



Computer Hardware Maintenance

Syllabus for Diploma in “IT, Networking and Cloud”

Core Module 1

Practical

PART A – Practical

Lab Outcomes

At the end the module you should be able to:

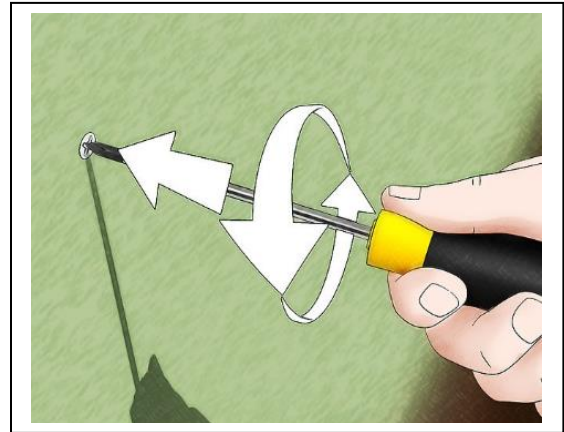
- Disassemble and assemble PC using basic hand tools
- Perform basic troubleshoot of PC
- Work with different cables, connectors and its crimping techniques for PC
- Install and maintain software programs for a PC
- Manage files effectively in Windows and Linux environment
- Customize PC in Windows and Linux environment
- Conduct service and Maintenance of Computer Hardware

1. Skills on using Basic PC Hand Tools

1.1 Steps to remove screws using a Screwdriver

Procedures:

- a. Extracting Screws with Locking Pliers
- b. Determine the Screw and size
- c. Examine the Screw's Head
- d. Position the Screwdriver
- e. Hold the Screwdriver near Its Tip
- f. Apply Some Pressure
- g. Make the Left Turn
- h. Drill into the Screw
- i. Free the Screw

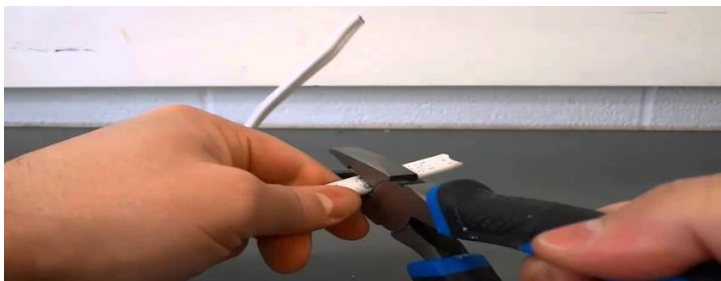


1.2 Cut and Skin cables using a Cutting Plier

Procedures:

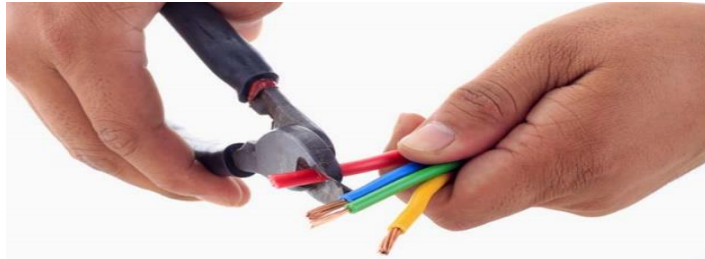
Step 1

Place the wire into the proper slot for the size wire you are. With the wire at a slight angle, push the handles of the stripper together.



Step 2

By gently rocking the stripper blades back and forth to cut through the insulation but not into the wire.



1.3 Desolder electronic components using a desoldering pump

Procedures:

- a. Heat up the solder you want to remove with a soldering iron
- b. Press down on the plunger
- c. Once the solder is molten, place the tip of the de-soldering pump against the solder that you want to remove
- d. Release the plunger or bulb
- e. Remove free component
- f. Repeat steps 1-4 to remove any excess solder
- g. Dispose of the solder inside the pump by repeatedly pressing down and releasing the plunger.



1.4 Remove electronic components using tweezers

Procedures:

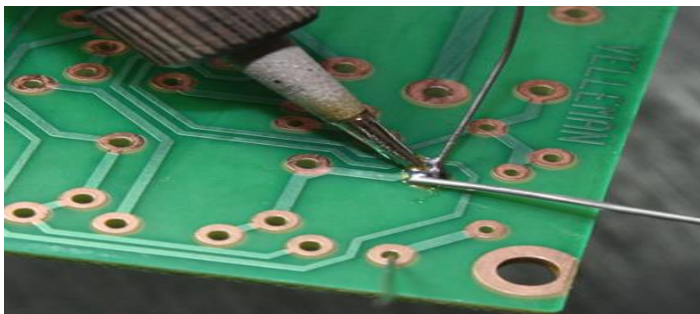
- a. Take the Tweezer wick and place it over the solder you want to remove
- b. With the soldering iron, lightly press on the wick, to ensure the heat is transferred through to the solder.



1.5 Solder electronic components

Procedures:

- a. Prepare the components for soldering
- b. Be extremely careful and solder only in an appropriate environment
- c. Tin" the soldering iron tip
- d. Feed the solder wire onto the interface between the pad and lead.
- e. Stop feeding new solder when all the surfaces have been wetted.



1.6 Crimp CAT 6 cables using a crimping tool

Procedures:

Stage 1

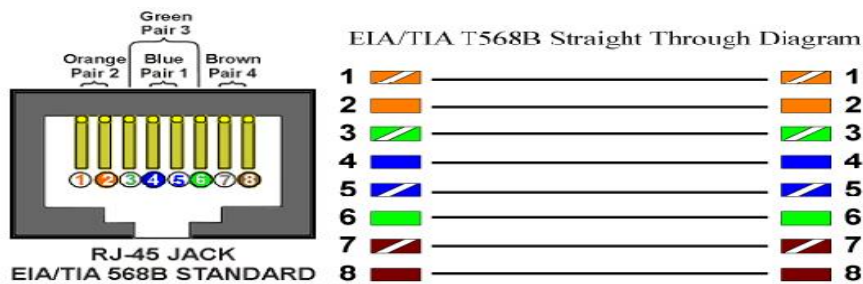
Cut the cable to the length needed.

Stage 2

Strip back the cable jacket approximately 1 inch.

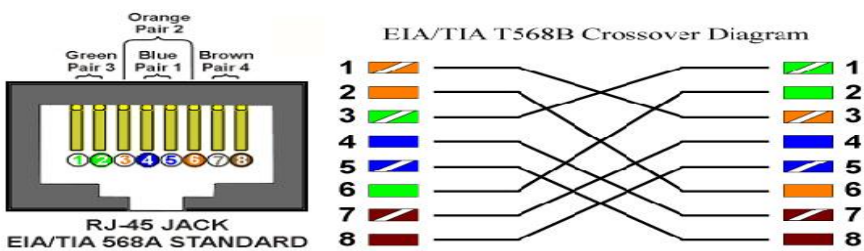
Stage 3

Apply the 568-B wiring scheme on both ends for a standard patch cable.



Stage 4

For a crossover type cable use the 568-B scheme on one end and the 568A on the other end.



Stage 5

- Get together all the wires as close as possible.
- Hold the grouped wires together tightly between the thumb, and the forefinger.
- Crop all the wires at a perfect 90-degree angle from the cable, half an inch from the end of the cable jacket.
- Take a sharp cutting tool so as not to "squash" the wire ends.

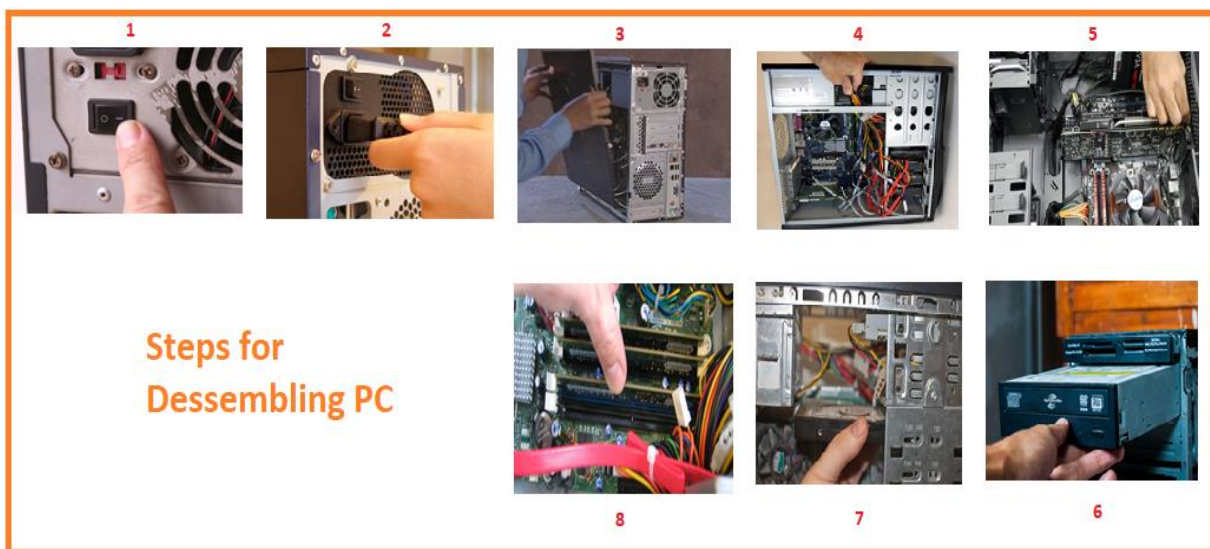
Stage 6

With the connector pins facing up, carefully place the wires into the connector. Apply a moderate amount of force to properly seat the wires against the contacts in the connector.

2. Disassembling PC

Procedures:

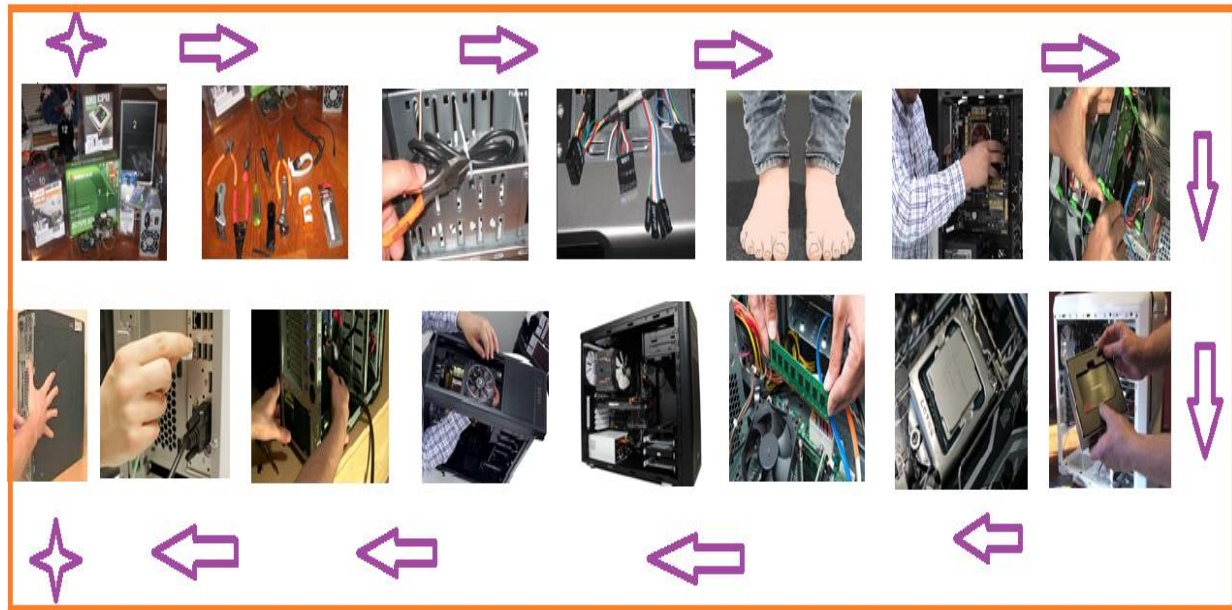
- a. Switch off the power supply
- b. Detach power cable
- c. Remove the CPU cabinet cover.
- d. Detach internal cables
- e. Uninstall internal cards.
- f. Remove CD/DVD drives
- g. Remove Hard Disk Drive
- h. Remove RAM



3. Assembling PC

Procedures:

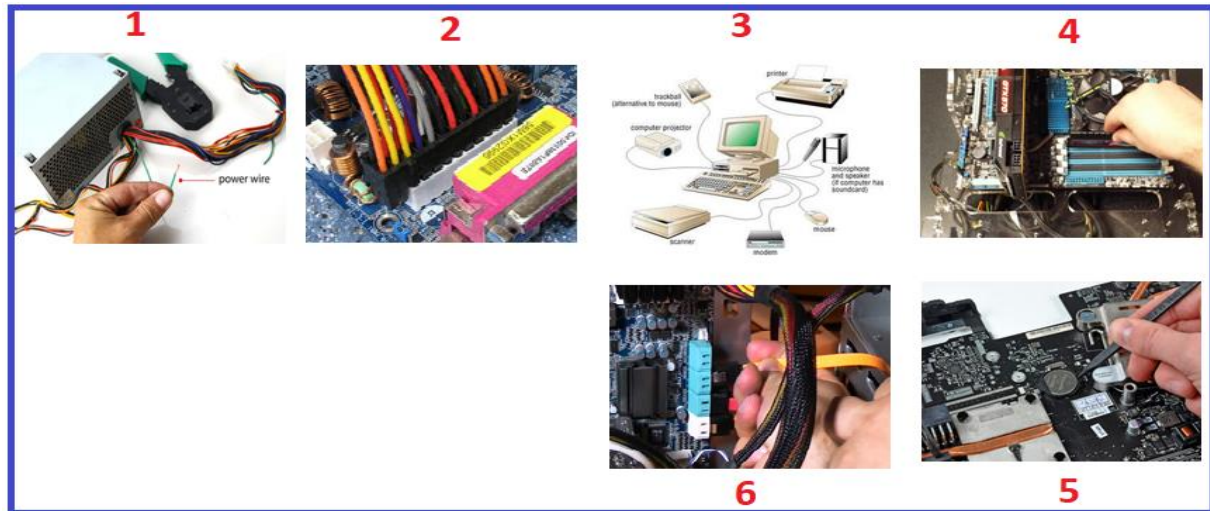
- a. Procuring Parts
- b. Gather Tools and Supplies
- c. Open the Case
- d. Prepare the Case for Assembly
- e. Ground Yourself
- f. Install the following components
 - ✓ Motherboard
 - ✓ Hard Drive
 - ✓ Optical Drive
 - ✓ CPU
 - ✓ RAM
 - ✓ CPU Fan
 - ✓ Case Fan
 - ✓ Power Supply
 - ✓ Connect Cables
- g. Wrap-up



4. Basic Troubleshooting Techniques

Procedures:

- Check PC Power Supply
- SMPS cables and connections to the motherboard
- Check connection of I/O devices to PC
- Remove and reinsert RAM and reinsert CMOS battery
- Check HDD/DVD cables



5. Cables and Connectors



6. Software Installation

The process of installing the software will depend on your operating system and the program you are installing. Because of these many combinations, we have created the steps below as

a general guideline. The following does not cover mistake or errors during the installation process, as they are too vast for one document.

6.1 General guidelines

- Make sure that your computer meets the system requirements of the program, game, or utility you are attempting to install.
- The manual or the readme file will contain the exact instructions on how to install a program and in the same directory as the installation files.
- When installing a program, utility, or game, it is always a good idea first to close the other programs that are running.
- After installing a new program, if the system needs to prompt you to reboot the computer, do it.

6.2 Different Methods of software installation

6.2.1 Autorun from a CD or DVD

Many software programs like games and utilities have an AutoPlay feature. This feature will automatically start a setup screen for the software program when the CD or DVD is inserted. If your program listed this feature, follow the steps that appear after inserting the disc into the computer.

6.2.2 No Autorun Feature

Procedures:

- Open My Computer.
- Inside the My Computer window, open the drive that contains the installation files. For example, if the CD-ROM drive contains the files then, open the D: drive or letter of your CD-ROM drive.
- Inside the drive that contains your files, locate either the executable setup (i.e. "setup.exe") or install file. Double-clicking on this file starts the installation process. If you see multiple setups or install files, try to locate an executable file or double-click each of the setups or install files until you find the file that starts the installation. Most of the times, the icons associated with the installation files have the same name.

6.2.3 Install a CD on a computer with no disc drive

In a few of the new computers will no longer have a disc drive. If your computer does not have a disc drive, try to install what is on the CD from the Internet. Computer drivers, software for hardware devices, and some games and other programs will be available for downloading and can be installed from a download.

If the program is not available for download copy the contents all the CD or DVD to another drive on another computer. For example, you could easily copy the contents of the disc to a USB flash drive and then install the program from the USB flash drive.

6.2.3 Install from a Download

Procedures:

- Download the programs from the website which provides the program.
- Open the download folder.
- If the file that you downloaded is an executable file, double-click the file icon to start the setup process. If the downloaded file is compressed (e.g., .zip), you must extract the file's contents before setup can begin (i.e select the file and click the file from the mouse and it will display the list of the file as dialogue box, select the compressed option then it will compress to ZIP file). By fortunately this function is built into most versions of Windows.
- Once the files are extracted, double-click the setup to install the file.

7. File Management

File Management Process

Draw sketches using paint for practice on mouse/touch pad	
Draft a document using Note Pad for practice on Key Board	
Create, save, rename, move, copy and delete files and folders	
Transfer files and folders from/to external storage devices	
Extract the zip file	
Create zip file	
Create automatic backup	
Hide/unhide files/folder	
Create password for individual files	

Below mentioned file management tips will help you keep your files accessible:

- Apply the default installation folders for program files
- One place for all documents
- Create folders in a logical hierarchy
- Nest folders within folders
- Follow the file naming conventions
- Give electronic files as logical, specific names and include dates in file names if possible
- The best time to file a document is when you first create the file.
- Order your files for your convenience
- Refresh and check your files regularly

- Back up your files regularly

8. Linux

Lab #1

Basic Linux Commands/Utilities

- a. Login using your credentials
- b. On screen, your default shell (command interpreter inactive)

tty[terminal type] : display the type of xxx used

Syntax: tty [switches] [arguments]

Ex: #tty

-shell

Tty100

Prompt #

9. Open Office

9.1 MS Paint

Lab #1

Open MS Paint Program and explore various options then draw an image to show any five basic hand tools. You can make use of appropriate paint tools in suitable colors.

Lab #2

Draw the following images using MS paint and file each image with a different colour.

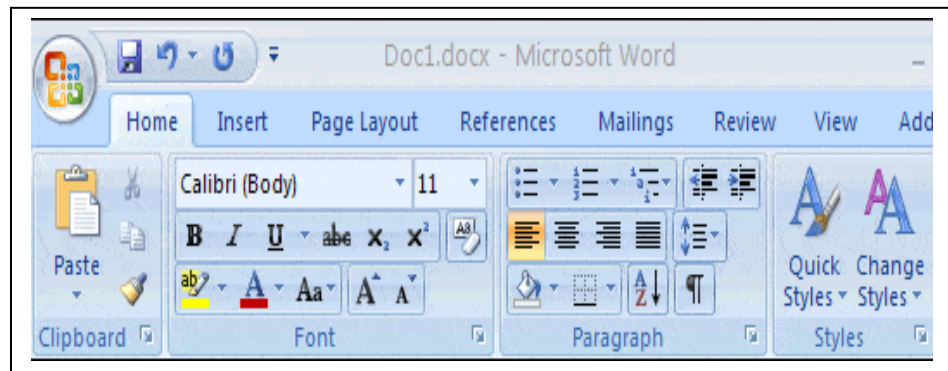
- Chess Board
- Olympic circles
- MS Word
- Cube
- Rectangular

9.2 MS Word

Lab # 1

Open MS word to explore the options available in the following categories.

- Home
- Insert
- Page Layout
- References
- Mailing
- Review
- View
- Help



Lab # 2

After exploring the options, design your own resume using the options. From the following data, get the sum of each component separately. At the end get the total of all the components (Use equations).

	A	B	C	D	E	F	G
		Mon	Tue	Wed	Thu	Fri	TOTAL
1	Breakfast	3,594	3,186	2,952	3,395	3,436	
2	Lunch	20,163	21,415	19,962	19,468	18,528	
3	Bar	9,875	12,172	12,642	12,711	17,846	
4	Snacks	2,405	3,644	2,694	9,120	3,712	

	Total						
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Lab #3

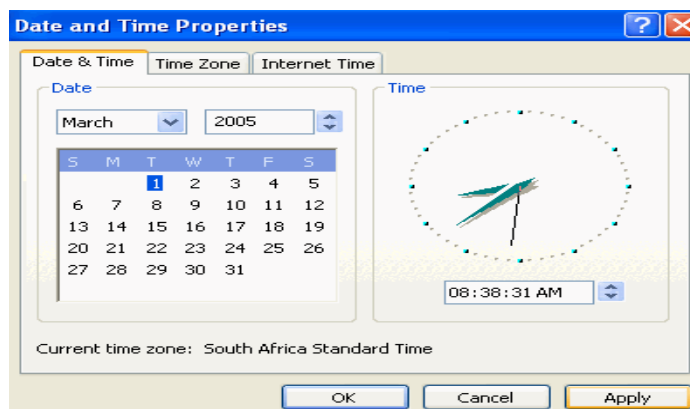
Using the information given in the table below, calculate the total amount payable by the company to the employees.

	A	B	C	D	E
	Services Company Ltd				
	Overtime Details				
	Date	Name	Hours Worked	Rate	Amount
1	26- Nov	Ravi	5	70	350.00
2	26- Nov	Raju	5	70	800.00
3	26- Nov	Mary	5	90	500.00
4	26- Nov	Shivu	4	100	600.00
5	30- Nov	Radha	3	100	300.00
6	30- Nov	John	6	70	420.00
7	30- Nov	Astaf	5	80	800.00
8	30- Nov	Kennedy	4	70	580.00
9	30- Nov	Paul	5	80	700.00

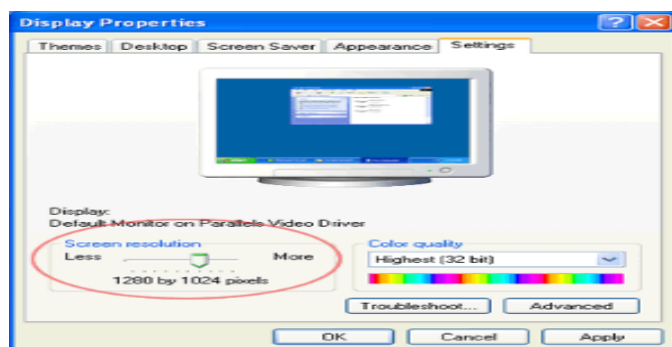
10	30-Nov	Lewis	5	100	400.00
11	02-Dec	Judy	4	70	680.00
			Total Amount		

10. PC Customization (Windows/Linux)

10.1 Set the system Date and Time



10.2 Change the Display Properties

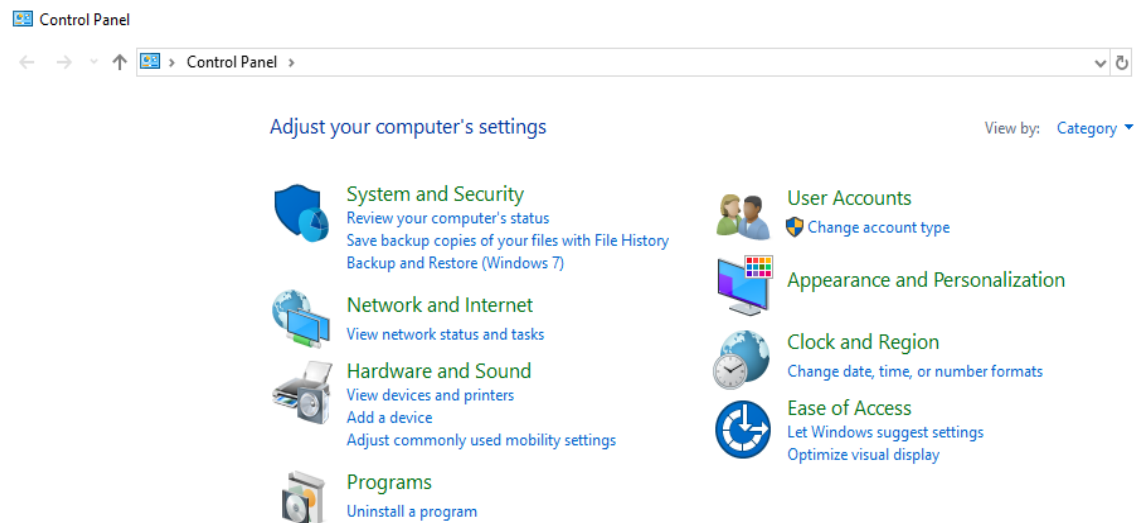


(Themes, Desktop screen resolution, Screensaver, Appearance, and Gadgets can be changed)

10.3 Personalize Taskbar



10.4 Setting the Control Panel



Below mentioned changes can be done

- ✓ Add/remove hardware
- ✓ Install/uninstall software
- ✓ Change properties of peripheral devices
- ✓ Enable system security
- ✓ Language and region
- ✓ Change input methods using language and region

11. PC Management

11.1 Steps in PC Management

- ✓ Create and format partitions, volumes, assigning drive letters using disk part command
- ✓ Browse and Manage event logs using event viewer
- ✓ Schedule and maintain automated tasks at a specific time using task scheduler
- ✓ Install and update the drivers for hardware devices using device manager
- ✓ Stop/start service using SC config command
- ✓ Create file shares and set permission
- ✓ Share files to different users and manage
- ✓ Start/stop the application using task manager
- ✓ Monitor PC performance using task manager
- ✓ Close programs which are not responding using task manager

11.2 Anti-virus

- ✓ Install anti-virus
- ✓ Run a full system scan
- ✓ Fix browser from redirecting to other websites (browser hijack)
- ✓ Blocking un-trusted network
- ✓ Block social network websites

12 Hardware Maintenance

12.1 Service of Dead PC

- ✓ Check power cable continuity
- ✓ Check SMPC DC output, check cables and connectors
- ✓ Check cabinet power on button

12.2 Service CPU ON and no display

- ✓ Check DC power supply from SMPS to the motherboard
- ✓ Remove the sound card if any and check for the restoration of the booting process
- ✓ Check for proper insertion of RAM
- ✓ Check for dust on the motherboard
- ✓ Replace SVGA cord with a new one
- ✓ Check for any crack on motherboard PC
- ✓ Check for overheating of any ICs on the motherboard
- ✓ Replace BIOS

12.3 Service if the system is frequently restarting

- ✓ Replace the RAM
- ✓ Check for any boot virus
- ✓ Check all the connections of the motherboard

12.4 Service if the system gives continuous beep sound

- ✓ Check for proper insertion of RAM
- ✓ Check for dust on the motherboard
- ✓ Replace SVGA cord with a new one

12.5 Service if System not Booting

- ✓ Check SATA/IDE cable and SMPS
- ✓ Check HDD partition problem
- ✓ Check CMOS battery voltage
- ✓ Check HDD parameters in CMOS setup
- ✓ Check for boot virus

12.6 Service if OS not loading

- ✓ Check RAM
- ✓ Check proper installation of Driver Software in device manager

- ✓ Uninstall recently performed drivers
- ✓ Boot in safe mode

12.7 Service if the system gets frequently hanging

- ✓ Check for the proper working of CPU cooler fan
- ✓ Check for dust in the motherboard
- ✓ Run chk disk
- ✓ Check for boot virus
- ✓ Boot in safe mode
- ✓ Reload OS

12.8 Service if the system is very slow

- ✓ Close all opened applications
- ✓ Run msconfig and remove unwanted startup applications
- ✓ Check virus effect on OS
- ✓ Run chkdisk

12.9 Troubleshoot if the paper is a jam in the printer

- ✓ Check for any loose components in feed assembly
- ✓ Check for any blockage in paper eject assembly
- ✓ Check if paper put tray is full
- ✓ Check paper pick up sensor
- ✓ Check paper pick up roller for any damage
- ✓ Check-in cartridge access cover
- ✓ Remove and insert the cartridge

Additional References

Sl No	Topic	Video References
1	Basic Hand tools	https://www.youtube.com/watch?v=uJieLx_1MEY
2	Types of Tweezers	https://www.youtube.com/watch?v=ly0e22pCbdY
3	Safety on basic hand tools	https://www.youtube.com/watch?v=l47TCGb5J1c
4	Assembling and disassembling PC	https://www.youtube.com/watch?v=mozlEPyeVAY
5	Basic Troubleshooting methods	https://www.youtube.com/watch?v=YNDvSkXjy2I
6	Cable and Connectors	https://www.youtube.com/watch?v=2M8YvAPOsU8
7	PC Customization using windows 10	https://www.youtube.com/watch?v=iwLx8pqVEJk
8	Basics of MS Excel	https://www.youtube.com/watch?v=3kNEv3s8TuA
9	Basics of Computer	https://www.youtube.com/watch?v=ctAVC2JwEwI
10	How to assemble computer	https://www.youtube.com/watch?v=XiEPlSHsyr4

