SNS COLLEGE OF TECHNOLOGY

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Department of MCA

Topic: **AGILE METHODS**

Course

23CAE718
AGILE SOFTWARE DEVELOPMENT

Unit I

AGILE METHODS

Elective

II Semester / I MCA

Methods AGILE SOFTWARE DEVELOPMENT

Agile methods are a **set of principles and practices** used primarily in **software development** that **focus** on **flexibility, collaboration, and delivering value incrementally.**

They emphasize responding to change rather than following a rigid plan, with the goal of producing high-quality software that meets users' needs.

Here are some key aspects of Agile methodologies:

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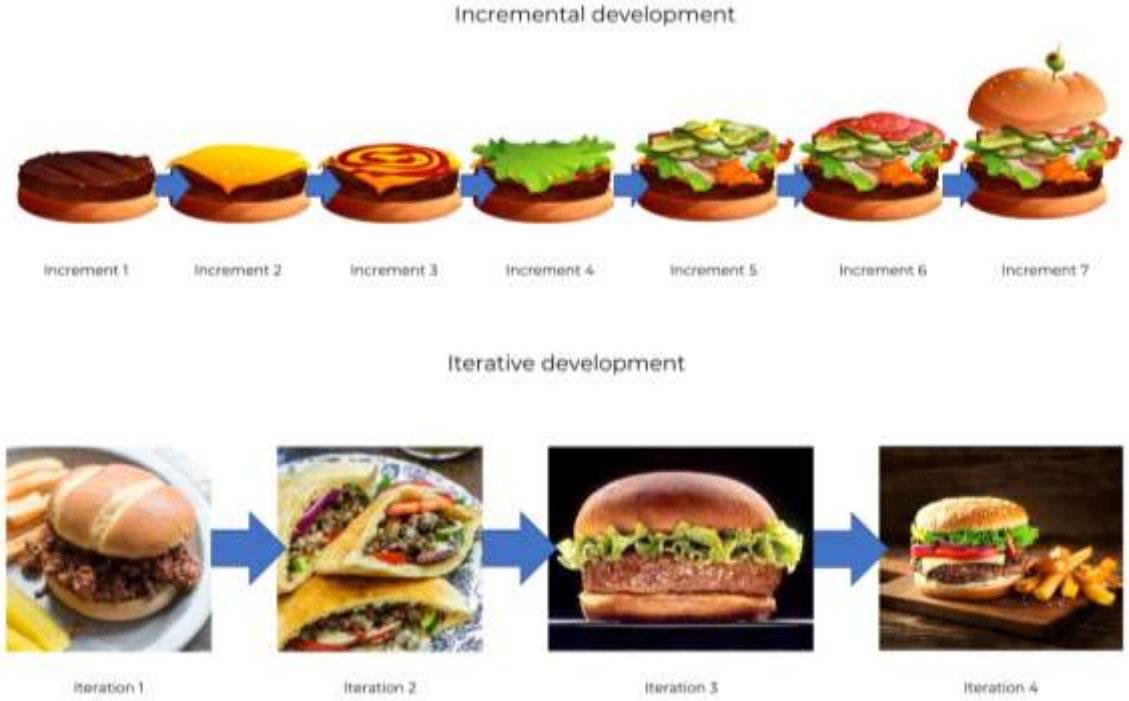
1. Iterative and Incremental Development

Work is divided into small, manageable chunks called iterations (or sprints, typically 1-4 weeks).Each iteration delivers a potentially shippable product increment, allowing teams to gather feedback early and adjust course.



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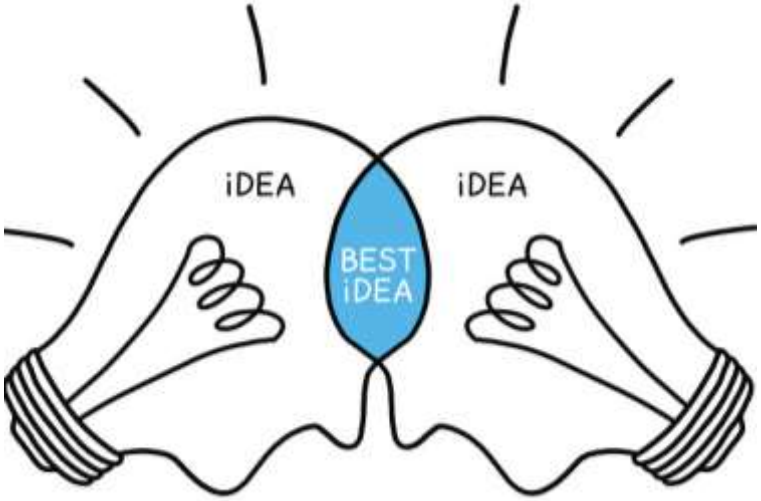
2. Collaboration

Agile emphasizes close collaboration between developers, stakeholders, and users.Teams typically include cross-functional members (developers, testers, etc.) to allow for efficient decision-making and problem-solving.



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3. Customer Focus

Customer feedback is sought early and continuously, ensuring that the end product aligns with user needs.Agile teams adapt based on changing requirements, even if they come in later stages of development.

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4. **Flexibility and Adaptability**

Agile allows for changes in requirements and priorities, responding to feedback and the evolving landscape. Teams should be willing to pivot based on the current needs of the project or business.

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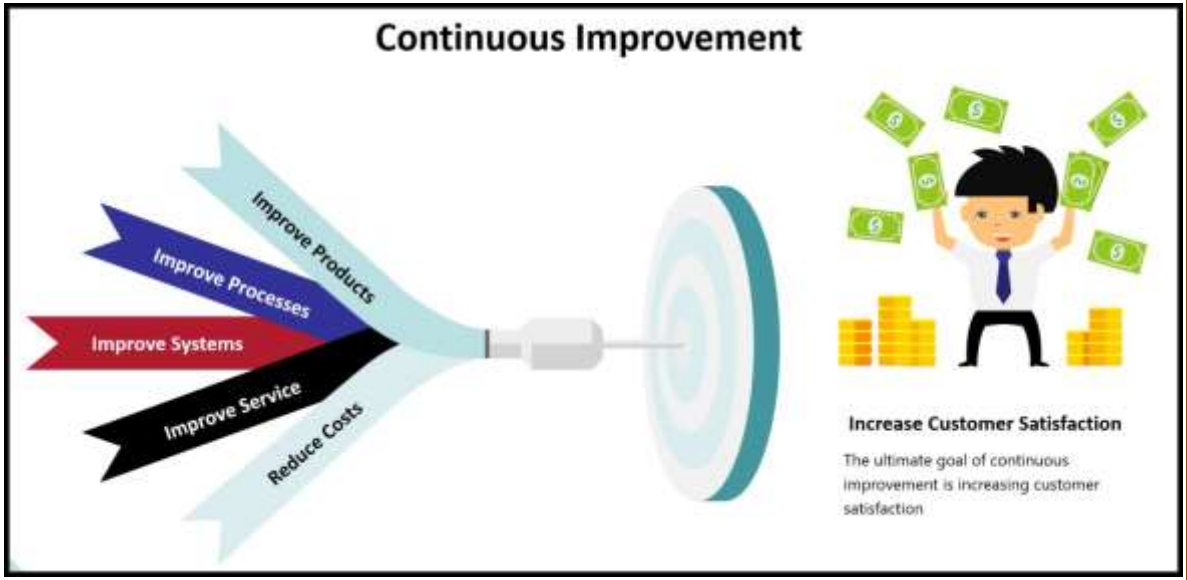
5. **Continuous Improvement**

After each iteration or sprint, the team holds a retrospective to discuss what went well, what didn't, and how they can improve in the next iteration. This promotes a culture of ongoing learning and better performance over time.



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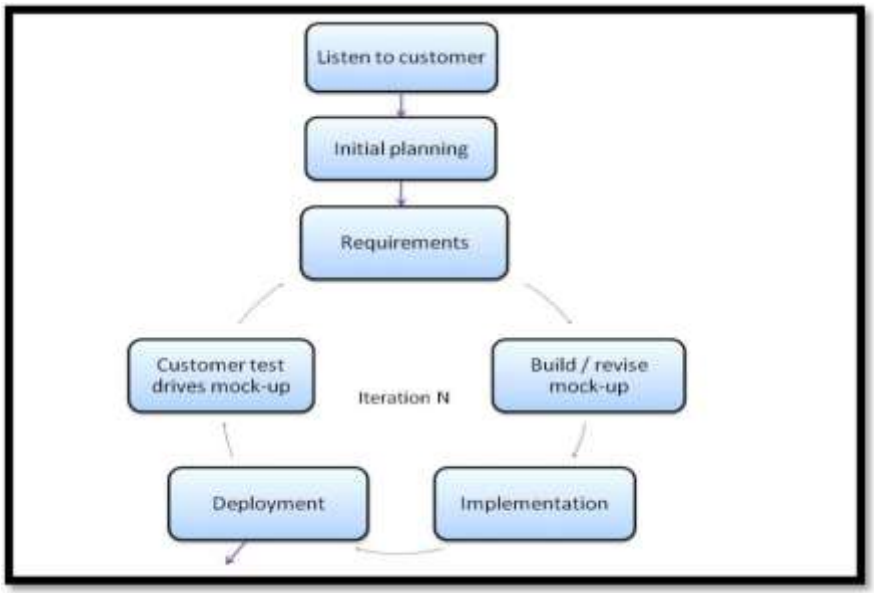
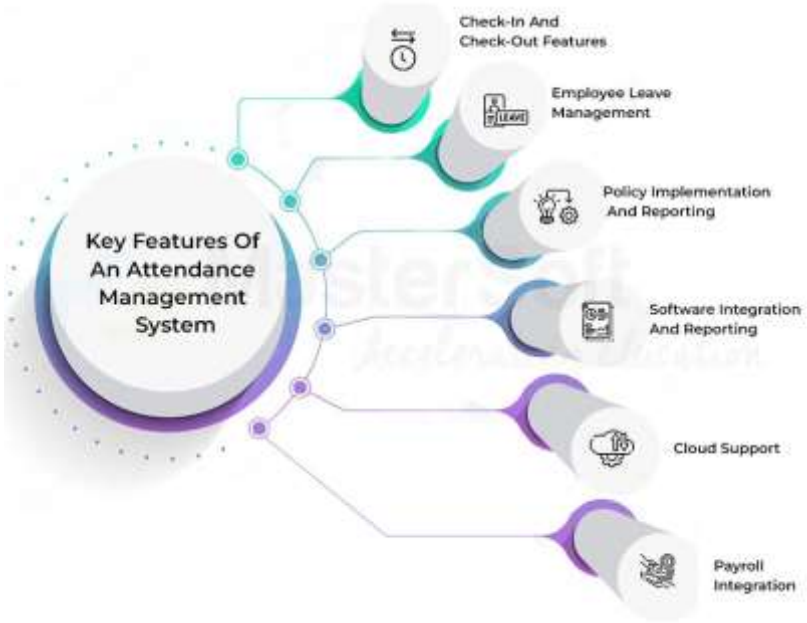
Example: Attendance Application





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6. **Working Software Over Documentation**

Agile values delivering functional software over extensive documentation, but this doesn't mean no documentation—it just focuses on what's necessary for the team to work efficiently.

Working software over comprehensive documentation

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Popular Agile Frameworks:

Scrum: A well-defined Agile framework where work is divided into sprints, with roles like Scrum Master and Product Owner ensuring the process is followed.

Kanban: Focuses on visualizing the workflow and managing work-in-progress to improve efficiency.

Extreme Programming (XP): Focuses on practices such as pair programming, test-driven development (TDD), and continuous integration.

Lean Software Development: Aims to reduce waste and increase efficiency by focusing on value delivery.

Agile methods are widely adopted outside software development as well, like in project management, product development, and marketing. The core idea remains the same: prioritize collaboration, adapt to change, and focus on delivering value incrementally.

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How to implement Agile methodology?

The AGILE methodology can be implemented with the help of various frameworks such as **Scrum, Kanban, eXtreme Programming(XP), Lean, Crystal, Adaptive Project Framework(APF), Feature Driven Development(FDD), Dynamic Systems Development Method(DSDM), Agile Unified Process(AUP**) and so on.

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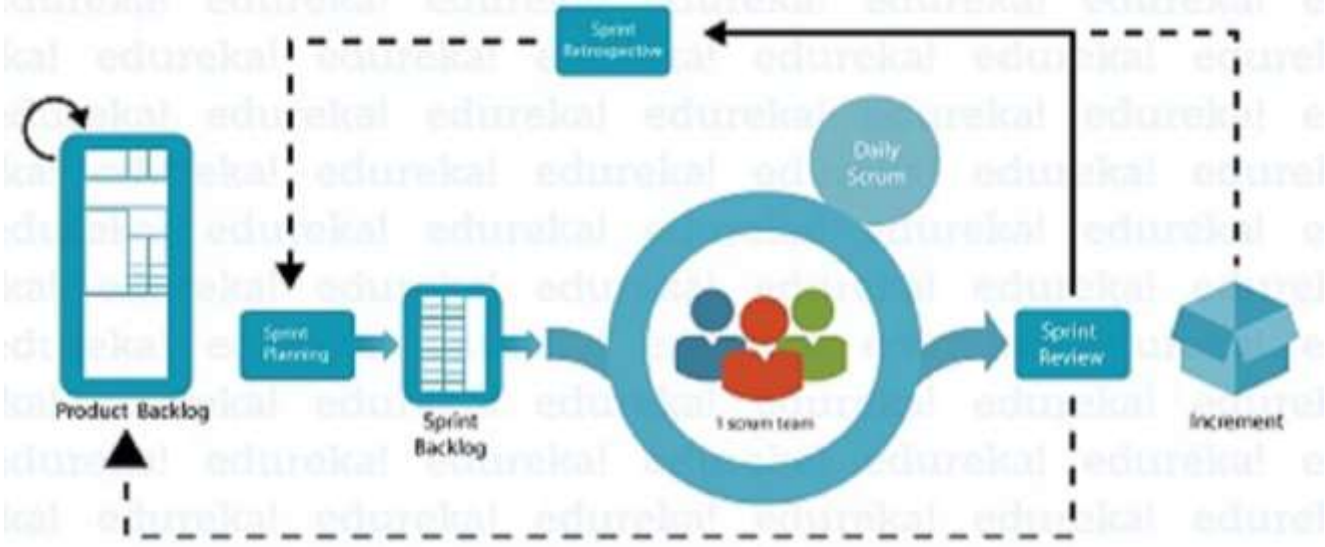
AGILE frameworks

Scrum

Scrum is a framework within which people can address complex adaptive problems, while productively and creatively delivering products of the highest possible value. It is a simple framework for effective team collaboration on complex products. It is the most popular and widely followed Agile methodology.



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Scrum

The Scrum framework addresses two critical pain points of software development. First is the speed of software development and the second is client requirements which keep on changing. In this approach, the software development project is executed in phases and each phase known as a Sprint. Also, small teams of 5-6 members are created, who collectively work towards the desired results.

The Scrum methodology allows active client participation at each stage so that any required changes are addressed immediately and acted on. This ensures that the project is delivered within time and meets the client demands effectively.

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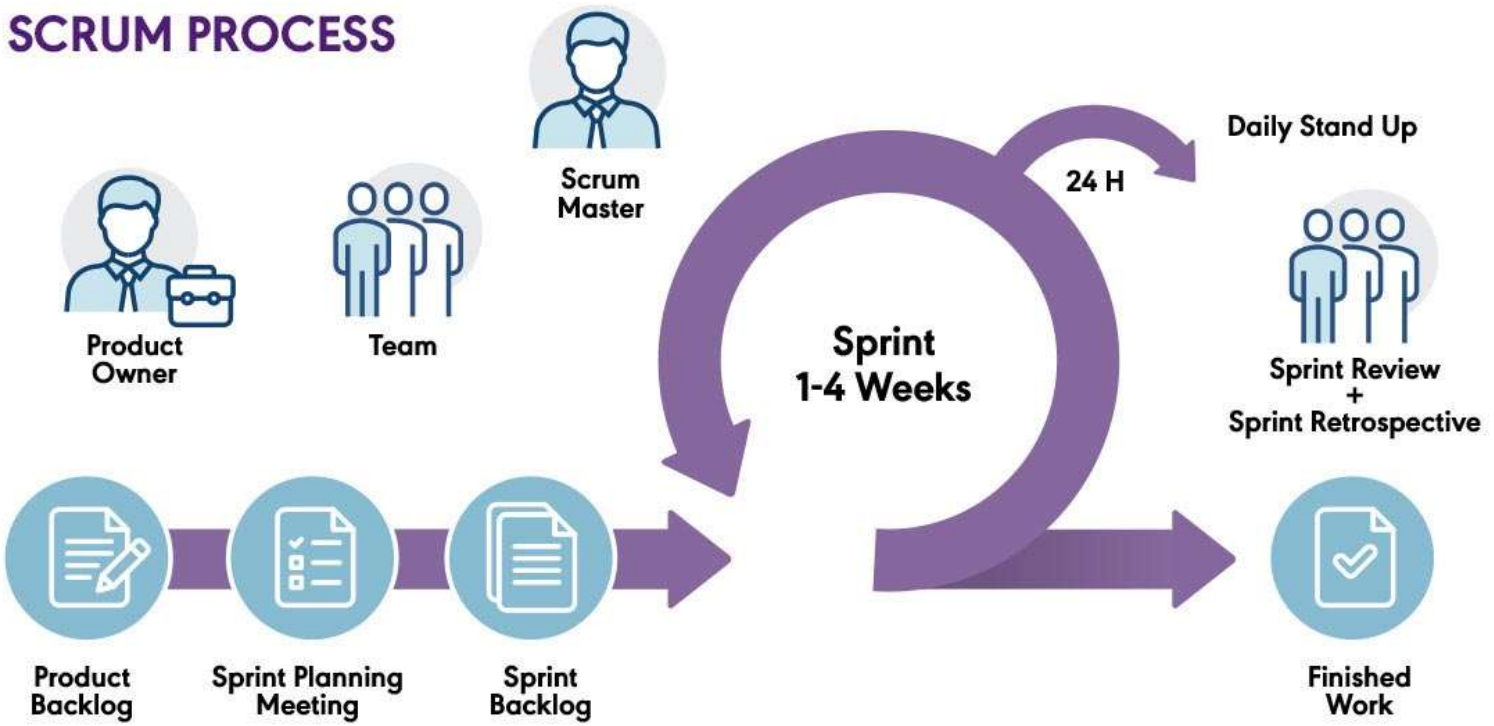
Scrum



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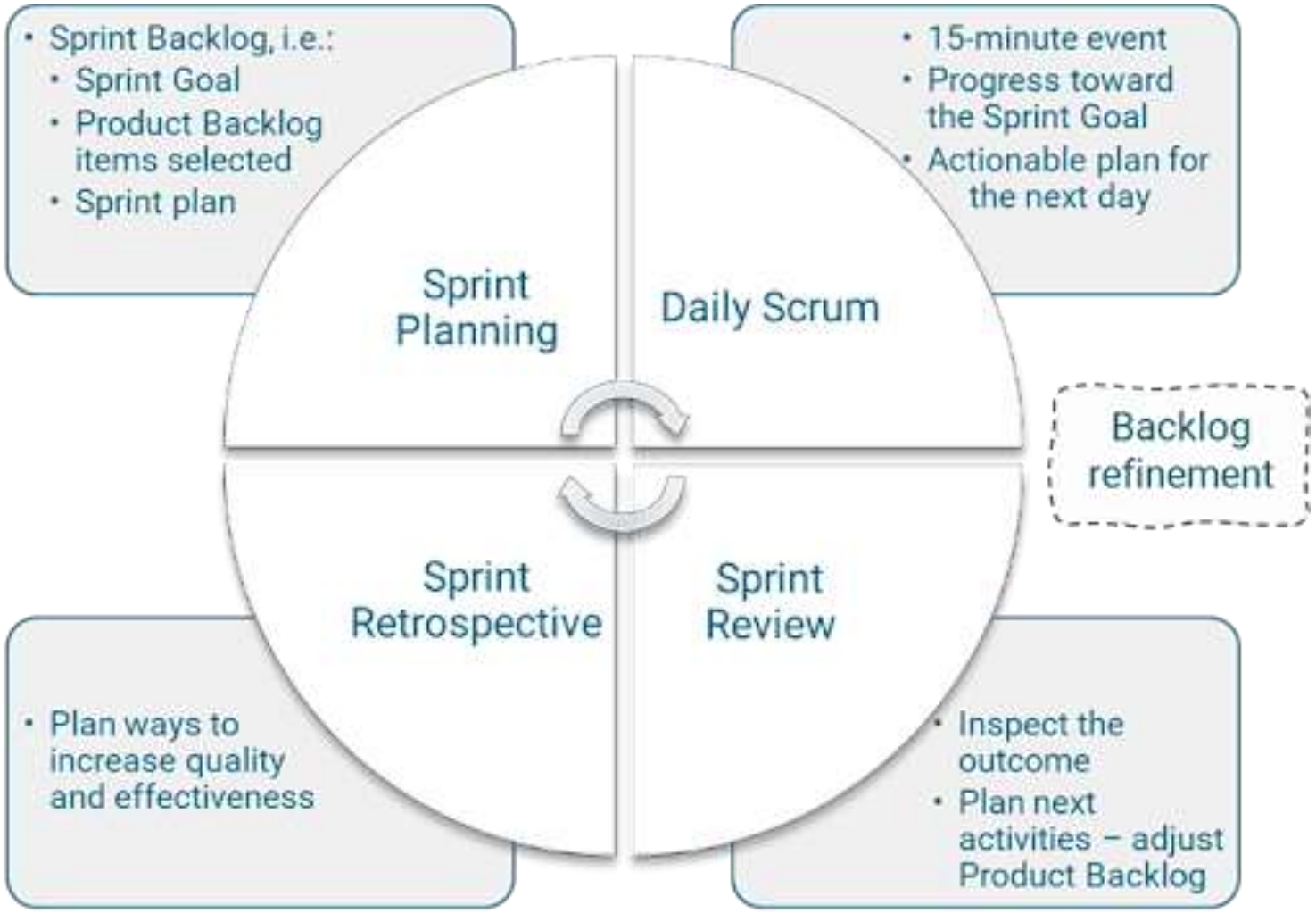
Scrum



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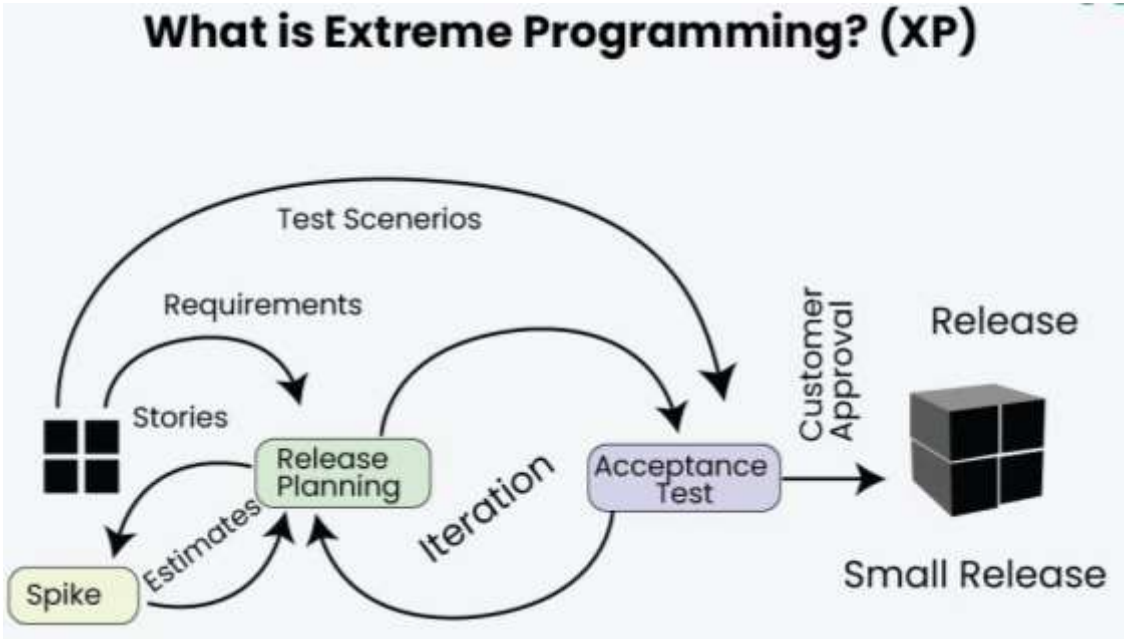
eXtreme Programming

Extreme Programming (XP) is an Agile software development methodology that focuses on delivering high-quality software through frequent and continuous feedback, collaboration, and adaptation. XP emphasizes a close working relationship between the development team, the customer, and stakeholders, with an emphasis on rapid, iterative development and deployment.



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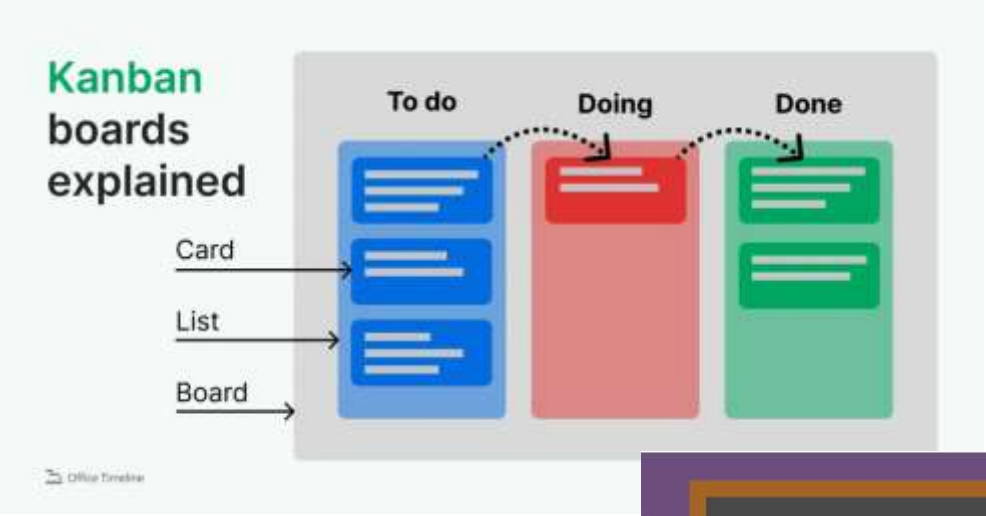
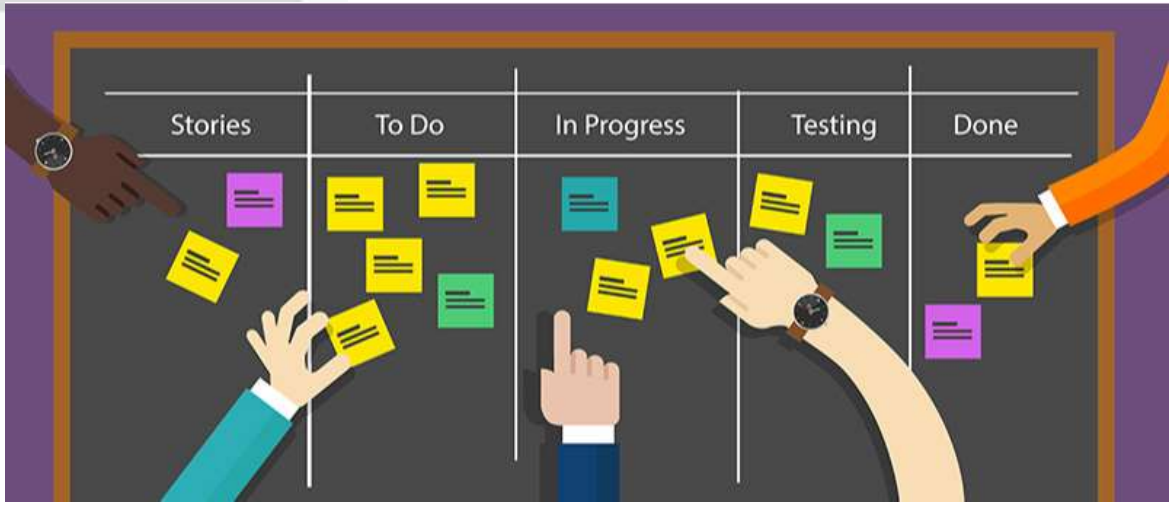
Kanban

Kanban is a visual system for managing work that uses cards to track tasks as they move through a process.



Kanban teams represent every work item as a separate card on the board. The main purpose of representing work as a card on the Kanban board is to allow team members to track progress through its workflow in a highly visual manner.

Kanban means Signboard



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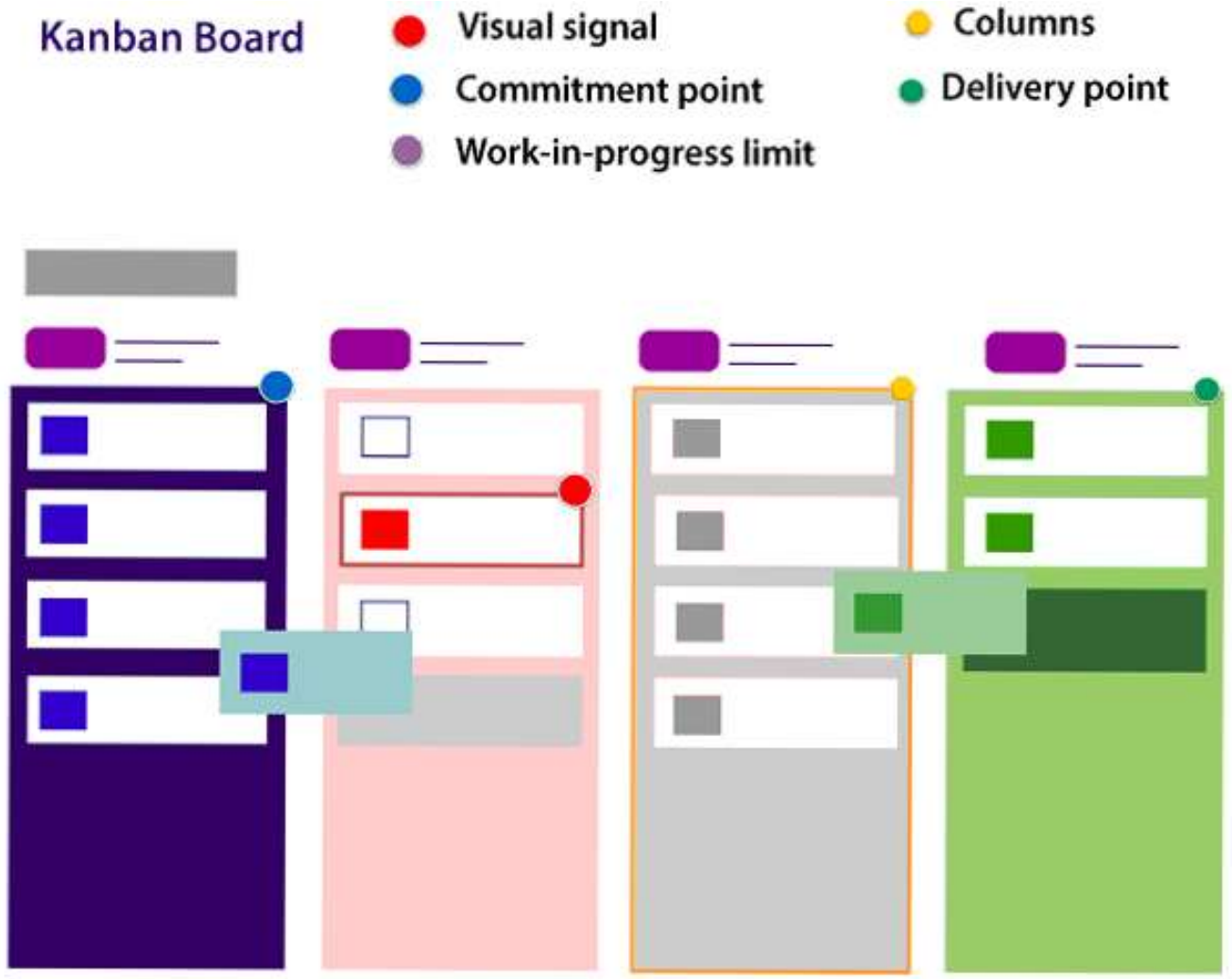
Kanban



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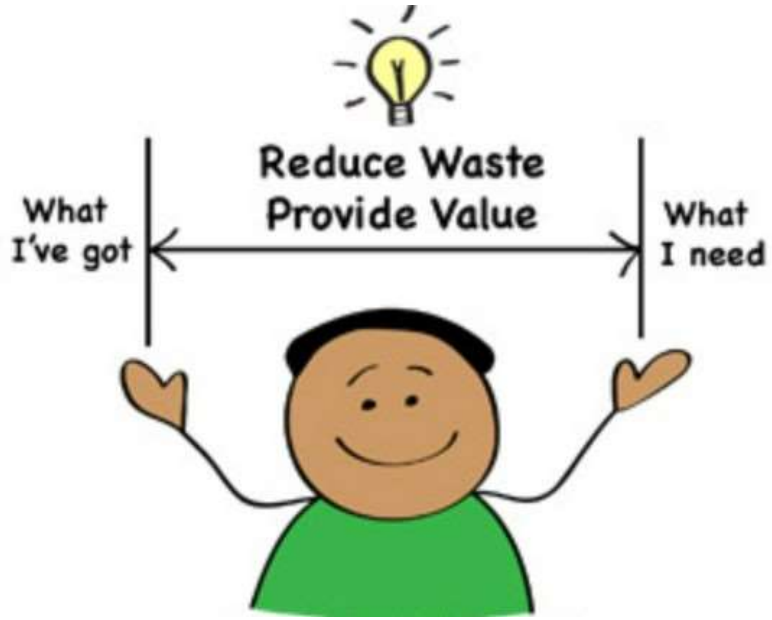
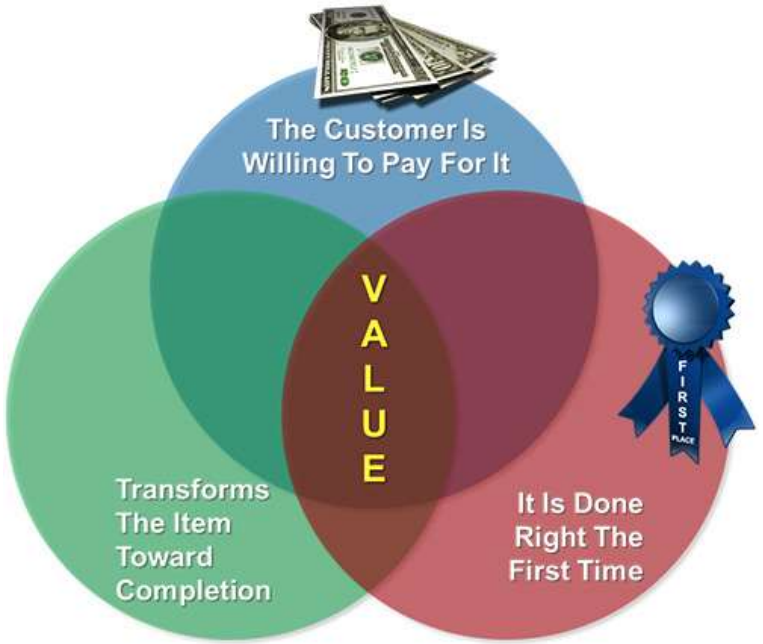
Lean

Lean is a way of thinking about creating needed value with fewer resources and less waste. And lean is a practice consisting of continuous experimentation to achieve perfect value with zero waste. Lean thinking and practice occur together. Lean thinking always starts with the customer.





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Lean

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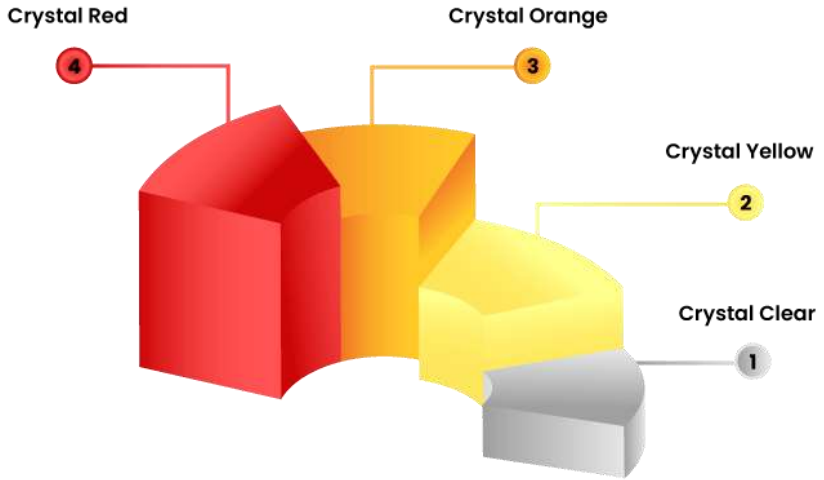
Crystal

Crystal is an agile framework that focuses on people, collaboration, and adaptability. It's a subset of the agile manifesto's core value of prioritizing people and interactions over processes and tools.



AGILE – METHODS

Types of Agile Methodology

There are numerous Agile methodologies that are used by most companies. A few of them

1. **Scrum**
2. **Kanban**
3. **Extreme Programming**
4. **Feature Driven Development**
5. **Lean**
6. **Crystal**

AGILE – METHODS

Different types of agile development frameworks

Each methodology promotes the elements at the root of agile development — flexibility, collaboration, iteration, short release cycles, and immediate feedback.

Crystal Crystal focuses on customization. It empowers agile teams to define the most effective way of collaborating, based on details like the number of team members and the specific type of project you are working on. As a developer, you have the autonomy to adjust processes and optimize workflows to fit your needs.

Dynamic systems development methodology (DSDM) Dynamic systems development methodology (DSDM) combines the principles of time-boxing and collaboration with an emphasis on goals and business impact. It lays out distinct phases for tackling projects, from evaluating feasibility to creating prototypes to implementation. DSDM is typically selected by larger organizations and governments with the budget to cover overhead and implementation.

Extreme programming (XP) Extreme programming is all about collaboration and transparency. XP espouses five key values: communication, simplicity, feedback, courage, and respect. Developers typically engage in pair programming — sitting together and writing code on one machine. Small teams that are co-located and close-knit can benefit from using XP.

Feature-driven development (FDD) Feature-driven development espouses a customer-centric view to software development. By prioritizing user stories, FDD helps teams deliver more features that customers want. Work moves quickly — developers typically build each feature in two weeks. FDD can be useful for companies with a more rigid or hierarchical structure, where lead developers make decisions that impact the rest of the team.

AGILE – METHODS

Different types of agile development frameworks

Kanban Kanban is a visual method for managing workflows. Teams use a **kanban board** to quickly see the status of upcoming work. The goal is to reduce lead time by optimizing the flow of work and limiting the amount of work in progress. Kanban is popular with many types of agile development teams, as well as product and project teams.

Large-scale scrum (LeSS) Large-scale scrum defines 10 principles for deploying and maintaining scrum across an entire company. LeSS was created to support organizations with multiple scrum teams. There are two configurations: one for two to eight scrum teams and one for more than eight scrum teams. LeSS co-creators Craig Larman and Bas Vodde co-wrote a book that outlines how teams can adopt the principles.

Lean software development (LSD) Lean software development promotes a minimalist approach — eliminating waste, ensuring quality, and delivering quickly. Many growing teams rely on lean practices to help them create more functionality faster.

Nexus The Nexus framework was created by Ken Schwaber, one of the co-creators of scrum. It is an agile model that is used in tandem with scrum. Nexus adds an integration team composed of a product owner, scrum master, and integration team members. The nexus team is focused on facilitating dependencies and other issues between teams.

Rapid application development (RAD) Rapid application development emphasizes speed and flexibility. Developers build prototypes, collect user feedback, and iterate often. RAD is ideal for highly skilled teams that need to develop a product quickly (within a few months) and are able to collaborate with customers during the process.

AGILE – METHODS

Different types of agile development frameworks

Scaled agile framework (SAFe®) The Scaled Agile Framework is a set of principles, guidelines, and prescribed levels for implementing agile and lean principles at scale. SAFe is used by more than 70 of the 100 companies at the top of the Fortune 500 list.

Scrum Scrum is the most popular agile development methodology. Teams work in time-boxed sprints of two to four weeks and each person has a clearly delineated role, such as scrum master or product owner. After an initial planning session, teams meet daily and also have retrospectives at the end of each sprint to reflect on how to improve. Scrum is well-suited to small teams that are nimble, cohesive, and willing to pivot often based on stakeholder feedback.

Scrumban Scrumban is a hybrid of scrum and kanban. It was initially developed as a way for teams to transition from scrum to kanban or vice versa. But over time it gained traction as a standalone methodology, not just as a stopgap. The scrum part of scrumban gives teams defined guidelines for roles, planning, and how to run sprints effectively. The kanban part of scrumban offers a way to balance work against resources with the pull system — plus visualizations of work in progress.

What about DevOps? It is also worth mentioning DevOps, an approach to software delivery that grew out of agile philosophy. DevOps emphasizes short development cycles and continuous delivery of high-quality software. The focus is on close working relationships between the development and operations teams. Many principles of DevOps — such as automated testing, short feedback loops, and frequent collaboration — are seen in the agile development methodologies above.

References

Text Books

1. Ken Schawber, Mike Beedle, “Agile Software Development with Scrum”, International Edition, Pearson.

2. Robert C. Martin, “Agile Software Development, Principles, Patterns and Practices”, First International Edition, Prentice Hall.

Web Resources

- https://www.myagilepartner.com/blog/index.php/2019/04/10/scrum-model/
- https://www.edureka.co/blog/what-is-agile-methodology/
- https://intellipaat.com/blog/what-is-agile/
- https://www.aha.io/roadmapping/guide/agile/development-methodologies
- https://www.xpand-it.com/blog/top-5-agile-methodologies/
- https://www.youtube.com/watch?v=-qIXhr9u0Vw

Thank you