

Unit 2 Computer Software

Introduction to Software

Among the two major components of a computer system, Software is one while Hardware being the other. Software refers to a set of computer programs and related data that provide the instructions for telling a computer what to do and how to do. It is a set of instructions that guides the hardware and tells it how to accomplish each task. Hardware refers to the physical equipment that is necessary for performing various operations such as storing results and providing output to users in the desired form.

In a computer system, the software is basically a set of instructions or commands that tell a computer what to do. In other words, the software is a computer program that provides a set of instructions to execute a user's commands and tell the computer what to do. For example like MS-Word, MS-Excel, PowerPoint, etc.

Types of Software

1. System Software

- Operating System
- Language Processor
- Device Driver

2. Application Software

- General Purpose Software
- Customize Software
- Utility Software

1. System Software

System software is software that directly operates the computer hardware and provides the basic functionality to the users as well as to the other software to operate smoothly. Or in other words, system software basically controls a computer's internal functioning and also controls hardware devices such as monitors, printers, and storage devices, etc. It is like an interface between hardware and user applications, it helps them to communicate with each other because hardware understands machine language(i.e. 1 or 0) whereas user applications are work in human-readable languages like English, Hindi, German, etc. so system software converts the human-readable language into machine language and vice versa.

Types of System Software It has two subtypes which are:

Operating System: It is the main program of a computer system. When the computer system ON it is the first software that loads into the computer's memory. Basically, it manages all the resources such as computer memory, CPU, printer, hard disk, etc., and provides an interface to the user, which helps the user to interact with the computer system. It also provides various services to other computer software. Examples of operating systems are Linux, Apple macOS, Microsoft Windows, etc. **Language Processor:** As we know that system software converts the human-readable language into a machine language and vice versa. So, the conversion is done by the language processor. It converts programs written in high-level programming languages like Java, C, C++, Python, etc(known as source code), into sets of instructions that are easily readable by

machines(known as object code or machine code). **Device Driver:** A device driver is a program or software that controls a device and helps that device to perform its functions. Every device like a printer, mouse, modem, etc. needs a driver to connect with the computer system eternally. So, when you connect a new device with your computer system, first you need to install the driver of that device so that your operating system knows how to control or manage that device.

Features of System Software

- System Software is closer to the computer system.
- System Software is written in a low-level language in general.
- System software is difficult to design and understand.
- System software is fast in speed(working speed).
- System software is less interactive for the users in comparison to application software.

2. Application Software

It is a program of a group of programs designed for individual users. It allows end-users to accomplish one or more specific non-computer related task. Example: Word processor, presentation software, data management system, desktop publisher, web browsers, etc.

Software that performs special functions or provides functions that are much more than the basic operation of the computer is known as application software. Or in other words, application software is designed to perform a specific task for end-users. It is a product or a program that is designed only to fulfill end-users' requirements. It includes word processors, spreadsheets, database management, inventory, payroll programs, etc.

Types of Application Software There are different types of application software and those are:

- General Purpose Software: This type of application software is used for a variety of tasks and it is not limited to performing a specific task only. For example, MS-Word, MS-Excel, PowerPoint, etc.
- Customized Software: This type of application software is used or designed to perform specific tasks or functions or designed for specific organizations. For example, railway reservation system, airline reservation system, invoice management system, etc.
- Utility Software: This type of application software is used to support the computer infrastructure. It is designed to analyze, configure, optimize and maintains the system, and take care of its requirements as well. For example, antivirus, disk fragmenter, memory tester, disk repair, disk cleaners, registry cleaners, disk space analyzer, etc.

Features of Application Software

- An important feature of application software is it performs more specialized tasks like word processing, spreadsheets, email, etc.
- Mostly, the size of the software is big, so it requires more storage space.
- Application software is more interactive for the users, so it is easy to use and design.
- The application software is easy to design and understand.
- Application software is written in a high-level language in general.

System Software

Application Software

System Software	Application Software
It is designed to manage the resources of the computer system, like memory and process management, etc.	It is designed to fulfill the requirements of the user for performing specific tasks.
Written in a low-level language.	Written in a high-level language.
Less interactive for the users.	More interactive for the users.
System software plays vital role for the effective functioning of a system.	Application software is not so important for the functioning of the system, as it is task specific.
It is independent of the application software to run.	It needs system software to run.

Program vs Software

Software is the superset of programs in which one or many programs are executed sequentially or simultaneously to perform a particular job. It is the end product of a set of programs. Example: MS-Excel

A program is a combination of lines of codes which takes input works on instruction on a computer to generate output. A program is the group of instructions which when performed will generate a logical output. Example: addition or subtraction operation in MS-Excel

Summarizing, the program is a set of instructions that are executed by a computer, whereas software is a set of programs. Example: the calculator is a software whereas addition, subtraction, etc. are set of programs that exist in the calculator

Computer Virus and Antivirus

A computer virus is a set of malicious code or program written to alter the way a computer operates. It is usually designed to spread from computer to computer. A virus operates by inserting or attaching itself to a legitimate program or document that supports macros in order to execute the codes. A virus has the potential to cause unexpected or damaging effects such as harming system software by corrupting or damaging data. Once a virus successfully attaches itself to a program, file or document, the virus will remain dormant until circumstances cause a computer to execute its code. In order for a virus to infect any computer, the infected program has to be run in order for the code to be executed.

A computer virus is a program which can harm our device and files and infect them for no further use. When a virus program is executed, it replicates itself by modifying other computer programs and instead enters its own coding. This code infects a file or program and if it spreads massively, it may ultimately result in crashing of the device. Across the world, Computer viruses are a great issue of concern as they can cause billions of dollars' worth harm to the economy each year.

Signs of Computer Virus Since the computer virus only hits the programming of the device, it is not visible. But there are certain indications which can help you analyse that a device is virus-hit. Given below are such signs which may help you identify computer viruses:

- **Speed of the System** – In case a virus is completely executed into your device, the time taken to open applications may become longer and the entire system processing may start working slowly

- Pop-up Windows – One may start getting too many pop up windows on their screen which may be virus affected and harm the device even more
- Self Execution of Programs – Files or applications may start opening in the background of the system by themselves and you may not even know about them
- Log out from Accounts – In case of a virus attack, the probability of accounts getting hacked increase and password protected sites may also get hacked and you might get logged out from all of them
- Crashing of the Device – In most cases, if the virus spreads in maximum files and programs, there are chances that the entire device may crash and stop working

Different types of Virus Discussed below are the different types of computer viruses:

- **Boot Sector Virus** It is a type of virus that infects the boot sector of floppy disks or the Master Boot Record (MBR) of hard disks. The Boot sector comprises all the files which are required to start the Operating system of the computer. The virus either overwrites the existing program or copies itself to another part of the disk.
- **Direct Action Virus**
When a virus attaches itself directly to a .exe or .com file and enters the device while its execution is called a Direct Action Virus. If it gets installed in the memory, it keeps itself hidden. It is also known as Non-Resident Virus.
- **Resident Virus** A virus which saves itself in the memory of the computer and then infects other files and programs when its originating program is no longer working. This virus can easily infect other files because it is hidden in the memory and is hard to be removed from the system.
- **Multipartite Virus** A virus which can attack both, the boot sector and the executable files of an already infected computer is called a multipartite virus. If a multipartite virus attacks your system, you are at risk of cyber threat.
- **Overwrite Virus** One of the most harmful viruses, the overwrite virus can completely remove the existing program and replace it with the malicious code by overwriting it. Gradually it can completely replace the host's programming code with the harmful code.
- **Polymorphic Virus** Spread through spam and infected websites, the polymorphic virus are file infectors which are complex and are tough to detect. They create a modified or morphed version of the existing program and infect the system and retain the original code.
- **File Infector Virus** As the name suggests, it first infects a single file and then later spreads itself to other executable files and programs. The main source of this virus are games and word processors.
- **Spacefiller Virus** It is a rare type of virus which fills in the empty spaces of a file with viruses. It is known as cavity virus. It will neither affect the size of the file nor can be detected easily.
- **Macro Virus** A virus written in the same macro language as used in the software program and infects the computer if a word processor file is opened. Mainly the source of such viruses is via emails.

Antivirus The most suitable way of making your computer virus-free is by installing an Anti-virus software. An anti-virus is a software which comprises programs or set of programs which can detect and remove all the harmful and malicious software from your device. This anti-virus software is designed in a manner that they can search through the files in a computer and determine the files which are heavily or mildly infected by a virus.

Given below is a list of few of the major antivirus software which is most commonly used:

- Norton Antivirus
- F-Secure Antivirus

- Kaspersky Antivirus
- AVAST Antivirus
- Comodo Antivirus
- McAfee Antivirus

These are few of the many anti-virus software widely used to remove viruses from a device

Features of Antivirus

1. Default deny protection It is implemented to prevent the entry of suspicious files by default.
2. Auto sand-box technology A virtual environment where suspicious and unknown files are secluded and run to check for any malicious activity without interfering the normal operations.
3. Containment technology It validates and authorizes the programs that are executable and ensure that processes are running without affecting the regular operation of the system.
4. Host intrusion protection system (HIPS) It terminates any malicious activity once found. This prevents malware from infecting the operating system, registry keys, personal data or the system memory.