# CSCB07 - Software Design

## Agile Software Development

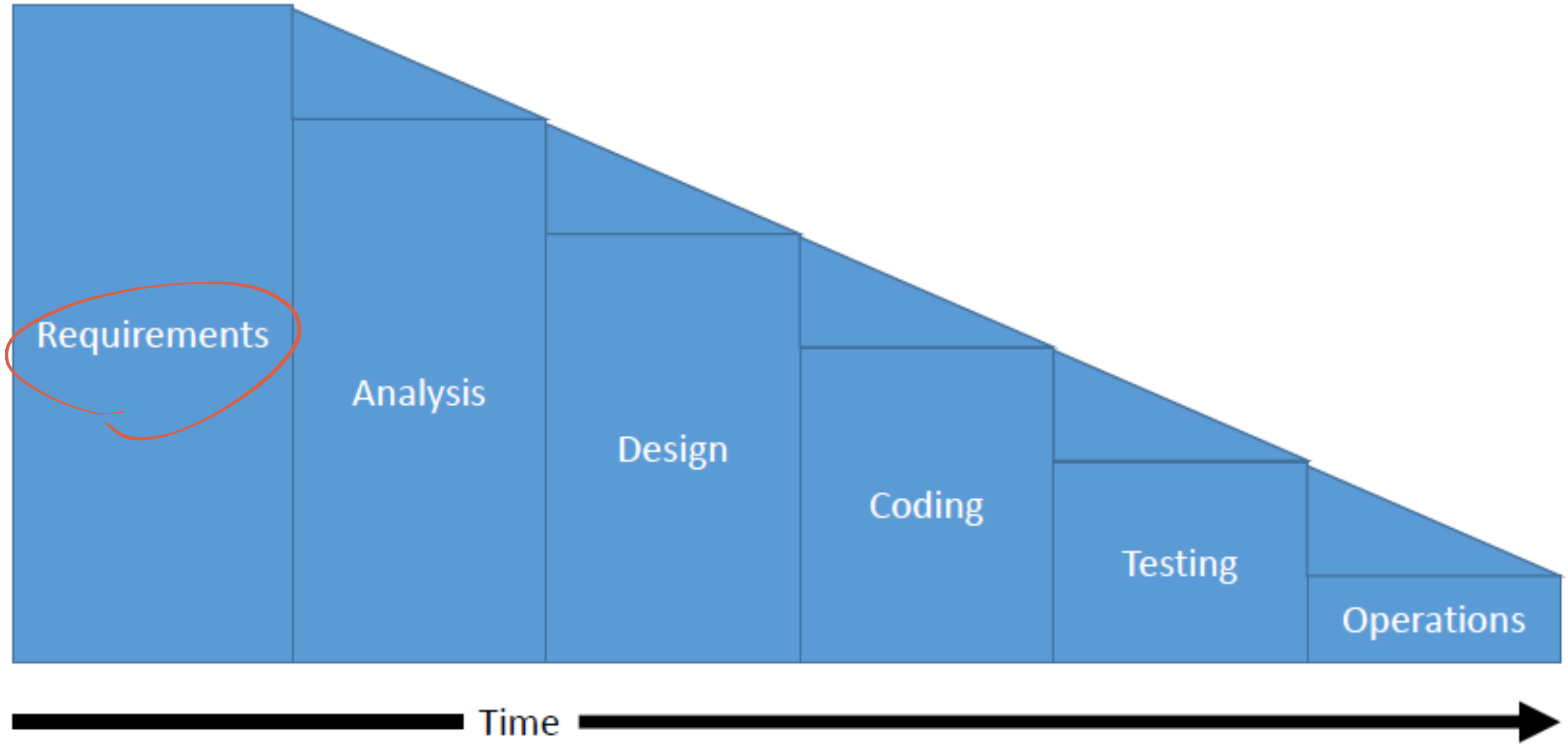
Fall 2023

# Software Development Process

- A systematic methodology for building and maintaining software
- It involves various stages such as requirements elicitation, design, implementation, and testing.
- Two contrasting approaches:
  - Waterfall
  - Agile

# Waterfall model

- A traditional approach for software development
- Sequential (non-iterative) model



# Agile

- Issues with Waterfall
  - Inappropriate when requirements change frequently
  - Time gets squeezed the further into the process you get → want. feedback.
- Agile Methodologies
  - Extreme Programming (XP)
  - Scrum
  - Test-driven Development (TDD)
  - Feature-driven Development (FDD)
  - Etc.

# Agile Manifesto

*“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 aspect

Beck, K., et al. (2001) Manifesto for agile software development.

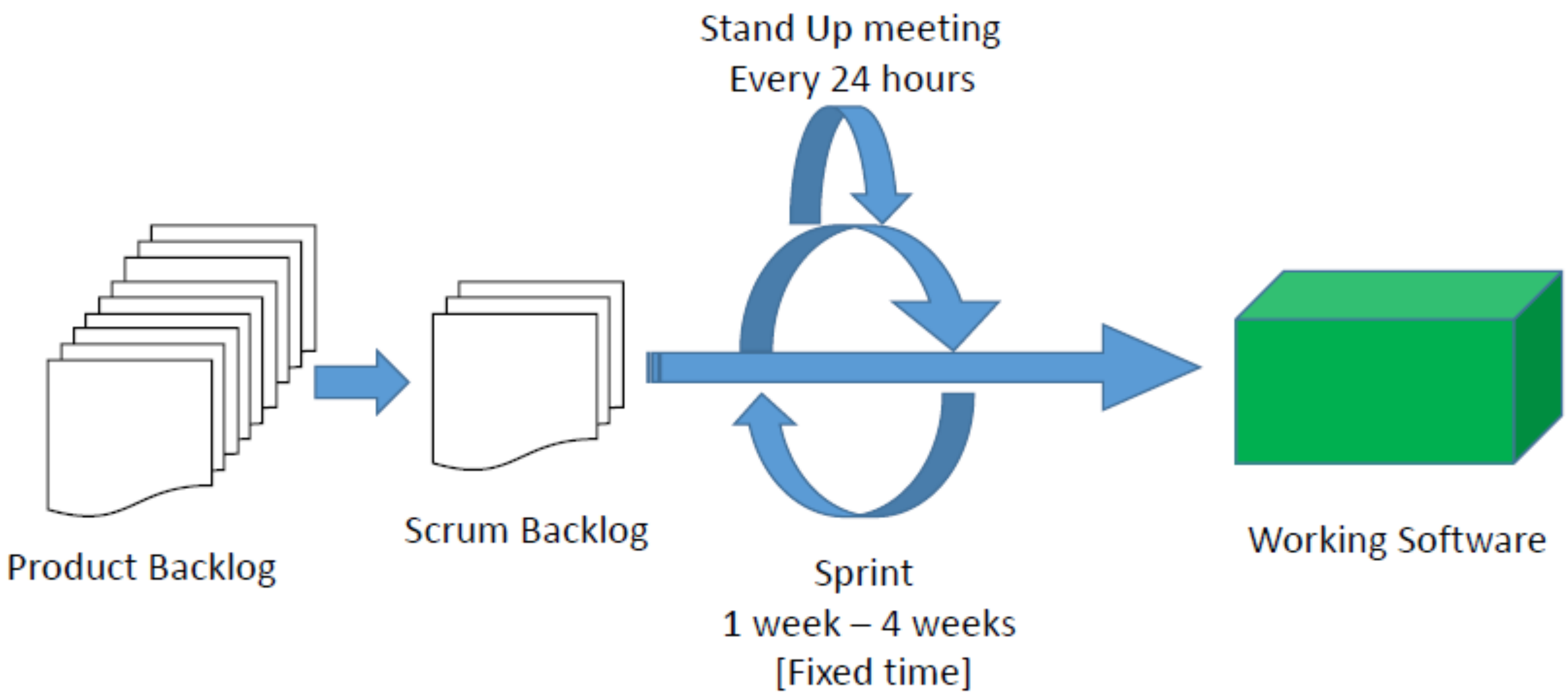
# Agile vs. Waterfall

|  | Agile | Waterfall |
|---|---|---|
| Iterative? | Yes | No |
| Late Changes? | Yes | No / $$$ |
| Fixed timeline? | No* | Yes |
| Fixed Cost? | No* | Yes* |
| Volume of meetings | Consistent | Heavy up front, reduced middle, heavy end |
| Release frequency | Every Sprint | Once per project |
| Business Involvement | Heavy throughout | Heavy early, and at very end |
| Cost to fix mistakes | Low | High |

→ small project

# Scrum

- Scrum is currently one of the most widely used methodologies of software development



# Scrum - Roles

- Product Owner
  - ➢ Responsible for delivering requirements and accepting demos
  - ➢ Involved in planning session
- Scrum Master
  - ➢ Responsible for removing impediments 阻碍.
- Team members
  - ➢ No one has a fixed role other than the scrum master and product owner
  - ➢ Everyone takes on tasks, and completes them based on what they are most comfortable with

# Scrum - Sprint

- The sprint is a fixed time to deliver a working set of features, that are reviewed in a demonstration to the product owner
- Tasks in Scrum are broken into “User Stories”
- In a sprint, a team agrees at the beginning to take on a certain number of user stories
- Sprints are usually between 1 and 4 weeks in length
- At the end of each sprint, teams hold a “retrospective” which is a meeting where the past sprint is discussed, and chances for improvement for the next sprint are raised

# Scrum – User Stories

- User stories are similar to requirements. They are written in the following format:

  *As a {ACTOR/OBJECT} I want to {ACTION} so that {RESULT}*

# Scrum – Planning Session

- Planning sessions happen at the start of each sprint.
- They usually take a few hours. During this time, the team decides how much work it will take on and discusses any major technical challenges they expect to face.
- Usually, Product Owners are available for at least a portion of this meeting, to help with prioritization. They are only there to assist in this regard, and not to dictate what the team will complete.

# Scrum – The Standup Meeting

- Happens EVERY SINGLE day that you are working
- The goal is to make sure people are doing alright
- Shouldn’t be longer than 15 minutes
- Answer three questions:
    1. What did I finish since the last standup?
    2. What am I going to finish by the next standup?
    3. What is stopping me / what impediments am I facing?

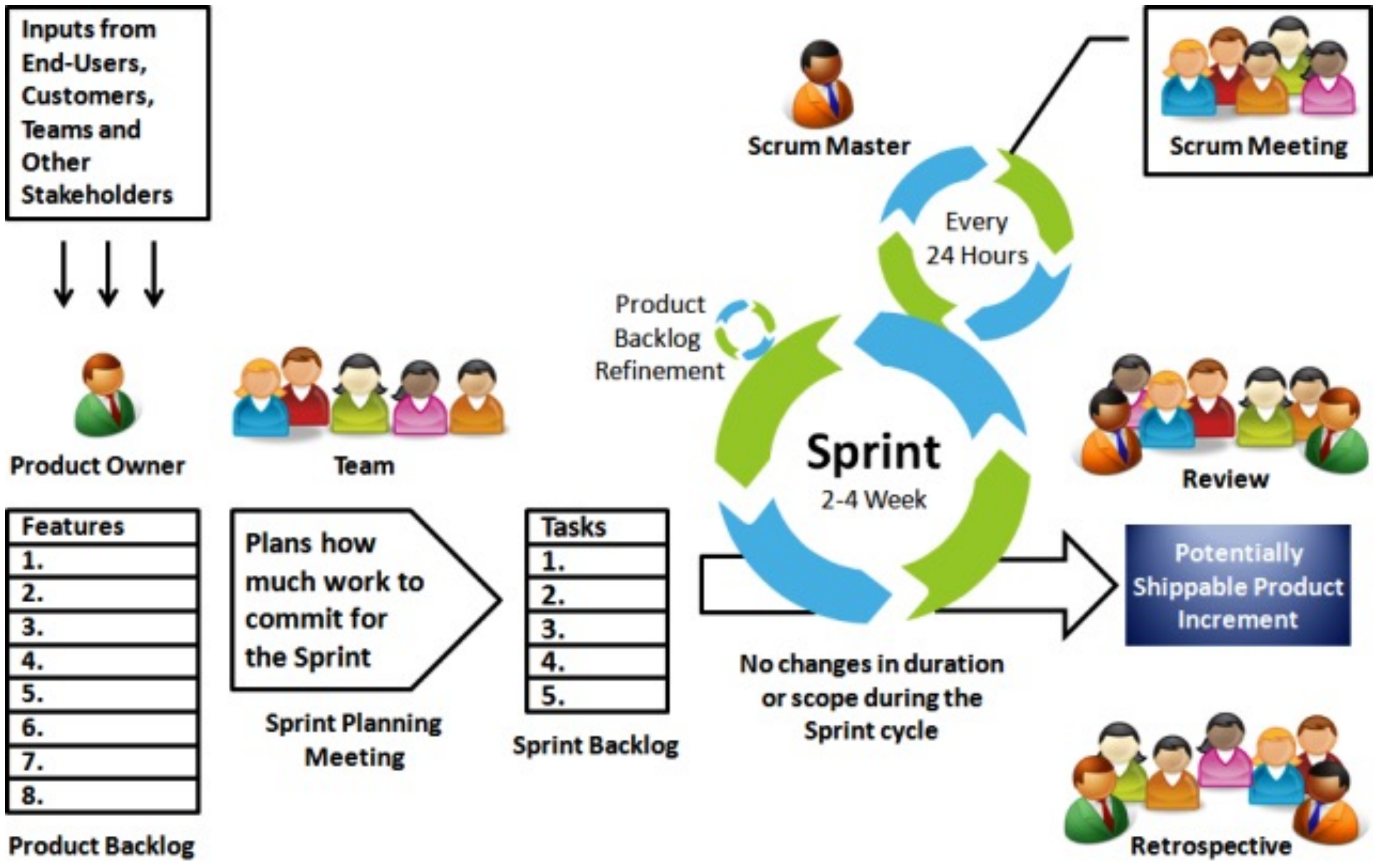
# Scrum – Working Agreement

- A series of statements that everyone on the team agrees to about how the team will work
- Things in working agreements may include:
  - ➢ The standup will occur at 1:00 pm every day, and last 15 minutes
  - ➢ We will not speak during the standup, unless it is our turn to speak
  - ➢ Our meetings will take place in the lobby of the IC building
  - ➢ All code must be peer-reviewed
  - ➢ We will submit all code 24 hours prior to the due date

# Scrum – Definition of Done

- A formal agreement of when work is considered complete.
- For example, a story can be marked as done when:
  - ➢ It has been fully unit tested
  - ➢ It successfully integrated with the rest of the code
  - ➢ It has been peer reviewed
  - ➢ It is fully commented
  - ➢ Etc.
- It is important that team comes to an agreement on this definition before they start work.

# Scrum – overall mechanism


Inputs from End-Users, Customers, Teams and Other Stakeholders
Product Owner
Team
Features
1.
2.
3.
4.
5.
6.
7.
8.
Product Backlog
Plans how much work to commit for the Sprint
Sprint Planning Meeting
Tasks
1.
2.
3.
4.
5.
Sprint Backlog
Scrum Master
Every 24 Hours
Scrum Meeting
Product Backlog Refinement
Sprint
2-4 Week
No changes in duration or scope during the Sprint cycle
Review
Potentially Shippable Product Increment
Retrospective

https://pkpmp.files.wordpress.com/2014/11/scrum2.png