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Modern Software Development Methodologies

AGILE

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Session Outcomes

- Agile Development Methodologies
  - SCRUM
  - SCRUM Roles
  - SCRUM Processes
  - SCRUM Artefacts
  - SCRUM Tools

Traditional Models

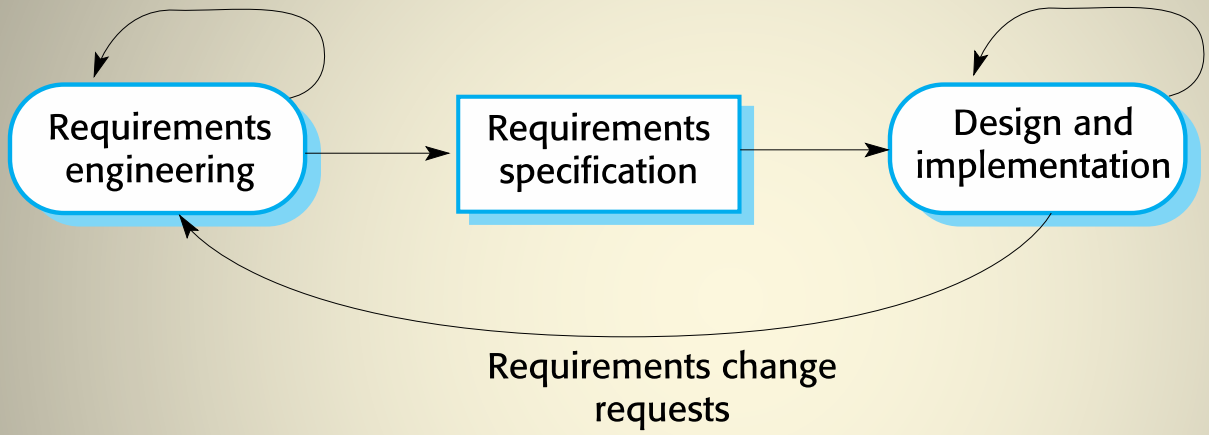
- What are the issues in traditional development methods like waterfall?
  - High Cost
  - Changes are not acceptable
  - Can detect errors only in the latter part of the SDLC
  - Less or no iterations
  - Lack of transparency

Plan-based Vs AGILE

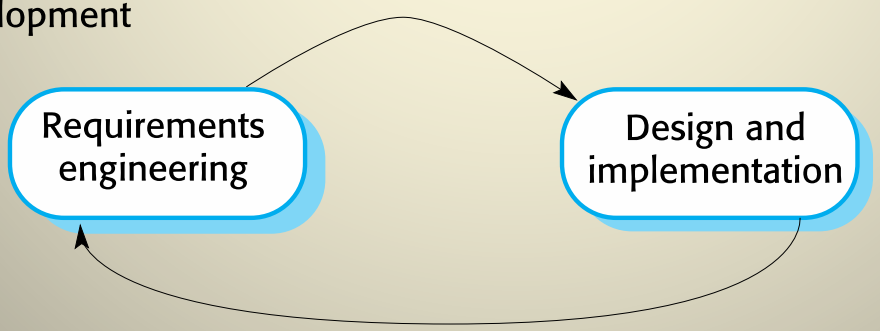
- Some types of software need a complete analysis of the system and proper planning beforehand. Plan-based development
  - Safety critical control systems
- But what about a system used in a fast moving business environment? Can we use plan-based development?
- AGILE Development !

AGILE Vs Plan-based development

Plan-based development



Agile development



Ref: Software Engineering, I. Sommerville, 10th Edition

AGILE

What is AGILE?

- AGILE methods are designed to produce useful software quickly. All the AGILE methods share some common characteristics.
  1. The process of specification, design and implementation are interleaved.
  2. The system is developed in series of increments. End users and stakeholders are involved in specifying and evaluating each increment where they can propose changes.
  3. Extensive tool support to the development process.
     - eg: automated testing tools, configuration management tools, system integrations tools etc.

Ref: Software Engineering, I. Sommerville, 10th Edition

- Agile Software Development is an umbrella term for a set of methods and practices based on the values and principles expressed in the Agile Manifesto.
- Solutions evolve through collaboration between self-organizing, cross-functional teams utilizing the appropriate practices for their context.

Ref: What is Agile Software Development?", Agile Alliance, 2017

A more purposeful definition

- AGILE IS,
  - Building the highest value software
  - With high quality
  - With in the shortest time

AGILE manifesto

- The Agile Manifesto, also called as the Manifesto for Agile Software Development, is a formal proclamation of four key values and 12 principles to guide an iterative and people-centric approach to software development.

4 Key values

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

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

That is, while there is value in the items on the right , we value the items on the left more (bold ones). "

Ref: "Manifesto for Agile Software Development", Agile Alliance, 2017 / http://www.agilemanifesto.org

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Agile Manifesto

Agile

- **Advantages**
  - Customer collaboration
  - Early Working software
  - Changes are welcomed
  - No process overheads
- **Disadvantages**
  - difficult to assess the effort required
  - Lack of documentation
  - Customer has to be clear with his requirements

Different Trends of AGILE

- SCRUM
- eXtreme Programming (XP)
- Test Driven Development (TDD)
- Pair Programming
- Behaviour Driven Development
- Lean Software Development
- Kanban

Agile Alliance (www.**agilealliance**.org)

– A non-profit organization promotes agile development

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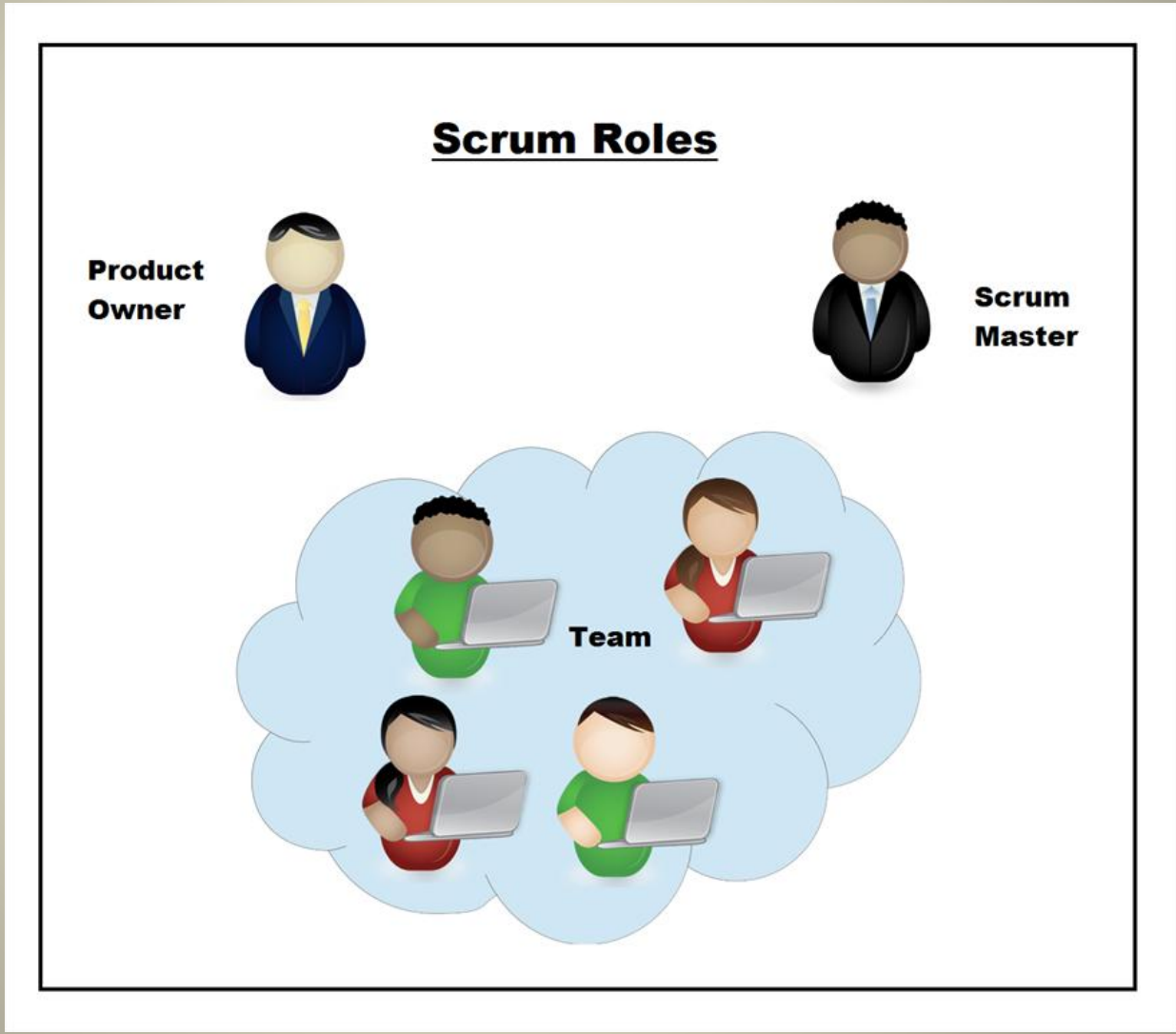
SCRUM

What is SCRUM?

- Scrum is a management and control process that cuts through complexity to focus on building software that meets business needs.
- Components
  - SCRUM Roles
  - SCRUM Activities
  - SCRUM Artifacts

Ref: "What is Scrum?", Scrum.org, 2017

SCRUM Roles



SCRUM Roles

- Product Owner
  - Client's representative
  - Define the features of the product
  - Decide on release date and content
  - Accept or reject work results
- SCRUM Master
  - Represents management to the project
  - Removes the impediments
  - Shield the team from external interferences

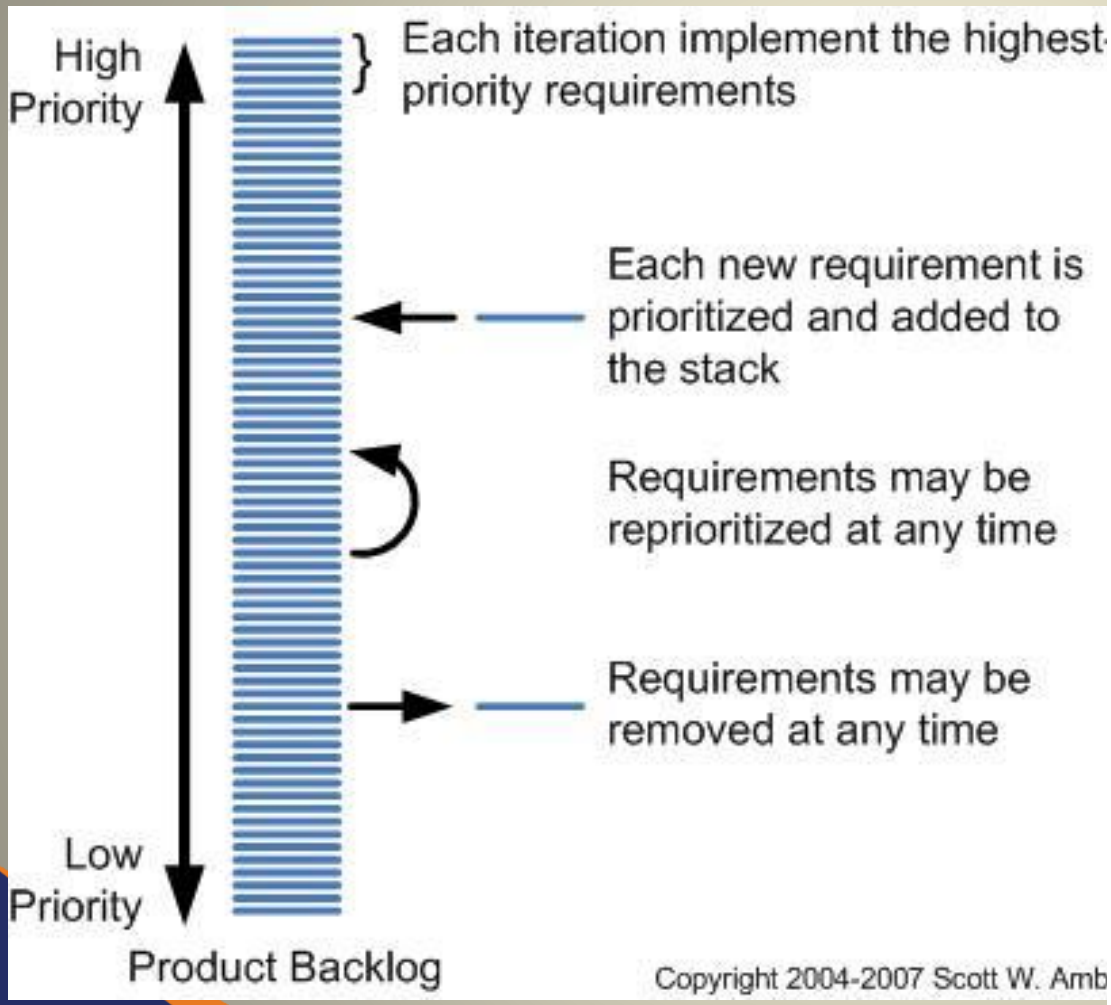
SCRUM Roles

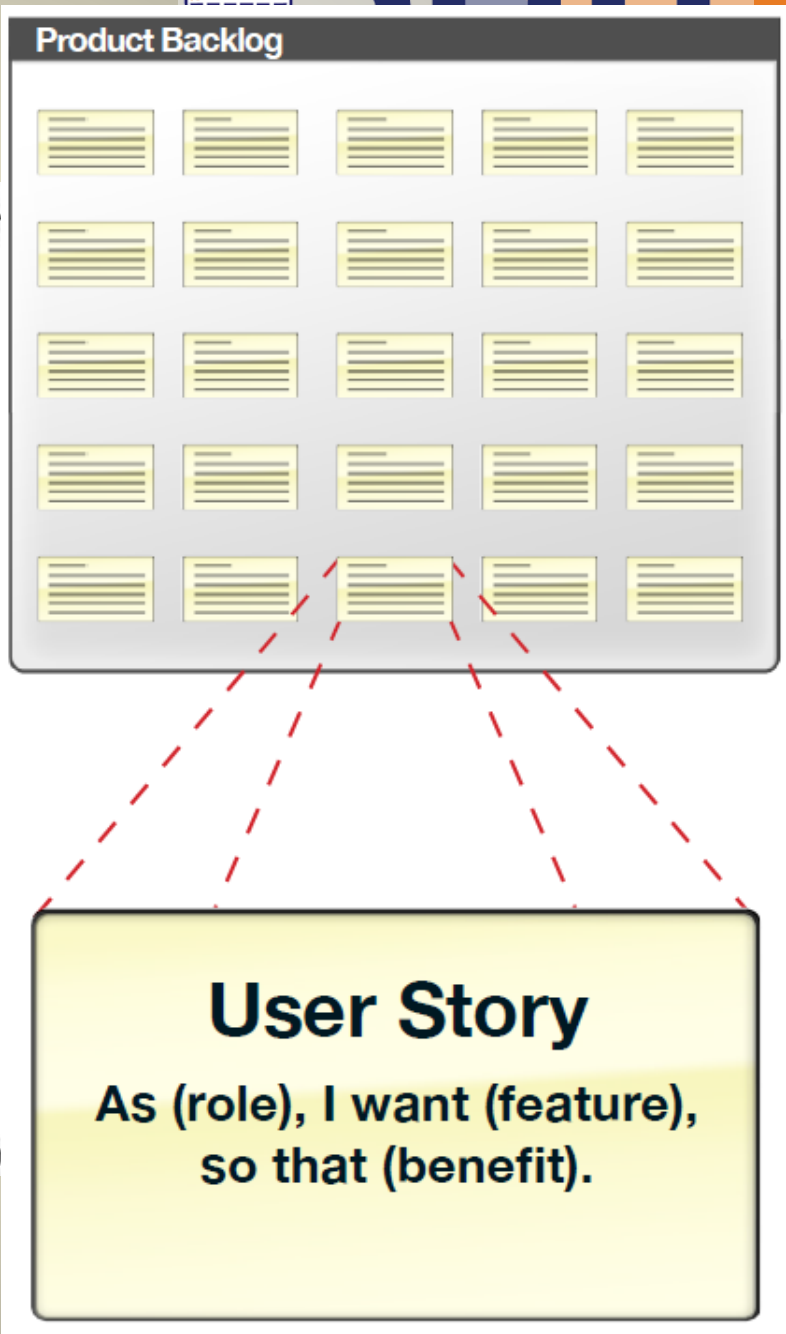
- Dev Team
  - Cross-functional
    - QA, Programmers, UI Designers, etc.
  - Work collaboratively and share responsibilities.
  - Typically 5-10 people
- Users/Stakeholders
  - Those who are going to use the product or have a vested interest in how it turns out.

SCRUM Artifacts

- Product Backlog
- Sprint Backlog
- Burn down Charts

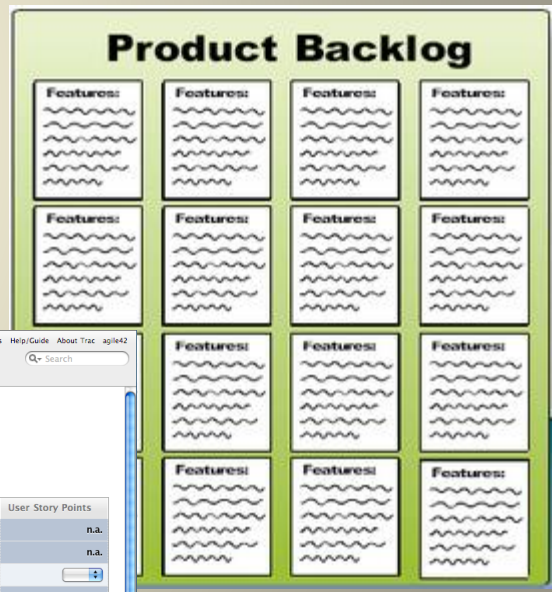
Product Backlog

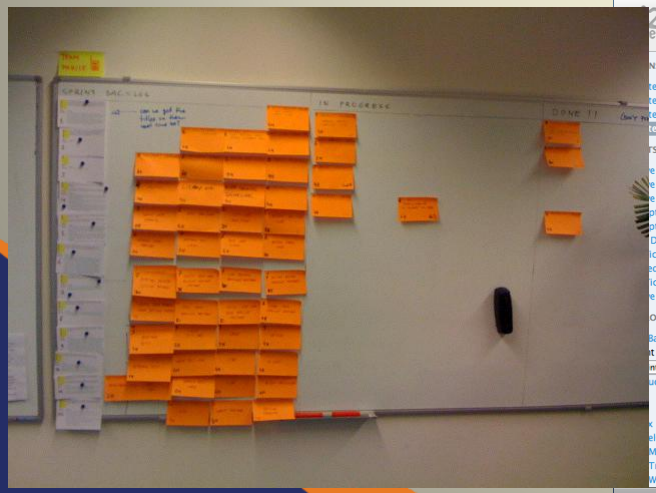


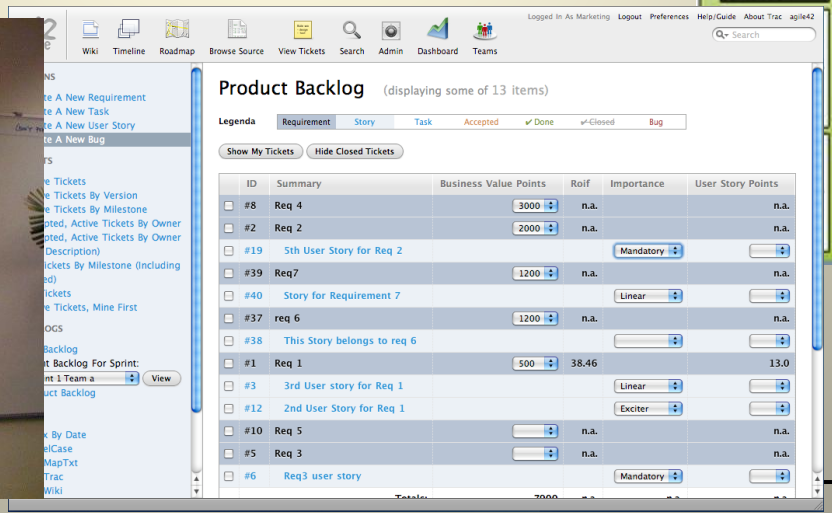


Creating the product backlog

- There are many ways to store the product backlog:
  - As a collection of index cards or post-its on the wall
  - On a flip-chart
  - In a requirements management tool
  - In Excel



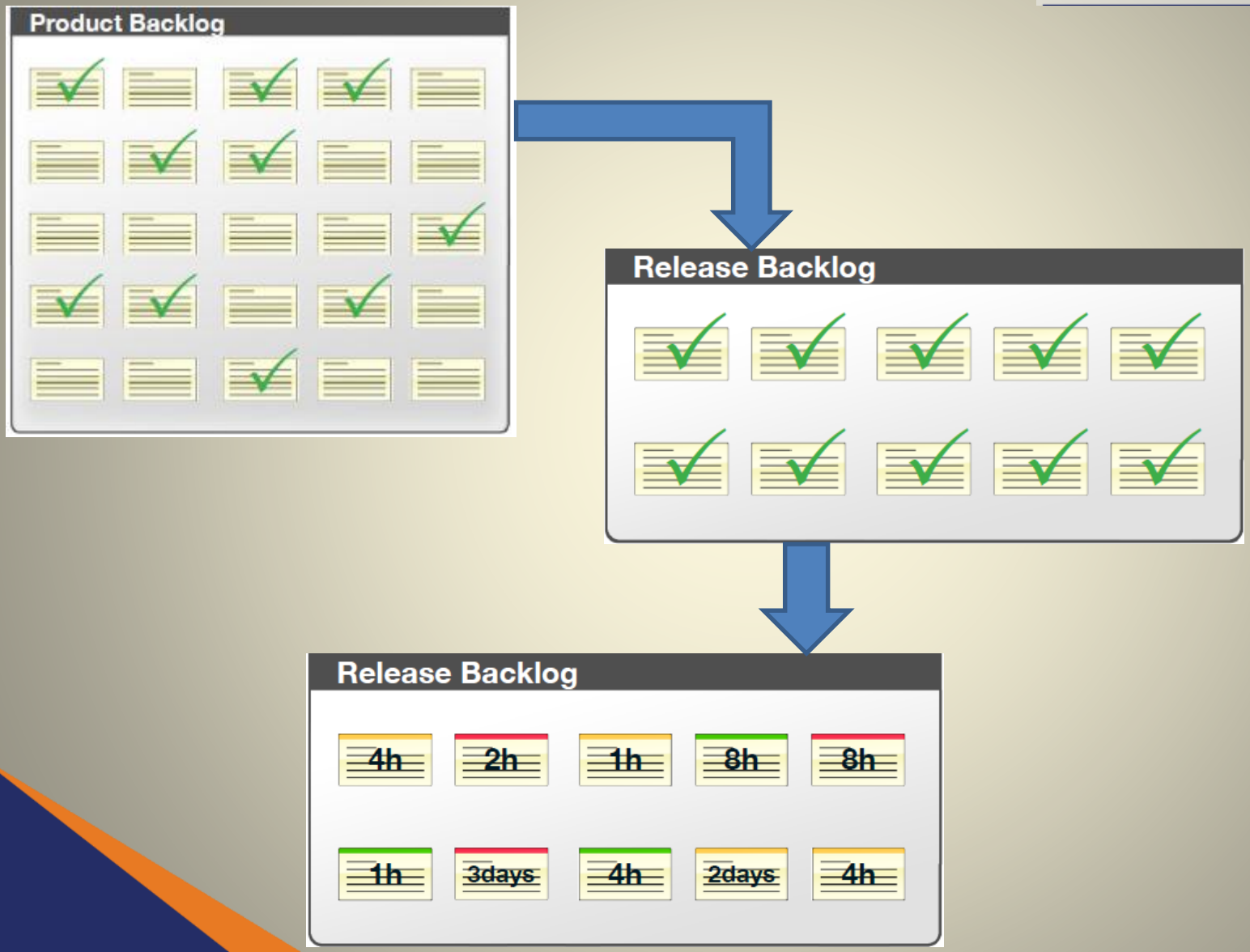




Sprint and Sprint Backlog

- An iteration in a Scrum project is known as a Sprint.
- Before starting a Sprint the Team should come up with a Sprint backlog.
- The sprint backlog (release backlog) is a list of user stories identified by the Scrum team to be completed during the sprint.
- This is a subset of Product backlog user stories defined only for a particular sprint.

Sprint Backlog



Sprint Burn Down Chart

- A burn down chart is a graphical representation of work left to do vs time.
- The outstanding work (or backlog) is often on the **vertical axis**, with time along the **horizontal**.
- That is, it is a run chart of outstanding work. It is useful for predicting when all of the work will be completed.

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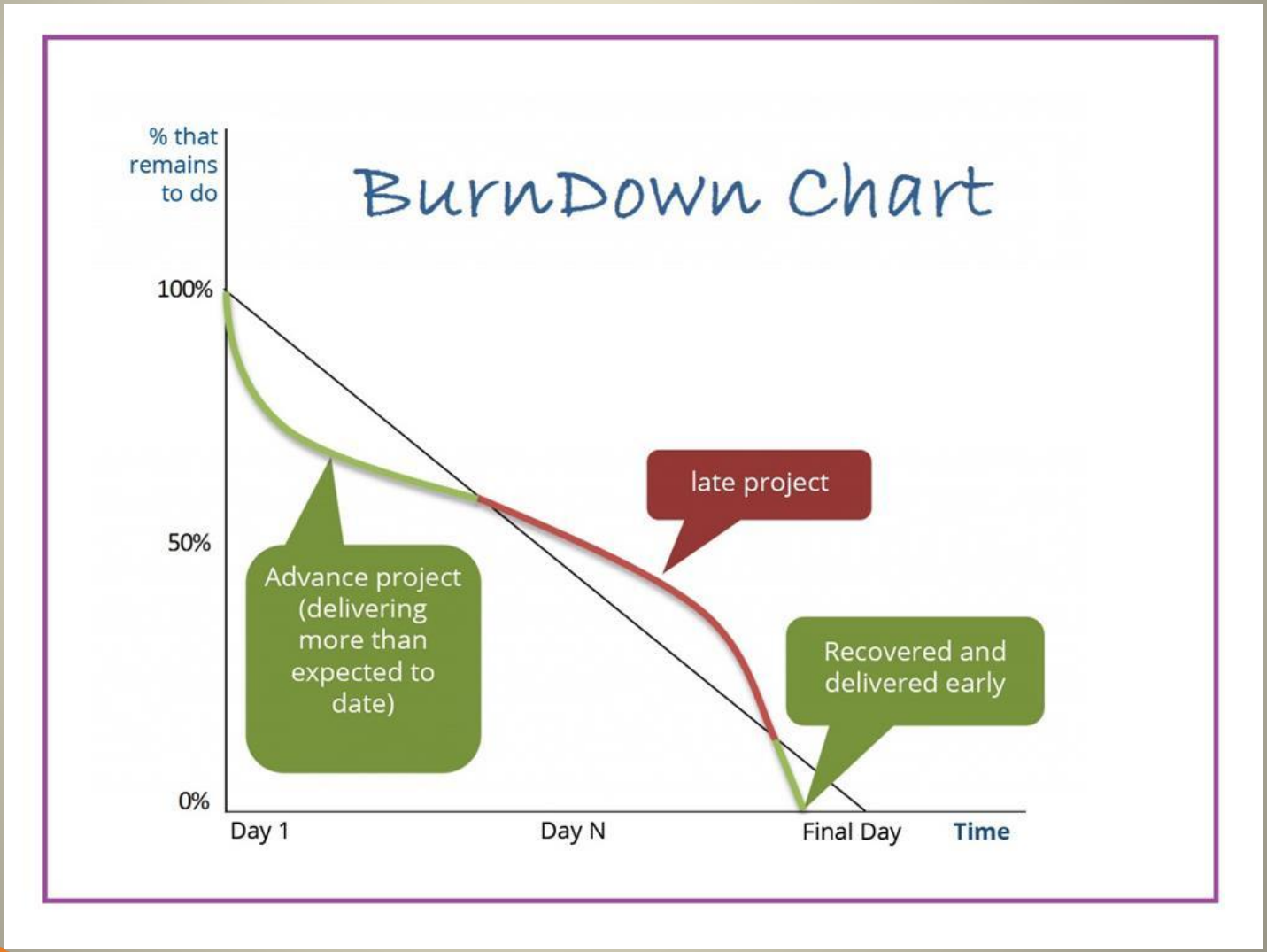
Sprint Burn Down Chart



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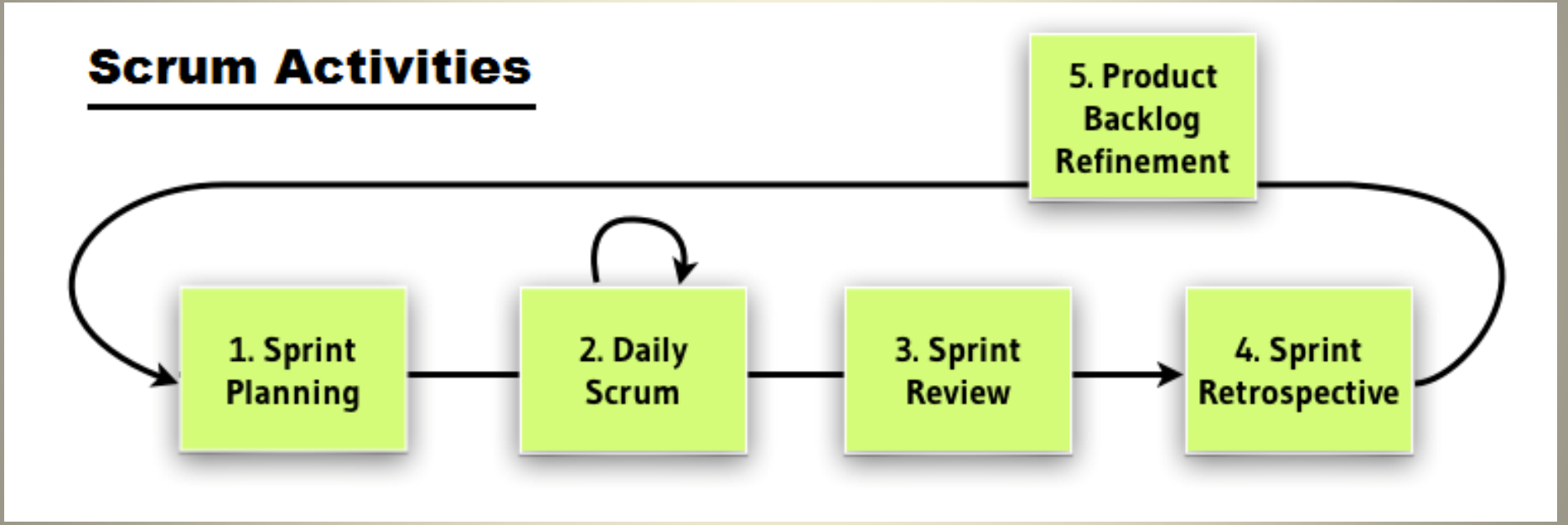
Scrum Activities



Sprint Planning

- Each Sprint may be considered a project with no more than a one-month horizon.
- Like projects, Sprints are used to accomplish something. Each Sprint has a definition of what is to be built, a design and flexible plan that will guide building it, the work, and the resultant product.

Sprint Planning Meeting

- The work to be performed in the Sprint is planned at the Sprint Planning, its a collaborative work of the entire Scrum Team.
- Time-boxed to a maximum of eight hours for a one-month Sprint.
- Sprint Planning answers the following:
  - What can be delivered in the Increment resulting from the upcoming Sprint?
  - How will the work needed to deliver the Increment be achieved?

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Daily Scrum

Daily SCRUM

- Short (15 min) frequent meetings, facilitated by the Scrum Master.
- One activity – Scrum Master asks each attendee 3 questions.
  1. What have you completed (relative to the Backlog) since the last Scrum meeting?
  2. What got in your way of completing this work?
  3. What will you do between now and the next Scrum meeting?

Sprint Review

Sprint Review

- Sprint Review is held at the end of the Sprint to inspect the Increment and adapt the Product Backlog if needed.
- ANYTHING can be changed, work can be added, eliminated, reprioritized.
- 4 hour time boxed meeting for a 1 month sprint.

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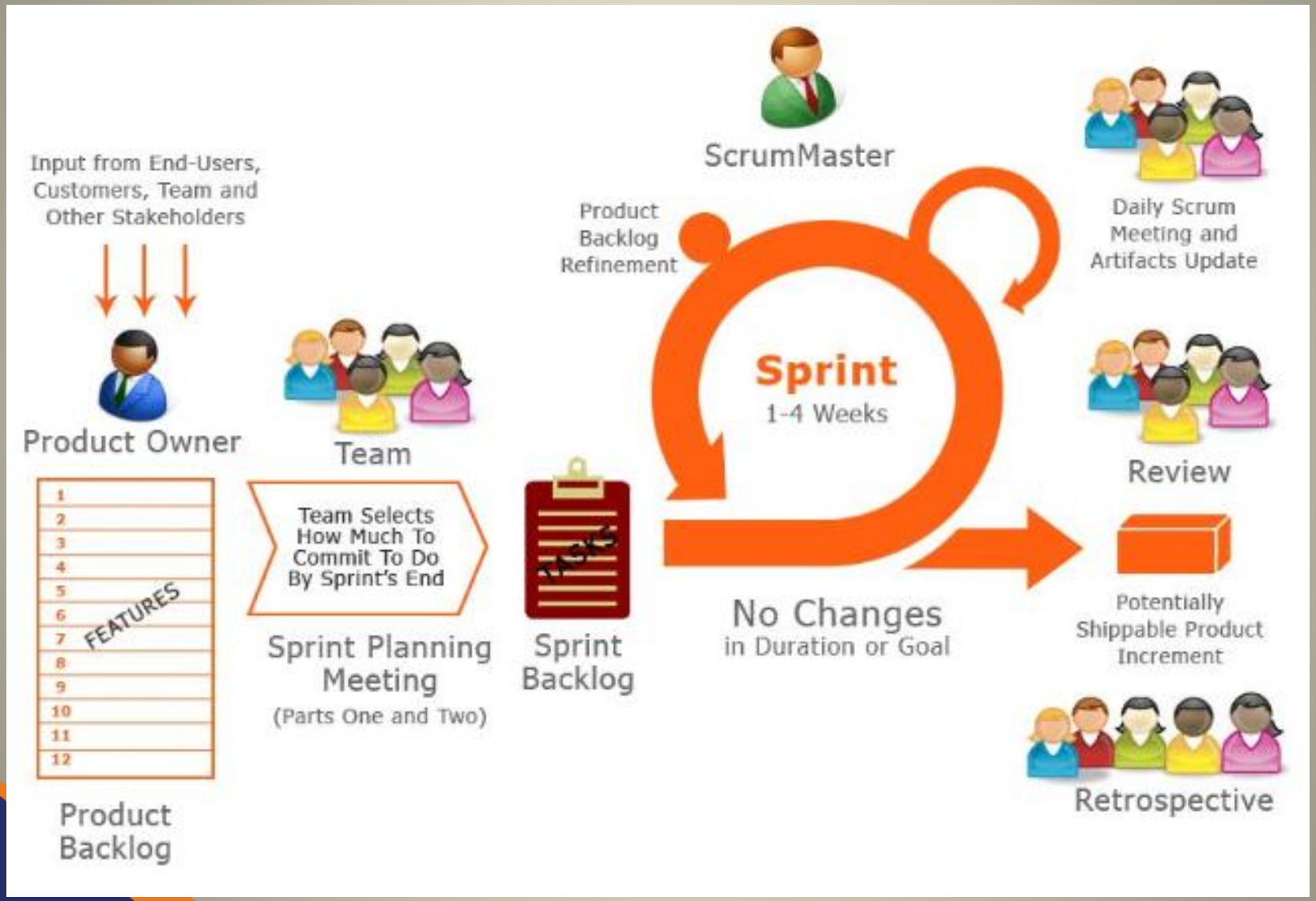
Sprint Retrospective

Sprint Retrospective

- The Sprint Retrospective occurs after the Sprint Review and prior to the next Sprint Planning.
  - Three-hour time-boxed meeting for one-month Sprint.



SCRUM Tools

- There are many tools available to manage the SCRUM process development.
  - Targetprocess
  - Trello

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Activity

- Form your project group.
- Choose a Scrum Master for your group.
- Chose 1-designer, 2-developers and 1 QA Engineer.
- Consider the lecturer as the Product Owner
- Prepare user stories for your case study (at least 10)
- Prioritize and arrange them in product backlog.

Activity Contd...

- Select user stories from the product backlog into three releases.
- Select a release and prepare the sprint backlog.

References

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