

# Software Construction with an Emphasis on Scrum

ENSE 281 with Tim Maciag



University  
of Regina



**FACULTY OF ENGINEERING  
& APPLIED SCIENCE**  
Software Systems Engineering



# Mid-point assessment

- Next week! (Feb.11)
  - ED 616
  - 2:30 – 4:30 (4:45 hard cut-off)
- Content
  - Weeks 1—5 (that includes today's lectures)
- Still finalizing the questions...
  - I'm contemplating one giant question that builds off a specific scenario

# Outline

- Software construction
- Common software processes and methodologies
- Prerequisites
- Focus on the Scrum Framework

# Software construction

(design, development, engineering...)

- Project initiating
  - Business case and Charter – the vision and rationale – the problem and the “why”
- Project planning
  - Requirements development
  - Eliciting and documenting the groundwork of design (scope, scheduling, team, budget, and the like)
  - Stakeholders and communications
  - Assumptions and risk
  - Quality and constraints
  - Picturing (software) architecture
- Project execution
  - Coding & debugging
  - Testing
    - Code
    - Usability
  - Deployment
- Project closing
  - Change management, lessons learned, etc.
- Part of all stages
  - Documentation, maintenance, & refactoring
- Iteration (maybe)



# Software construction

(design, development, engineering...)

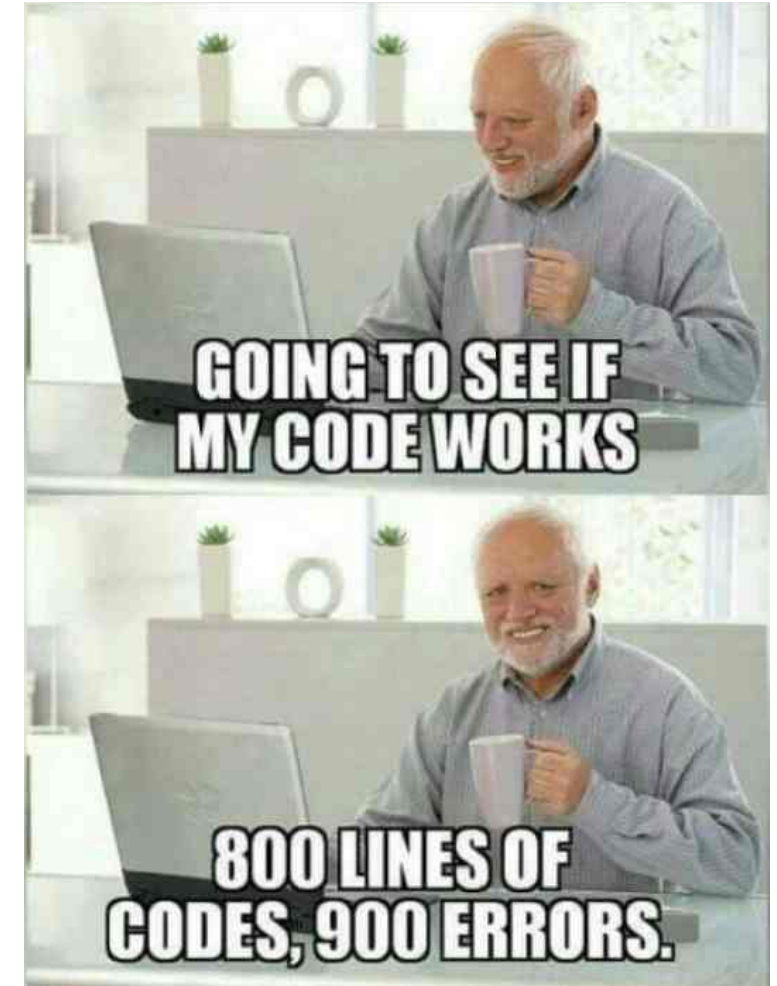
- Project initiating
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Remember  
It's a social  
effort!



# Specifics of software construction

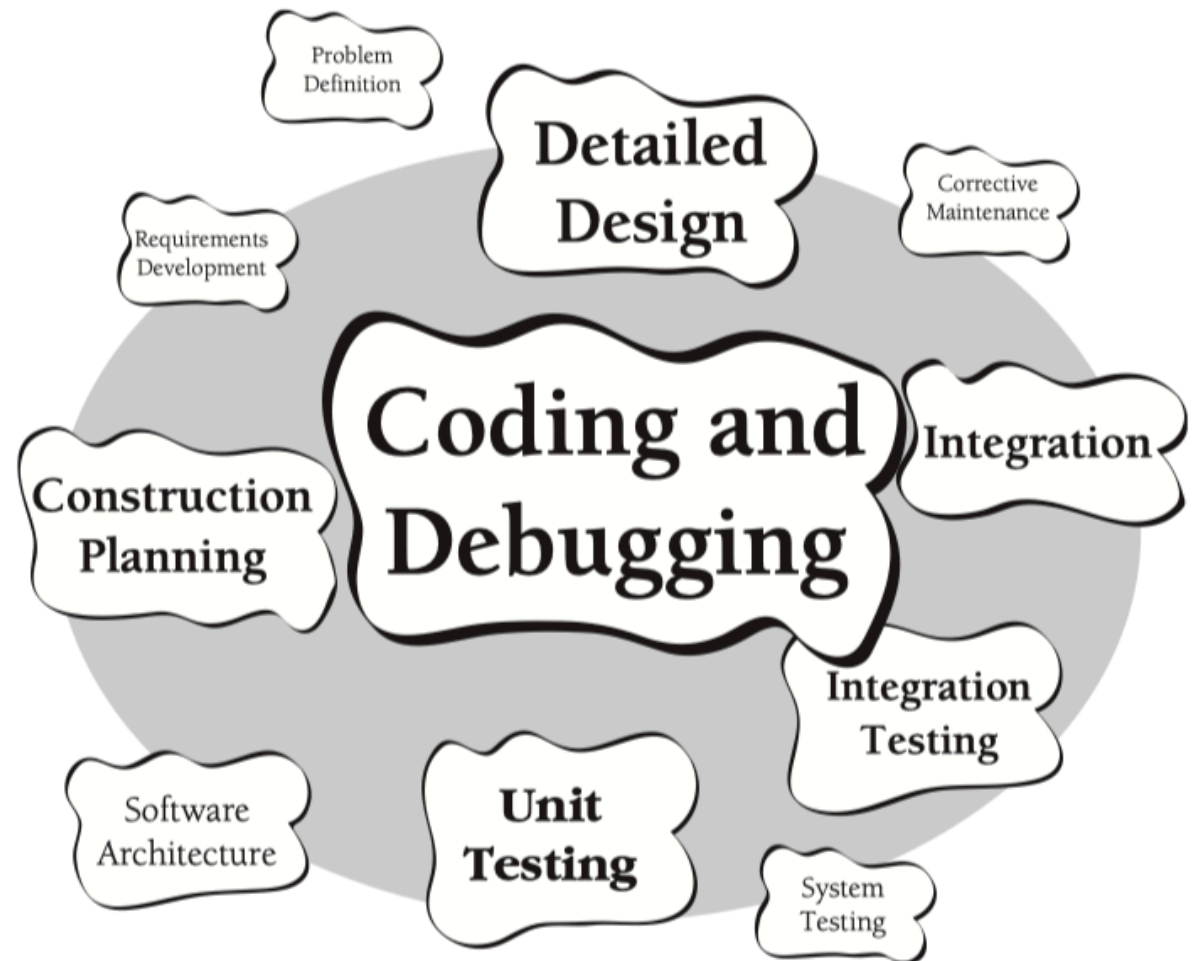
- What is it all about?



- S. McConnell's. Code Complete, Second Edition. Microsoft Press. 2004

# Specifics of software construction

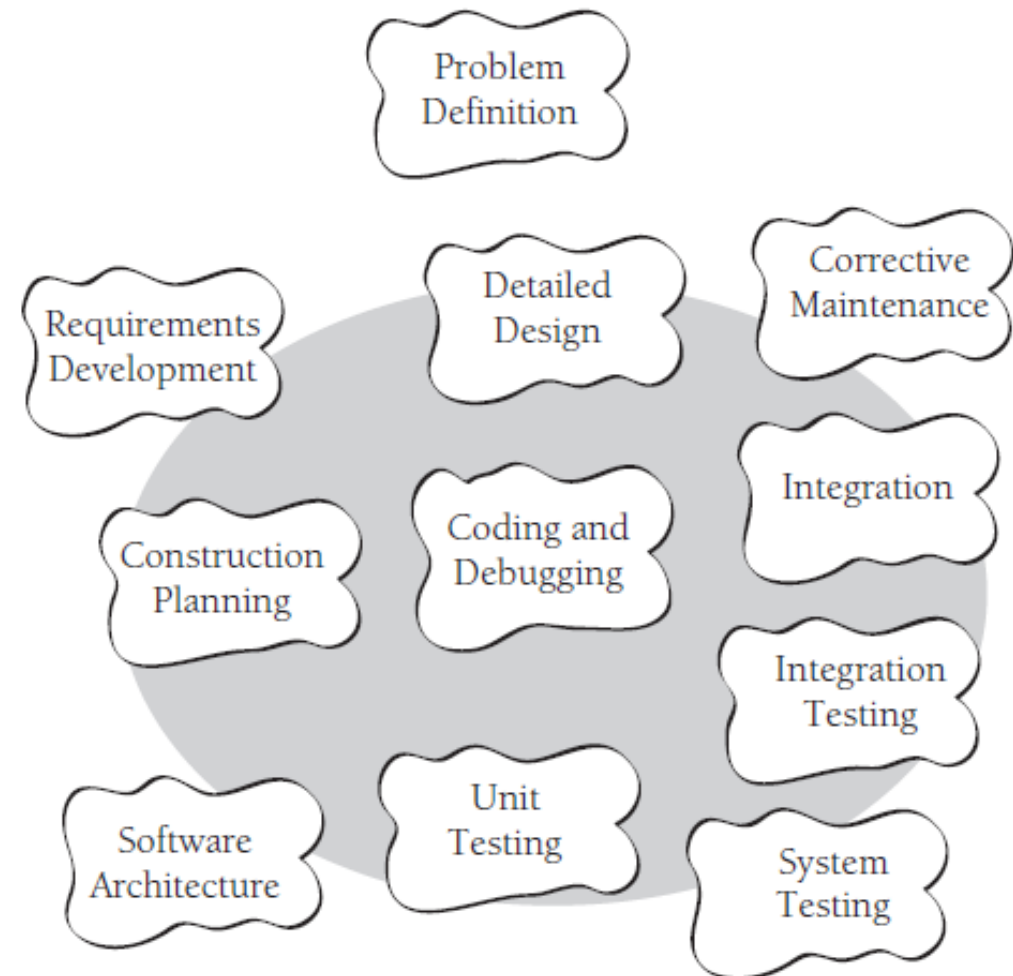
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- Our only guarantee!



- S. McConnell's. Code Complete, Second Edition. Microsoft Press. 2004

# Specifics of software construction

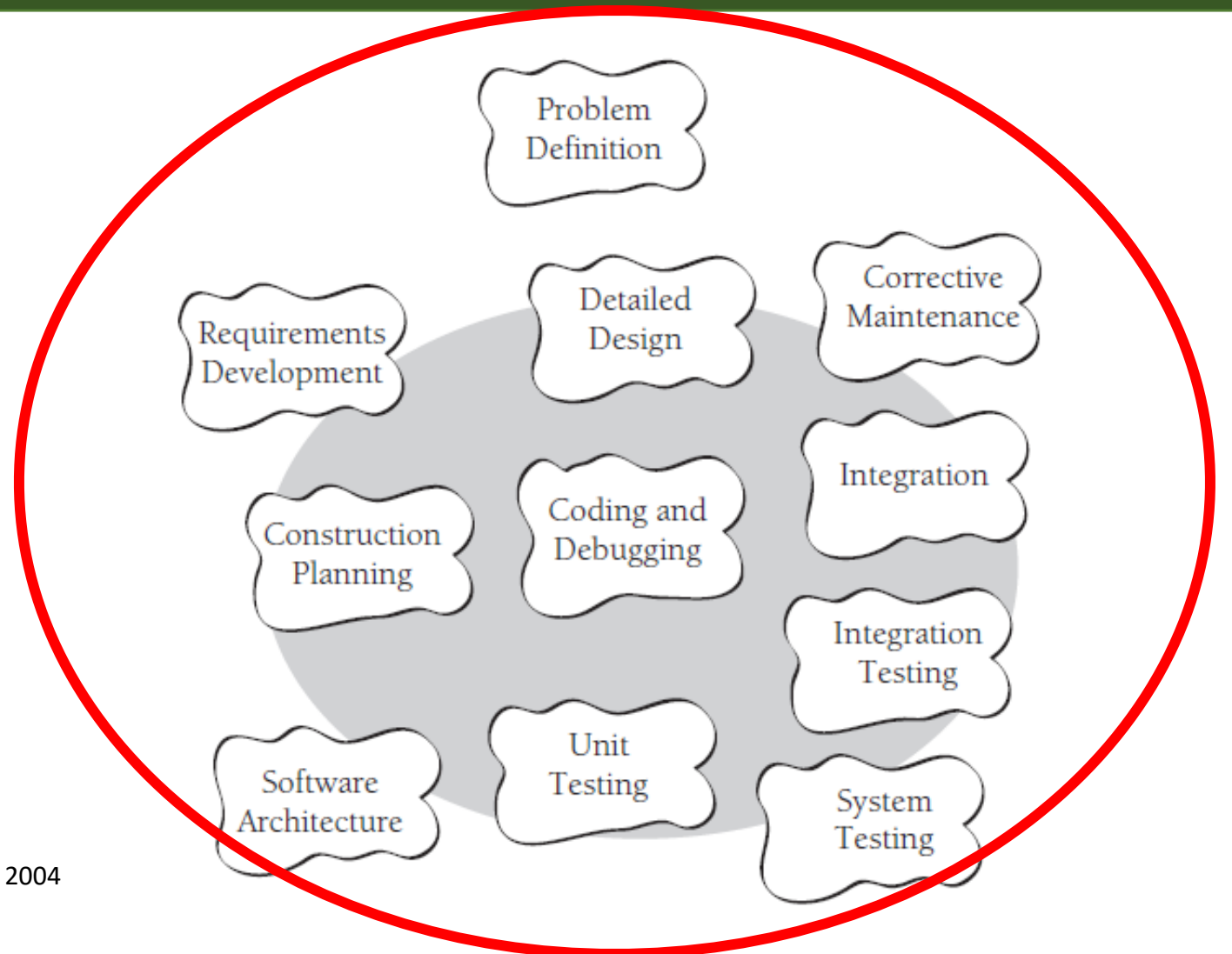
- What is it all about?
- Our only guarantee!
- Historically...





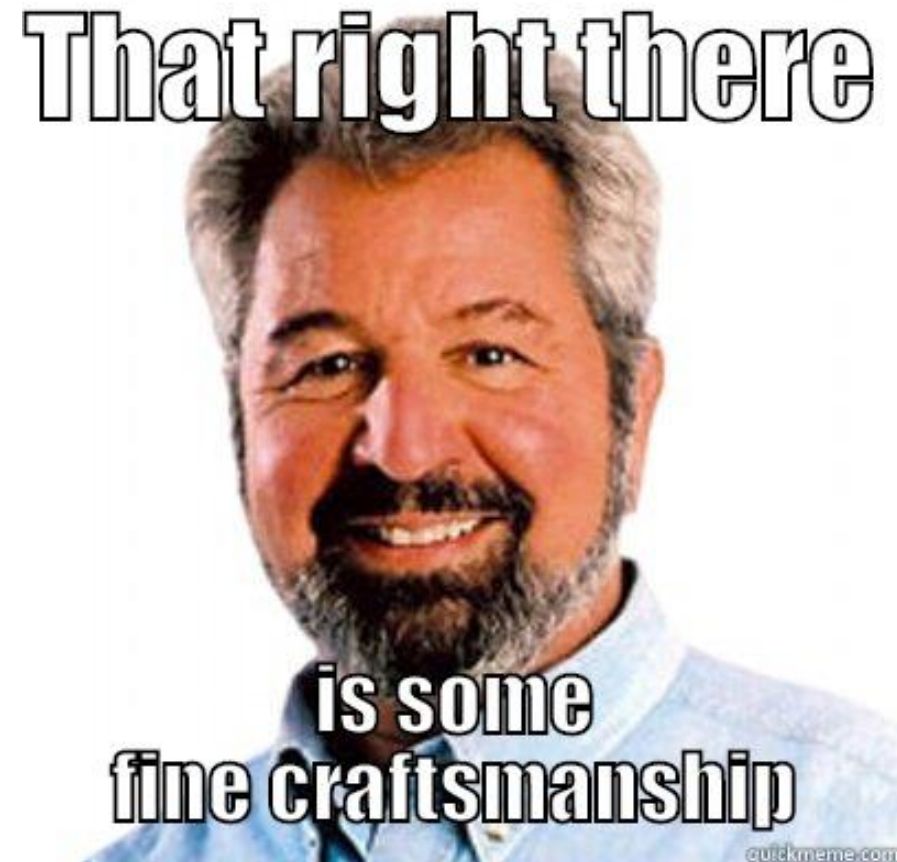
# Specifics of software construction

- What is it all about?
- Our only guarantee!
- Historically...
- A change in thinking is needed



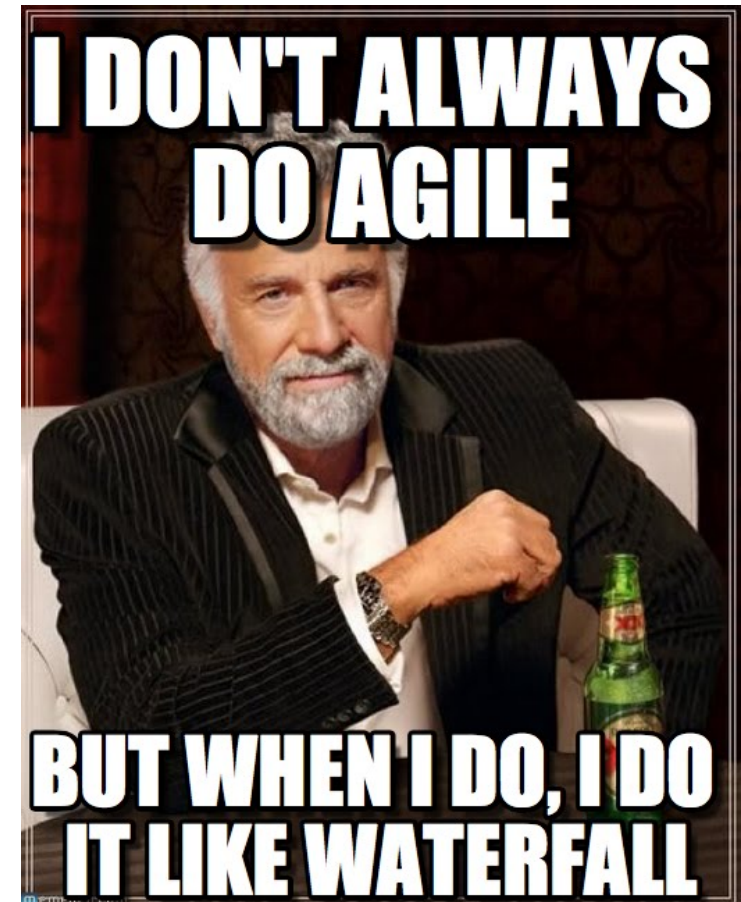
# About quality & craftsmanship

- Construction planning
- Writing code
- Documentation
- Integration
- Refactoring
- Iteration
- Management



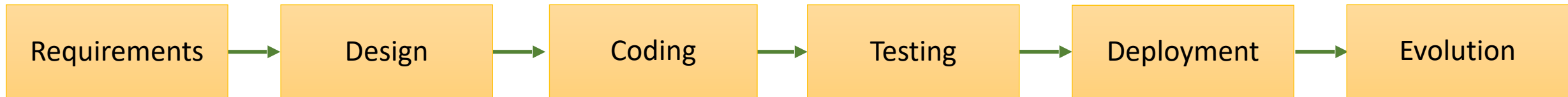
# Software design process & methodology

- Waterfall
- Iterative/Incremental
- Rational Unified Process (RUP)
- Agile
  - Fast feedback cycle (271)
  - Design thinking



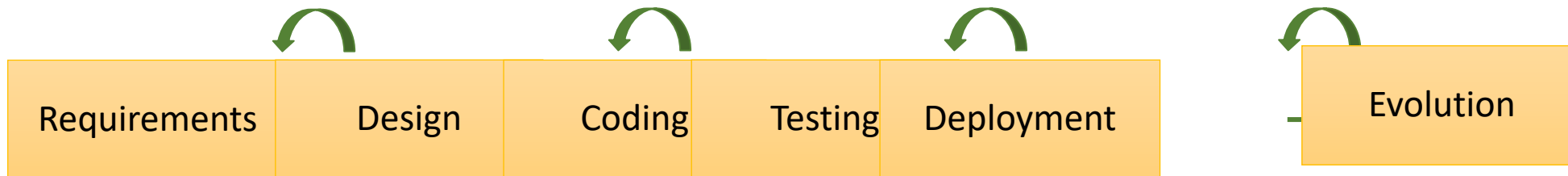
# Waterfall

- Linear approach to software systems design and development



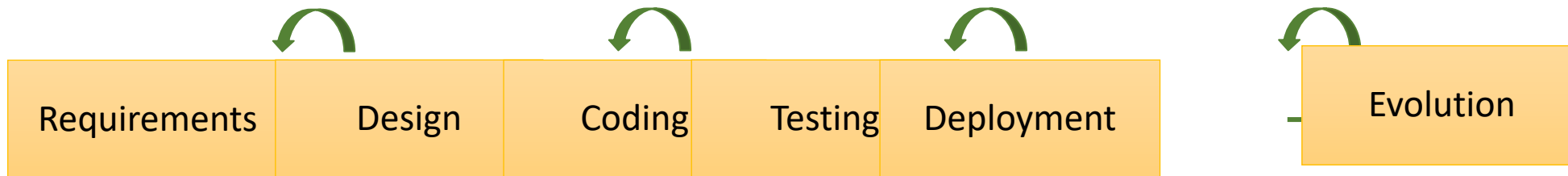
# Waterfall

- Linear approach to software systems design and development
- Modified waterfall throughout the years



# Waterfall

- Linear approach to software systems design and development
- Modified waterfall throughout the years
- Problematic

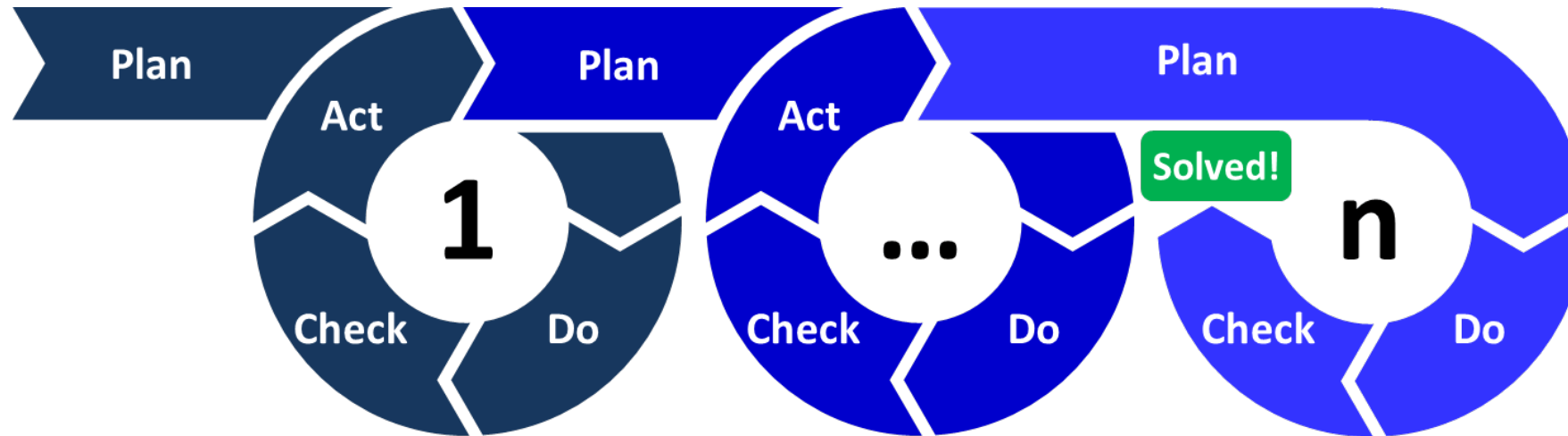


# Incremental

- The evolution of waterfall, provides the foundation for Agile
- Defined increments
  - You might hear me call these “chunks of work”
    - Not this type of chunk... 😊
- Assign priority
- Waterfall-ish activity *may* commence
  - Some food for thought: <https://www.mountangoatsoftware.com/blog/an-iterative-waterfall-isnt-agile#comments>
- “Chunks” of work are time driven
- Completed “chunks” of work are integrated into the system

# Incremental & iterative

- Iterative often used with incremental and vice versa
- Lean – PDCA/PDSA

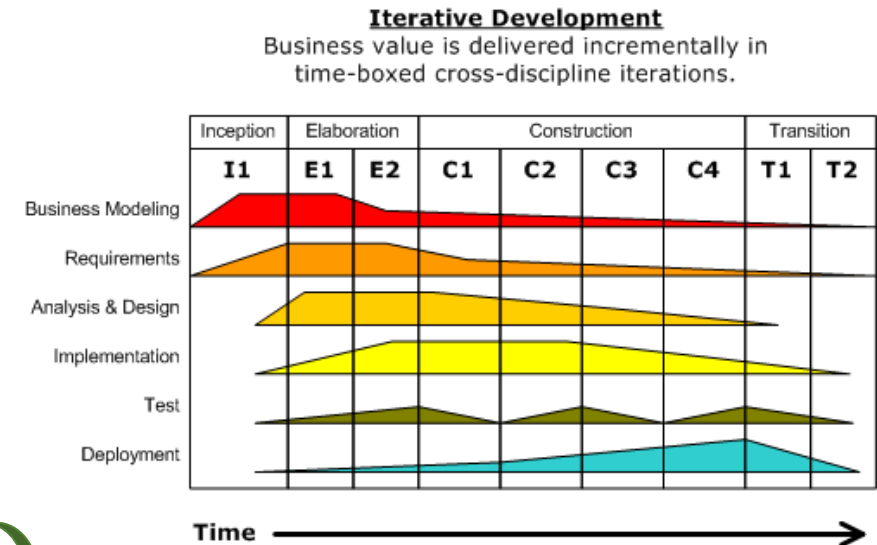
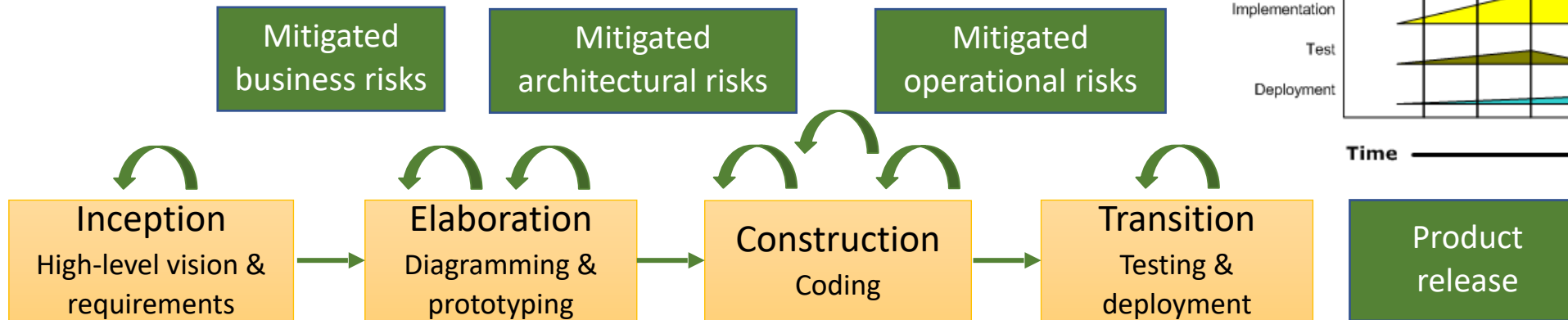


- M Halabi. Software Engineering Essentials. Pluralsight. 2015
- W.E. Deming. The New Economics. The MIT Press. 1994. (Deming's book "Out of the Crisis" is also a must read!)
- C. Roser. The Key to Lean – Plan, Do, Check, Act! Online: <http://www.allaboutlean.com/pdca/>



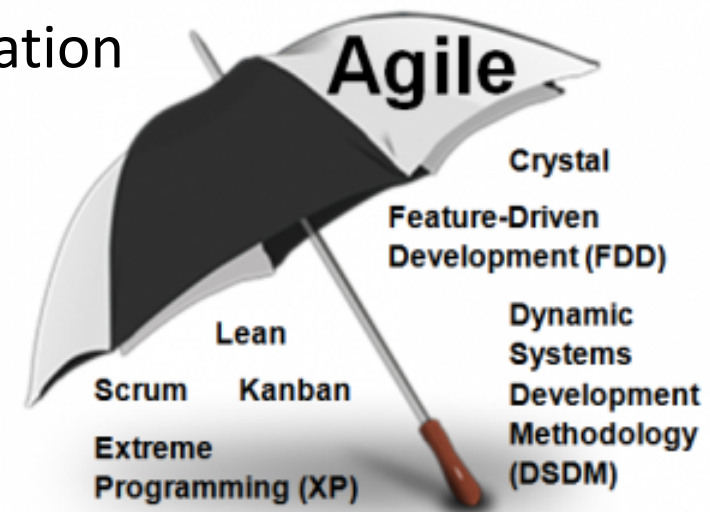
# Rational Unified Process (RUP)

- Rational Unified Process (RUP)
- Phases and milestones



# Agile

- At a high level
- “Manifesto for Agile Software Development” (2001)
  - Individuals and interaction over processes and tools
  - Working software over comprehensive documentation
  - Customer collaboration over contract negotiation
  - Responding to change over following a plan
- Sooner product delivery



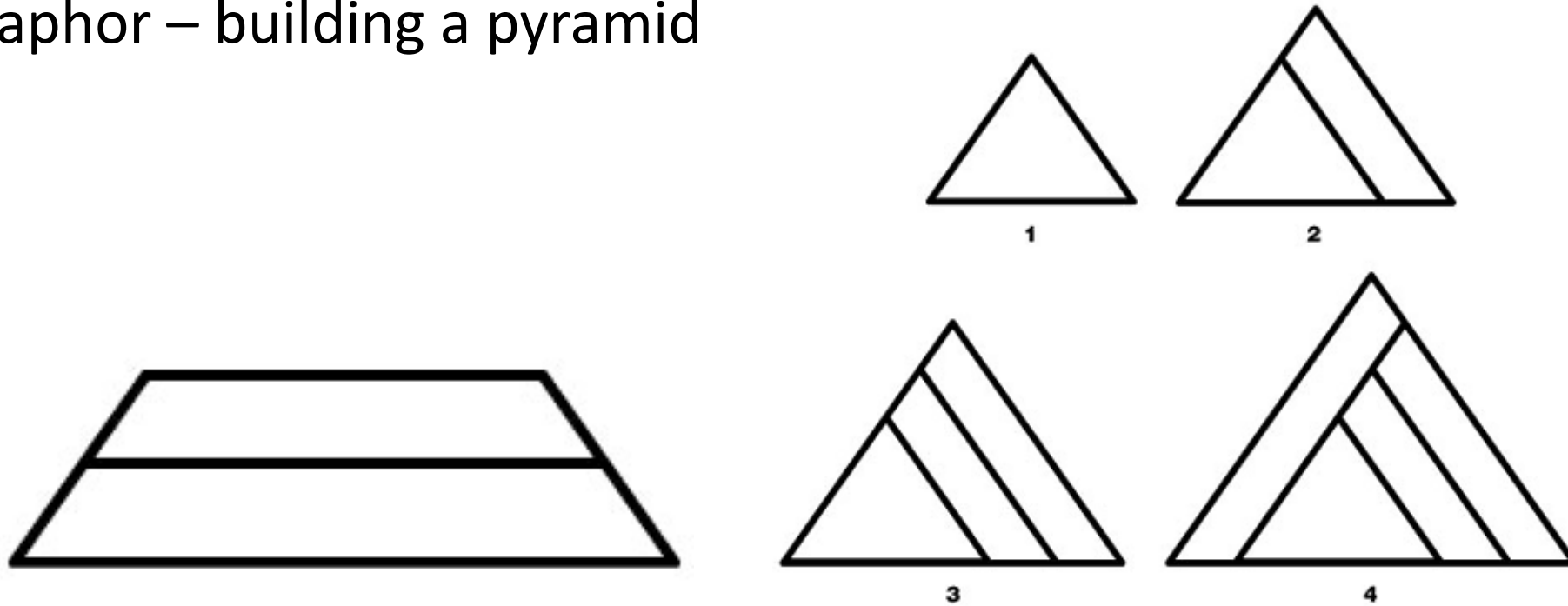
- S. Haunts. Agile Fundamentals. Pluralsight.com. 2015.
- K. Beck et al. Manifesto for Agile Software Development. Online. <http://agilemanifesto.org/>

# Agile principles

1. Our highest priority is to satisfy the customer through early and continuous delivery of valuable software
2. Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage
3. Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale
4. Business people and developers must work together daily throughout the project
5. Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done
6. The most efficient and effective method of conveying information to and within a development team is face-to-face conversation
7. Working software is the primary measure of progress
8. Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely
9. Continuous attention to technical excellence and good design enhances agility
10. Simplicity--the art of maximizing the amount of work not done--is essential
11. The best architectures, requirements, and designs emerge from self-organizing teams
12. At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly

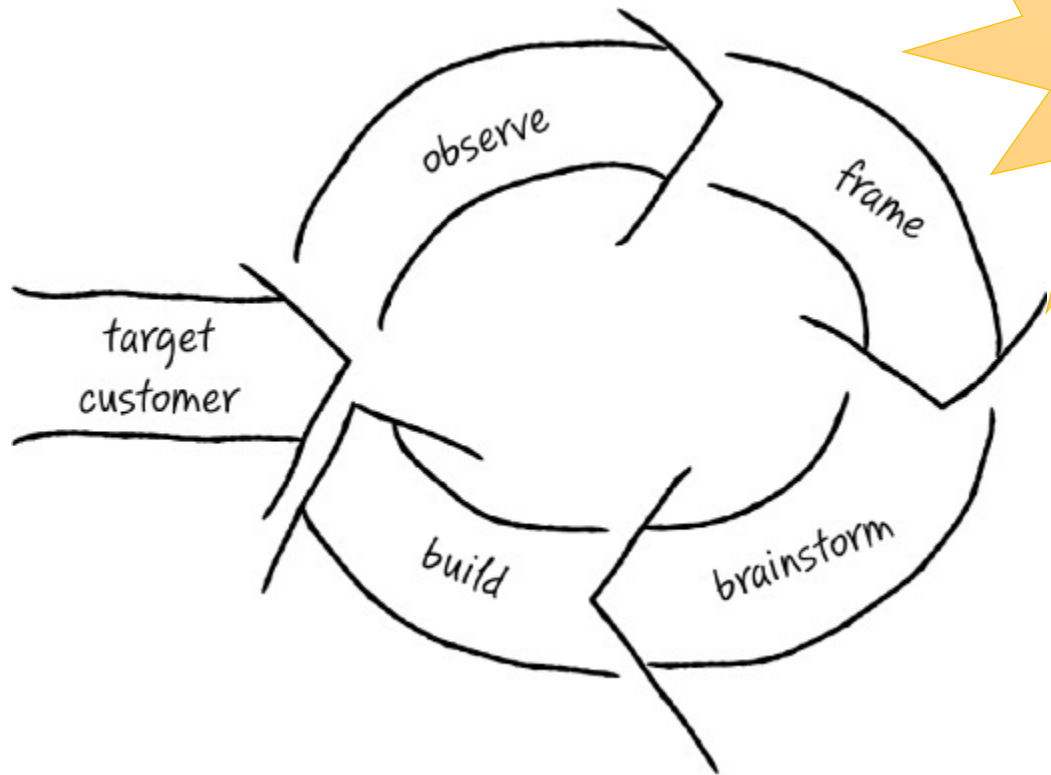
# Minimum Viable Product (MVP)

- Fundamental goal in agile
- Metaphor – building a pyramid

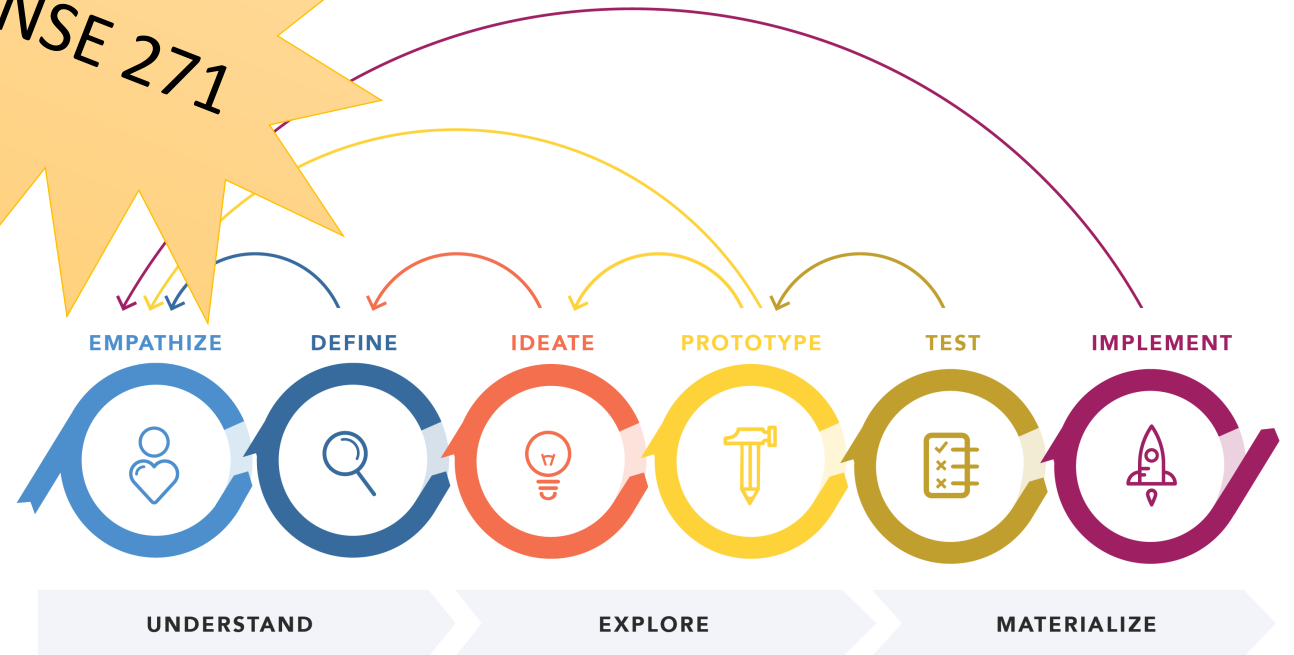


- J. Mayo-Smith. Two ways to build a Pyramid. Information Week. 2001. Online: <https://www.informationweek.com/two-ways-to-build-a-pyramid/d/d-id/1012280>
- H. Makabee. The Minimum Viable Product and Incremental Software Development. 2014. Online: <https://effectivesoftwaredesign.com/2014/11/02/the-minimum-viable-product-and-incremental-software-development/>

# FFC & Design Thinking

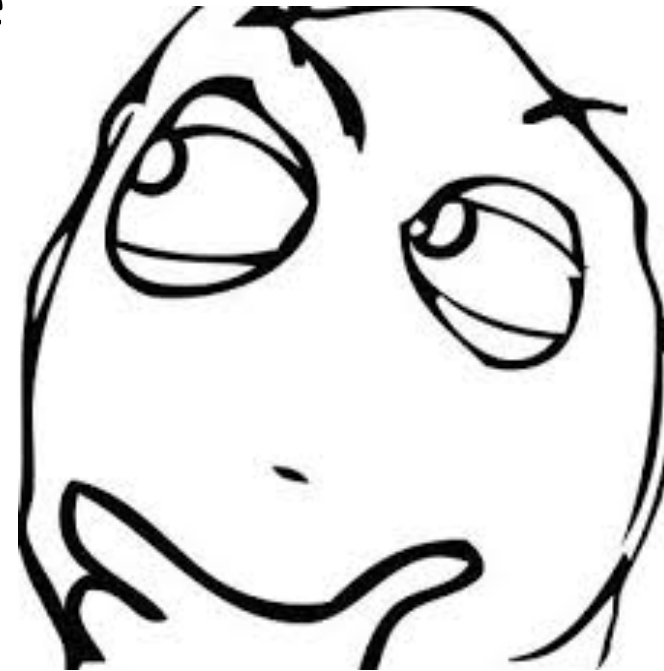


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# OK, so what are we going to explore?

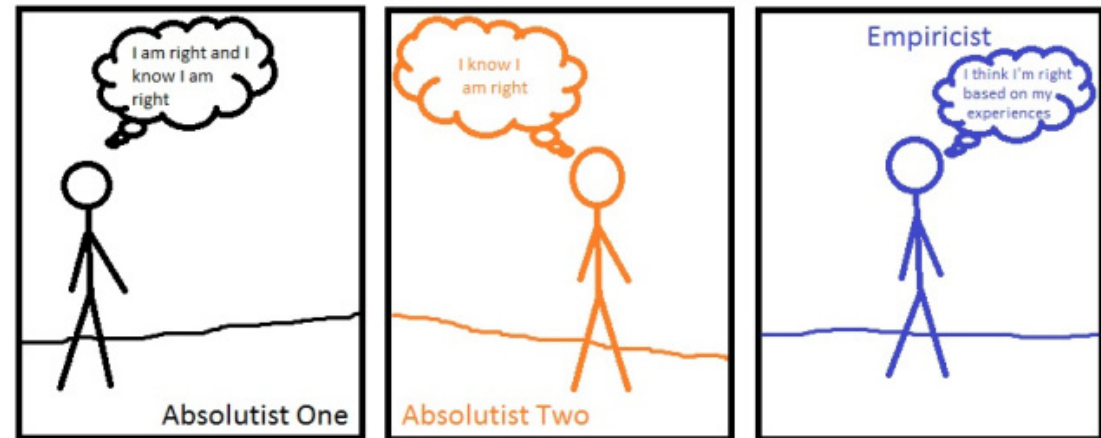
- The Scrum Framework is one way
- About people, projects, and software construction management!



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- K. Schwaber and J. Sutherland. The Scrum Guide. Online: <http://www.scrumguides.org/>

# So what is the Scrum Framework (or just Scrum)?

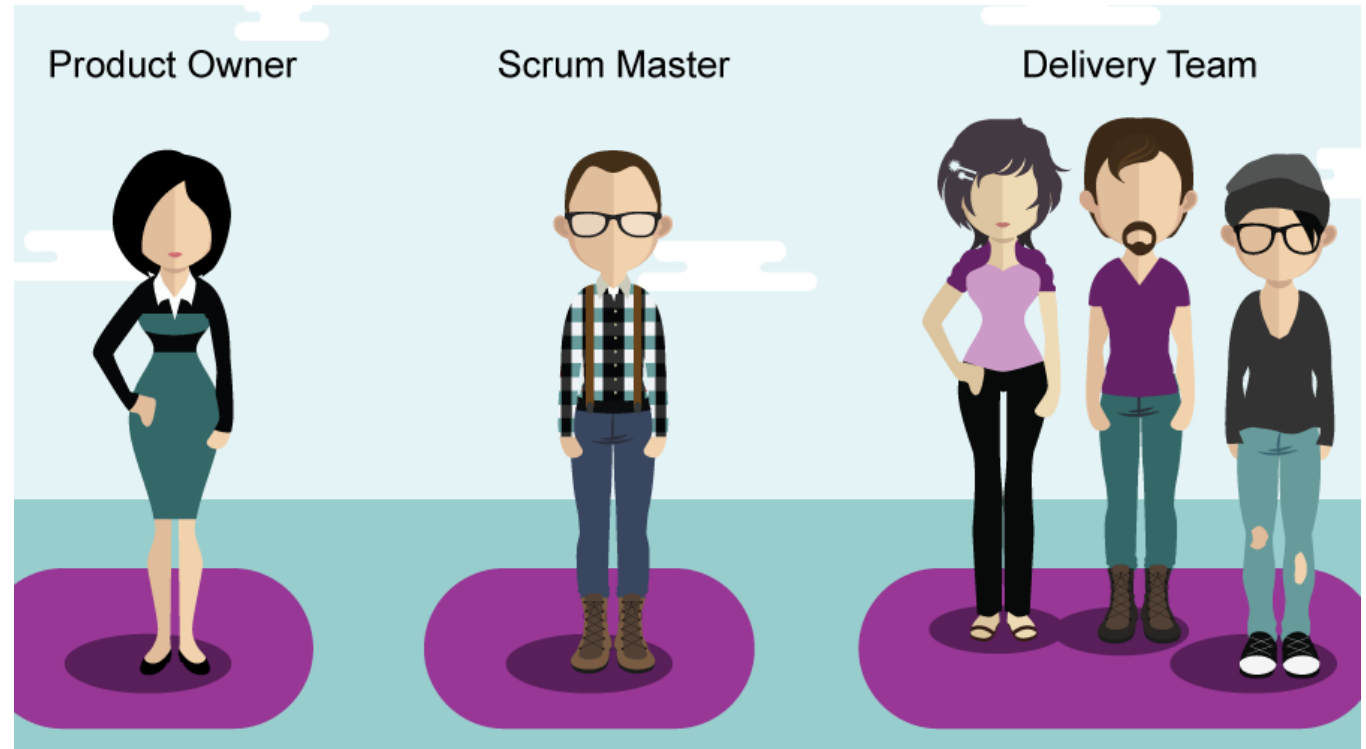
- “A framework within which people can address complex adaptive problems, while productively and creatively delivering products of the highest possible value”
- Empiricism and the three pillars of Scrum
- Three aspects of empiricism
  - Transparency
  - Inspection
  - Adaptation/change



- K. Schwaber and J. Sutherland. The Scrum Guide. Online: <http://www.scrumguides.org/>
- W. James. Absolutism vs Empiricism in James (image). Online: <https://rajarosenhagen.info/excellent-student-contributions/>

# Scrum roles (team) & responsibilities

- Scrum team
  - Cross-functional
  - Self-organizing

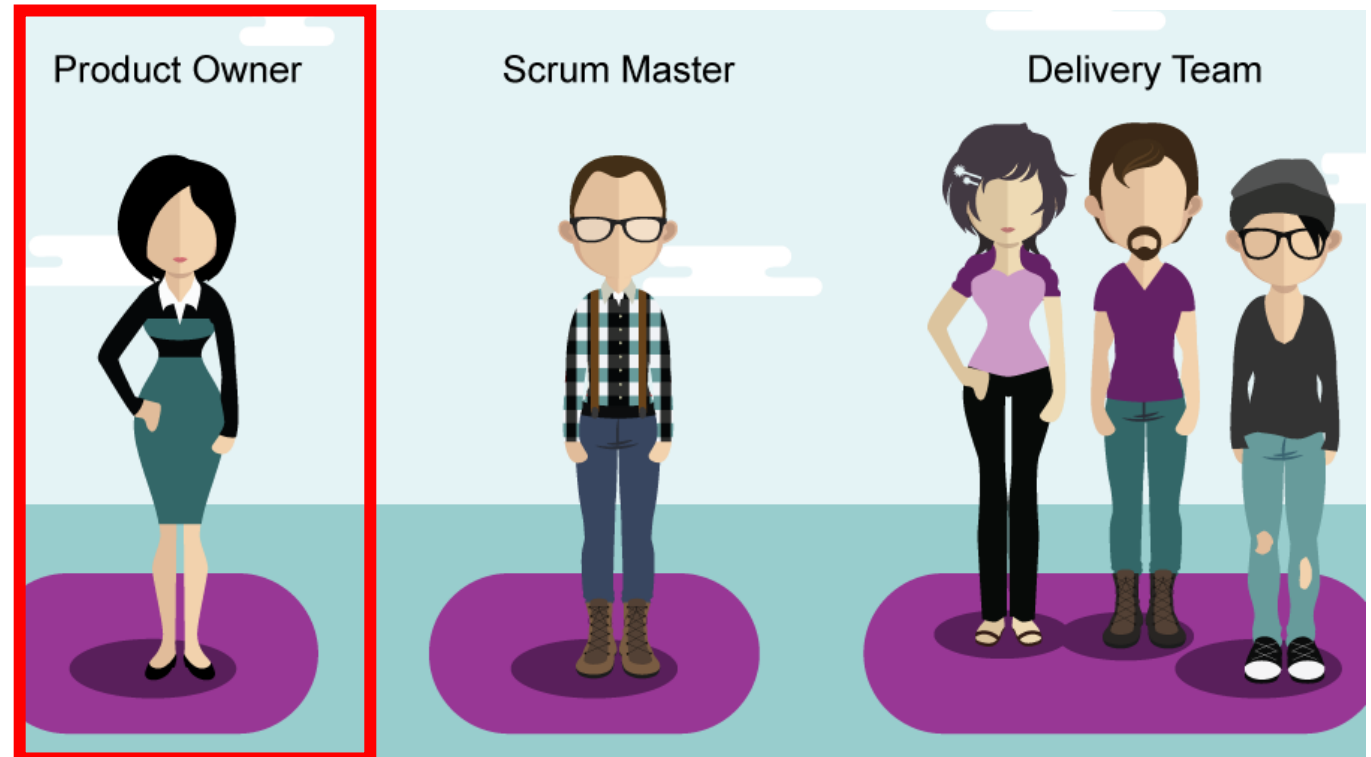


- K. Schwaber and J. Sutherland. The Scrum Guide. Online: <http://www.scrumguides.org/>
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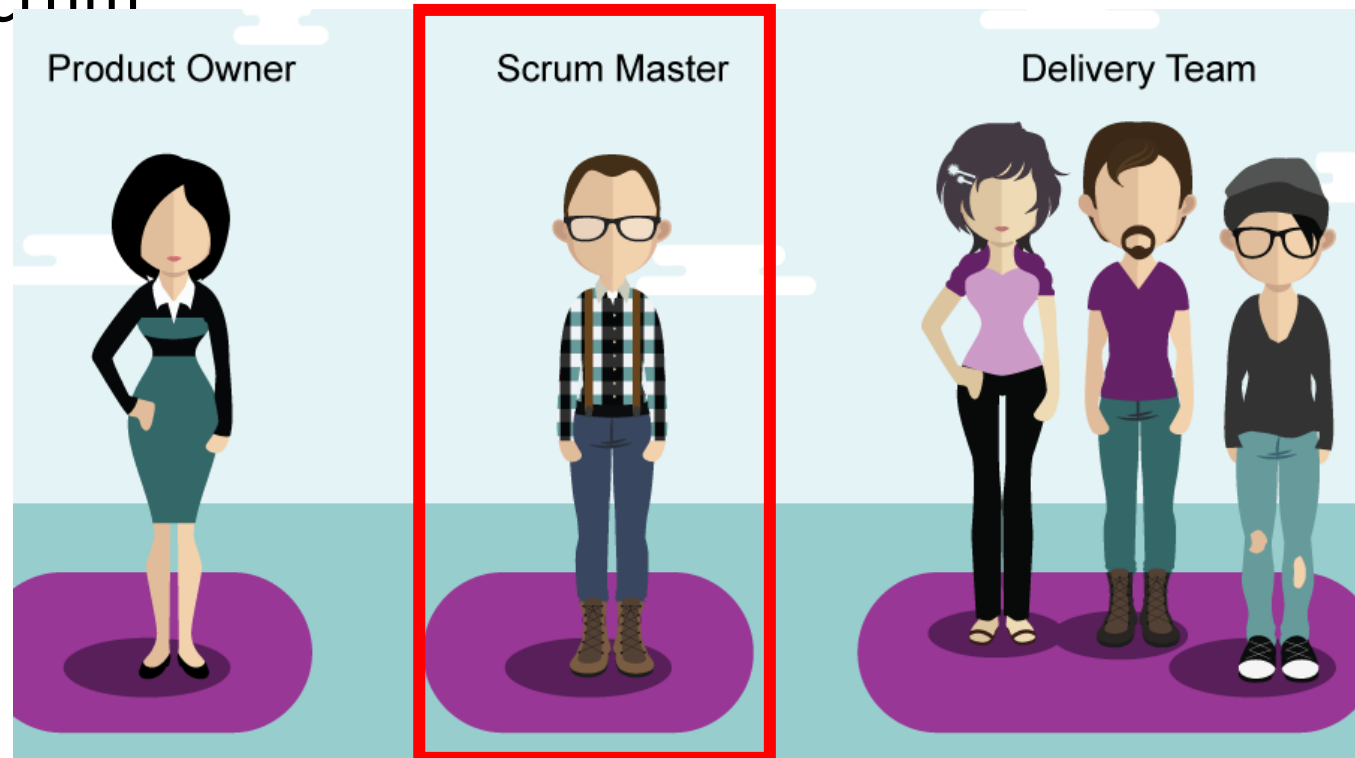
- Scrum team
  - Cross-functional
  - Self-organizing
- Product owner
  - One person
  - The work
  - Accountabilities



- K. Schwaber and J. Sutherland. The Scrum Guide. Online: <http://www.scrumguides.org/>
- S. Fry. What is the Scrum Methodology? (image). Online: <http://www.create-hub.com/learn/what-is-the-scrum-methodology/>

# Scrum master

- Servant-Leader for the Scrum team
- Ensures project understanding
- Fundamental goal



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# Scrum master

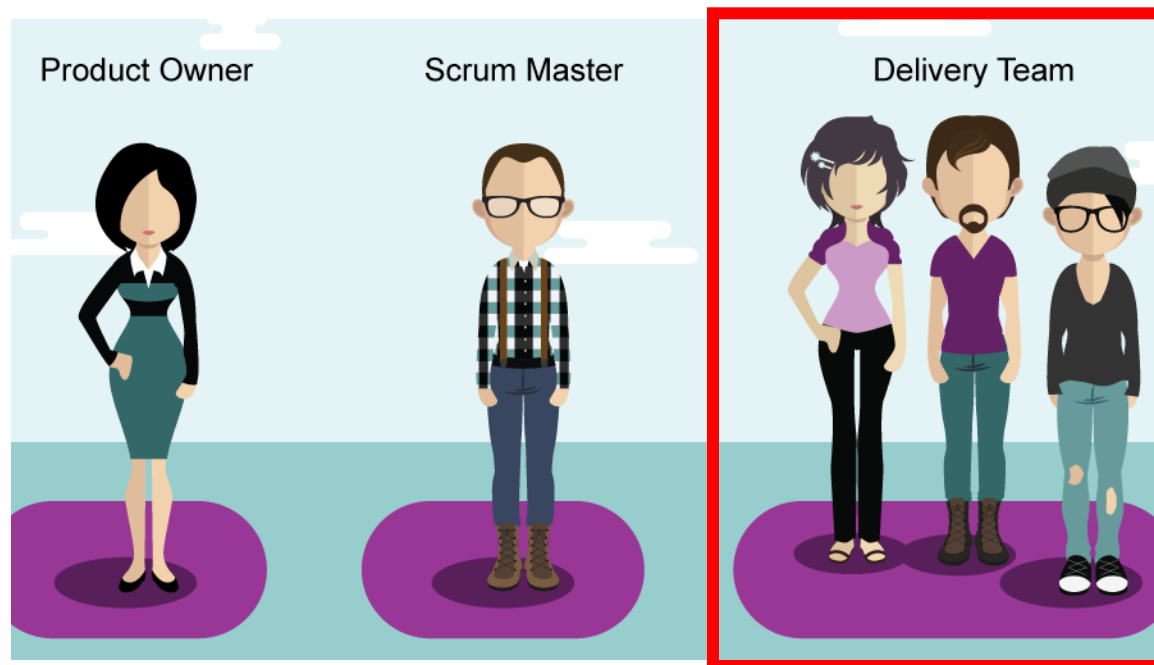
- Servant-Leader for the Scrum team
- Ensures project understanding
- Fundamental goal
- Beware the certified



- K. Schwaber and J. Sutherland. The Scrum Guide. Online: <http://www.scrumguides.org/>

# ...Scrum roles (team) & responsibilities

- Development team
  - The folks responsible for getting the product “done”



- K. Schwaber and J. Sutherland. The Scrum Guide. Online: <http://www.scrumguides.org/>
- D. Tzemach. Scrum Team Roles & Responsibilities (image). Online: <http://www.machtested.com/2017/05/scrum-team-roles-responsibilities.html>

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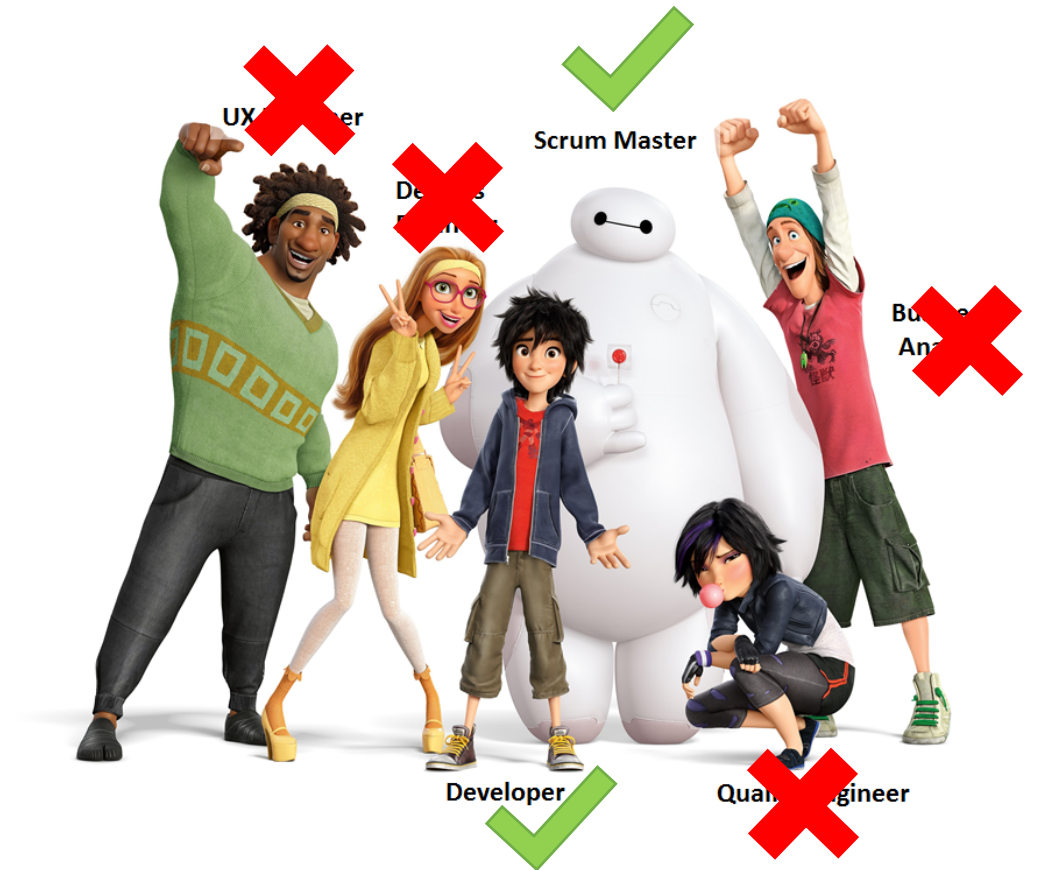
- Development team
  - The folks responsible for getting the product “done”
- Team roles



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# ...Scrum roles (team) & responsibilities

- Development team
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- Accountabilities
- Team size



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# ...Scrum roles (team) & responsibilities

- Development team
  - The folks responsible for getting the product “done”
- Team roles
- Accountabilities
- Team size
- Empowerment



- K. Schwaber and J. Sutherland. The Scrum Guide. Online: <http://www.scrumguides.org/>
- D. Tzemach. Scrum Team Roles & Responsibilities (image). Online: <http://www.machtested.com/2017/05/scrum-team-roles-responsibilities.html>



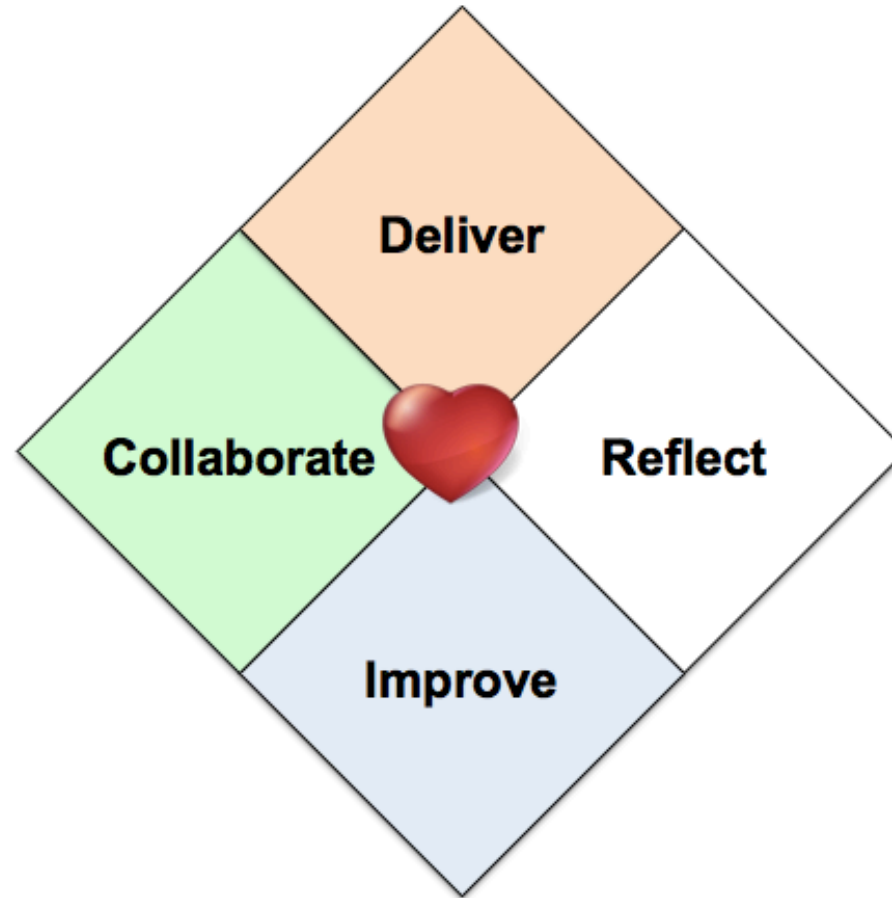
# So, Scrum eh



- K. Schwaber and J. Sutherland. The Scrum Guide. Online: <http://www.scrumguides.org/>



# Sprints – the “heart” of scrum



- K. Schwaber and J. Sutherland. The Scrum Guide. Online: <http://www.scrumguides.org/>
- A. Holub. Picturing Architecture: UML (The Good Bits) and More. Pluralsight. 2016.
- A. Cockburn. The Heart of Agile. Online: <http://heartofagile.com/>

# Sprint plan



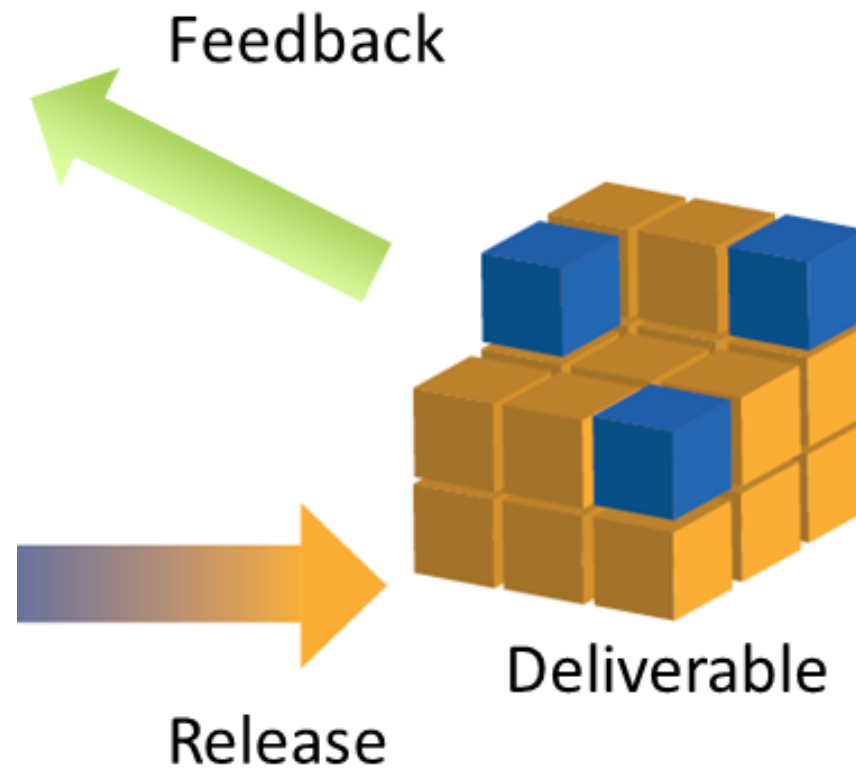
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# Daily scrum



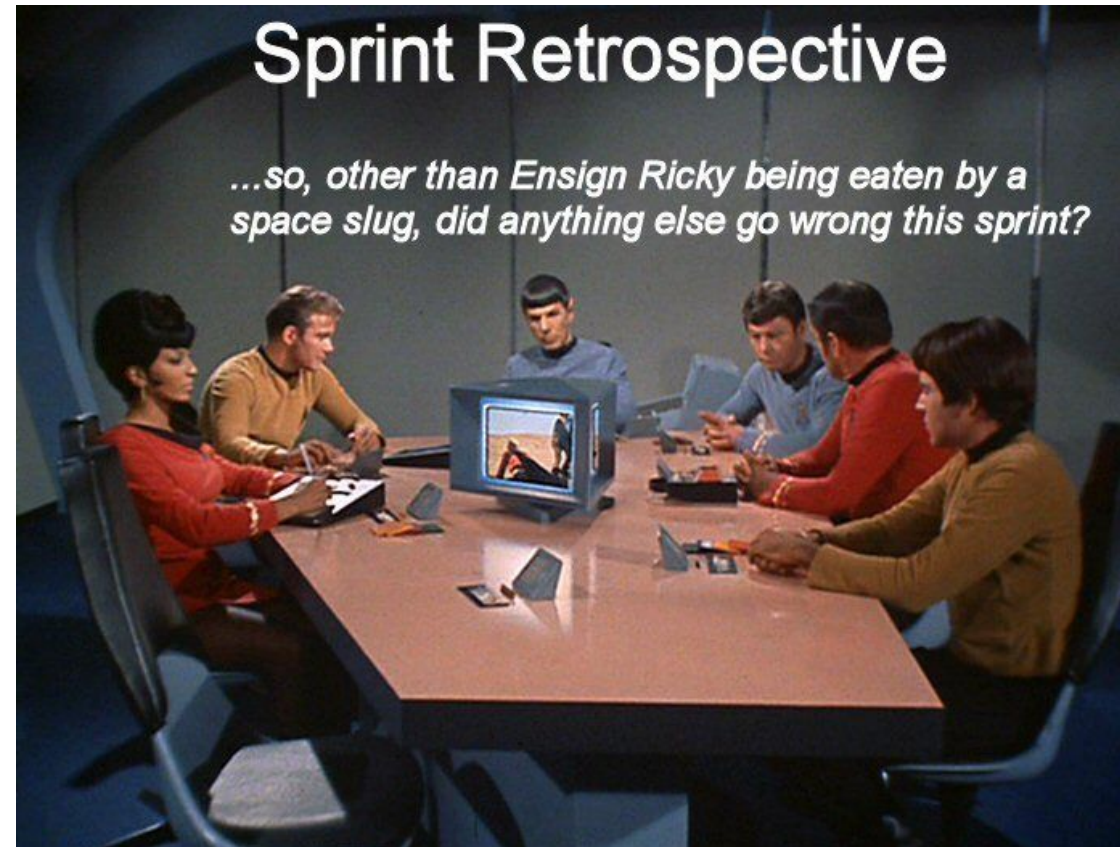
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- M. Cohn/Mountain Goat Software. Daily Scrum Meeting. Online: <https://www.mountaingoatsoftware.com/agile/scrum/meetings/daily-scrum>

# Sprint review



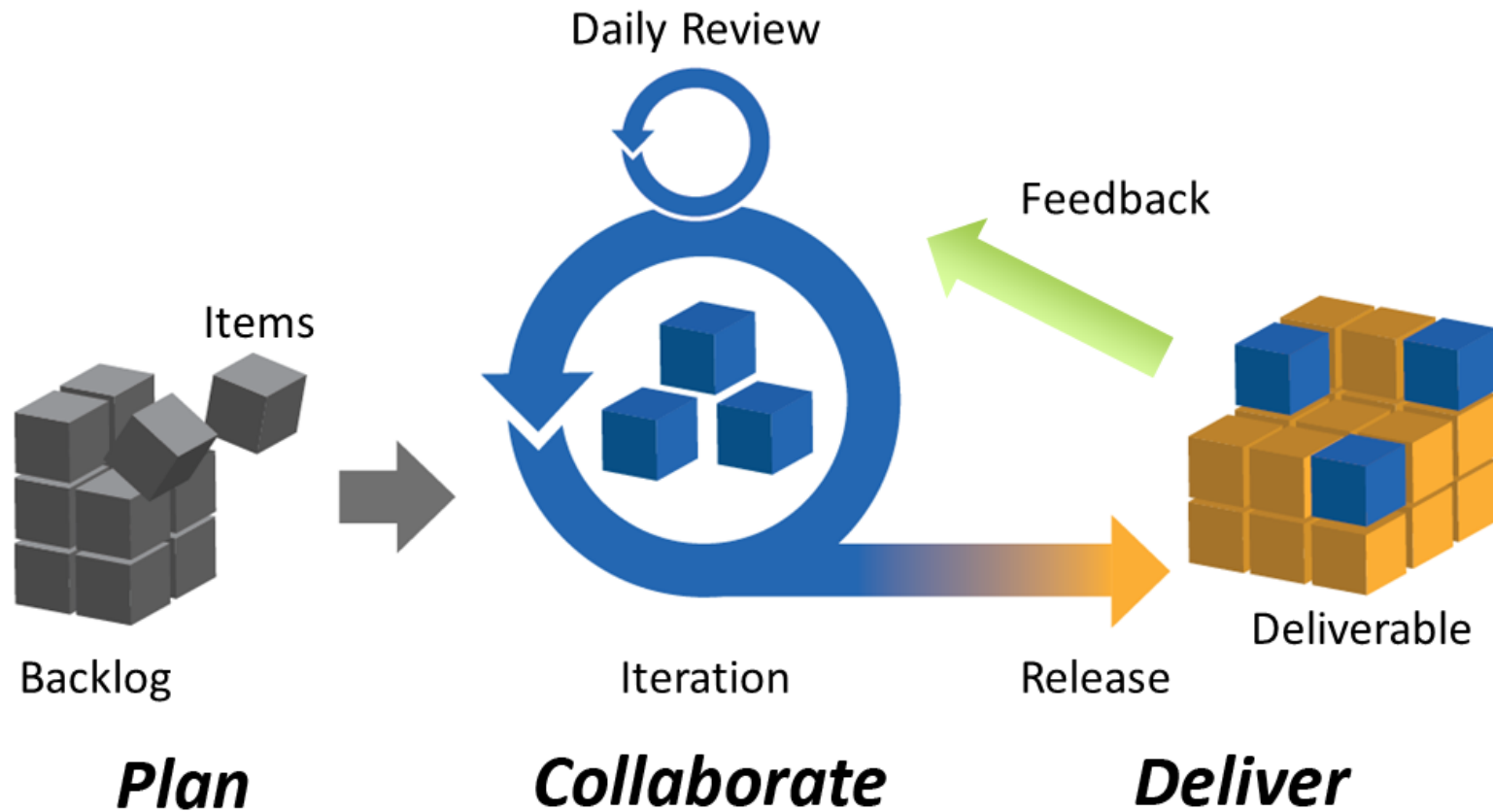
- K. Schwaber and J. Sutherland. The Scrum Guide. Online: <http://www.scrumguides.org/>

# Sprint retrospective

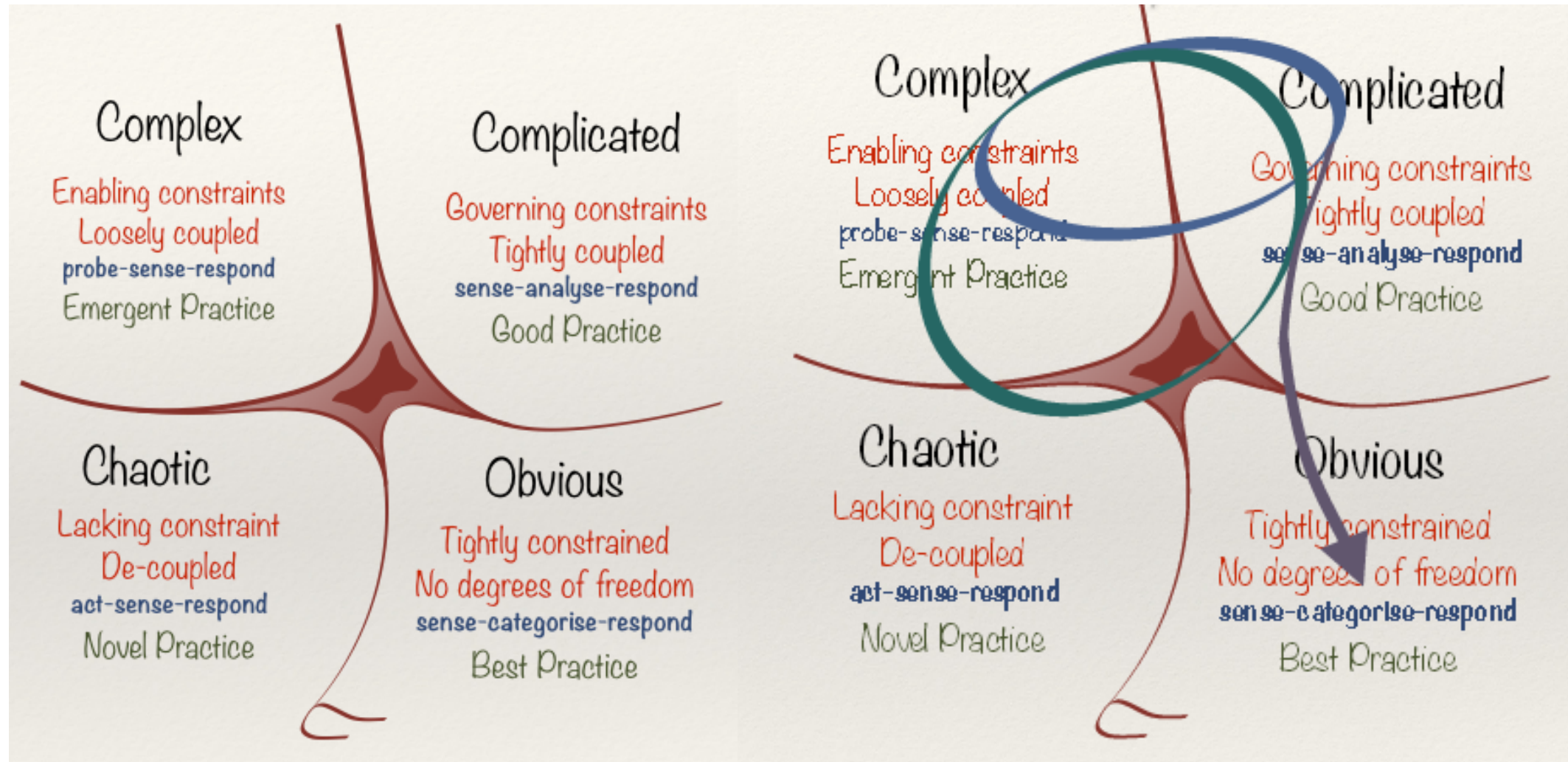


- K. Schwaber and J. Sutherland. The Scrum Guide. Online: <http://www.scrumguides.org/>
- M. Cohn/Mountain Goat Software. Sprint Retrospective. Online: <https://www.mountaingoatsoftware.com/agile/scrum/meetings/sprint-retrospective>

# Scrum, bringing it all together



# NOTE: Understanding the problem comes first!





# Image refs

- Obama, <https://i.pinimg.com/236x/7c/26/53/7c26532949bdf6d263f1f6f0479ee17--management-software-project-management.jpg>
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- Team work, <http://mobprogramming.org/team-team-team-team-team-i-even-love-saying-the-word-team/>
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