

Computing Systems Hardware and Software

K-2.CS.2 Explain the functions of common hardware and software components of computing systems.

3-5.CS.2 Demonstrate how computer hardware and software work together as a system to accomplish tasks.

The following table highlights the points that differentiate a hardware from a software.

Hardware	Software
It is the physical component of a computer system.	It is the programming language that makes hardware functional.
It has the permanent shape and structure, which cannot be modified.	It can be modified and reused, as it has no permanent shape and structure.
The external agents such as dust, mouse, insects, humidity, heat, etc. can affect the hardware (as it is tangible).	The external agents such as dust, mouse, insects, humidity, heat, etc. cannot affect (as it is not tangible).
It works with binary code (i.e., 1's to 0's) .	It functions with the help of high level language like COBOL, BASIC, JAVA, etc.
It takes in only machine language, i.e., lower level language.	It takes in higher level language, easily readable by a human being.
It is not affected by the computer bug or virus.	It is affected by the computer bug or virus.
It cannot be transferred from one place to other electronically.	It can transfer from one place to other electronically.
Duplicate copy of hardware cannot be created.	A user can create copies of a software as many as he wishes.

An operating system is the fundamental basis of all other application programs. Operating system is an intermediary between the users and the hardware.

Operating system controls and coordinates the use of hardware among application programs. The major services of an operating system are –

- Memory management
- Disk access
- Creating user interface
- Managing the different programs operating parallel
- Likewise, it controls and manage the hardware's working

Applications of Operating System

Following are the major *applications* of an operating system –

- An operating system is accountable for the formation and deletion of files and directories.
- An operating system manages the process of deletion, suspension, resumption, and synchronization.
- An operating system manages memory space by allocation and de-allocation.
- An operating system stores, organizes, and names and protects the existing files.
- Further, an operating system manages all the components and devices of the computers system including modems, printers, plotters, etc.
- In case, if any device fails, the operating system detects and notify.
- An operating system protects from destruction as well as from unauthorized use.
- An operating system facilitates the interface to user and hardware.

Types of Operating System

Following are the major types of operating system –

- Disk Operating System (DOS)
- Windows Operating System
- Unix Operating System

Let us now discuss each operating system in detail.

Disk Operating System

MS-DOS is one of the oldest and widely used operating system. DOS is a set of computer programs, the major functions of which are file management, allocation of system resources, providing essential features to control hardware devices.

DOS commands can be typed in either upper case or lower case.

Features of DOS

Following are the significant features of DOS –

- It is a single user system.
- It controls program.
- It is machine independence.
- It manages (computer) files.
- It manages input and output system.
- It manages (computer) memory.
- It provides command-processing facilities.
- It operates with Assembler.

Types of DOS Commands

Following are the major types of DOS Command –

- **Internal Commands** – Commands such as DEL, COPY, TYPE, etc. are the internal commands that remain stored in computer memory.
- **External Commands** – Commands like FORMAT, DISKCOPY, etc. are the external commands and remain stored on the disk.

Windows Operating System

The operating system window is the extension of the disk operating system.

It is the most popular and simplest operating system; it can be used by any person who can read and understand basic English, as it does not require any special training.

However, the Windows Operating System requires DOS to run the various application programs initially. Because of this reason, DOS should be installed into the memory and then window can be executed.

Elements of Windows OS

Following are the significant element of **Windows Operating System (WOS)** –

- Graphical User Interface
- Icons (pictures, documents, application, program icons, etc.)
- Taskbar
- Start button
- Windows explorer
- Mouse button
- Hardware compatibility
- Software compatibility
- Help, etc.

Versions of Windows Operating System

Following are the different versions of Windows Operating System

Version	Year
Window 1.01	1985
Windows NT 3.1	1993
Windows 95	1995
Windows 98	1998
Windows 2000	2000
Windows ME	2000
Windows XP	2001
Windows XP Professional x64	2005
Windows Vista	2007
Windows 7	2009
Windows 8	2012
Windows 10	2015
Windows Server 2016	2016
Windows 11	2021

Features of Internet

Internet Software

Internet Software comprises of all the tools needed for networking through computer. Following are a few important components of the Internet Software –

- Transmission Control Protocol/ Internet Protocol (TCP/IP)
- Dialer Software
- Internet Browser

Internet Applications

Internet applications are server-based applications. Following are a few Internet Applications –

- World Wide Web (WWW)
- Electronic mail (e-mail)
- File Transfer Protocol (FTP)
- Telnet (i.e., log-in to the computer located remotely)
- Internet Relay Chat (IRC) (Real time video chatting)

Unix Operating System

UNIX is an operating system which was first developed in the 1960s, and has been under constant development ever since. By operating system, we mean the suite of programs, which make the computer work. It is a stable, multi-user, multi-tasking system for servers, desktops and laptops.

Designed for flexibility and adaptability.