CS471 Lecture 02

Agile Lifecycle Models: Scrum

References

- Sims and Johnson. The Elements of Scrum. pp. 71..112.

- [Takeuchi_1986_Scrum.pdf] Takeuchi and Nonaka. "New Product Development Game". Harvard Business Review. Jan 1, 1986.

- Resource for finding research articles:
  - https://scholar.google.com/

References

- Williams, Brown, Meltzer and Nagappan. "Scrum + Engineering Practices: Experiences of Three Microsoft Teams." *Proceedings of the 2011 International Symposium on Empirical Software Engineering and Measurement*. IEEE Computer Society. 2011.
  - Williams_ESEM2011_Scrum_3_Microsoft_Teams.pdf on Piazza (Additional Reading)
  - Paper required for Scrum Quiz!

Software Life Cycle

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- AKA: Life Cycle Model, Software Process or Software Development Process, Software Process Model

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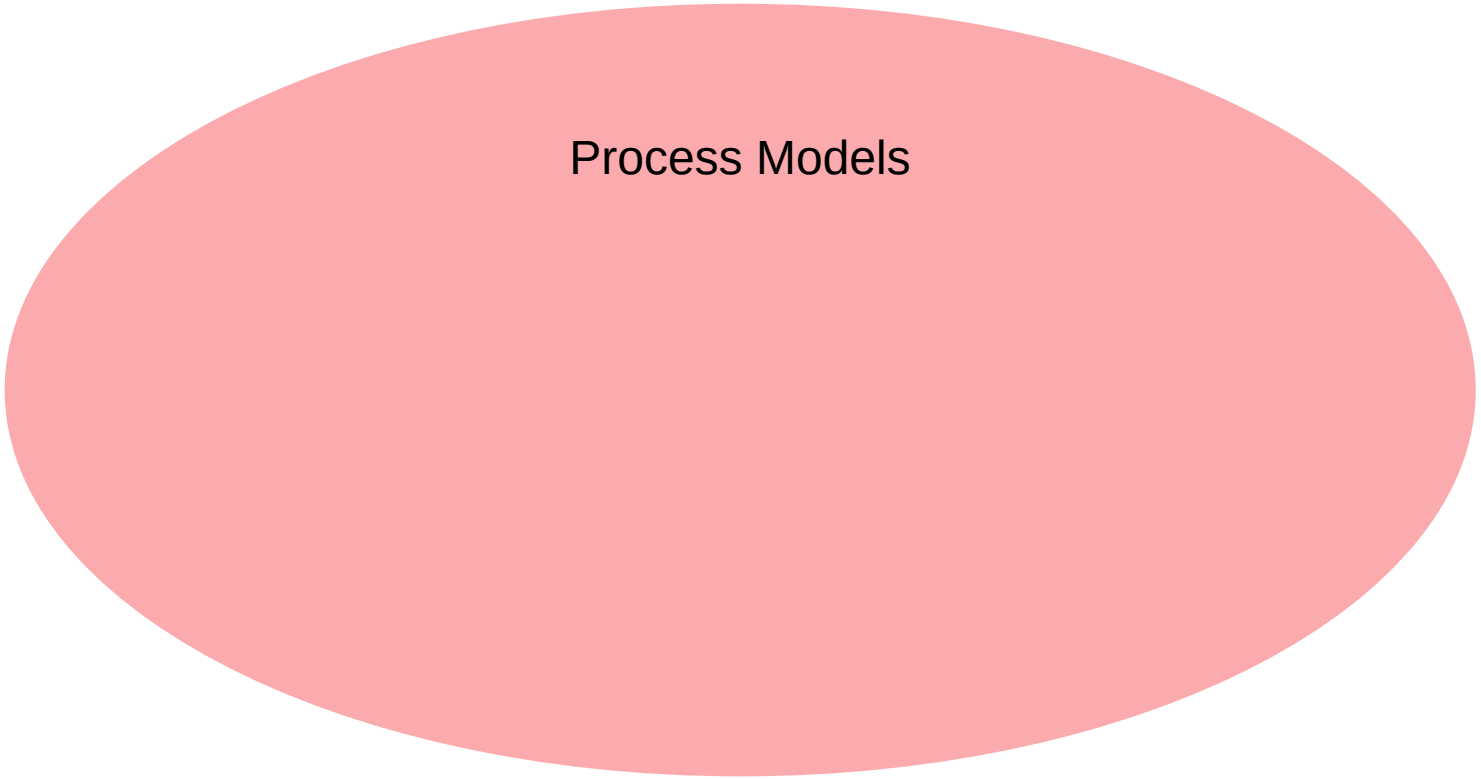
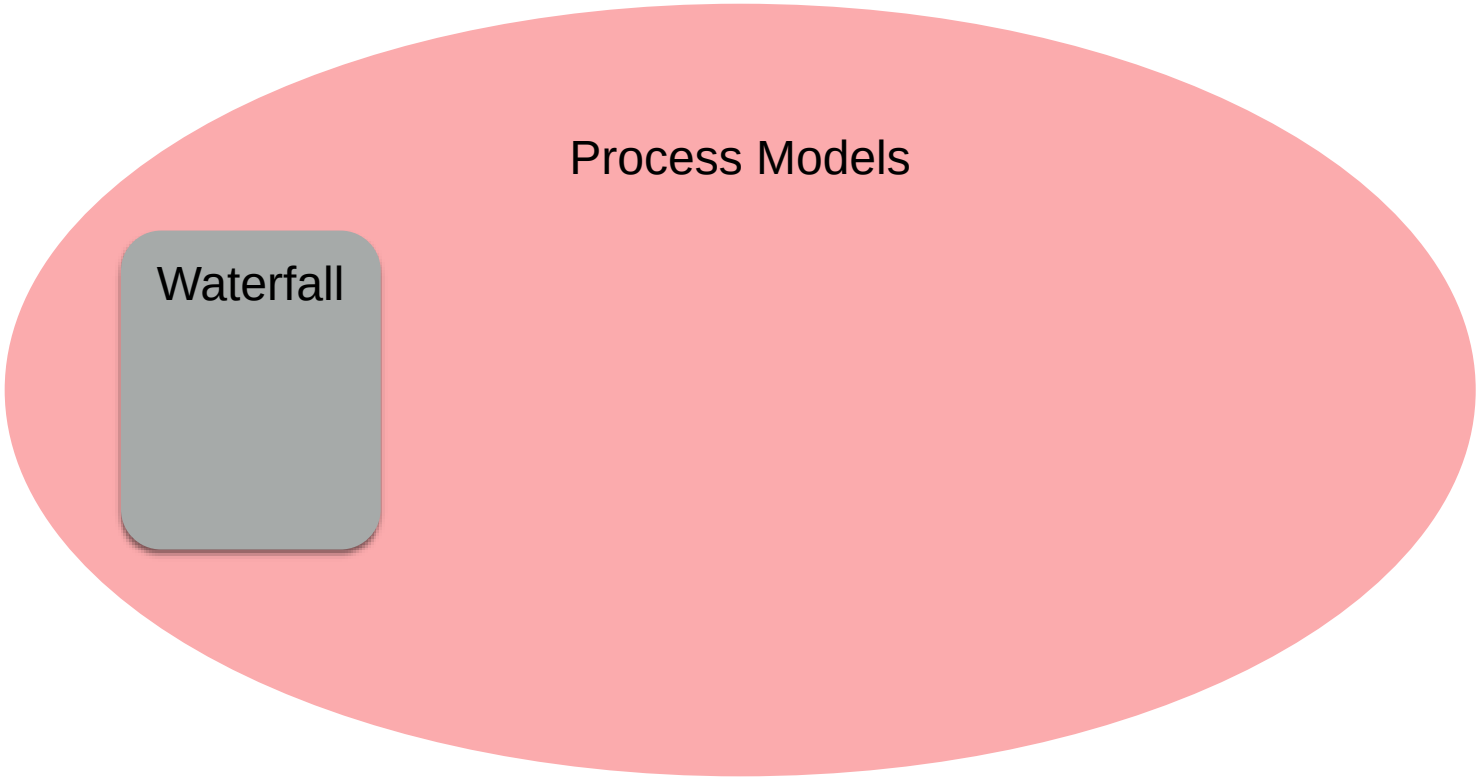
- Describes how to construct a software product
  - *Activities*: what you do (e.g., *requirements capture*, *design*, *implementation*, *integration and testing*, etc)
  - *Stages* (AKA phases): the sequence in which you perform those activities
  - *Artifacts*: what you deliver (e.g., requirements document, product code, tests, documentation…)

Process Models: Big Picture



Process Models: Big Picture



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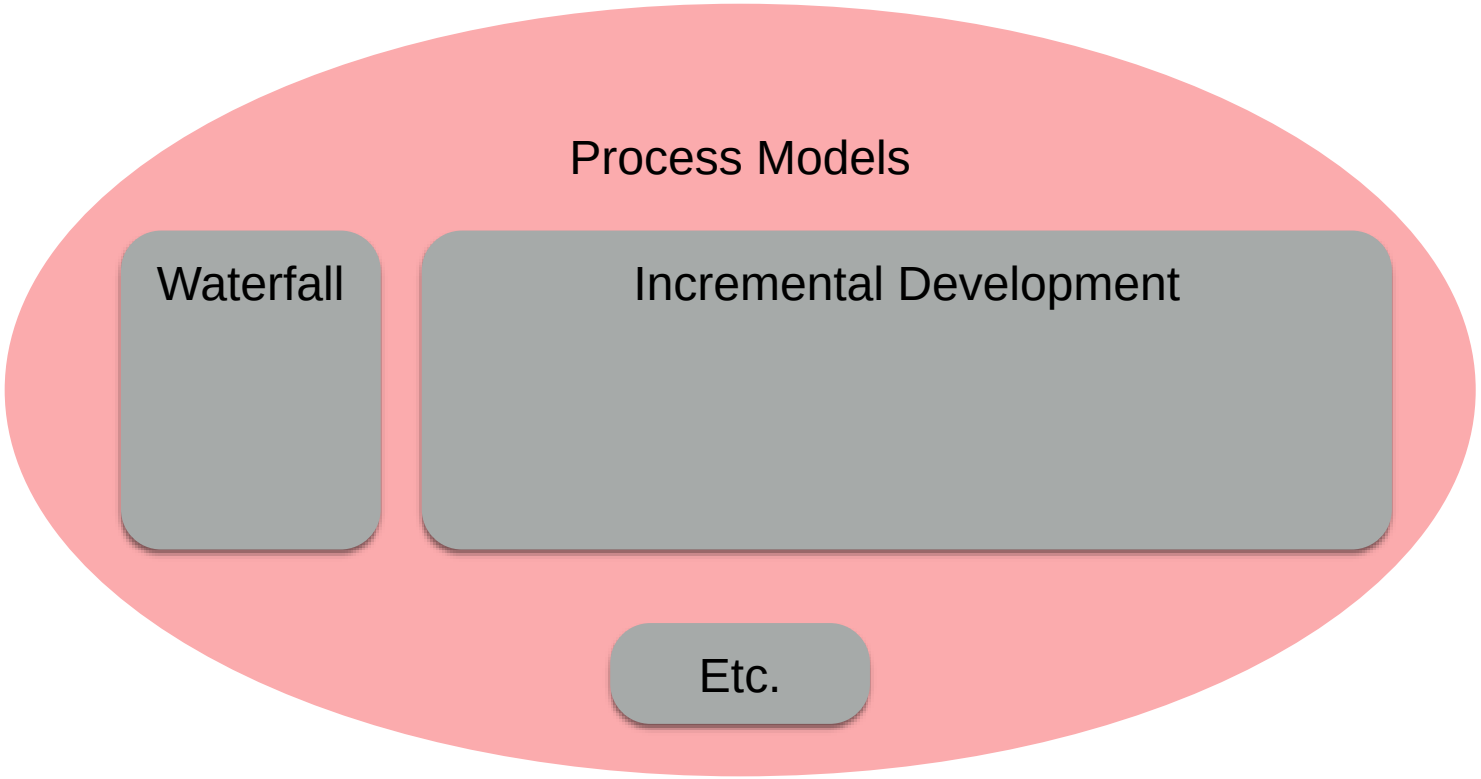
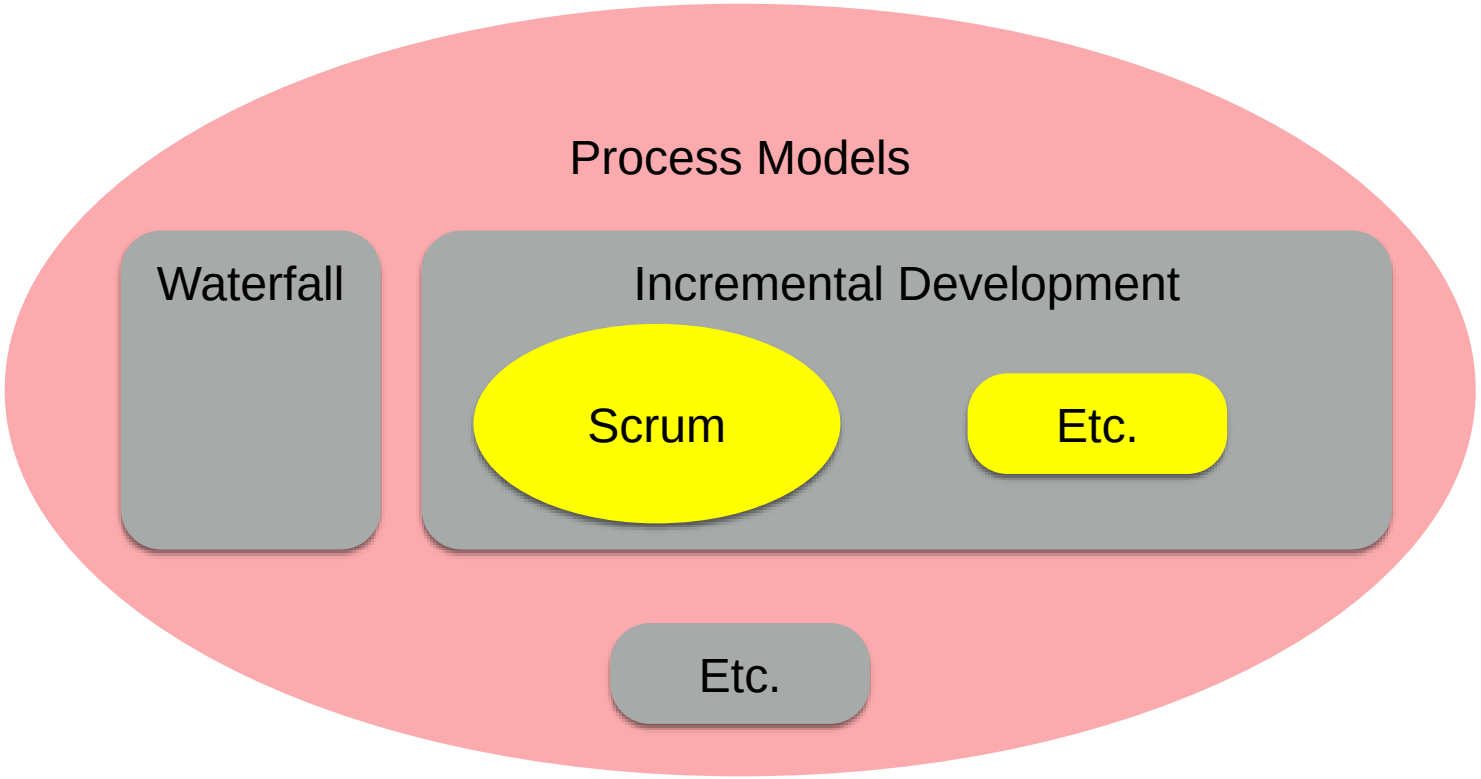


Process Models: Big Picture



Scrum Overview

The Scrum Process Model

- There are many agile *life cycle models*, e.g.:
  - XP (E**x**treme **P**rogramming)
  - Lean Software Development
  - Kanban
  - Crystal
  - etc.

- We'll cover Scrum in detail because of its popularity

The Scrum Process Model

- Arguably, Scrum is not really a software development life cycle
- Lacks engineering practices (e.g. coding, unit-level tests, etc.)
- Originally published in Harvard Business Review (1986Takeuchi.pdf) and almost didn't mention software

The Scrum Process Model

- However…, Scrum can be adapted for software development
- Minimal up-front planning
- Builds product in a series of stages called *sprints*

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- Not exactly
- You had a life cycle appropriate for small products such as classroom assignments

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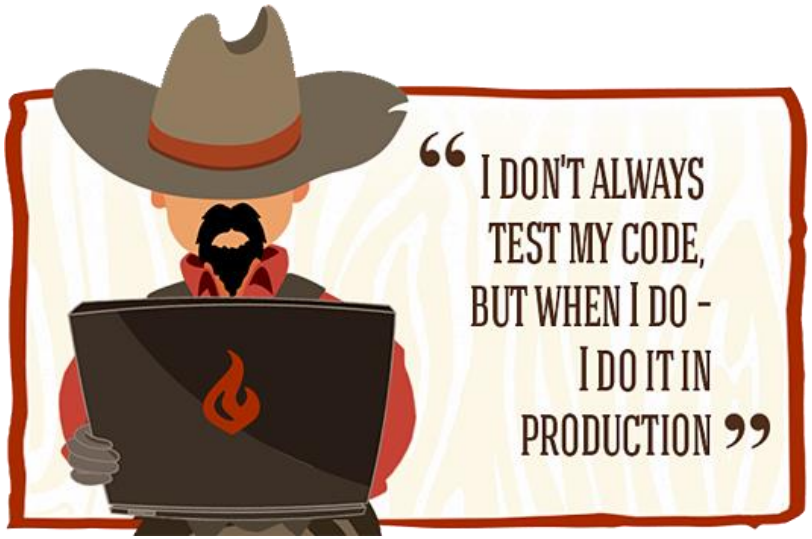
- Not exactly
- You had a life cycle appropriate for small products such as classroom assignments
- *Code and Fix*
- AKA *Cowboy Coding*



Scrum is an Agile Life Cycle

- Agile refers to a life cycle's responsiveness to change

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- Agile refers to a life cycle's responsiveness to change
  - Functionality: What does the end user need the product to do?
  - Schedule: When will we deliver the functionality to the users?
  - Design: How will we implement the functionality?
  - Technologies/Tools: What existing technologies (e.g. frameworks, web servers, platforms, databases, etc.) and tools will we use?

Scrum is Deceptively Simple

- Scrum is succinctly described in Sims and Johnson, *SCRUM: A Breathtakingly Brief and Agile Introduction*. Dymaxicon. 2012.
- Scrum describes only a few items:
  - Roles
  - Artifacts
  - Sprint Cycle

- Business managers understand Scrum
- Simplicity may explain Scrum's popularity

Scrum focuses on Project Management, not Software Development

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- Scrum lacks Software Engineering practices
  - Pair programming (or even programming!)
  - Code reviews
  - Test-driven development
  - Static analysis
  - Continuous integration
- Scrum focuses on how to manage a project
- We develop software with engineering practices

Scrum + Engineering Practices

- Scrum, augmented with software engineering practices, has delivered high quality products
- Scrum without engineering practices may be dangerous as its critics attest
- Thus… many authors have concluded: Scrum is inadequate by itself

Scrum + Engineering Practices

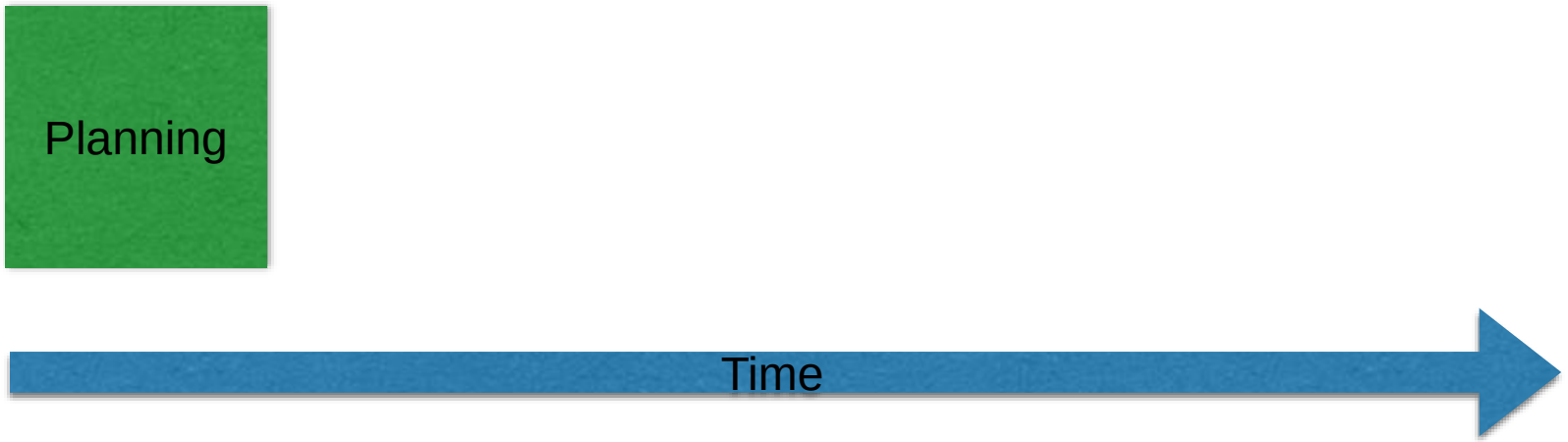
- Software Engineers often augment Scrum with Extreme Programming's (another agile life cycle) engineering practices
  - Test Driven Development and Unit-Level Testing
  - Pair Programming
  - Continuous Integration

Scrum + Engineering Practices

- We will use additional software engineering practices
  - Static analysis
  - Code reviews
  - Source code control
  - Code coverage instrumentation

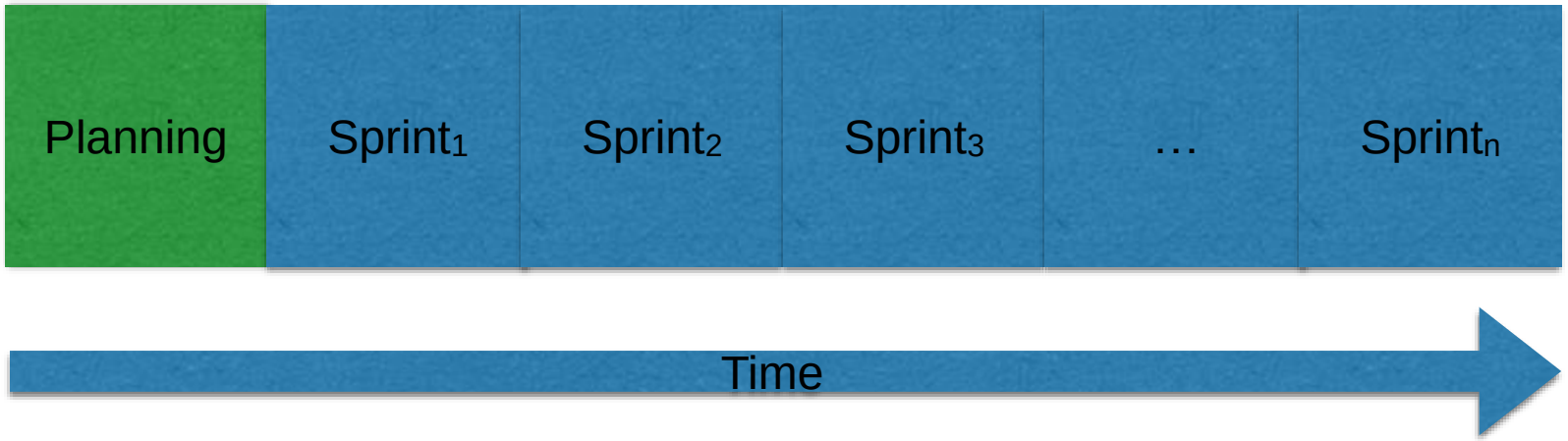
Scrum: Overview

- Do a little up-front planning to produce an initial *Product Backlog* (i.e., a prioritized list of *User Stories* describing what the product needs to do)



Scrum: Overview

- Do a little up-front planning to produce an initial *Product Backlog* (i.e., a prioritized list of *User Stories* describing what the product needs to do)
- Then conduct a series of *sprints*, each releasing a fully tested implementation of the product
  - Each release includes additional (*incremental*) functionality



Scrum Roles

Scrum Roles

- Everyone on a scrum team serves in one of these roles
  - Product Owner (PO)
  - Scrum Master (SM)
  - (Multiple) Developers (Team members)

Scrum Roles: Product Owner (PO)

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- Champions business and customer interests
- Communicates the product vision
- Responsible for maximizing the return the business gets on it's investment
- PO = "interface (proxy) between team and customer"

Scrum Roles: Product Owner (PO)

- Accountable for the *User Stories and Acceptance Criteria*, that go into the *Product Backlog:*
  - directly writing/creating them or
  - arranging for the Development Team to write them
- Creates *Acceptance Criteria (test cases)* for each *User Story*
- Prioritizes the *User Stories* in the *Product Backlog*

Scrum Roles: Product Owner (PO)

- Provides rapid feedback to the team

- PO is usually the most demanding role on a scrum team