

# **SYSTEM STARTUP AND CONFIG**

**SET IN ALL SECTIONS (840/1)**

# **SYSTEM STARTUP AND CONFIG (TOPIC CONTENT/SUBTOPICS)**

- **Computer Booting**
- **System Configuration**
- **Software Installation**
- **Computer Troubleshooting**

# BOOTING A COMPUTER

**Booting/bootstrapping** is the process of starting or resetting a computer, which involves loading an operating system into memory (RAM).

*There are two methods of booting a computer. They include:*

1. **Cold booting**: This is the initial process of turning on a computer after it has been powered off completely. Also called **Hard boot**
2. **Warm booting**: This is also called **soft boot**, a warm boot is one method of resetting a computer system that is already powered on.

A warm boot can be accomplished by pressing the CTRL - ALT - DEL keys simultaneously, or by selecting the restart command from an operating system menu. Warm boots run faster than turning a computer off and on again.

# **CIRCUMSTANCE THAT MAY REQUIRE RESTARTING A COMPUTER(WARM/SOFT)**

- Commonly used to recover from errors that cannot be recovered.
- When a computer locks or freezes.
- After installing of certain new software program.
- After installing a new hardware device like a flash disk.
- After uninstalling a hardware device.
- After uninstalling a software program.
- When the computer slows down.
- After changing CMOS or BIOS setup.
- When a computer has a virus, it can constantly restart itself.

# **REASONS TO EXPLAIN WHY COMPUTERS ARE WARM BOOT.**

- **To refreshes the system.**
- **To flush RAM and removes other files that could be causing computer freezing Clears memory off any malware.**
- **To increase the processing speed and system performance. Reboots are known to keep computers running quickly.**
- **To stop Memory Leaks which occur when programs don't close properly.**
- **Completing the installations by allowing the system to configure or initiate a new software or hardware**
- **Fixes Internet/network Connection. *Sometimes computers lose their connection to the Internet or network and need restart to re-establish the connection***

# WINDOWS BOOTING PROCESS

1. If all the cables are well connected, turn on the wall switch that sends the power to the power supply unit.
2. The power supply sends an electrical signal to the motherboard and other devices located in the system unit.
3. The CPU resets itself and looks for the ROM that contains the BIOS.
4. The BIOS executes the Power-On Self Test (POST) to make sure that the computer hardware is connected properly and operating correctly.

# **BOOTING PROCESS CONT..**

- 5. The results of the POST are compared with data in a CMOS chip on the motherboard.**
- 6. If the POST is completed successfully, the BIOS looks for the boot program that loads the operating system.**
- 7. Once located, the boot program is loaded into memory and executed, which then loads the kernel of the operating system into RAM.**
- 8. The operating system loads system configuration information, and the remainder of the operating system is loaded into RAM, and the desktop and the icons display on the screen.**

# POST (POWER-ON-SELF-TEST)

POST is an in-built program that checks whether certain hardware is available and is working properly. It happens at boot up and checks; **CPU, RAM, CMOS, video card, HDD and HDD controllers, mouse, keyboard** etc.

- Errors found are returned in form beeps

**Non fatal errors** are errors displayed on screen and the computer can complete boot up

**Fatal errors** are errors that don't allow the computer to complete e.g. failed/absence of RAM



# WHAT IS THE KERNEL

**The kernel** is the core or the heart of the operating system that performs all management functions of the OS.

**The kernel is memory resident-** it is a running program/process for as long as the computer is on.

## Roles of the kernel

1. Does process scheduling
2. Manages virtual memory
3. Manages user privileges
4. Allows processes to communicate

# CONCLUSION ON BOOTING

- **Booting/bootstrapping is starting the operating system**
- **Booting/bootstrapping is loading the operating system into memory**
- **The boot loader is the program for booting**
- **The boot sector of the hard disk contains code for booting**
- **A master boot record (MBR) is a special type of boot sector at the very beginning of partitioned computer HDD.**

# SYSTEM CONFIGURATION

## Definitions

**Computer systems** refers to a series of hardware, software, data, users and procedures.

**Computer system unit** refers to a housing that protects all internal components of a computer

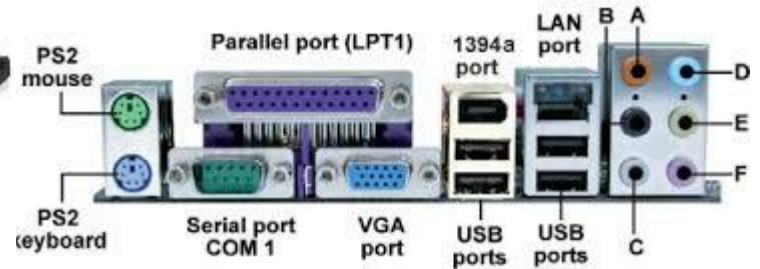
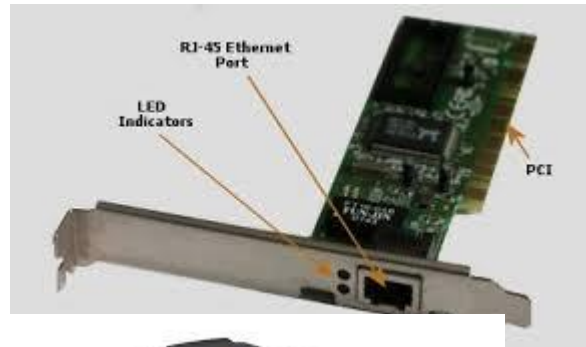
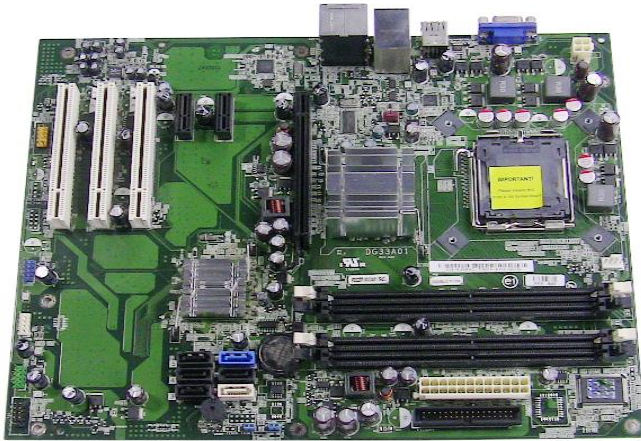
**System startup** is a process of turning on a computer for use

**System configuration** refers to setting hardware and software of a computer appropriately to allows a user perform his tasks.

# INTERNAL COMPONENTS

**Internal components** refers to all hardware components that reside in the system case. These include; hard drive, heat sink, power supply unit, graphics card, network interface card, RAM chip, motherboard, CPU, ROM chips, CPU and system fans, CD/DVD drive, CMOS battery, ports

# INTERNAL COMPONENTS



# INTERNAL COMPONENTS

NO	COMPONENT	FUNCTION
1	MOTHERBOARD	-Is the main circuit board in a computer -It provides points of connection (sockets) for all internal and peripheral components
2	CPU	-Is the brain of the computer -Carries out instructions from computer programs
3	RAM CHIP	-Provides temporary storage for data and programs
4	POWER SUPPLY UNIT	-Converts AC to DC and supplies power to all internal and peripheral devices .
5	HARD DRIVE	-Provides permanent storage for data and program files.
6	HEAT SINK	-Absorbs heat to prevent CPU overheating
7	FANS	-Placed above heat sink to wipe away absorbed heat
8	NETWORK CARD/NIC	-Allows a computer to connect to a network
9	GRAPHICS CARD	-Generates output images for display -Outputs via VGA, HDMI, DDC,DVI, S-video, etc.
10	PORTS	-Provide interface between computer & peripherals

# PORTS AND CONNECTORS

**A port** is interface between a computer and peripheral devices.

**A connector** is an end of a cable that joins into a port.

Ports can be male if they have exposed pins and female if they have matching holes for pins.

**Examples of ports include;**

**USB, Bluetooth, Firewire, VGA, PS/2, Serial, Parallel, Sockets, power connectors, Ethernet, MODEM, Game ports, DVI, etc.**

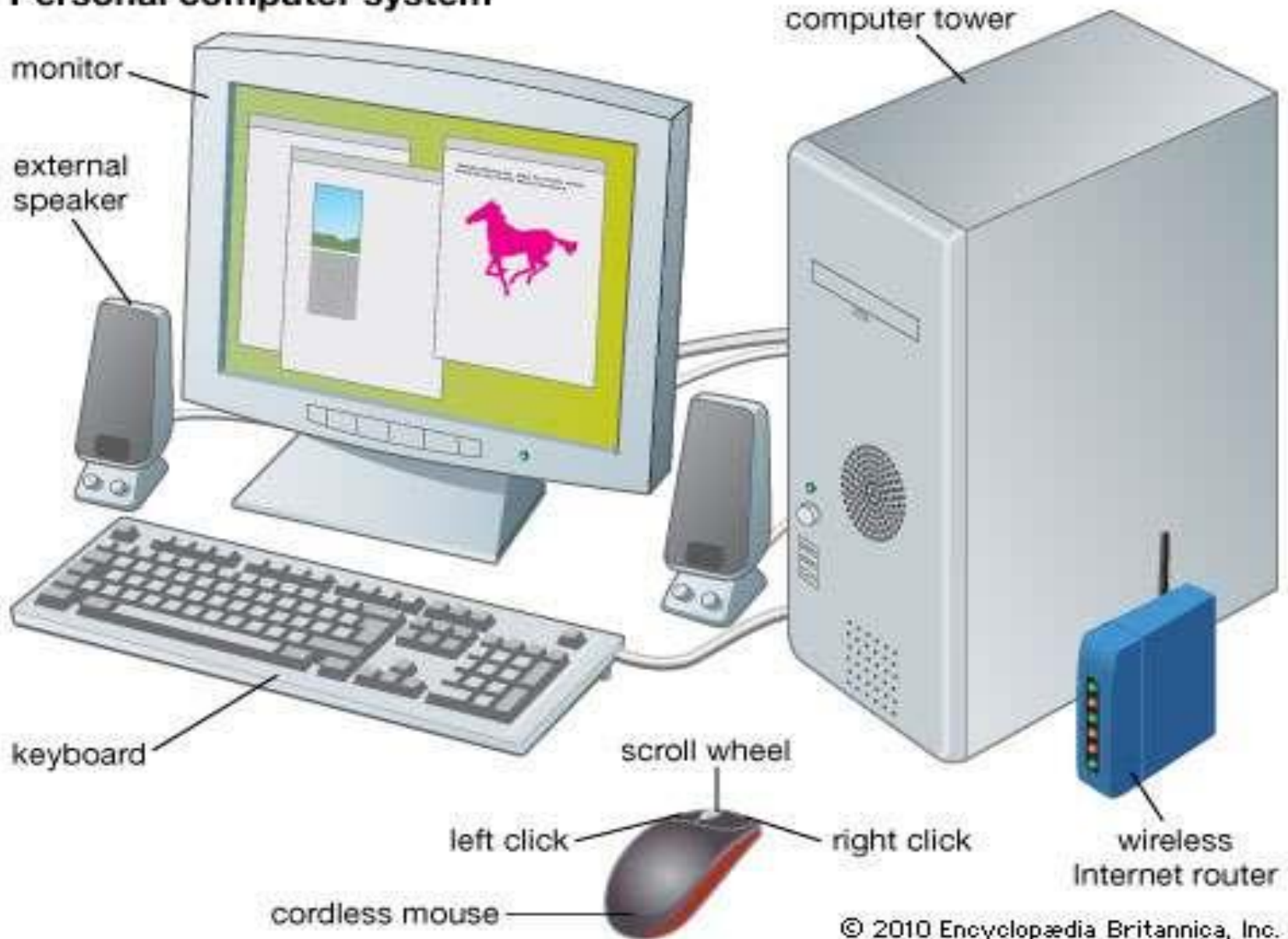
# PORTS

PORT	DESCRIPTION
<b>USB</b>	Used to connect peripherals like mice, keyboards, printers, modems, scanners, external disks
<b>VGA</b>	Connects visual display units (VDUs) like monitor and projectors
<b>PS/2</b>	Used to connect mice (green port) and keyboard (purple)
<b>Power connectors</b>	Connect the system unit to power source using a power cable
<b>Bluetooth</b>	Connects the computer to a Bluetooth-enabled devices
<b>Serial</b>	Connect devices like scanners, modem, scanner transferring data bit by bit
<b>Parallel</b>	Connects devices like external disks, backup tapes, etc
<b>Firewire</b>	Connects devices that require high data transmission speeds eg digital cameras, DVD writers, printers , scanners, etc
<b>Ethernet</b>	Connects Ethernet cables (network cables)
<b>Game ports</b>	Connect gaming devices



# COMPUTER ASSEMBLY

## Personal computer system



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# EXERCISE

- What is meant by the term booting?
- Distinguish between soft and hard boot
- Explain any five stages involved in system booting
- Write down the steps for soft resetting a computer
- Under what circumstances would a user restart a computer?
- Explain five reasons for restarting a computer
- What is the importance of the following in booting
  - a) RAM
  - b) POST
  - c) BIOS
  - d) Boot program
  - e) Operating system
- Explain the system configuration
- What is meant by the term system unit. Explain five internal components you know.
- What are the roles of the following components in the computers; power supply unit, Hard drive, CPU, RAM chip, motherboard, buses
- What are expansion slots? Give three components that can be added to computers expansion slots
- What is a computer port?
- Explain five ports you know. State any one component that connects in the ports you have stated.

# EXERCISE

The head teacher of your school purchased the following computer parts for the new computer lab

- System unit with all its component and power cables and VGA cable, Monitor, UPS, USB Key board, PS/2 Mouse, Speakers, Operating system and Microsoft office suite CD, Multifunctional printer

As a computer student, write-down step- by – step procedures that you will follow to setup the computer ready for use.

# SYSTEM/SOFTWARE INSTALLATION

**System installation** is the process of putting software into the computer so that it can be executed by the CPU.

**Uninstallation** is removal of software from the computer. Uninstallation usually involves more than just erasing the program folder. For example, **registry files** and other **system code** may need to be modified or deleted for a complete uninstallation.

# **ACTIVITIES DURING INSTALLATION**

- **Making sure that necessary system requirements are met**
- **Checking for existing versions**
- **Creating or updating program files and folders**
- **Making the software accessible to the user, for instance by creating links, shortcuts**
- **Performing product activation**
- **Updating the software versions**

# **INSTALLATION OF THE O/S LIKE WINDOWS**

**Here are some methods for installation of operating systems onto computers**

- 1. Clean installation**
- 2. Upgrade installation**
- 3. Multi-boot installation**
- 4. Virtualization installation**

# INSTALLATION OF THE O/S LIKE WINDOWS

**Clean installation.** This is a type of installation done on a new computer or one which doesn't need an upgrade of the current operating system.

**Upgrade installation.** This is a type of installation done when replacing the current operating system with a newer version. For instance from win 8 to win 10.

**Multi-boot installation.** This is a type of installation in which more than one O/S are installed on a computer. E.g. Linux and windows

**Virtualization installation.** This is a type of installation that allows more than one operating systems to run on a computer at the same time

# **WHY DO WE UPGRADE SOFTWARE?**

- **Allows faster performance of the computer.**
- **Upgrading software fixes the current bugs.**
- **New features might be added which were not available in the older version of the software.**
- **Allows for Improved security.**
- **Allows for more hardware to be compatible with the upgraded software.**



# **ADVANTAGES OF CLEAN INSTALLATION OVER UPGRADE**

- **The entire drive is wiped out, so there is no chance for malware.**
- **Better chance of a good install than upgrade.**
- **Less chances of problems down the road.**
- **Less chances of an incompatible driver.**
- **Your PC will almost always run faster on a clean install than an in-place upgrade.**
- **When you fail to find solutions to software problems, a clean install will always fix software issues.**

# **ADVANTAGES OF UPGRADE INSTALLATION OVER CLEAN INSTALL**

- **Clean install requires backup of data or else it is lost compared to upgrade install.**
- **Upgrade install retains already installed apps and drivers compared to clean install.**
- **Upgrade install is easier compared to clean install since it takes less time.**
- **Upgrade install doesn't require installation media compared to clean install.**

# **FACTORS TO CONSIDER BEFORE YOU INSTALL AN O/S OR PROGRAMS**

- **Minimum amount of RAM**
- **Minimum hard disk space**
- **Type of graphics card**
- **Minimum processor speed**
- **Minimum Video adapter and monitor resolution**
- **Compatibility with other applications and hardware.**
- **Read manuals first**

# SYSTEM SPECIFICATION

**Systems specification** refers to the technical description of the computer's components and capabilities.

- To access your computers system specification, click start button, access Run, type “msinfo32 ” and press enter.
- System information include; **OS name, OS version, computer name, computer manufacturer, computer model, type of processor and its speed, installed RAM, total virtual memory, boot device, etc**

**NB. *The above factors affect the buyer's decision on a particular type of computer.***

# **MINIMUM REQUIREMENTS FOR WIN 7**

- **1 GB ram for windows 7 and above, 512mb for windows XP**
- **AT least 20GB hard disk space**
- **A graphics card**
- **2.3 MHz processor**
- **Video adapter and monitor with Super VGA (800 x 600) or higher resolution**

# **WIN 7 INSTALLATION STEPS**

## **CLEAN INSTALL**

- 1. Insert installation CD/DVD into the drive,**
- 2. Start the computer and press F12 to enter its BIOS**
- 3. Choose to boot from the CD/DVD.**
- 4. Choose the language & Keyboard**
- 5. Click install now button**
- 6. Accept the license agreement.**
- 7. Choose either to upgrade or custom install.**
- 8. Format the partitions, and chose which one to install on.**
- 9. During installation, the computer will restart several times.**
- 10. Activate your windows, configure updates and your windows installation will be successful.**

# HOW TO PARTITION A DISK?

- Disk partitioning** refers to slicing a disk into small parts
- Right click on the “my computer” icon, select **Manage**.
  - Click on disk management option under the **storage category**.
  - Right clicking on the disk space listed as **unallocated**.
  - On the menu that appears select the, “**New partition option**”
  - You will now be presented with a wizard that guides you as to how you like the partition to be created.
  - Press **next** at the 1<sup>st</sup> screen, on the following screen determine if u need a **primary or extended partition**.
  - Then you will be prompted to type in how much space you would like to use for the new partition and then press **next** and finally select **finish** to finish the partitioning.

# DELETING A PARTITION

- Right click on the “my computer” icon, select **Manage**.
- On the Computer management screen that appears, click on disk management option under the **storage category**.
- A screen displaying your hard disks will be shown.
- Right click on the partition that you would like to delete and chose the **Delete Partition** option.
- A confirmation box appears asking whether you are sure you want to continue. If yes select the **YES** button.
- The partition will now be deleted and you can create a new one or exit the program.



# DISK FORMATTING

**Disk formatting** is the process of preparing a disk for initial use by creating a new file system on it.

**Disk formatting:** Configuring a disk with a file system in order to store information on it.

# HOW TO FORMAT A DISK

1. Right click on the “my computer” icon, select Manage.
2. Click on disk management option under the **storage category**.
3. A screen displaying your hard disks will be shown.
4. Right clicking on the space listed as unallocated.
5. Select the, “New partition option”
6. Determine if u need a primary or extended partition.
7. Type in how much space you would like to use for the new partition and then press next.
8. Select the drive letter and choose NTFS or FAT32 as file system.
9. Type the name of the partition and click the finish button .

# INSTALLING APPLICATIONS

1. Copy the set up on the computer or insert a CD/DVD/ flask disk containing the setup
2. Open the folder containing the installation file.
3. Locate a file named setup or install and double click to run.
4. Follow the instructions until installation is successful

***NB. Installer*** is a computer program that installs files, such as applications, drivers, or other software, onto a computer

# HOW TO UNINSTALL APPLICATIONS

- Click on start button and choose control panel
- Under programs choose uninstall a program
- From the list select a program of your choice
- Click uninstall and follow instructions until uninstallation is successful.

NB **Un-installer** is a utility program used to remove application programs from the computer.

# INSTALLATION OF DRIVERS

- **Drivers** are small programs that allow devices to communicate with the operating system.
- Peripheral devices like printers, scanners, mice, keyboards, etc. cant work without drivers

**NB Driver installation is similar to other applications.**

# **WHY SOFTWARE FAILS TO INSTALL**

- **Software source CD may not be readable**
- **Software is not compatible with computer system**
- **Lack of installation code or serial number**
- **Computer lacks the requirements**
- **Setup is corrupted and cant run**
- **Power loss from computer system**

# **HOW TO IMPROVE THE COMPUTER'S SPEED & OVERALL PERFORMANCE**

## **HARDWARE UPGRADES**

- Upgrade RAM chip for better memory.
- Upgrade HDD for better storage.
- Consider using SSD instead magnetic HDD
- Install a better CPU is matches the architecture of the computer
- Install a better graphics card.
- Monitor, Battery, motherboard.

## **SOFTWARE CHANGES**

- Uninstall all bloatware
- Uninstall add-ons from web browsers.
- Run a few programs when the computer is turned on.
- Check for malware, install strong updated antivirus
- Use disk cleanup and defragmenters.

# THE CONTROL PANEL

**The control panel** is a feature of Microsoft OS that provides ability to view and change system settings.

The following are some system setting that can be changed using the control panel;

**Account passwords, date & time, screen colors and monitor, modem and mouse features, program uninstallation, networking options, etc.**



# FEATURES OF THE CONTROL PANEL

Adjust your computer's settings

View by: Category ▾



## System and Security

- Review your computer's status
- Back up your computer
- Find and fix problems



## Network and Internet

- View network status and tasks
- Choose homegroup and sharing options



## Hardware and Sound

- View devices and printers
- Add a device
- Connect to a projector
- Adjust commonly used mobility settings



## Programs

- Uninstall a program



## User Accounts and Family Safety

- Add or remove user accounts
- Set up parental controls for any user



## Appearance and Personalization

- Change the theme
- Change desktop background
- Adjust screen resolution



## Clock, Language, and Region

- Change keyboards or other input methods



## Ease of Access

- Let Windows suggest settings
- Optimize visual display

# FEATURES OF THE CONTROL PANEL

FEATURE	FUNCTIONS
System and security	<ul style="list-style-type: none"><li>-Review computer status, backup data</li><li>-Find and fix problems</li></ul>
User accounts and family safety	<ul style="list-style-type: none"><li>-Create or delete user accounts,</li><li>-Set controls for any account</li></ul>
Network and internet	<ul style="list-style-type: none"><li>-View network status, configure new network</li><li>-Configure sharing options</li></ul>
Appearance and personalization	<ul style="list-style-type: none"><li>-Change screen resolution,</li><li>-change desktop background</li></ul>
Hardware and sound	<ul style="list-style-type: none"><li>-View devices, add devices, configure devices</li></ul>
Clock, language and region	<ul style="list-style-type: none"><li>-Set date &amp; time, change region, change location</li><li>- Change input methods</li></ul>
Programs	<ul style="list-style-type: none"><li>-Uninstall programs, view installed updates</li><li>-Turn windows features on or off</li></ul>
Ease of access	<ul style="list-style-type: none"><li>-Change how devices work, set microphone</li></ul>

# HOW TO PERFORM SOME SETTINGS USING THE CONTROL PANEL

**Create an account:** start button, control panel, user account and family safety, add or remove accounts, create new account, account name, create account.

**Set a password to an account:** start button, control panel, user account and family safety, choose account in user accounts, set password for account, type and confirm password, create password.

**Uninstall a program:** start button, control panel, uninstall under programs, select program and choose uninstall, wait or follow instructions

**Set correct date and time:** start button, control panel, Clock, language and region, set date and time, change date and time, click ok.

# HOW TO PREFORM SOME SETTINGS USING THE CONTROL PANEL

**Change screen resolution:** start button, control panel, Appearance and personalization, adjust screen resolution, click ok

**Connect to a network:** start button, control panel, Network and internet, connect to a network, choose the network and select connect.

**Add network printer:** start button, control panel, Network and internet, view network computers and devices, add printer, choose network printer, select the printer and follow instruction until it installs successfully.

**Configure display to projector only:** start button, control panel, Appearance and personalization, connect projector, projector only.

# TROUBLESHOOTING

**Troubleshooting** is the process of figuring out a problem on a computer and providing an appropriate solution to it.

Computer users usually face the following common challenges;

- The printer is not working.
- The computer is frozen. A program is not responding.
- The keyboard is not working.
- New hardware or software is working incorrectly
- The mouse is not working.
- The computer is slow.
- The browser's homepage suddenly changed.

# COMPUTER ALERTS AND ERROR MESSAGES

**Error messages** are messages indicating detection of an error in a computer.

These are usually displayed in a dialogue.eg

**Access denied:** occurs when a user has less right to a file or program.

**File not found:** occurs when a user opens a deleted or damaged file.

**Out of memory:** computer has run out of memory. Install more RAM or close programs

**Low disk space:** disk is nearly full. Delete files or clean up disk

# COMPUTER ALERTS

**Computer alerts** are sound or visual signals indicating an error or an event that has just occurred.eg

- When a device is plugged in a sound is heard
- Zig-zag lines are shown for wrong grammar and spelling.
- Message or sound is sent for low battery in a computer system.
- When a card isn't fixed well, computer alerts you
- When an app is updated a message is sent.

# **STEPS FOR TROUBLESHOOTING COMMON PROBLEMS**

- **Close open programs and windows you are not currently using.**
- **Make sure all of your cords are connected properly.**
- **Try to repeat the sequence of commands you performed before the problem occurred.**
- **Press the F1 key to access the Help window.**
- **If there is an error message, record the full message for future reference.**
- **Restart your computer to see if it clears the problem.**
- **If the issue is still not resolved, check the common technology issues below or call your system administrator.**



# HOW TO TROUBLESHOOT COMMON ISSUES

<b>Problem</b>	<b>Proposed solution</b>
Computer cant boot	Check the power cable is properly plugged in.
Computer beeps and cant start	Check the availability of the RAM and ensure that it is properly fixed or working.
Computer Runs slowly.	Ensure that few programs are running, or close some programs - Scan your computer for viruses.
Printer fails to print	- Check and see that printer is on, has paper in the tray, and is connected to the computer sending the print job.
An application freezes	Force quit of application by pressing (CTRL+ALT +DEL) that helps u access the task manager to close the program. or restart the computer.
Mouse or keyboard stops working.	For a wired mouse or keyboard, check that it is properly connected.
Sound is not working	- Check the volume level to verify it is on & up - check audio player control to ensure its volume is turned on - connect headphones to test for sound

# EXERCISE

- **What the difference between software installation and uninstallation?**
- **Explain any five activities done during software installation**
- **Discuss four methods of installing an operating system onto a computer set**
- **Differentiate between multi-boot and virtualization installation**
- **What factors would you consider when selecting an operating system for a computer**
- **Mention four benefits of keeping software updated on computer set**
- **What is meant by the term system specifications?**
- **Outline five sets of information found in a list of a computer's specification.**

# EXERCISE

- Define the concept of trouble shooting.
- Distinguish between computer alerts and error messages
- Explain five common error messages that may pop-up on screen
- Give the possible causes and solutions to the above errors
- State the steps that can be taken to solve the following problems on a computer.
  - a) The computer has frozen and the program is not responding.
  - b) The printer is not printing
  - c) The Keyboard is not working
  - d) Mouse is not working
  - e) The scanner is not working.
- What is control panel? State five settings that can be done using the control panel
- Explain any ten functions of computer system control panel that you know.
- Describe how you can go step by step to perform the following tasks.
  - a) Establishing the hard disk space on your PC
  - b) Formatting a flash disk for use
  - c) Uninstalling an application program from your PC
  - d) Checking your computer specifications

# EXERCISE

5. Musoke has been working on his computer for the last three months. Of late, the keyboard and mouse have stopped to respond. After replacing them, still they could not work. Identify four possible causes of the above scenario.
6. Explain two activities that need to be done to have his keyboard and mouse work well.
7. Give the steps you would go through to perform a clean installation of windows OS on a computer
8. Explain five reasons why software installation may fail
9. Discuss five hardware and software upgrades that can be made to improve the overall performance of a computer
10. Distinguish between a clean installation and a Upgrade installation in respect to windows operating system
11. Mention any five reasons that would require you to perform a clean installation other than an upgrade installation.