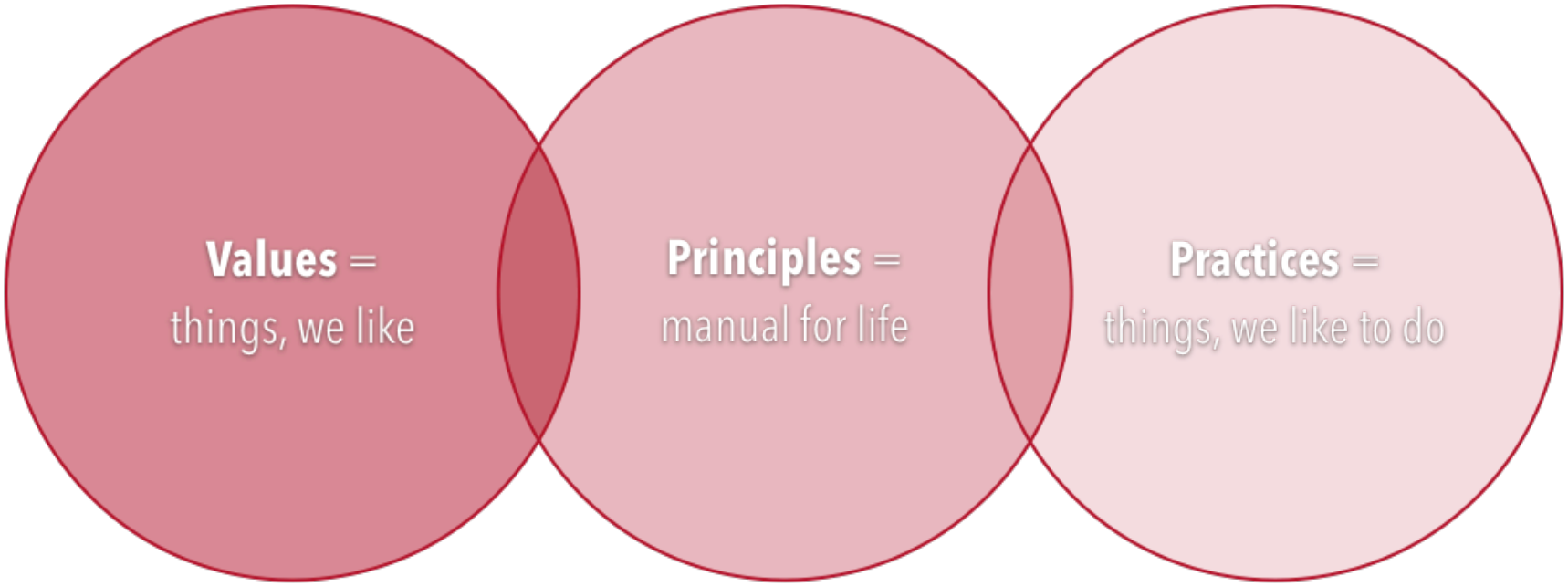
- Empirical process control theory
  - Empiricism asserts that knowledge comes from experience and making decisions based on what is known.
  - Scrum employs an iterative, incremental approach to optimise predictability and control risk.
- Three pillars of Scrum
  - transparency
  - inspection
  - adaptation
- Scrum team characteristics
  - Self-organizing
  - Cross-functional
  - Flexibility, creativity, productivity
  - Agility / completeness / 3 - 9 members
- Scrum team roles
  - Product owner
  - Development team
  - Scrum master



Scrum process



eXtreme programming



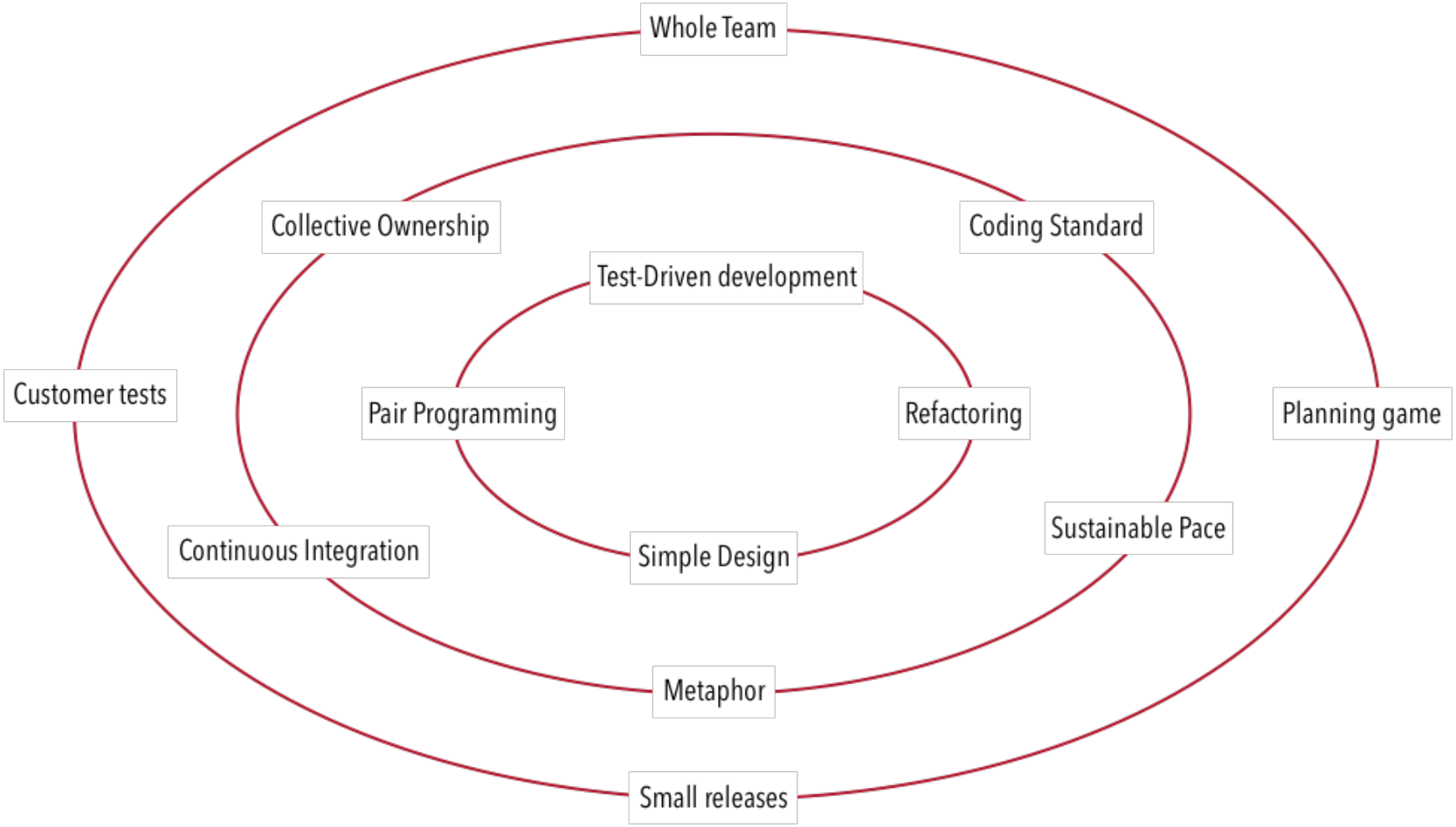
communication, simplicity, courage, feedback, respect

humanity, economical, good for all, improvements, diversity, reflection, constant stream, redundancy, error acceptance, quality, accountability, small changes, …

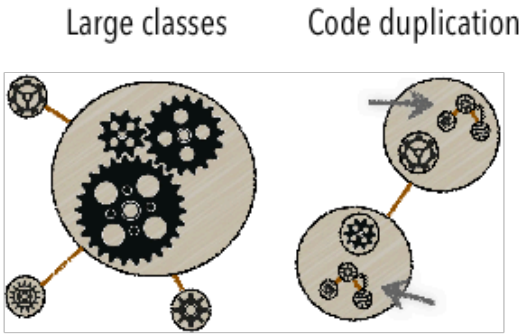
end-user involvement,, iterative development, source code sharing, open source, development team continuity, …

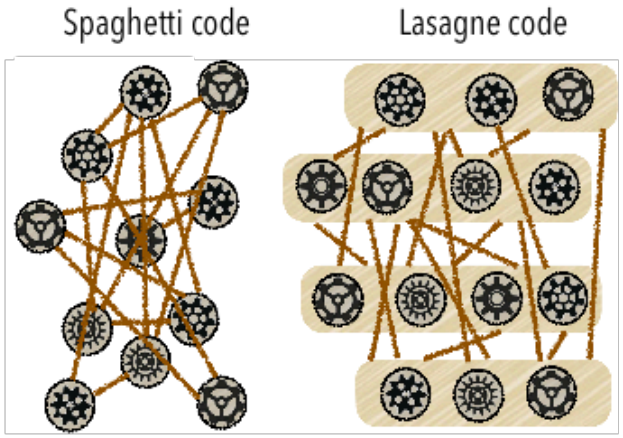
The goals is a development of extensible in flexible solutions.

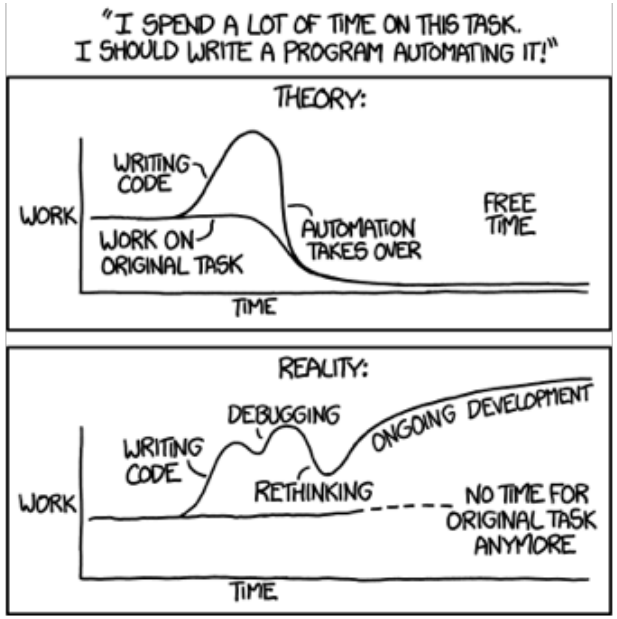
eXtreme programming development practices



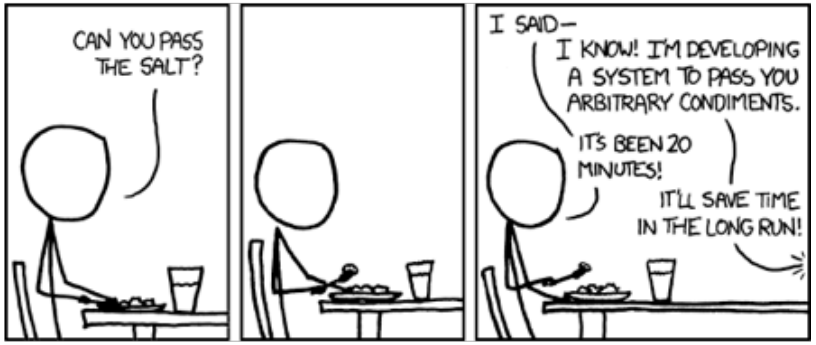
Source code problems





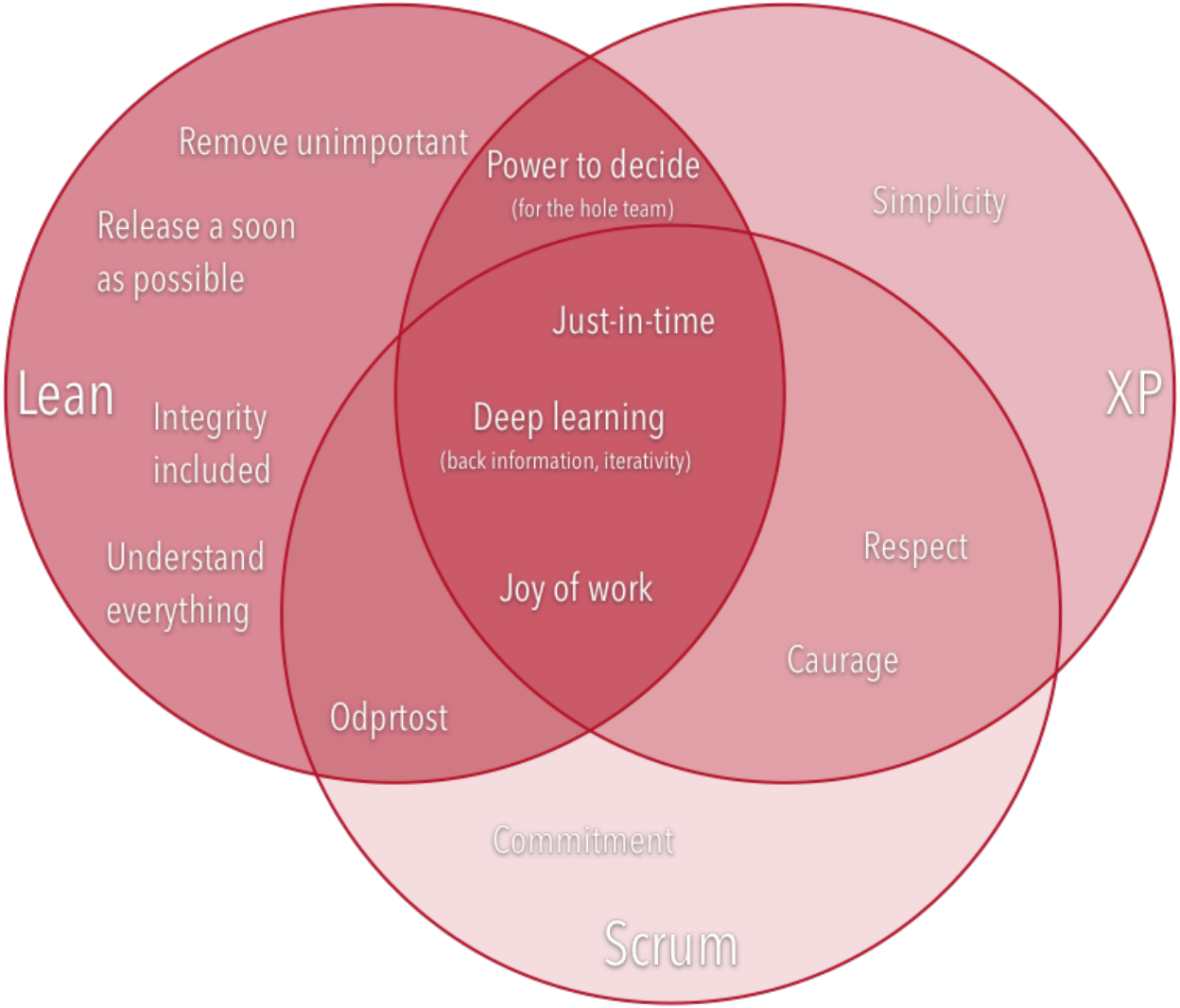


Automation, http://xkcd.com/1319



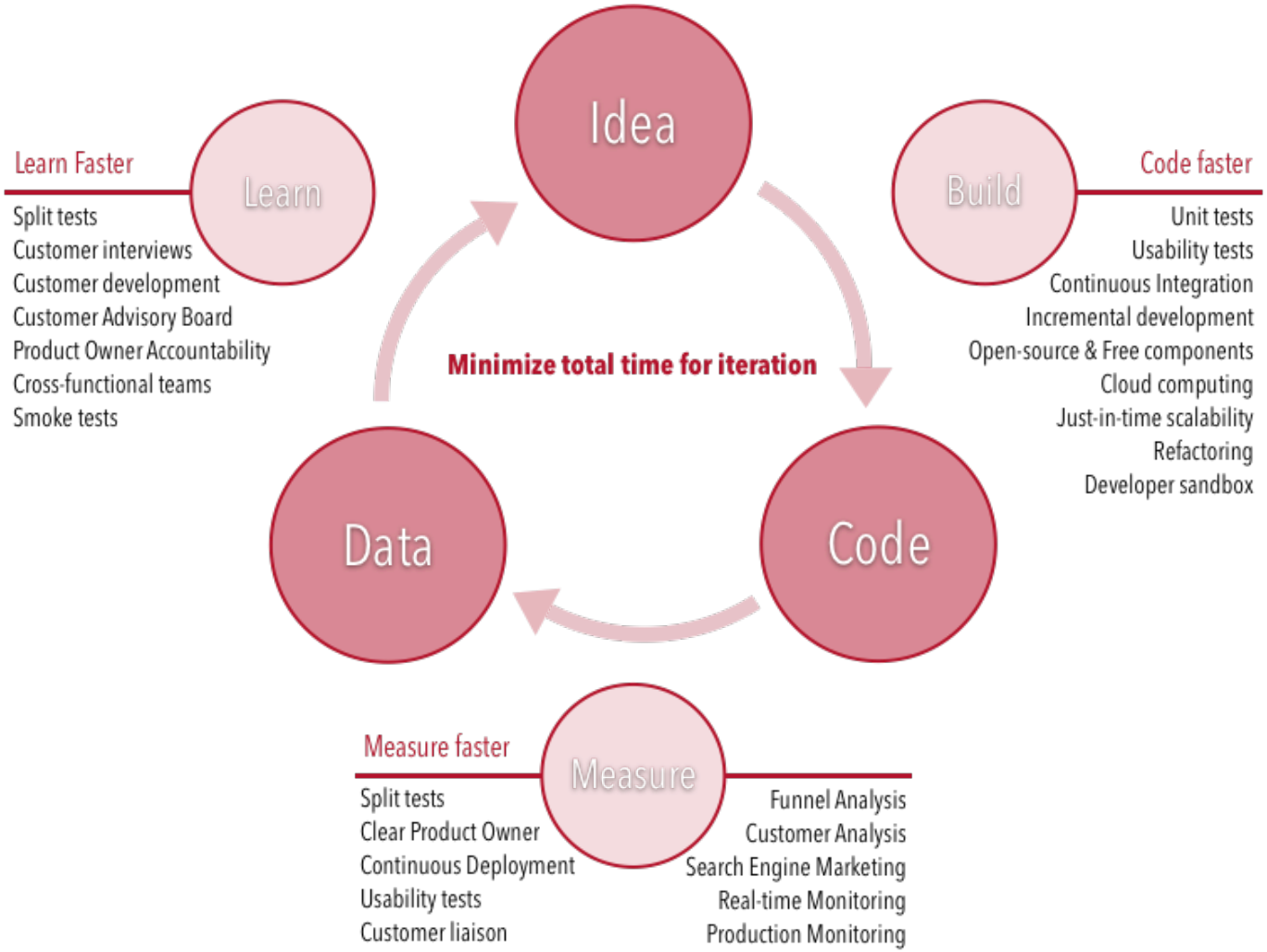
The general problem, http://xkcd.com/974

Lean



The Lean Startup, http://theleanstartup.com

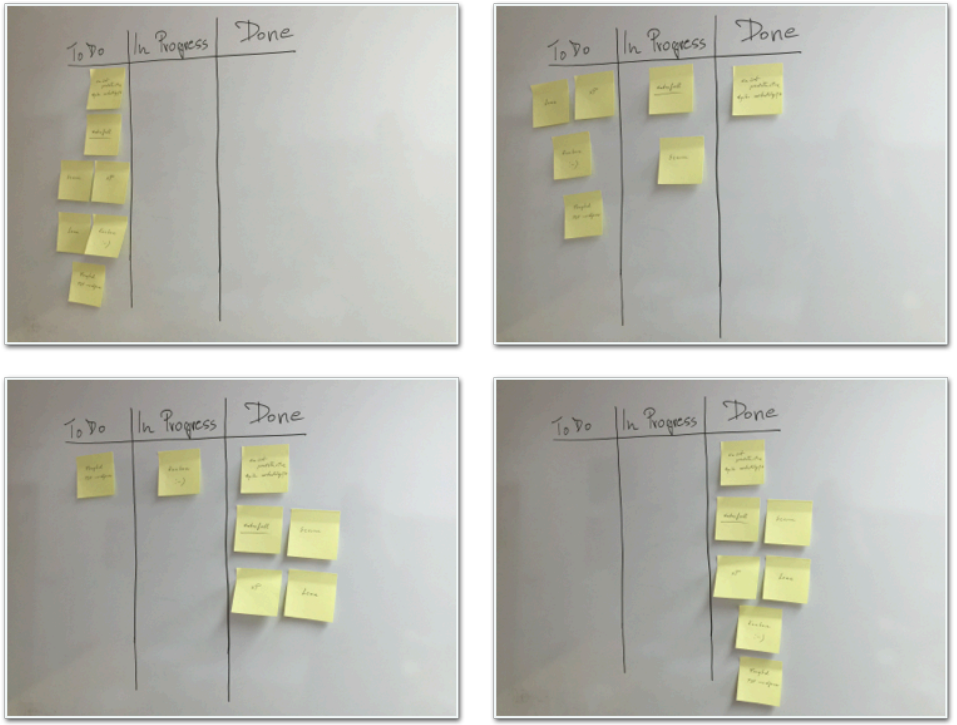
Lean process



Kanban

… is a lean method to manage and improve work across human systems. This approach aims to manage work by balancing demands with available capacity, and by improving the handling of system-level bottlenecks.

- Basic principles
  - We start with what we know
  - Incrementally introduce enhancements
  - We start by keeping existing job titles, roles and responsibilities
- Basic practices
  - Visualise the workflow
  - Limit Work In Progress - WIP
  - Manage flow
  - Explicit politics
  - Information feed-back loop
  - Enhance collaboration, experimental development



Game

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