Form 4 Computer Note 4

Computer Software

Learning Outcome: Students should be able to:

i. Explain the functions and features of each type of software.
ii. Explain key Operating system tools and utilities used for managing computer resources (files & folders, devices and applications).

Different types of software

Definition: Software is the computer program (instructions) that enables a computer to perform a specific task. Computer software is also known as computer programs.

Computer software can be categorized into three main types:

1. System Software
2. Application Software
3. Programming Software

Computer Software has to be installed into the computer's storage device (usually the hard drive). Once the software is installed, the computer is able to execute (run) the software. This involves passing instructions from the Application Software, through the system software to the computer hardware.

1) **System Software (Operating System)**

System software provide the instructions to control the work of the computer hardware. It is often called the computer **operating system** (OS). Every computer system MUST have an operating system.

Common Operating System

Computer Type	Name of Operating System
Personnel Computer (PC)	Microsoft Windows Vista Linux
Mainframe	UNIX
Apple Macintosh PC	Mac OS X
iPad	iOS
Smart Phones	Android

Main Functions of Operating System

The computer system controls the basic functions of a computer. It also provides the interface between the computer hardware and the users.

The basic functions of an operating system include:

- Starting-up (Booting) the computer
- Performing basic computer activities
- Providing a user interface

- Handling system resources
- File Management

Booting the computer

The process of starting or restarting the computer is known as booting. A cold boot is when you turn on the computer, that has been turned off completely. A warm boot is the process of using the OS to restart the computer.

Performing basic computer activities (tasks)

Operating System performs basic computer tasks, such as managing the various peripheral (hardware) devices (mouse, keyboard and printers). Most OS now have a 'plug and play' feature, which means a device such as a printer can be detected automatically and be used by the OS without any user intervention.

Provides a User Interface

A user interacts with software through the user interface. The two main types of user interfaces are: **command line** and a **graphical user interface (**GUI). With a command line interface, the user interacts with the operating system by typing commands to perform specific tasks. With a graphical user interface, the user interacts with the operating system by using a mouse to access windows, icons, and menus.

Handling system resources

The operating system handles system resources such as the computer's memory and sharing of the central processing unit (CPU) time using various applications and peripheral devices.

File Management

The operating system also handles the organization and finding of files and directories folders) saved or retrieved from a computer storage. The file management system allows the user to perform tasks such as creating files and directories, renaming them, coping and moving files, and deleting them. The operating system keeps track of where files are located on the hard drive using a particular type of file system.

Features of an Operating System

A computer operating system has four main parts:

- The kernel
- The device drivers
- The user interface
- System utilities

The kernel

The kernel loads the applications (software) into memory, making sure they do not interfere with one another. As well as determining how they will share the process of using the CPU efficiently.

The device drivers

Every hardware component that makes up the computer or connected to it, will have a device driver that allows the OS to control and communicate with it. There could be hundreds of device drivers pre-installed with the OS, and the right ones for that particular computer set-up is loaded when the computer starts up. This is why sometimes when a new printer or other piece of hardware is connected to the computer system for the first time the OS will ask to install a software driver.

The user interface

This part of the operating system determines what is to be seen on the screen based on given user inputs. The user interface could be a basic command line interface or more commonly, a Graphical User Interface such as the Mac OS X, Windows or Gnome.

System Utilities

This part of the OS provides all the basic facilities that run in the background without user interaction. For example, printing services and file management services.

Different features of the Operating System

OS types	Description	Example
Single User, Single Application	Allow one user at a time, running one user application at a time.	Basic mobile phone OS
Single User, multi-tasking	Allow one user at a time but can deal with many applications at a time.	Windows Linux Mac OS X
Multi-user, Multi-tasking	Allow many users running many applications at the same time.	Unix Linux
Network Operating System	Allow computer resources such as printers and user applications to be shared by many users at the same time.	Windows server Linux Unix

2) Application Software

An application or application program, is a software program that runs on a computer. The word "*application"* is used because each program has a specific application or task for the user.

Applications, are often called productivity programs or end-user programs because they enable the user to complete tasks such as creating documents, spreadsheets, databases, and publications, conducting online research, sending email, designing graphics, running businesses, and even playing games.

Given below are a few examples of the different types of Application Software:

Application Type	Main Function	Main Features	Example
Word Processor	Creating different types of documents such as letters, reports, etc.	Text editing and text wrapping	MS Word, WordPerfect, MS Works, AppleWorks
Spreadsheet	Creating different types of tables or sheets while using simple calculations as well as plotting nice graphs	Use of formula and functions, provide a wide range of graphs and fast calculations	MS Excel, Quattro Pro, Lotus 1-2-3
Database	For storing records of data such as address, membership and other text information. A database can be used to easily sort and organize records.	Use of tables for storing data, showing relationships between the tables and using queries to read and write information to the tables	MS Access, Filemaker Pro
Presentation	For creating multimedia slides that can effectively present a lesson or a product. The user often clicks on buttons to advance to the next slide in a sequence.	Use of prepared templates, animation, transition effects and different layouts	MS PowerPoint, Hyper Studio, Flash
Desktop Publishing (DTP)	For creating attractive graphics and designing posters, flyers, and many graphical art work.	Use of text boxes, text formatting features, drawing and graphic tools. Some DTP provides a large range of professional templates	Adobe PageMaker, MS Publisher, Quark Express
Web development or Web content Management	For creating web pages and websites	The use of WYSIWYG* interfaces, templates, multimedia and hyperlinks	Dreamweaver, Microsoft Frontpage, Joomla
Email	To communicate with other users over the internet. Users can use different public email to communicate with families and friends all over the world	Use of mail boxes, creating of new email messages and sending options	MS Outlook Express, MS Outlook, Eudora
Web Browsing	To view websites and use Internet services such as Facebook and Google. By clicking a hyperlink or by typing the web addresses, the user is able to view Web sites consisting of one or more Web pages	The use of address bar (URL), navigation button, bookmarks or favorites, stop button, refresh and home button	Mozilla Firefox, Internet Explorer, Safari, Google Chrome

*Note: WYSISYG- stands for *What You See Is What You Get.* In some applications, users can design their work in many ways knowing for sure that their work will be look the same as with the original work when it is printed, displayed on another computer screen, or shared with another user.

Software Suite

A software suite is a group of software applications with related functionalities.

Examples Microsoft Office software suites might include word processing, spreadsheet, database, presentation, and email applications.

Graphics suites such as Adobe Creative Suite include applications for creating and editing images as well as videos, whereas the Sony Audio Master Suite is used for audio production.

3) **Computer Languages (programming software)**

Programming software is used for creating computer programs, mobile apps, websites, games or any other type of software.

Programs are created through the use of a programming language. This language allows the program to function with the machine it is running on. It can be a computer, a mobile phone, or any other type of hardware.

There are many different type of programming languages and knowing what programming language to use can be accomplished by learning that language.

There are different programming languages for developing web applications, PC applications and mobile apps. Such languages are referred to as high –level languages.

The most popular high-level languages are Python and Ruby.

Note: Programming is often called coding. A person who writes the code for the program is called a Programmer.

Basic Features of Programming Languages

Programming languages follow similar features such as:

1. Programming concepts such as using variables, conditional statements, functions and data input.
2. Compilers- Many programming languages require compilers, which are programs designed to translate the code into a language that the machine can understand. Other languages, such as Python, uses an interpreter, which can run (execute) the program instantly without compiling.
3. Syntax- The syntax is the way the language is written so that the compiler or interpreter can understand it. Each language has a different syntax but some elements are shared by many languages. Learning the syntax is key for learning how to program.
4. Debugging- A program is going to come across errors (bugs). These are errors can be harmless, or could be very harmful such as the bugs that stop the program from compiling or running. Hunting down and fixing these errors are part of a major process known as debugging.
5. Comment- Nearly all programming languages have a “comment” function that allows text that is not processed by the interpreter or compiler. These are short, but clear, human-language explanations of what the code does to help programmers remember them when coding large programs. It also allows others to understand what the code is about.

Managing Computer Resources

The operating system manages the hardware and software resources of the computer system.

- In a PC, these resources include the processor, memory, devices, storage and more.

- Computer operating systems often contain additional applications known as tools or utilities to assist users in managing computer resources.

Examples of operating system tools and utilities include antivirus software, backup software and disk tools.

Antivirus Software helps protect a computer system from viruses and other harmful programs. A computer virus is a computer program that can cause damage to a computer's software, hardware or data. It is referred to as a virus because it has the capability to replicate itself and hide inside other computer files.

Backup software helps backup files on your computer. Most computer systems use a hard disk drive for storage. Backup software copy the most important files to another storage device, such as an external hard disk. In this way, users can still have access to their files and applications even when their computer fails to work.

Disk tools include a wide range of different tools that help manage hard disk drives and other storage devices. This includes utilities to scan the hard disks for any potential problems or disk cleaners to remove any unnecessary files.

Accessories

A folder that located in the Start menu in a Windows operating system that contains useful tools such as the Accessibility tools, Communication tools, System tools, Calculator, WordPad, Notepad and more.

Accessibility tools

The magnifier

The magnifier is a display tool that makes the computer screen more readable by people who have low vision. In other words, to zoom in and zoom out.

The Narrator

Is a test to speech utility for people who are blind or have low vision. Anything you type on the screen, the Narrator read it and say it out loud for you to hear.

The On-screen keyboard

On-screen keyboard is a tool that display a keyboard on the screen of your computer.

System tools

Examples of Accessories in the system tools folder are:

- Back Up
- Disk Cleanup

Backup

Makes it easy for user to backup all their important files. To save a copy of your work in another location or another device.

Disk Cleanup

Can be used to automatically remove unnecessary files on the storage devices, which can help make the PC run faster. It deletes temporary files and system files that are not in use, empties the Recycle Bin, and removes a variety of other items that are no longer needed by the user.

Device Stages

The device stages is the main control center for hardware devices. When a device is connected to a PC, a menu of popular tasks will appear for that type of device. A multifunctioning printer, for example, will show options for printing and scanning.

Device and Printers

Devices and Printers folder shows the installed devices that are connected to the PC, making it a handy way to check on connected printers, music players, cameras, mouse, or digital picture frames.

It's also the place where users can add a new network or wireless devices as well as check problems involved with a device or printer.

Managing Applications

Manages the installation, updating and access of software applications.

An application manager can monitor how an application performs and let the user know of this progress.