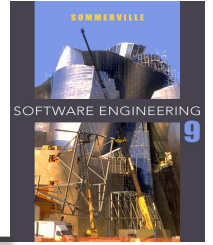


# CSE 470 : Software Engineering

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## Agile Software Development

# Topics

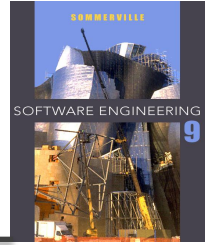
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- ✧ Agile Software Development
- ✧ Agile manifesto
- ✧ Agile Characteristics
- ✧ Existing Agile Methods
  - Extreme Programming
  - Agile Unified Process
  - Scrum

# Agile Software Development (cont.)

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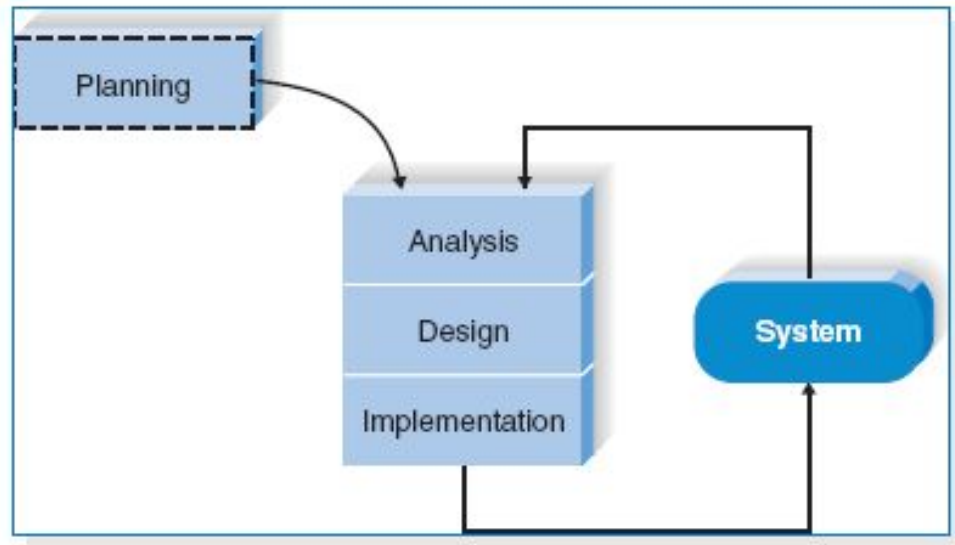


- ✧ Dissatisfaction with the overheads involved in software design methods of the 1980s and 1990s led to the creation of agile methods. These methods:
  - Focus on the **code** rather than the design
  - Are based on an **iterative approach** to software development
  - Are intended to **deliver working software quickly** and evolve quickly to meet changing requirements.
- ✧ The aim of agile methods is to **reduce overheads** in the software process (e.g. by limiting documentation) and to be able to respond quickly to changing requirements without excessive rework.

# Agile Software Development (cont.)



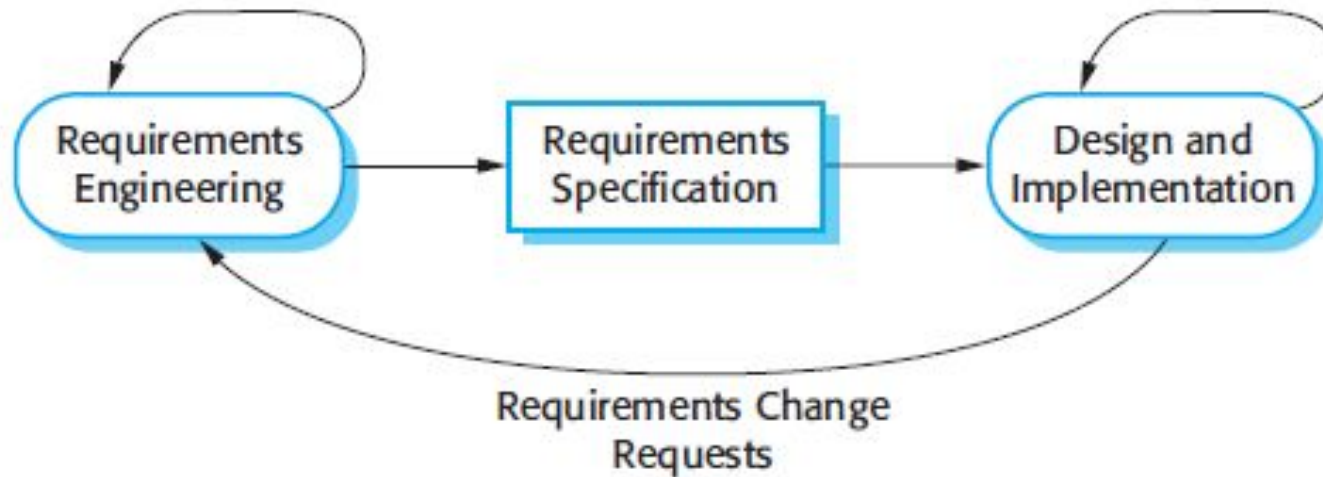
- ✧ **Agile software development** is a conceptual framework for software engineering that promotes development iterations throughout the life-cycle of the project.
- ✧ Software developed during one unit of time is referred to as an iteration, which may last from one to four weeks.
- ✧ Agile methods also emphasize working software as the primary measure of progress



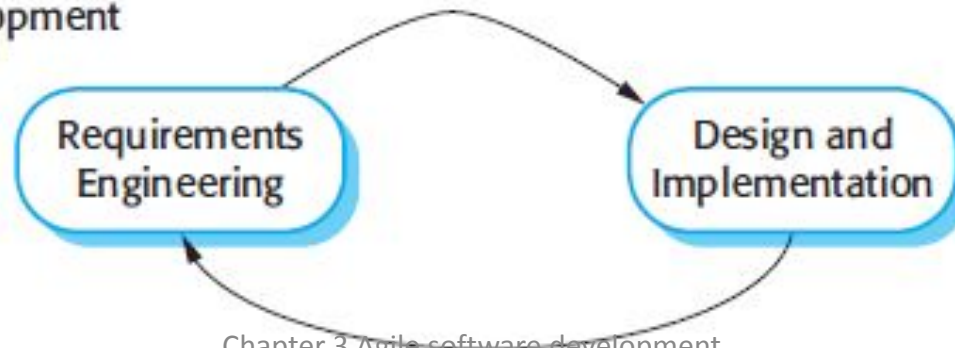
# Plan-driven and agile specification



## Plan-Based Development

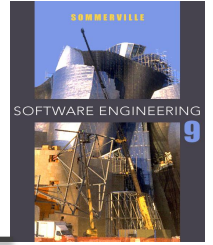


## Agile Development



# Agile Software Development (cont.)

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- ✧ Characteristics of Agile Software Development
  - Light Weighted methodology
  - Small to medium sized teams
  - vague and/or changing requirements
  - vague and/or changing techniques
  - Simple design
  - Minimal system into production

# Agile manifesto

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- ✧ *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.*

# Agile Characteristics

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- ✧ Modularity
- ✧ Iterative
- ✧ Time-bound
- ✧ Incremental
- ✧ Convergent
- ✧ People-oriented
- ✧ Collaborative



# Existing Agile Methods

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✧ Extreme Programming (“XP”)

✧ Agile Unified Process

✧ Scrum

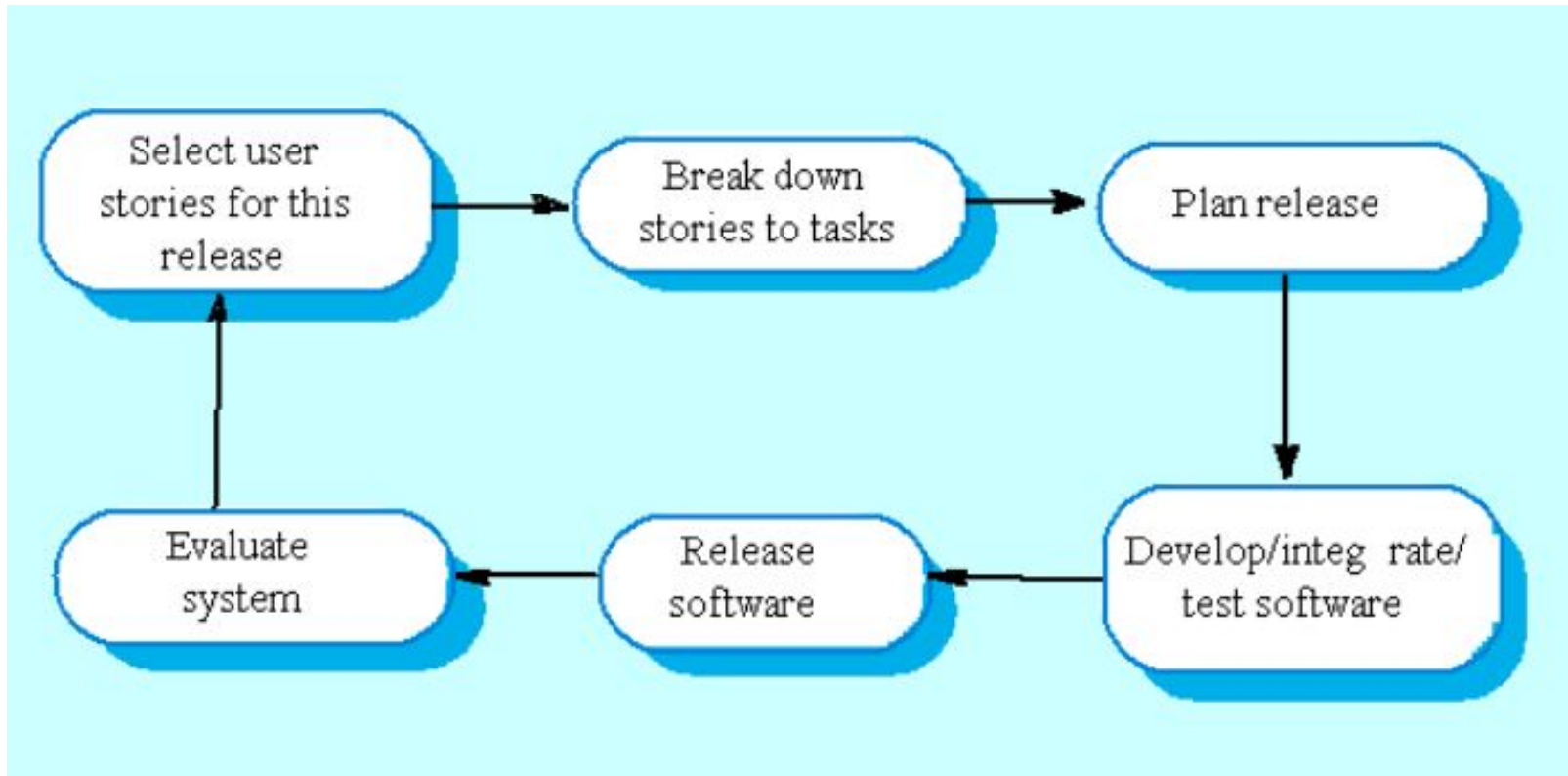
# Extreme Programming

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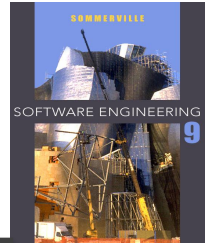


- ✧ Perhaps the best-known and most widely used agile method.
  
- ✧ Extreme Programming (XP) takes an ‘extreme’ approach to iterative development.
  - New versions may be built several times per day;
  - Increments are delivered to customers every 2 weeks;
  - All tests must be run for every build and the build is only accepted if tests run successfully.

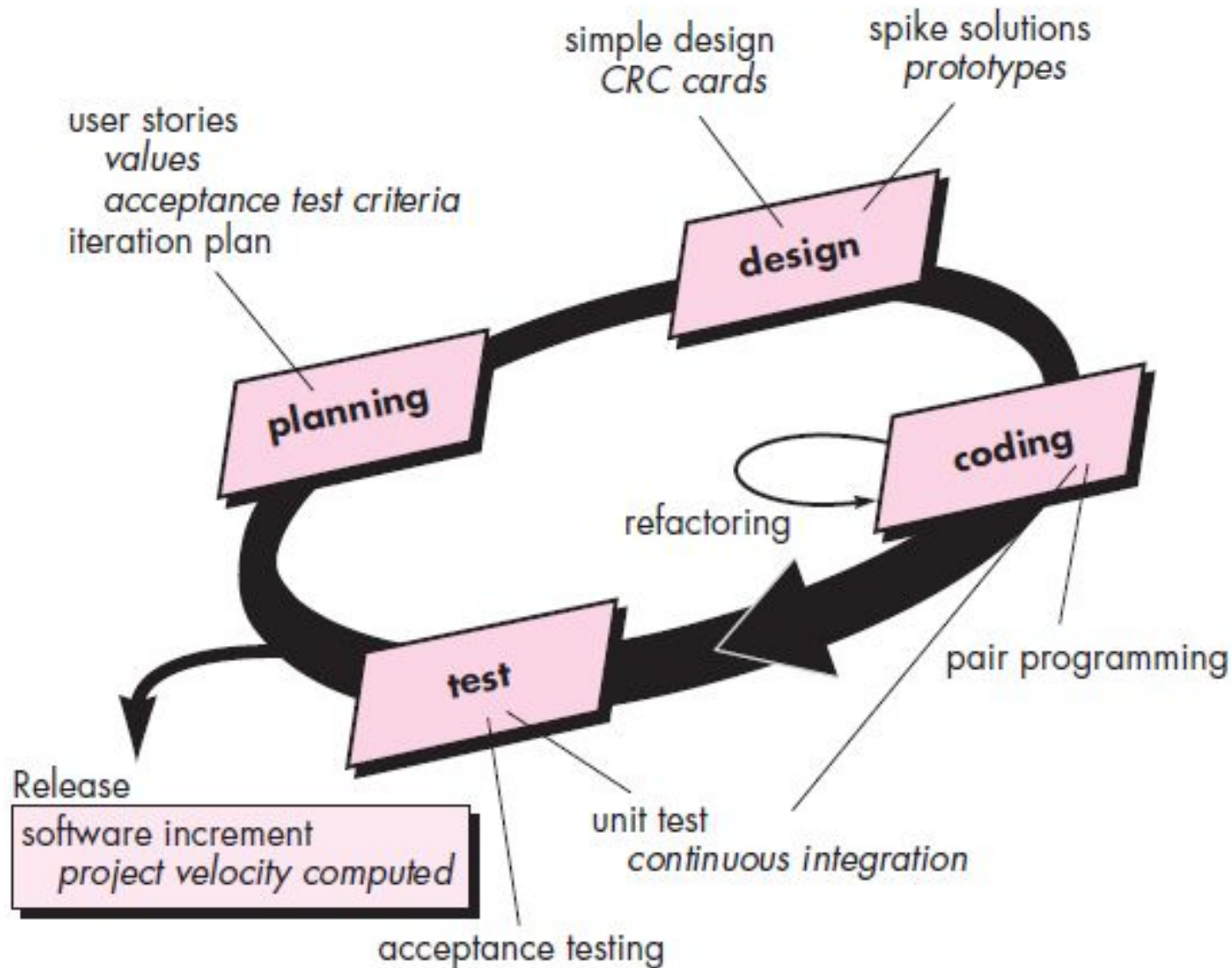
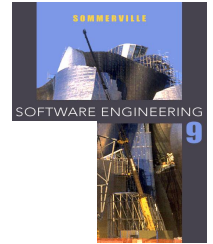
# Extreme Programming



# Extreme Programming Project

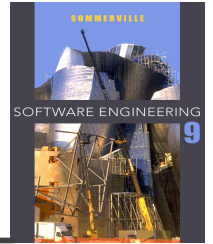


# Extreme Programming Project



# XP Principle or Practice

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Incremental planning

Small releases

Simple design

Test-first development

Refactoring

Pair programming

Collective ownership

Continuous integration

Sustainable pace

On-site customer

# Agile Unified Process

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- ✧ Agile Unified Process (AUP) is a simplified version of the Rational Unified Process (RUP).

## Phases of AUP

- Inception (scope of the project)
- Elaboration (basic architecture design)
- Construction (implementation)
- Transition (final product release)

# Disciplines of AUP

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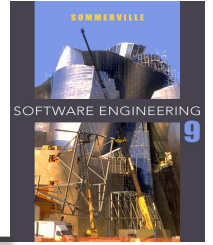


- Business Modelling (requirements and design)
- Implementation
- Test
- Deployment
- Configuration and Change Management
- Project Management
- Environment



# Scrum

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- It is an Agile S/W development method for project management

## Characteristics:

- Prioritized work is done
- Completion of backlog items
- Progress is explained
- Agile Software Development

# Scrum Framework



## Roles

- Product owner
- Scrum Master
- Team

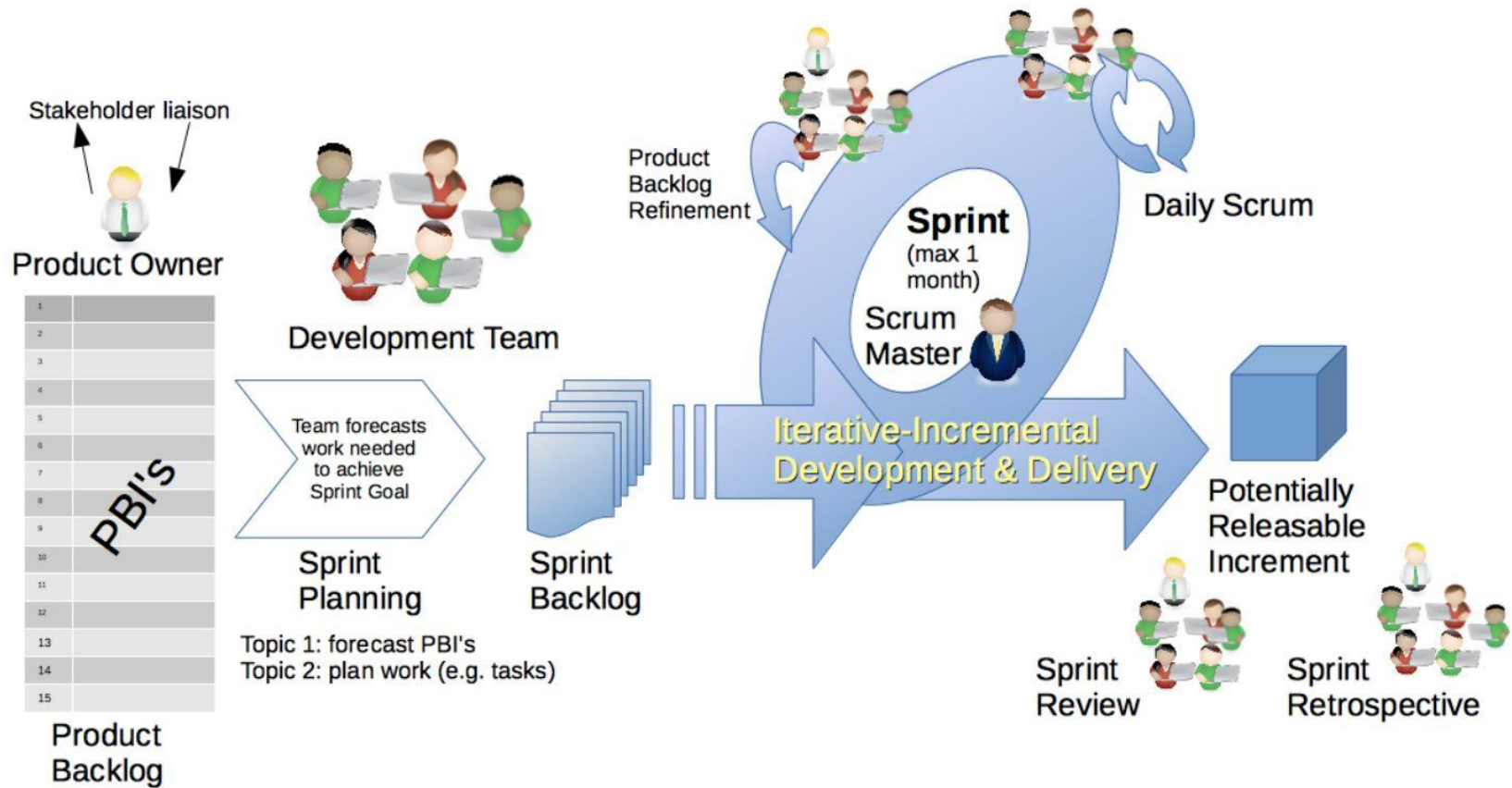
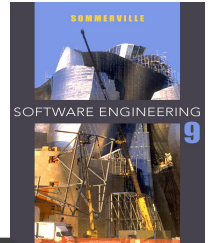
## Ceremonies

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

## Artifacts

- Product backlog
- Sprint backlog
- Burndown charts

# Scrum Framework (cont.)

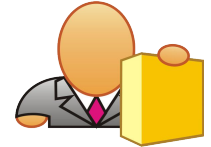


# Scrum Roles



- Product Owner

- Possibly a Product Manager or Project Sponsor
- Decides features, release date, prioritization, \$\$\$



- Scrum Master

- Typically a Project Manager or Team Leader
- Responsible for enacting Scrum values and practices
- Remove impediments / politics, keeps everyone productive

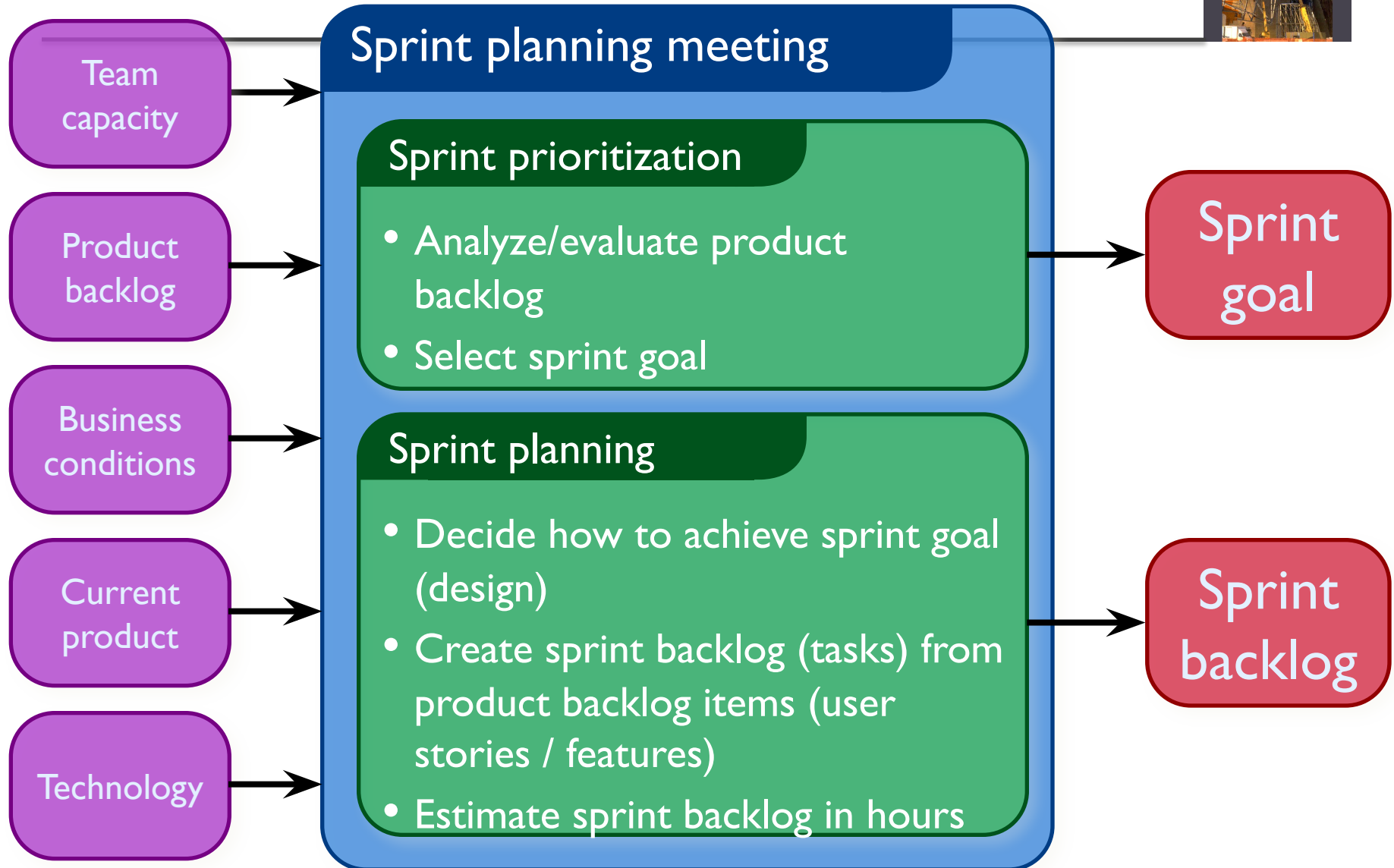


- Project Team

- 5-10 members; Teams are self-organizing
- Cross-functional: QA, Programmers, UI Designers, etc.
- Membership should change only between sprints



# Sprint Planning Mtg.



# Daily Scrum Meeting

- Parameters

Daily, ~15 minutes, Stand-up

Anyone late pays a \$1 fee

- Not for problem solving

Whole world is invited

Only team members, Scrum Master, product owner, can talk

Helps avoid other unnecessary meetings

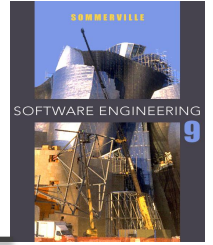
- Three questions answered by each team member:

1. What did you do yesterday?
2. What will you do today?
3. What obstacles are in your way?



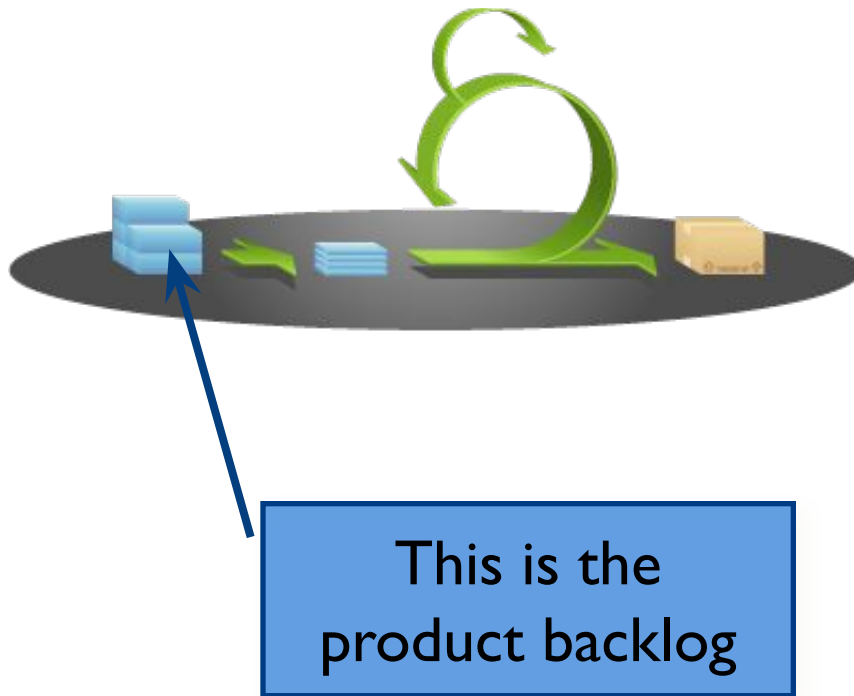
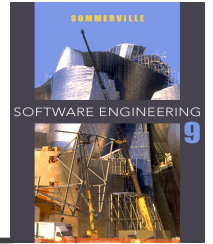
# Scrum's Artifacts

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- ✧ Scrum has remarkably few artifacts
  - Product Backlog
  - Sprint Backlog
  - Burndown Charts
  
- ✧ Can be managed using just an Excel spreadsheet
  - More advanced / complicated tools exist:
    - Expensive
    - Web-based – no good for Scrum Master/project manager who travels
    - Still under development

# Product Backlog



This is the  
product backlog

- The requirements
- A list of all desired work on project
- Ideally expressed as a list of user stories along with "story points", such that each item has value to users or customers of the product
- Prioritized by the product owner
- Reprioritized at start of each sprint



# User Stories

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- ✧ Instead of Use Cases, Agile project owners do "user stories"
  - **Who** (user role) – Is this a customer, employee, admin, etc.?
  - **What** (goal) – What functionality must be achieved/developed?
  - **Why** (reason) – Why does user want to accomplish this goal?

As a [user role], I want to [goal], so I can [reason].

- ✧ Example:
  - "As a user, I want to log in, so I can access subscriber content."
- ✧ **story points**: Rating of effort needed to implement this story
  - common scales: 1-10, shirt sizes (XS, S, M, L, XL), etc.

# Sample Product Backlog



| Backlog item   | Estimate         |
|--|------------------|
| Allow a guest to make a reservation  | 3 (story points) |
| 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               |

# Sprint Backlog

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- ✧ Individuals sign up for work of their own choosing
  - Work is never assigned
- ✧ Estimated work remaining is updated daily
- ✧ Any team member can add, delete change sprint backlog
- ✧ Work for the sprint emerges
- ✧ 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

# Sample Sprint backlog



| Tasks                   | Mon | Tue | Wed | Thu | Fri |
|-------------------------|-----|-----|-----|-----|-----|
| Code the user interface | 8   | 4   | 8   |     |     |
| Code the middle tier    | 16  | 12  | 10  | 4   |     |
| Test the middle tier    | 8   | 16  | 16  | 11  | 8   |
| Write online help       | 12  |     |     |     |     |
| Write the Foo class     | 8   | 8   | 8   | 8   | 8   |
| Add error logging       |     |     | 8   | 4   |     |

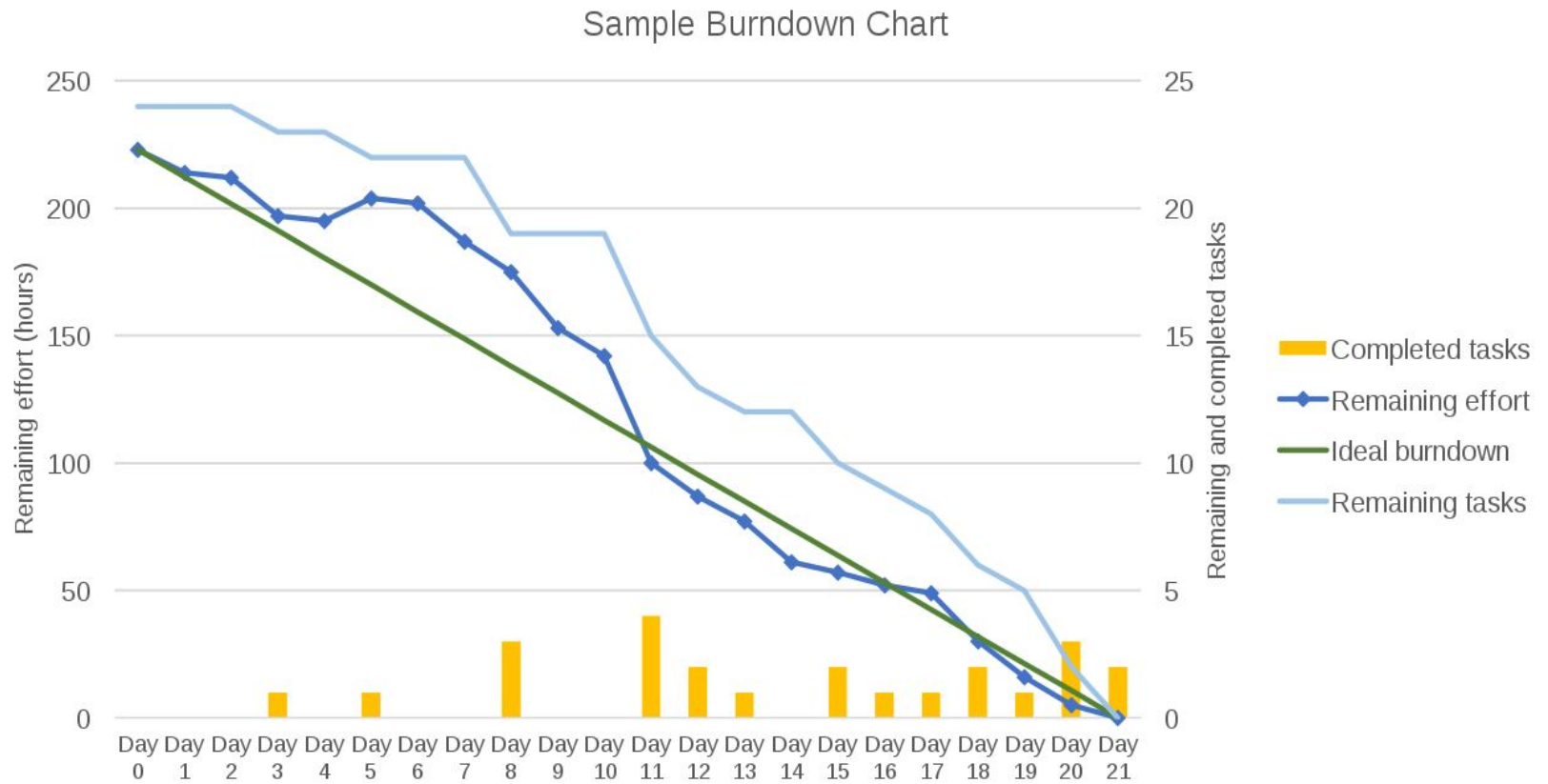
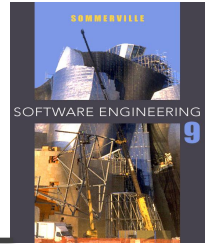
# Sprint Burndown Chart

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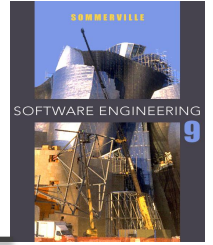


- ✧ A display of what work has been completed and what is left to complete
  - one for each developer or work item
  - updated every day
  - (make best guess about hours/points completed each day)
  
- ✧ *variation:* Release burndown chart
  - shows overall progress
  - updated at end of each sprint

# Sprint Burndown Chart



# The Sprint Review

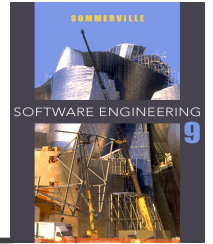


- ✧ Team presents what it accomplished during the sprint
- ✧ Typically takes the form of a demo of new features or underlying architecture
- ✧ Informal
  - 2-hour prep time rule
  - No slides
- ✧ Whole team participates
- ✧ Invite the world



# Credits, References

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