



# Introduction to Software Engineering

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# Learning Objectives

## **L01:**

Understand what software engineering is and why it is necessary.

## **L02:**

Recognize that different types of software systems may necessitate the use of extra software engineering techniques.

## **L03:**

Be aware of legal and professional issues that affect software engineers.



**Let's do a fun activity**



# Activity

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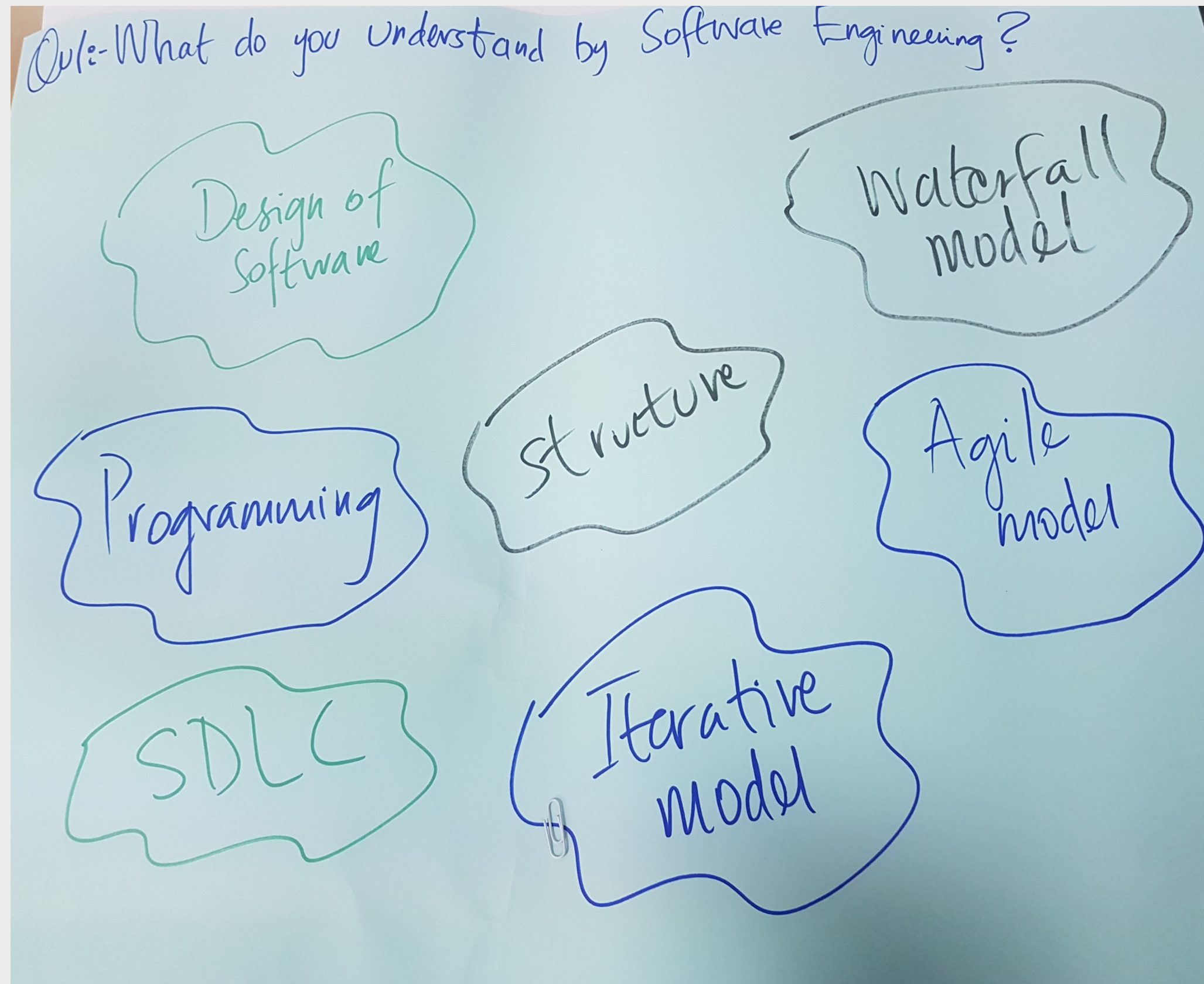
 Mentimeter

## What do you understand by Software Engineering?

0 responses



# Word cloud by students





# **Definition**

**Software engineering** is an engineering discipline concerned with all aspects of software production, from the early stages of system specification to maintaining the system after its use.



# Two types of software product

Software engineers are concerned with developing software products, that is, software that can be sold to a customer.

**Generic**

**Bespoke**







# **Need for software engineering**

**To manage large  
software**

**To manage cost  
effectively**

**To cater for scalability**

**For better quality  
management**

**To manage the dynamic  
nature of software**





# Attributes of a good software

- **Maintainability**

- Software must evolve to meet changing needs

- **Efficiency**

- Software should not make wasteful use of system resources

- **Dependability**

- Software must be trustworthy

- **Usability**

- Software must be usable by the users for which it was designed

# Need for software engineering

The systematic approach used in software engineering is sometimes called a software process.

A sequence of activities that produce a software product, and four critical activities are common to all processes.





## **Four critical activities**

- Customers and engineers describe the software that will be developed as well as the constraints that will govern its functioning in a software specification
- Software development is the process of designing and programming software.
- Program validation is the process of ensuring that the software meets the needs of the customer.
- Software evolution is the process of modifying software to meet changing consumer and market needs.

# Professional software development

Professional software development is the process of creating software products that meet the needs of clients, end-users, and stakeholders while adhering to professional standards, best practices, and ethical considerations.

It involves a team of developers, project managers, designers, and quality assurance testers, who work collaboratively to design, develop, and deploy software products.





# Key principles and practices

## **Requirements gathering:**

Professional software development teams gather and analyze requirements from clients and end-users to understand their needs and design software products that meet those needs.

## **Agile development:**

Agile development is an iterative and incremental approach to software development that emphasizes collaboration, flexibility, and responsiveness to change.

## **Design patterns:**

Design patterns are reusable solutions to common software development problems. Professional software development teams use design patterns to create software products that are efficient, reliable, and maintainable.

# Key principles and practices

## **Code quality:**

Professional software development teams prioritize code quality by following coding standards, writing clean and readable code, and performing code reviews.

## **Testing:**

Professional software development teams test their software products rigorously to ensure that they meet quality standards, are free of bugs and errors, and function as expected.

## **Security:**

Professional software development teams consider security in every stage of the software development lifecycle to protect against vulnerabilities and ensure the confidentiality, integrity, and availability of data.

# Key principles and practices

## **Continuous integration and deployment:**

Professional software development teams use continuous integration and deployment tools and processes to automate the build, test, and deployment of software products, resulting in faster and more reliable releases.





# **Internet Software Engineering**

**Internet software engineering** refers to the process of designing, developing, testing, and maintaining software applications that are designed to run on the internet. This includes web applications, mobile applications, and other internet-connected software.



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# Legal aspects



## **Intellectual Property:**

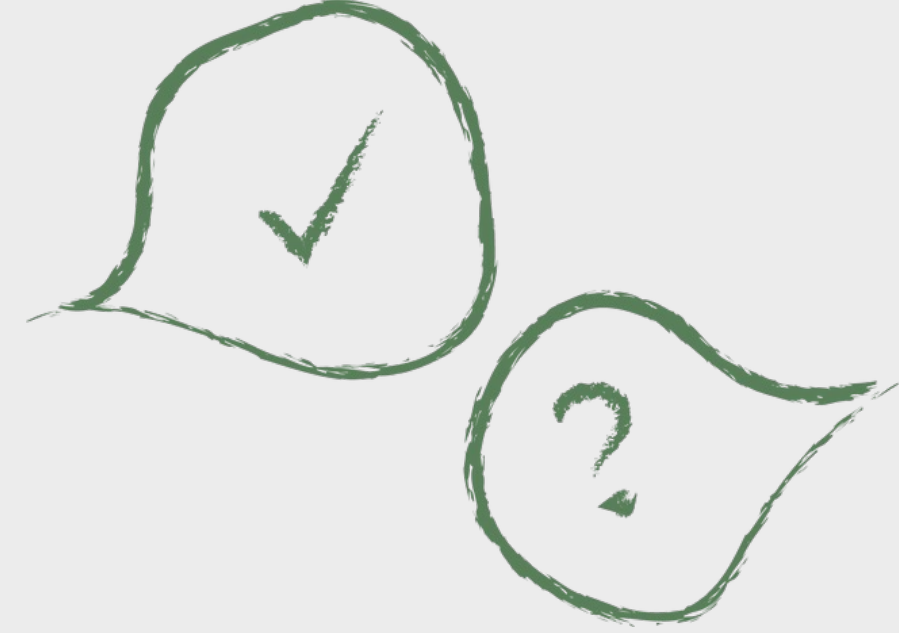
Intellectual property law covers patents, copyrights, and trademarks.

Software engineering teams need to ensure that they do not infringe on the intellectual property rights of others while developing and distributing their software products.

## **Licensing:**

Software licensing agreements define how software can be used, distributed, and modified. Licensing agreements can vary depending on the software type and can include terms related to payment, support, warranty, and liability.

# Legal aspects



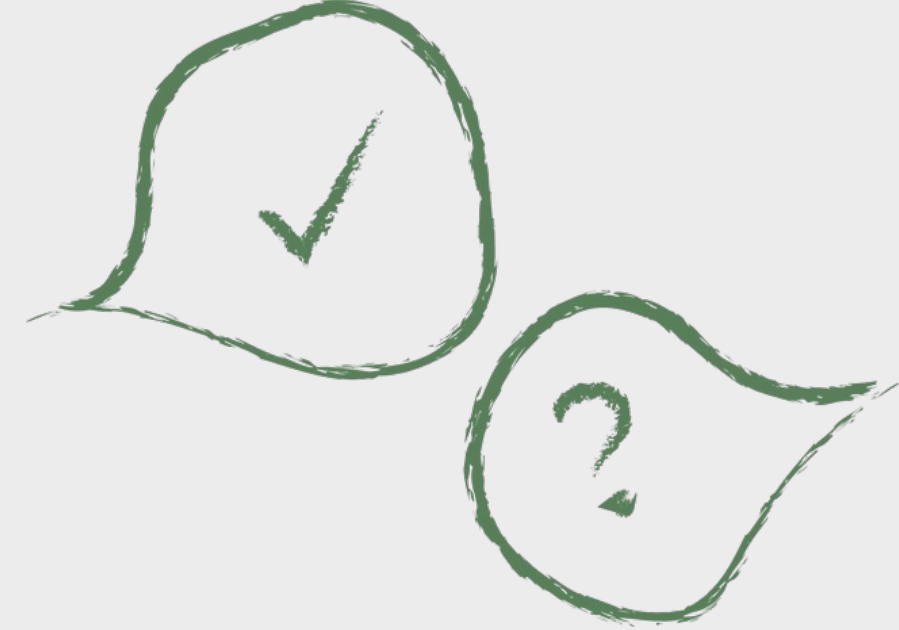
## **Privacy:**

Software engineering teams must be mindful of privacy laws, such as GDPR in the European Union or CCPA in California, that require software companies to take specific measures to protect personal data.

## **Liability:**

Software engineering teams should be aware of their potential liability for any harm caused by their software. Liability can arise due to defects, security vulnerabilities, or other issues that could cause harm to users.

# Legal aspects



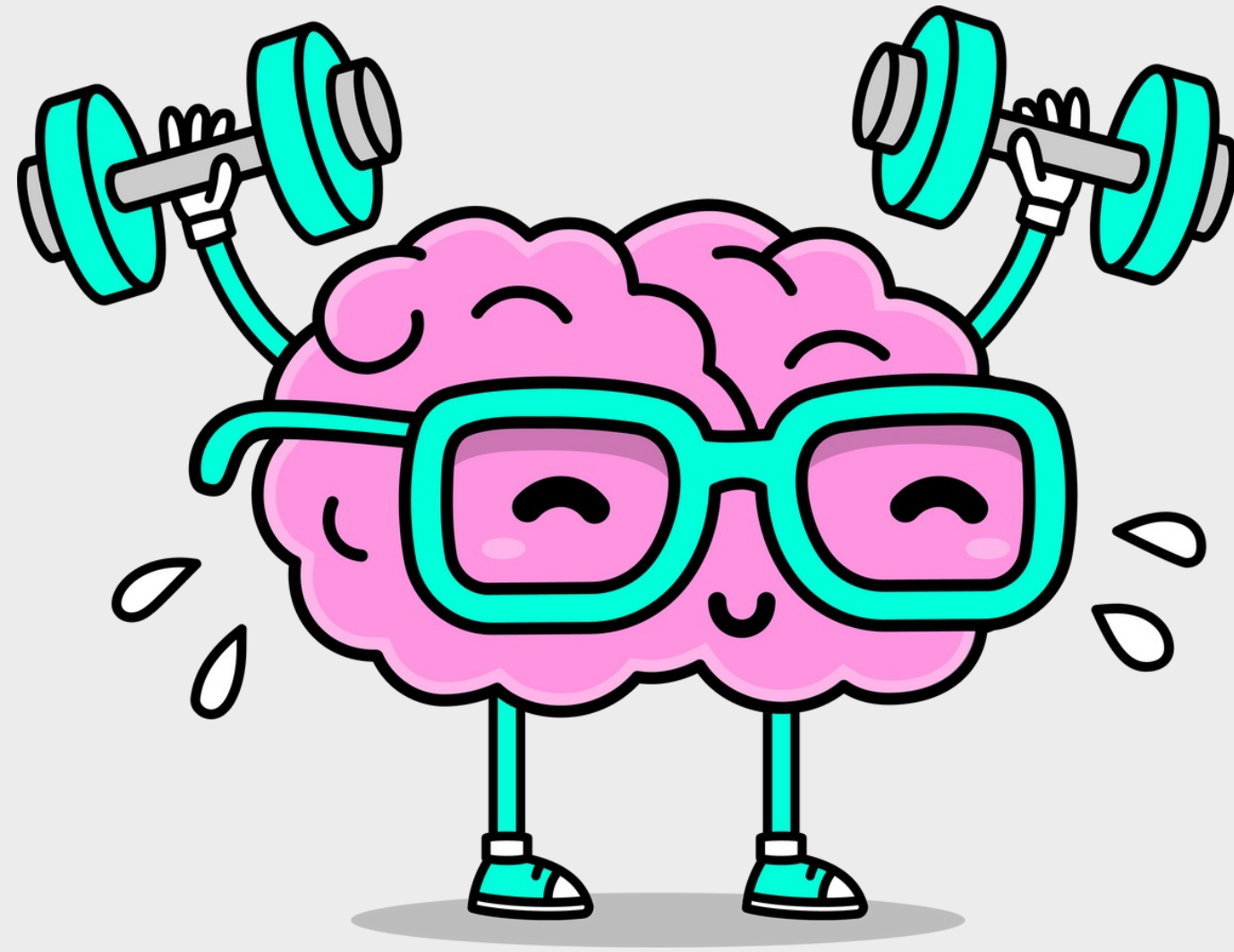
## **Contracts:**

Software development contracts define the terms of engagement between the software development team and the client or customer. These contracts can cover a range of topics, such as payment terms, delivery timelines, and project scope.

## **Cybersecurity:**

Cybersecurity laws and regulations impose requirements on software developers to ensure that their products are secure and protect against unauthorized access or data breaches.





**Time for a recap activity!**

# Activity

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**What are the key ideas/words from today's sessions?**

0 responses

<https://www.menti.com/alkrrrew5h91>

# Word cloud by students

See the group work done in class at the link:

<https://tinyurl.com/589kkwhf>



THANK  
you