Agile Software Development Practices (SOFT2412)

SCRUM Method

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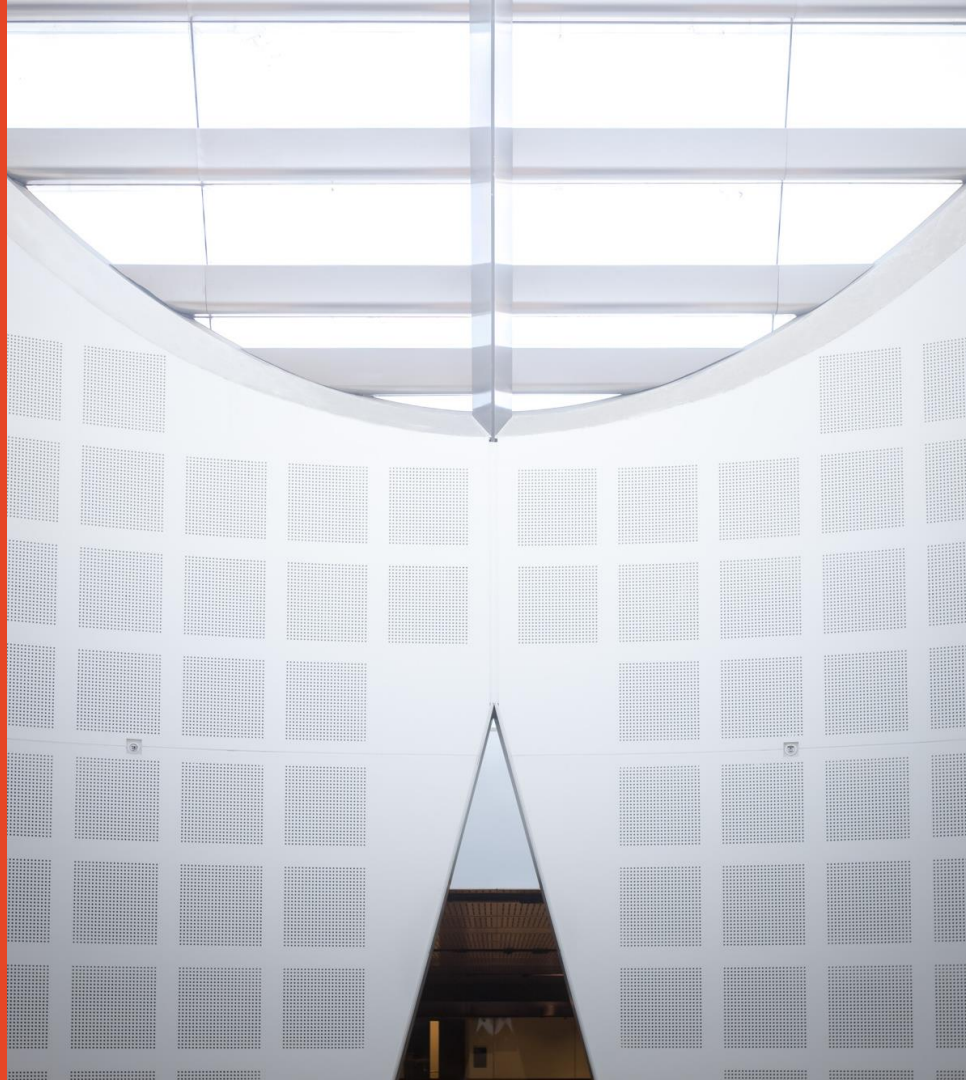

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Agenda

- Scrum
  - Definition and Values
  - Teams and Roles
  - Events
  - Artifacts

Scrum

- Originating in a broader “product development” lifecycle from H. Takeuchi and I. Nonaka (1986)
  - A new approach to increase 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

Scrum (Software Development)

- An agile framework for managing software products within which people can address complex adaptive problems, while productively and creatively delivering products of the highest possible value
- A framework within which various processes and techniques can be employed
- Focus on continuous improvement of the product, the team and the working environment
- Scrum is lightweight, simple to understand but **difficult to master**

https://en.wikipedia.org/wiki/Scrum_%28software_development%29

Scrum Theory

- Scrum is based on 'empirical process control' theory
  - Empiricism asserts that knowledge comes from experience and making decisions based on what is known
  - Iterative, incremental approach to optimize predictability and control risks

- Pillars of empirical process control
  - *Transparency*: significant aspects of the process must be visible to those responsible for the outcome
  - *Inspection:* Scrum users must frequently inspect Scrum artifacts and progress toward a Sprint Goal to detect undesirable variances
  - *Adaptation:* adjust the aspects of the process (or tools) that lead to deviation outside the acceptable limits

Scrum Framework

- Scrum framework consists of
  - Scrum Teams and their associate roles
  - Events
  - Artifacts
  - Rules
    - Bind together the roles, events, artifacts, governing the relationship between them
- All of the above components are essential for Scrum success

Scrum Values

- The Scrum team members should learn and explore the following values as they work with the Scrum roles, events, and artifacts:
  - Commitment: people personally commit to achieving the goals of the Scrum Team
  - Courage: Team members have courage to do the right thing and work on tough problems
  - Focus: everyone focuses on the work of the sprint (iteration) and the goals of the Scum team
  - Openness: the team and the stakeholders agree to be open about the work and the challenges with performing the work
  - Respect: Scrum team members respect each other to be capable, independent people

The Scrum Team

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Scrum Team

- Scrum Team
  - Small enough to be agile
  - Cross-functional: has all competencies needed to accomplish the desired work
  - Self-organizing: team decides the best way to accomplish their work
  - Deliver products iteratively and incrementally, maximizing opportunities for feedback

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

Scrum Team – The Product Owner

- **Product Owner** responsible for maximizing value of the product and the work
  - The only person responsible for managing the Product Backlog
    - Assign to development team, but still accountable

- **Managing the Product Backlog includes:**
  - Clearly expressing Product Backlog items;
  - Ordering the items in the Product Backlog to best achieve goals and missions;
  - Optimizing the value of the work the Development Team performs;
  - Ensuring that the Product Backlog is visible, transparent, and clear to all, and shows what the Scrum Team will work on next; and,
  - Ensuring the Development Team understands items in the Product Backlog to the level needed

Scrum Team – The Development Team

- Development team consists of professionals who do the work of delivering a potentially releasable product at the end of each Sprint (iteration)

- Only members of the Dev team creates the increment

- What's the optimal team size? Discuss
  - Small enough and large enough!
  - Less than 3 members?
  - More than 9 members

Scrum Team – The Development Team

- Characteristics of Scrum Development Teams
  - Self-organizing: No one tells the Development Team how to turn Product Backlog into Increments of potentially releasable functionality
  - Cross-functional: with all the skills as a team necessary to create a product
  - No titles for Development Team members: regardless of the work being performed by the person;
  - No sub-teams: regardless of domains that need to be addressed like testing, architecture, operations, or business analysis
  - Whole team is accountable: Individual Development Team members may have specialized skills and areas of focus, but accountability belongs to the Development Team as a whole

Scrum Team – The Scrum Master

- **Scrum Master** keeps team focused on using Scrum properly ("servant-leader")
  - Helping everyone understand Scrum rules and values (coaching)
  - Remove impediments
  - Help outside of the Scrum team to understand which of their interactions with the Scrum team are/aren't helpful
  - Maximize the value created by the Scrum team through changing team interactions

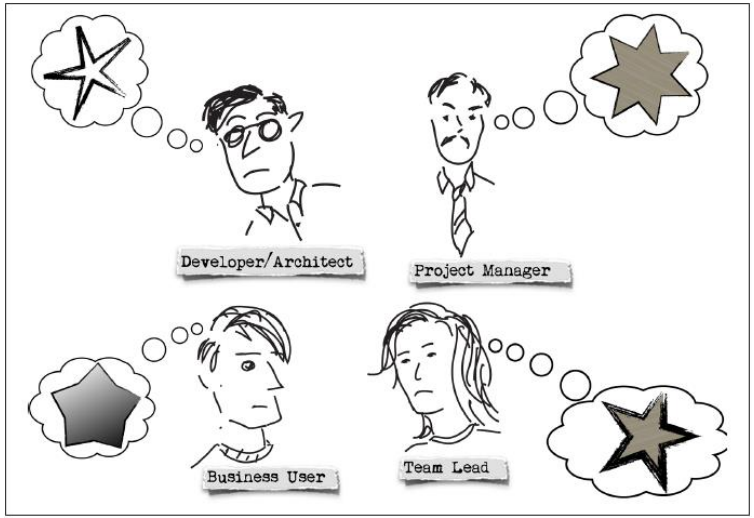
Scrum Team – The Scrum Master

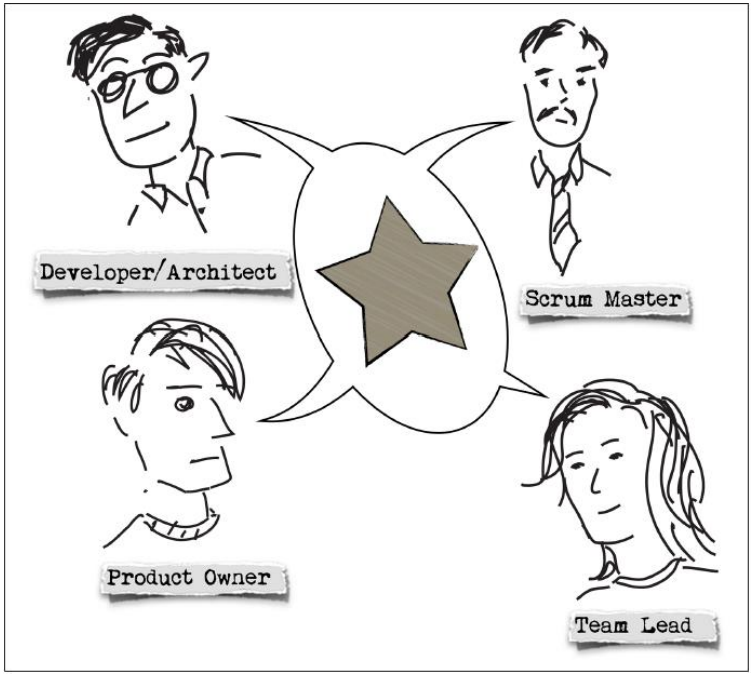
- Serves the Product owner
  - Ensuring that goals, scope, and product domain are understood by everyone on the Scrum Team as well as possible;
  - Finding techniques for effective Product Backlog management;
  - Helping the Scrum Team understand the need for clear and concise Product Backlog items;
  - Understanding product planning in an empirical environment;
  - Ensuring the Product Owner knows how to arrange the Product Backlog to maximize value;
  - Understanding and practicing agility; and,
  - Facilitating Scrum events as requested or needed

Scrum Team – The Scrum Master

- Serves the Development Team
  - Coaching the Development Team in self-organization and cross-functionality;
  - Helping the Development Team to create high-value products;
  - Removing impediments to the Development Team's progress;
  - Facilitating Scrum events as requested or needed; and,
  - Coaching the Development Team in organizational environments in which Scrum is not yet fully adopted and understood

Which team applies Scrum?





The Scrum Events

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Scrum Events

- Predefined events are used to create regularity and minimize the need for meetings
- All events are time-boxed (max. duration)
- Cannot be changed once a Sprint (iteration) has started
- Events are designed to enable transparency and to provide a formal opportunity to inspect and adapt something

Scrum Events – The Sprint

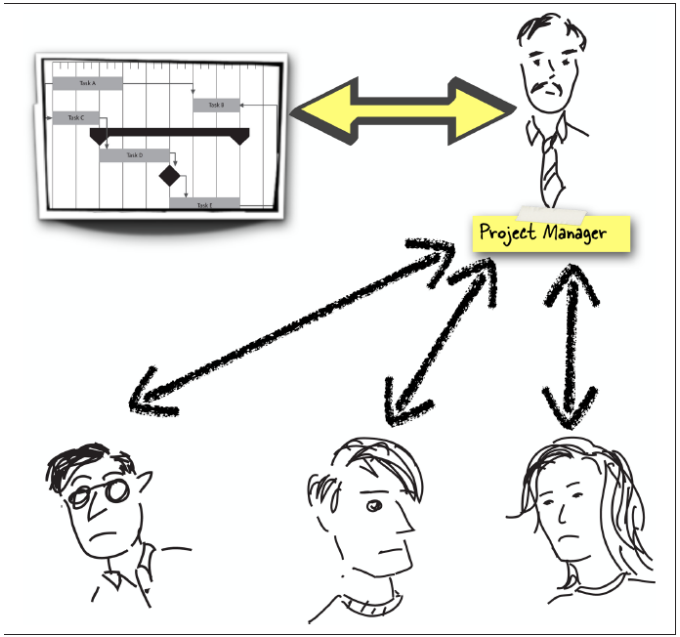
- **Sprint** is an iteration (one cycle) of the development (a container for all events)
  - Useable and potentially releasable product increment is created
- Time-boxed (typically 2-4 weeks)
  - Too long sprints may lead to changes in the definition
- Sprints have consistent durations during the product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

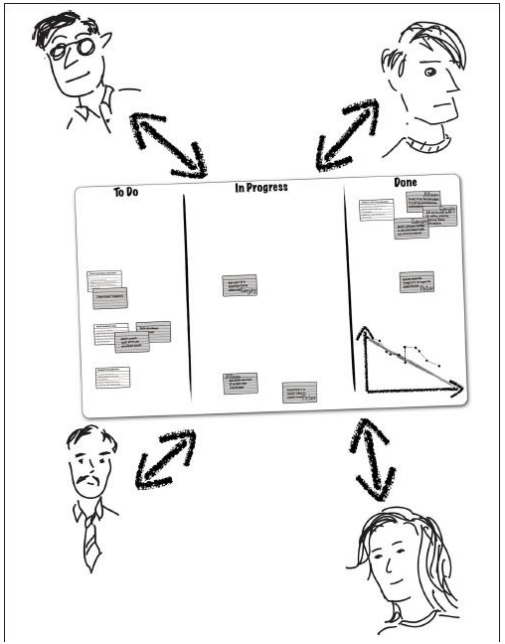
Scrum Events – Sprint Planning

- Iteration Planning (at most 8 hours!)
  - Identify the Sprint Goal (what we plan to achieve: items from the "Product Backlog")
  - Identify work to be done to deliver this
  - Two-parts meeting including the Scrum Master, Product Owner and all Team Members
    - **Prior to the meeting**: the Product Owner prepares a prioritized list of items that are most valuable to the users and stakeholders
    - **Meeting part 1** *(at most 4 hours)*: the Product Owner works with the Team to select items to be delivered at the end of the sprint based on their value and on the team's estimate of how much work they will be
    - **Meeting part 2** *(at most 4 hours)*: the team members (with the Product Owner's help) figure out the individual tasks they'll use to actually implement those items
- Output: Sprint Backlog (the items selected by the team for development)

Group Discussion

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



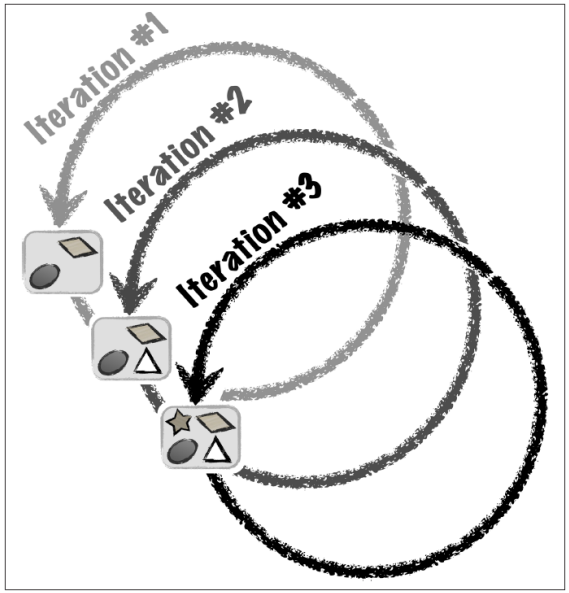


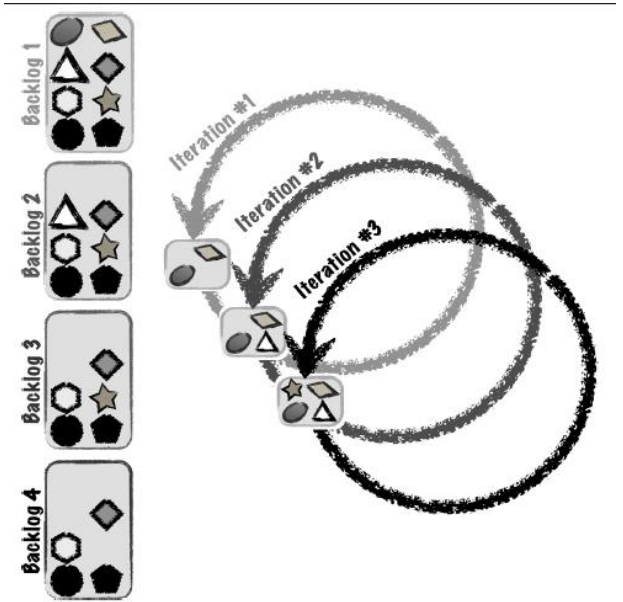
Scrum Iteration Process

- Sprint (development iteration)
  - Timeboxed (typically 2–4 weeks – no more than one month)
  - Create a "Done" usable, potentially releasable product

- A Scrum iteration (*Sprint*) 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 – any new items should be added to the Product Backlog instead
  - If new work items are important enough, they will get done in the next Sprint/iteration

Scrum Iteration Process





Scrum Events – During Sprint

- **Daily Scrum meeting**
  - Purpose: to make sure that 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 members briefly answer 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 development team to meeting the Sprint Goal?
  - Must be brief (15 minutes!); no problem-solving during the meeting. Relevant team members should arrange a follow-up meeting if further discussion is required

Scrum Events – During The Sprint

The **Development Work**

- The team builds the items in the Sprint Backlog into working software
- Team members need to inform the Product Owner if they are overcommitted or can add extra items if time allows
- The team must keep the Sprint backlog up to date and visible to everyone

Scrum Events – During The Sprint

The Sprint Review

- Sprint Review (informal) meeting (at end of the Sprint, at most 4-hours)
  - The team demonstrates working software to users and stakeholders
    - Items actually *done* done – completed and tested and accepted by the product owner
    - Only functional working software – not architecture, database design etc.
  - Stakeholders share their feedback, ideas, feelings, thoughts, opinions about the demo
  - The Product Owner to update the Product Backlog with any changes, requested by stakeholders, to be accounted for in the next Sprint planning
  - The Scrum Master ensures that the event takes place and that attendees understand its purpose, and maintain within the time-box
  - Output: revised Product Backlog and probable items for next iteration

Scrum Retrospectives

– Opportunity for the Scrum team to inspect itself and create plan for improvements

– Purpose

- Inspect how the last Sprint went with regards to people, relationships, process, and tools;
- Identify and order the major items that went well and potential improvements; and,
- Create a plan for implementing improvements to the way the Scrum Team does its work

Scrum Retrospectives

Retrospective meetings

- 1-2 hours meeting including the Scrum Master and the Team (product owner)
- Each person answer two questions:
  - What went well during the Sprint?
  - What can be improved in the future?
- The Scrum Master to note improvements that should be added to the Product Backlog as non-functional items
  - E.g., set-up a better build server, adopting design principles, changing office layout
- Output: identified improvements to be implemented in the next Sprint (adaptation)

Scrum 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.***

(From Norm Kerth'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 (items) that you know you need to do to build the product (the "Plan" for multiple iterations)

  –Features, functions, requirements, enhancements and fixes identified from previous Sprints

– Maintained by the Product Owner (content, availability and ordering)

–The source of the product requirements

  – Evolves over the time and never complete (dynamic)

– The items ordered by priority – value to the customer

- To deliver some value to the customer in each iteration, put the most important things early

– It is OK to add things to the Product Backlog

Scrum Artifacts – Product Backlog

–What does a Product Backlog look like?

- It is a simple spreadsheet
- Some items are the names of "**customer features**"
  - Could be a user screen, an 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?
  - If it is a document that nobody reads, leave it out (because you are Agile)
  - Can an early GUI prototype be an item?

- Effort estimates – each item should have an "estimated effort" assigned by the team
  - Should managers do the estimation of Product Backlog Items? No, never
  - Estimates must come from the team – and they should be realistic

Scrum Artifacts – Sprint Backlog

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

–The development team to forecast what should be implemented next

–Also include at least one high priority improvement identified from previous Sprint

– As new work is required, the Development Team adds it to the Sprint Backlog. As work is performed or completed, the estimated remaining work is updated

– Visible to anyone and to be modified by the development team

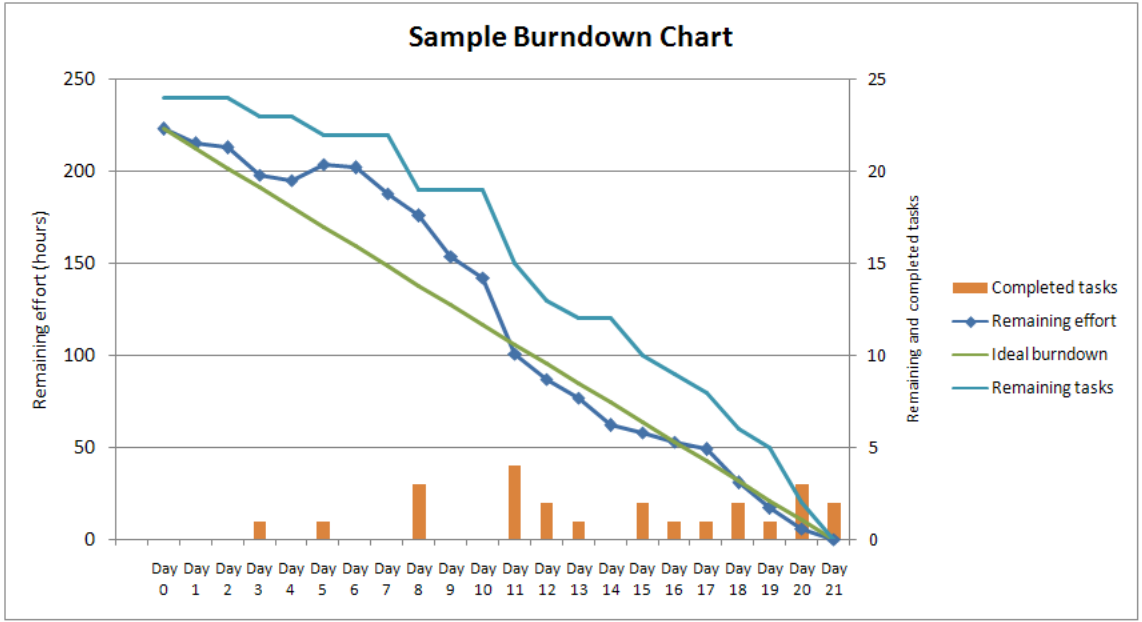
Project Estimation and Iteration Estimation

- The Product Owner work with the project manager and customers to set the priority of each item
- Within an iteration, the team divides the Product Backlog Items into individual tasks
- The development team defines tasks and estimates the size/effort for each item (Self-organizing team)
  - Managers/customers are not allowed to change the estimates
- The list of tasks is flexible – new items might be discovered during the iteration, some items might be combined or eliminated
- Development team tracks all "tasks" on a Task Board (Backlog, in-progress, Done)
- Development team tracks progress with a burn-down chart

Scrum Artifacts – Progress Monitoring

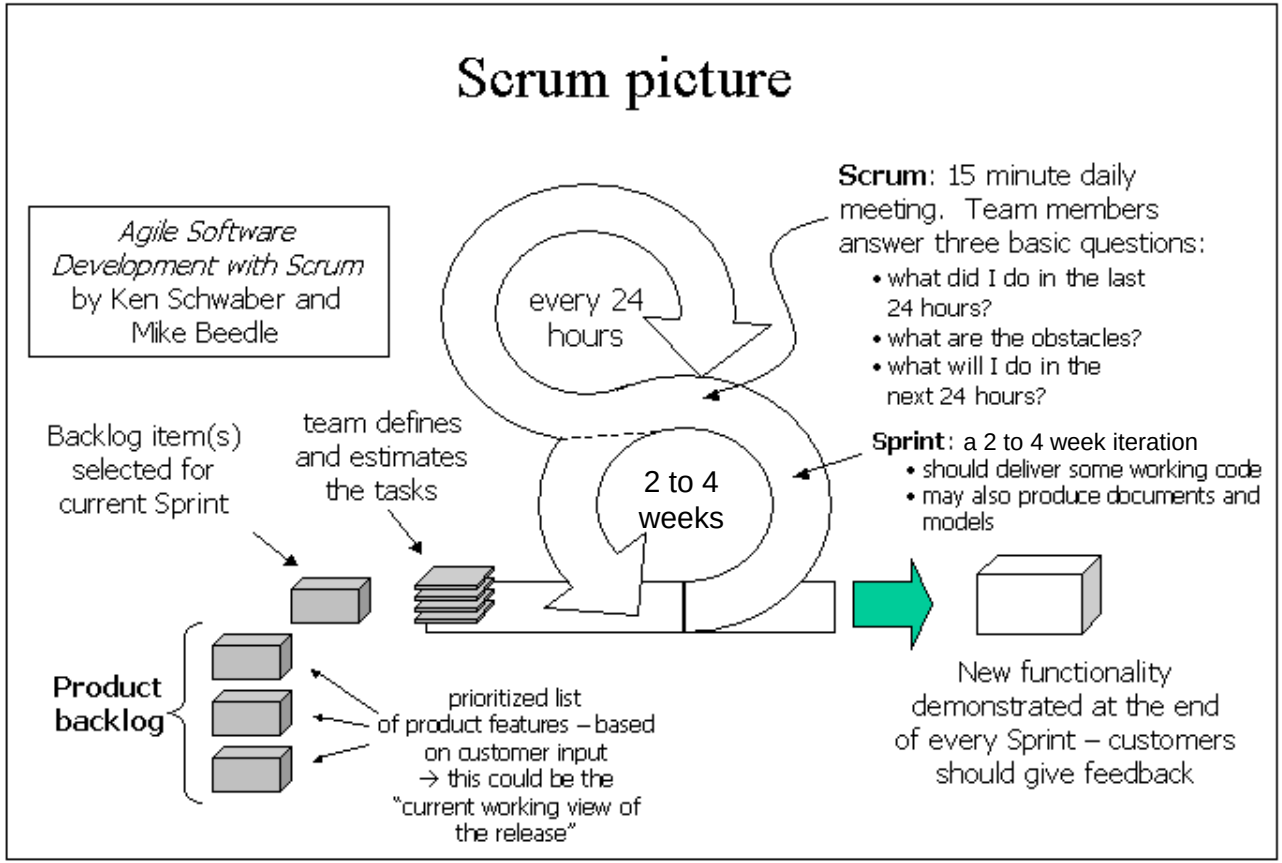
- Total work remaining to reach the goal – the product owner tracks this at least every Sprint Review
  - Compare with previous Sprints to assess progress toward projected work (transparent to all stakeholders)
  - Forecasting progress through burn-downs, burn-ups or cumulative flows
    - It's an estimate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

Scrum – Burn-downs (Example)



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

Summary of the Scrum Process



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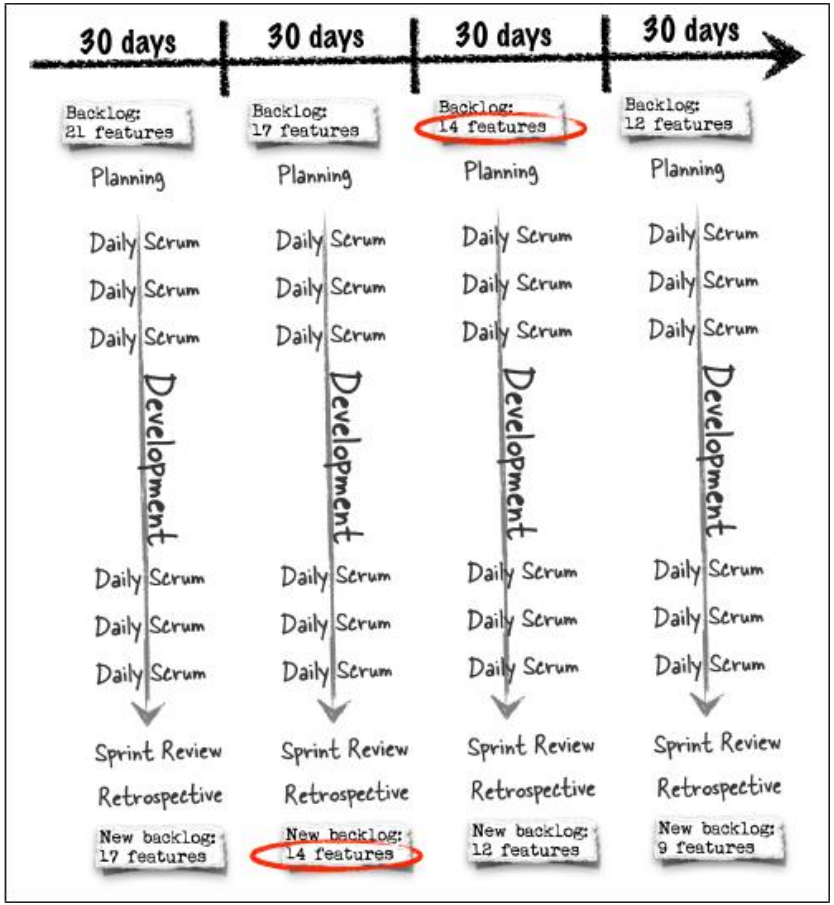

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