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# Modern Software Development Methodologies

AGILE

# Session Outcomes

- Traditional Development Methodologies
- What is AGILE?
- Agile Development Methodologies
  - SCRUM
  - SCRUM Roles
  - SCRUM Processes
  - SCRUM Artefacts
  - SCRUM Tools

# Traditional Models

- What are the traditional development models you know of?
  - Classical Waterfall model
  - Iterative waterfall model
  - Prototype model
  - Spiral model

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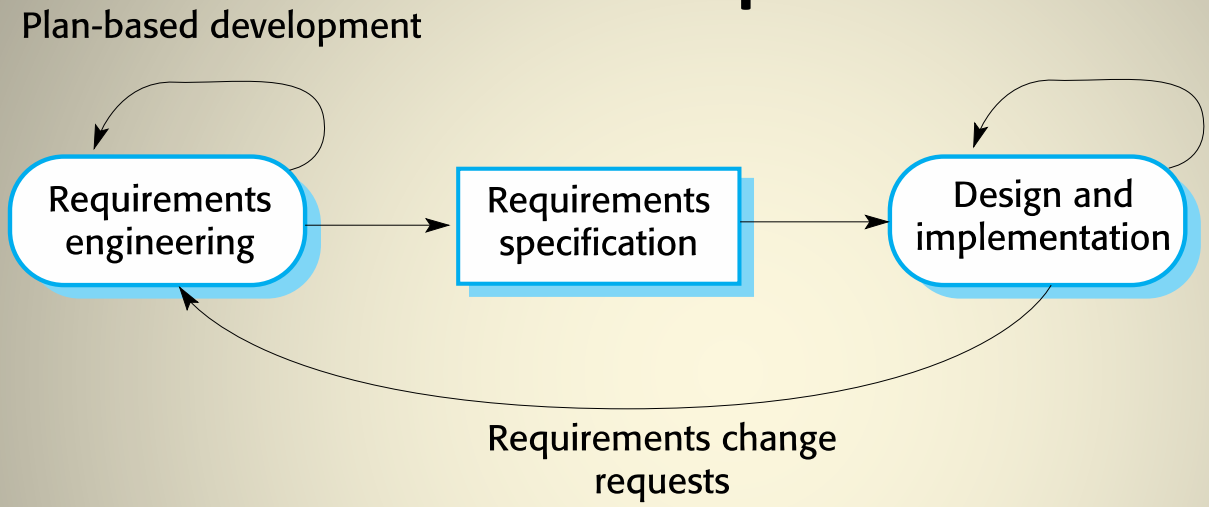
# Traditional Models

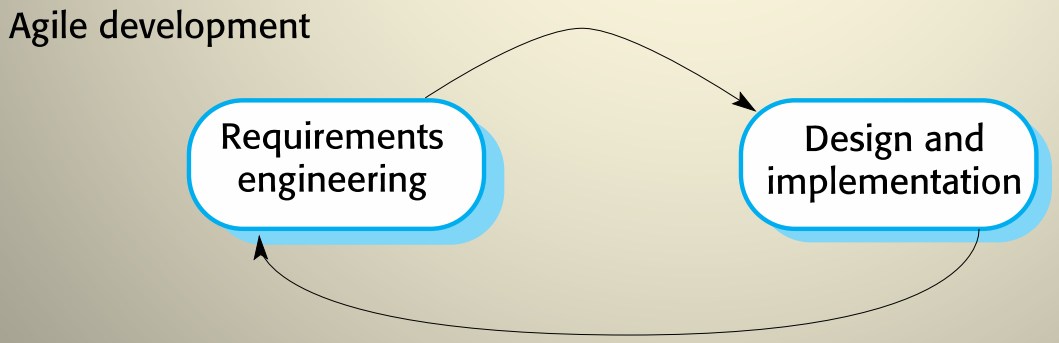
- What are the known issues in traditional development methods?
  - High Cost
  - Changes are not acceptable
  - Can detect errors only in the latter part of the SDLC
  - Less or no iterations
  - Lack of transparency

# 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




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

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# AGILE

# What is AGILE?- Definition

- 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**

# In Summary ….

- AGILE provides a foundation for the teams to build software
  - With the highest value
  - With high quality
  - With in the shortest time

# Activity

- Do you have an Agile or Fixed mindset?
  - Form your project group.
  - Choose a Scrum Master for your group.
  - Scrum Master with the help of the group categorize the following items into An agile or growth mindset/A fixed mindset
    - an agile or growth mindset is an attitude that equates failure and problems with opportunities for learning
    - a fixed mindset believes that basic skills, intelligence, and qualities are inherent and fixed.

# Activity Items

- Learn by doing
- Feedback is about current capabilities
- Right the first time
- Fail fast
- Think and learn
- Feedback is personal
- Embrace challenges
- Desire to look smart
- No need to change or improve
- Avoid Failure
- Can be wrong the first time
- Trust team members

# AGILE manifesto

- The Agile Manifesto, also called 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.

**Ref: What is Agile Manifesto? - Definition from WhatIs.com**

# 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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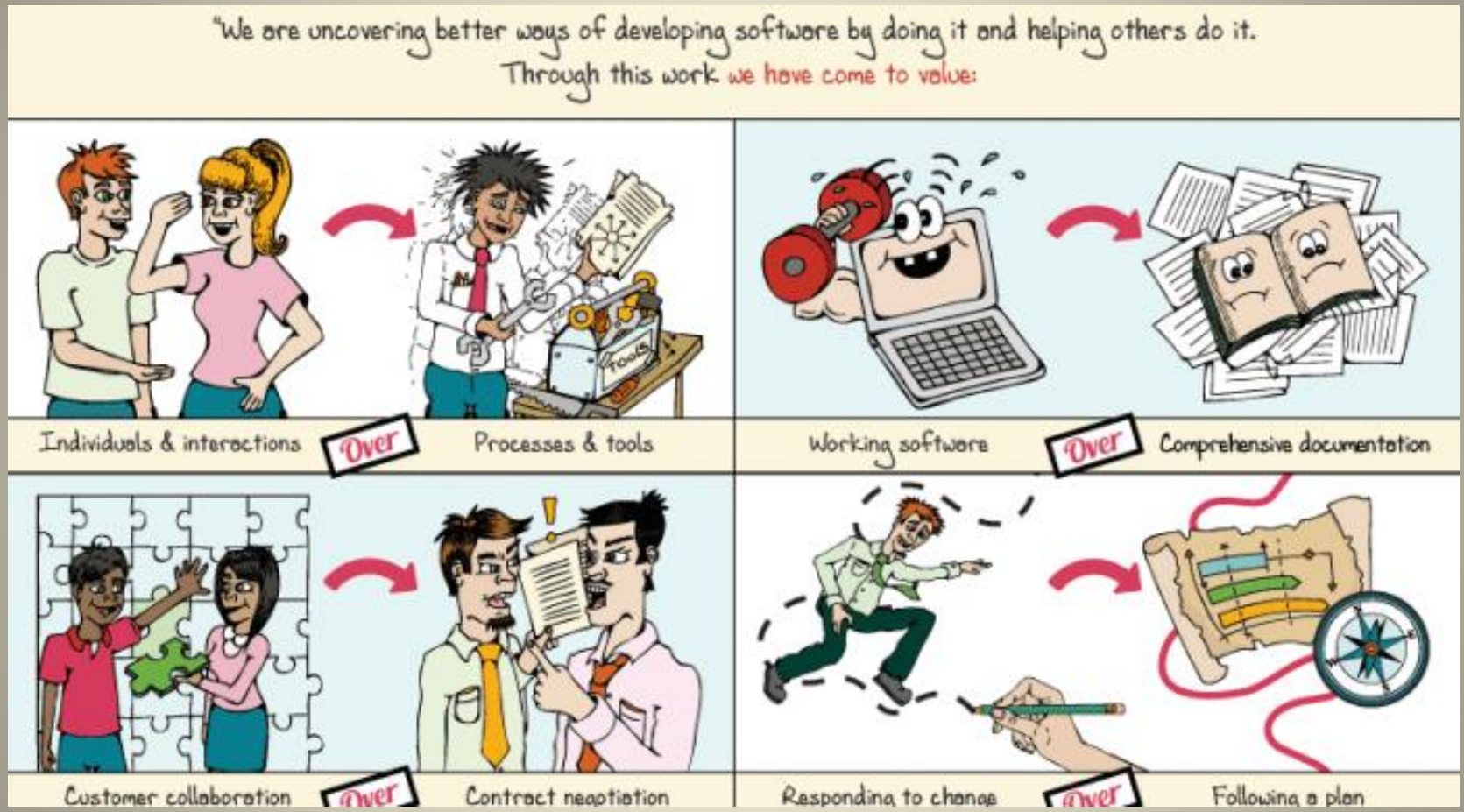
# Agile Manifesto



# Activity

- Compare and contrast a Library Management System if developed with traditional way and with AGILE.

# 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

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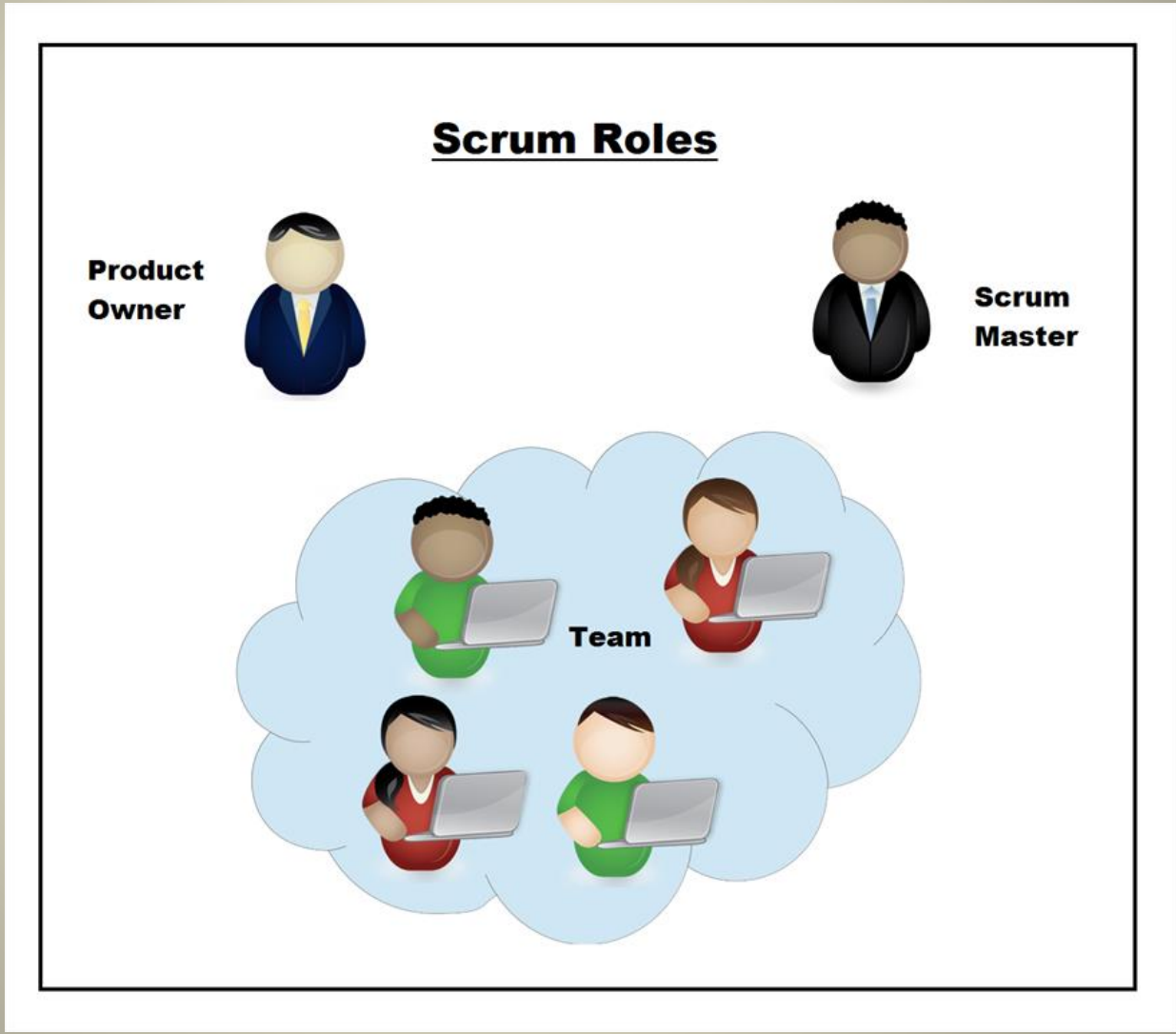
# What is SCRUM?

- 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



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# 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.

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# Activity

1. How should work be allocated to the team in an Agile project?
   a) The Team Leader(Scrum Master) should allocate specific tasks to individuals
   b) Tasks should be randomly allocated to team members, using Planning Poker
   c) Team members should self select tasks appropriate to their skills
   d) The most complex tasks should be allocated by the Team Leader (Scrum Master)

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# Activity

1. An Agile team ...
   a) Is self - organizing, with each member having the same technical skills.
   b) Collaborates and supports its team members
   c) Ensures that weak members of the team are allocated the simpler tasks
   d) Ensures blame is allocated fairly

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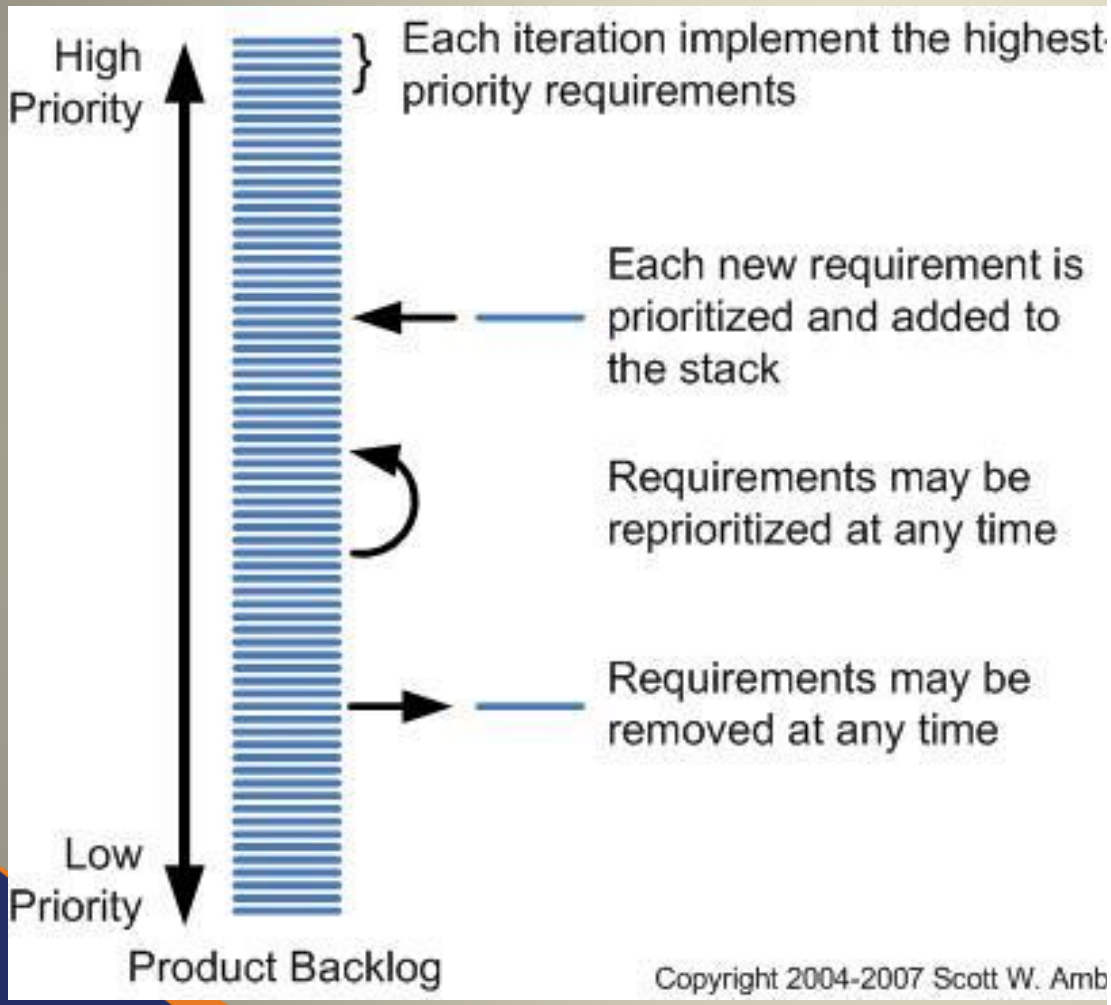
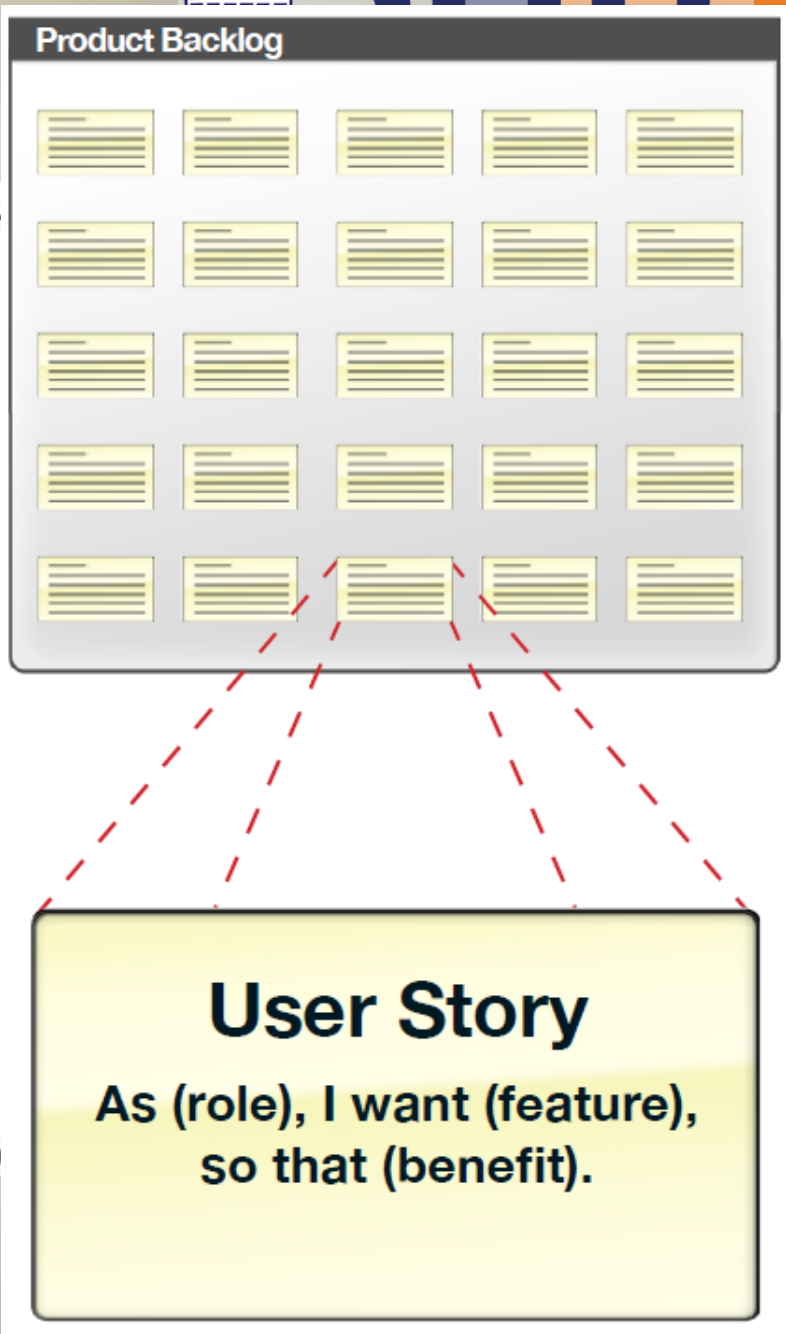
# SCRUM Artifacts

- Product Backlog
- Sprint Backlog
- Burn down Charts

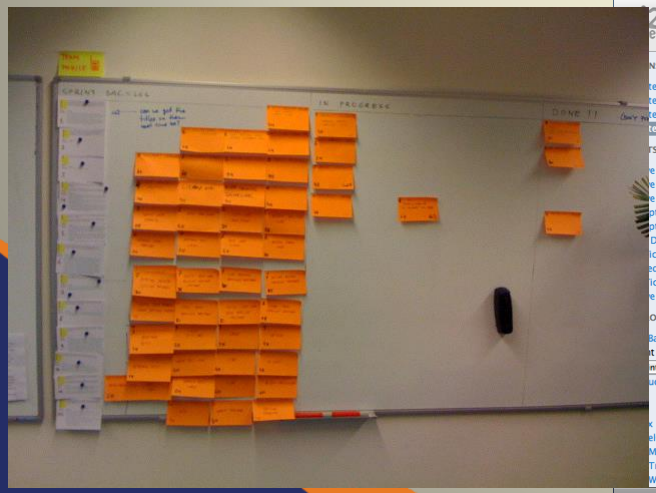
# Product Backlog

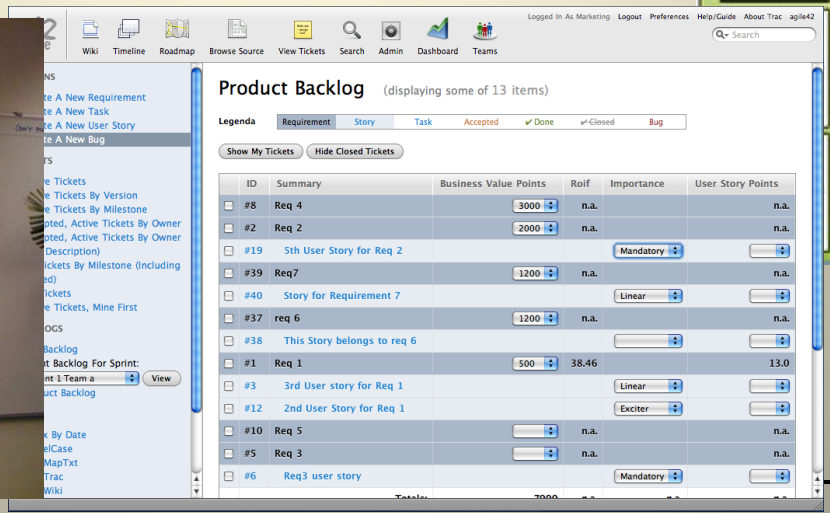


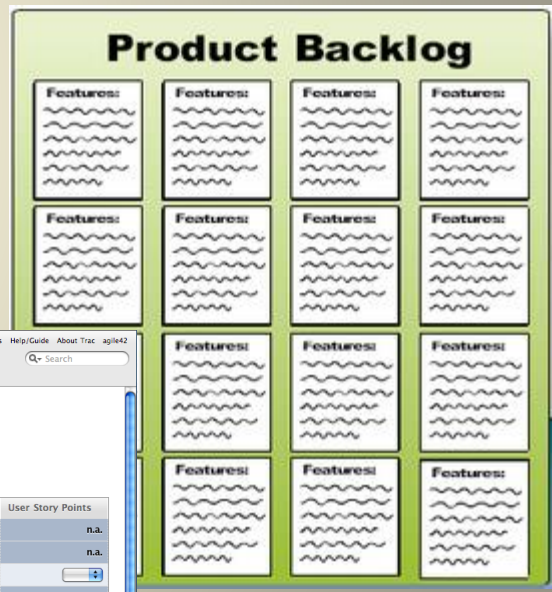



# Creating the product backlog

- 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





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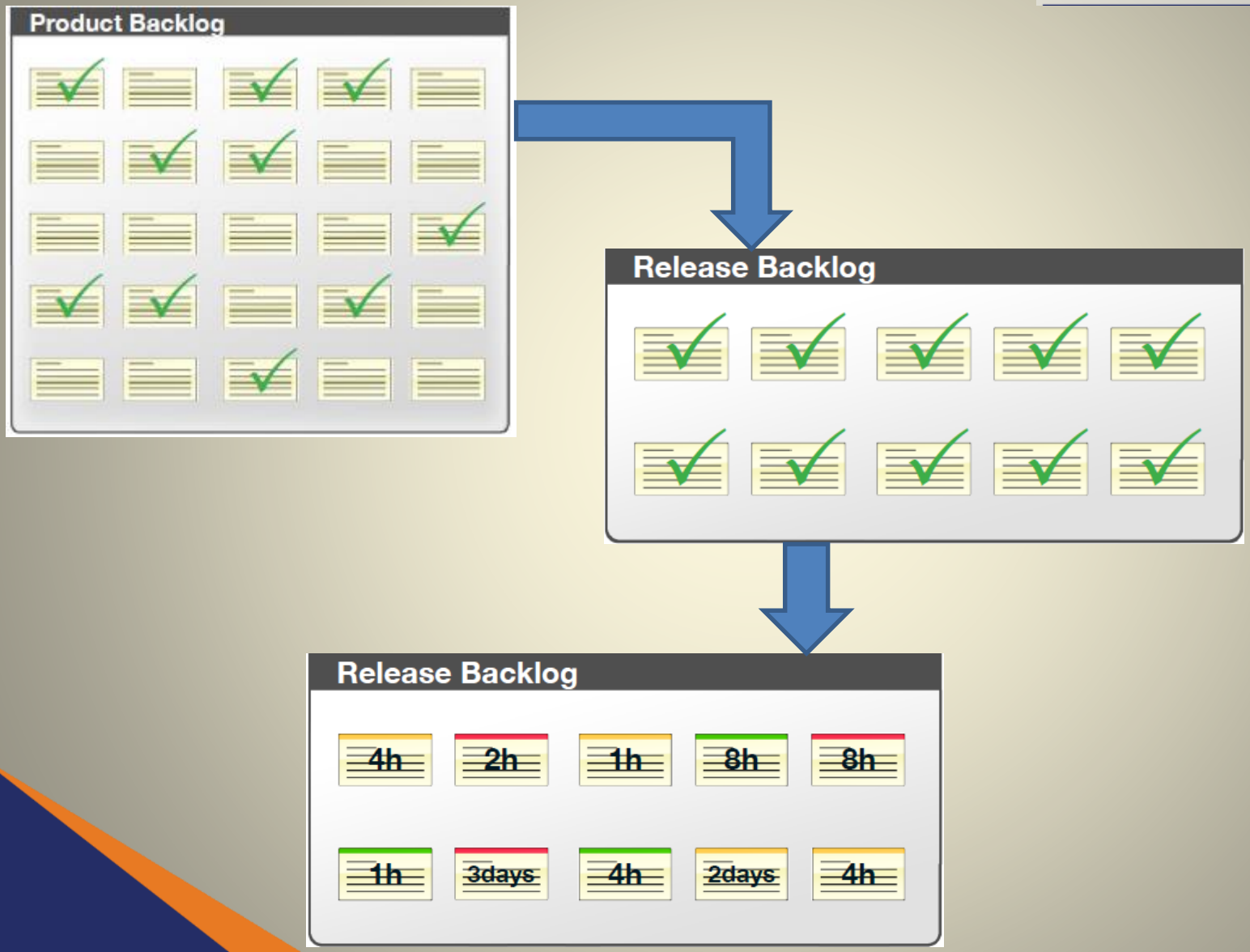
# Activity

1. Who is responsible for prioritizing the product backlog?
   a) Product Owner
   b) SCRUM Master
   c) Lead Developer
   d) End Customer

# 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



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# Activity

1. Who is responsible for all estimates of the Product Backlog items?
   a) The Product Owner
   b) The Development Team
   c) The Scrum Master
   d) The Scrum Team

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# 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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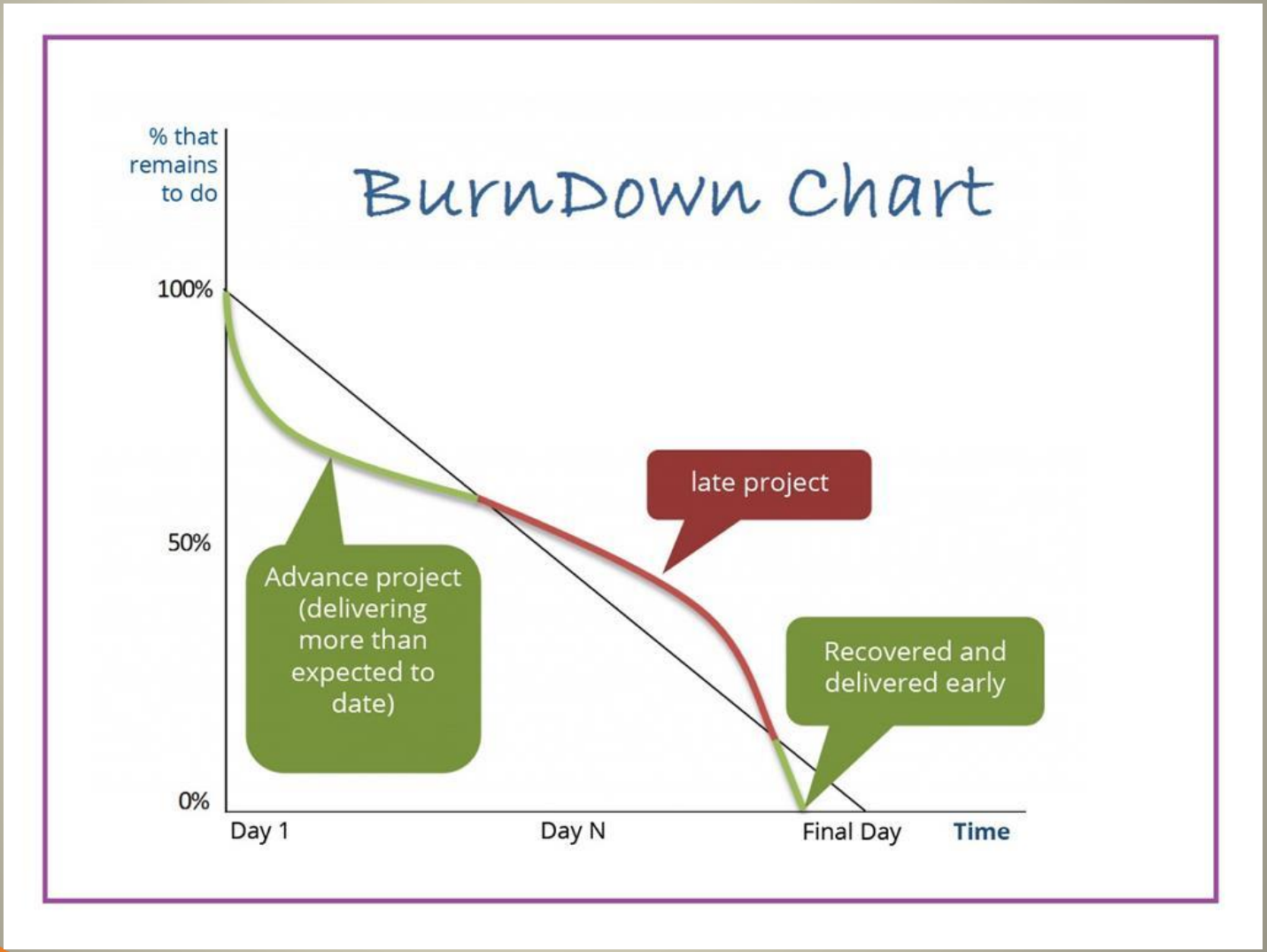
# Sprint Burn Down Chart



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# Activity

1. What is the Scrum Master responsible for?
   a) Ensuring the Scrum Team adheres to Scrum theory, practices, and rules
   b) Ensuring the Product Backlog is visible, transparent, and clear to all
   c) Ensuring the Development Team understands items in the Product Backlog to the level needed
   d) Ensuring Scrum is understood and enacted

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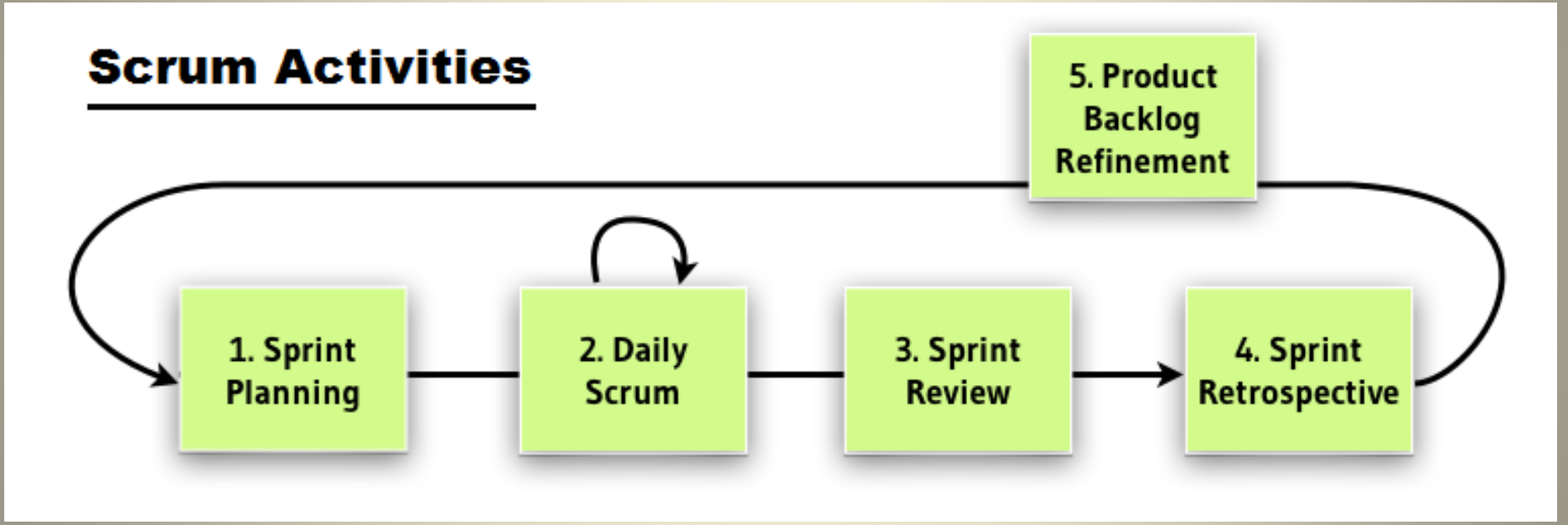
# Scrum Activities



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# 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.

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# 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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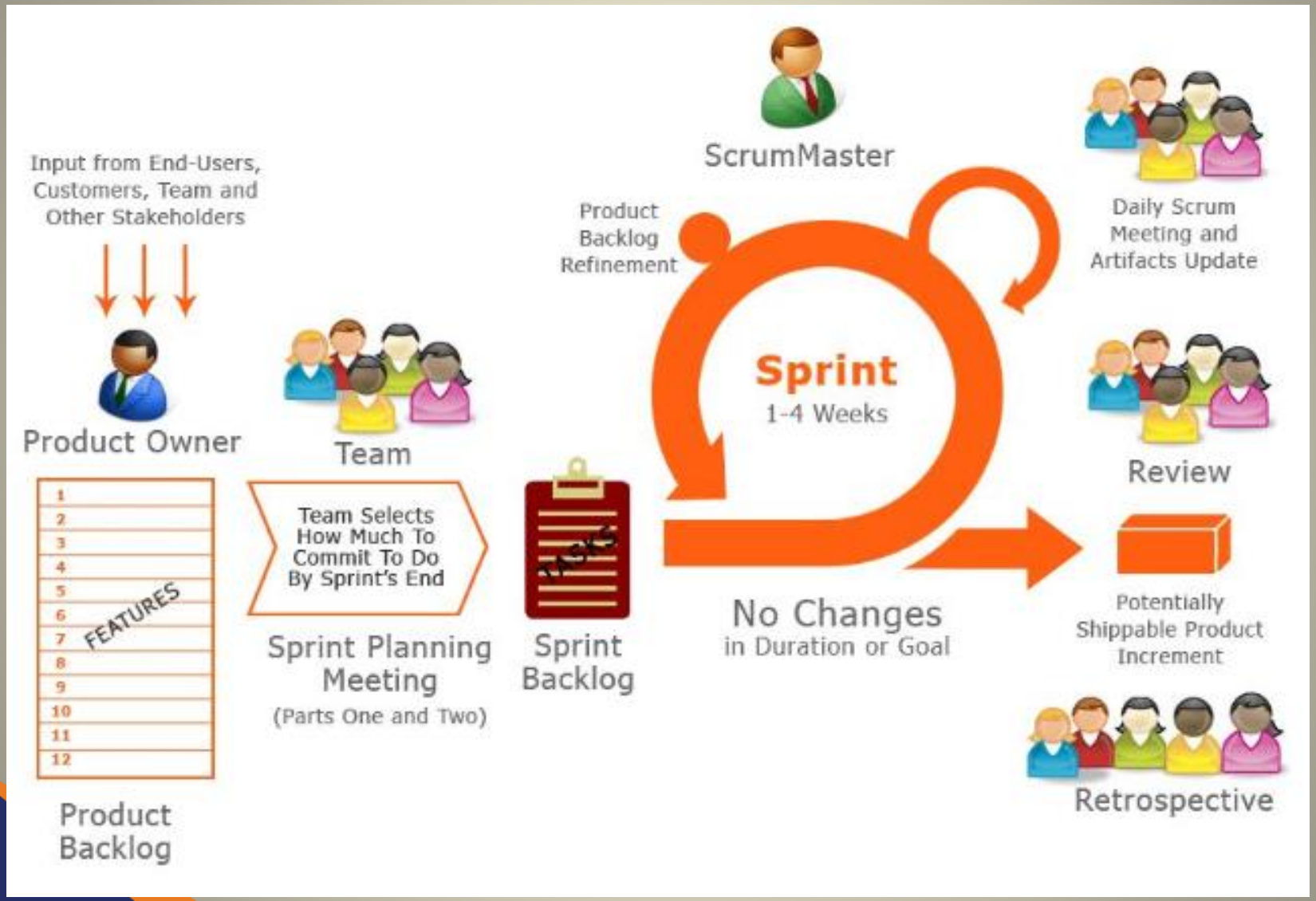
# Sprint Retrospective

# 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.

# Activity

1. When is the work planned for the first days of a Sprint decomposed?
   a) At the end of Sprint Review
   b) At the end of Sprint Planning
   c) At the first Daily Scrum
   d) At the beginning of Sprint Retrospective


Input from End-Users, Customers, Team and Other Stakeholders
Product Owner
Team
1
2
3
4
5
6
7
8
9
10
11
12
FEATURES
Product Backlog
Team Selects How Much To Commit To Do By Sprint's End
Sprint Planning Meeting
(Parts One and Two)
TASKS
Sprint Backlog
ScrumMaster
Product Backlog Refinement
Sprint
1-4 Weeks
No Changes
in Duration or Goal
Daily Scrum Meeting and Artifacts Update
Review
Potentially Shippable Product Increment
Retrospective

# 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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