COMPUTER SYSTEM MAINTENANCE

CHAPTER - 4

OBJECTIVES OF THIS CHAPTER

4.1 INTRODUCTION

We all know that a computer system consists of Hardware and Software. Both Hardware and Software are required for a computer system to get our task done. So, to keep our computer system always in a running condition, we need to take care of it. Computer maintenance is a practice of keeping computers in a good state of repair.

4.2 COMPUTER SYSTEM MAINTENANCE AND SECURITY

Computer hardware maintenance involves taking care of the computer system components, such as its keyboard, hard drive and internal CD or DVD drives. Cleaning the computer, keeping its fans free from dust, and defragmenting its hard drives regularly are all parts of a computer hardware maintenance program.

Whereas **software maintenance** is a process by which a computer program is altered or updated after it has been released.

Security and Maintenance is a component of the Windows NT family of operating systems. These components monitor the security and maintenance status of the computer system. Monitoring criteria of these components includes optimal operation of antivirus software, personal firewall, as well as the working status of Backup and Restore, Network Access Protection (NAP), User Account Control (UAC), Windows Error Reporting (WER), and Windows Update. It notifies the user of any problem with the monitored criteria, such as when an antivirus program is not up-to-date or is offline.

4.3 PREVENTIVE MAINTENANCE

Preventive Maintenance is the process of inspecting hardware on a regular basis to ensure it stays in good running order. If we are taking good care of our PC, it won't crash and thus protects our data from lose.We should follow the preventive maintenance to stop PC problems.

If our PC resides in a relatively clean, climate-controlled environment, an annual cleaning should be sufficient. But in most real-world locations, such as dusty offices or shop floors, our system may need a cleaning every few months.

4.3.1 Basic Guidelines for Preventive Maintenance

Below is a list of some preventive maintenance guidelines that weshould follow for our computer or computer hardware to keep it running smoothly.

- Always turn off and unplug the system before we clean any of its components. Never apply any liquid(like water or cleaner) directly to a component. Spray or pour the liquid on a lint-free cloth, and wipe the PC with the cloth.
- **Clean the case :** Wipe the case and clear its ventilation ports of any obstructions. Compressed air of Vacuum cleaner is great for this, but don't blow dust into the PC or its optical drives using air-blower, while doing so the dust particles will be blocked in important parts of motherboard. Keep all cables firmly attached to their connectors on the case.
- **Maintain mouse :** Mouse is an important device. The optical mouse also gets dirty as the non-optical mouse (older one)gets. The pointer moves erratically. Clean the dirt down from the surface of the mouse. Always use Mouse Pad to keep clean the mouse from surface. Don't press left, right and scroll button with pressure.
- **Maintain keyboard :** Usually we don't keep our keyboard covered with cover after use, so the dust and particles get inside and over the keyboard. To clean keyboard keep it upside down and shake it to clear the crumbs from between the keys. If your keys of the keyboard easily removed from keyboard then remove it gently and then clean it precisely and fix the removed keys at relevant places. Cover the keyboard after use.
- **Maintain monitor :** Wipe the monitor case and if you are using CRT monitor, clear its vents of obstructions, without pushing dust into the unit. Clean the screen with a

standard glass cleaner and a lint-free cloth. If your monitor has a degauss button (look for a small magnet icon), push it to clear magnetic interference. Many LCDs can be cleaned with isopropyl alcohol. Wipe your LCD lightly: The underlying glass is fragile.

- **Maintain power supply :** The Computer can't run without Power supply. The Power cable must be of good quality. We must check its both ends periodically. We must use these cables for intended purpose. These cables must be installed properly, means the connections must not be loose. The must not be an obstruction in the way of these cables and if possible, these cables must be fixed with clips.
- **Maintain your CD and DVD media :** If you are unable to access media from your CD/DVD then there could be dust on it. So, gently wipe each disc with a moistened, soft cloth. Use a motion that starts at the centre of the disc and then moves outward toward the edge. Never wipe a disc in a circular motion.
- **Maintain your Printers :** Printers are more mechanical than other peripherals and therefore require more attention. Because they use paper, ink, or carbon, printers generate pollutants that can build up and cause problems. Always check the manufacturer's recommendations for cleaning.

4.4 BOOTING AND SAFE MODE PROBLEMS

When we press the power button of computer system, the O.S. (Operating System) start loading, this process is known as booting. Moreover, it can be initiated by hardware such as a button press, or by a software command. After it is switched on, a CPU has no software in its main memory, so some process must load software into memory before it can be executed. This may be done by hardware or firmware. Ifour Windows computer is not booting up,it might be because of a hardware, software, or firmware error.

If Window isn't starting properly, we can often use the integrated "start-up repair" tool to fix it. This recovery tool will scan our PC for problems like missing or damaged system files. It can't fix hardware issues or Windows installation problems, but it's a great first place to start if we are experiencing trouble booting into Windows.

This tool is available on Windows 7, 8, and 10. We can access it from the built-in Windows recovery tools, recovery media, or a Windows installation disc.

For many other types of PC problems, we can also use Safe Mode tool of windows. Safemode is a diagnostic mode of a computer operating system (OS).

When Windows starts normally, it launches start-up programs, fires up all the services configured to start, and loads the hardware drivers we have installed. In Windows, safe mode only allows essential system programs and services to start up at boot. Safe Mode starts our PC with a minimal set of drivers. Windows uses a very low screen resolution with generic video drivers and doesn't initialize much hardware support in Safe Mode.

Safe mode is intended to help fix most, if not all problems within an operating system.Safe Mode is a great way to remove problem-causing software - like malware or has unstable hardware drivers that cause blue screens. It also provides an environment where we may find it easier to roll back drivers, and use certain troubleshooting tools.

4.4.1 How to Start Windows in Safe Mode

Our Windows PC should automatically start up in Safe Mode if it crashes more than once while trying to start normally. However, we can also boot into Safe Mode manually:

- **Windows 7 and earlier :** Press the F8 key while the computer is booting (after the initial BIOS screen, but before the Windows loading screen), and then select Safe Mode in the menu that appears.
- **Windows 8:** Hold Shift while clicking Restart on the Power menu on the login screen to begin the process.
- **Windows 10 :** Hold Shift while clicking Restart on the "Power Options" submenu of the Start Menu. Click Troubleshoot > Advanced Options > Startup Settings > Restart. Press the "4" key when we see the Startup Settings screen.

4.4.2 How to Fix Your PC in Safe Mode

After starting Windows in Safe Mode, we can perform most of the regular system maintenance and troubleshooting tasks to fix our computer:

- **Scan for Malware :** Use our antivirus application to scan for malware and remove it in Safe Mode. Malware that may be impossible to remove in normal mode-because it's running in the background and interfering with the antivirus-may be removable in Safe Mode. If we are using Windows Defender in Windows 10, we might be better off performing an offline malware scan.
- **Run System Restore :** If our computer was recently working fine but it's now unstable, we can use System Restore to restore its system state to the earlier, known-good configuration.
- **Uninstall Recently Installed Software :** If we recently installed software (such as a hardware driver or a program that includes a driver) and it's causing our computer to blue-screen, we can uninstall that software from the Control Panel. Our computer should hopefully start normally after we have uninstalled the interfering software.
- **Update Hardware Drivers :** If your hardware drivers are causing system instability, we may want to download and install updated drivers from our manufacturer's website and install them in Safe Mode. If our computer is unstable, we'll have to do this from Safe Mode-the hardware drivers will be installed and won't make our computer unstable in Safe Mode.
- **To check system crashes :** If our computer is unstable normally but works fine in Safe Mode, it's likely that there's a software problem causing our computer to crash.

However, if the computer continues to crash in Safe Mode, this is often a sign that there's a hardware problem with our computer. (Note that stability in Safe Mode doesn't necessarily mean it's a hardware problem. For example, your graphics card may be faulty and causing crashes under load. However, it may be stable in Safe Mode because your computer isn't performing demanding operations with it.)

4.5 INSTALLATION OF DEVICE DRIVERS

A driver is software that a device uses to work with our PC. When our device isn't working properly, we can check if the driver is installed correctly or not. Faulty driver could always be the cause of problem in our PC. To fix the problem, we need to update the driver. For some devices, Windows can update the driver automatically. For some devices especially external devices, we need to install the updated drivers our self, then we need to download the driver manually.

4.5.1 Download the drivers manually

To download new drivers, we need to visit to PC manufacturer's website or device manufacturer's website. Driver updates are often available in the Support section of their website. If we are using a branded computer, it is recommended that we go to the PC manufacturer's website to check for the latest driver first, as they may customize the driver. We are required to use the PC model and the operating system that you are using(like win-7/8/10 etc) to download the correct driver (Operating System is selected automatically on some manufacturer's website). Usually, the PC model can be found on the machine. If we need to download the driver from device manufacturer, then we are required to know the device model.

4.5.2 How to install the driver

When we download a driver file then the downloaded driver file will be an executable file (File name ends in ".exe".) or a zip file (File name ends in ".zip".).

- **For executable file,** to install the driver, we just need to double-click on the file and follow the on-screen instructions.
- **For zip file,** we need to unzip it and find the executable file in the archive. If we cannot find an executable file, we need to install the driver step by step using the ".inf" file. Following steps should be followed to install the driver in this way.

Fig 4.1 Device Manager

1. Open the **Device Manager** by Right Clicking on Start Button in Windows 10.
2. Find the device that need to install a driver. (Here let's take video card for example.)
3. Right-click on the device and select **Update Driver Software...**

4. Select **"Browse my computer for driver software"** as shown in Fig. 4.2.

Fig: 4.2

5. Select **"Let me pick from a list of device drivers on my computer"** as shown in Fig. 4.3.

Fig: 4.3

6. Click Have Disk... button as shown in Fig. 4.4.

Fig: 4.4

7. Click Browse... button as shown in Fig. 4.5. Navigate to the folder where we saved the downloaded driver file and browse the .inf driver file.

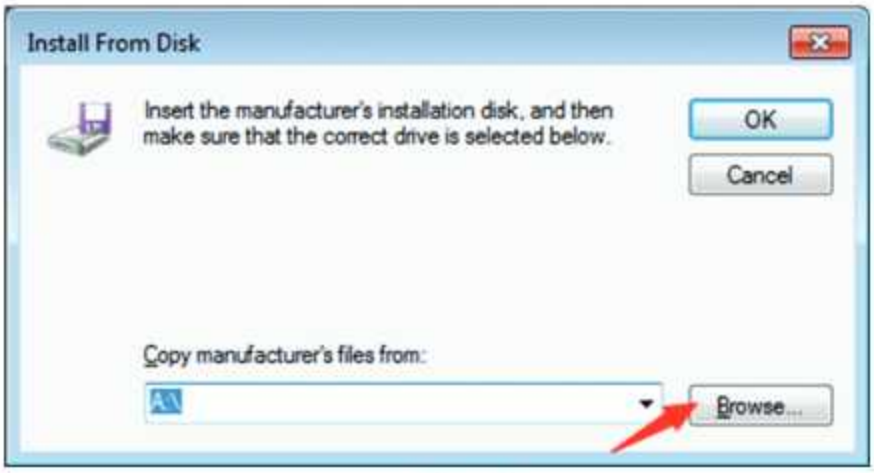

Fig: 4.5

8. Click OK button then Next button to finish the installation. We might be asked for an admin password or to confirm our choice.

4.6 PLUG AND PLAY HARDWARE INSTALLATION

Plug and Play is sometimes abbreviated as PnP. It is a term used to describe that the devices will start work with a computer system as soon as they are connected. So the user does not have to manually install drivers for the device. Instead the computer automatically recognizes the device it loads new drivers for the hardware if needed and begins to work with the newly connected device.

For example, if we connect a Plug-and-Play Keyboard to the USB port on our computer, it will begin to work within a few seconds of being plugged in. If our computer doesn't support plug-and-play device feature then we would require going through several steps of installing drivers and setting up the device before it would work as explained in the previous topic. The basic thing to keep in mind is that the internal components usually require the computer to be turned off when they are installed, while external devices can typically be installed while the computer is running.

4.7 TYPES OF PORTS

In computer hardware, a port acts as an interface between the computer and peripheral devices. Computer ports have many uses such as to connect a monitor, webcam, speakers, or other peripheral devices. So, a port is a physical docking point using which an external device can be connected to the computer. Let us now discuss a few important types of ports:

- **Serial Port :** This port is mainly used for external modems and older computer mouse. It has two versions: 9 pins and 25 pins. The data travels at 115 kilobits per second using this port.

- **Parallel Port :** This port is used for scanners and printers and it is also called printer port. It has 25 pins.
- **PS/2 Port :** This port is used for old type of computer keyboard and mouse. It is also called mouse port. Most of the old computers provide two PS/2 ports: one for mouse and other for keyboard. Mouse port comes in green color code and keyboard port comes in Magenta color. Color codes are used for quick identification.

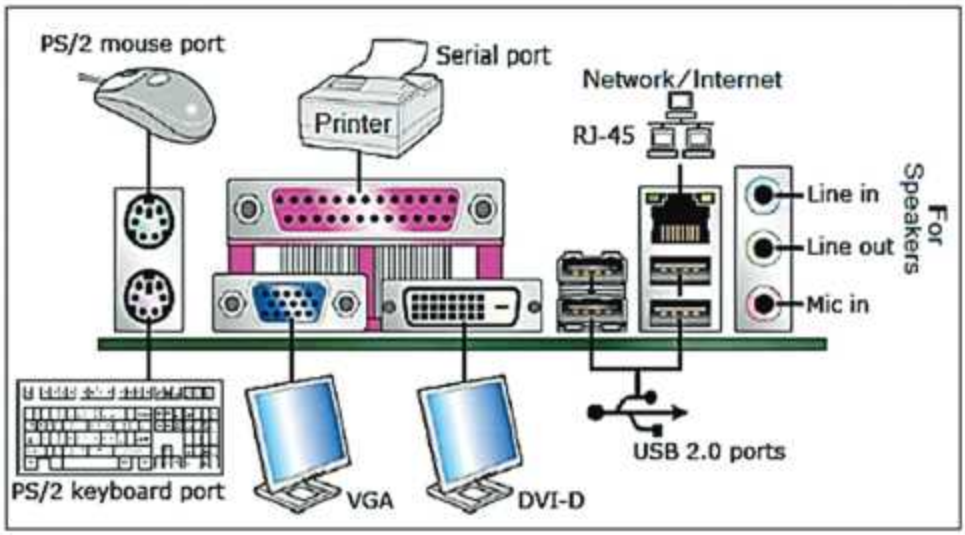

Fig: 4.6 Different Types of Ports

- **Universal Serial Bus (or USB) Port :** This is a very popular and versatile type of port. It can connect all kinds of external USB devices such as external hard disk, printer, scanner, mouse, keyboard, etc. This port was introduced in 1997. Most of the computers provide two USB ports as minimum. In Advanced models, there are four USB ports; very first two ports come with Blue color code and other in black code. Blue code of USB port states that the port is providing the USB 3.0 access. At USB 3.0 port, data travels at 12 or more megabits per seconds. USB compatible devices can get power from a USB port.
- **VGA Port :** It is also called Monitor Port and it is used to connect monitor to a computer's video card. It has 15 holes and it is very similar to the serial port connector. However, serial port connector has pins but the VGA port has holes.
- **Power Connector :** This connector is used for providing power supply to computer system. It is three-pronged plug. Right hole for Phase left one is for Neutral and uppermost is used to provide earthen connectivity in case of power leakage or computer component security. It connects to the computer's power cable that plugs into a power bar or wall socket.
- **Modem Port :** This port is also called communication port and it connects a PC's modem to the telephone network. It connects with a RJ-11 type connector.

- **Ethernet Port :** This port is also called LAN port and it connects our PC to a network and high speed Internet. A RJ-45 connector is used to connect the network cable to a computer. This port resides on an Ethernet Card. Data travels at 10 megabits to 1000 megabits per seconds depending upon the network bandwidth.
- **Digital Video Interface, DVI port :** It connects Flat panel LCD monitor to the computer's high-end video graphic cards. It is very popular.

4.8 PC SECURITY TOOLS

Computer security is important because it keeps our data protected. It's also important for our computer's overall health.Proper computer security helps prevent viruses and malware, which allows programs to run quicker and smoother. Over the internet when we try to install a freeware that is not verified then we open our computer to a slew of attacks. For example, we might download a free desktop application and unknowingly install spyware or a browser toolbar along with the application.

Typically, these free applications will have a checkbox installation that we might miss, which allows the spyware or toolbars to be installed. This spyware, in many cases, can track everything we do in our web browser-and these toolbars can potentially slow our entire system down.When we install untrusted freeware, we open our computer system for:Trojan Horses, Spyware, Viruses and much more.

4.8.1 Importance of PC Security tools

When we come to know that our system has got infected with any of the above attacks then we try to install an antivirus after paying charges. We can either purchase it from local vendor or from online vendors. But our Operating System provides us some very significant security tools that are inbuilt and free for use. Windows Defender is built into the latest versions of Windows and helps guard our PC against viruses and other malware. For a PC running an older version of Windows 7, we can download Microsoft Security Essentials. Microsoft Security Essentials is built for individuals and small businesses. Here are some ways Microsoft Security Essentials helps keep our PCs safe without getting in our way or making us worry.

- Real-time protection
- System scanning
- System cleaning
- Windows Firewall integration
- Dynamic signature service
- Rootkit protection

4.9 SOFTWARE UPDATE AND UPGRADE

Update and upgrade are two different ways to make a change to an app or operating system. But the prime difference lies in a number of modifications made and the importance of

those modifications. A software update includes bug fixes, and other small improvements, while a software upgrade changes the version of software.

4.9.1 Software Update

An update is a patch that is made available after the product has been released, often to solve problems or glitches. When we perform an update, it involves making changes to an app or an operating system is such a way that it doesn't affect its core structure. So, most of the frequent changes made to our computer like bug fixes, security patches, adding support for drivers and newer hardware, etc. can be termed as an Update. An update is often small in size, and it might take a couple of minutes to perform one. Updates are often free and they are often necessary.

4.9.2 Software upgrade

An upgrade is the replacement of an older version of one product to a newer one. When a set of changes made to software are significant, we can call it an Upgrade. A switch from Ubuntu 16.04 to Ubuntu 17.04 would be called an upgrade, not update.

An upgrade mostly includes important changes to the GUI and a variety of new features and options which are not in the existing version of a software or operating system. Its size can go up to several gigabytes. An upgrade would cost money and they are often not necessary

4.10 MS OFFICE INSTALLATION

Microsoft Office is the full suite of Microsoft productivity software, comprising of Word, Excel, PowerPoint, OneNote, Publisher and Access. These programs represent Microsoft's key products besides the operating systems themselves. It is probably the most reliable and widely used commercial software in the world. The Office suite contains all the programs that we are likely to need in an office environment, with the majority of companies using the Windows operating system and Microsoft Office.

4.10.1 Installing MS Office (Example using Office 2013)

Proceed with the installation using the following steps:

- Open the folder that contains the installation files for MS Office.
- Select the version of Windows Office that we wish to install (32-bit or 64-bit).
- Double click on the file setup.exe.

- Read the license agreement, click on the checkbox - **I accept the terms of this agreement** as shown in Fig. 4.7 and then click **Continue.**

- Click **Install Now** as shown in Fig. 4.8.

Fig: 4.7

Fig: 4.8

Note : If you have a previous version of Microsoft Office installed in your computer, this button will be shown as "Upgrade."

- Wait while the software is installed. Installation progress will be shown using Progress bar.
- Once the installation is complete, click **Close** as shown in Fig. 4.10.

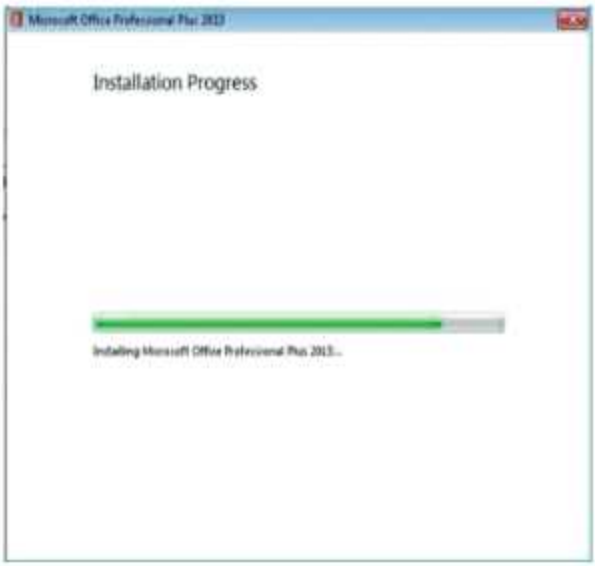

Fig: 4.9

Fig: 4.10

4.10.2 Activation instructions (Example of office 2013)

- From the start menu click All programs → Microsoft Office 2013, then click on any software in the folder (e.g. Word 2013, Excel 2013) to open it.
- The Activate Office window will open. Click **"Enter the product key instead".**
- Enter the product key and then click **Continue.**

4.11 INTRODUCTION TO WINDOWS OPERATING SYSTEM

An Operating system (OS) is software which acts as an interface between the user and computer hardware. Every computer must have at least one OS to run other programs. Applications like Chrome, MS Word, Games, etc. needs an environment in which it will run and perform its task. The OS helps us to communicate with the computer hardware without knowing how to speak the computer's language. It is not possible for the user to use any computer or mobile device without having an operating system in it.

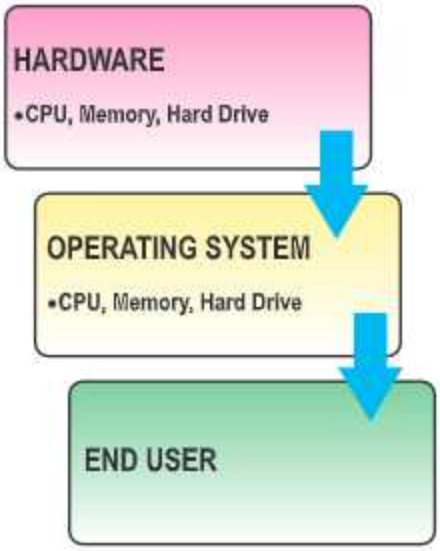

Fig 4.11

Microsoft Windows has seen nine major versions since its first release in 1985. Over 29 years later, Windows looks very different but somehow familiar with elements that have survived the test of time, increases in computing power and - most recently - a shift from the keyboard and mouse to the touchscreen. Following is an overview of some latest windows operating systems that are widely used:

- **Windows 10 :** Windows 10 is the ninth version of Windows. It is designed to unify all Windows platforms across multiple devices, including Windows Phone and tablets, with universal apps that can be downloaded from the Windows Store and run on all Windows devices

  Windows 10 represents another step in Microsoft while bringing back the Start menu and more balances to traditional desktop computer users. Some interesting features include the ability to switch between a keyboard and mouse mode and a tablet mode.

- **Windows 8.1 :** A free point release to Windows 8 introduced in October 2013, Windows 8.1 marked a shift towards yearly software updates from Microsoft and included the first step in Microsoft around its new visual interface.

  Windows 8.1 re-introduced the Start button, which brought up the Start screen from the desktop view of Windows 8.1. Users could also choose to boot directly into the desktop of Windows 8.1, which was more suitable for those using a desktop computer with a mouse and keyboard than the touch-focused Start screen.

- **Windows 7 :** Windows 7 was first released in October 2009. It was intended to fix all the problems and criticism faced by Vista, with slight tweaks to its appearance and a concentration on user-friendly features and less "dialogue box overload".

  It was faster, more stable and easier to use, becoming the operating system most users and business would upgrade to from Windows XP, forgoing Vista entirely.

4.12 INTRODUCTION TO THIN CLIENT TECHNOLOGY

Thin Clients are compact devices with few moving parts and locally stored programs. They connect to servers to perform computer roles and run remote display protocols to access hard drives in secure data centres. This process instantly delivers virtual applications and desktops to end users. Thin Client technology is widely regarded as an effective virtual desktop computing model. This is because it is a secure device where programs, applications, memory, and sensitive information are stored securely in a data center instead of the device itself. As a result, Thin Clients are viable alternatives to regular PCs for businesses which demand flexibility, energy efficiency, improved data security, and longer IT infrastructure lifespan.

Fig 4.12 Thin Client Technology

4.13 CONTROL PANEL

The Control Panel is a feature of the Windows operating system that allows the user to modify system settings and controls. It includes several small applications, or control panels, that can be used to view and change hardware or software settings. Some examples of hardware control panels are Display, Keyboard, and Mouse settings. Software control panels include Date and Time, Power Options, Fonts, and Administrative Tools.

Fig 4.13 Control Panel

The Windows Control Panel can be accessed by clicking the Start menu and selecting Control Panel. Control Panel can be viewed in either Category View or Classic View. Category

View arranges the control panels into sections, while Classic View shows them all at once. While the Category View is designed to make locating different settings easier, people familiar with most of the control panels often find the Classic View more efficient. Let's Discuss about Hardware Control Panel in details as below:-

4.13.1 Display Properties:

Microsoft Windows has a built in feature allowing us a wide range of control over the visual display. This feature is called the Display Properties Panel. Once we have learned how to manage the Display Properties Panel, we will be able to shrink or enlarge text, modify system colors and fonts, or even change the resolution of the display itself. Let's study it:-

4.13.1.1 Opening the Display Properties Panel : There are two basic ways to open the panel. Following are the steps for the first way to open display properties:

- Click on the window's **Start** button,
- Select **Settings → Control Panel,** Control Panel Items will appear on the screen.
- Click the **"Display"** button to open the **Display Properties** panel.

The **second way** to open the panel is to right click on the empty portion of the desktop and then select **"Properties or Personalize"** as shown in Fig. 4.14 from the drop-down menu. A window as shown in the following figure will open:

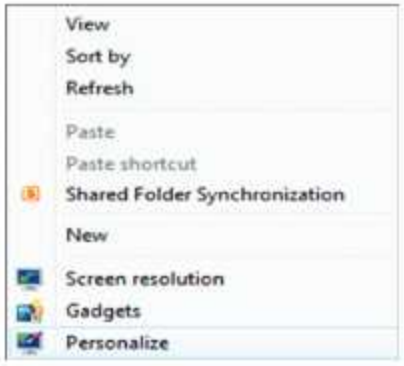

Fig 4.14 Display Properties

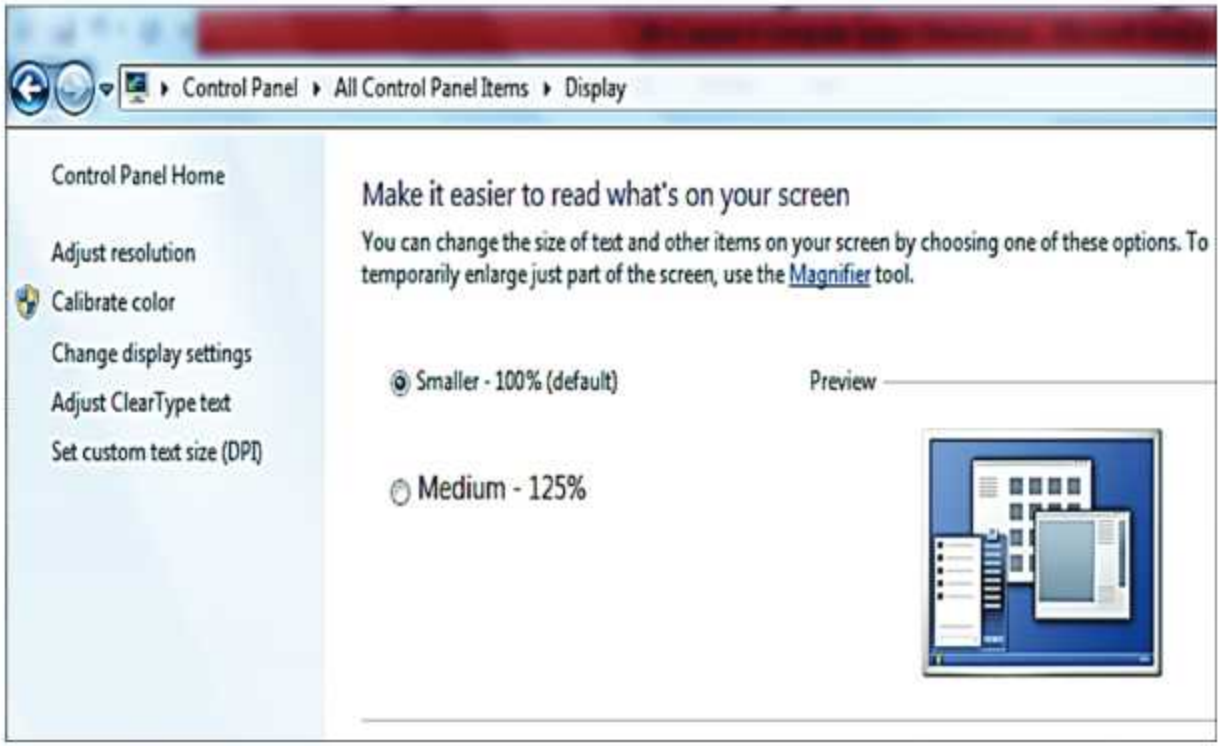

Fig 4.15 Display Properties Panel

Display Properties panel has following properties:

- **Adjust resolution :** It is used to change the resolution of the display screen.
- **Calibrate Color :** It is used to improve the colors on display.
- **Change display settings :** It is used to change the appearance of window components.
- **Adjust clear Type Text :** It is used to improve the readability of text on LCD screen.
- **Set customize text size (DPI) :** It is used to change the size of text, apps and other items.

4.13.2 Mouse and Keyboard:

From the control panel, we can adjust many settings related to our computer's keyboard and mouse. Following description shows about it:

4.13.2.1 Keyboard : Computer users can change some settings and features of a computer keyboard. The numbers of settings and features that can be changed depend on the type of keyboard used. To access keyboard settings for our computer keyboard, follow the steps given below:

- Open the Control Panel (**Start → Settings → Control Panel**)
- Find and click on the **Keyboard** icon. (If we are not viewing the Control Panel as icons, change the View by to Large or Small icons in the top-right corner of the Control Panel.)

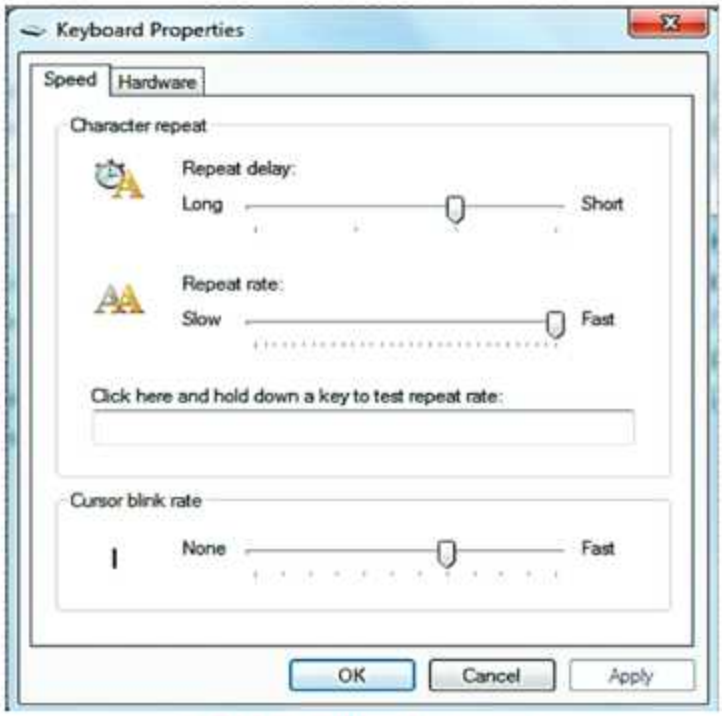

Fig 4.16 Keyboard Properties

Keyboard Properties window have two tabs: Speed and Hardware, which are explained below:

- **Speed tab :** This tab is used to change some basic settings for our keyboard as shown in the figure 4.16 above:
  - We can set the **Repeatdelay** and **Repeat rate** using the sliders provides in the **Character repeat** section.
  - We can set the **Blinking rate of cursor** using the slider provided in the **Cursor blink rate** section.
- **Hardware Tab :** The Hardware tab displays the keyboard that is currently installed, as well as its status.

4.13.2.2 Mouse : Mouse is one of the most common ways which we use to interact with our computers.So it's natural that people will have different preferences when it comes to using a mouse. If we are left-handed, switching our primary mouse button can make using the computer much easier. We can also change how fast the pointer moves, the speed with which we need to double-click, and more. To access mouse settings, follow the steps given below:

- Open the Control Panel (**Start → Settings → Control Panel**)
- Find and click on the **Mouse** icon. (If we are not viewing the Control Panel as icons, change the View by to Large or Small icons in the top-right corner of the Control Panel).

  Once the Mouse Properties window is open we can change some basic settings for our mouse. There are 5 tabs in Mouse Properties dialog box: Buttons, Pointers, Pointer Options, Wheel and Hardware:

Fig 4.17 Mouse Properties

Some of the common mouse settings are explained below:

- **Buttons tab :** The Buttons tab allows us to adjust the settings for the physical buttons of a mouse. Using this tab,
  - We can switch the primary mouse button from the left to the right.
  - We can also adjust the double click speed using the slider.
  - We can toggle Click Lock on, which allows us to perform click-and-hold actions without having to hold the mouse button down.
- **Pointers tab :** Pointer tab is used for these settings. We can do the following using this tab:
  - We can change the cursors for all the different modes. We can use the "Scheme" menu to choose from any of the pre-installed collections of cursors. We can download custom cursors online also.
- **Pointers Options tab :** We can also change how the mouse cursor moves around on the screen.
  - The slider in the Motion section allows us to adjust how quickly the mouse moves around the screen. We'll be able to test the effects as soon as we adjust the slider. The **"Enhance pointer precision"** check box will turn on mouse acceleration, which can make moving it around more natural.
  - The **"Snap To"** check box, when enabled, will automatically move the cursor to the default button on any windows that appear.
  - The **"Visibility"** section allows us to enable a trail for the pointer, as well as hide the pointer when we're typing.
  - We can also make the pointer emit circles to help us to locate it when we press Ctrl key from keyboard.
- **Wheel tab :** We can change how fast your wheel scrolls. The settings in the Wheel tab affect how fast we can scroll through documents and web pages.
  - The **"Vertical Scrolling"** speed is dictated by lines-per-click. We can also set it to scroll a whole screen at a time.
  - The **"Horizontal Scrolling"** speed is dictated by characters at a time. Not all mice support horizontal scrolling.
- **Hardware Tab :** The Hardware tab displays the mice that are currently installed, as well as their status.

4.13.3 Date and Time

Current date and time always show in the notification area of the taskbar. We can adjust and change many settings related to the date and time. Windows control panel can be used for this purpose. Following description explain about it:

Fig: 4.18 Task Bar

- Open the Control Panel (Start → Settings → Control Panel)
- Find and click on the **Date and Time** icon. (If we are not viewing the Control Panel as icons, change the View by to Large or Small icons in the top-right corner of the Control Panel.)

Fig. 4.19 Date & Time

4.13.3.1 Change Current Date and Time : Once the Date and Time Properties window is open we can change some basic settings for our Computer.

- In the Date and Time window, under the **Date and Time** tab, click the **Change date and time...** button.
- Make your adjustments and click OK.
- Click OK on the Date and Time window to save the changes.

4.13.3.2 Adjusting the time zone : We can also change the time zones according to the country we live in, using Date and Time Window:

- As shown in the fig 4.19 in the Date and Time window from above, under the Date and Time tab, click the Change time zone... button.
- Select the new time zone in the Time zone drop-down field and click OK.
- Click OK on the main Date and Time window to save the time zone change.

Fig. 4.20

4.13.4 Devices and Printers

The Devices and Printers panel was first introduced in Windows 7 with the aim of providing a user friendly way to interact with external devices connected to our computer.

We can open Devices and Printers window using the Control Panel. In the Devices and Printers window, we can view our own computer along with the external devices connected to it. The list of included devices is: smartphones, portable music players, digital cameras, webcams, monitors, keyboards, mouse, printers, scanners, Bluetooth adapters, external hard drives, media extenders and network devices connected to our computer.

4.13.5 Regional Settings

Wecan access the regional settings by opening the Control Panel and clicking the "Region and Language" or "Region" icon (Region and Language iconin windows 7, Region icon in Windows 10). Windows displays the Language, and Region dialog box.

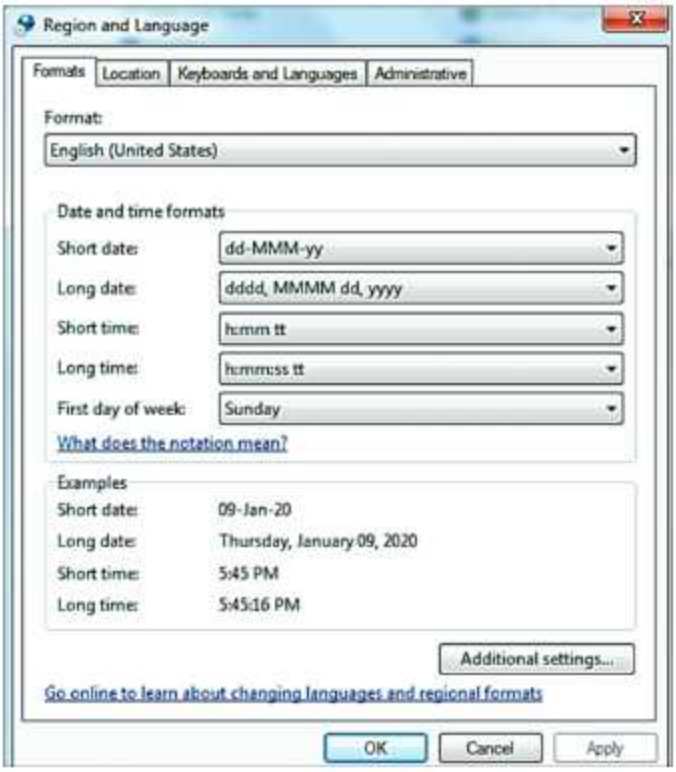

Fig: 4.21 Region and Language

Using the "Region and Language" window, we can change the formats of date, time, numbers, and currency:

- Using **Formats** drop down list, we can select the country for which we want to use formats of date and time, numbers and currency.
- To customize the formats of date and time, numbers and currency for the selected region, click on the **"Additional Settings"** button. **Customize Formats** dialog box will appear now.
- We can customize date and time, number and currency formats using this dialog box as per our requirements. After customizing the settings, click on "Apply" and then "OK" to save any changes.
- Now click on "OK" again to close the "Regional and Language" window.

4.13.6 Fonts

A font is the combination of typeface and other qualities, such as size, pitch, and spacing. For example, Times New Roman is a typeface that defines the shape of each character. Within Times New Roman, however, there are many fonts to choose from - different sizes, italic, bold, and so on. Times, New Roman, Calibri, Arial, AnmolLipi, Joy, Asees, Raavi, Gurbani, Hindi etc. are the examples of commonly used fonts. We can add or remove fonts in our computer using the Fonts window in Control Panel.

Installing a font allows us to use that font when we format text in our documents. First of all download a new font from the Internet. Open the folder containing the new font we'd like to

install. Right-click on the font file and click on the Install option in the menu. Make sure we are installing the desktop fonts and not web fonts. Zipped folders MUST be unzipped to extract the font files.

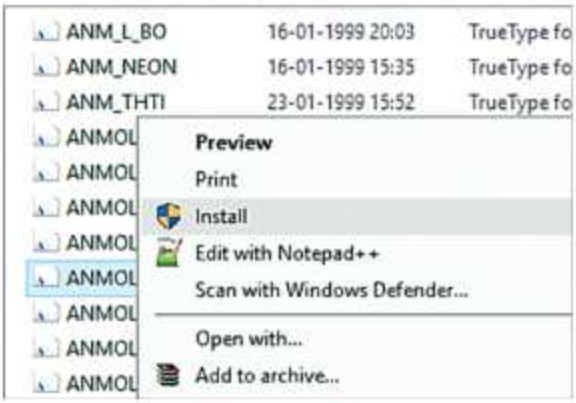

Fig. 4.22 Fonts

4.14 UTILITY PROGRAMS

A program that performs a specific task related to the management of computer functions, resources, or files, as password protection, memory management, virus protection, and file compression is called Utility Program. In other words, Software that plays a supporting role for users and developers, are called Utility Programs. Basic utility programs include file/folder management (copy, move, etc.), file search and compare, disk format and partition, as well as diagnostic routines to check performance and the health of the hardware. Let's discuss some of the commonly used Utility program:

4.14.1 File Compression tools

File compression is a process of "packaging" a file (or files) to use less disk space. Compression software allows you to take many files and compress them into one file, which is smaller than the combined size of the originals.A file compression utility can be helpful in situations where hard drive space needs to be saved or large files have to be sent via email. Almost every computer in the world has a file compression utility.

There is plenty of file compression software available in the market. However, every software supports different file archive formats and offers different features. Winzip, WinRAR, 7-zip are the example of commonly used file compression tools.

The above software are required to download from Internet, but if we want to compress our files/folders then Windows gives us an option for this. Following steps should be used to compress files/folders using built option of window are as follows:

- Select the files/folders to compress
- Right click on it/them
- Click Send to → Compressed (Zipped) Folder, as shown in figure 4.23.

Fig. 4.23

In this way, our required files/folders will be compressed to some extent.

4.13.2 Disk Defragmentation

It is another important inbuilt utility of Windows operating system. Defragmentation is like cleaning space for our PC.It picks up all of the pieces of data that are spread across our hard drive and puts them back together again. It is very important because every computer is affected by the constant scattering growth of data in disk. If we don't clean space in disk then our PC start giving problems.

Disk fragmentation occurs when a file is broken up into pieces to fit on the disk. Because files are constantly being written, deleted and resized, fragmentation is a natural occurrence.

When a file is spread out over several locations, it takes longer to read and write. But the effects of fragmentation are far more widespread: Slow PC performance, long boot-times, random crashes etc.

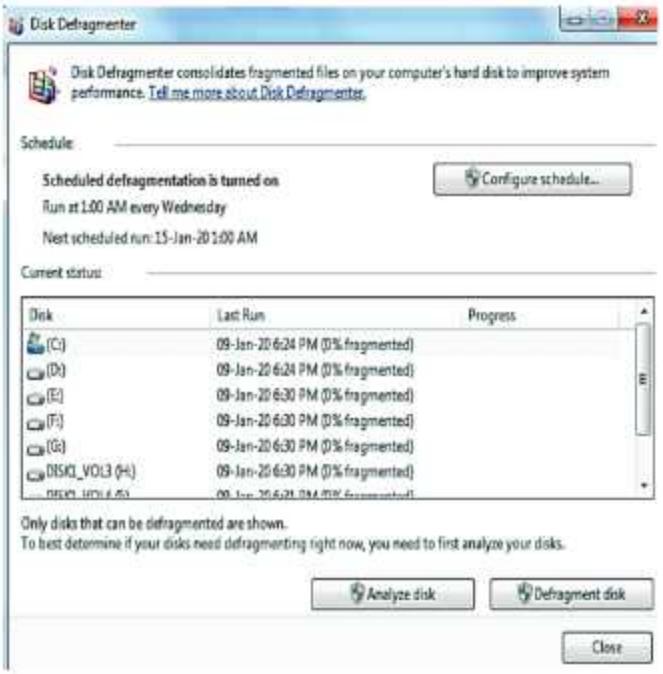

Fig. 4.24 Disk Defragmenter

To defrag a Hard disk in computer in Windows, perform the following steps:

- Open the Windows Start menu by pressing the Window key from the keyboard.
- Type **'defragment'** and a search result called **'Defragment and Optimise Drives'** will show up.
- Click on it to open the **Disk Defragmenter** window.
- In the opened window, select the disk (from the list shown) that we wish to defragment.
- Now click on the Defragment disk to start defragmentation process.

4.14.3 Disk Clean-up:

Disk Clean-up is computer maintenance utility that is included in the Microsoft Windows operating system and it is designed to free up space on the hard drive. The cleanup process

involves searching and analysing the hard drive for files that are no longer needed. Then it proceeds to remove them and thus freeing up disk space on the hard drive.

Fig. 4.25 Disk Cleanup

To defrag a computer in Windows, perform the following steps:

- Open the Windows Start menu by pressing the Window key from the keyboard.
- Type **'disk clean'** and a search result called **'Disk Clean-up'** will show up.
- Click on it to open the Disk Clean-upwindow.
- In the opened window, choose what type of files and folders to delete.
- Click OK
- To delete system files that are no longer needed, click Clean up system files. We may be prompted by UAC (User Account Control) to confirm the action.
- Click Delete Files
- To free more space, go to the More options tab.
- Click Clean up at the Programs and Features section to remove program files that are no longer needed.
- Click Clean up at the System Restore and Shadow Copies section to remove restore points, except the last one.

4.14.4 Backup and Restore

A **backup** is a copy of a file or a set of multiple files that is stored in a separate location from the original, such as a DVD, an external drive or someplace else on the Internet. A backup helps protect our files from being permanently lost or damaged during an accidental deletion, a virus attack or a failure of our system. Typically, people make backups of files including pictures, videos, music, projects and financial records. However, programs and software do not

normally need to be copied into a backup as they typically take up a lot of space and we can re-use the original product to reinstall them if necessary.

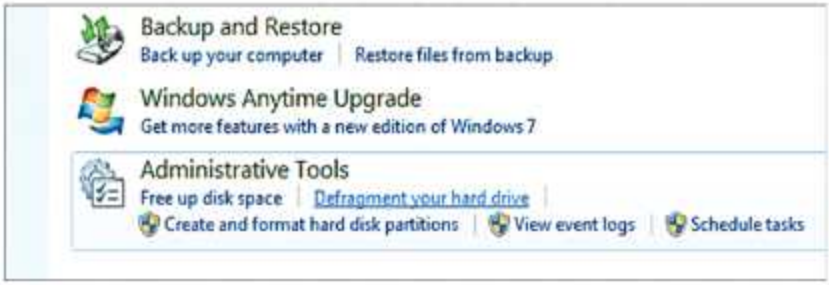

Fig 4.26 Backup and Restore

Whereas, a **system restore** is a process that generally happens automatically on our computer's operating system. At various points in time, our computer will create restoring points where it "remembers" some of the information we are working on. We will use a restore when our computer has a problem. For example, if a program is freezing but we have not had time to save the document we were working on, a restore will allow us to go back to a previous point, which can be as far back as a couple of days ago, or just a few minutes before the problem occurred. This doesn't mean we will get the original document in its entirety, but it will allow us to get back some past data without damaging our system's integrity.

A backup is not automatic, while restore point are created automatically by our computer. Backup and Restore option is available in the Control Panel of the window.

4.15 SHUTTING DOWN OPTIONS

Windows supports several states for when we're not at our computer, and they're not all the same. Some methods help us shut down our computer completely, while another methods makes it look like our PC is turned off but it's actually ready to jump into action at a moment's notice.

The key to shutting down our Windows computer is in the Start menu. Click the Start button and we'll see, among other items, the shutdown button. Next to that button is a triangle; click the triangle to bring up the other shut down options such as: switch user, Log off, Lock, Restart, Sleep, Hibernate etc. The Switch User, Log Off, Lock, and Sleep options don't turn off the computer. The Restart, Hibernate, and Shut Down options do turn off the system. All these options are explained below:

Fig. 4.27

- **Switch User :** We remain logged in to the computer and our programs continue to be open, but choosing this option allows another user to access the computer.
- **Log Off :** We can end our Windows session, save our stuff, and quit programs, but Windows remains on and ready for other people to use the computer.

- **Lock :** Not a complete logout, this option helps you protect your stuff by displaying the Windows logon screen. We must type our password or log in as another user to get into the computer.
- **Restart :** The computer is shut down and then started again when this option is chosen from the Shut Down menu. It's also called a reset or a warm boot.
- **Sleep :** The computer is put into a low-power consumption mode, saving energy. Also known as Stand By, this mode may put the entire computer, or only the monitor or hard drives, into low-power mode. In this power-saving mode, the computer comes back to life quickly, usually with the press of any key or jiggle of the mouse.
- **Hibernate :** Choosing this option, the best power-saving mode, shuts down the computer and turns it off. But information in memory is saved so that when the computer turns on again, we simply resume our former activities (after logging in). Hibernation saves the most power, but it takes longer to restart the computer than either Sleep or Standby mode, because we're literally turning it on again.
- **Shut Down or Turn Off :** When this option is selected, the computer is shut down: We're logged out of our account, which closes our programs and allows us to save our data. Windows then shuts itself down, and eventually the computer turns itself off.

Points To Remember

1. Computer hardware maintenance involves taking care of the computer's physical components, such as its keyboard, hard drive and internal CD or DVD drives.
2. Whereas software maintenance is a process by which a computer program is altered or updated after it has been released.
3. Preventive Maintenance is the process of inspecting hardware on a regular basis to ensure it stays in good running order.
4. Safemode is a diagnostic mode of a computer operating system (OS). Safe Mode starts our PC with a minimal set of drivers.
5. A driver is software that a device uses to work with our PC.
6. PnP is a term used to describe that the devices will start work with a computer system as soon as they are connected.
7. A port is a physical docking point using which an external device can be connected to the computer.
8. A software update includes bug fixes, and other small improvements, while a software upgrade changes the version of software.
9. A font is the combination of typeface and other qualities, such as size, pitch, and spacing.
10. File compression is a process of "packaging" a file (or files) to use less disk space.

11. A backup is a copy of a file or a set of multiple files that is stored in a separate location from the original, such as a DVD, an external drive or someplace else on the Internet.

12. Using Log Off,we can end our Windows session, save our stuff, and quit programs, but Windows remains on and ready for other people to use the computer.

Part-A

1. Objective Type Questions

I. _____ is a process by which a computer program is altered or updated after it has been released.

a. Software maintenance b. Hardware maintenance

c. Corrective maintenance d. Preventive Maintenance

II. In computing, _____ is the process of starting a computer.

a. Safe mode b. booting

c. starting d. login

III. Which of the following is not a type of computer port?

a. Ethernet b. PS/2 Port

c. VGA d. Printer

IV. _____ security tool is built into the latest versions of Windows and helps guard our PC against viruses and other malware.

a. Antivirus b. Malware

c. Windows Defender d. Defragmenter

V. _____ is a software which acts as an interface between the end user and computer hardware.

a. Windows Defender b. File Compression Utility

c. Operating system d. Security Tools

2. Fill in the Blanks:

I. _____ is the process of inspecting hardware on a regular basis to ensure it stays in good running order.

II. A _____ is software that a device uses to work with our PC.

III. A _____ is a physical docking point using which an external device can be connected to the computer.

IV. A _____ is the combination of typeface and other qualities, such as size, pitch, and spacing.

V. Using _____,we can end our Windows session, save our stuff, and quit programs, but Windows remains on and ready for other people to use the computer.

3. Write the Full form of following:

I. PnP

II. USB

III. VGA

IV. UAC

V. OS

VI. NAP

Part-B

4. Short Answer Type Questions. (Write the answers in 4-5 lines)

I. What is Preventive Maintenance?

II. What do you mean by Plug and Play Devices?

III. Write about the PC Security tools.

IV. What do you know about Windows Operating Systems?

V. What is Control Panel in Windows operating system?

Part-C

5. Long Answer Type Questions. (Write the answers in 10-15 lines)

I. Write the difference between software update and upgrade.

II. Explain the basic guidelines for preventive maintenance.

III. What are ports? Explain any two types of computer ports.