WHAT IS AGILE?

- The agile software development emphasizes on four core values.
  - Individual and team interactions over processes and tools
  - Working software over comprehensive documentation
  - Customer collaboration over contract negotiation
  - Responding to change over following a plan

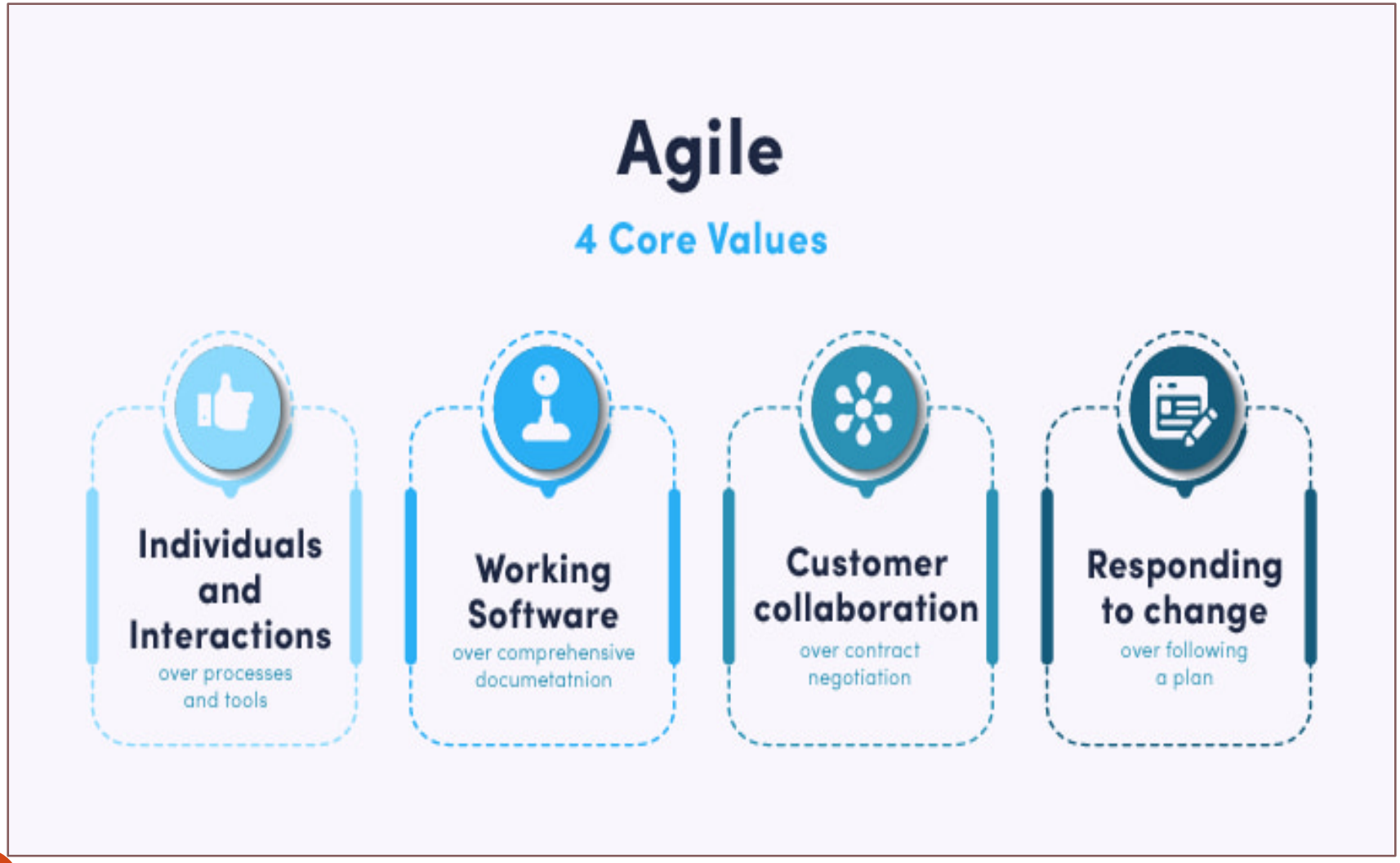
Agile Methodology

- Agile is an iterative approach to project management and software development that helps teams deliver value to their customers faster and with fewer headaches.
- Instead of betting everything on a "big bang" launch, an agile team delivers work in small, but consumable, increments.
- Requirements, plans, and results are evaluated continuously so teams have a natural mechanism for responding to change quickly.

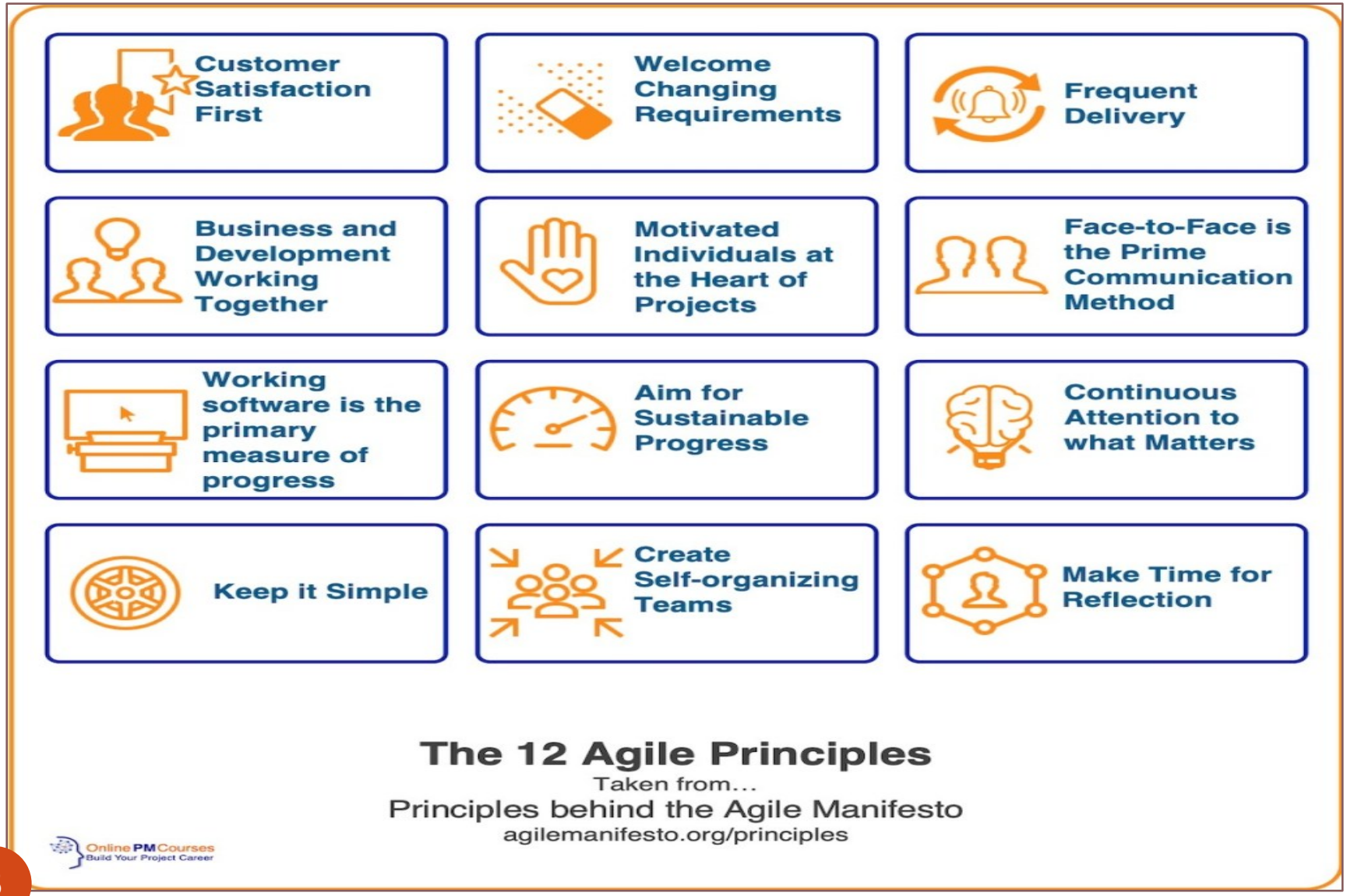
Agile Manifesto

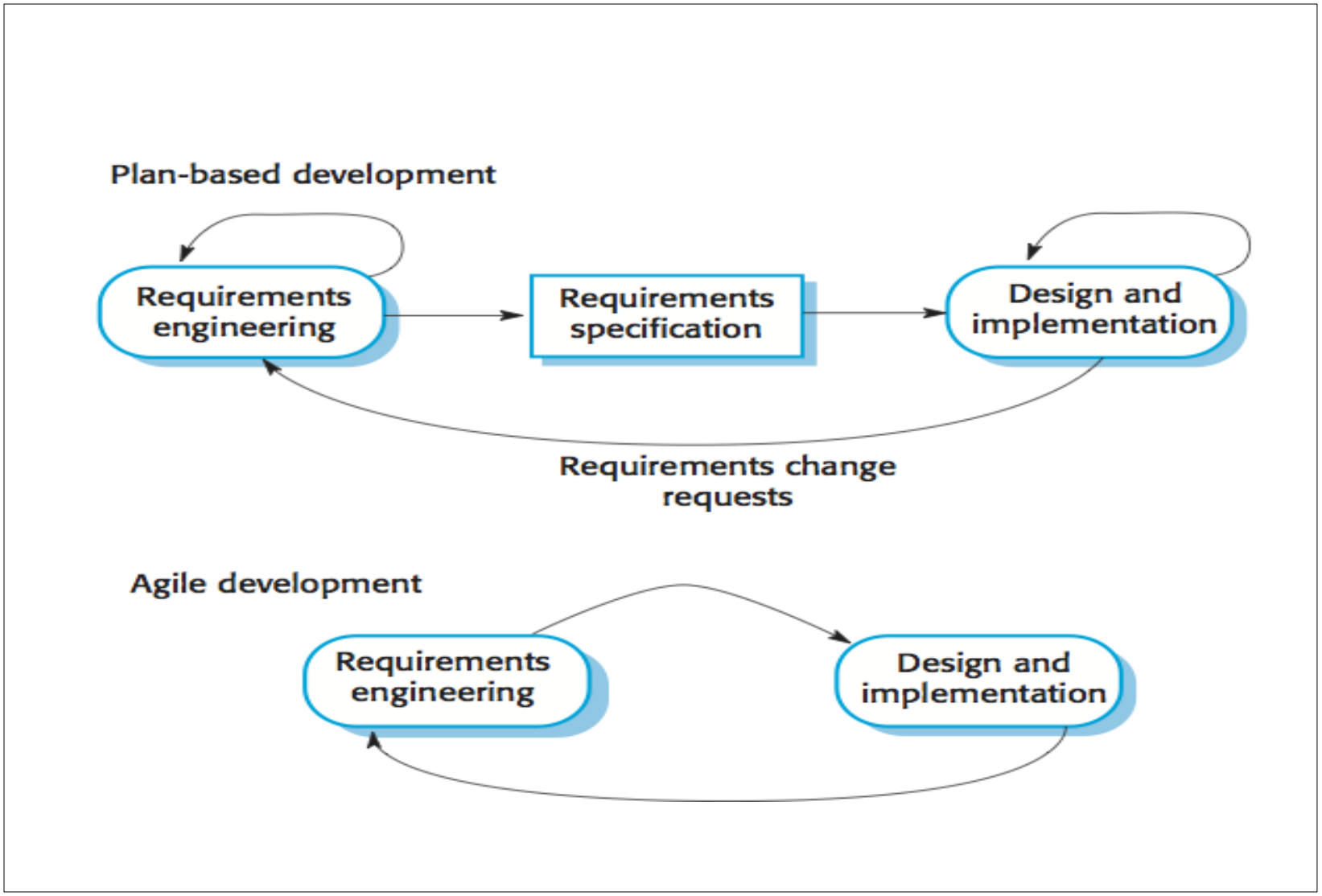
- The Agile Manifesto is the new bible for the software development industry. Its values and principles offer more concrete examples of how Agile software development should take place.
- To better understand the Agile Development, we need to briefly see what these values and principles mean, and assess whether they still matter.
- The Agile Development is standing on 4 core values and 12 principles. It is essential to understand these values and principles to understand the Agile approach clearly.

Agile 4 core values



Agile 12 Principles

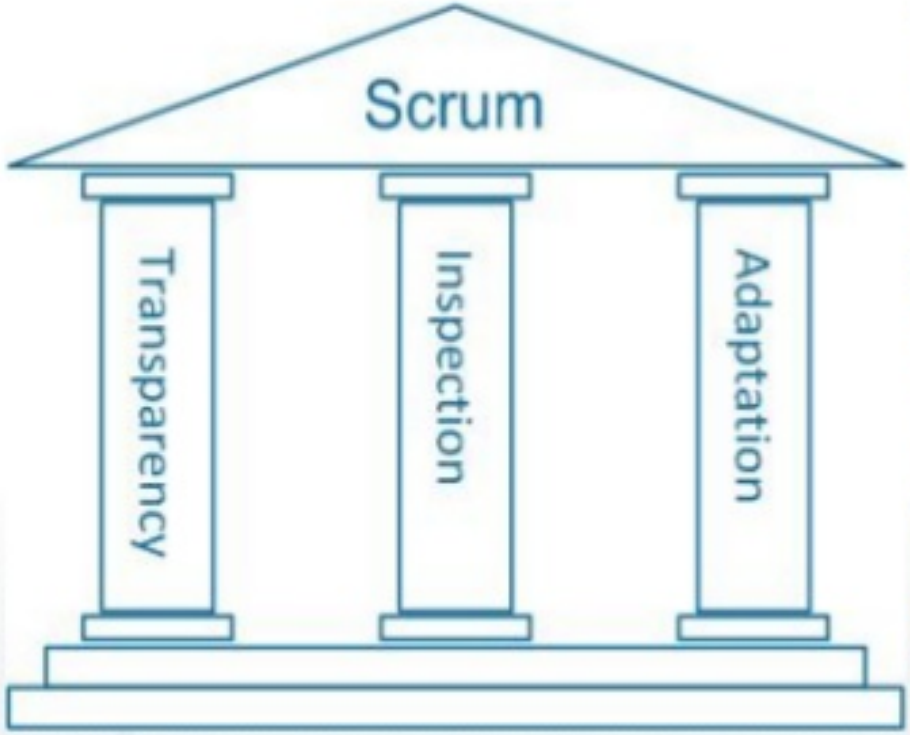



Plan-based development
Requirements engineering
Requirements specification
Design and implementation
Requirements change requests
Agile development
Requirements engineering
Design and implementation

SCRUM FRAMEWORK

- Scrum is a lightweight framework that helps people, teams and organizations generate value through adaptive solutions for complex problems.
- Scrum requires a Scrum Master to foster an environment where:
  - A **Product Owner** orders the work for a complex problem into a Product Backlog.
  - The **Scrum Team** turns a selection of the work into an Increment of value during a Sprint.
  - The Scrum Team and its stakeholders inspect the results and adjust for the next Sprint.
  - *Repeat*

SCRUM THEORY



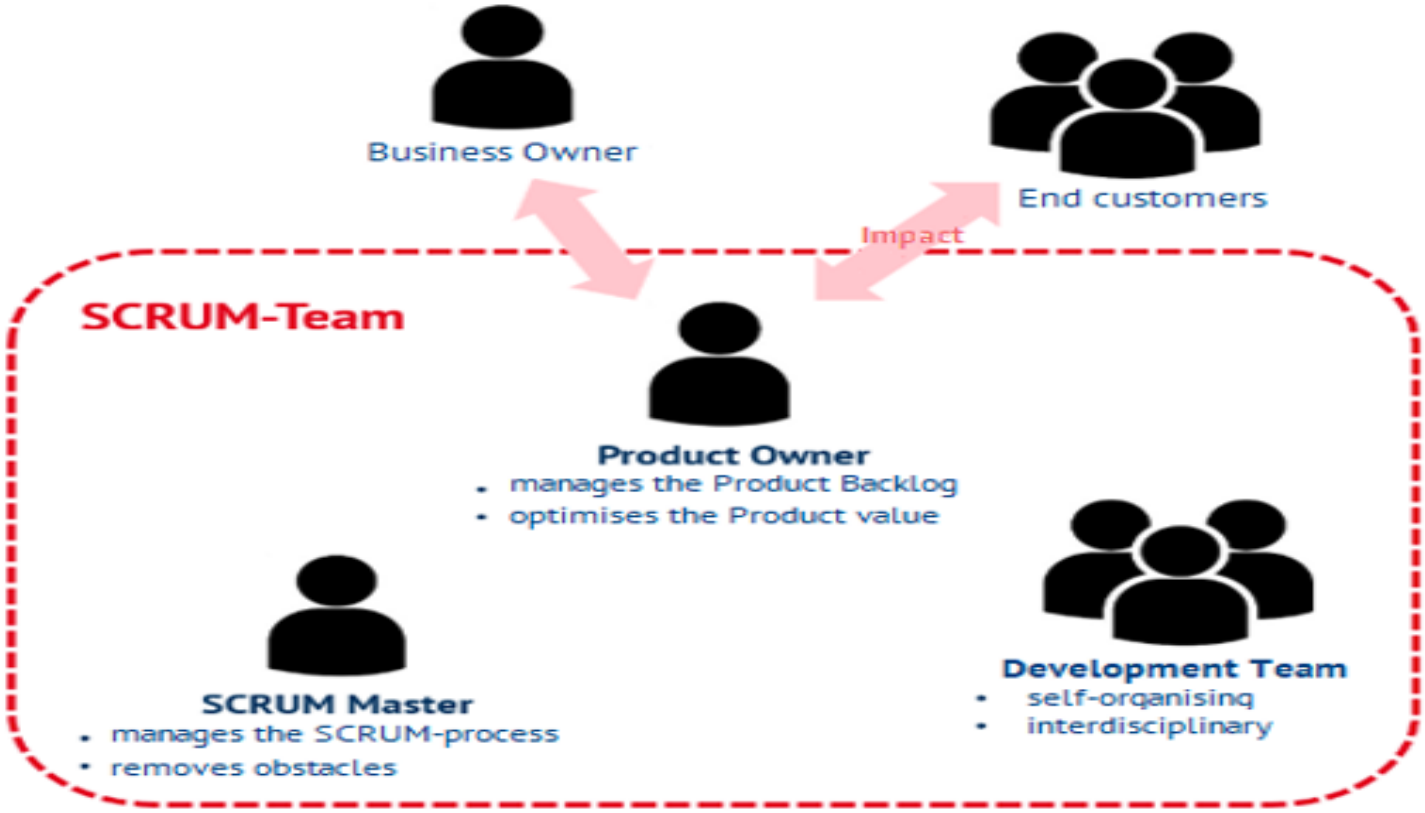
Transparency:
Giving visibility to the significant aspects of the process to those responsible for the outcome.

Inspection:
Timely checks on the progress toward a Sprint Goal to detect undesirable variances.

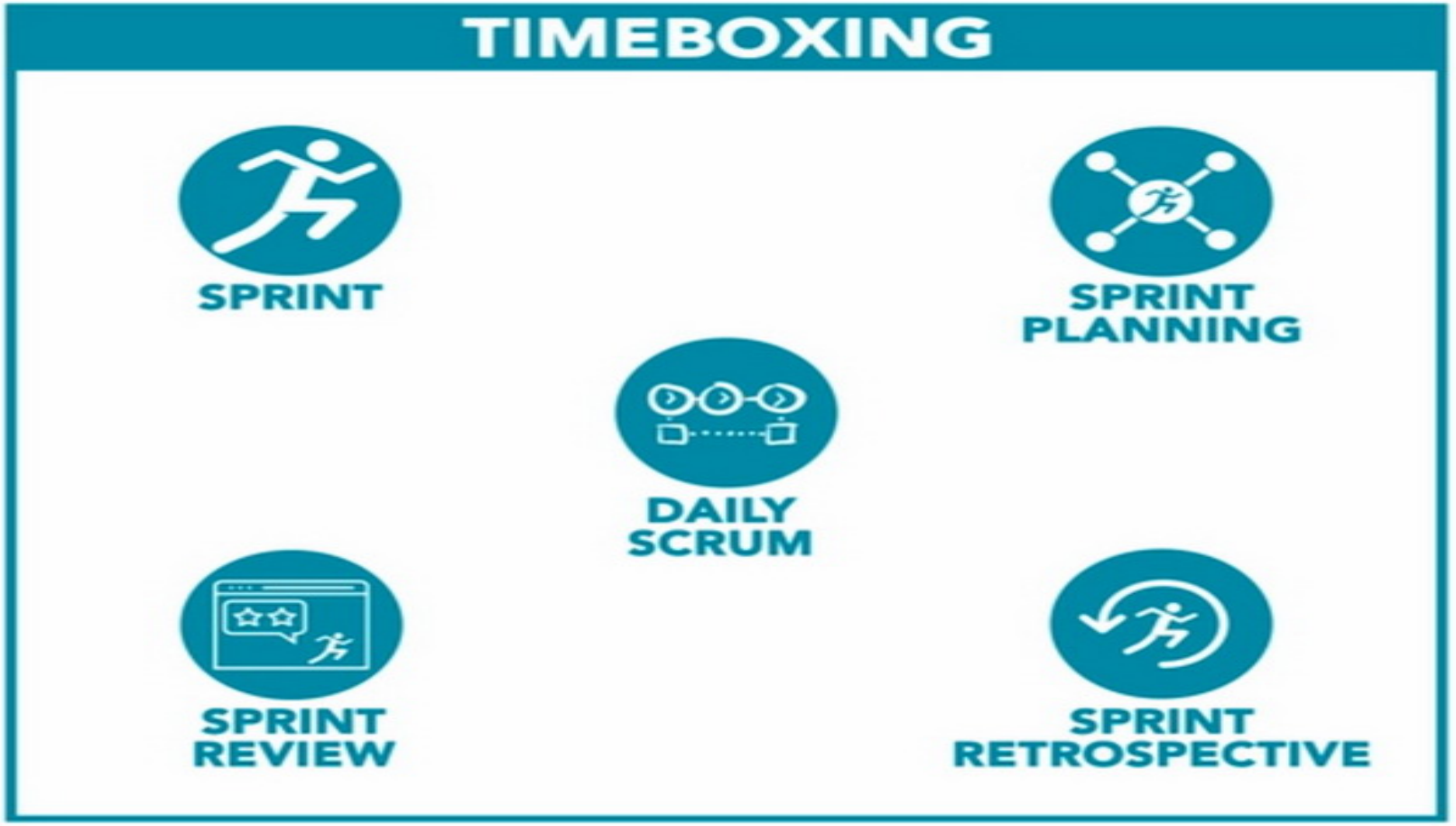
Adaptation:
Adjusting a process as soon as possible to minimize any further deviation or issues.

SCRUM VALUES

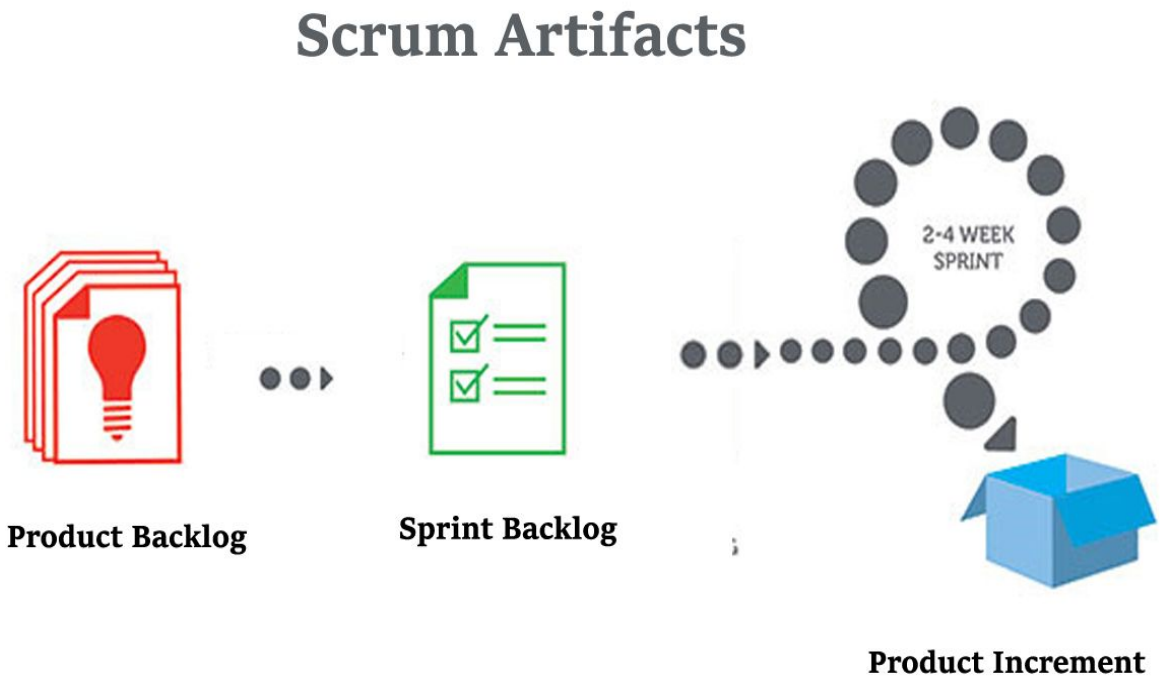
SCRUM TEAM


Business Owner
End customers
Impact
SCRUM-Team
Product Owner
• manages the Product Backlog
• optimises the Product value
SCRUM Master
• manages the SCRUM-process
• removes obstacles
Development Team
• self-organising
• interdisciplinary

SCRUM EVENT


TIMEBOXING
SPRINT
SPRINT PLANNING
DAILY SCRUM
SPRINT REVIEW
SPRINT RETROSPECTIVE

SCRUM ARTIFACTS



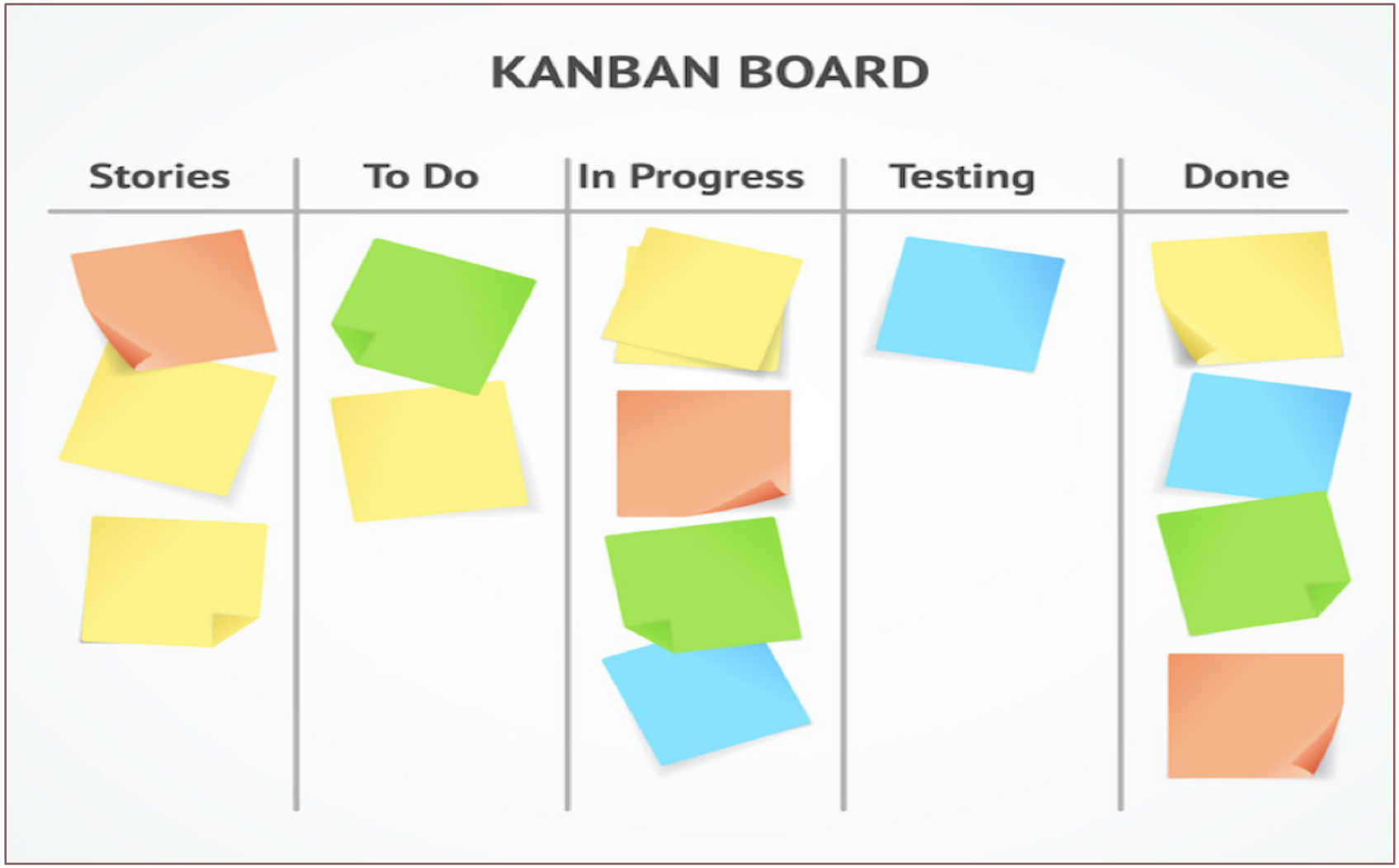
Kanban

- Kanban means “Visual Card” in Japanese.
- Kanban is a method applying just-in-time delivery while not overloading the team members.
- In Kanban, the process, from definition of a task to its delivery to the customer, is displayed for stakeholders to see.
- Team members pull work from a queue when they have excess capacity.

Kanban

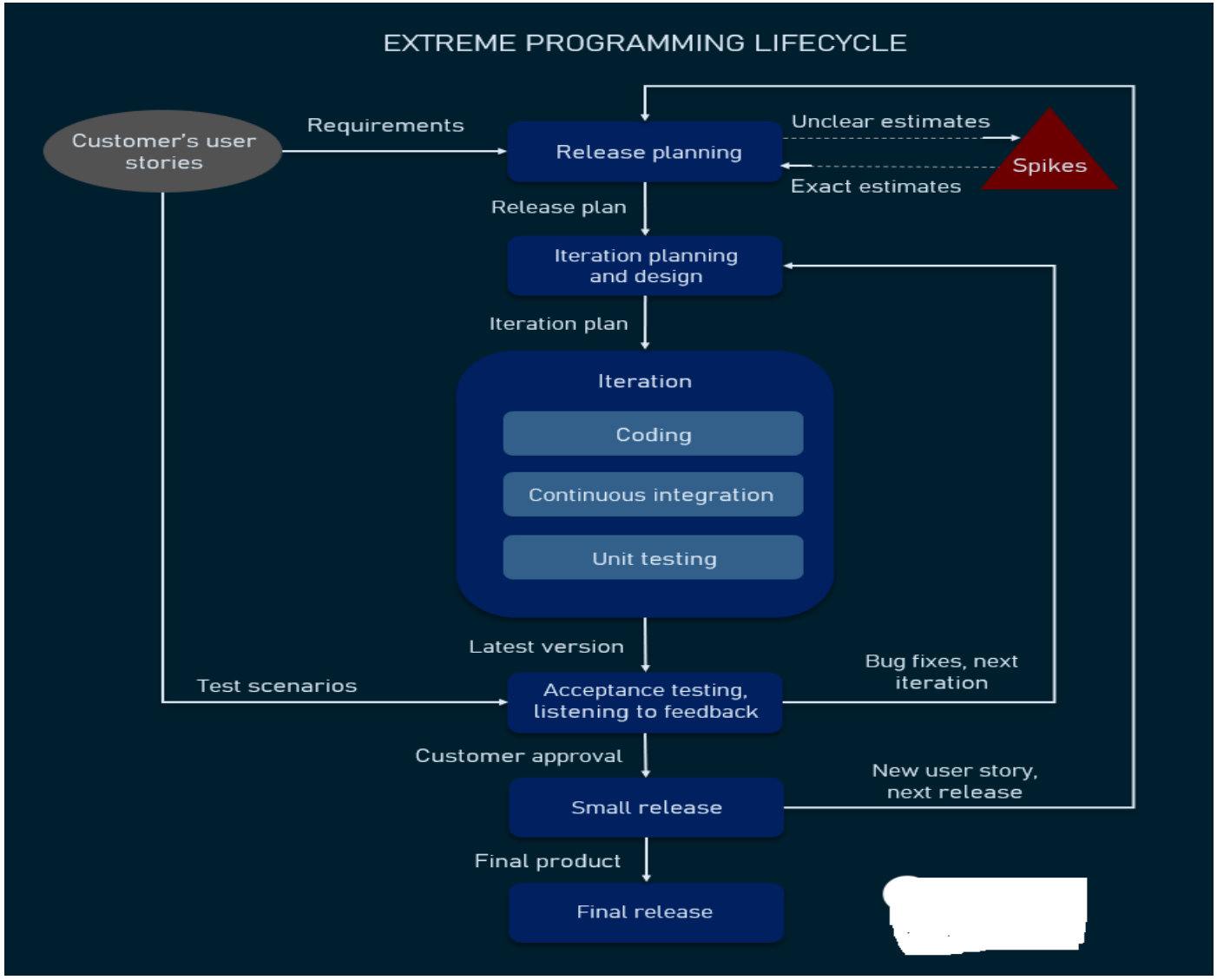
- Visualize the workflow
  - Kanban literally means "signboard" or "billboard"
- Just-in-time (JIT)
  - identify and eliminate wasteful activities, only build what you need
- Limit Work In Process (WIP)
  - establish and respect your ideal capacity, do what works best to get the work done
- Manage and optimize the flow/process
  - continually seeks ways to reduce the lead time for getting the work done
  - make process policies explicit
  - improve collaboratively

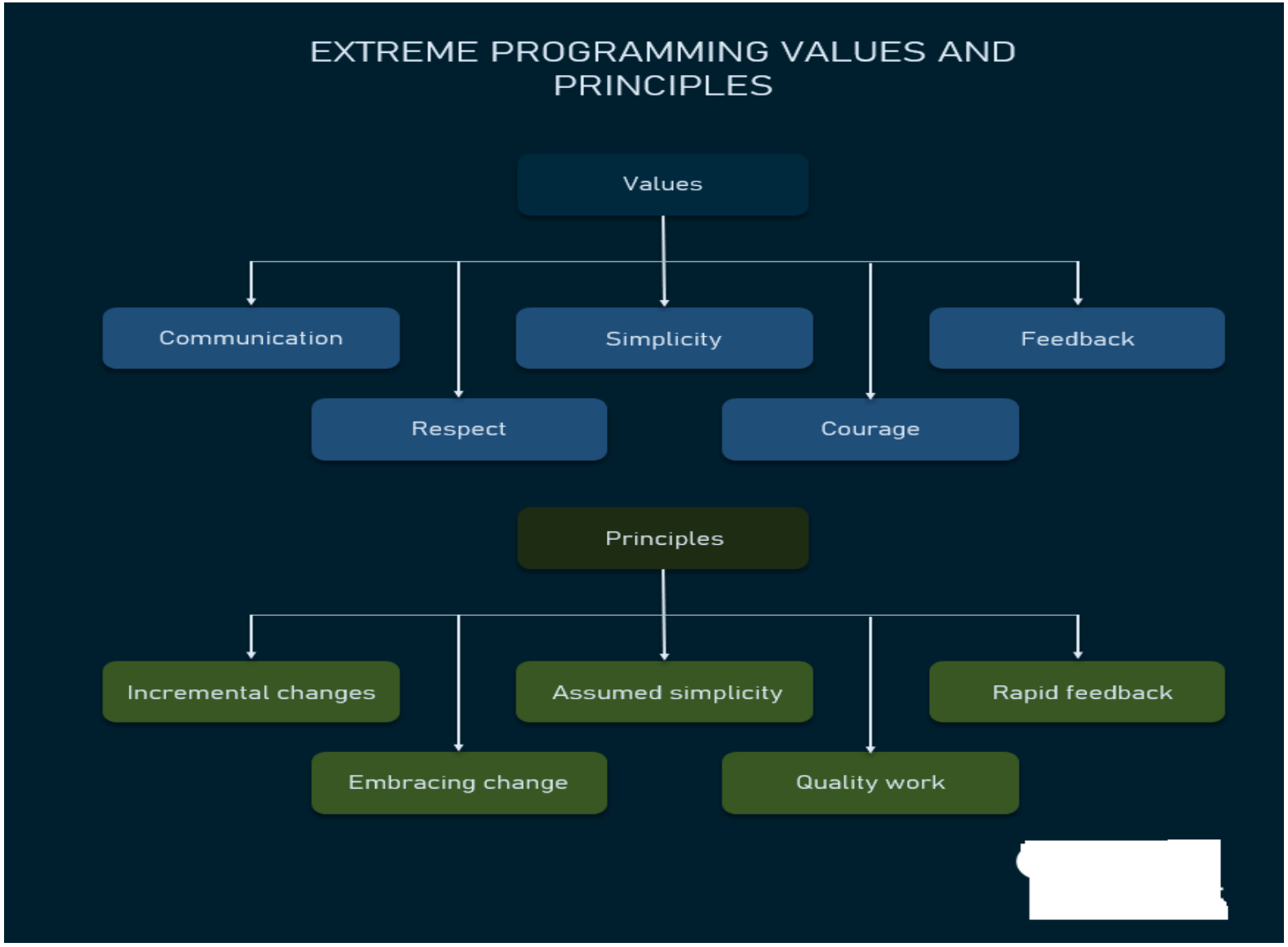
It's not an inventory control system; it's a pull scheduling system that tells you what to produce, when to produce it, and how much to produce.


KANBAN BOARD
Stories
To Do
In Progress
Testing
Done

Extreme Programming (XP)

- Extreme Programming (also known as “XP”) is one of the numerous Agile frameworks applied by IT companies. But its key feature — emphasis on technical aspects of software development — distinguishes XP from the other approaches.


EXTREME PROGRAMMING LIFECYCLE
Customer's user stories
Requirements
Release planning
Unclear estimates
Spikes
Exact estimates
Release plan
Iteration planning and design
Iteration plan
Iteration
Coding
Continuous integration
Unit testing
Latest version
Test scenarios
Acceptance testing, listening to feedback
Bug fixes, next iteration
Customer approval
Small release
New user story, next release
Final product
Final release


EXTREME PROGRAMMING VALUES AND PRINCIPLES
Values
Communication
Simplicity
Feedback
Respect
Courage
Principles
Incremental changes
Assumed simplicity
Rapid feedback
Embracing change
Quality work

Values of extreme programming

- XP has simple rules that are based on 5 values to guide the teamwork:
- **Communication.** Everyone on a team works jointly at every stage of the project.
- **Simplicity.** Developers strive to write simple code bringing more value to a product, as it saves time and effort.
- **Feedback.** Team members deliver software frequently, get feedback about it, and improve a product according to the new requirements.
- **Respect.** Every person assigned to a project contributes to a common goal.
- **Courage.** Programmers objectively evaluate their own results without making excuses and are always ready to respond to changes.

Principles of extreme programming

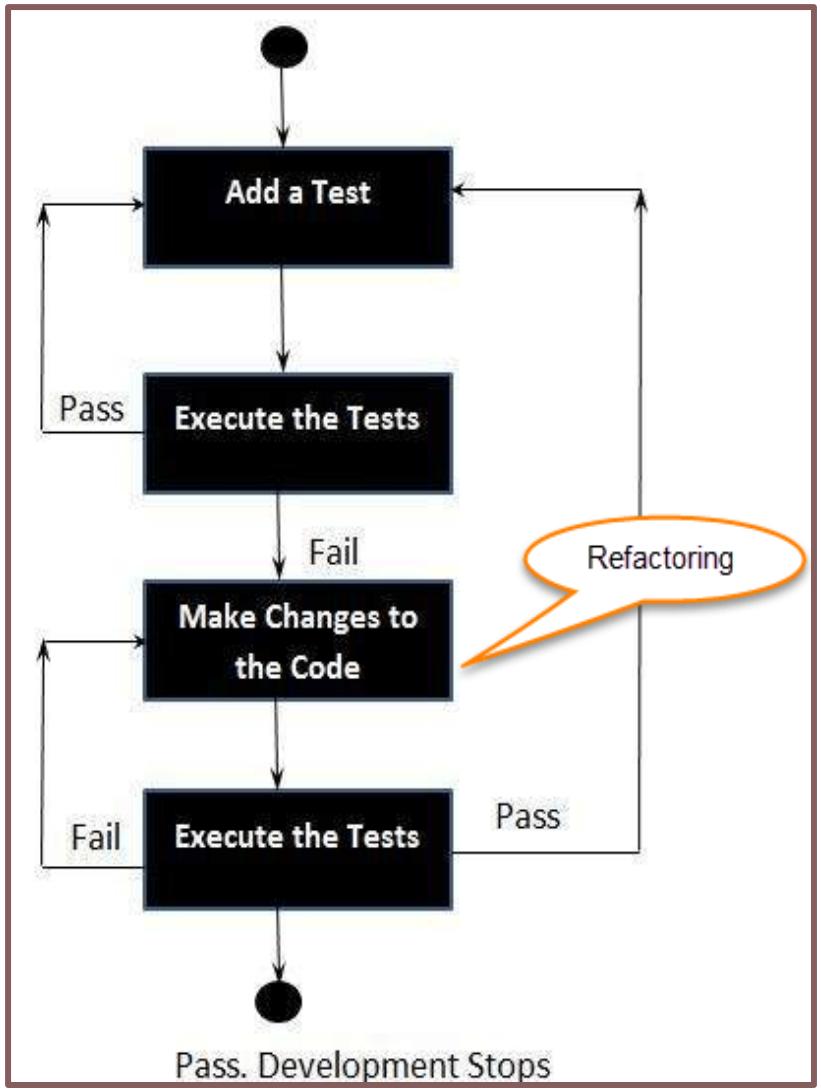
- Most researchers denote 5 XP principles as:
- **Rapid feedback.** Team members understand the given feedback and react to it right away.
- **Assumed simplicity.** Developers need to focus on the job that is important at the moment and follow YAGNI (You Ain't Gonna Need It) and DRY (Don't Repeat Yourself) principles.
- **Incremental changes.** Small changes made to a product step by step work better than big ones made at once.
- **Embracing change.** If a client thinks a product needs to be changed, programmers should support this decision and plan how to implement new requirements.

Extreme programming practices

- Test-Driven Development
- The Planning Game
- Pair Programming
- Code Refactoring
- Continuous Integration
- Small Releases
- Simple Design
- Coding Standards
- Collective Code Ownership
- System Metaphor
- 40-Hour Week

Test Driven Development(TDD)

- **Test Driven Development (TDD)** is software development approach in which test cases are developed to specify and validate what the code will do. In simple terms, test cases for each functionality are created and tested first and if the test fails then the new code is written in order to pass the test and making code simple and bug-free.



Feature Driven Development (FDD)

- This method is focused around "designing & building" features. Unlike other agile methods, FDD describes very specific and short phases of work that has to be accomplished separately per feature. It includes domain walkthrough, design inspection, promote to build, code inspection and design.
- Five basic activities exist during FDD:
  - Develop overall model
  - Build feature list
  - Plan by feature
  - Design by feature
  - Build by feature

- **Predictive Software Development Life Cycle:**
  - As the name suggests, predictive SDLC assumes you can predict the complete workflow. It involves fully understanding the final product and determining the process for delivering it. In this form of project life cycle, you determine the cost, scope, and timeline in the early phases of the project.
  - One of the most common predictive models is the waterfall model. It assumes various phases in the SDLC that can occur sequentially, which implies that one phase leads into the next phase. In simple words, in waterfall model, all the phases take place one at a time and do not overlap one another.
- **Adaptive Software Development Life Cycle:**
  - Adaptive SDLC approaches have a mix of incremental and iterative development. It involves adding features incrementally and making changes and refinements according to feedback. In other words, the work can easily adapt to the changing requirements based on new feedback received from the client.
  - Agile and other iterative methodologies fall under the umbrella of adaptive SDLC.