Software Concepts

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What is Software?

- A computer software represents a set of programs that govern the operation of a computer system and make the hardware functional.

- The software that controls internal computer operation is called System Software.

- The software that carry out operations for a specified application is called Application Software.

Types of Software
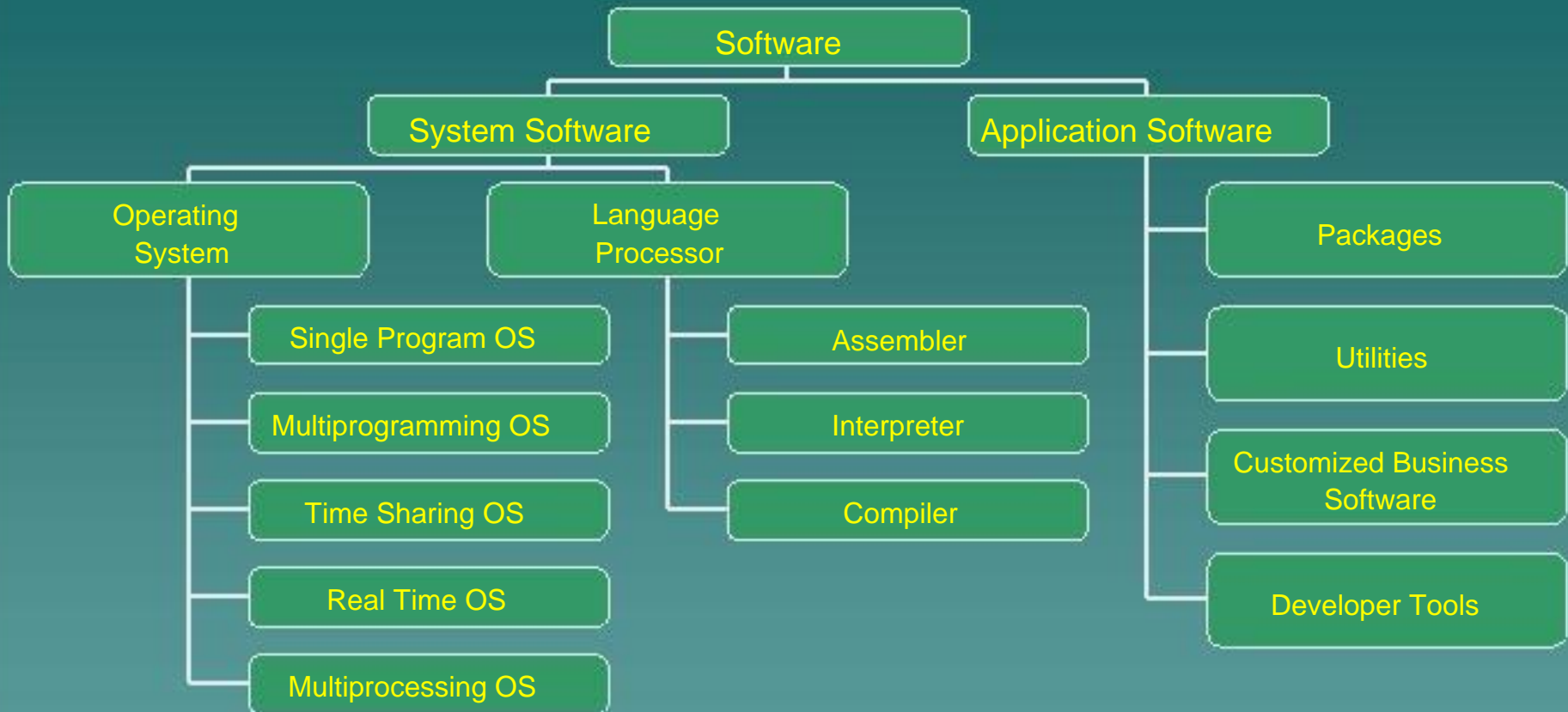
Operating System

- An Operating System (OS) is a program which acts as an interface between a user and the hardware.
- Being a Resource Manager, OS performs the following functions-

  1. Process Management.

  (Which and when a program is to be loaded/ executed)

  2. Memory Management

  (Where a program is to be loaded in the memory)

  3. I/O Device Management

  (How I/O devices to be controlled)

  4. File Management

  (How a file is created/accessed / deleted / copied on storage devices)

Types of OS

- Single Program OS

  Only one user program can be loaded and executed at any point of time.

- Multiprogramming OS

  Multiple program can be loaded and executed at the same time.

- Time Sharing OS

  CPU shares it time among multiple users as per their job scheduling.

- Real Time OS

  A response time is pre determined. Each job is completed in a specified dead line.

- Multiprocessing OS

  It can handles more than one processor (CPU) for load sharing. Generally used in Mainframe and Super computers.

Language Processors

A program written in High Level Languages (HLL) must be converted into its equivalent Machine code, so that computer can understand and execute. This conversion is done by Language Processors.

Type of language processors are-

- Assembler:

  Coverts program written in Assembly Level Language into Machine level.

- Interpreter:

  Converts HLL program into Machine level code in line by line manner. If any error occurs, stops the execution and reports the error.

- Compiler:

  It converts the entire HLL program into one go, and reports all the errors with line numbers. After removing the errors Program is recompiled and executed. It creates an object file (.exe/ .com) so that each time of execution of program, compiler is not required.

Application Software

Packages:

It is an Application software that are required to make the computer useful for people by handling a task. Most commonly used Software packages are-

1. Word Processor: MS Word
2. Spreadsheets : MS Excel, Lotus
3. Desk Top Publishing : MS Publisher, Page Maker, Ventura
4. Data Base Management System (DBMS): MS Access, FoxPro, Oracle etc.
5. Graphics, Multimedia and Presentation Software:

Adobe Photoshop, Corel Draw, MS Power Point, Macro Media Director.

Utilities:

It is Application program that assist the computer by performing Housekeeping jobs:

Text Editor, Backup Utilities, Compression Utilities, Disk Defragmentor and Anti Virus software packages are the example of Utilities.

Customized Business Application:

This type of Software is designed to meet the requirement of any Business organizations like Banking, Accounting, Hotel Management, Ticket Reservation System and Insurance etc.

Developer Tools:

These Software assist to Software developer. They provides various types of tools (Source code editor, Compiler, Debugger, GUI Builder, Code Generetor etc.) and provides a platform to build a software quickly. They are also known as Integrated Development Environment (IDE). Ex. VB IDE, JAVA IDE (NetBeans)

Hardware & Software

- All the physical and tangible component (Mechanical, Electrical or Electronic) of the computer is known as Hardware (Peripherals).

- Software represents the set of programs that controls the operation of computer and make the hardware functional.

A set of instruction is called Program and a big sized Program is known as Software. Hardware can be manufactured but Software can be developed.

System Security

What is System Security ?

- System Security is the ability of system to protect information and system resources with respect to confidentiality and integrity.

- System Security covers three main area known as CIA, which are-

Confidentiality:-

Ensure that information is not accessed by unauthorized persons.

Integrity:

Ensure that information is not changed by unauthorized persons.

Authentication:

Ensure that users are the persons they claim to be.

Threats to Computer Security

- Virus
  - Worm
  - Trojans
- Spyware
- Adware
- Spamming
- PC Intrusion
  - Denial of service
  - Sweeping
  - Password Guessing
- Phishing

Malware represents computer viruses, Spyware and Adware etc.

Computer Viruses

- Computer viruses are malicious and self replicating codes/programs that cause damage to data and files on the system
- Virus can attack any part of computer software like Boot block, OS, System files, application program and data files.
- Major Symptoms of viral infection - Slow execution of program, Damage or deletion of files, Denial of service.
- **Worm**

    It is self replicating program which eats entire disk space or memory. It copies itself until all the disk space or memory is filled.

- **Trojan Horses**

    It is a program that appears harmless (like utility program) but actually performs malicious functions such as deleting/ damaging files.

Types of Computer Viruses

- Boot Sector Virus

  Infects Master Boot Record (MBR) and loaded each time when system is booted.

- File Virus

  Also called parasitic viruses which attached themselves with executable files (.exe/ .com) and loaded into memory when such program is run.

- Macro Virus

  Written in Macro Language (MS Word/ Excel) and typically infects system by e-mail. They can delete/ damage files.

- Multipartite Virus

  It is combination of Boot sector and File viruses.

- Polymorphic Virus

  These viruses can mutate their code to hide

themselves. They are difficult to detect to remove for Signature based Anti virus program.

Spyware & Adware

- Spyware is a program designed to spy on your activities and report this data to people willing to pay it either legal or illegal purposes. It is get installed without your consent by 'Piggybacking' onto a file or gets downloaded from Websites on Internet.

- Adware are the programs that deliver unwanted ads to your computer (in Pop-up form). They consume network bandwidth. It is similar to Spyware, but it may installed with your consent.

- Sometimes these are spread through a utility program/ freeware (but actually it is Bogus Software) and steals personal information. This types of programs known as Scareware.

Spamming & Phishing

- Spamming refers to the sending of bulk-mail by an identified or unidentified sources.

- In non-malicious form, bulk advertisement mail is sent to many account. In malicious form, the attacker keeps on sending bulk mail until mail-server runs out of disk space.

- Phishing is a process of attempting to acquire sensitive information such as User name and password, credit card number, bank account details etc.

Another type of attack known as spoofing in which an IP packet is tempered to crack the security system.

PC Intrusion

A PC connected to Internet is a potential target for hackers. PC Intrusion may occur in any of the following form-

1. **Sweep Attack:**

Your data may sweep (deleted) by a malicious program.

2. Denial of Service:

This types of attach may eats up all the resources of the computer and system or Program come to a halt.

3. Password Guessing:

Most hackers crack or guess password of system accounts and gain entry into remote computer system. They can damage your data files.

How to protect our self ?

□ The entire Computer security is based on some safeguards designed to protect a computer system from threats.

□ Active Protection:

  Installation of Programs for protection against Viruses, Spyware, Adware and PC Intrusion.

□ Preventive Measures:

  You should opt some preventive measures to avoid such things.

Precaution Measures Get ready .

1. Install a reliable Antivirus and Anti-Spyware program.
2. Keep your System and Anti-virus program update.
3. Schedule Full System Scan weekly/monthly.
4. Think twice before downloading anything from Internet. (Down load from trusted sites)
5. Be careful while opening e-mails.
6. Disable Cookies, if possible.

(IE->tools->Internet options->privacy commands)

7. Use Filter utility to get off spam.
8. Keep your e-mail address private.

9. Install Firewall to prevent unauthorized access to or from a private network.

10. Disconnect Internet when it is not in use.