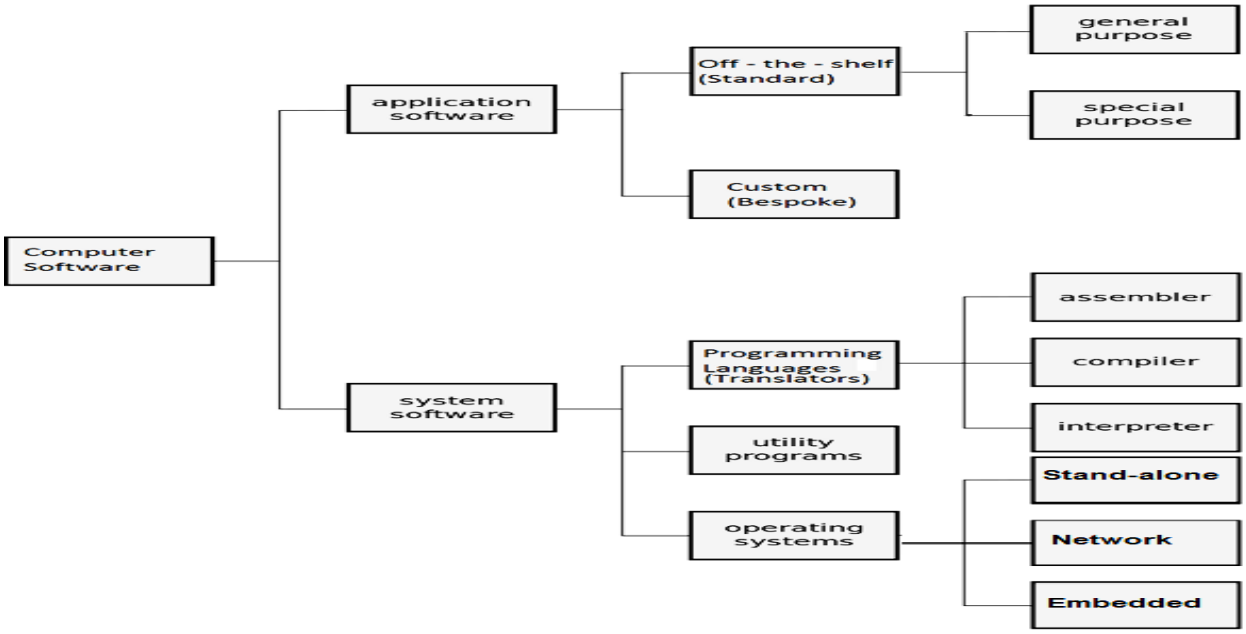
TOPIC 3: COMPUTER SOFTWARE

Computer software refers to the electronic instructions and procedures that command and control the operation of a computer. Software tells the computer what to do.

Illustration of computer software



TYPES OF SOFTWARE

There are mainly two types of software.

- System Software
- Application software

SYSTEM SOFTWARE

System software refers to a category of software that enables the computer to work and as well control devices connected to it.

Or It refers the software that performs tasks related to the operation and performance of the computer system.

System software is a set of programs designed to manage operations of the computer and avail computer resources to the user.

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Functions of system software

- Booting the computer
- Making sure that all hardware elements are working properly
- Performing operations such as retrieving, loading, executing and storing application programs
- Storing and retrieving files
- Performing a variety of system utility functions.

CATEGORIES OF SYSTEM SOFTWARE

There are three categories of system software.

- Operating system
- Utility programs
- Programming

OPERATING SYSTEM SOFTWARE

Operating system is a type of system software that performs daily activities of a computer. These are programs that manage the computer resources.

Types of operating system

- Stand-alone operating system
- Network operating system
- Embedded operating system

Examples of Operating System Software

- Windows operating system
- Linux , Unix, Ubuntu Operating System
- Macintosh(MAC)
- Chrome operating system
- Novell operating system
- Android for mobile phones

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Function of Operating System (Os)

- It helps in processor management e.g. multitasking and time sharing.
- Control the use of peripheral devices.
- It provides an environment that enables installation of application software
- Controls the booting process of a computer
- Monitors system performance.
- Helps in administering security
- It helps in file management.
- It helps in connecting devices to work with computer(configuring of devices)
- Responsible for scheduling computer tasks/jobs
- Helps to establish network connections.

Forms of Operating System User Interfaces

There are two forms of Operating user interfaces.

- Command-Line User Interface:
- Graphical User interface

Command-Line User Interface:

With a command line interface, a user types keyboard or press special keys on the keyboard to enter data and instructions. The set of commands a user uses to interact with the computer is called command language. Examples are DOS, UNIX, Linux.

You are provided with a virtually empty screen with a blinking cursor where commands are keyed and the computer executes them by pressing the enter key.

Advantages of Command User Interface:

- Commands are executed faster.
- Consumes limited Random Access Memory
- Cannot easily affected by viruses
- Ideal for programming and programmers
- Commands can be grouped together.

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Disadvantages of Command User Interfaces

- Commands are not easily memorized
- Requires a lot of knowledge to master the commands
- Commands have to be typed correctly
- No graphics on the screen.
- A mouse cannot be used

Graphical User Interface (GUI)

Graphical user interface allows the user to use menus and visual images such as icons, buttons and other graphical objects to issue commands.

Advantages of Graphical User Interface (GUI)

- It is user friendly because it is easy to learn and work with
- There is no need to type and memorize any command language.
- The interface is similar for any application.
- You are provided with a coloured screen with icons each representing a program.
- A mouse may be used.

Disadvantages of Graphical User Interface (GUI)

- Require much more memory and as well as the processor
- Require much more desk space to hold the files
- Difficult to automate for expert users
- Easily affected by viruses
- Not good for programmers.

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UTILITY SOFTWARE

This is parts of system software which are designed to configure, analyze, optimize and maintain a computer in its operation.

Functions of the Utility Programs

- It detects and protects a computer against computer viruses
- It reduces screen burnout (ghosting) by playing a screen saver
- It increases desk space by compressing data files
- It checks disk errors and sometimes fixes them
- It stores the system functionality (i.e. system store)
- It enables computers to sort files in order.
- It enables a user to merge files
- It defragments hard disks
- It enables a user to encrypt files.

Common Utilities used

Antivirus utility: used to search, find and remove viruses from the computer

System archives: These output a stream or a single file when provided with a directory/set of files.

Disk checkers: these scan an operating hard drive for logical (file system) and physical errors

Backup utility: makes a copy of all information stored on the hard disk onto another storage medium e.g external hard disk, dvds, etc.

Cryptographic utilities: used to encrypt and decrypt streams of files.

Data compression utilities: output a smaller file when provided with a file.

Disk compressors: these compress/reduce the size of the file thus increasing the capacity of the disk.

Disk defragmenters: These detect computer files whose content is scattered in several locations on the hard disk and move fragments to one location to increase efficiency.

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Screen savers: these prevent phosphor burn-in on CRT and plasma monitors by filling it with moving images, patterns when the computer is not in use.

Sorting utilities: these help to organize data in a given order.

Memory testers: these check for memory failures.

Disk partition editors: these divide a drive into multiple logical drives, each with its own file system which can be mounted by the operating system to be treated as an individual drive.

File synchronization utilities: these maintain consistency between two sources. They enable redundancy or making copies of data.

System profilers: provide detailed information about the software installed and hardware attached to the computer.

Network utilities: these analyze a computer's network connectivity, configure network settings, check data transfer or log events.

DEVICE DRIVERS

This is a small program that tells the operating system how to communicate with the device. Each device on a computer (e.g. a mouse) has its own specialized set of commands and thus requires its own specific driver. The operating system loads each device's driver when the computer boots up.

To communicate with the hardware devices, the operating system relies on device drivers.

• A device driver is a program that accepts instructions and then converts them into commands that the device understands.

• Each device on a computer, such as the keyboard, mouse, monitor, printer, card reader/writer, and scanner, has its own device driver.

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PROGRAMMING LANGUAGES

These refer to the languages used to write a computer instruction, program software. A person who writes a program is called a programmer.

Functions of Software Programmer

- He writes a computer program
- He maintains a computer program
- He upgrades a computer

TYPES OF PROGRAMMING LANGUAGES

Programming languages are of two types

- Low level programming language
- High level programming language

Low level languages

This is a computer program written in machine code language, the language understood by a computer. It is also referred to as binary language because it consists of only two digits. The digits of 0s and 1s

Types of low-level languages

- Machine code language (First generation)
- Assembly language (Second generation)

Assembly (low-level) languages

This is a language which consist of mnemonic symbols (English like words) used to represent the binary digits of zeros and ones of machine language. Assembler languages are used to develop system software.

However computers can only understand machine language, thus assembler languages must be translated into machine language for execution.

Advantages of Low level languages/Machine code

- Machine code program are executed faster.
- They don't require either a compiler or interpreters except assembly
- They are suitable to developing operating systems.

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Disadvantages of Low level languages

- They are difficult to learn and understand.
- The instructions are expressed in binary form (0 and 1s)
- The programs are machine dependent hence difficult to be used by other machines of different family.

High level programming languages

This is a computer program written in official language (known to man) but should be converted to machine code for a computer to understand.

High level languages consist of statements or sequences text including words, numbers and punctuation, much like written natural languages.

Advantages of High level Languages

- They are machine independent and can be used by other computers.
- They are user friendly and problem oriented.
- They are easier to learn, write, correct and revise than assembler and machine languages.
- They can be used for development of application software.

Disadvantages of High level Languages

- They require to be translated to machine code
- They are not executed faster.

Examples of high level languages

- ❖ COBOL
- ❖ PASCAL
- ❖ Python
- ❖ Java Script
- ❖ Java
- ❖ C
- ❖ Ruby
- ❖ C++
- ❖ C#(C-sharp)
- ❖ PERL
- ❖ FORTRAN
- ❖ PHP

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LANGUAGE PROCESSORS/TRANSLATORS

Language processors: These have to translate high level languages to machine code languages which the processor can understand. They are software designed to translate from high level language to low-level language.

Examples of language processors

A compiler: a compiler is a program which translates a whole source program from high level language to low level language which can easily be understood by the computer.

An interpreter: This is a program that translates the source program line by line while the program is running from high level language to low level language.

The assembler: This translates assembler instructions from assembley language to machine code language or the binary code.

The linkers: These combine compiled programs and determine where the program will be located in the memory.

Language editors

These are applications/software used to write computer language/codes. Some also compile.

Examples of language editors

- Notepad
- Trouble c
- Borland
- Sublime Text
- Dev C, C++
- CodeBlocks
- Notepad ++

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Common terms used in programming

Source code is a program instruction written as text file by the programmer that must be translated by a compiler or interpreter or assembler into an object code before execution.

Source code cannot be understood by the computer until it has been translated into machine code.

Execution is the process by which a computer system performs the instructions of a computer program.

Object code is a program code in machine language that is ready for execution by the computer.

Bug is a logical problem in the program source code that stops the program to give wrong results/ from running

Debugging is the process of detecting, checking and identifying problems and errors in the source code.

APPLICATION SOFTWARE

This is a software program that performs a specific and user function. Application software is installed on operating system.

Application software consists of programs designed to perform specific tasks for end-users. For example typing a letter.

TYPES OF APPLICATION SOFTWARE

Application software is categorized into two:

- Off-shelf packages
- Customized programs/ Bespoke/ Tailor-made programs

OFF SHELF PACKAGES

- These are programs already written and ready to be run upon their purchase.

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Main categories of off shelf packages

Word processors

These are programs that enable you to perform word processing functions, they are document production applications.

Word processing software

An application software with which a user creates, edits save, format And print letters reports and other documents. E.g. word processing software, EZ word, word perfect etc

Spreadsheet software

An application with which a user can organize data in rows and columns create graphs and can perform calculations e.g. Ms excel, Lotus 123, VisiCalc

Presentation software

An application with which a user can organize content on a slide for viewing by the audience. Ms power point, Harvard graphics, Corel presentation

Database software

An application with which one can store lots of data for future manipulation

Desktop publishing software

Application software with which one can design publications like news papers, wedding cards certificates etc

Imaging software application software with which done can edit, retouch a photograph.

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Web browsing software

Web browsing software used for displaying and viewing webpages from the internet or html documents on computers.

Examples Include:

- Mozilla Firefox,
- Internet Explorer
- Safari
- Opera
- Netscape Navigator
- Chrome

Web authoring software

Web authoring software – These are used by webmasters for building websites. Examples include:

- Microsoft FrontPage,
- Adobe Dreamweaver,
- Microsoft Expression Web,
- Antenna Web Design Studio
- Sublime text 3

Media Players for Audio and Video

Media Players for Audio and Video playback on computers. Examples include:

- Windows Media Player,
- Nero Showtime,
- Jet-Audio,
- Power DVD,
- VLC Media Player
- Virtual DJ, e.t.c.

Graphics software

Graphics software – Used by graphic designers to create and design artistic graphics and to manipulate visual images on a computer such as

logos, cartoons etc.

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Examples include

- Paint,
- Adobe Photo shop,
- Corel Draw,
- Adobe Illustrator etc.

Accounting software

Accounting software helps companies to record and report their financial transactions. With accounting soft-ware, you perform accounting activities related to the general ledger, accounts receivable, accounts payable, purchasing, invoicing, job costing, payroll functions, etc. Examples include Quick Books

Audio and video editing software

Audio editing software lets users produce studio quality soundtracks. With video editing software, you can modify video clips: you can reduce the length of a video clip, reorder a series of clips, or add special effects such as words that move horizontally across the screen etc.

- Adobe Premier Video Editor
- Ulead Video Editor
- Adobe Audition for –audio
- Fruity Loops Studio-audio

Images viewing software

This refers to computer applications primarily used for previewing digital photographs on the computer screen.

Many have basic features such as viewing thumbnails, slideshows, printing and simple editing such as cropping and resizing.

Examples of Image viewers include: Microsoft Office Picture Manager, Windows Photo viewer, Picasa photo viewer, etc.

Reference software

Reference software provides valuable and thorough information for all individuals. Popular reference software includes encyclopedias, dictionaries, health/medical guides, and travel directories.

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Examples include: Encyclopaedia Britannica 2011 Ultimate Reference DVD

Microsoft Student with Encarta Premium, e.t.c.

Note Taking software

Note taking software enables users to enter typed text, handwritten comments, drawings, or sketches anywhere on a page and then save the page as part of a notebook .The software can convert handwritten comments to typed text or store the notes in handwritten form. Examples include Microsoft Office OneNote

Text Editors

Text editors are simple word processors that are generally used to type without any special formatting. Text editors are mainly used to create small notes, memos and programs. Examples of common text editors are: Notepad,

Notepad++, Sublime Text, Gedit etc.

Gaming Software

These are programs developed as electronic game that involve human interaction with a user interface to generate visual feedback on a computer.

Common computer games include solitaire, chess titans, Racing, StarCraft, Need for Speed, GTA Vice City, and Alien Shooter.

Email Software / Email client

Email software (Commonly known as email client) is a computer program used to access and manage a user's email account.Web applications that provide message management, composition, and reception functions are sometimes also commonly referred to as webmail.

Popular locally installed email clients include Microsoft Outlook, Pegasus Mail, Mozilla's Thunderbird, KMail, Evolution and Apple Mail. Popular web-based email clients include: GMail, Yahoo! Mail, mail.com, Lycos mail, and Hotmail.

Advantages of off-shelf packages

- They are relatively cheaper than bespoke packages.
- They are readily available for purchase.
- They are user friendly; many have a graphical user interface, sample manuals provided on purchase.
- The user does not face research and development costs or problems since the package is already in operation.
- The user faces limited risk since the user has an option to seek information from existing users about the package before making a decision to purchase.

Disadvantages of off-shelf packages

- They hardly full fill users' specific needs perfectly.
- They are standardized implying it may be hard to make adjustments.
- They may not be recommended where a particular company wants to gain competitive advantage over others.
- Where the package does too much compared to the company needs, the amount of extra space occupied in the hardware can lead to memory wastage.
- The package may also be limited to a particular operating system like Microsoft Office for Windows operating system.
- It may be easy to manufacture viruses that may tamper with such application programs.

CUSTOMIZED/TAILOR-MADE/BESPOKE PROGRAMS

These are tailor made programs constructed to meet specific user requirements. They are specifically designed to meet user requirements.

Merits of customized programs

- Ability to satisfy user's specific needs
- The company will be able to perform tasks with its software that its competitors cannot do with theirs thereby gaining a competitive advantage.
- They can easily be modified or upgraded.
- Ownership is to the company that ordered for the software.

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Disadvantages of customized software

- Time taken to develop the package may be long yet requirements could be urgent.
- The cost of paying programmers makes them expensive. The organisation has to incur development and consultancy costs in this case.
- They are not flexible i.e. not meant to do various tasks.
- They are expensive to maintain. When they breakdown programmers who are expensive have to be called in
- In-case of breakdown, the company may be brought to a standstill
- There is a greater probability of bugs in bespoke programs.
- They are not compatible with all computer types i.e. they are designed for specific computer types.
- The program may not run which means that the programmer has to design another one. This could even lead to more costs on the side of the user as well as causing delays

Shareware

Shareware is copyrighted software that is distributed at no cost for a trial period. To use a shareware program beyond that period, you send payment to the program developer. In some cases, a scaled-down version of the software is distributed free, and payment entitles the user to the fully functional product.

Copyrighted software

Copyrighted software refers to computer programs with restrictions regarding use, modification, and redistribution. You have to pay for copyrighted software and must not copy it without permission from the manufacturer. Copying copyrighted software without paying for it is clearly unethical and illegal.

Freeware

Freeware is copyrighted software provided at no cost by an individual or a company that retains all rights to the software. Therefore, other programmers cannot include freeware in applications they intend to sell.

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Open-source

Open source software is software provided for use, modification, and redistribution. This software has no restrictions from the copyright holder. Open source software usually can be downloaded from the Web at no cost.

Public-domain software

Public-domain software has been donated for public use and has no copyright restrictions. Anyone can copy or distribute public domain software to others at no cost.

Web-based software

Web-based software refers to programs hosted by a Web site. Users access and interact with Web-based software from any computer or device that is connected to the Internet. Many Web sites allow free access to their programs; some charge a fee. Examples of Web-based software include e-mail,

Website builders, online games, travel and mapping software ,e.t.c.

Special Purpose (Specialized) Software

This refers to computer programs developed and dedicated to accomplish particular jobs only. Programs that run on special purpose computers like ATMs are special purpose software.

Other Examples of specialized software include:

- Business – Transaction and Sales Management software.
- Science and Engineering software etc..

General purpose

This refers to a Wide a variety of application programs that perform many common tasks.

• Varieties of General purpose application programs include Word processing programs, Spreadsheet programs, web browsers, Graphics programs, etc.

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Software suite

A software suite is a collection of several applications that are bundled together and sold or distributed as a single package. The software programs may have correlative features and functionality or they may be completely different from one another but share a similar theme.

When you install the suite, you install the entire collection of applications at once instead of installing each application individually. At a minimum, suites typically include the following software applications: word processing, spreadsheet, database, and presentation graphics,

Examples of software suites

- Microsoft Office
- Libre Office Productivity Suite.
- Open Office.Org
- Word Perfect Office X5
- Zoho
- Quickoffice & OfficeSuite
- ProOffice Free 3.0
- KOffice
- Lotus Smart Suite
- Adobe Master Suite

Advantages of using software suites

- Costs significantly cheaper than buying each of the application package separately
- Easy to learn and use because applications within a suite usually use a similar interface and share common features such as clip art and toolbars.
- Easy installation because all the various applications can be installed at once.

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Common Terminologies used in Software

Software needs to be accessed before it can be used. There are many terms used for the process of accessing software including running, executing, starting up, opening, and others. A program can also be referred to as an application and the two words are used interchangeably.

Software license

This is a document that provides legally binding guidelines for the use and distribution of software.

Software agreement

This refers to the legal contact between licensor and /or author and the purchaser of a piece of software which establishes the purchaser's' rights.

Software piracy This is the illegal duplication of copyrighted software.

Software bug refers to an error in the programming code that does not permit it to function well.

Beta software is a type of software provided to people for testing purposes.

Software release is the process of issuing/letting the software or application for publication, use and distribution.

Software version refers to variation of an earlier or original type with minor changes to the existing version or type. Eg. ITunes 12.0, ITunes 12.2.3

Hot fix: This is a software program that is designed to fix a bug or security hole in software program.

Spy ware: This is a software application that is designed to gather information about a person or organization without their knowledge that may send such information to another entity.

Software Patch: This is a software program that is designed to modify, correct, and fix problems in software.

Software update: This is a software application that provides fixes for features that are not working as intended or adds minor software enhancements and compatibility.

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Software upgrade: This is a process of replacing a product with a newer version of the same product.

Firmware: This is a permanent software that is programmed or embedded in a hardware usually read-only-memory by the manufacturer.

Characteristics of Good computer software

- ...provides the required functionality.
- ...is usable by real (i.e. simple) users.
- ...is predictable, reliable and dependable.
- ...functions efficiently.
- ...has a "life-time" (measured in years).
- ...provides an appropriate user interface.
- ...is accompanied by complete documentation.
- ...can be easily customized/configured.
- ...can be "easily" maintained and updated.

Factors to consider before obtaining a software program

- Correctness — does the software do what it is suppose to do (according to the design specs)?
- Robustness — how does the software respond to unexpected conditions (wrong input)?
- User-friendliness — is the software easy to use by users from the intended audience?
- Adaptability — how difficult is it to modify the software to adjust to an ever-changing world?
- Cost effectiveness

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Characteristics of good software

- **Suitability**. This is the essential Functionality characteristic and refers to the appropriateness (to specification) of the functions of the software.
- **Accurateness**. This refers to the correctness of the functions, an ATM may provide a cash dispensing function but is the amount correct?
- **Interoperability**. A given software component or system does not typically function in isolation. It concerns the ability of a software component to interact with other components or systems.
- **Compliance**. Where appropriate certain industry (or government) laws and guidelines need to be complied with. This s addresses the compliant capability of software.
- **Security**. This relates to unauthorized access to the software functions.
- **Fault tolerance**. The ability of software to withstand (and recover) from component, or environmental, failure.
- **Understandability**. Determines the ease of which the systems functions can be understood, relates to user mental models in Human Computer Interaction methods.
- **Learnability**. Learning effort for different users, i.e. novice, expert, casual etc.
- **Maintainability**. Characterizes the amount of effort to change a system.
- **Stability**. Characterizes the sensitivity to change of a given system that is the negative impact that may be caused by system changes.
- **Replace ability**. Characterizes the plug and play aspect of software components, that is how easy is it to exchange a given software component within a specified environment.

TOPIC: SYSTEM START-UP & CONFIGURATION

Sub Topic: **1 Computer Booting**

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Sub Topic: **2 System Configurations**

Sub Topic: **3 Software Installations**

Sub Topic: **4Computer Troubleshooting**

COMPUTER BOOTING

Booting is the process of starting the computer and it involves loading of the operating into the memory of the computer.

Booting is the process of loading the operating system (OS) from disk into working memory. Booting (also known as booting up) is the initial set of operations that a computer system performs when electrical power is switched on.

The process begins when a computer that has been turned off is re-energized, and ends when the computer is ready to perform its normal operations.

Types of booting

There are basically two types of booting:

1. Cold booting/Hard boot: This is the process of turning on a computer after it had been powered off completely.

2. Warm booting/Soft boot: This is the process of restarting a computer that already is powered on.

Reasons for warm booting

- After installing a software program
- After uninstalling a software program
- When a computer freezes
- When the computer slows down.
- When switching operating systems in case of multi-boot system
- After troubleshooting the computer
- Automated software can also cause a warm boot.
- Unexpected power loss can also cause a reboot
- When a computer is infected with a virus.

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Benefits of restarting a computer

- It flushes RAM and removes other files that could be causing computer freezing.
- Fast Performance. Reboots are known to keep computers running quickly.
- Stops Memory Leaks. These occur when a program doesn't close properly.
- Fixes Internet Connection.

Procedure for a warm boot

1. On a computer running Windows, a warm boot can be accomplished by pressing the Ctrl+Alt+Del keys simultaneously or
2. By selecting a restart option within Windows.

Why a computer may restart

1. When there is a computer virus. A computer may restart itself.
2. When a computer program is in the process of installing operating system.
3. When the CPU fan or heat sink stops to work, the computer shall keep on restarting.

Step-by-step process of booting

1. The power supply sends a signal to the components in the system unit.
2. The processor finds the ROM chip(s) that contain the BIOS (Basic input/output system).
3. The BIOS performs the POST (Power-On Self-Test) which checks components such as the mouse, keyboard and adapter cards. A series of messages may display.
4. The results of the POST are compared with data in a CMOS chip.
5. The BIOS looks for system files on the Hard disk (C:)
6. The system files and the kernel of the Operating System load into RAM from the Hard
7. The OS loads configuration information and displays the welcome screen.
8. A series of messages that may be displayed during a POST

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9. On startup, the OS may verify that the person attempting to use the computer is a legitimate user through use of a password.
10. After the user logs on, the desktop and icons are displayed on the screen.
11. Finally, the operating system also executes programs in the Startup folder, which contains a list of programs that open automatically when you boot the computer.

Terms used in the Booting process

A boot loader is a computer program that loads the main operating system or runtime environment for the computer after completion of self-tests. Examples of boot loaders include NTLDR, BOOTMGR, GNU GRUB, Syslinux, etc.

A boot drive is the drive from which your personal computer boots (starts). In most cases, drive C (the hard disk) is the boot drive.

System Configuration

System Configuration is the arrangement in which hardware and software components of a given computer are laid out, set up or interconnected in order to have a working computer to perform intended tasks. In this section, two areas are important:

1. System specification of a computer,
2. How to find system specifications of a computer.

System specifications

The specification or 'spec' is a list of the key components that make up the computer. It is provided by retailers to help buyers decide which PC, and which combination of features, they need. When buying a PC, it is important to start by deciding what it is you want the PC to do.

System specifications

This is structured set of information manufacturers provide to indicate a given standards in the design of a system or sub-system. System specifications are either minimum or recommended.

Minimum system specifications include the list of requirement design component(s) that can be used at a level of the lowest guidelines for software or hardware to perform a task.

Recommended system specifications are requirements that are almost always of a significantly higher level and represent the ideal situation in which to run the software or hardware component.

A sample of system requirements include:

Hardware requirements

The most common set of requirements defined by any operating system or software application is the physical computer resources, also known as hardware, A hardware requirements list is often accompanied by a Hardware Compatibility List (HCL), especially in case of operating systems. An HCL lists tested, compatible, and sometimes incompatible hardware devices for a particular operating system or application.

Hardware requirements of a computer

1. Architecture.
2. Processing power.
3. Memory.
4. Secondary storage.
5. CD ROM drives.
6. Display adapter.
7. Peripherals.
8. Network interface card (NIC)

Software requirements

Deal with defining software resource requirements and basics that need to be installed on a computer to provide optimal functioning of an application. They include:

1. Platform.
2. APIs and drivers.
3. DirectX.
4. .framework.
5. Web browser.

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6. Internet connection.

How to find specifications of a computer:

Using the internet:

1. Open a browser of your choice,
2. Use a URL of any search engine of your choice.
3. Type in the computer name and model.
4. A list of system requirements shall be displayed for you.

On the computer itself:

1. Right click my computer.
2. Select properties.

Note: This approach shall give you a detailed list of standard information clusters that provides a better way of understanding how the system shall work.

Software installation

Software Installation

This refers to adding an application or program into the memory of the computer and the operating system.

Hardware installation

The term computer parts refer to all items that can be put / added in / on the computer to provide a best environment to a user to perform tasks. In this section; software, hardware are well known as parts to configure.

Connecting and setting up computer hardware parts:

1. Connecting hardware components or peripheral devices by plugging them into ports e.g. PS/2, HDMI, USB, e.t.c.
2. Setting up hardware components involves the processing of configuring a tangible part such as a printer.

Installing a system unit

A systems' unit contains the most critical hardware components of a computer. Some of these parts can be added or removed to increase performance of a computer system. These include:

- RAM chips,
- CPU,
- RAM BIOS,
- Hard disk,
- CD-ROM / DVD drives,
- Sound card,
- Network card.
- Video Cards .

Note: *All these components can be connected using channels or expansion slots*.

Connecting a peripheral device

A peripheral device is a hardware component that can be connected externally on a computer's system unit. Examples include: keyboard, mouse, monitor, printer, e.t.c.

Peripheral devices are connected to a system's unit using an interface / connection point called a port. Examples of ports include:

Examples of common ports

1. Serial Port
2. Parallel Port
3. PS/2 Port
4. Universal Serial Bus (or USB) Port
5. VGA Port
6. Power Connector
7. Firewire Port
8. HDMI Port
9. Ethernet Port, e.t.c.

System Installation

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System installation refers to the process of putting a software program into a computer as needed by the user. This can be the installation of operating system or application programs.

Methods of Installing Operating system

1. **Clean install**. It is done on a brand new computer system or in case one wants to have a new operating system. It involves formatting the hard disk fully during the process.
2. **Upgrade**. It is done when a user wants to improve functionality of the software that involves installing a new operating system on the existing operating system.
3. **Multi-boot installation**. It is done when a user runs more than one operating systems on the same system. E.g. one can install Windows 8 and Linux to run on the same computer.
4. **Virtual install**. It is used when one wants to configure a server. It enables multiple copies of the operating system to run on a single hardware thus creating several virtual machines like in the case of *NComputing*.

What should be done before installing Operating System?

1. Document your login IDs, passwords, and settings.
2. Export your e-mail and address book, bookmarks / favourites, and cookies.
3. Download the latest applications and drivers.
4. House cleaning and backing up your data.
5. Assess whether you need service packs
6. Load genuine operating system from known developers.
7. Reconfigure personal settings.
8. Enable previous versions and create a "clean install" restore point.
9. Configure network, install service packs, patches, and security updates.
10. Ask your self “Do you really need this software”?
11. Is there any conflicting software on your computer?
12. Always read online reviews about the software
13. Investigate the software developer or company and their reputation.
14. Check out removal options before installing.
15. Always create System Restore Point.
16. Always select Custom installation.

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17. Always uncheck installation of extras.
18. Install to the default directory.

Steps taken when installing operating system

1. Insert the installation disk or flash drive.
2. Restart your computer.
3. Wait for the computer's first start-up screen to appear.
4. Press and hold Del or F2 to enter the BIOS page.
5. Locate the "Boot Order" section.
6. Select the location from which you want to start your computer.
7. Move your selected location to the top of the list.
8. Save your settings and exit the BIOS.
9. Restart your computer.
10. Follow the on-screen prompts

Installing an application program

1. How to install from a CD or DVD (*with or without the auto-run feature*).
2. How to install from a download.
3. How to install from a USB flash drive.

Computer Troubleshooting

What is Troubleshooting a Computer?

This is a form of problem solving used to repair products and processes. **Troubleshooting** refers to identifying a hardware or software problem, giving possible causes and suggesting possible solutions to the problem.

Troubleshooting a computer

- Regular preventive maintenance reduces hardware and software problems.
- Before beginning any repair, back up the data on a computer.
- The troubleshooting process is a guideline to help you solve computer problems in an efficient manner.
- Document everything that you try, even if it fails. The documentation that you create will become a useful resource for you and other technicians.

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- There is a basic troubleshooting process that includes the elimination of variables one at a time in a logical progression. When following a structured approach to troubleshooting, you will avoid following unnecessary leads, which will waste time and cause frustration. A newly employed technician would benefit from following a senior technician on a repair job. Communication skills (soft skills) are very important to the success of a career as a repair technician.

The Troubleshooting process

Explain the purpose of data protection

- Customer information
- Company name, contact name, address, phone number
- Computer configuration
- Operating system, patches and updates, network environment, connection type
- Use a work order to collect information
- Description of problem
- Open-ended questions
- What were you doing when the problem was identified?
- Closed-ended questions
- Are you currently logged into your network?
- **Gather data from the customer**

Verify the obvious issues

- Is the caps lock key set to ON?
- Is there a non-bootable disk in the floppy drive?
- Are the drive settings and boot order configured correctly in BIOS?
- Can you log on as another user?
- Was the computer turned off without being shut down properly?
- Has the password changed?
- Does the monitor have power?
- Does the display have the correct settings?

Try quick solutions first

- Use the Last Known Good Configuration settings
- Enter Safe Mode to troubleshoot video problems

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- Uninstall an application that was recently added
- Roll back the system using a System Restore point
- Examine the Device Manager for device conflicts
- Run cleanmgr to clean up temp files
- Run chkdsk/f to repair problems with the hard drive
- Run defrag to speed up the hard drive
- Reboot the computer
- Login as a different user

Gather data from the computer

- Examine system files.
- Run diagnostic software.
- Refer to the computer user manual or BIOS website for the meaning of beep codes.
- Examine the event logs to determine the cause of computer problems.

Evaluate the problem and determine the solution

- POST checks to see that all of the hardware in the computer is operating correctly.
- If a device is malfunctioning, an error or a beep code alerts the technician that there is a problem.
- Typically, a single beep denotes that the computer is functioning properly.
- If there is a hardware problem, the computer may emit a series of beeps.
- Each BIOS manufacturer uses different codes to indicate hardware problems.
- Consult the motherboard documentation to view beep codes for your computer.

Common Problems and Solutions

Problem Symptom	Possible Solution
The computer displays the desktop in 16 color VGA mode after updating the video drivers.	Use the “Roll Back Driver” option to remove the new video driver. Remove any unnecessary programs from the Startup tab and reboot the computer.

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The computer will no longer boot to Windows and gives the error "Invalid systems disk"	Remove any floppies and CDs from the computer and verify that the HDD is set as a bootable device in the BIOS setup.
The computer will not finish loading Windows.	Boot the computer in safe mode and uninstall any recently installed applications.
Computer displays a blue screen on startup	Disconnect any newly attached hardware and reboot.
Computer program frequently freezes during operation.	Scan the computer for viruses, and also update your programs or patch them up in case of program bugs.

The Purpose of Preventive Maintenance

- Reduce the likelihood of hardware or software problems by systematically and periodically checking hardware and software to ensure proper operation.
- Reduce computer down time and repair costs

Hardware Maintenance

- Make sure that the hardware is operating properly.
- Check the condition of parts.
- Repair or replace worn parts.
- Keep components clean.
- Create a hardware maintenance program.
- Remove dust from fan intakes.
- Remove dust from power supply unit
- Remove dust from components inside the computer.
- Clean mouse and keyboard.
- Check and secure any loose cables.

Software Maintenance

- Review updates

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- Follow policies of your organization
- Create a schedule
- Review security updates
- Review software updates
- Review driver updates
- Update virus definition files
- Scan for viruses and spyware
- Remove unwanted programs
- Scan hard drives for errors
- Defragment hard drives

Preventive Maintenance Benefits

- Reduce computer down time.
- Reduce repair costs.
- Reduce loss of worker productivity.
- Increases data protection
- Extends the life of the components
- Increases equipment stability
- Reduces repair costs
- Reduces the number of equipment failures.

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