



**CHANDIGARH**  
**UNIVERSITY**

Discover. Learn. Empower.

Department of Computer Science

# **University Institute of Engineering**

## **DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

Bachelor of Engineering

Subject Name: System Programming

Subject Code: CST-315

Assemblers

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# Chapter-1

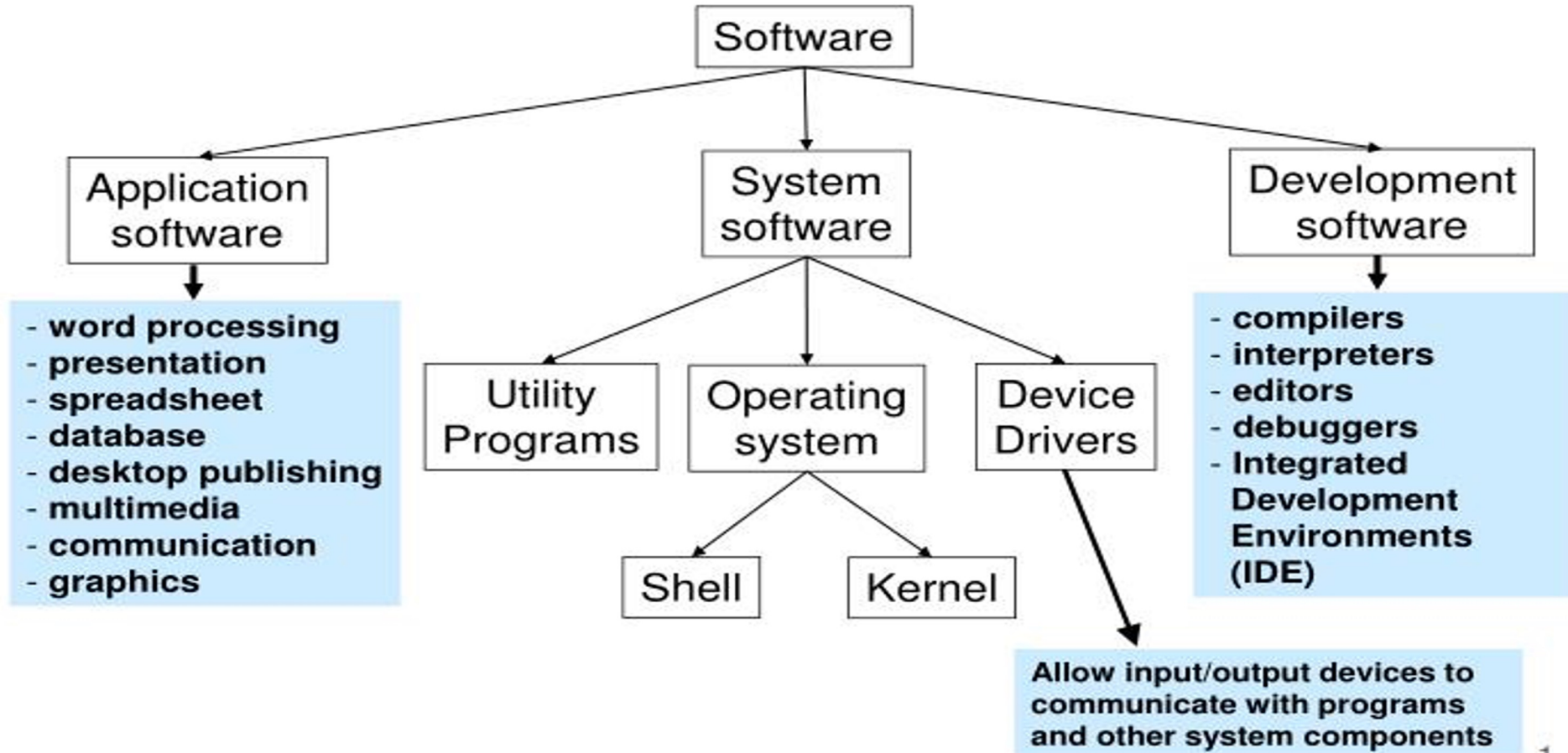
## Overview of System Software

- Introduction
- Software
- Software Hierarchy
- System Programming

# Introduction-Software

- Software means computer instructions or data. Anything that can be stored electronically is software, in contrast to storage devices and display devices which are called hardware.
- A computer system consists of two components; Hardware (the physical component of which includes keyboard, mouse, printer etc) and the software (the electronic working components). Hence, software is indispensable for any computer system

# Software Hierarchy



# Categories of Software

Software is categorized into

- Systems software and
- Applications software.
- Development Software

-Systems Software refers to set of programs that coordinates activities and functions of the hardware and various other programs. It is operating system and all utility programs that manage computer resources at a low level.

The systems software consists of

- operating systems
- Utility systems
- Devices drivers and
- programming languages.

**Operating system** refers to the system which runs a computer. Operating systems consist of the master system of programs that manage the basic operations of the computer.. Examples of OS for the PC include Windows, Unix etc.

**Utility Software-** Utility software (a type of system software) is designed to help you monitor and configure settings for your computer system equipment, the operating system, or application software. A desktop widget is a specialized utility program that appears on a computer's screen-based desktop

# Systems Software

- **Device Drivers** . A device driver is software that helps a peripheral device establish communication with a computer. Eg., Windows Device Manager.
- The Programming Languages refers to coding schemes used to write both systems and application software
- Hence, systems software refers to the operating system and all utility programs that manage computer resources at a low level. The system software serves the application, which in turn serves the user.
- **Systems software:** coordinates the activities and functions of hardware and programs

# Operating Systems Functions

1. User interface and input/output management
  - User interface: allows individuals to access and command the computer system
  - Command-based user interface: requires that text commands be given to the computer to perform basic activities
  - Graphical user interface (GUI): uses icons and menus displayed on screen to send commands to the computer system
2. Hardware independence
  - Application program interface (API): allows applications to make use of the operating system
3. Memory management
  - Control how memory is accessed and maximize available memory and storage

# Operating Systems Functions

4. Processing tasks
  - **Multitasking:** more than one program can run at the same time
  - **Time-sharing:** allows more than one person to use a computer system at the same time
  - **Scalability:** ability of the computer to handle an increasing number of concurrent users smoothly
5. Networking capability
  - Features and capabilities of the OS that aid users in connecting to a computer network
6. Access to system resources and security
  - Protection against unauthorized access
  - Logins and passwords
7. File management
  - Ensures that files in secondary storage are available when needed and that they are protected from access by unauthorized users



# Applications Software

Application software is all the computer software that causes a computer to perform useful tasks beyond the running of the computer itself. A specific instance of such software is called a software application, application program, application or app.

Applications software comprises programs designed for an end user.

## **Examples**

accounting software enterprise software, graphics software, media players, word processors, database systems, and spreadsheet programs.

Figuratively speaking, applications software sits on top of systems software because it is unable to run without the operating system and systems utilities.

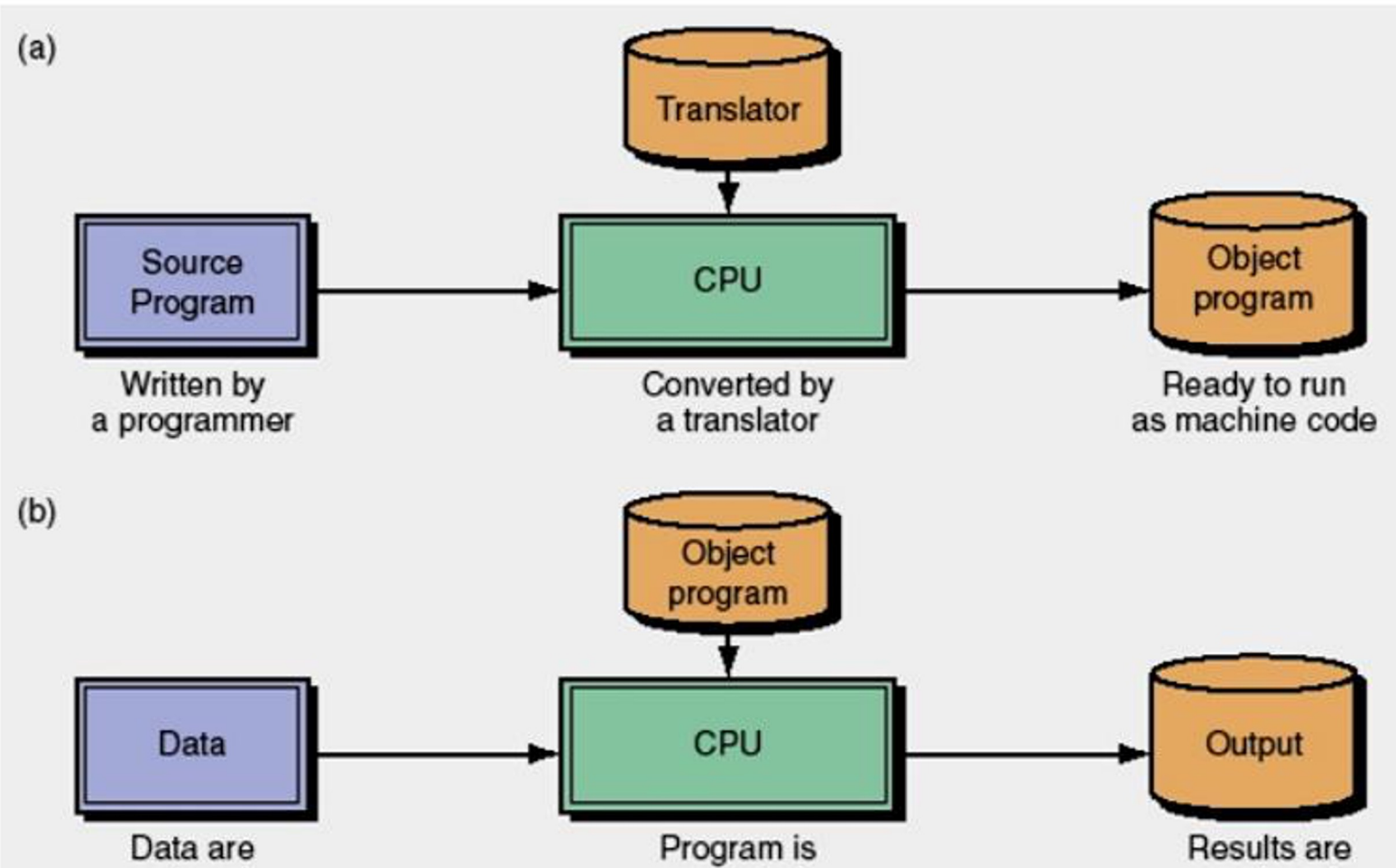
# Types of Applications Software

Application software can also be seen as being either horizontal or vertical.

- **Horizontal applications** are more popular and widespread, because they are general purpose, for example word processors or databases.
- **Vertical applications** are niche products, designed for a particular type of industry or business, or department within an organization. Integrated suites of software will try to handle every specific aspect possible of, for example, manufacturing or banking systems, or accounting, or customer service.

# Development Software

## The “Compilation” Process



# System Programming

- System programming (or systems programming) is the activity of programming the system software. The primary distinguishing characteristic of systems programming when compared to application programming is that application programming aims to produce software which provides services to the user (e.g. word processor), whereas systems programming aims to produce software which provides services to the computer hardware (e.g. disk defragmenter). It requires a greater degree of hardware awareness.
- An example is an operating system, which usually acts as the interface between the user, the application software, and computer hardware. The OS provides an environment that enables users to execute other programs efficiently. Comprising of a set of system programs, the operating system functions include storage management, file handling, memory management, CPU and device scheduling and management, error handling, process control and more.

# References

- [Introduction to Computer Software PowerPoint Presentation, free download - ID:5644955 \(slideserve.com\)](#)
- [Introduction to software | computer Software \(w3htmlschool.com\)](#)
- [Types of Software – GeeksforGeeks](#)



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