

# Software Project Management - Laboratory

Lecture n° 1  
A.Y. 2020-2021

Prof. Fabrizio Fornari

# Who is Fabrizio Fornari?

**2020** Postdoc in Computer Science at UNICAM

**2018** PhD title in Computer Science at UNICAM. 3 months in Brisbane Queensland University of Technology (Australia)

**2012-2013** Master's degree in Computer Science at UNICAM and University of Reykjavik (Iceland)

**2010-2011** Bachelor degree in Computer Science at UNICAM



# Collaboration

PROS Lab - PROcesses and Services Laboratory <http://pros.unicam.it/>

## Past collaborations:

- National Research Center of Pisa (CNR)
- Apromore group <https://apromore.org/> (University of Melbourne)
- Technical University of Denmark
- Sant'Anna School of Advanced Studies (Pisa)



# My Research Topics

Business Process Management  
Business Process Modeling and Verification  
Business Process and IoT

## Tool:

- BProVe, Business Process Verifier
- BEBoP, understandaBility vErifier for Business Process models
- RePROSitory, Repository of open PROcess models



# Teaching

2020-2021

- Software Project Management Laboratory at “University of Camerino”, Department of Computer Science (6CFU)

2019-2020

- Computer Science at “Università di Macerata”, Faculty of “Economia e diritto” (6CFU)

2018-2019

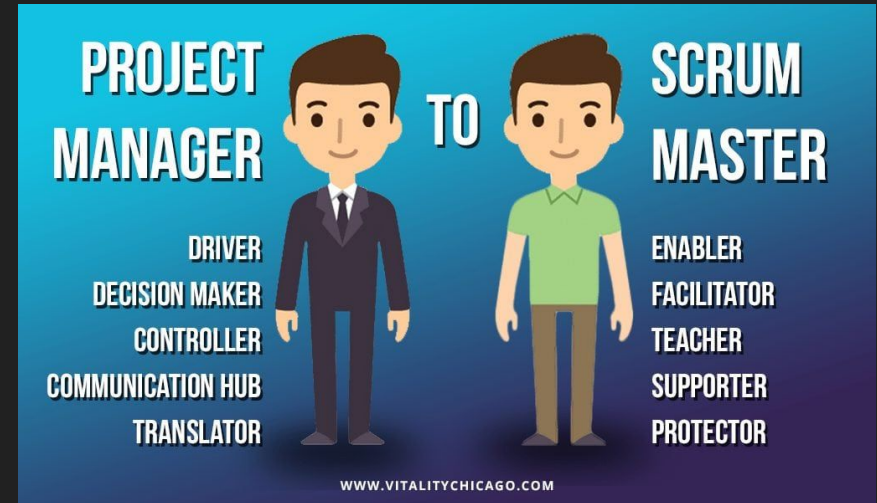
- Computer Science at “Università di Macerata”, Faculty of “Economia e diritto” (6CFU)
- Software Project Management Laboratory at “University of Camerino”, Department of Computer Science (3CFU)



# Group Projects

I supervised/co-supervised a dozen of group projects and experimental thesis.

I try to apply together with the students the methodology that we will see during the course.



# Course Overview

## Course Objective

The course introduces the students to the basic knowledge of complex software system production following the **DevOps methodology**.

## Prerequisite knowledge

- Basic Programming Experience
- Basic Software Engineering Methods and Techniques

## Learning Outcome

The student will be able to manage the organization and the development of a software applying DevOps methodology.

# Course Overview

## Website:

- [http://didattica.cs.unicam.it/doku.php?id=didattica:magistrale:spm:ay\\_2021:main&s\[\]=spm](http://didattica.cs.unicam.it/doku.php?id=didattica:magistrale:spm:ay_2021:main&s[]=spm)

## Teaching Hours:

- Thursday 9am-11am (Lab)
- Friday 11am - 1pm (Lab)

## Students Meeting:

- After each lesson or,
- By requesting a meeting by sending an email to [fabrizio.fornari@unicam.it](mailto:fabrizio.fornari@unicam.it)

**Note:** only email coming from the @studenti.unicam.it domain will be processed.



# Software Requirements

- Java (type `java -version` in a terminal/command line)
- Eclipse IDE for Java Developers (or an IDE of your choice)

# Exam

The exam involves the development of a software project by following the methodologies introduced during lecture hours with the objective of supporting a “Smart Parking” system.

## Exam Evaluation:

- Git Usage
- Testing
- SCRUM application/Sprint management
- Presentation
- Overall Project

# Group Formation

- Group of 2 or 3 students have to be formed
- A Project will be assigned
- A GitHub account is needed for every student
- A GitHub repository will be assigned to each group

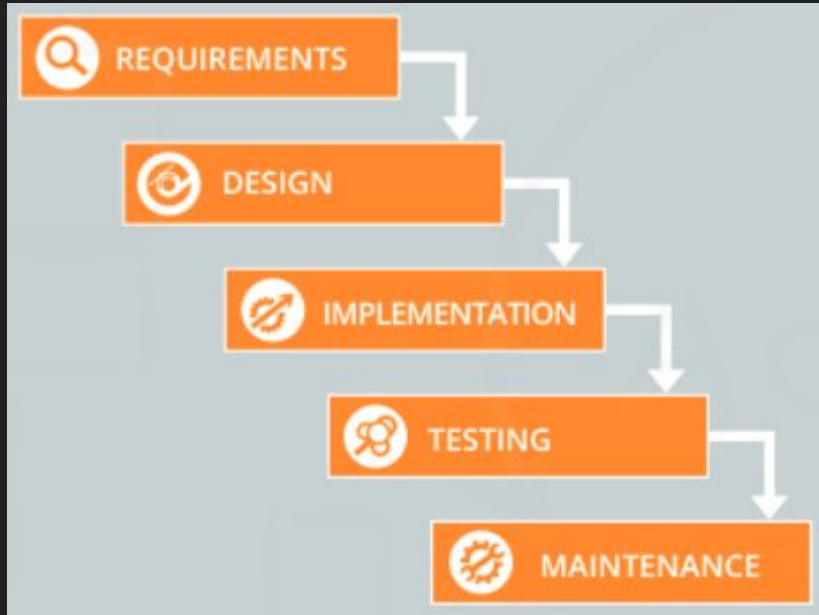
What is a Software  
Development Process?

# Software Development Process

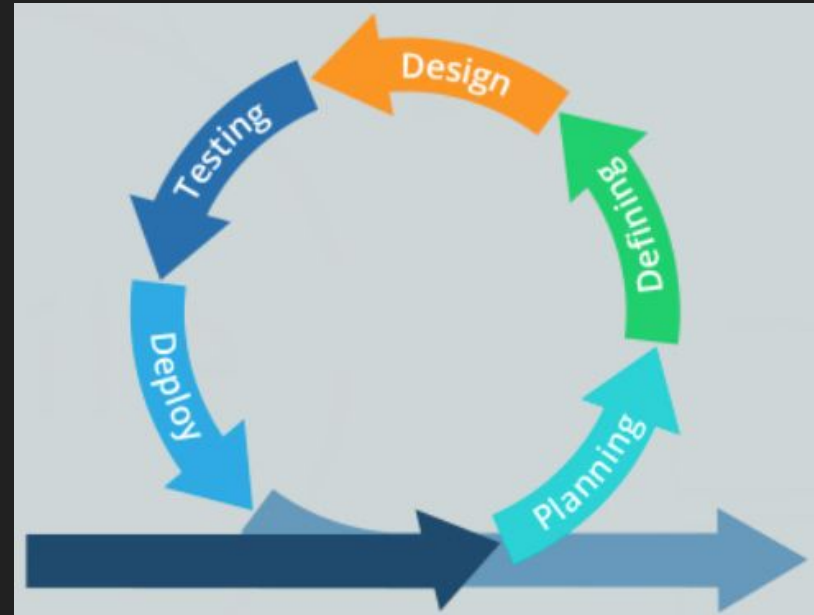
Software Development Process is the process of dividing software development work into distinct phases to improve design, product management, and project management. It is also known as a software development life cycle (SDLC)

# Software Development Process

Waterfall



Agile



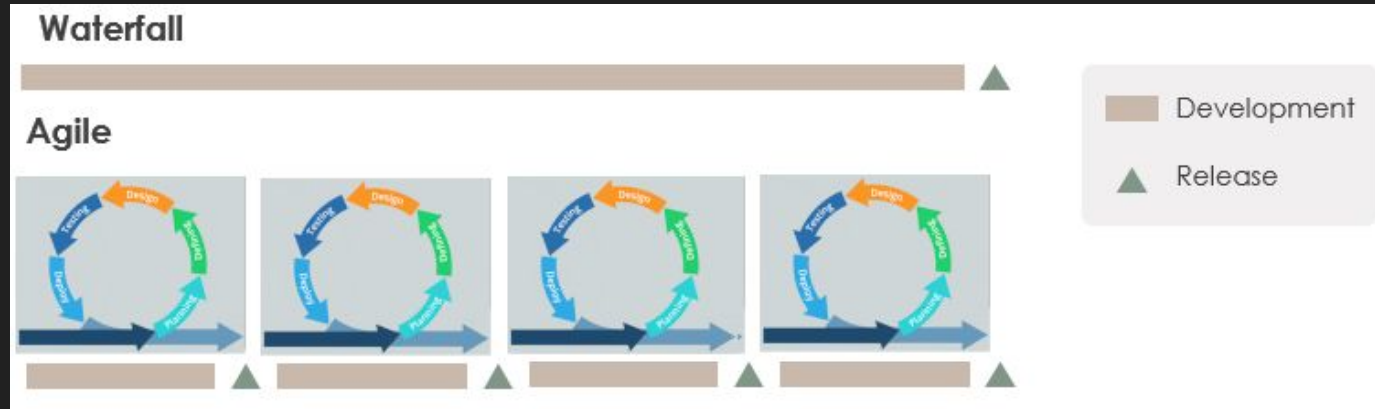
# Waterfall vs Agile



## Agile characteristics:

- Complex work is divided in simple pieces
- Large organizations are divided into small teams
- Far-reaching project are divided into short time lists of task called sprints

# Waterfall vs Agile



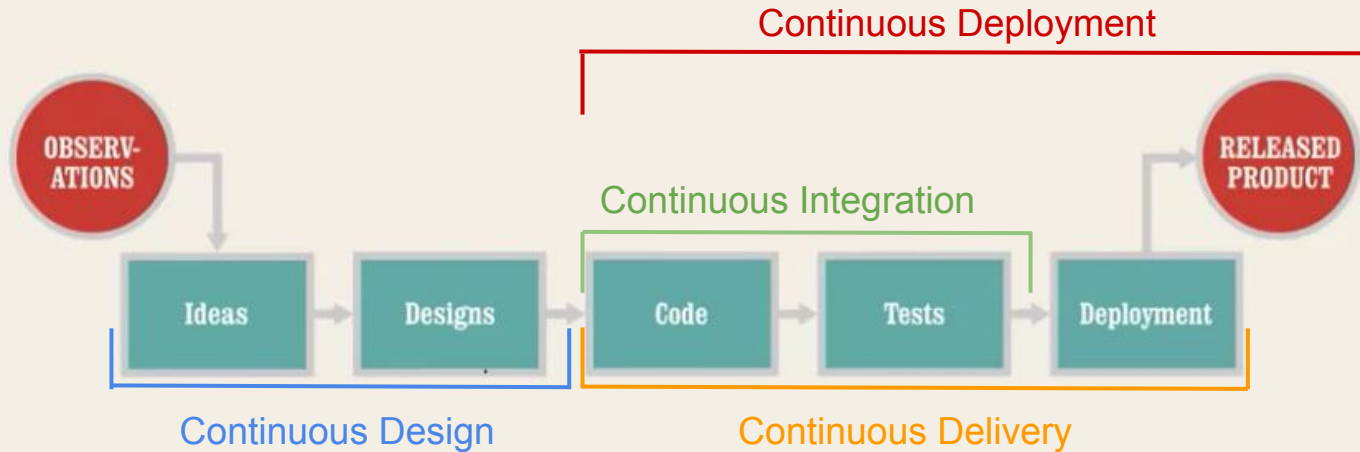
Agile characteristics:

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# The Product Pipeline

## THE PRODUCT PIPELINE



# Roles & Interfaces

## DEVELOPER



**Inputs:** User stories

**Outputs:** Software design  
& Implementation

## TESTER



**Inputs:** Working software, notes on target behavior

**Outputs:** Validated software

## OPERATORS



**Inputs:** Validated software  
deployment notes

**Outputs:** Working systems,  
monitoring & analytics thereof  
evaluates what the software is doing and if it behaves as expected

# Classic (and Old) Process

Stakeholders and communication chain in a typical IT process.



# The Agile Manifesto

Individuals Interactions	>	Processes Tools
Working Software	>	Comprehensive Documentation
Customer Collaboration	>	Contract Negotiation
Responding to Change	>	Following a Plan

# Agile

Agile addresses gaps in Customer and Developer communications



# DevOps

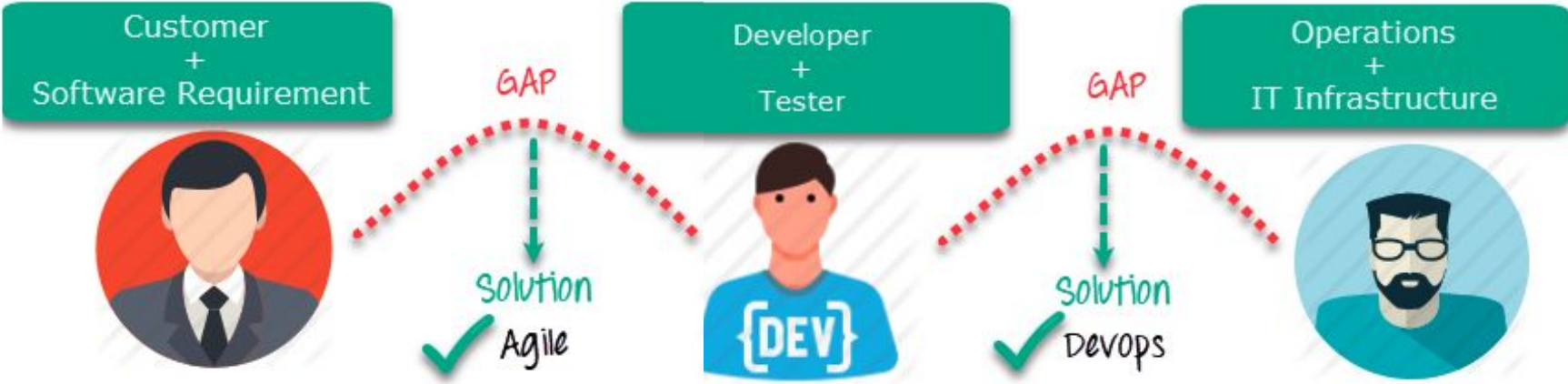
*“A compound of development (Dev) and operations (Ops), DevOps is the union of people, process, and technology to continually provide value to customers.*

*What does DevOps mean for teams? DevOps enables formerly siloed roles — development, IT operations, quality engineering, and security — to coordinate and collaborate to produce better, more reliable products. By adopting a DevOps culture along with DevOps practices and tools, teams gain the ability to better respond to customer needs, increase confidence in the applications they build, and achieve business goals faster.”*

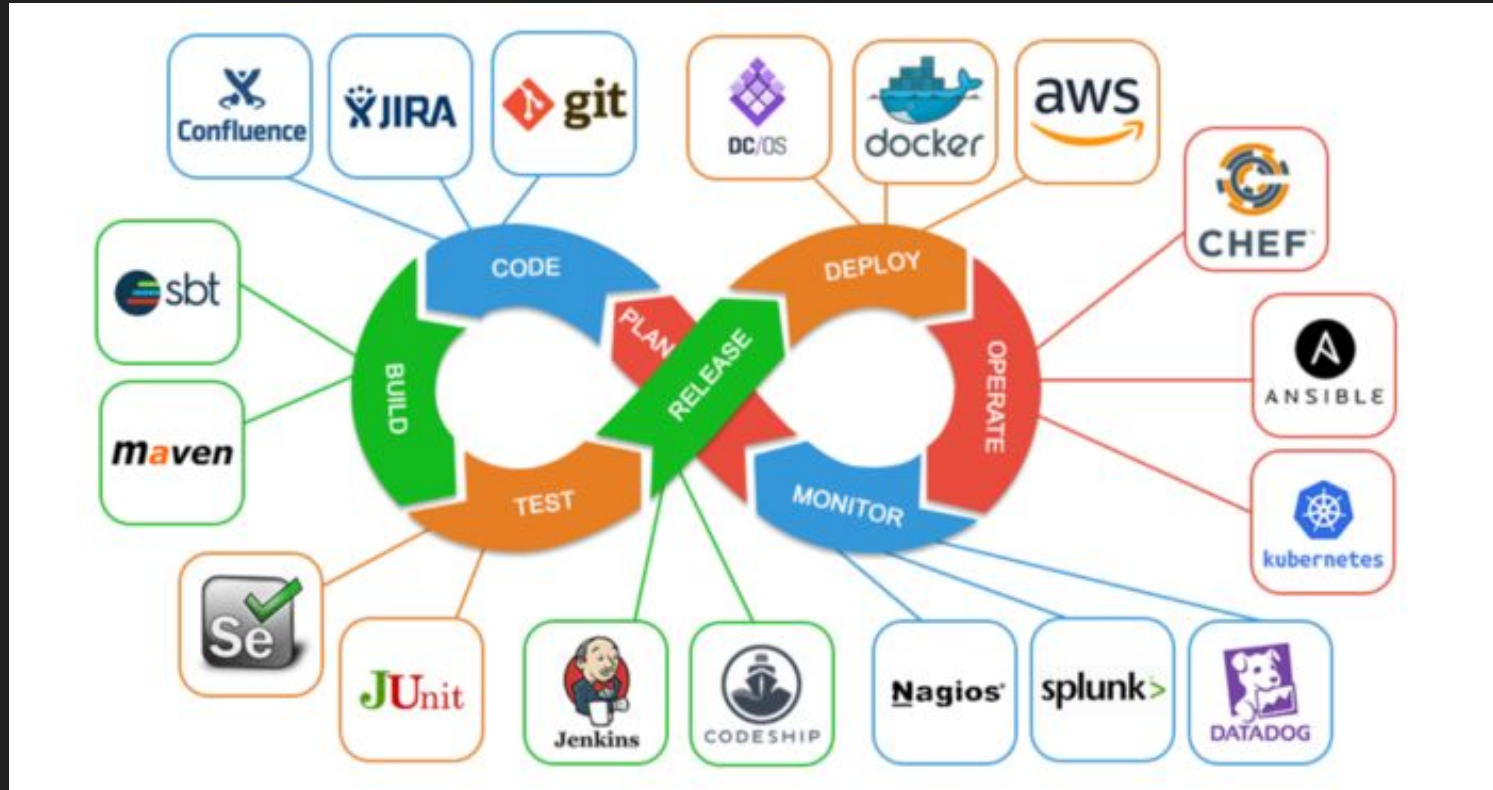
— [Azure.microsoft.com](https://azure.microsoft.com)

# DevOps

DevOps addresses gaps in Developer and IT Operations communications

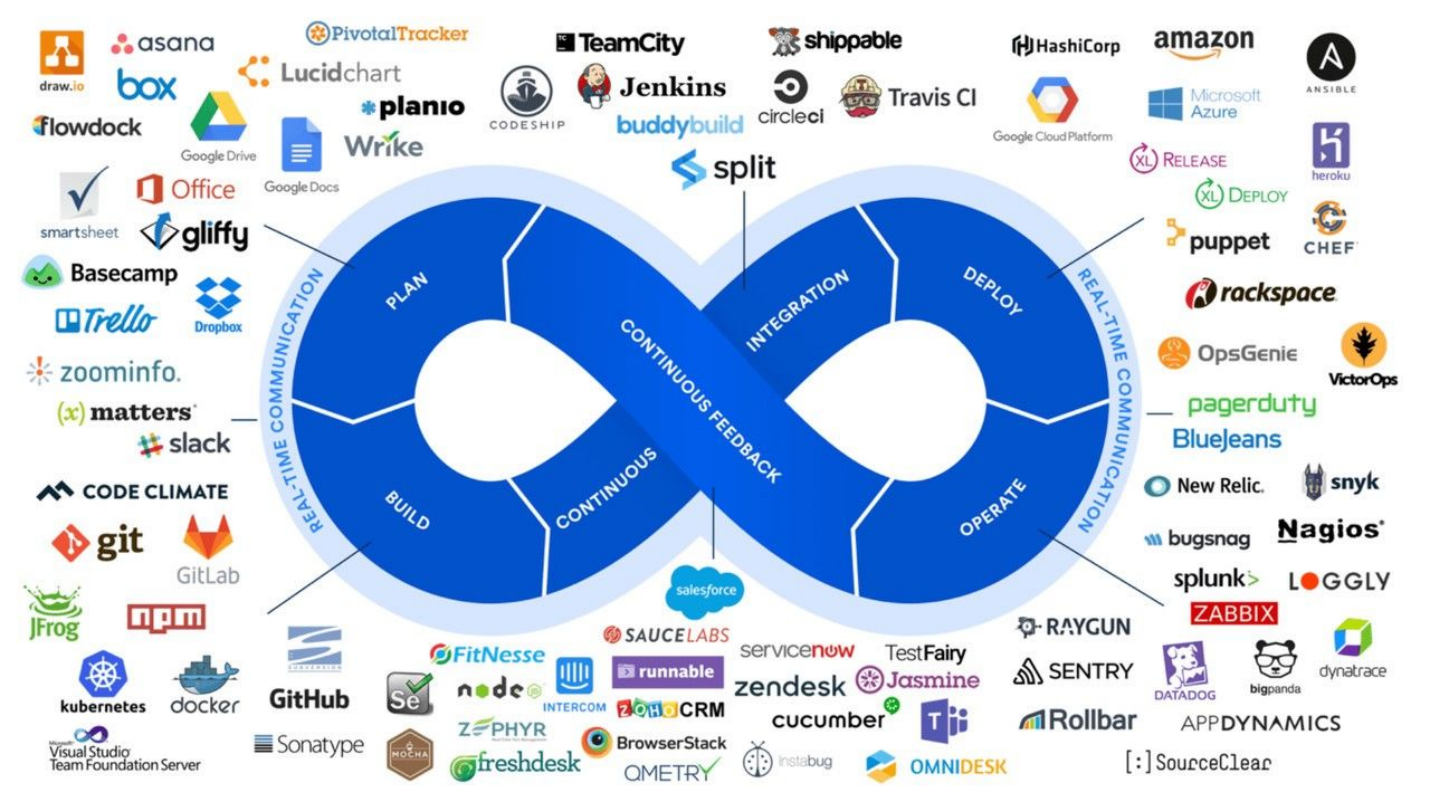


# DevOps Technologies

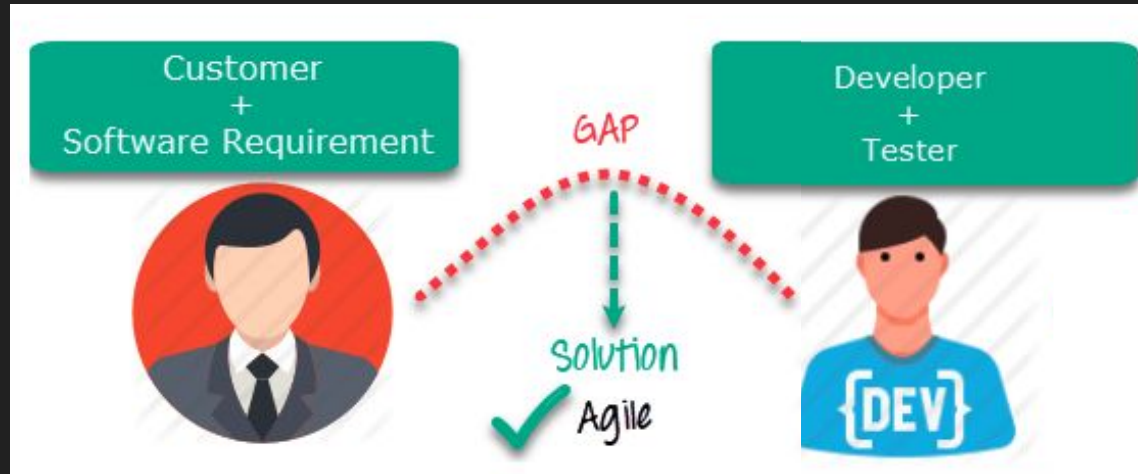




# DevOps Technologies

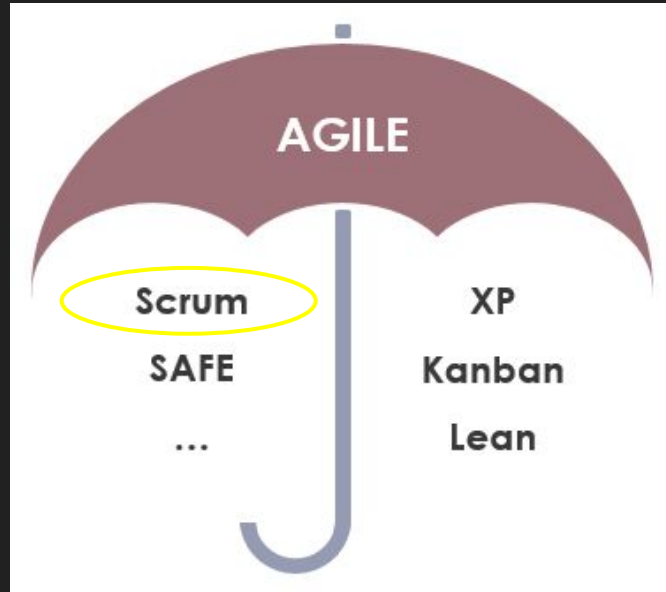


# Let's focus on the Agile part



# SCRUM

**Scrum** is an Agile framework for project management that emphasizes teamwork, accountability and iterative progress toward a well-defined goal.



# SCRUM

The Scrum Framework deals with the fact that the requirements are likely to change or not known at the start of the project.

Scrum is:

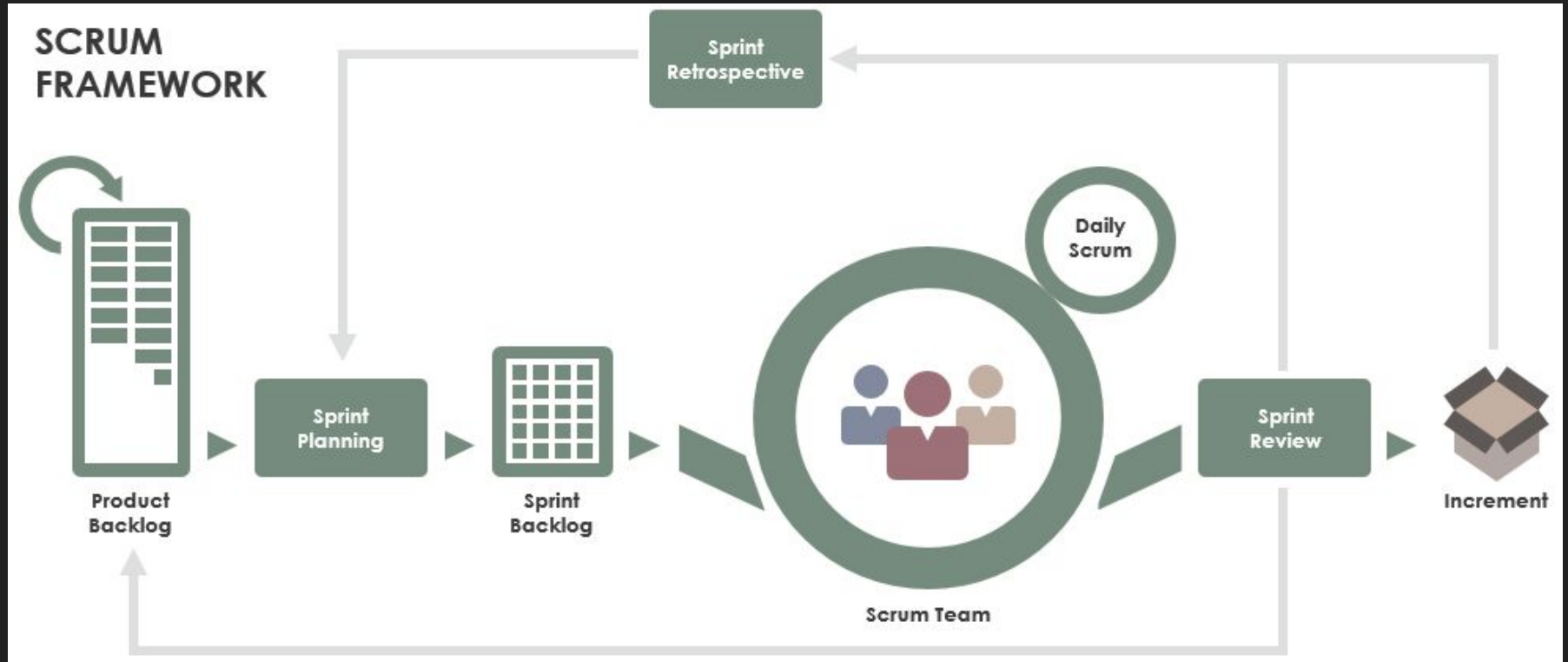
- Lightweight
- Simple to understand
- Difficult to master

# SCRUM

## Benefits:

- Better Quality Products
- Reduced time to market
- Increase Return on Investment
- Higher Team Morale
- Enhance Team Collaboration

# SCRUM



# SCRUM

The main components of the Scrum Framework are:

- **Roles**
- **Artifacts**
- **Events**
- **Sprint**

# Roles

**Product Owner** - is responsible for working with the user group to determine what features will be in the product release. Some of the responsibilities:

- Develop the direction and strategy for the products and services, including the short and long-time goals;
- Provide or have access to knowledge about the product or the service;
- Understand and explain customer needs for the Development team;

**Scrum Master** - is the facilitator for an agile development team. Some of the responsibilities:

- Act as a coach, helping the team to follow scrum values and practices;
- Help to remove impediments and protect the team from external interferences;
- Promote a good cooperation between the team and stakeholders;

**Scrum Team** - is formed by 3 to 9 people who MUST fulfill all technical needs to deliver the product or the service. They will be guided directly by the Scrum Master, but they will not be directly managed. They must be self-organized, versatile, and responsible enough to complete all required tasks.



# Artifacts

The SCRUM artifacts are used to help define the workload coming into the team and currently being worked upon the team.

The main artifacts:

- Product backlog - a collection of user stories which present functionalities required/wanted by the product team. Usually the product owner takes responsible for this list.
- Sprint backlog - a collection of stories which could be included in the current sprint.

# User Stories

A User Story is a simple and quick description of a specific way that the user will use the software. Generally between one and four sentences long.

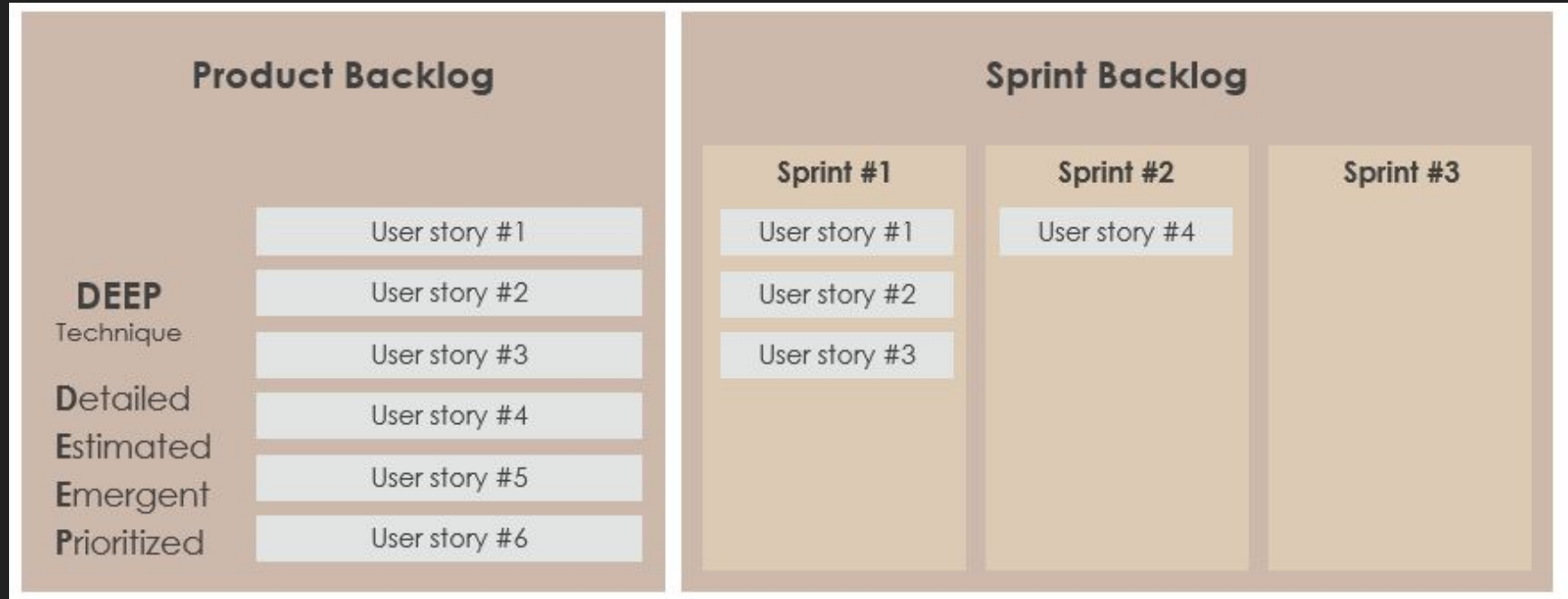
Can generally follow a template:

*As a <type of user>,  
I want to <specific action I'm taking>  
so that <what I want to happen as a result>.*

e.g. “As a customer, I want to be able to create an account so that I can see the purchases I made in the last year to help me budget for next year.”

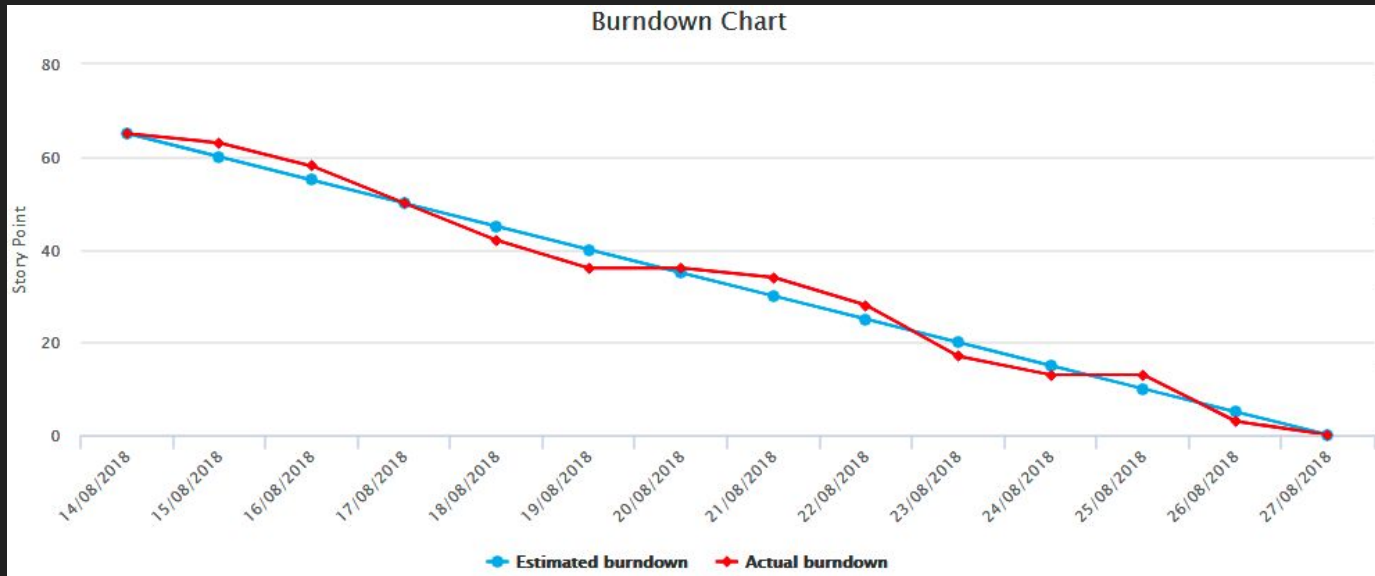
Assign a value to estimate the effort needed to elaborate a user story (e.g., 1 to 5).

# Artifacts: Product Backlog and Sprint Backlog

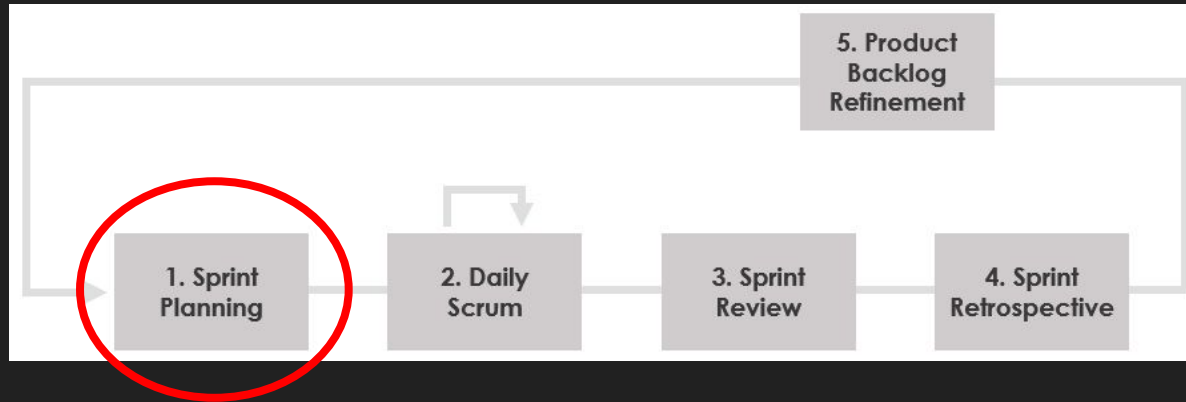


# Artifacts: Burn-down chart

A burn-down chart is a graphical representation of work left to do versus time. It is useful for predicting when all of the work will be completed.

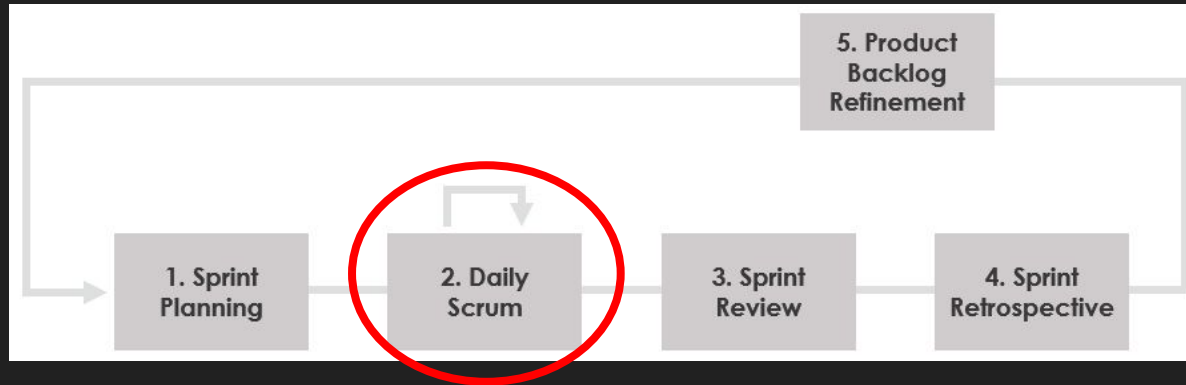


# Events



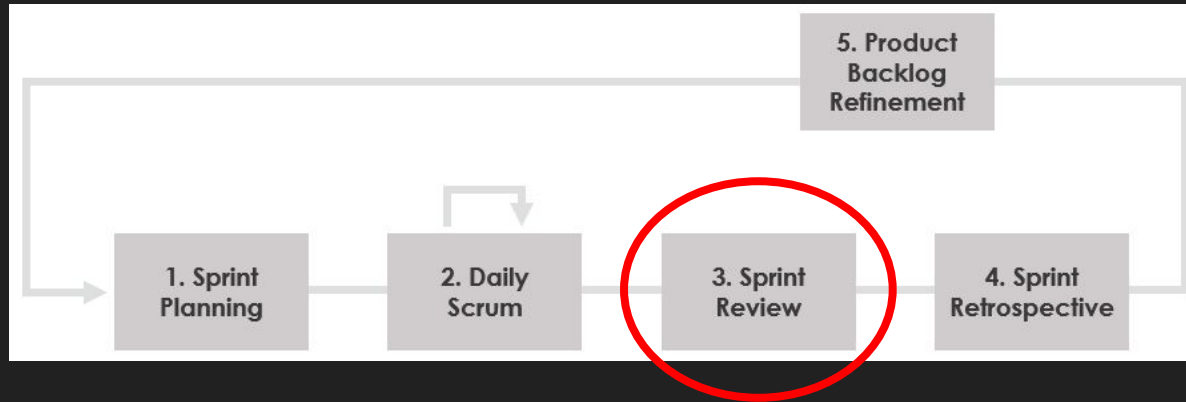
- All sprints begin with planning.
- The team needs to identify and commit to which items are going to be delivered as part of the sprint.
- Here the Scrum master has a main role

# Events



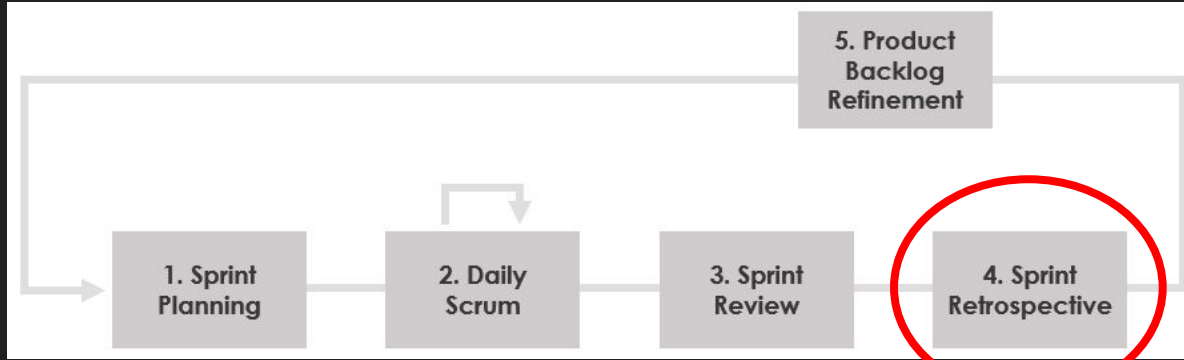
- The aim of this meeting is to ensure everyone within the team knows the status of the tasks accomplished (done) and of those in progress.
- The team has to answer the following questions:
  - What have we done until now?
  - What are we going to do today?
  - What are the impediments?
- No longer than 3 minutes per person
- The SCRUM master must where possible mitigate outside interruptions and distractions to the team

# Events



- A Sprint Review/Demo meeting is held at the end of the Sprint to inspect the Increment.
- The Team demonstrates the Increment with focus on the Sprint Goal according to the Definition of Done.
- The Product Owner reviews and accepts the delivered Increment.

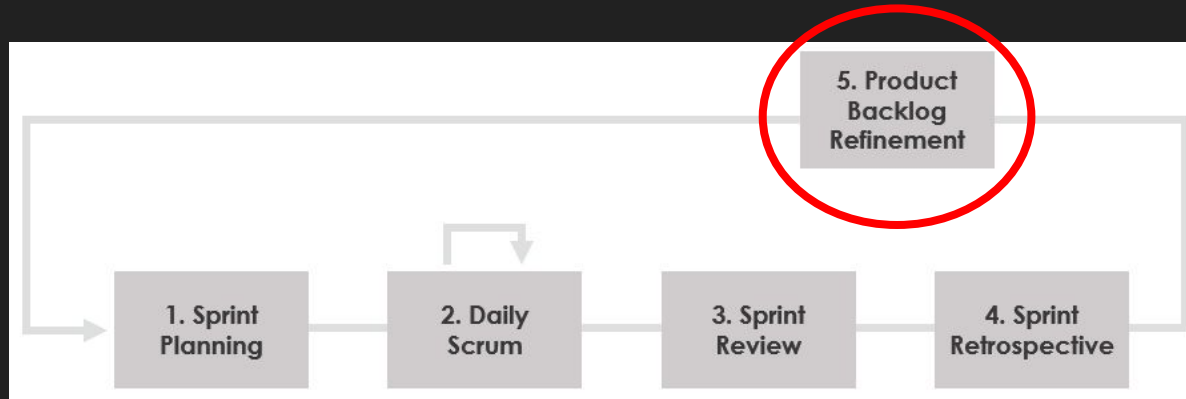
# Events



- The sprint retrospective is usually the last thing done in a sprint.
- You can schedule a scrum retrospective for up to an hour, which is usually quite sufficient.
- The retrospective gives the team the opportunity to identify 3 key aspects:
  - What should starting doing?
  - What did not go well (and stop doing again)?
  - What went well (and should keep doing)?
- Continually improve the team efficiency.



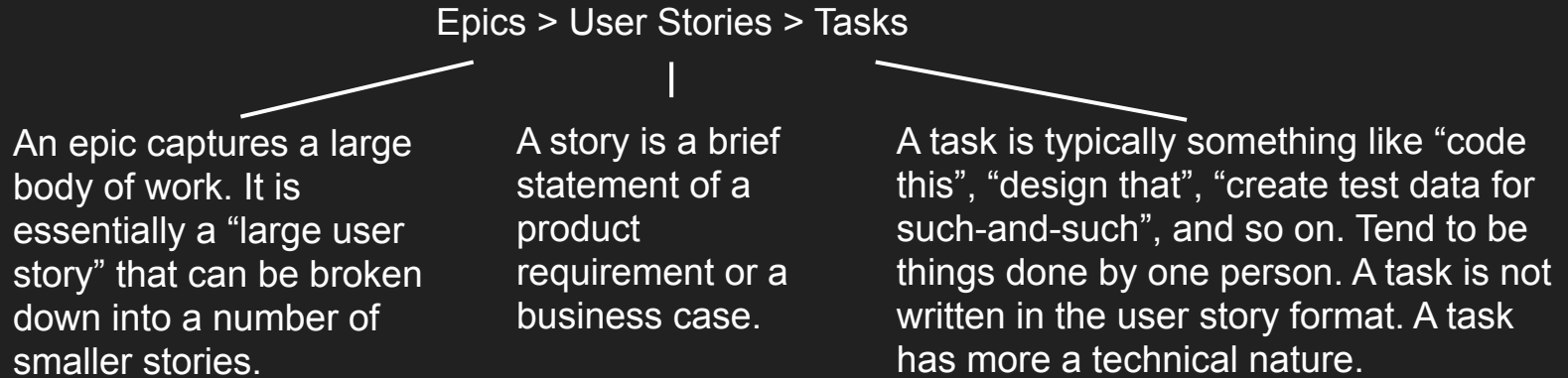
# Events



- Think of the backlog as the roadmap of the project.
- As the team collaborates to create a list of everything that needs to be built or done for project completion, this list can be modified and added to throughout the project to ensure that all of the necessary needs of the project are met.

# Sprint

In the Scrum Framework all activities needed for the implementation of entries from the Scrum Product Backlog are performed within Sprints (also called 'Iterations'). Sprints are always short: normally about 2-4 weeks.



Experienced Scrum Teams spend time and effort to break down complex and larger items (i.e user features or epics) into smaller user stories (or subsequently breaking down into tasks, or subtasks).



# Recap

## Process Models

DevOps vs Other Models

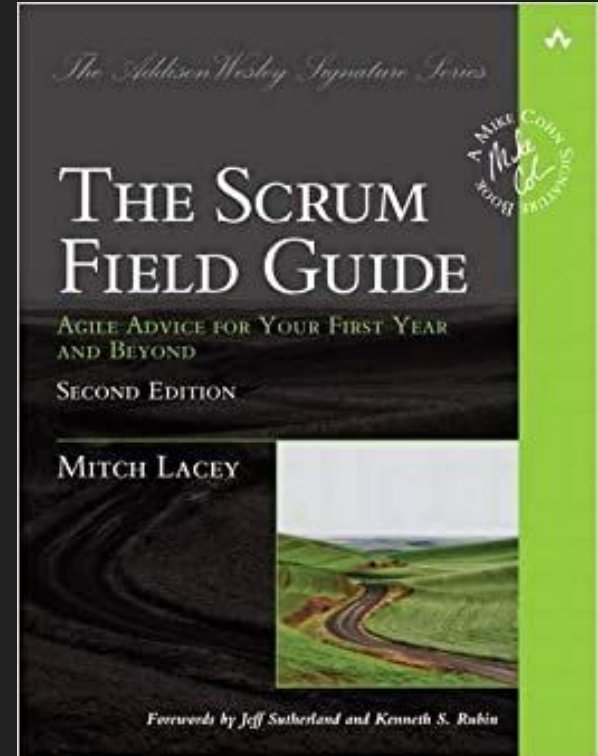


# Additional Materials

Scrum Field Guide,

The: Agile Advice for Your First Year and Beyond  
(Addison-Wesley Signature Series (Cohn)) 2nd Edition

By Mitch Lacey



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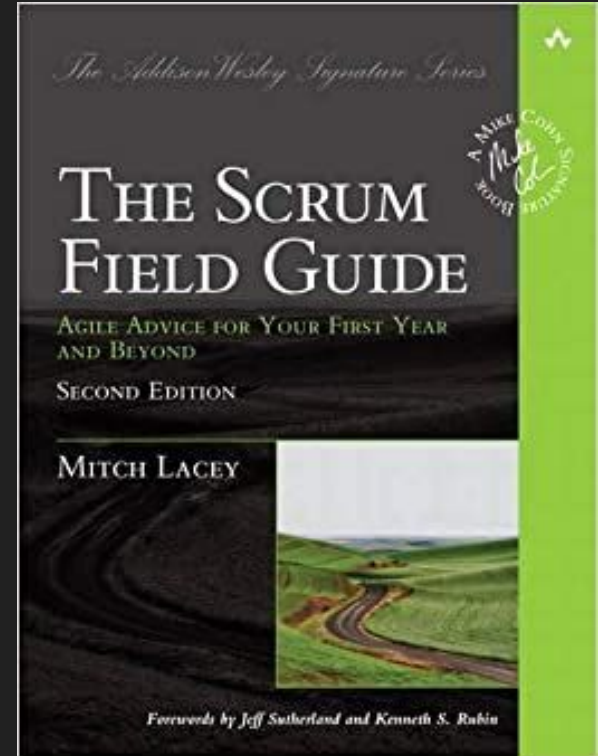
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<https://www.mountangoatsoftware.com/>

By Mike Cohn



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# Group Formation

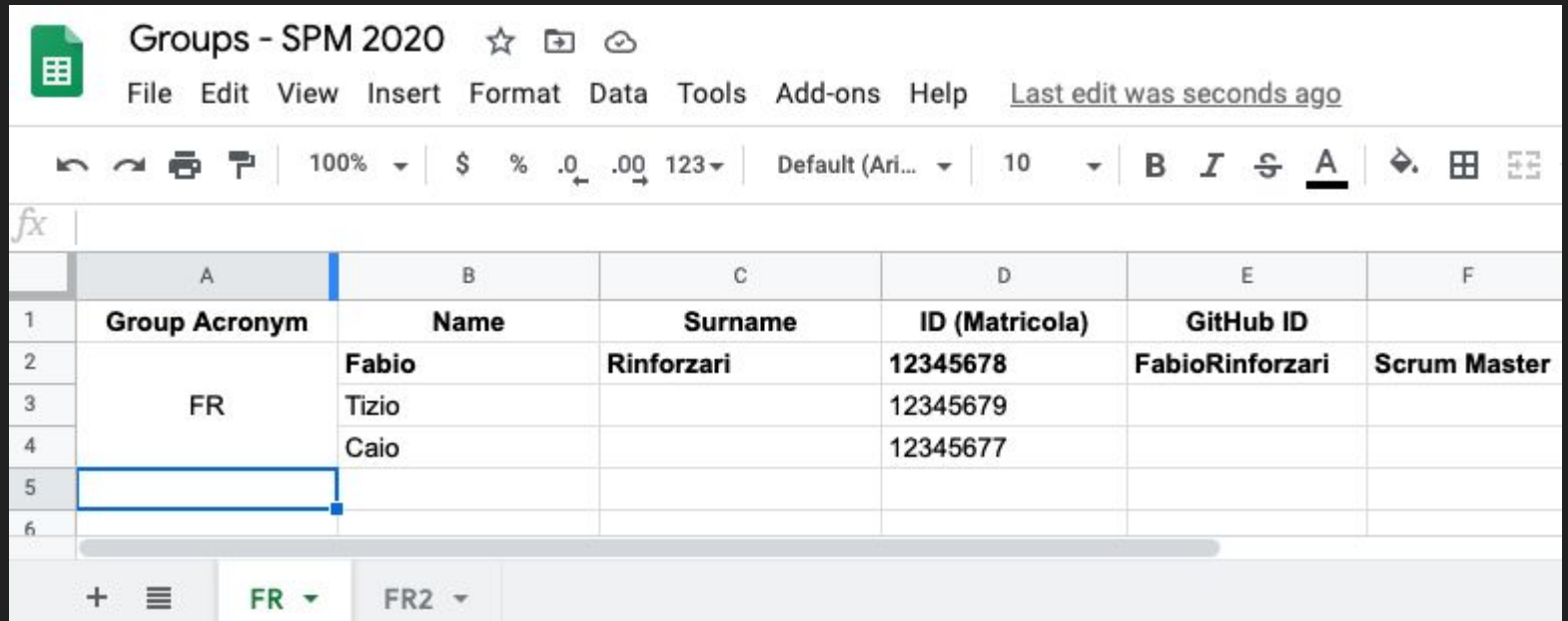
- Group of 2 or 3 students have to be formed
- A Project will be assigned
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# Google Sheets

<https://docs.google.com/spreadsheets/d/1tOdMoBKzBjcHGQI3ACmrkkcaFbc2TuPfgmFQM2jL9BU>

<https://tinyurl.com/yynuktc1>



The screenshot shows a Google Sheet interface with the following elements:

- Title:** Groups - SPM 2020
- Menu:** File, Edit, View, Insert, Format, Data, Tools, Add-ons, Help
- Toolbar:** Undo, Redo, Print, Copy, Paste, Zoom (100%), Currency, Percent, Decimal, Thousand Separator, Font Color, Background Color, Text Color, Bold, Italic, Underline, Link, Table, Grid
- Formula Bar:** fx
- Table:**

	A	B	C	D	E	F
1	Group Acronym	Name	Surname	ID (Matricola)	GitHub ID	
2	FR	Fabio	Rinforzari	12345678	FabioRinforzari	Scrum Master
3		Tizio		12345679		
4		Caio		12345677		
5						
6						

At the bottom, there are tabs for 'FR' and 'FR2'.

Any Question?