Software Development Project 1

Welcome to the Software Development Project 1 course!

Agile software development and Scrum

- The learning objectives for this week are:
    - Knowing about the course contents, assesment and schedule
    - Knowing what is agile software development
    - Knowing what is the software development lifecycle
    - Knowing what is Scrum
    - Knowing how requirements are managed in agile software development

About the course

- So far during the studies we have mostly worked on fairly small applications *by ourselfs*
- Different kind of problems arise while we work on more complicated applications *in a software development team*
- These problems aren't *only technical*, the *management* of the software development process can be quite tricky
- During this course, we will learn how to *manage the software development process* and how to *work as a member of a software development team*
- We will learn these skills in practice by developing a *software development project* in a software development team consisting of 4-5 students

About the course

- Each team will be developing a project described on the course page
- The project is a web application implemented with *Java* programming language using the *Spring Boot framework*
- *JavaScript* and *React* is used as a frontend technology
- The development of the project is split into *three* two-week iterations called *Sprints*
- Each Sprint has high-level requirements, but teams should make most of the technical decisions themselves
- The project starts on week three

Course assesment

- The assessment is based on the *team's project* and the *personal contributions* of a team member
- The project assessment is based on the following aspects:
    - Technical implementation
    - Project management
    - Documentation
    - Following the schedule
- Each of the three Sprints is assessed based on the Sprint requirements
- The team can earn up to 10 points from each Sprint which adds up to the maximum number of 30 points from the project

Course assesment

- Each team member’s personal assessment is based on the following aspects:
  - Activity in team work
  - Technical contributions
  - Project management and documentation contributions
  - Exercise submissions
- The personal assessment is done based on the teacher’s observations and peer reviews from the team members
- Each team member can earn up to 10 points based on their personal efforts towards the project

Course assesment

- The final grade (1-5) is composed of the project points (maximum of 30 points) and the personal points (maximum of 10 points)
- The following are necessary to pass the course:
    - At least 80% of the first two week's exercises have to be completed before their deadlines to pass the course
    - Written peer review for each team member
    - Passing grade from the peer reviews

Course schedule

- There's weekly sessions during which we will cover different topics
- Attendance on weekly sessions is *mandatory*
- During the first two weeks, we will cover topics that are important to grasp before starting to work on the project
- The team work with the project starts on week three
- During the team work we will learn about new topics, but most importantly we will learn how to apply our new knowledge in practice
- Both individual exercises and project exercises have *deadlines*
- The detailed schedule can be found on the course page

Agile software development

> "*able to move quickly and easily*"
>
> – Dictionary definition for the word "*agile*"

- The word *agile* is often used in many industries to describe the way of working in organizations
- The word is commonly used in a positive manner, for example, "we are an *agile* organization", or "we work in a *agile* manner"
- In *agile software development*, the development process follows values and principles that have been found to lead to successful software development projects
- These values and principles have been constituted and written down as the *Manifesto for Agile Software Development* by famous software development pioneers

Manifesto for Agile Software Development

- The Manifesto for Agile Software Development describes the following values:
    - Individuals and interactions over processes and tools
    - Working software over comprehensive documentation
    - Customer collaboration over contract negotiation
    - Responding to change over following a plan

Agile software development

- One of the key value is the attitude towards *change*
- For example, there is often need to change the software's requirements during the development process
- Agile software development process should welcome any kind of change with open arms
- That is, because *change is inevitable and frequent* in many business environments
- The Manifesto for Agile Software Development doesn't go into details on how to actually *implement* these values in practice
- Different Agile software development process frameworks, such as *Scrum* and *SAFe* describe a detailed process that follows these values

Software development lifecycle

- It requires *different phases* to be completed so that an idea of what we can do with a software becomes an actual working software which provides the desired features
- The software development process is divided into different phases:
  i. Requirements phase
  ii. Design phase
  iii. Implementation phase
  iv. Test phase
  v. Deployment phase
  vi. Maintenance phase
- The phases are commonly performed in the mentioned order and the whole process is often called the *software development lifecycle*

Requirements phase

- In the *requirements phase*, the development team collects requirements from several stakeholders such as customers, internal and external experts, and managers
- The requirements cover use cases that describe user interactions that the software must provide
- For example, "As a blog reader I want to browse list of blog posts of a blog so that I can find interesting posts to read" could be a requirement for a blog application
- These requirements are written down as the *software requirement specification document*

Design phase

- In the *design phase*, the development team analyzes requirements and identifies the best solutions to create the software
- For example, they may consider integrating pre-existing modules, making technology choices, and identifying development tools
- During the design phase different kind of documentation, such as architecture diagrams, are produced to support the *implementation phase*

Implementation phase

- In the *implementation phase*, the development team codes the product
- They analyze the requirements to identify smaller coding tasks they can do daily to achieve the final result
- The organization of the collaboration during the implementation phase isn't simple and it requires the development team to carefully follow mutually agreed *process*
- The development team needs to use different kind of tools to ease the collaboration, such as *version control tools*, which we will cover later

Test phase

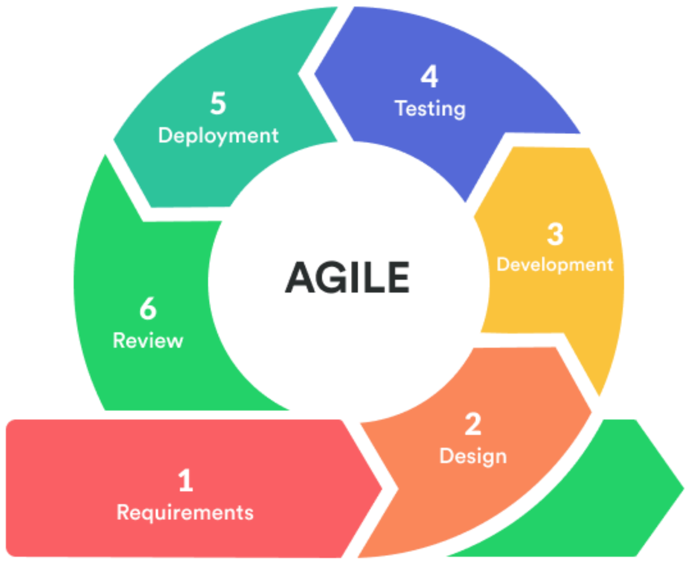
- In the *test phase*, the development team combines automation and manual testing to check that the software works as intended
- In practice, the test phase isn't usually separated from the implementation phase
- This means that software developers usually implement a small coding task, write automated test cases for the task and moves on to the next task.
- Testing the software is usually considered to be the responsibility of the software developer who wrote the code, because *they are most familiar with the implementation*

Deployment and maintenance phase

- In the *deployment phase*, the implemented software is distributed to the users
- For example, a web application is published online so that users can access it with their browsers
- Once the software is distributed, it needs to be constantly *maintained*
- In the *maintenance phase*, among other tasks, the development team fixes bugs, resolves customer issues, and manages software changes

Software development licefycle in agile software development

- Agile software development has an *iterative approach* in the software development lifecycle
- In this approach, the software is developed in short, typically one or two-week-long iterations
- Each iteration starts with the requirements phase and during the iteration design, implementation, test, deployment, and maintenance phases are completed
- The outcome of each iteration is working software that users can actually use and give feedback
- This cycle repeats in every iteration



Benefits of the iterative approach

- The benefits of the iterative approach is the ability to *respond to change quickly* and the *feedback loop* it provides
- After each iteration the requirements can change which makes it easy to respond to new user and business needs
- After each iteration the users of the software can get their hands on new features which they can give feedback on
- The feedback can be used to define requirements for the next iterations
- This forms the *feedback loop* which is the heartbeat of the agile software development process

Scrum

- *Scrum* is an iterative software development process framework that defines practical ways to carry out agile software development principles
- The offical guide to Scrum process is the *Scrum Guide* which describes each aspect of the process in detail
- In the Scrum process, the *Scrum Team* developes software in fixed length iterations called *Sprints*
- In each Sprint, there are fixed *events*, which help the Scrum Team to organize their work and keep track on the progress of the Sprint
- During the course we will use Scrum to manage our software development process while working on the project

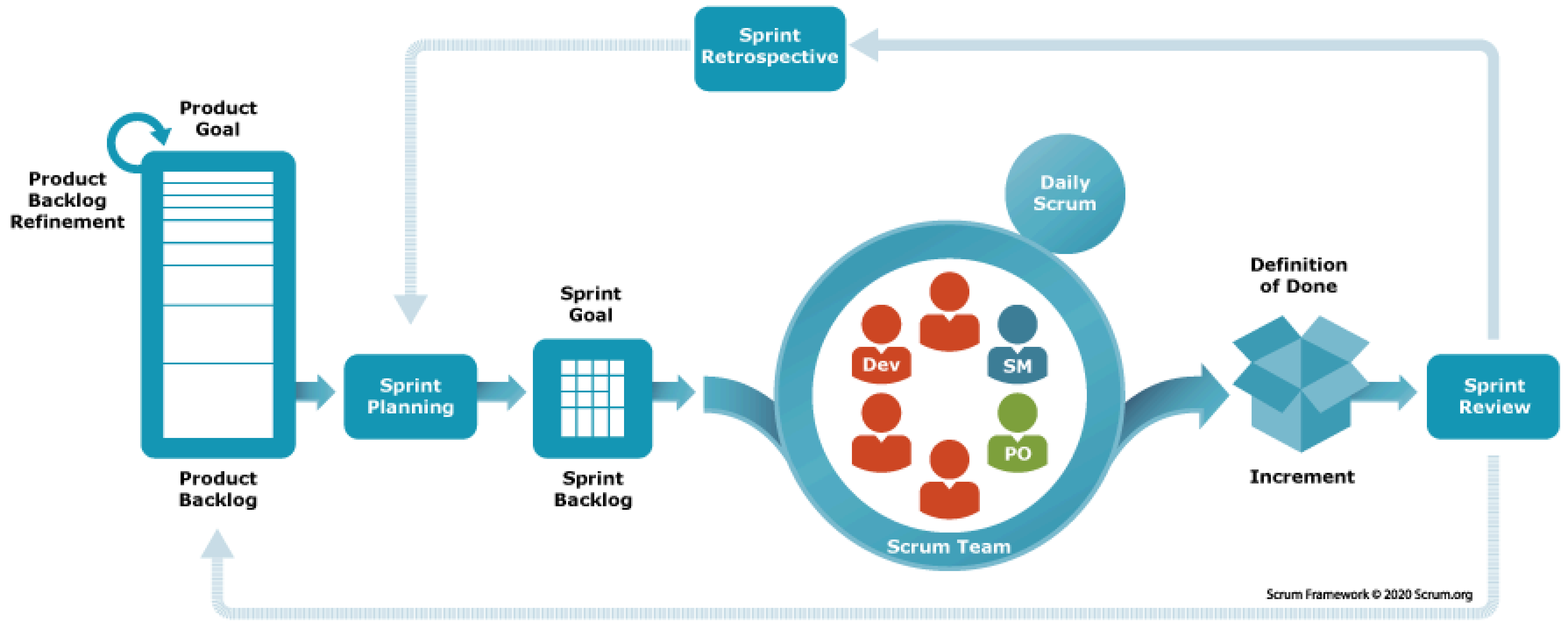
Scrum Team

- The *Scrum Team* is responsible for the outcome of each Sprint
- It consists of one *Scrum Master*, one *Product Owner*, and *Developers*
- *Developers* are responsible for the technical implementation of the software
- *Product Owner* is responsible for maximizing the value of the product resulting from the work of the Scrum Team
- *Scrum Master* is responsible that the software development process follows the Scrum practices
- During the course, the teacher is the Product Owner and students are the Developers

Scrum Events

- Four *events* take place during each Sprint: *Sprint planning*, *Daily Scrum*, *Sprint Review* and *Retrospective*
- At the beginning of the Sprint, there's a *Sprint planning* event during which the Scrum Team decides which set of requirements are implement during the upcoming Sprint
- During the Sprint, the Scrum Teams organizes *Daily Scrum* meetings to discuss the progress of the Sprint
- At end of the Sprint, there's a *Sprint Review* event during which the Scrum Team goes through the outcome of the Sprint
- Before starting the next Sprint, the Scrum Team discuss the problems with the process and figure out ways to improve it during the *Retrospective* event

The Scrum process



Agile requirement specification

- In agile software development, requirements are commonly written as *user stories*
- A user story is a short, simple description of a feature told from the perspective of the person who desires the new feature in the software
- During each Sprint, the Developers of the Scrum Team implement features for the software based on user stories
- User stories are sort of todo items, like "take out the trash". They are there so that the Scrum Team remembers what kind of features need to be implemented for the software

User story

- For example, two separate user stories for a blog application could be the following:
  - "As a content creator, I want to create a new blog so that I can start writing blog posts."
  - "As a blog reader, I want to browse list of blog posts of a blog so that I can find interesting posts to read."
- A user story is written from the user’s perspective and commonly follows the following format:

  > As [a user persona], I want [to perform this action] so that [I can accomplish this goal].

Writing good user stories

- A good user story describes a *feature that provides value for the end user of the software*
- This means, that the description should be written so that the *customer can understand it*
- For example the following user story is too technical:

  > ❌ As a blog reader, I want to send an HTTP GET request to the /api/blogs/{id}/blog-posts REST API endpoint on the server to get the list of blog posts of a blog in JSON format so that I can find interesting blog posts to read.

- A better user story would express the feature from the user’s point of view:

  > ✅ As a blog reader, I want to browse the list of blog posts of a blog so that I can find interesting posts to read.

The INVEST criteria

- There are also other common guidelines for a good user story. One popular guideline is the *INVEST criteria*
- *Independent*: written so they can be developed and tested independently of other stories.
- *Negotiable*: written to allow for negotiation between the development team and the customer.
- *Valuable*: should provide value to the end user.
- *Estimable*: written in a way that allows the development team to estimate the amount of effort required to complete them.
- *Small*: small enough to be completed within a single iteration of the development process.
- *Testable*: written to allow testing to be performed at the end of the development process.

The INVEST criteria

- Which INVEST criteria does the following user story violate?

> ❌ As a content creator, I want to register with a username and password, a profile picture, and a profile description so that I can start writing blog posts.

The INVEST criteria

- It is better to split these kinds of big user stories into multiple smaller user stories:

  > ✅ As a content creator, I want to register with a username and password so that I can start writing blog posts.

  > ✅ As a content creator, I want to register with a profile picture so that my readers know what I look like.

  > ✅ As a content creator, I want to register with a profile description so that my readers know about me.

- If the description of the feature contains words like "and" or "or", it could be that the user story can be split into smaller user stories

Meet your team

- Let's form teams of 4-5 students for the project starting on week three
- Each team member should introduce themselves to others. You can e.g. share the following things about yourself:
    - Which parts of software development you are most interested in? (e.g. backend development, frontend development, databases...)
    - Which parts are you most comfortable with?
    - From which parts you would want to learn more about?
    - What are your expectations towards the course?