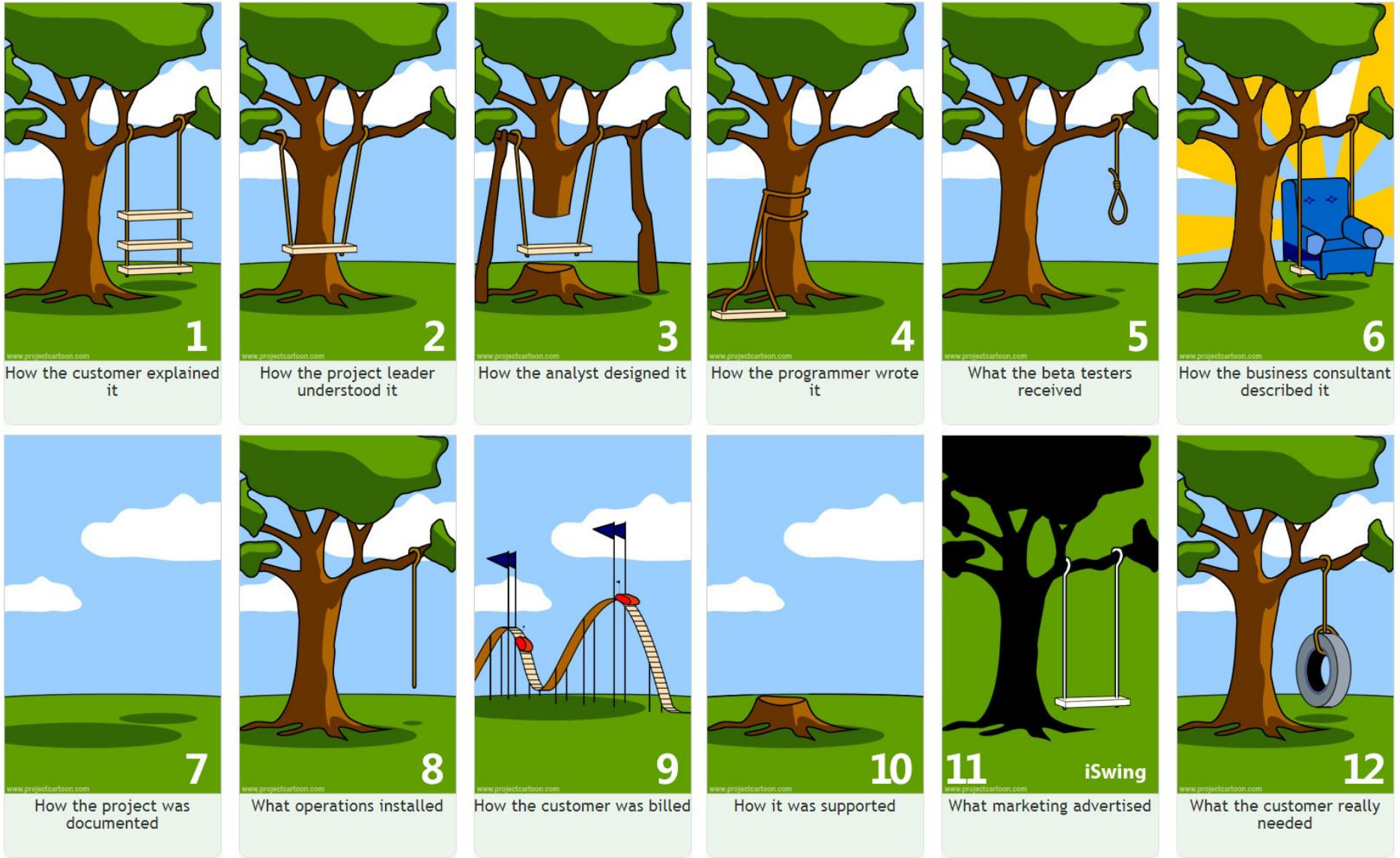
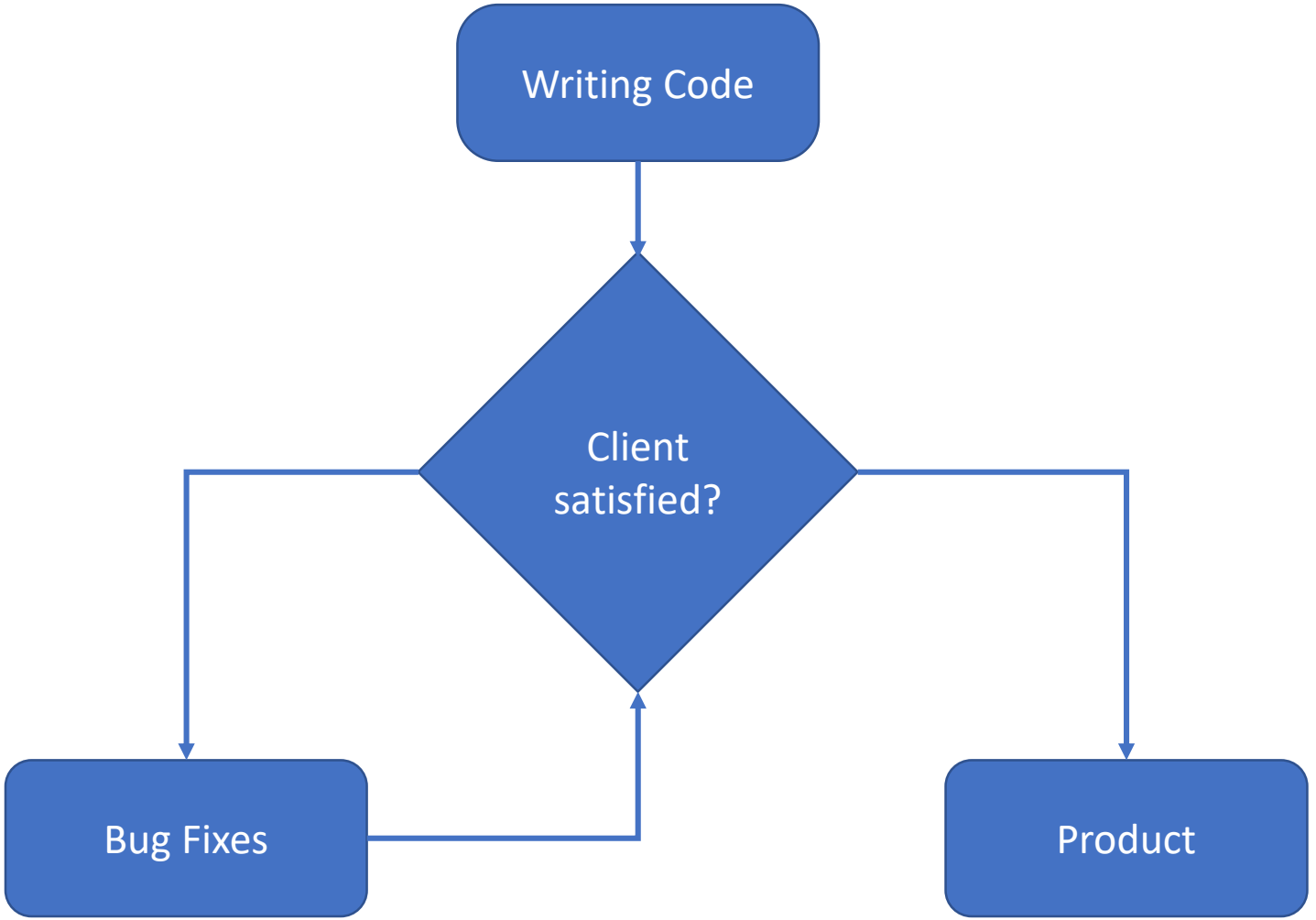
Software Development Methodologies

07/09/2019

Development lifecycle



Code and Fix



Advantages of Code and Fix

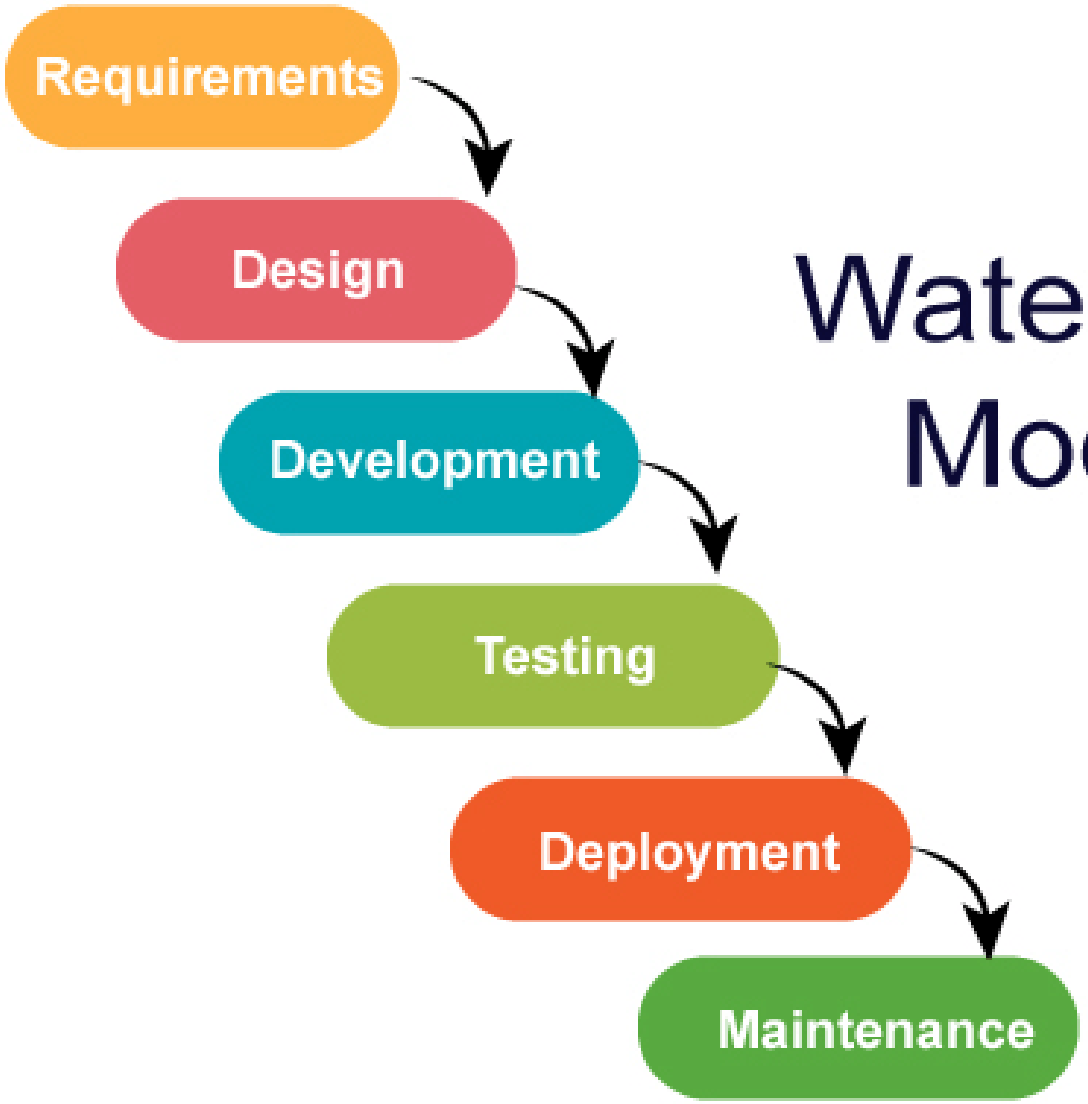
- Simplification
- Velocity

Disadvantages of Code and Fix

- Code doesn’t correspond to requirements
- Costs for modifications and refactoring are too high

Code and Fix

99 little bugs in the code.
99 little bugs in the code.
Take one down, patch it around.
127 little bugs in the code...



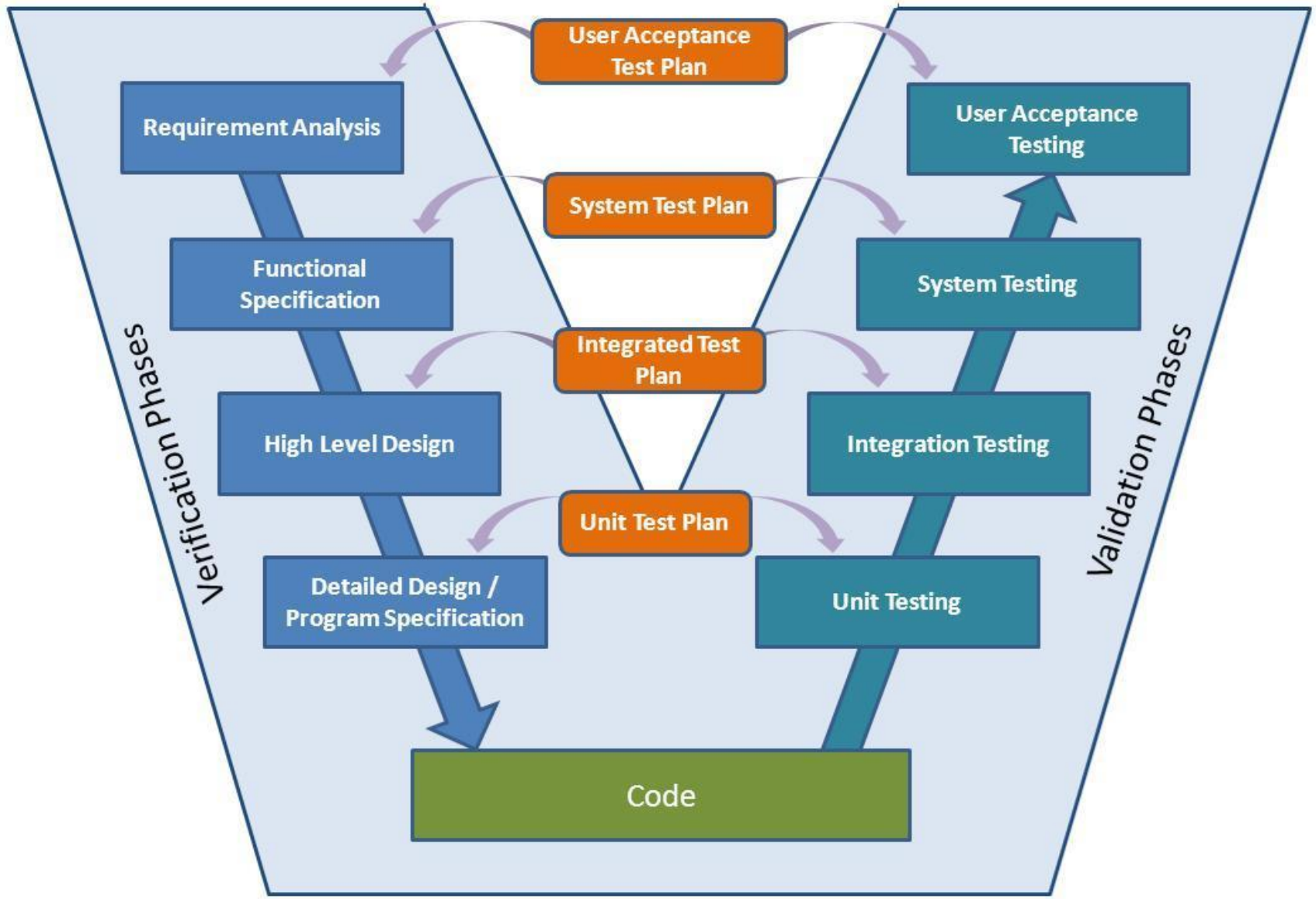
Waterfall Model

Advantages of Waterfall model

- Consistent execution of project stages in a strict fixed order
- Complete and consistent documentation at every stage

Disadvantages of Waterfall model

- Delayed results
- Error high cost

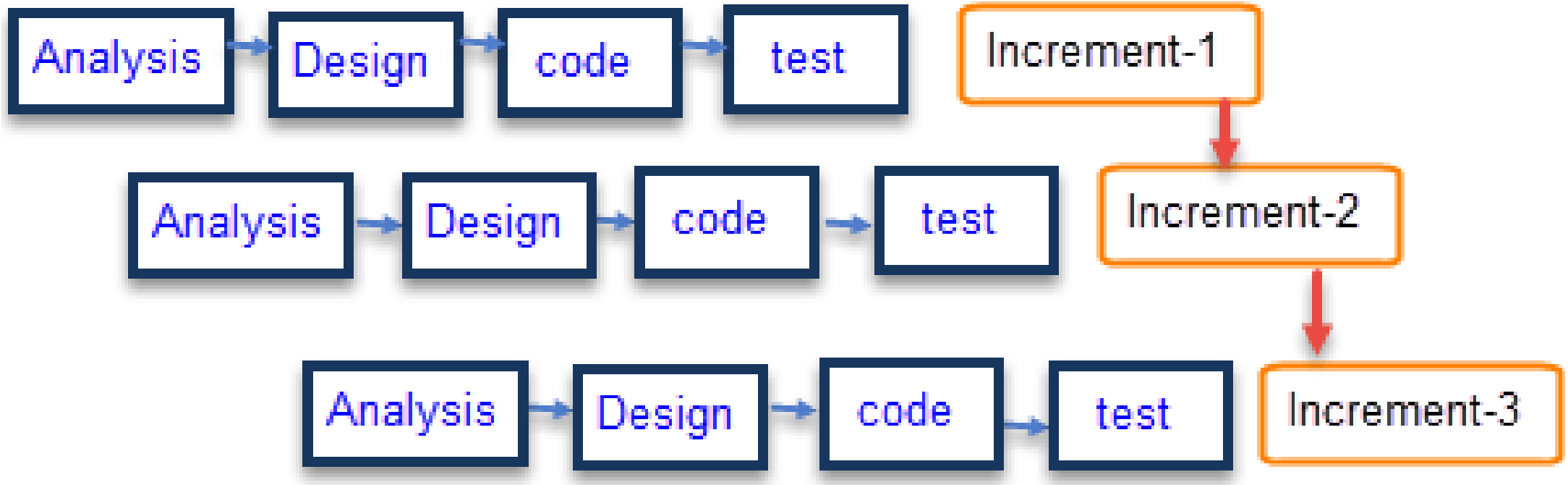

User Acceptance Test Plan
Requirement Analysis
User Acceptance Testing
System Test Plan
Functional Specification
System Testing
Integrated Test Plan
High Level Design
Integration Testing
Unit Test Plan
Detailed Design / Program Specification
Unit Testing
Code
Verification Phases
Validation Phases

V-model advantages

- Model provides verification and validation of all external and internal received data
- Good enough for projects which critical parameters are high reliability and safety, rather than high cost.
  - Medicine
  - Space

V-model disadvantages

- Do not allow change in requirements during development
- Long testing and deployment phases



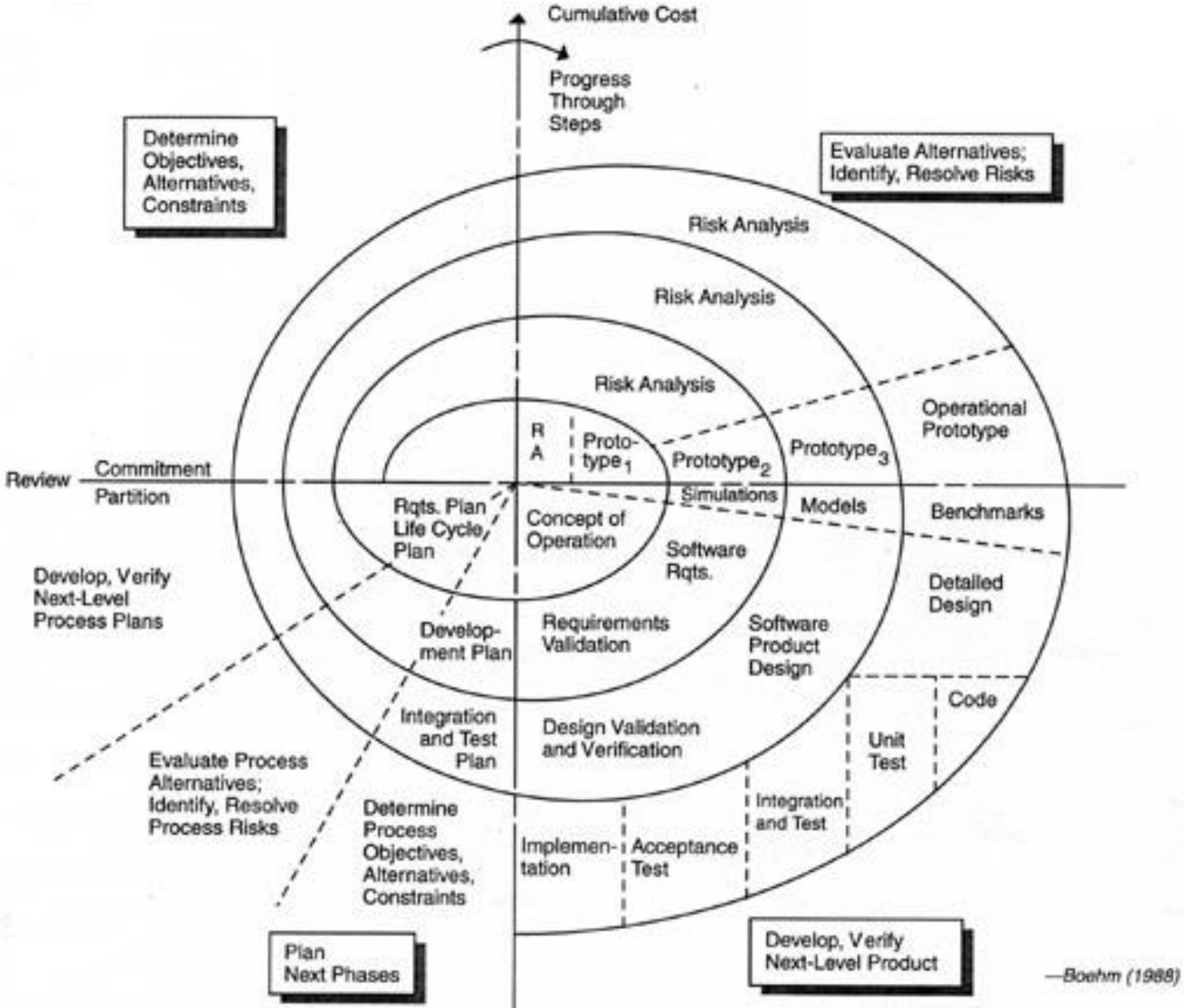
Incremental Model

Incremental model disadvantages

- No iterations for each increment
- Full specification should be defined at the beginning (for sake of increment definitions)

Prototype model. Classification

- Research
  - Requirements clarification
- Experimental
  - Technology checks
- Evolutional
  - Simplest product version development


Cumulative Cost
Progress Through Steps
Determine Objectives, Alternatives, Constraints
Evaluate Alternatives; Identify, Resolve Risks
Risk Analysis
Risk Analysis
Risk Analysis
R A
Proto-type$_1$
Prototype$_2$
Prototype$_3$
Operational Prototype
Review
Commitment Partition
Rqts. Plan Life Cycle Plan
Concept of Operation
Simulations
Models
Benchmarks
Software Rqts.
Develop, Verify Next-Level Process Plans
Detailed Design
Develop-ment Plan
Requirements Validation
Software Product Design
Code
Integration and Test Plan
Design Validation and Verification
Unit Test
Evaluate Process Alternatives; Identify, Resolve Process Risks
Integration and Test
Determine Process Objectives, Alternatives, Constraints
Implemen-tation
Acceptance Test
Plan Next Phases
Develop, Verify Next-Level Product

—*Boehm (1988)*

Spiral model advantages

- Risk analysis
- Iterations

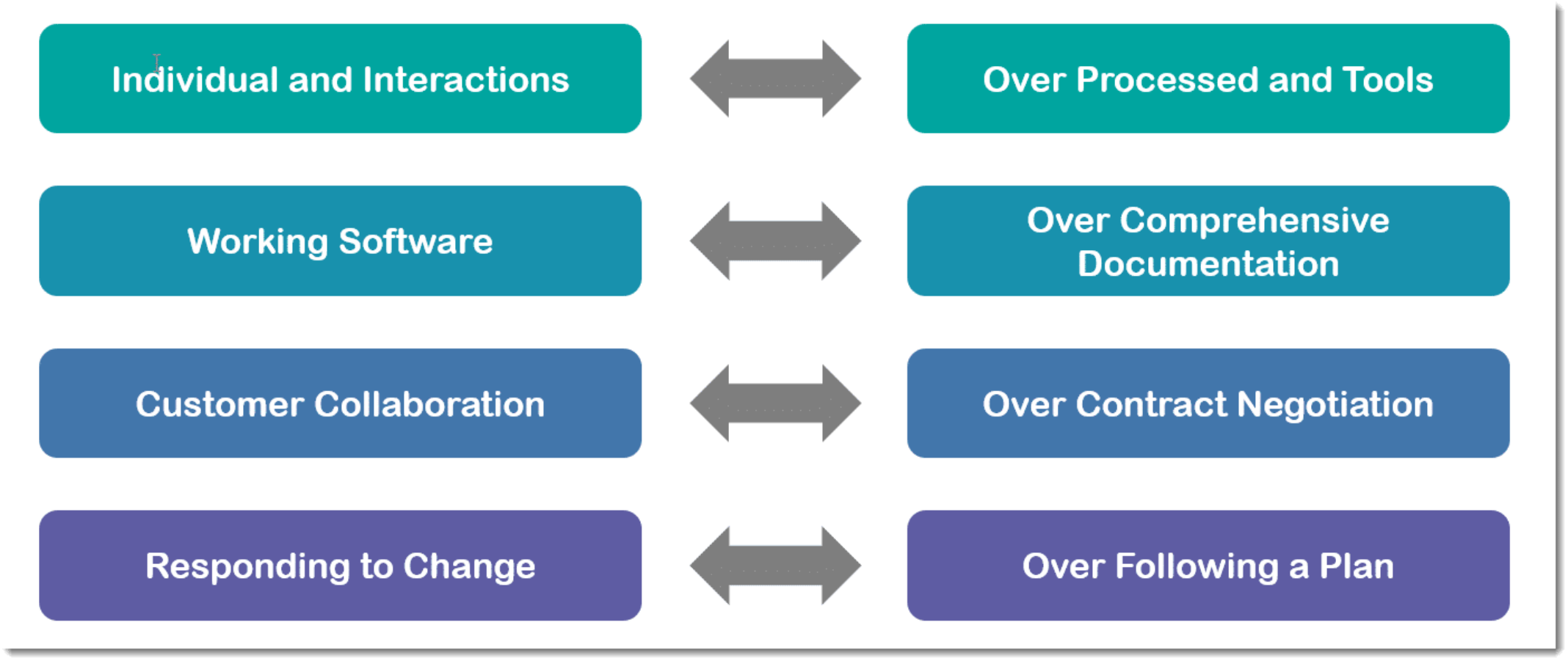
Spiral model disadvantages

- Not for simple projects with low risks
- Complex model

Problems

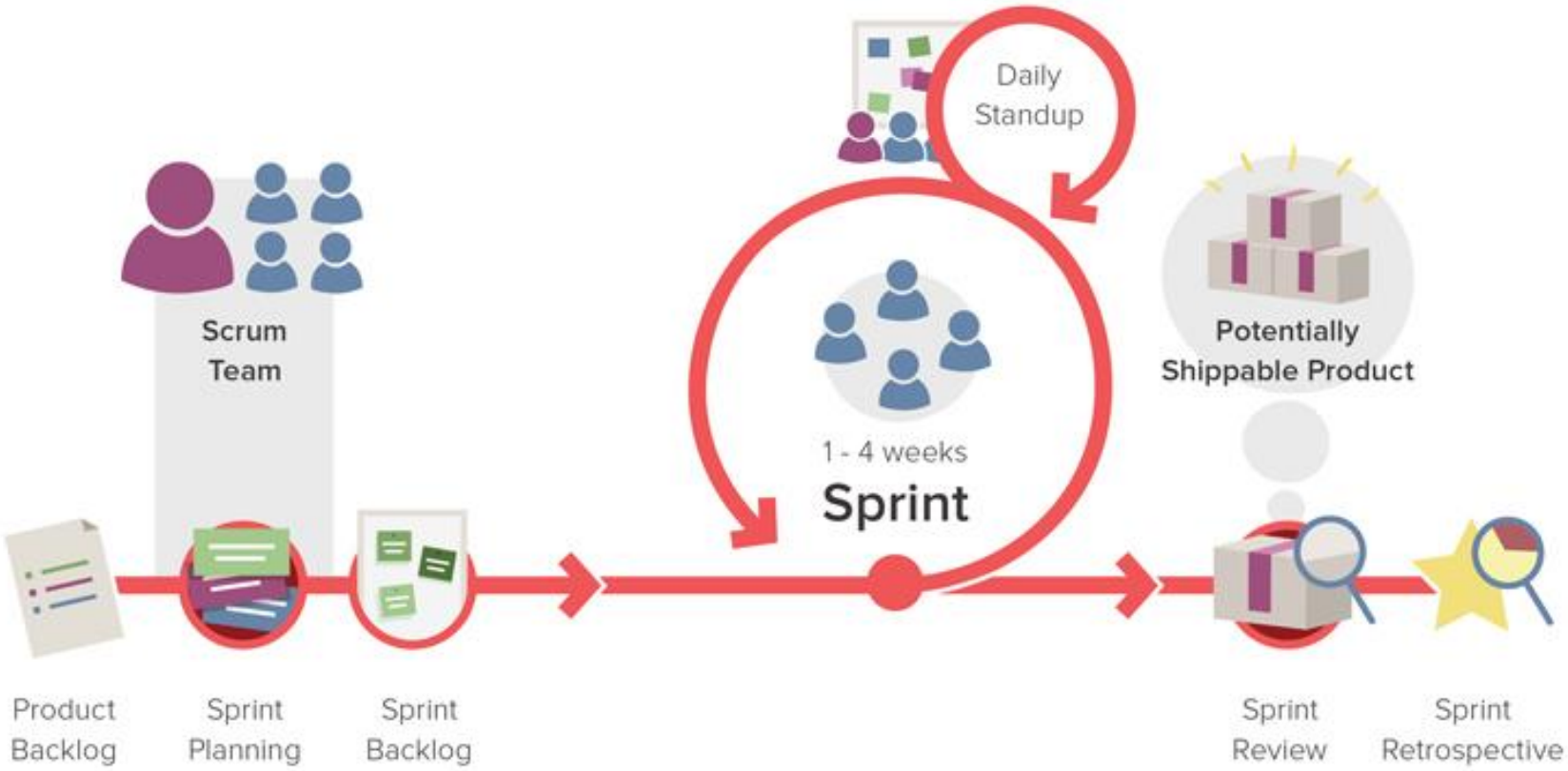
- Long phases
- Specifications should be initially defined
- Modifications are expensive

Agile


Individual and Interactions
Over Processed and Tools
Working Software
Over Comprehensive Documentation
Customer Collaboration
Over Contract Negotiation
Responding to Change
Over Following a Plan

Scrum

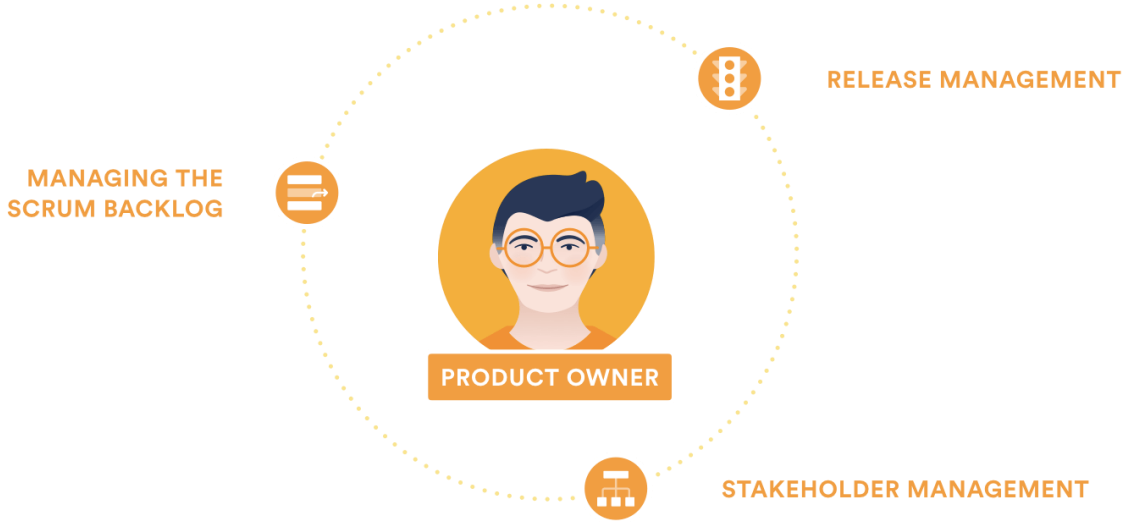
Scrum


Daily
Standup
Scrum
Team
Potentially
Shippable Product
1 - 4 weeks
Sprint
Product
Backlog
Sprint
Planning
Sprint
Backlog
Sprint
Review
Sprint
Retrospective

Scrum sprint

- 1-4 weeks
- Analysis/Coding/Testing
- Demo/Release at the end of the sprint

Scrum roles


RELEASE MANAGEMENT
MANAGING THE SCRUM BACKLOG
PRODUCT OWNER
STAKEHOLDER MANAGEMENT

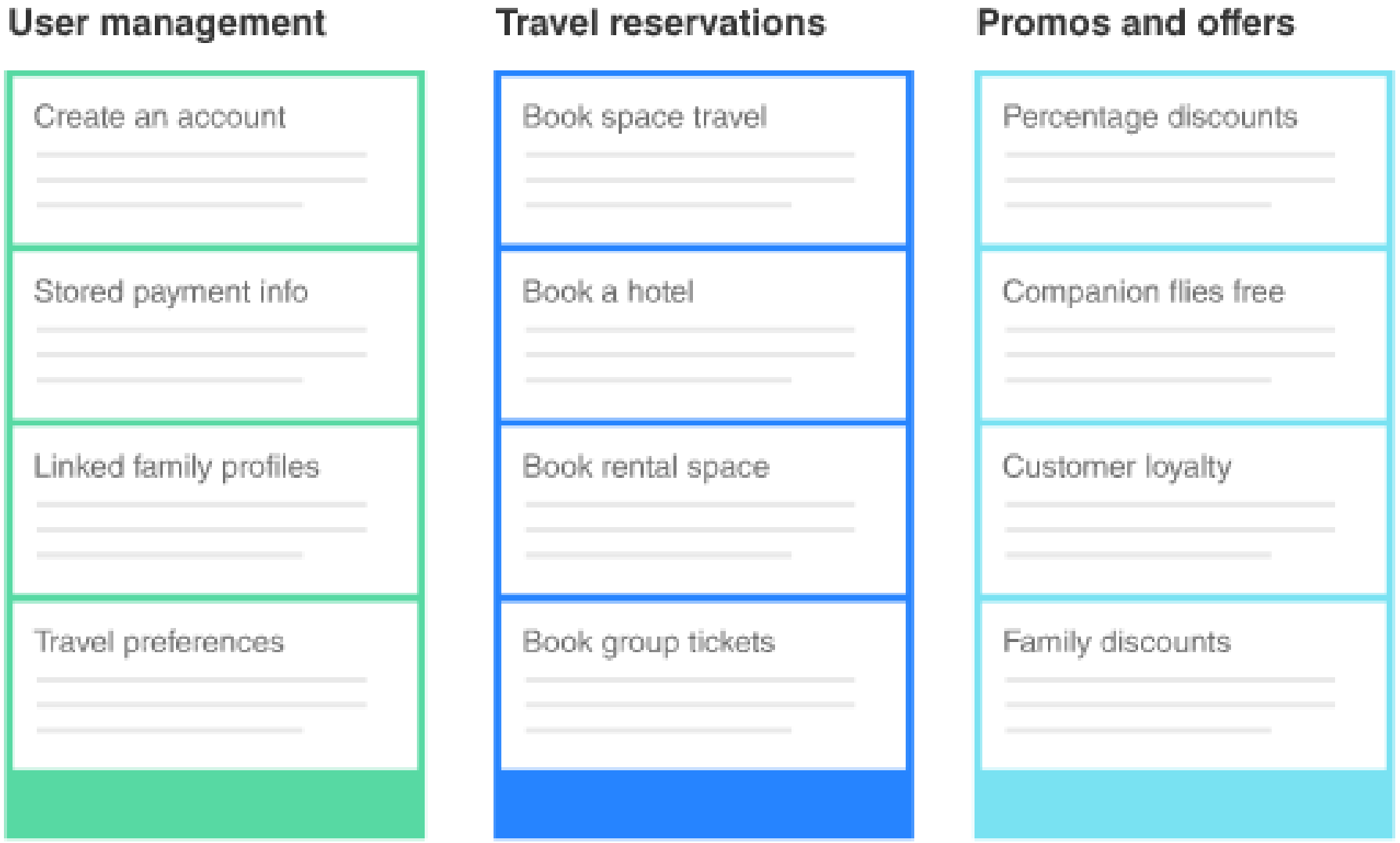
Scrum roles

TRANSPARENCY
SELF ORGANIZATION
PROTECTING THE TEAM
EMPIRICISM
SCRUM VALUES
REMOVE BLOCKERS
SCRUM MASTER

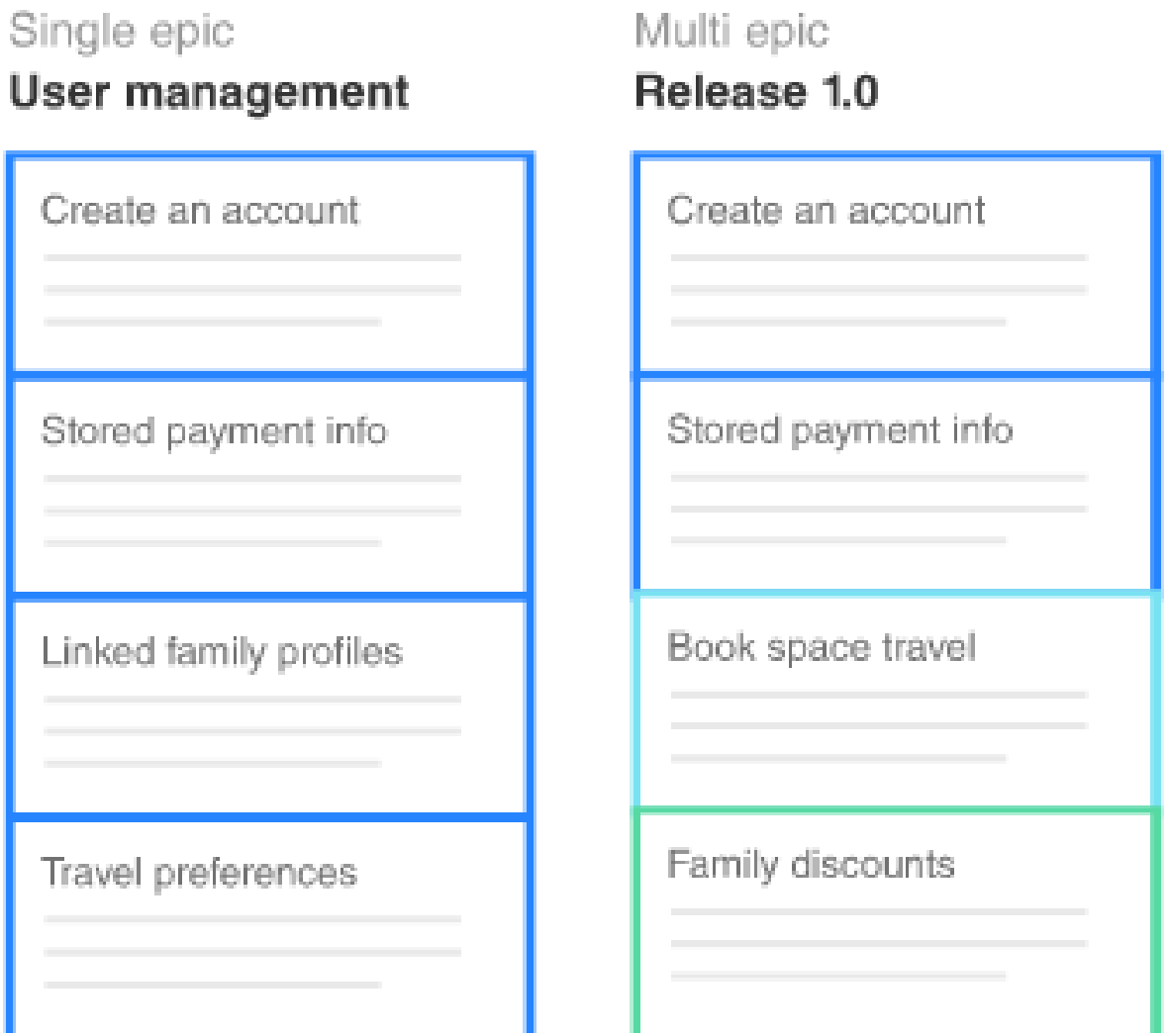
Scrum roles

SELF ORGANIZATION
DESIGN
DEVELOPMENT
UX
TESTING
DELIVERY
DEVELOPMENT TEAM

Backlog

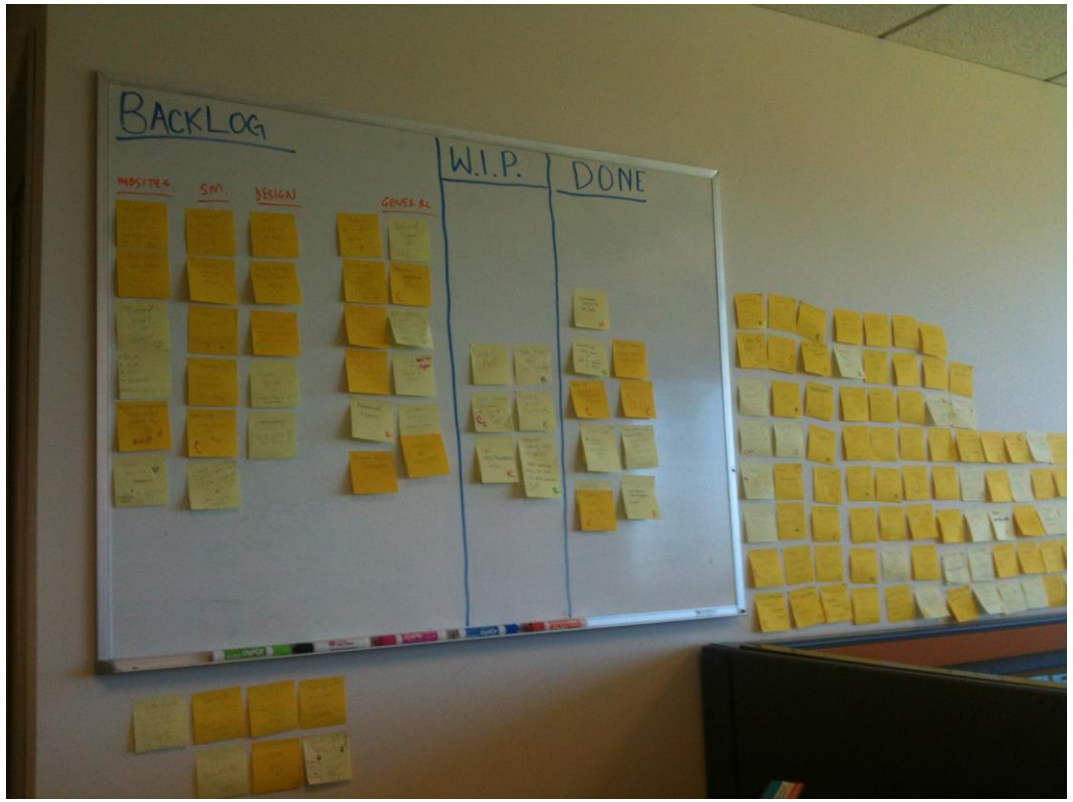

User management
Create an account
Stored payment info
Linked family profiles
Travel preferences
Travel reservations
Book space travel
Book a hotel
Book rental space
Book group tickets
Promos and offers
Percentage discounts
Companion flies free
Customer loyalty
Family discounts

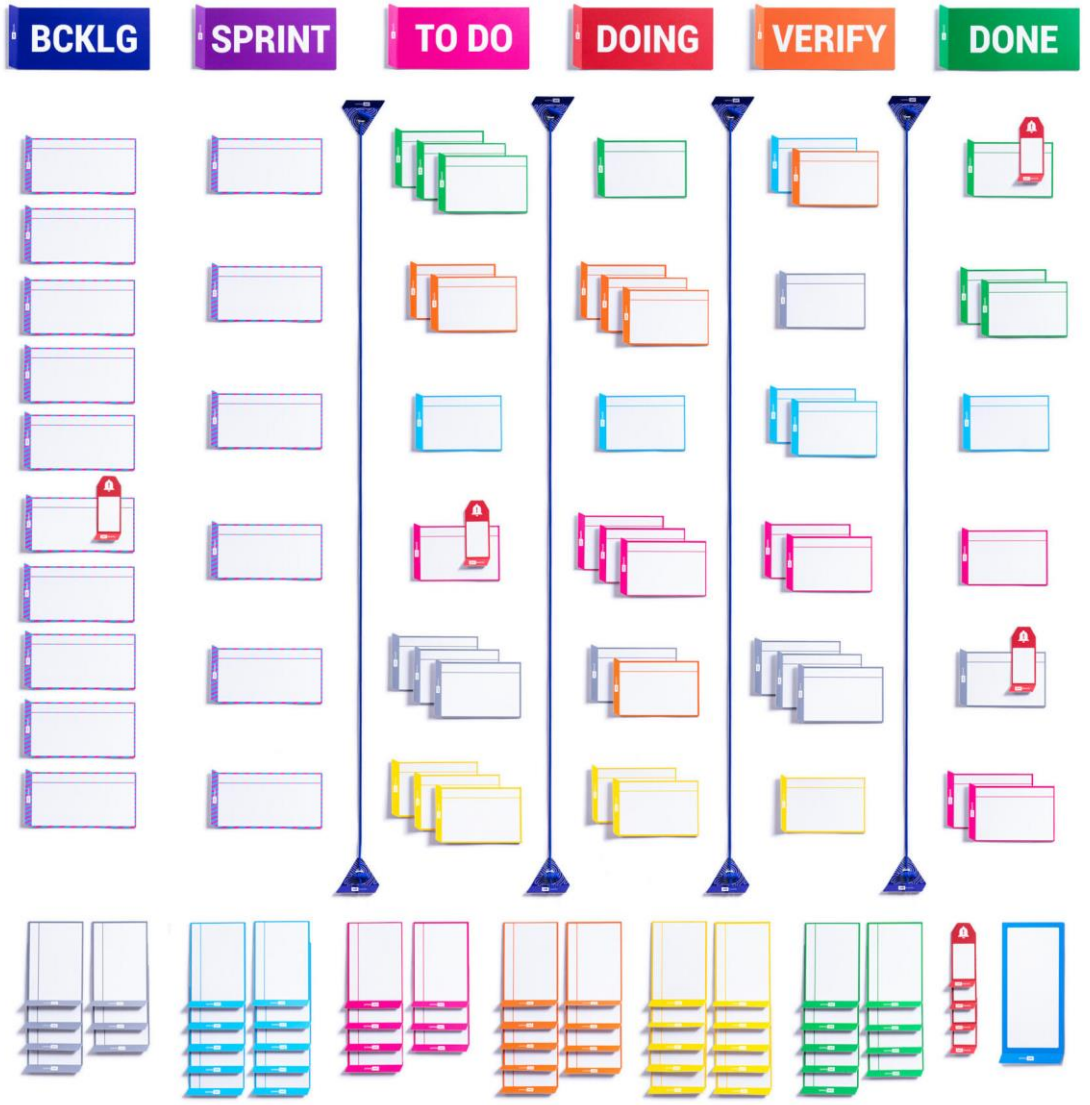
Backlog


Single epic
User management
Create an account
Stored payment info
Linked family profiles
Travel preferences
Multi epic
Release 1.0
Create an account
Stored payment info
Book space travel
Family discounts

Sprint planning

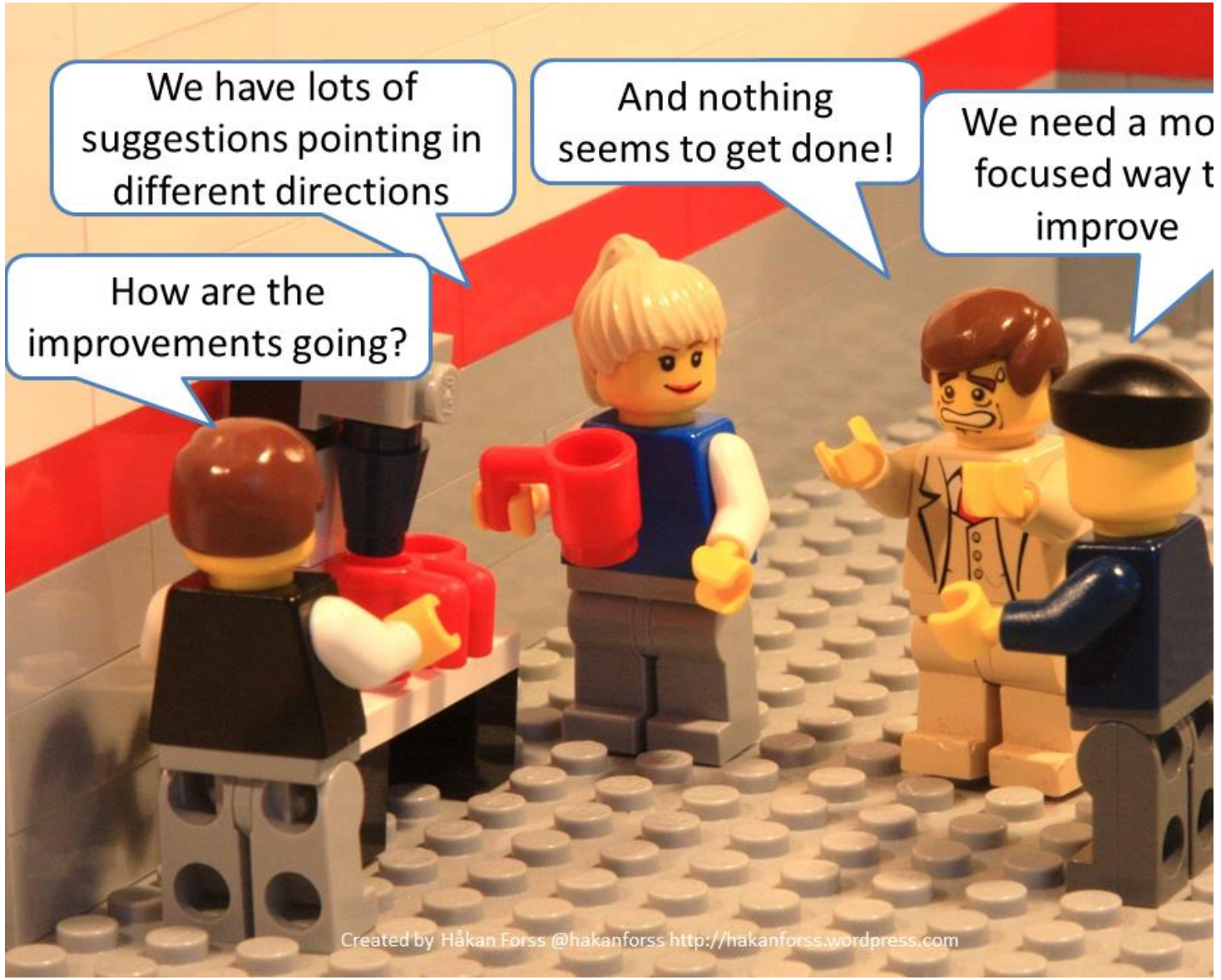
Scrum board





Daily standup

- ~15 minutes
- What was done yesterday
- What planned to be done today
- Problem discussions (shortly)

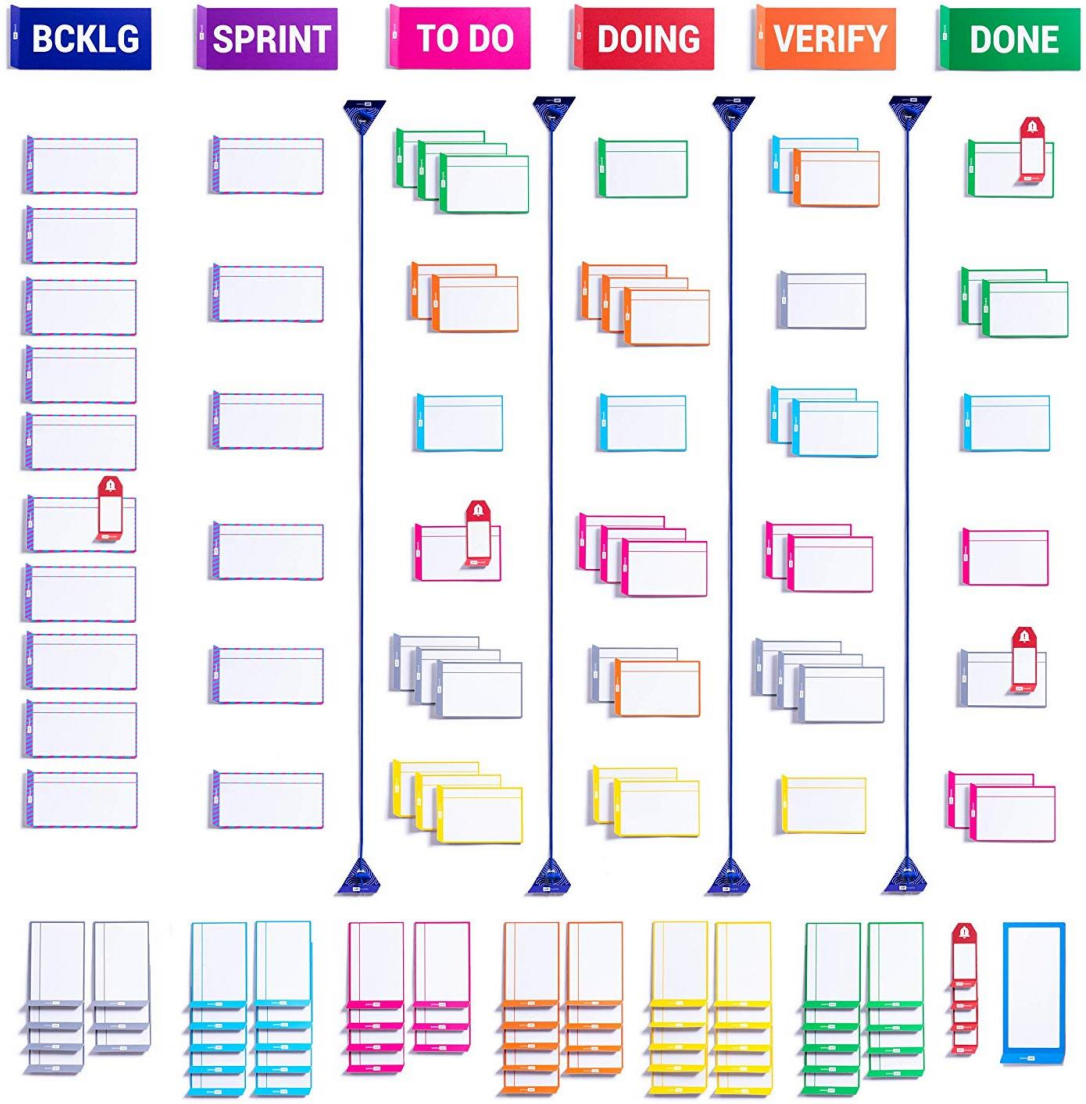


Sprint retrospective

- What was good in this sprint
- What was bad in this sprint
- Any potential changes to make work better

Kanban

- Establishing upper limit to work in process to avoid overcapacity



Kanban advantages

- Continuous process
- No time limits (?)

Kanban disadvantages

- Easy to loose project target
- What to treat as a task/story ?
  - No task/story estimations
- Simple planning
- More responsibility on manager