

# Agile Software Development Practices

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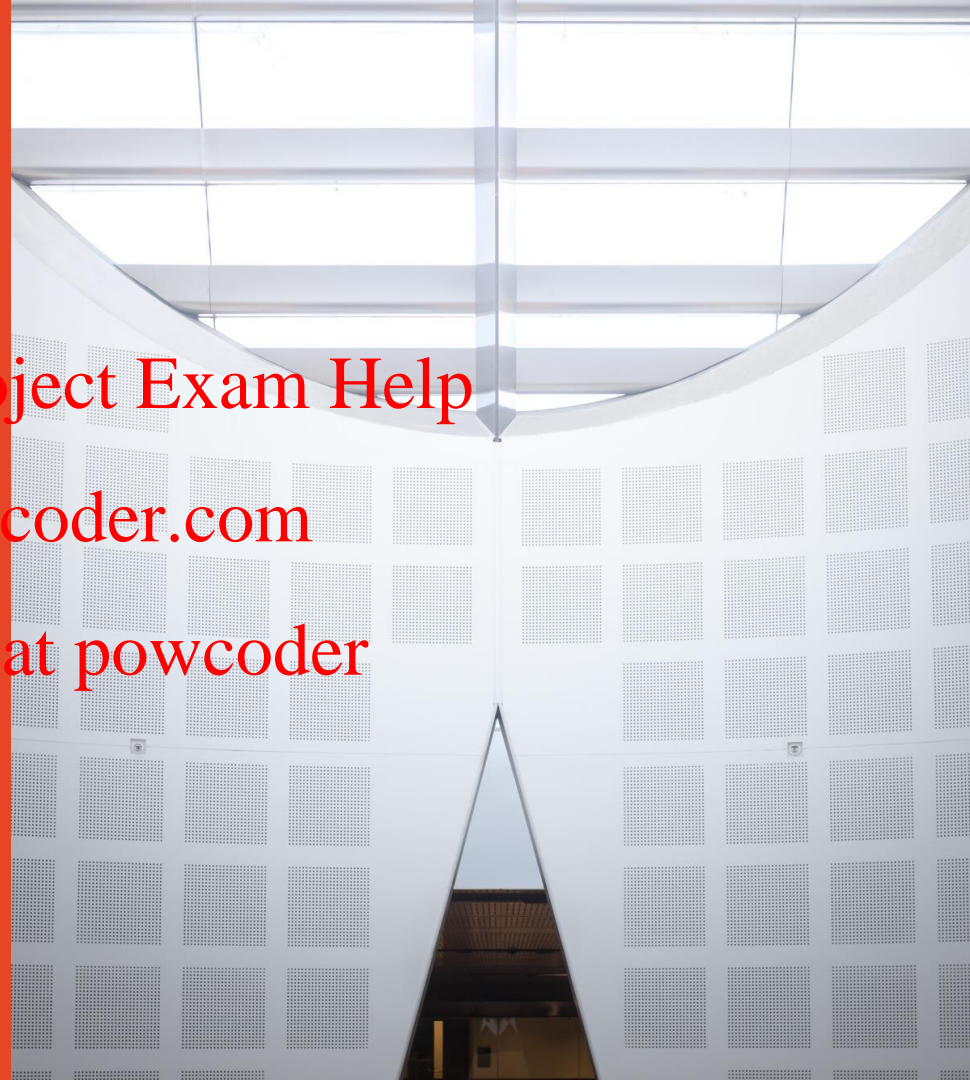
Agile Methods – Scrum

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# Agenda

- Agile Manifesto
  - Values and principles
- Agile Methods
  - Scrum, XP
- Scrum
  - Definition and Values
  - Teams and Roles
  - Events
  - Artifacts
  - Measuring progress

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# Agile Process

- Agile advocates believe:

- Current software development processes are too heavy-weight or cumbersome

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- Current software development is too rigid

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- More active customer involvement needed

# Agile Process

- Agile methods are considered
  - **Light-weight**
  - **People-based**
- Several agile methods
  - Extreme Programming (XP), Scrum
- Agile Manifesto closest to a definition
  - Set of principles
  - Developed by Agile Alliance

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# Agile Manifesto – Revisit

- “We are uncovering better ways of developing software by doing it and helping others do it. Through this work we have come to value”

- Individuals and interactions over processes and tools
- Working software over comprehensive documentation
- Customer collaboration over contract negotiation
- Responding to change over following a plan

Agile Manifesto: <http://agilemanifesto.org/>

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# 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. **Businesspeople** and **developers** must **work together daily** throughout the project

# Agile Principles

5. Build projects around **motivated individuals**. Give them the **environment and support** they need, and **trust** them to get the job done

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6. The most efficient and effective method of **conveying information** to and within a development team is **face-to-face conversation**

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7. **Working software** is the primary **measure of progress**.

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8. Agile processes promote **sustainable development**. The sponsors, developers, and users should be able to maintain a **constant pace** indefinitely.

# Agile Principles

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



# Agile Methods

- Shared goal; delivering valuable software iteratively
- Might have some different practices to achieve this goal
- Examples of Agile methods:
  - Scrum
  - Extreme Programming (XP)
  - Lean software development
  - Kanban (lean development)

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# eXtreme Programming (XP)

- Development and delivery of **very small increments** of functionality
- Relies on **constant code improvement**, user involvement in the development team and pair wise programming.  
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- Emphasizes **Test Driven Development (TDD)** as part of the small development iterations.  
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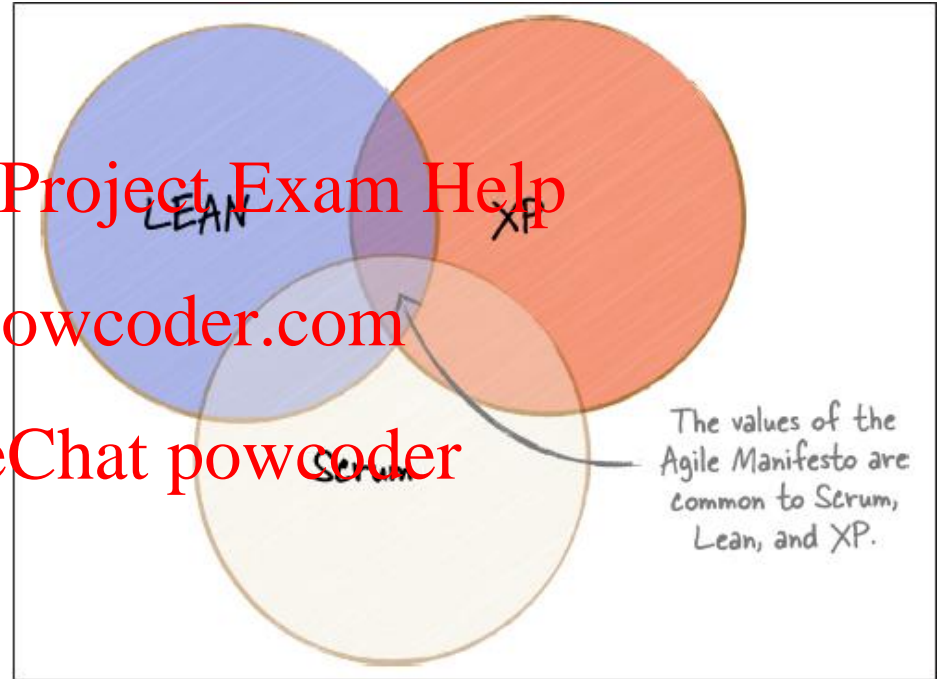
# Agile Methods

The common aspects among  
different Agile methods

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# Scrum

- Method for “product development” lifecycle from H. Takeuchi and I. Nonaka (1986)
  - Speed and flexibility
- Used for software development by K. Schwaber, J. Sutherland and others
- Extensively used in various organizations (e.g., manufacturing, product development, software, hardware)

[https://en.wikipedia.org/wiki/Scrum\\_%28software\\_development%29](https://en.wikipedia.org/wiki/Scrum_%28software_development%29)

# Scrum (Software Development)

- Managing software development to deliver products with highest value
- Continuous improvement of the product, the team and the working environment
- Scrum is lightweight, simple to understand but **difficult to master**

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[https://en.wikipedia.org/wiki/Scrum\\_%28software\\_development%29](https://en.wikipedia.org/wiki/Scrum_%28software_development%29)

# Scrum Theory

- Based on '*empirical process control*' theory
  - Knowledge from experience and decisions based on knowns
  - Optimize predictability and control risks
- Pillars of empirical process control
  - *Transparency*: the process visible to those responsible for the outcome
  - *Inspection*: frequently inspect Scrum artifacts and progress to detect variances
  - *Adaptation*: adjust the process to the acceptable limits

# Scrum Values

- Commitment: personally commit to achieving the goals of the Team
- Courage: members can do the right thing and work on tough problems
- Focus: everyone focuses on the work of the iteration and the team's goals
- Openness: the team and the stakeholders agree to be open about the work and the challenges with performing the work
- Respect: team members respect each other to be capable, independent

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# Scrum Practices

- Teams and their roles
  - Product Owner, Scrum Master, Dev Team
- Events
  - Sprint, Sprint Planning, Daily Scrum, Sprint Review, and Retrospective
- Artifacts
  - Product Backlog, Sprint Backlog, Increment
- Project estimation and Sprint estimation
- Rules govern the relationships between roles, events and artifacts

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**The Scrum Team**

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# Scrum Team

## – Scrum Team

- Small enough to be agile
- Cross-functional
- Self-organizing
- Deliver products iteratively and incrementally, maximizing opportunities for feedback

## – Team roles

- Development Team
- Product Owner (one person!)
- Scrum Master (one person!)

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# Scrum Team – The Product Owner

- **Product Owner:** maximize value of the product and the work
  - Understand requirements and its priorities
  - Manage the Product Backlog (only person)
    - Can assign it to the development team, but still accountable
- **Managing the product backlog:**
  - Record product backlog items and order it
  - Optimize the value of the work the development team performs
  - Ensure transparency and clarity of the product backlog
  - Ensure the development team understands product backlog

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# Scrum Team – The Development Team

- Professionals who do the work of delivering a potentially releasable product at the end of each iteration
- Creates the increment (only by dev team)
- What's the optimal team size? Discuss
  - Small enough and large enough!
  - Less than 3 members?
  - More than 9 members

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# Scrum Team – The Development Team

- Professionals who do the work of delivering a potentially releasable product at the end of each iteration
- Creates the increment (only by dev team)
- What's the optimal team size? Discuss
  - Small enough and large enough!
  - Two-Pizza team (4-9 members)

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# Scrum Team – The Development Team

- Self-organizing: turns product backlog into increments of potentially releasable functionality

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- Cross-functional: skills mix necessary to create a product

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- No sub-teams: regardless of domains that need to be addressed

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- Whole team is accountable
- No titles for Dev team members

# Scrum Team – The Scrum Master

- Keeps the team focused on using Scrum properly (“*servant-leader*”)
  - Everyone understands Scrum rules and values (coaching)
  - Remove impediments
  - Helps those outside the Scrum team which of their interactions with the Scrum team are/aren’t helpful
  - Maximize the value created by the Scrum team through changing team interactions

# Scrum Team – The Scrum Master

- Serves the product owner to ensure;
  - Mutual understanding of goals, scope and product domain
  - Effective ways for managing the product backlog
  - The Scrum team understands the need for clear and concise product backlog items; <https://powcoder.com>
  - Arranging the Product Backlog to maximize value;
  - Understanding and practicing agility
  - Facilitating Scrum events as requested or needed



# Scrum Team – The Scrum Master

- Serves the Dev team to ensure:
  - Be self-organizing and cross-functional;
  - Create high-value products;
  - Remove impediments to the Dev team's progress;
  - Facilitating Scrum events as requested or needed; and,
  - Coaching the Dev team

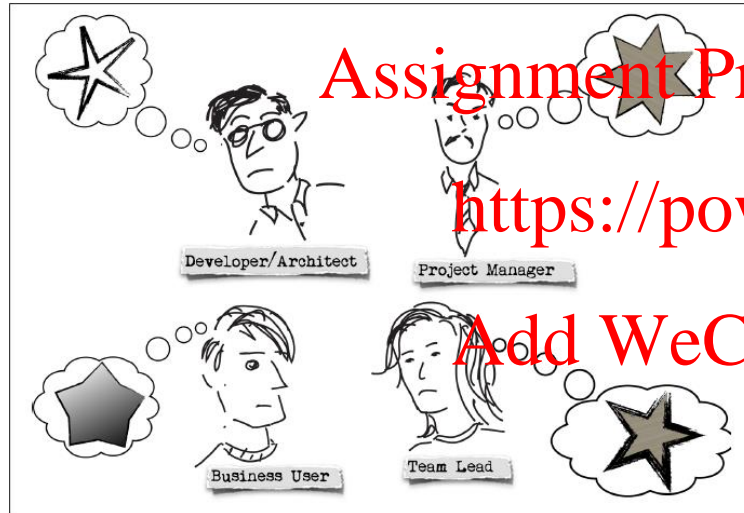
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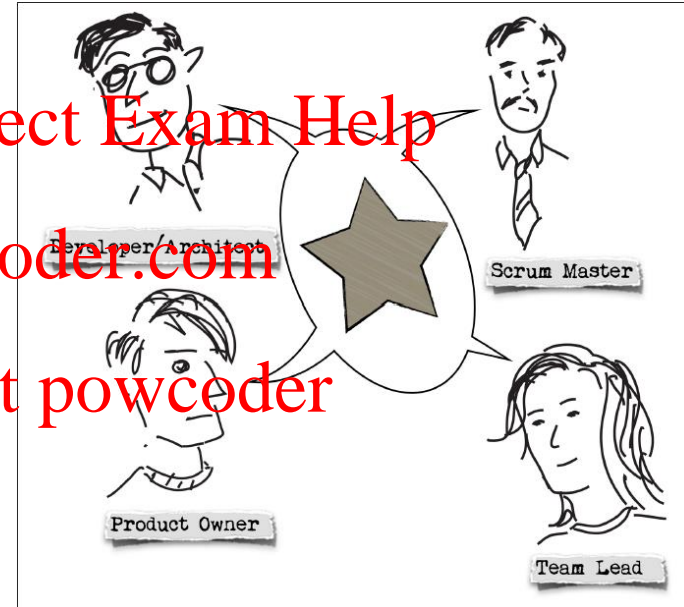
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# Scrum Team – Interactions

Which of the following best describe(s) Scrum team in terms of roles and interactions?



Team A



Team B

# The Scrum Events

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# Scrum Events

- To create regularity and minimize the need for meetings
- Time-boxed (max. duration)
- Cannot be changed once an iteration (sprint) has started
- Enable transparency and a formal approach to inspect and adapt work

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# Scrum Events – The Sprint

- A development iteration (one cycle)
  - Useable and potentially releasable product increment is created
- Time-boxed (typically 2-4 weeks)
  - Too long sprints may lead to changes in the definition
- Sprints have consistent durations during the product development
- Consists of the Sprint Planning, Daily Scrum, the Development Work, the Sprint Review and the Sprint Retrospective

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# Scrum Events – Sprint Planning

- Identify the Sprint Goal (items from the “Product Backlog”)
- Identify work to be done to deliver this
- Two-parts meeting (Scrum Master (SM), Product Owner (PO) and Dev team)
  - **Before meeting:** PO prepares prioritized list of most valuable items
  - **Part 1** (*max. 4 hours*): PO & Dev team select items to be delivered at the end of the Sprint based value and team’s estimate of how much work needed
  - **Part 2** (*max. 4 hours*): Dev team (with the PO’s help) identify the individual tasks they’ll use to implement those items
- **Output:** Sprint Backlog (the items selected by the team for development)

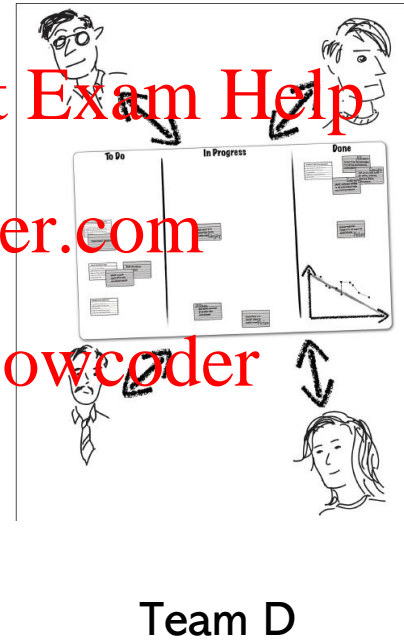
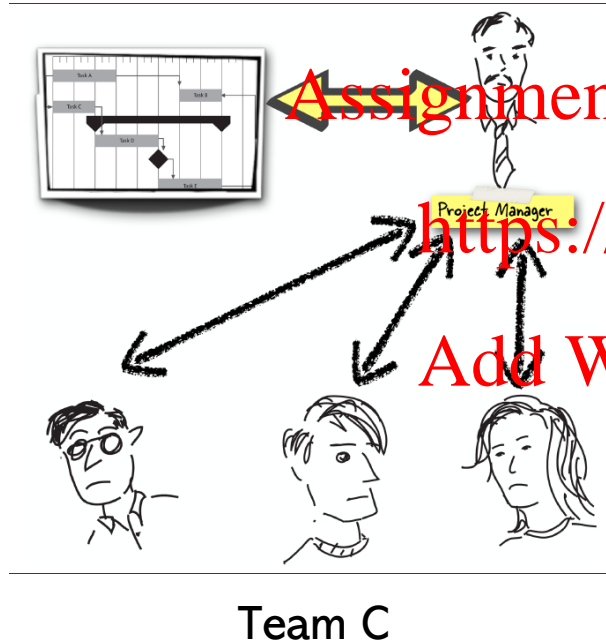
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# Scrum – Sprint Planning

Which team organization better describes the Scrum Sprint/iteration planning?



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# Scrum Iteration Process

- Sprint (development iteration)
  - Timeboxed (typically 2–4 weeks – no more than one month)
  - Create a “Done” usable, potentially releasable product
- A *Sprint* (Scrum iteration) contains a list of tasks and work product outputs that will be done in defined duration
  - At the beginning of the Sprint duration, each team member has a pretty good idea of what they will be working on
  - Management should not add new work product outputs to the Sprint – should be add to the Product Backlog instead

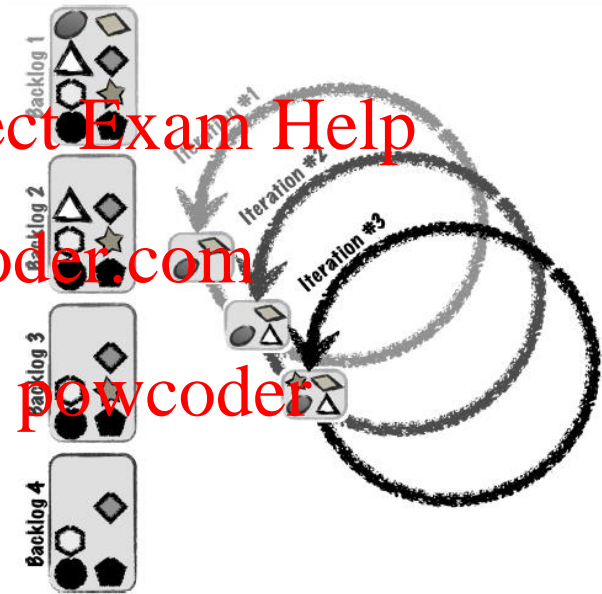
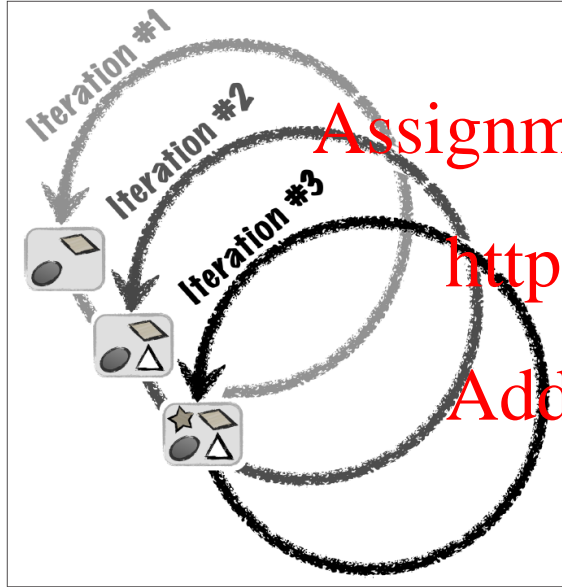
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# Scrum Iteration Process



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# Scrum Events – During Sprint

## – Daily Scrum meeting

- To ensure problems and obstacles are visible to the team
- Timeboxed *15 minutes* (same time and place each day)
- All team members including Scrum Master and Product Owner must attend
- Interested *stakeholders* may attend as observers
- Each briefly answers three questions:
  - What did I do yesterday that helped the development team meet the Sprint Goal?
  - What I will do today to help the development team meet the Sprint Goal?
  - do I see any obstacles that presents me or the Dev team to meeting the Sprint Goal?
- No problem-solving during the meeting
  - Follow-up meetings if further discussion is required

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# Scrum Events – During The Sprint

- **Development Work; the Dev team**

- Builds the items in the *Sprint Backlog* into working software

- Should inform the Product Owner if they are overcommitted or can add extra items if time allows

- Must update the *Sprint Backlog* and keep it visible to everyone

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# Scrum Events – During The Sprint

## The Sprint Review

- End of Sprint meeting (max. 4-hours)
  - Dev team demonstrates working software to customers/stakeholders
    - Completed, tested & accepted features (by PO)
    - Functional working software
  - Stakeholders share their feedback/thoughts about the demo
  - The PO updates the Product Backlog with any changes for next Sprint planning
  - The SM ensures participants understand its purpose, and maintain within the time-box
- Output: revised *Product Backlog* and probable items for next iteration

# Scrum Events – Retrospectives

- Opportunity for the team to inspect itself and create plan for improvements
  - Inspect how the last Sprint went; people, relationships, process, & tools;
  - Identify and order the major items that went well and potential improvements; <https://powcoder.com>
  - Create a plan for implementing improvements to the way the Scrum Team does its work

# Scrum Events – Retrospectives

## **Retrospective meetings** (max. 1-3 hours)

- The SM and the Dev. team (PO)
- Each to answer 2 questions:
  - What went well during the Sprint?
  - What can be improved in the future?
- The SM notes improvements that should be added to the Product Backlog
  - E.g., set-up a better build server, better design principles, changing office layout
- Output: identified improvements to be implemented in the next Sprint (adaptation)

# Scrum Events – Retrospectives

The Retrospectives Prime Directive:

***Regardless of what we discover, we understand and truly believe that everyone did the best job they could, given what they knew at the time, their skills and abilities, the resources available, and the situation at hand.***

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(from Norm Kent's book on Project Retrospectives  
See also <http://www.retrospectives.com> )

- Why this rule?

# Scrum Artifacts

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# Scrum Artifacts – Product Backlog

- Set of all features and sub-features to build the product (the “Plan” for multiple iterations)

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- Functions, requirements, enhancements and fixes identified from previous Sprints

- Maintained by the PO in collaboration with customers and team

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- The source of the product requirements

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- The items ordered by priority – value to the customer

# Scrum Artifacts – Product Backlog

- What does a Product Backlog look like?
  - Simple spreadsheet
  - Some items are “**customer features**”
    - E.g., user screen, interaction scenario or use case, a new report/algorithm
  - Some items are **internal tasks** that contribute to the value of the product
    - *Can a design document be an item?*
  - Effort estimates

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# Scrum Artifacts – Sprint Backlog

- Set of items selected for the Sprint, a plan for delivering the product increment and realize the Sprint Goal

- Identified by the Dev. team

- Includes at least one high-priority improvement from previous Sprint

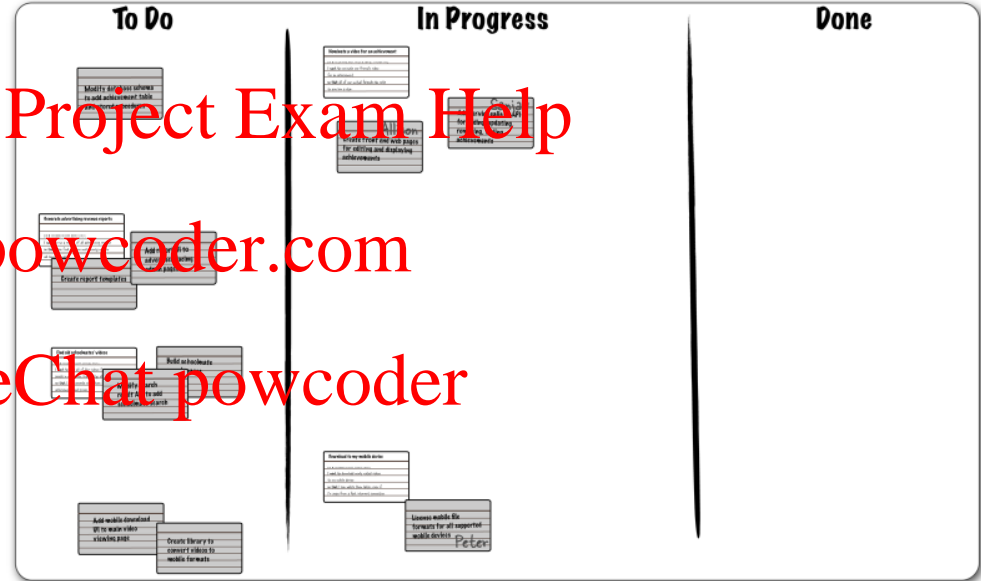
- The Dev. team adds new work to the Sprint Backlog

- The estimated remaining work is updated once an item is completed

- Visible to anyone and to be modified by the Dev. team

# Sprint Backlog – Example

- Typically divided into 3 sections; **To Do, In Progress, Done**
- Tools to support Sprint planning and monitoring; e.g., Trello



# Sprint Backlog – Example

–JIRA Agile – Scrum Board



# Scrum Estimation

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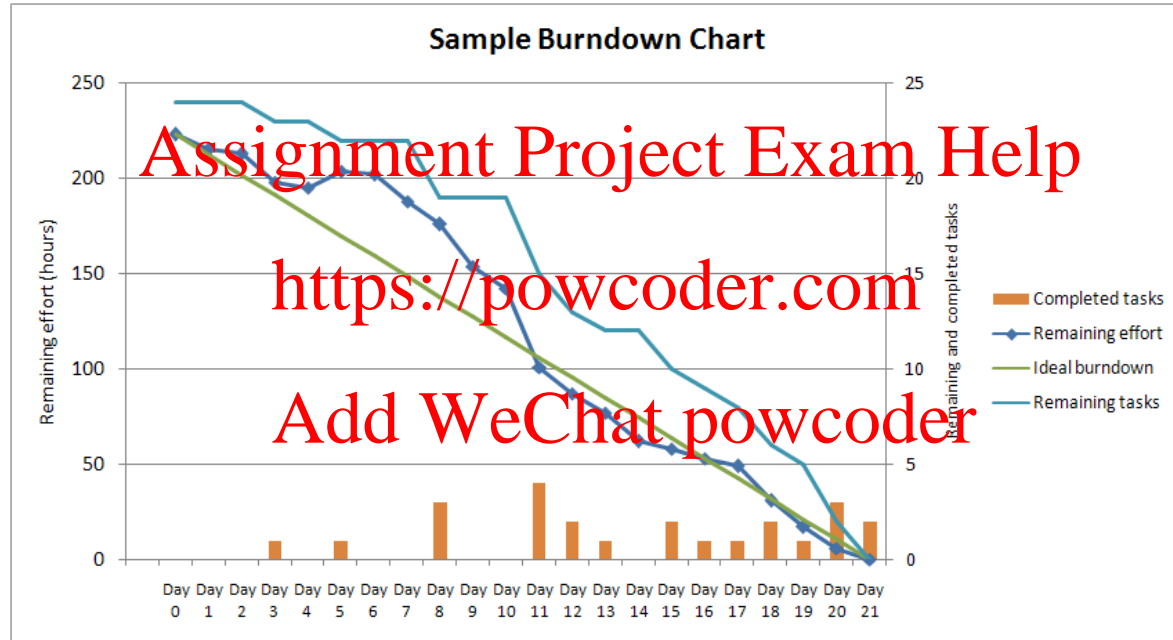
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# Scrum Artifacts – Progress Monitoring

- Total work remaining to reach the goal – the product owner tracks this at least every Sprint Review
  - Compare with previous Sprints to assess progress toward projected work (transparent to all stakeholders)
  - Forecasting progress through burn-downs, burn-ups or cumulative flows
    - It's an estimate – there're some risks of unknowns

# Scrum Artifacts – Burn-down Chart (Example)



<https://commons.wikimedia.org/wiki/File:SampleBurndownChart.png>

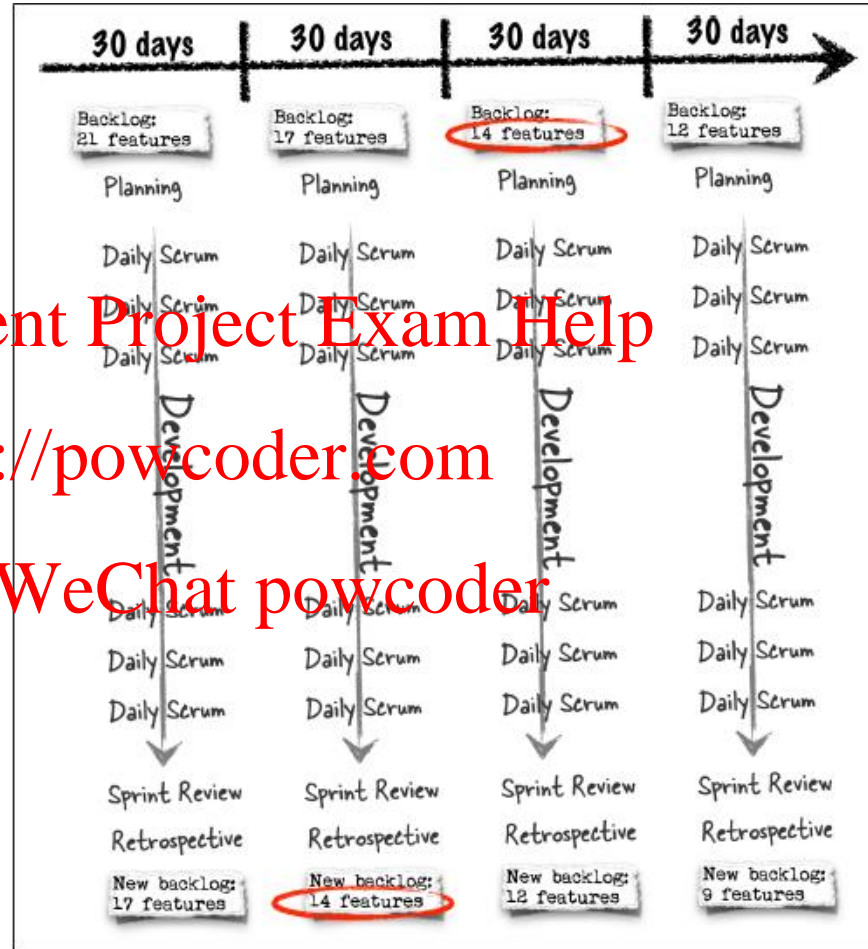


# Summary of Scrum

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# References

- Andrew Stellman, Margaret C. L. Greene 2014. Learning Agile: Understanding Scrum, XP, Lean and Kanban (1<sup>st</sup> Edition). O'Reilly, CA, USA.

## Assignment Project Exam Help

- Ken Schwaber and Jeff Sutherland, The Scrum Guide: The Definitive Guide to Scrum: The Rules of the Game.

<https://www.scrumguides.org/docs/scrumguide/v2017/2017-Scrum-Guide-US.pdf#zoom=100>

- Agile Alliance. [agilealliance.info]

- Scrum Software Development.

[\[https://en.wikipedia.org/wiki/Scrum\\_%28software\\_development%29\]](https://en.wikipedia.org/wiki/Scrum_%28software_development%29)