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Agile-based Engineering
Lecture 03

IT2080 IT Project

B. Sc. Special Honors in Information Technology

Year 2 – Semester 2

Agenda

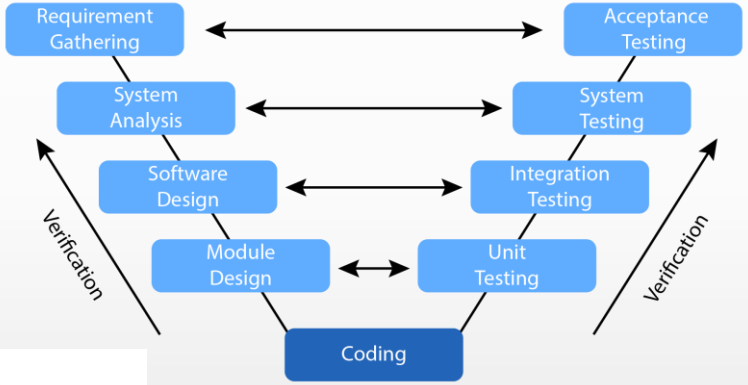
1. Why agile methodologies?
2. Agile approach
3. Agile-based project scope management
4. Agile-based project schedule management
5. Some agile methodologies

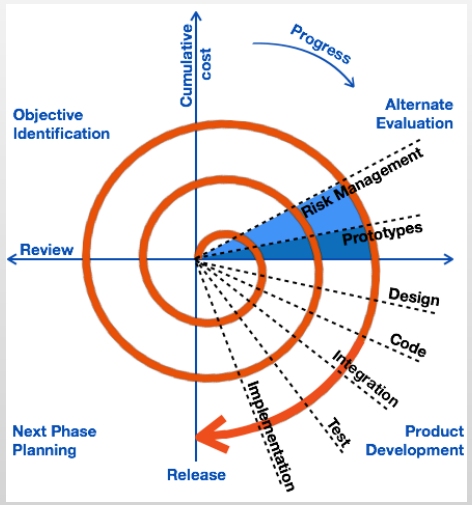
1. Why agile methodologies?

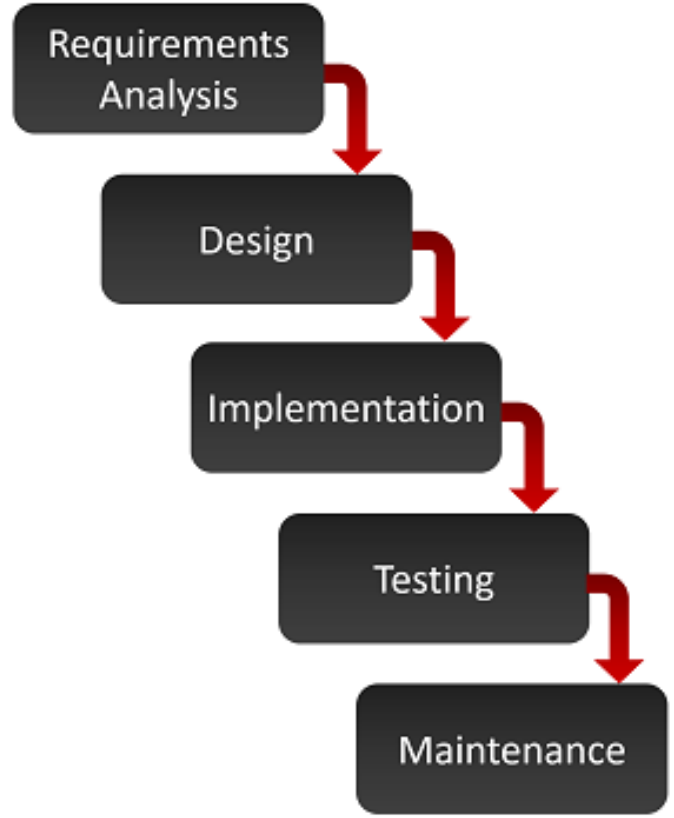
Traditional methodologies

Based on the waterfall model

- Iterative waterfall
- V model
- Incremental
- Iterative







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Traditional methodologies

- Documentation-based
- Depend on processes and tools
- Client’s do not see a product early so, difficult to evaluate
- Engineers and clients may have idea gaps

Lifecycle Concepts: The Development Lifecycles

	Predictive	Iterative	Incremental
Requirements	Fixed	Dynamic	Dynamic
Delivery	Single delivery	Single delivery	Frequent smaller deliveries
Change	Constrained as much as possible	Incorporated at periodic intervals	
Focus	Manage cost	Correctness of solution	Speed
Stakeholder involvement	Only at specific intervals or milestones	Regular involvement	
Work	Generally performed once on the project	Repeated until correct	Performed once per increment
Best suited for	Well understood projects	Scope determined early but can be modified	Series of iterations that successively add functionality

2. Agile approach

Agile Manifesto

Four Paired Values

1. **Individuals and interactions** over processes and tools
2. **Working software** over comprehensive documentation
3. **Customer collaboration** over contract negotiation
4. **Responding to change** over following a plan

https://agilemanifesto.org/

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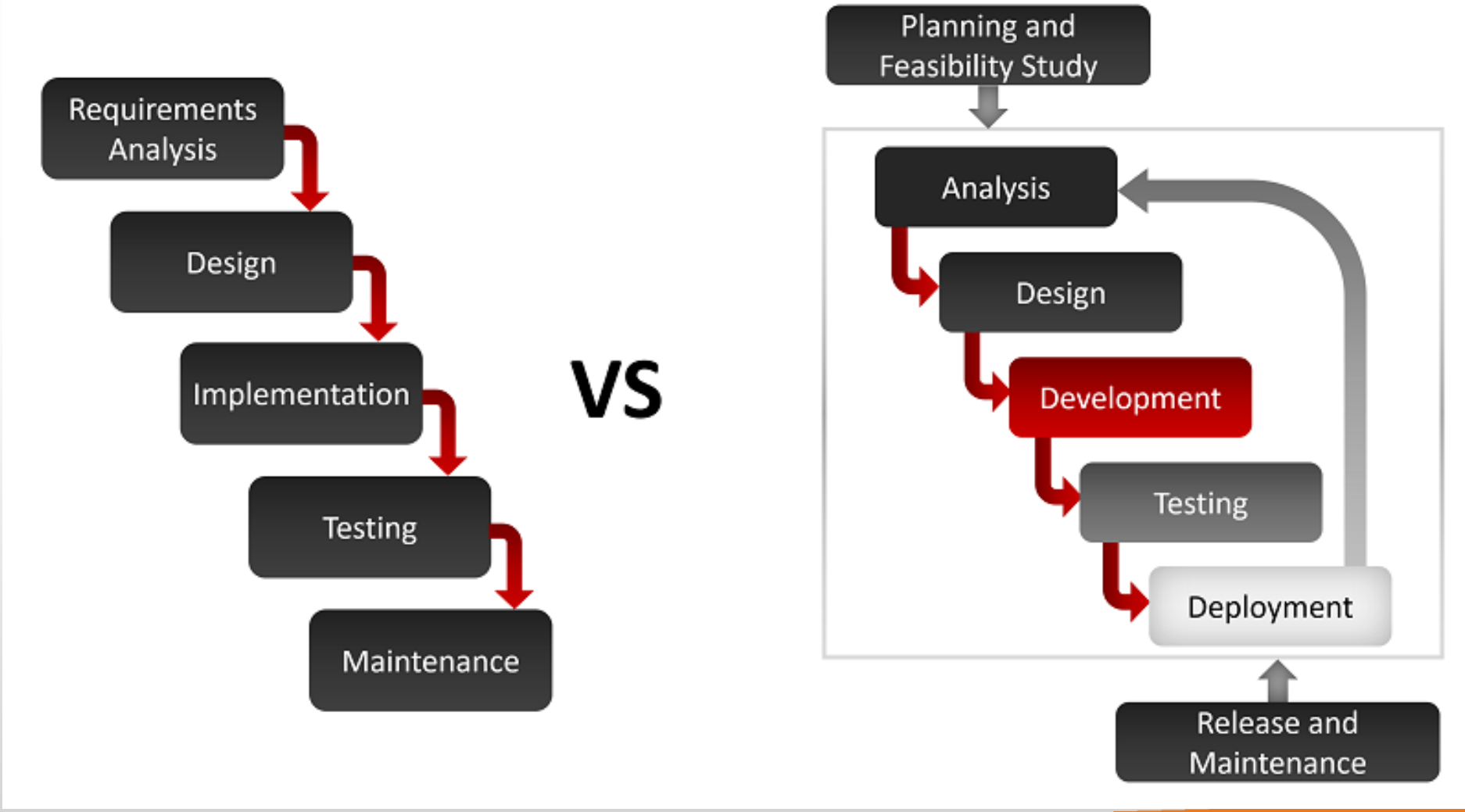
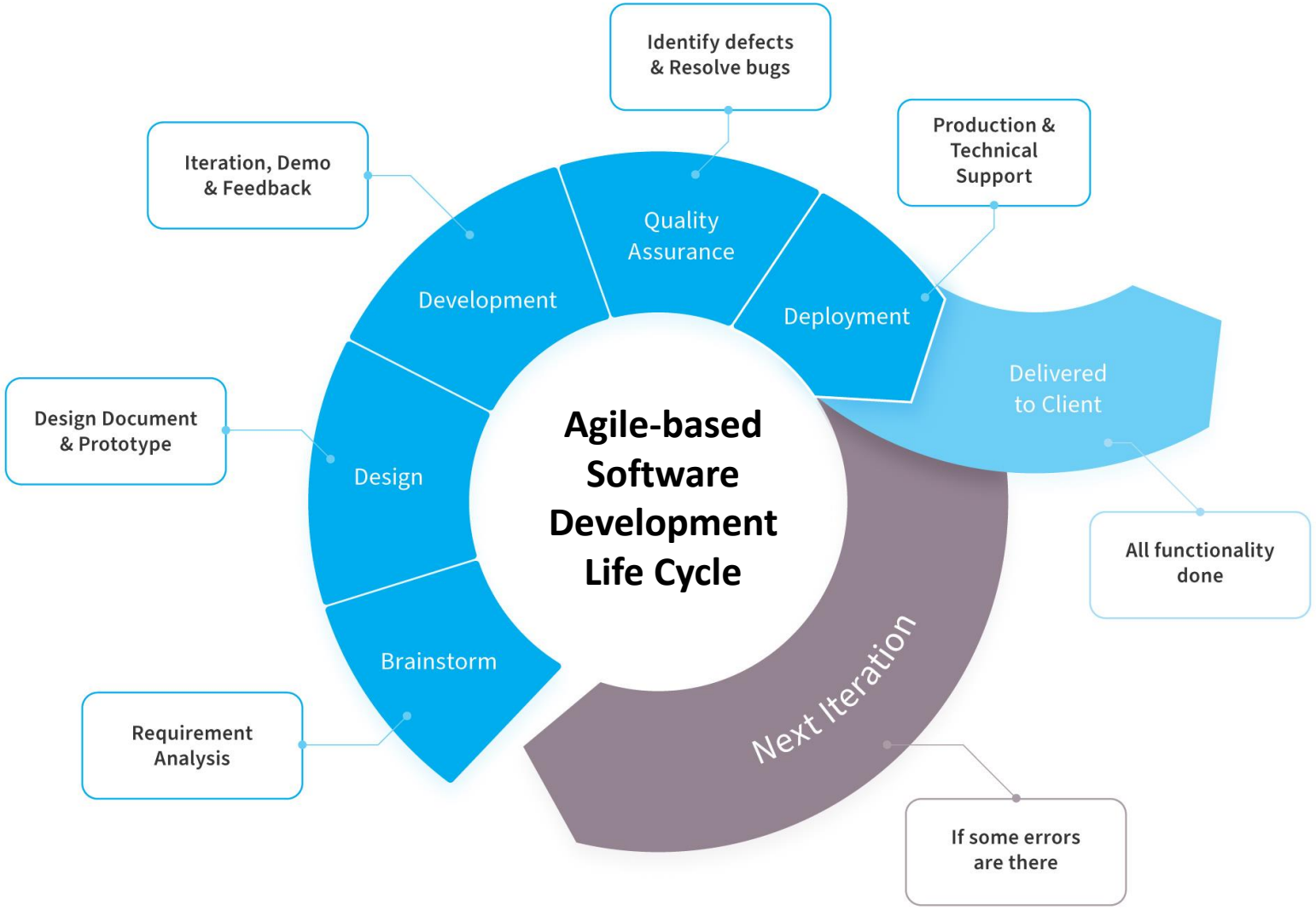
Agile approach over traditional approach

	Predictive	Iterative	Incremental	Agile
Requirements	Fixed	Dynamic	Dynamic	Dynamic
Delivery	Single delivery	Single delivery	Frequent smaller deliveries	Frequent small deliveries (sprints)
Change	Constrained as much as possible	Incorporated at periodic intervals		Incorporated in real-time delivery
Focus	Manage cost	Correctness of solution	Speed	Customer value
Stakeholder involvement	Only at specific intervals or milestones	Regular involvement		Continuously involved
Work	Generally performed once on the project	Repeated until correct	Performed once per increment	Continuously repeated
Best suited for	Well understood projects	Scope determined early but can be modified	Series of iterations that successively add functionality	Rapidly changing environment

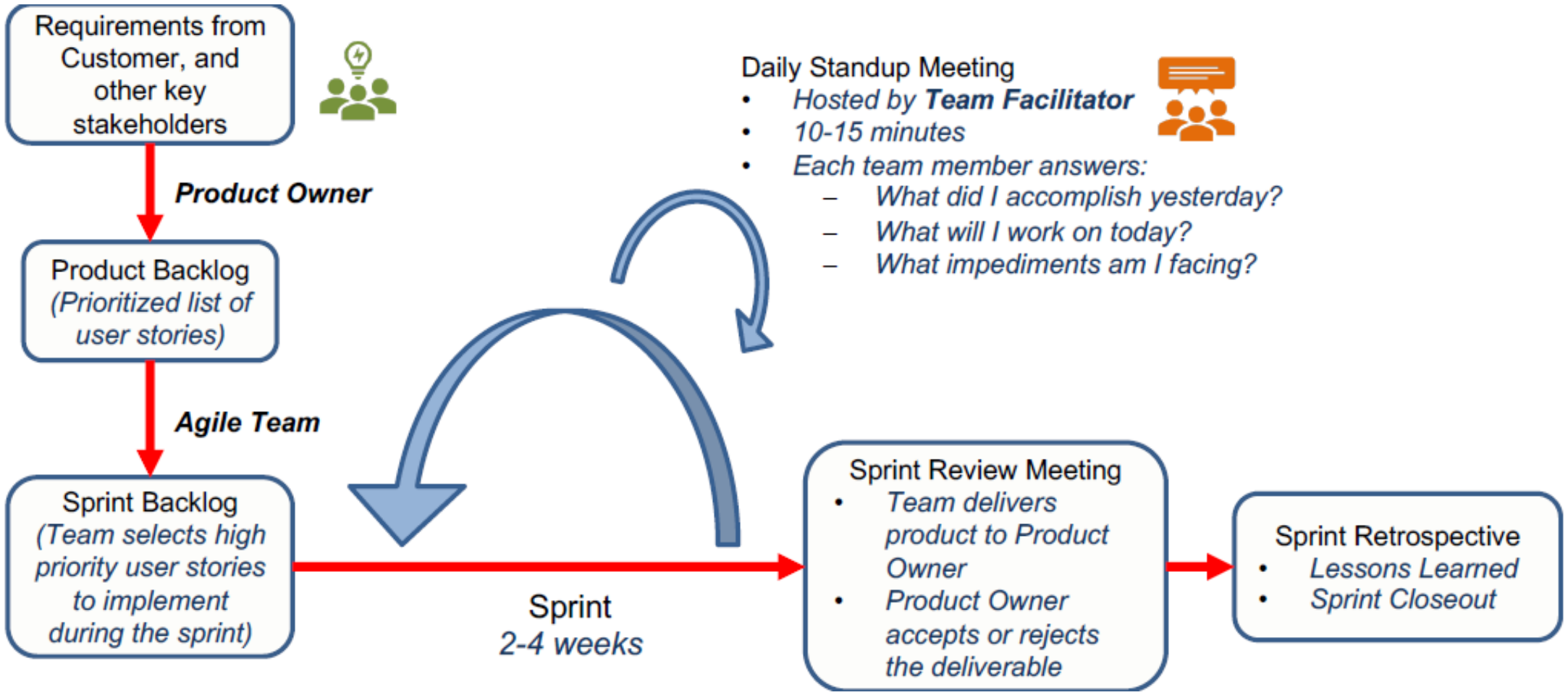
Agile approach over traditional approach



Agile Lifecycle – Iterative and Incremental



Agile Lifecycle – Iterative and Incremental



Agile-based team roles

Agile Team

- *Is self organizing and includes developers, testers, business analysts, designers, etc.*
- *Cross functional with T-shaped skills*

Image credit: Palto/Shutterstock

Agile Coach

- *Mentors and coaches the Agile team members*
- *Optional role (often played by experienced team facilitators)*

Agile-based team roles

Team Facilitator (Scrum Master)

- *Servant Leader who encourages collaboration between team members*
- *Removes impediments and ensures teams have the tools to complete the work*

Product Owner

- *Represents the business (customer)*
- *Prioritizes user stories to create the product backlog*
- *Approves items delivered during the sprint review*

3. Agile-based project scope management

Agile-based project scope management

- Product Backlog
  - *Prioritized list of user stories - by the Product Owner*
  - *Sprint backlog/Iteration backlog created from the Product backlog*
  - *Agile team produces high level relative estimates*
  - *Backlog items can be reprioritized at any time (backlog grooming)*
- User Stories

  "As a <Role>, I want <Functionality>, so that <Business benefit>"

  For example:

  "As a call center analyst, I want to search clients by first and last name so I can look up their records quicker."

Agile-based project scope management

Definition of Done

- Criteria to determine if the work is complete
- Agreed by Product Owner, Agile team and Team Facilitator during Release Planning

Definition of Ready

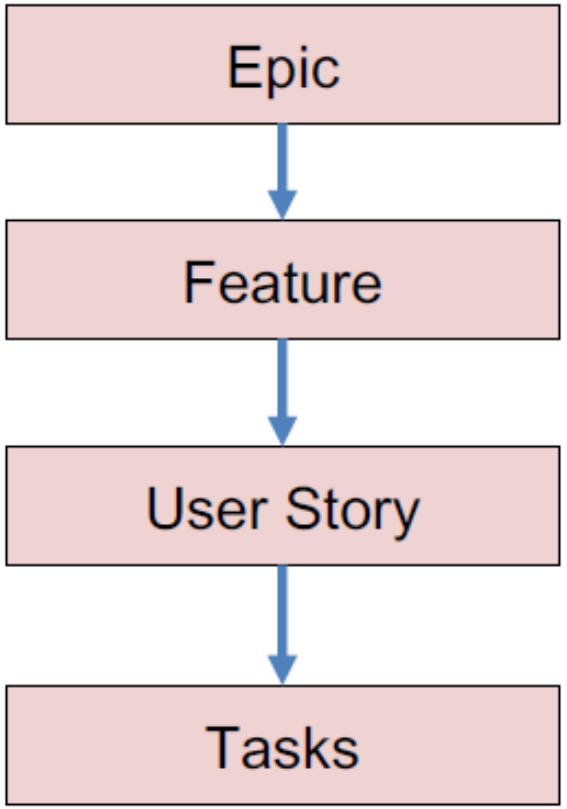
- Checklist to determine that all information is available for the team to start working on the user story
- User stories must be immediately actionable

4. Agile-based project schedule management

Agile-based project schedule management

- Agile uses a Product Roadmap (not a schedule)
- Iterative Scheduling with a Product Backlog
  - *User stories are prioritized based on priority and time*
  - *New stories can be added to the backlog*
  - *Does not always work well if there are complex dependency relationships*
- On-demand Scheduling
  - *Team members "pull" work from a queue*
  - *Based on Kanban and Lean methodologies*
  - *Works best when activities can be divided into equal sizes*
  - *Does not always work well if there are complex dependency relationships*

Agile-based project schedule management



Very large user story

Capabilities

Functionality

Several tasks needed to fulfill a User story

Estimating Methods, Prioritization, and Consensus Gathering

Estimating Methods – Agile

- T-shirt Sizing
  - *Follows sizes of t-shirts such as: XS, S, M, L, XL*
- Story Pointing
  - *Uses the Fibonacci Sequence of numbers*
  - *1, 2, 3, 5, 8, 13, 21, 34, 55*
- Planning Poker
  - *Uses a deck of cards with a modified Fibonacci sequence*

Estimating Methods, Prioritization, and Consensus Gathering

Prioritization (Agile)

- MoSCoW Analysis
  - *Must Have*
  - *Should Have*
  - *Could Have*
  - *Won't Have*
- Kano Model
  - *Satisfies vs. delights vs. dissatisfies vs. indifferent*
- Paired Comparison Analysis
  - *Prioritization of successive pairs*
- 100 Point Method
  - *Prioritization by spreading points across user stories*

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Estimating Methods, Prioritization, and Consensus Gathering

Consensus Gathering (Agile)

- Fist of Five
  - *Five fingers = Agree; Fist = Disagree*
  - *1-4 fingers = levels of agreement and disagreement*
- Roman Voting
  - *Thumbs up; Thumbs down*

- Polling
  - *Share a point of view: if unanimous then move on*
  - *If objections raised, then work to solve the objection*
- Dot Voting
  - *Team members use sticky dots to prioritize*

5. Some agile methodologies

Some agile methodologies

Kanban

- Kanban is a popular framework used to implement agile and DevOps software development.
- It requires real-time communication of capacity and full transparency of work.
- Work items are represented visually on a Kanban board, allowing team members to see the state of every piece of work at any time.

https://youtu.be/iVaFVa7HYj4

Some agile methodologies

Scrum

- Scrum is a framework that helps teams work together.
- Scrum encourages teams to learn through experiences, self-organize while working on a problem, and reflect on their wins and losses to continuously improve.

https://youtu.be/b02ZkndLk1Y

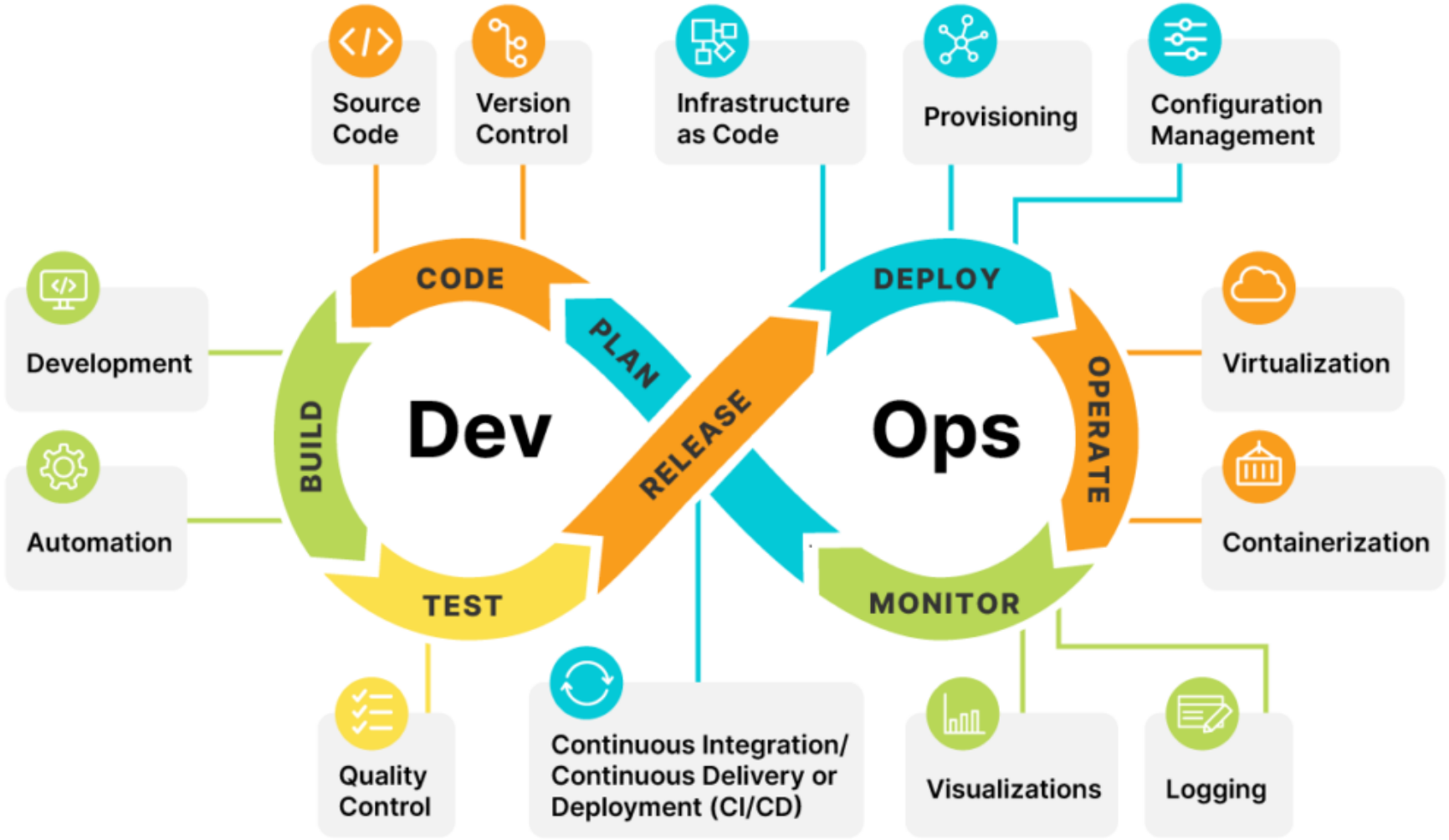
Some agile methodologies

- “Kanban vs. scrum” is a discussion about two different strategies for implementing an agile development or project management system.

- Kanban methodologies are continuous and more fluid, whereas scrum is based on short, structured work sprints.

Some agile methodologies

DevOps



Summary

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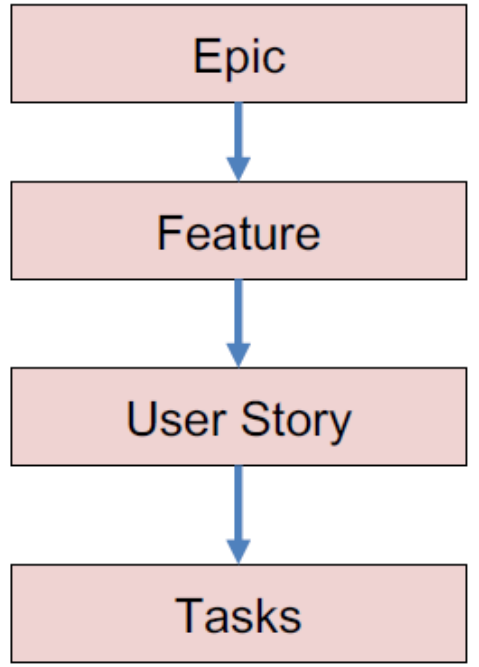
2. Agile approach
3. Agile-based project **scope management**
4. Agile-based project **schedule management**
5. Some agile methodologies



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