Agile Methodologies

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What is Agile?

- 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

Manifesto for Agile Software Development

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*

That is, while there is value in the items on the right, we value the items on the left more.

Kent Beck	*James Grenning*	*Robert C. Martin*
Mike Beedle	*Jim Highsmith*	*Steve Mellor*
Arie van Bennekum	*Andrew Hunt*	*Ken Schwaber*
Alistair Cockburn	*Ron Jeffries*	*Jeff Sutherland*
Ward Cunningham	*Jon Kern*	*Dave Thomas*
Martin Fowler	*Brian Marick*	

(https://agilemanifesto.org/)

Principles behind the Agile Manifesto

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. Business people and developers must work together daily throughout the project.

(...)

Principles behind the Agile Manifesto

(…)

5. Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.
6. The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.
7. Working software is the primary measure of progress.
8. Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.

(…)

Principles behind the Agile Manifesto

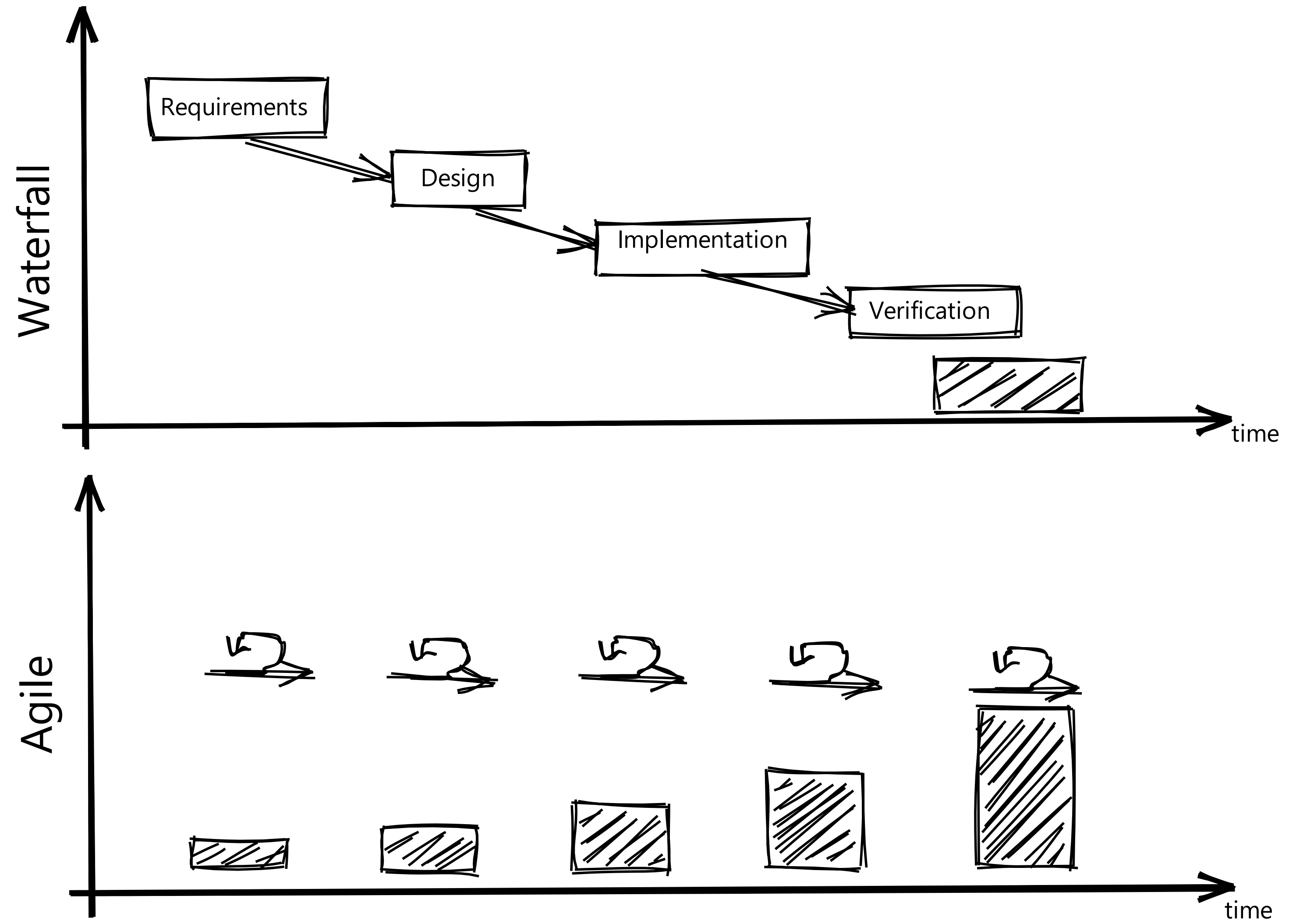
(…)

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.

Characteristics of Agile Software Development

- Light weight Methodology
- Small to medium sized teams
- Vague and/or changing requirements
- Vague and/or changing techniques
- Simple design
- Minimal system into production

Traditional vs. Agile Delivery



Why we user (or should use) it?

- Reduced risk
- Earlier Return on Investment (ROI)/value
- Increased visibility of progress
- Increased predictability
- Increased productivity
- Reduced waste
- More productive & happy teams

What is an Agile Framework?

- Frameworks are methodologies or even processes
- The majority of agile teams use frameworks only as a starting point for their agile transformation, eventually customizing elements to meet their unique needs.
- There are many popular agile frameworks used by various organizations. Often these organizations modify parts of the frameworks as they see fit and as they iterate on their own agile processes.

Popular Agile Frameworks

- Scrum
- eXtreme Programming (XP)
- Dynamic Systems Development Method (DDSM)
- Feature Driven Development (FDD)
- Adaptive Software Development (ASD)
- Lean Software Development (LSD)
- Disciplined Agile (DA)
- Scaled Agile Framework (SAFe)
- Rapid Application Development (RAD)

Which Framework is Best?

- Unfortunately, there is no one-size-fits-all way to practice agile software development.
- There are many factors that may influence which framework you choose to work with. Such as:
  - Company size
  - Team structure
  - Available resources
  - Needs of stakeholders
  - Structure/size of your product portfolio
- Each framework has its own unique set of strengths and weaknesses

Scrum

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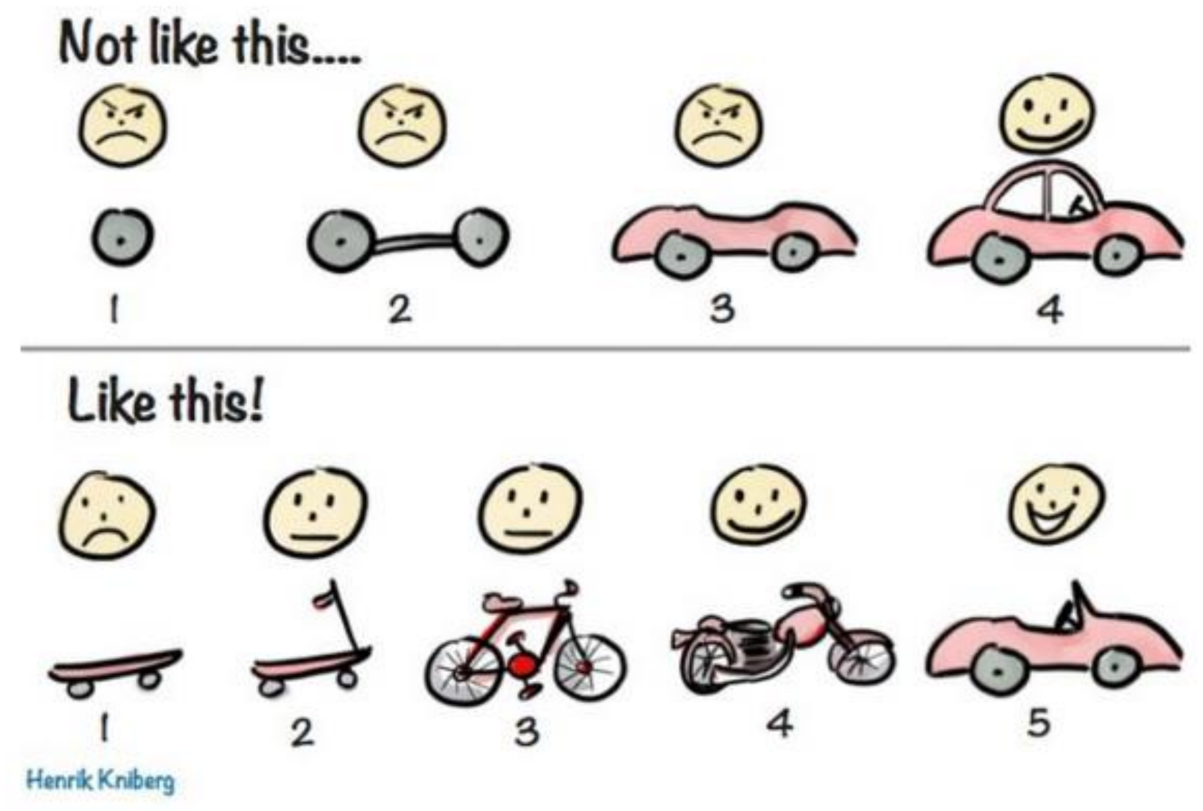
What is Scrum?

Incremental ≠ Iterative



http://softwaredevelopmenttoday.com/2015/09/how-to-explain-agile-and-incremental-delivery-to-anyone/

Scrum in a nutshell

- Scrum is an agile process that allows us to focus on delivering the highest business value in the shortest time.
- It allows us to rapidly and repeatedly inspect actual working software (every two weeks to one month).
- The business sets the priorities. Teams self-organize to determine the best way to deliver the highest priority features.
- Every two weeks to a month anyone can see real working software and decide to release it as is or continue to enhance it for another sprint.

Scrum origins

- Jeff Sutherland
  - Initial scrums at Easel Corp in 1993
  - IDX and 500+ people doing Scrum
- Ken Schwaber
  - Scrum presented at OOPSLA 96 with Sutherland
  - Author of three books on Scrum
- Mike Beedle
  - Scrum patterns in PLOPD4
- Ken Schwaber and Mike Cohn
  - Co-founded Scrum Alliance in 2002, initially within the Agile Alliance

Agile Project Management with Scrum
Agile Software Development with Scrum
Ken Schwaber
ENTERPRISE SCRUM
Ken Schwaber

Scrum has been used by:

Microsoft

yahoo!

PHILIPS

Google

SIEMENS

FARFETCH

blip web engineers

BBC

NOKIA

Critical manufacturing

Millennium bcp

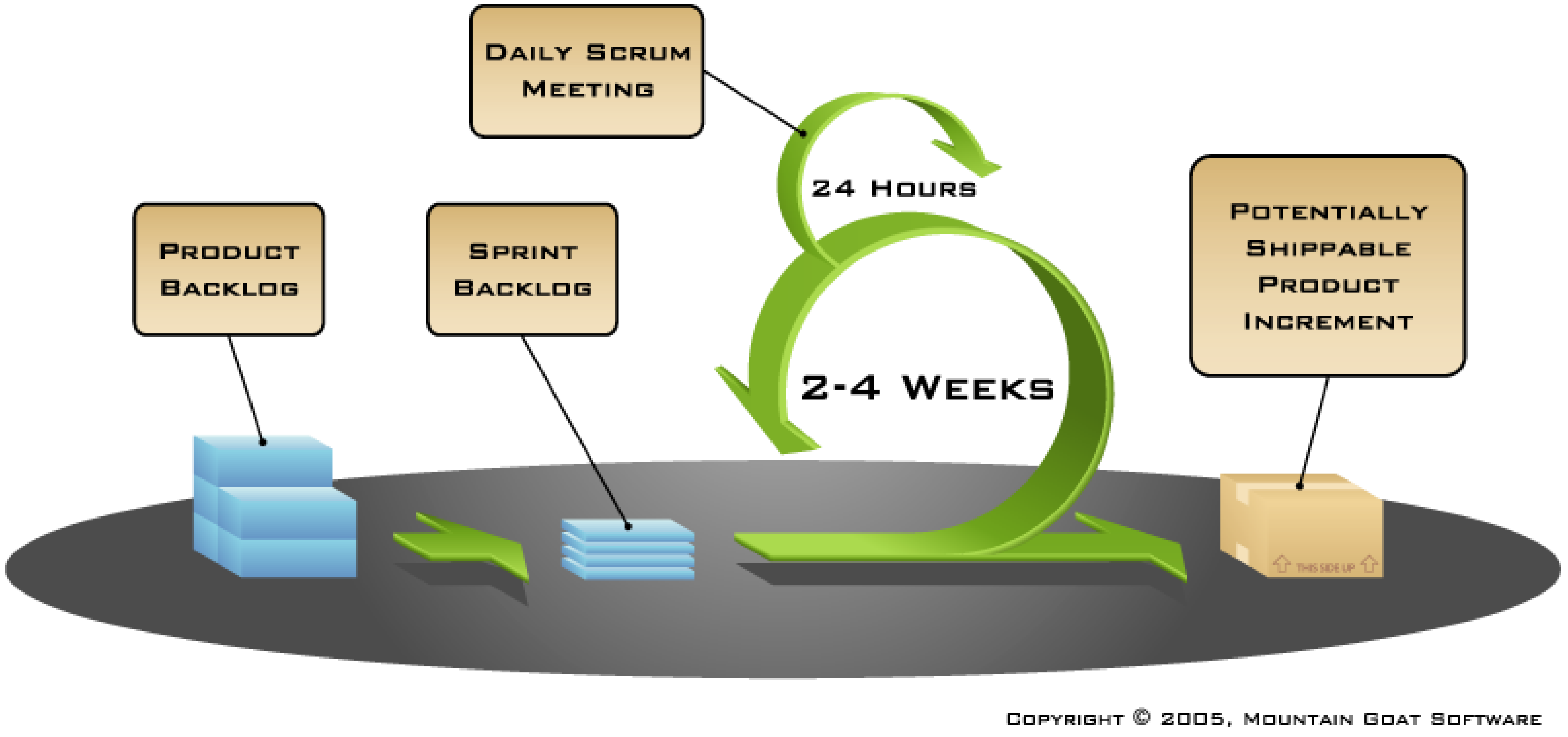
Scrum has been used for:

- Commercial software
- In-house development
- Contract development
- Fixed-price projects
- Financial applications
- ISO 9001-certified applications
- Embedded systems
- 24x7 systems with 99.999% uptime requirements
- the Joint Strike Fighter
- Video game development
- FDA-approved, life-critical systems
- Satellite-control software
- Websites
- Handheld software
- Mobile phones
- Network switching applications
- ISV applications
- Some of the largest applications in use

Characteristics

- Self-organizing teams
- Product progresses in a series of *sprints*
- Requirements are captured as items in a list of *product backlog*
- No specific engineering practices prescribed
- Uses generative rules to create an agile environment for delivering projects

Scrum framework


Daily Scrum Meeting
24 Hours
Product Backlog
Sprint Backlog
2-4 Weeks
Potentially Shippable Product Increment
This side up
Copyright © 2005, Mountain Goat Software

(www.mountaingoatsoftware.com/scrum)

Sprints

- Scrum projects make progress in a series of *sprints*
  - Analogous to Extreme Programming iterations
- Typical duration is 2–4 weeks or a calendar month at most
- A constant duration leads to a better rhythm
- Product is designed, coded, and tested during the sprint

Plan sprint durations around how long you can commit to keeping change out of the sprint.

Scrum framework

Roles

- Product owner
- ScrumMaster
- Team

Ceremonies

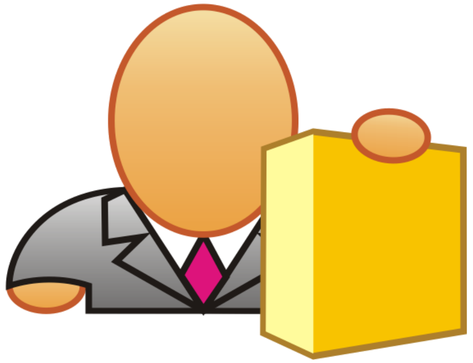
- Sprint planning
- Sprint review
- Sprint retrospective
- Daily scrum meeting

Artifacts

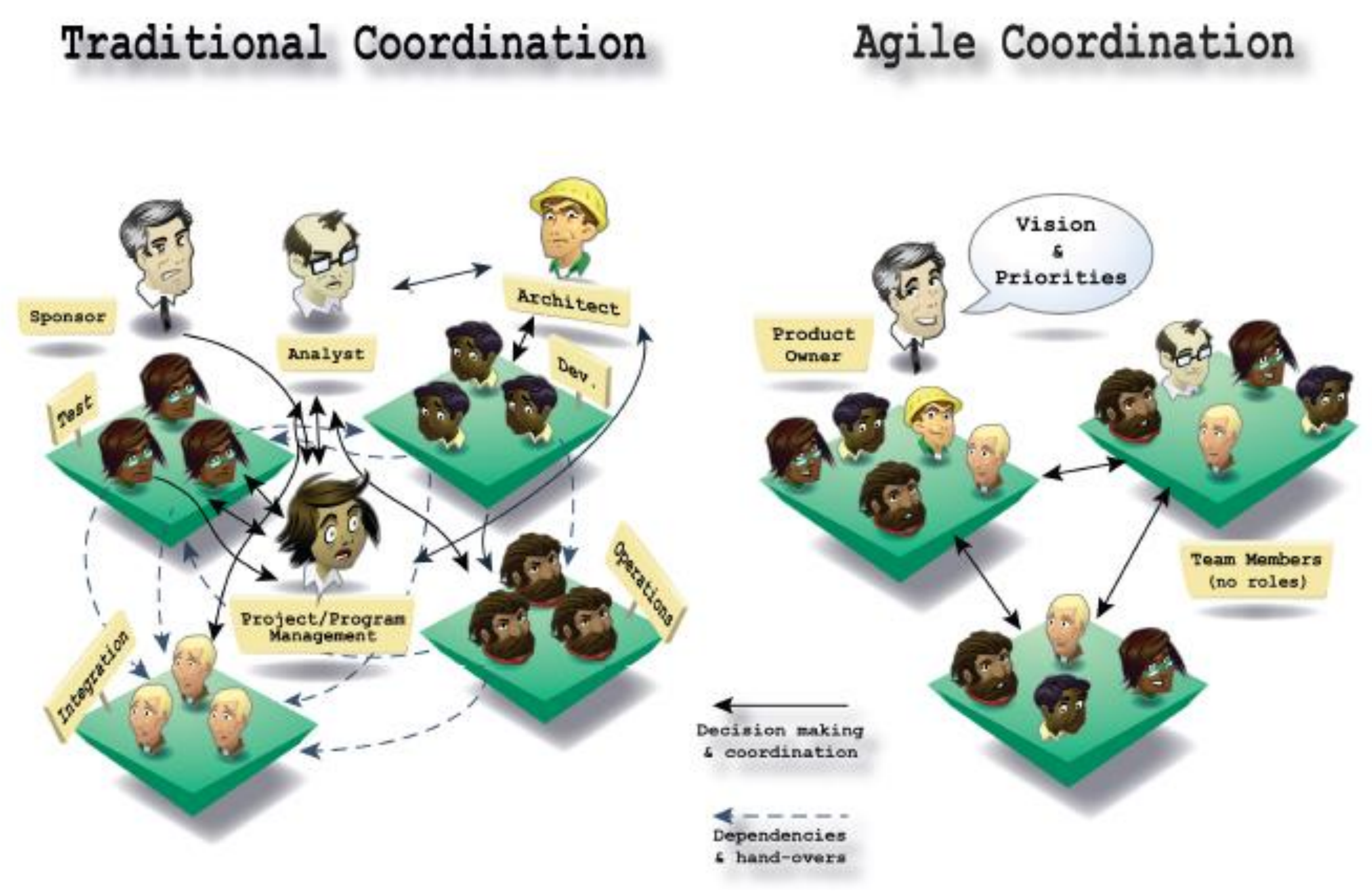
- Product backlog
- Sprint backlog
- Burndown charts

Product owner

- Define the features of the product (as User Stories)
- Decide on release date and content
- Be responsible for the profitability of the product
- Prioritize features according to market value
- Adjust features and priority every iteration, as needed
- Accept or reject work results



Product owner

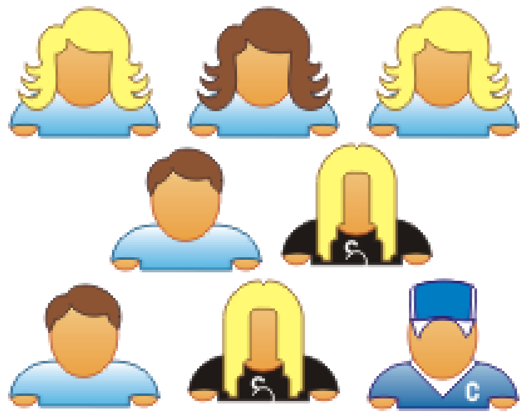


The ScrumMaster

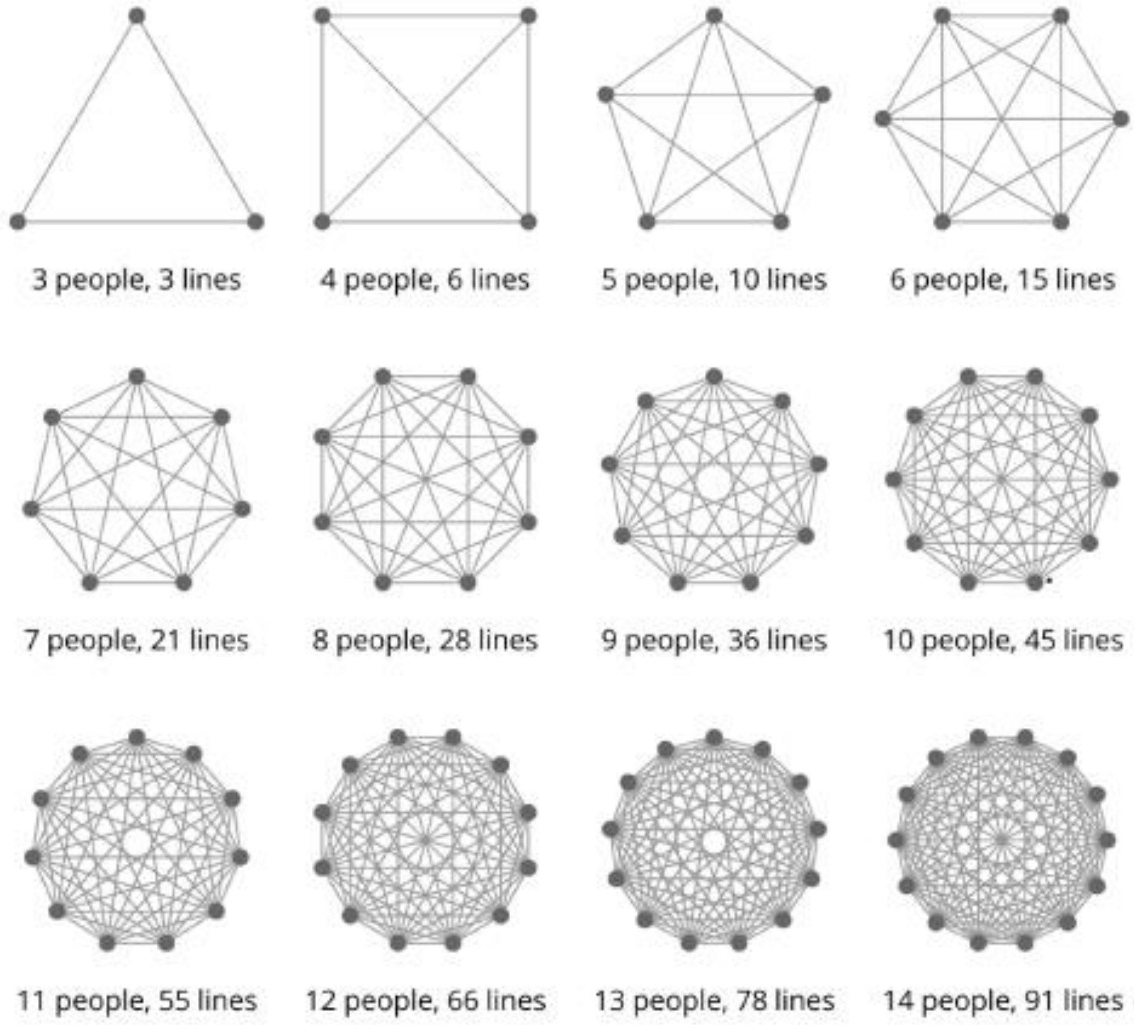
- Represents management to the project
- Responsible for enacting Scrum values and practices
- Removes impediments
- Ensure that the team is fully functional and productive
- Enable close cooperation across all roles and functions
- Shield the team from external interferences

The team

- Typically, 5-9 people
- Cross-functional:
  - Programmers, testers, user experience designers, etc.
- Members should be full-time
  - May be exceptions (e.g., database administrator)
- Teams are self-organizing
  - Ideally, no titles but rarely a possibility
- Membership should change only between sprints



The team size



High–performing teams are …

STABLE
Members of the team are't changed frequently

LONG-LIVED
Products will come and go but the team remain together for years

SMALL
Small enough to avoid silos and maximize Collaboration

DEDICATED
Each person is a Member of one and only one team

CROSS- FUNCTIONAL
The team has the functional skills to archive done

STEADILY IMPROVES
Continuous improvement helps the team to be constantly evolving

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Sprint planning

- Team selects items from the product backlog they can commit to completing
- Sprint backlog is created
  - Tasks are identified and each is estimated (1-16 hours)
  - Collaboratively, not done alone by the ScrumMaster
- High-level design is considered

As a vacation planner, I want to see photos of the hotels.

Code the middle tier (8h)
Code the user interface (4h)
Write test fixtures (4h)
Code the foo class (6h)
Update performance tests (4h)

The daily scrum

- Parameters:
  - Daily
  - 15-minutes
  - Stand-up
- Not for problem solving
  - Whole world is invited
  - Only team members, ScrumMaster, product owner, can talk
- Helps avoid other unnecessary meetings

The daily scrum

- Everyone answers 3 questions:

  1. **What did you do yesterday?**
  2. **What will you do today?**
  3. **Is anything in your way?**

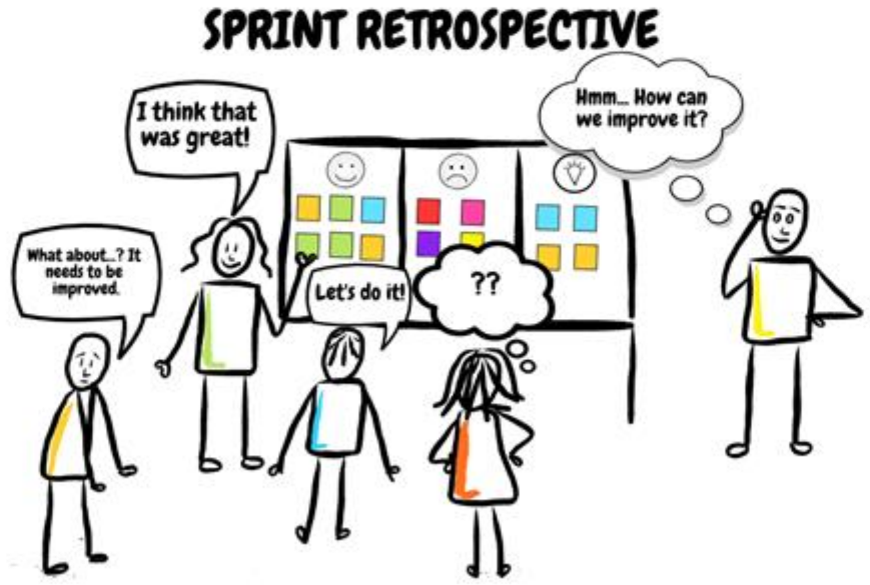
- These are not status for the Scrum Master
  - They are commitments in front of peers

The sprint review

- Team presents what it accomplished during the sprint
- Typically takes the form of a demo of new features or underlying architecture
- Informal
  - 2-hour prep time rule
  - No slides
- Whole team participates
- Invite the world

Sprint retrospective

- Periodically take a look at what is and is not working
- Typically 15–30 minutes
- Done after every sprint
- Whole team participates
  - ScrumMaster
  - Product owner
  - Team
  - Possibly customers and others


SPRINT RETROSPECTIVE
I think that was great!
Hmm... How can we improve it?
What about...? It needs to be improved.
Let's do it!
??

Sprint retrospective

- Whole team gathers and discusses what they'd like to:
  - **Start doing**
  - **Stop doing**
  - **Continue doing**

This is just one of many ways to do a sprint retrospective.

Scrum framework

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Product backlog

- The requirements (user stories, bugs, tech tasks, study)
- A list of all desired work on the project
- Ideally expressed such that each item has value to the users or customers of the product.
- Prioritized by the product owner.
- Reprioritized at the start of each sprint.

User Stories Context

As a ... (*user of the system*)
I want ... (*feature or problem to be solved*)
So that ... (*benefit of story being completed*)

Writing User Stories is a Product Owner Job.

The "so that" part is incredibly valuable as it focuses people on the real reason behind this story.

INVEST Acronym

- Set of criteria to assess the quality of a User Story

  Independent

  Negotiable

  Valuable

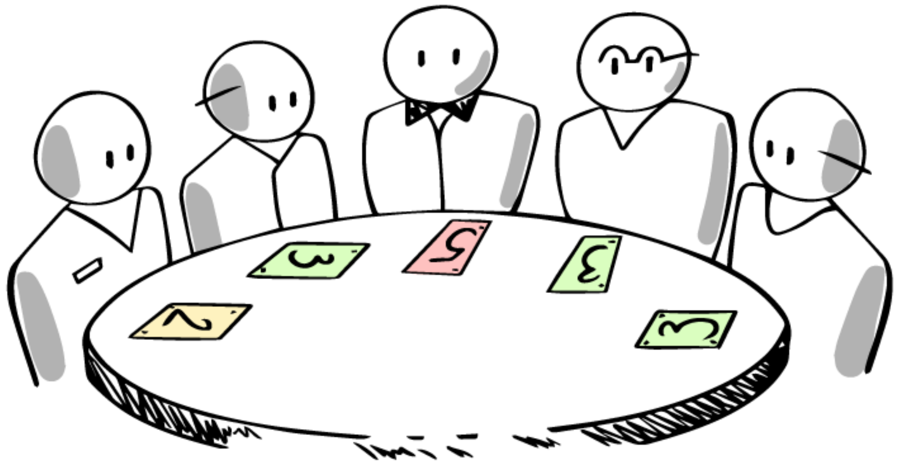
  Estimable

  Small (sized appropriately)

  Testable

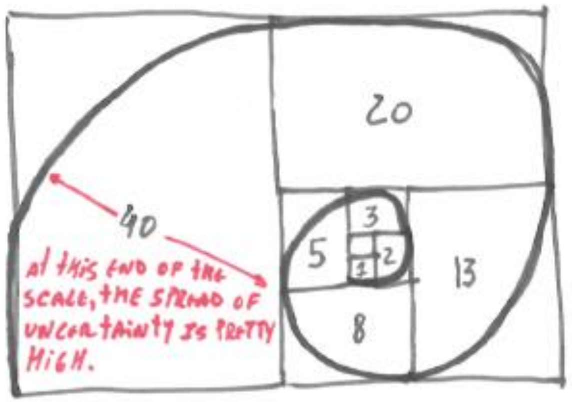
Some Agile Estimation Techniques

- Planning Poker
- T-Shirt Sizes
- Dot Voting
- The Bucket System
- Affinity Mapping
- …



Planning Poker

- Makes use of story points to estimate the difficulty of the task at hand.
- Based on the Fibonacci sequence, the story point values that can be assigned are 0, 1, 2, 3, 5, 8, 13, 20, 40 and 100.
- Each of these represent a different level of complexity for the overall project


20
40
AT THIS END OF THE SCALE, THE SPREAD OF UNCERTAINTY IS PRETTY HIGH.
3
5
2
1
1
13
8

Planning Poker

- Procedure:
  - Product Owner reads and explains the User Story
  - The team discusses the requirements
  - Each team member scores the US with points from the sequence
  - If the story point estimations match up, that will be the final estimate.
  - Otherwise, the team members who gave the lowest and highest points can voice their reasoning, and more discussion will ensue until there is a consensus.
- Useful tools:
  - Mobile Apps
  - Add-ons for Slack

T-Shirt Sizes

- This technique uses T-Shirts sizes as story points for the size of the project.
- Is a useful method for being time-efficient. It can give a quick and rough estimate for how much work is expected for a project.
- The sizes can be converted into numbers at a later stage – when the team assigns a relative size to the project on hand.
- This is decided through discussion and collaborative efforts to understand everything that needs to be done.

A sample product backlog

Backlog item	Estimate
Allow a guest to make a reservation	3
As a guest, I want to cancel a reservation.	5
As a guest, I want to change the dates of a reservation.	3
As a hotel employee, I can run RevPAR reports (revenue-per-available-room)	8
Improve exception handling	8
…	30
…	50

The sprint goal

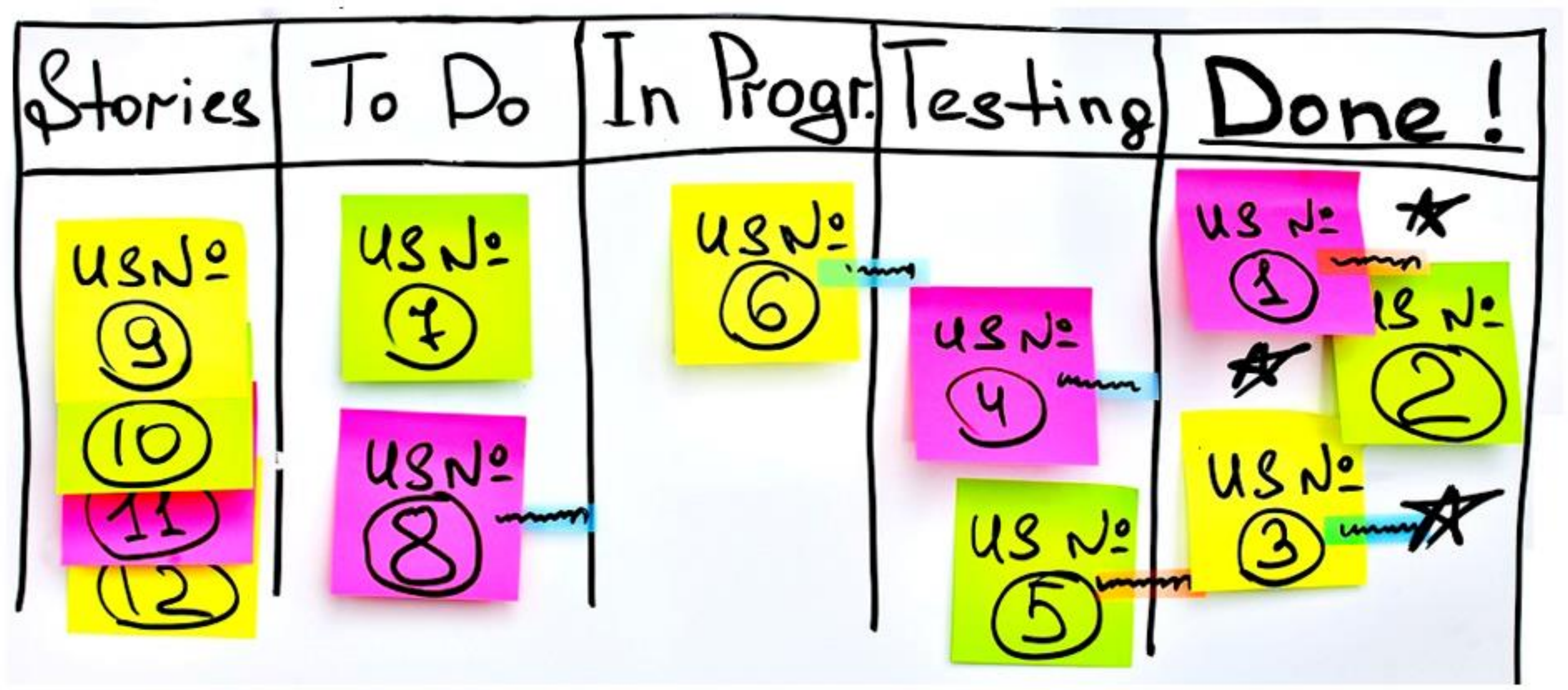
- A short statement of what the work will be focused on during the sprint

Database Application	• Make the application run on SQL Server in addition to Oracle
Life Sciences	• Support features necessary for population genetics studies.
Financial services	• Support more technical indicators than company ABC with real-time, streaming data.

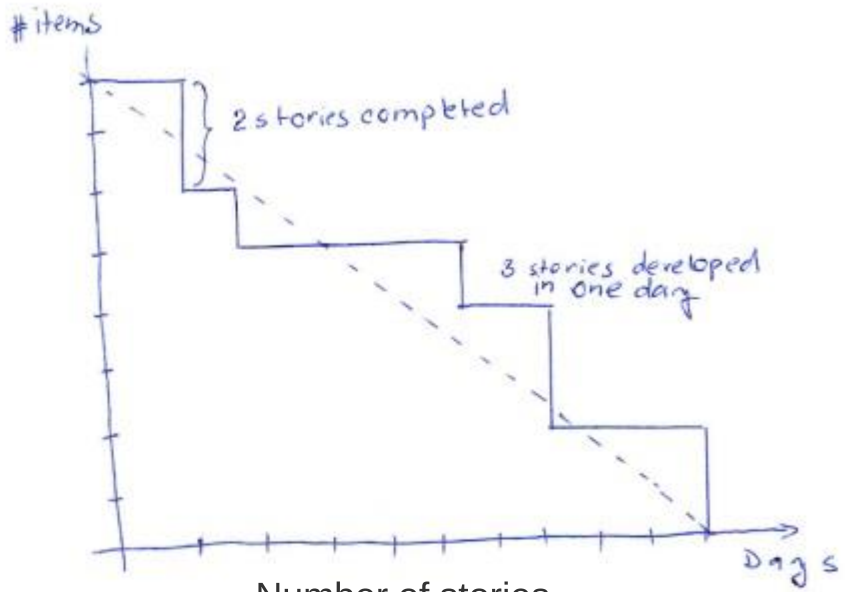
Managing the sprint backlog

- Individuals sign up for work of their own choosing
  - Work is never assigned
- Estimated work remaining is updated daily
- Any team member can change the sprint backlog tasks states.
- If work is unclear, define a sprint backlog item with a larger amount of time and break it down later
- Update work remaining as more becomes known

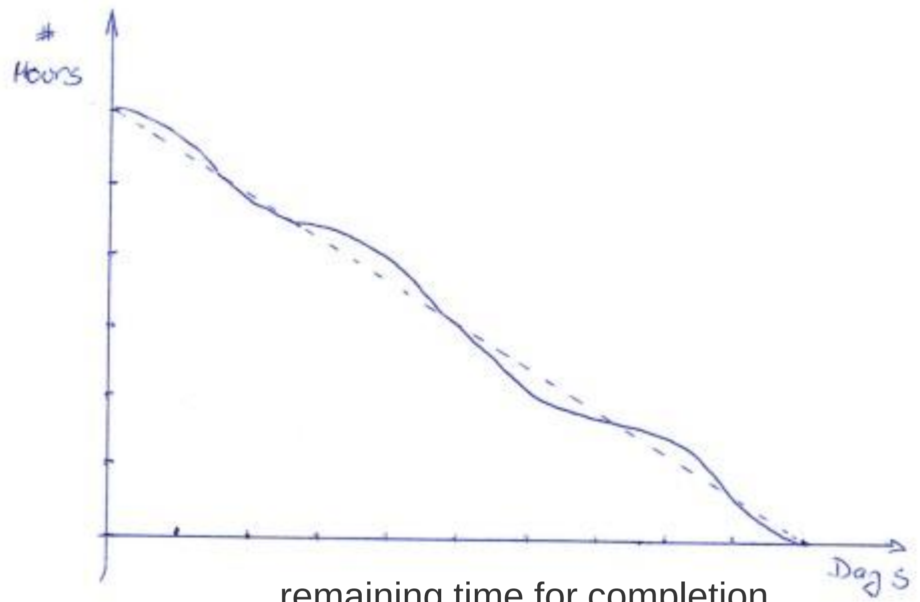
A sprint backlog



A sprint burndown charts

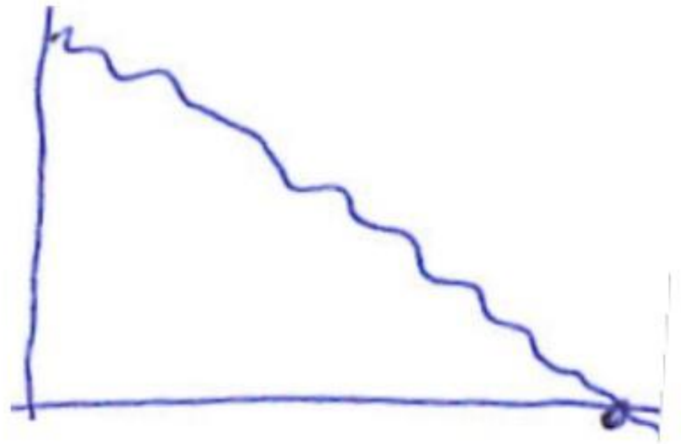


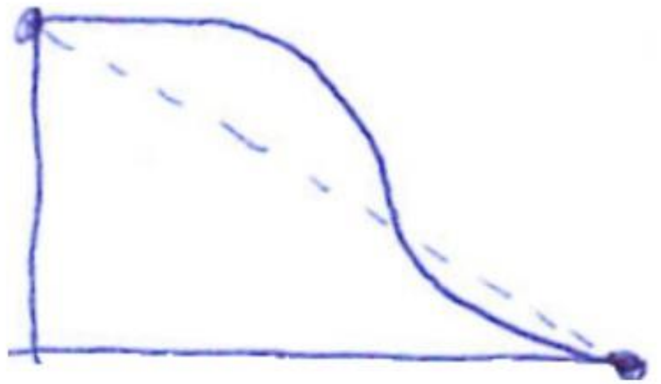
Number of stories

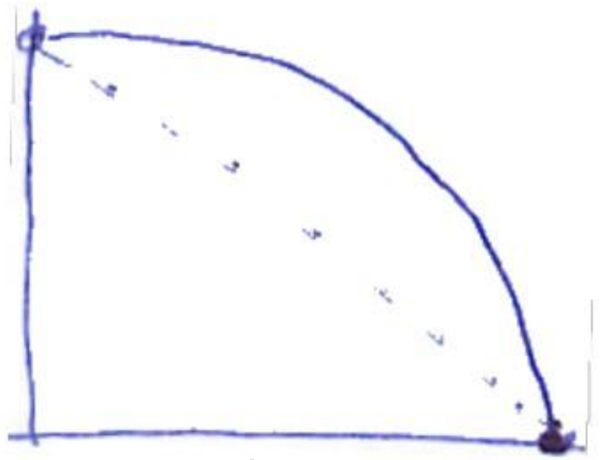


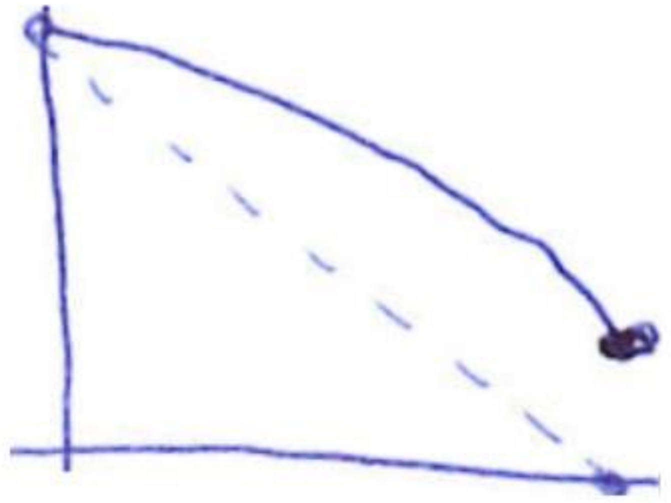
remaining time for completion

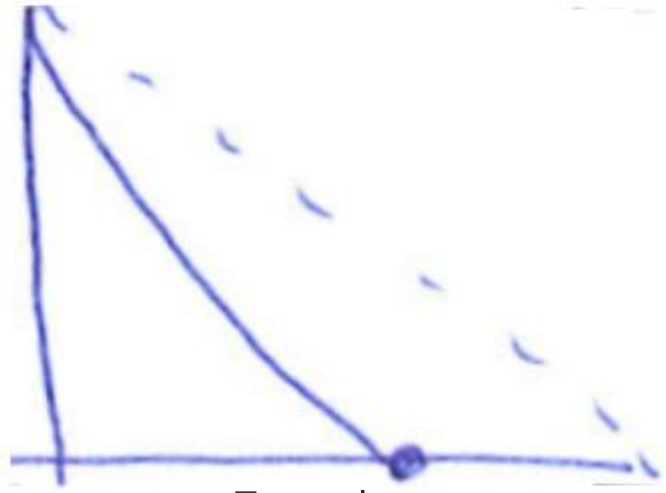
What a burndown chart can say about the team?

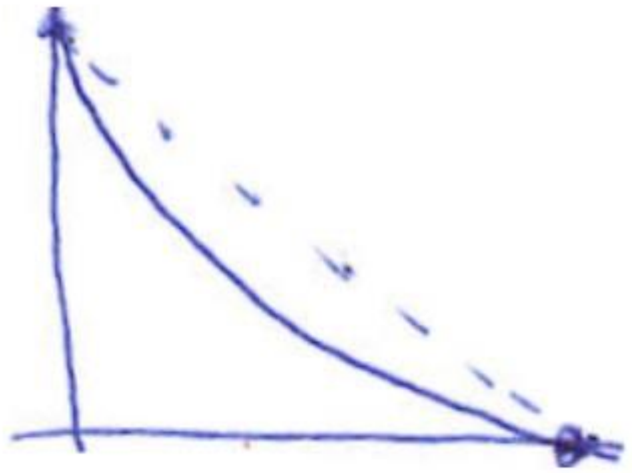

Ideal team


Great team


Nice team


Too late


Too early


They need to rest …

Scrum

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