

CSE 423: Software Engineering

Introduction to Software Engineering

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January 23, 2023

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What is Software Engineering?

What is Software Engineering? i

What is a Software?

A **collection of programs** that accomplish any particular task !!

What is Engineering?

application of **scientific and practical knowledge** to invent, design, build, maintain, and improve frameworks, processes, etc

What is Software Engineering? i

What then is the definition of Software Engineering?!!



What is Software Engineering? i

Definition

Software engineering is an engineering discipline that is concerned with from the **early stages** of **system specification** through to **maintaining** the system after it has gone into use.



Software Application Domains

SEVEN Broad Categories!!

System Software

- Software designed to **provide a platform for other software or service to other programs.**
- Example: Various operating systems (Android, Windows, Linux, macOS etc), compiler, Winzip, WinRAR etc)

Application Software

- **Stand-alone** programs that **solve a specific business need.**
- Example: MS Office, PowerPoint, Chrome, Adobe Photoshop, Notepad, Skype)

Software Application Domains i

Engineering/scientific software

- software satisfies the needs of a scientific or engineering user to perform enterprise-specific tasks
- Example: MATLAB, AUTOCAD, PSPICE, ORCAD, etc.

Embedded Software

- resides within a product or system and is used to implement and control features and functions for the end user and for the system itself.
- key pad control for a microwave oven or washing machines

Software Application Domains i

Web applications

- Application software that is **accessed using a web browser**
- provide stand-alone features, computing functions, and content to the end user, also integrated with corporate databases and business applications
- Example: online forms, shopping carts, video and photo editing, file conversion

Product-line/Business Software

- software is **used to support business applications** and is the most widely used category of software.
- software for inventory management, accounts, banking, hospitals, schools, stock markets, etc

Artificial intelligence software

- Computer program which **mimics human behavior** by learning various data patterns and insights
- Example: robotics, expert systems, pattern recognition (image and voice), artificial neural networks, theorem proving, and game playing.

System Software vs Application Software

System Software vs Application Software i

System Software	Application Software
Maintains system resources & gives path for application software to run	Built for specific tasks.
Low-level languages are used	High-level languages are used
System stops without system software	Without application software system always runs .
Runs independently .	Dependent on system software
Operates the system in the background until the shutdown of the computer	Runs in the front according to the user's request.
Example: OS	Example: Photoshop, VLC player, etc.

Software Engineering vs Computer Engineering

Software Engineering vs Computer Engineering i

Software Engineering?

- study of **software** which tell us about how Software is formed and about the processes involved in the formation of Software
- Applies the principles of Engineering in order to create a software

Computer Engineering?

- study of both **software and hardware** and informs about the theoretical and practical implementation of mathematical formulations and technologies
- Provide knowledge about various field: networking, processors and data base etc
- Base of Software Engineering

Essential Attributes of a Good Software

Essential Attributes of a Good Software i

Maintainability

- Software should be written in such a way so that it can **evolve** to meet the **changing needs** of customers.
- This is a critical attribute because software change is an **inevitable requirement** of a **changing business environment**.

Dependability and security

- Software dependability includes a range of characteristics including **reliability, security, and safety**. Dependable software **should not** cause **physical or economic damage** in the event of system failure. **Malicious users** should not be able to **access or damage** the system.

Efficiency

- Software **should not** make wasteful use of system resources such as **memory and processor** cycles. Efficiency therefore includes responsiveness, processing time, memory utilization, etc.

Acceptability

- Software must be **acceptable** to the **type of users** for which it is designed. This means that it must be understandable, usable, and compatible with other systems that they use.

