Unit – 03 : Troubleshooting Fundamentals

- Troubleshooting tools –
  - Bootable rescue disk,
  - diagnostic software,
  - virus detection software,
  - Anti-Static tools,
- Trouble-shooting guidelines –
  - Power system,
  - system board
  - hard drive, Optical drives,
  - keyboard, Monitor and printer problems,
- Surge protection & battery backup,
- Stand by UPS, Inline UPS, Line-interactive UPS, and intelligent UPS.

Questions to be discussed:

1. What is troubleshooting?
2. Explain in brief different troubleshooting tools.
3. Discuss about troubleshooting guidelines.
4. How to troubleshoot hard drive?
5. What is UPS? Discuss about different types of UPS.
6. Write short notes on :
   a. Online UPS
   b. Surge protection
   c. Bootable rescue disc
   d. diagnostic software

What is Troubleshooting?

- It is the process of identifying and resolving a technical problem within a software or computer system.
- Troubleshooting is needed to identify the trouble and make the product operational again.
- It enables the repair and restoration of a computer or software when it becomes faulty.
- The goal of troubleshooting is to determine why something does not work as expected and explain how to resolve the problem.
- Most troubleshooting begins with hardware.

Troubleshooting tools :

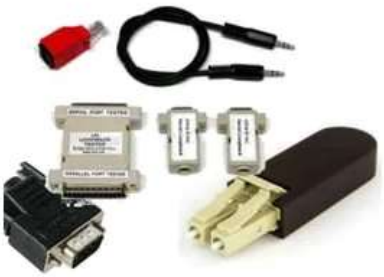
- The tools which is used in troubleshooting is called troubleshooting tools.
- There are various troubleshooting tools, some of them are given below:
  - Bootable rescue disk
  - Diagnostic software
  - Virus detection software
  - Anti-Static tools

Bootable rescue disc:

- It is a type of disc that finds threats and removes without disturbing the operating system.
- Rescue Disk can scan hidden files, system drivers, Master Boot Record (MBR) and hard drive.
- It is also known as Recovery disc, Rescue Disk and Emergency Disk.
- The ability to be a boot system independent of an internal hard drive is called bootable rescue disc.
- The rescue disk contains malware and rootkit detection, antivirus scanning, temporary file cleaners, data and driver backups, partition scanning, and even password crackers.

What is diagnostic software?

- It is a software tool used to diagnose problems with a particular set of hardware devices.
- It can be used by a trained technician to identify and resolve hardware issues.
- Diagnostic software is used to identify problems on a computer or piece of equipment.
- The most popular diagnostic tools are digital multimeter, loopback adapter etc.



Virus detection software:

- Virus stands for Vital Information Resources under Siege.
- It is a type of malicious software that can damage to your data, files, and software through replication.
- Malicious software is also known as malware - is a code that can harm your computers and laptops.
- Antivirus is known as virus detection software.
- Antivirus is a kind of software used to prevent, scan, detect and delete viruses from computer.
- Once installed, most antivirus software runs automatically in the background to provide real-time protection against virus attacks.

Antistatic tools:

- Antistatic tools are tools that improves the safety and workplace protection.
- It is used to prevent the undesirable effects of static electricity caused by mechanical friction.
- Some antistatic tools are:
  - Antistatic work benches.
  - Antistatic gloves.
  - ESD rubber matting.
  - Antistatic clothing etc.




Trouble shooting guide lines:

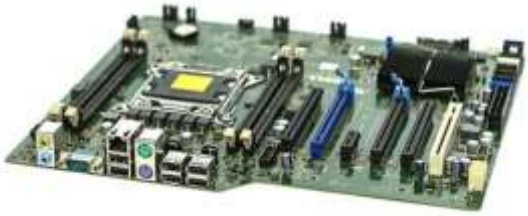
- Systematic trouble shooting means logical approach.
- It is a scientific and analytical process.
- The systematic trouble shooting approach can be divided into following steps
  1. Symptom observation
  2. Symptom analysis
  3. Fault diagnosis
  4. Fault rectification.

Power system troubleshooting:

- Check the power strip or surge protector to make sure it is plugged in and turned on.
- Check for loose cables in the back of the computer (especially the main power cable).
- Check the outlet for power problems or try moving the power cable to a different outlet.
- Try a different power cable.

Troubleshooting the System Board:

- The microprocessor, RAM modules, ROM BIOS, and CMOS battery are typically replaceable units on the system board.
- Both the microprocessor and the ROM BIOS can be sources of such problems.
- You should check both by substitution when dead system symptoms are encountered but the power supply is good.



How to troubleshoot a hard drive?

- Open File Explorer and find the disk which has problems.
- Right click on the hard disk with errors.
- Choose Properties.
- Navigate to Tools bar in the Properties window.
- Click on the Check button.
- Select Scan and repair drive to start detecting & fixing disk errors.

How to troubleshoot optical drive?

- Boot to the Windows 10 desktop, then launch Device Manager by pressing Windows key + X and clicking Device Manager.
- Expand DVD/CD-ROM drives, right-click the optical drive listed, then click Uninstall.
- Exit Device Manager then restart your computer.
- Windows 10 will detect the drive then reinstall it.

Troubleshooting Keyboard:

- Press and hold the Windows ( ) key, and then press the i key.
- Select Update and Security.
- Select Troubleshoot from the left panel.
- Look for Keyboard in the Find and fix other problems section, and run the troubleshooter.

How to troubleshoot a monitor:

- The monitor is difficult to troubleshoot due to the presence of analog component.
- Before trouble shooting the monitor one should have a fair knowledge of operation principle.
- Many display related problems are caused by incorrect configuration and cable fault.
- Verify display or video issue on a known-good monitor.
- Check for physical damages.
- Update the video card (GPU) driver, monitor driver, chipset driver & BIOS.

Troubleshooting printer:

- Check to make sure the printer is turned on and connected to the same Wi-Fi network as your device.
- Unplug and restart your printer.
- Set your printer as the default printer.
- Clear the print queue.
- Reset the service that manages the printing queue.

Surge Protection:

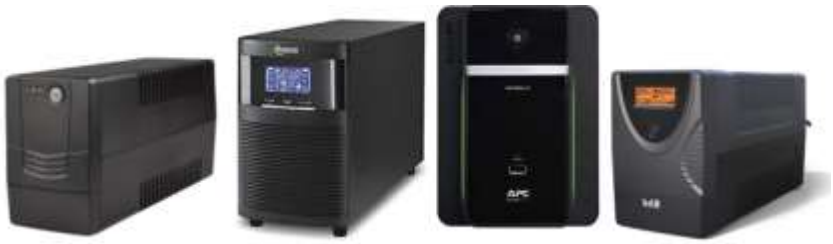
- Surge protection and battery backup one of the important equipment of computer system.
- Need for your computer is a surge protector.
- They allow you to plug multiple components into one power outlet.
- The other function of the surge protector is to protect the devices from electric surges.

Battery Backup:

- A device which provides power to equipment during the absence of commercial AC with the help of a battery is known battery backup's device.
- UPS is the poplar battery backup device.

What is an UPS?

- UPS stands for Uninterruptible Power Supply.
- It is a device that allows computer to keep running for short time when incoming power is interrupted.
- Small UPS provide power for a few minutes, while larger UPS have enough battery for several hours.
- The main parts of a UPS are: rectifier, battery, inverter and controller.
- There are four types of UPS:
  1. Stand by UPS,
  2. Online UPS,
  3. Line-interactive UPS, and
  4. Intelligent UPS.



Standby UPS:

- A Standby UPS can detect an electrical failure and switch to battery power automatically.
- The standby is also called off-line UPS.
- They provide surge protection and battery backup.
- The protected equipment is normally connected directly to incoming utility power.

Online UPS:

- Online UPS supplies power to the AC load through the Rectifier and inverter in normal operation.
- It uses an inverter to supply AC power during a power failure.
- Therefore, the output power supply always stays ON and there is no need for switching**.**
- Hence, there is no time delay in switching between its sources.
- There is no interruption in the case of power failure even for a nanosecond.

Line interactive UPS:

- A line-interactive UPS maintains the inverter in line and redirects the battery's DC current path from the normal charging mode to supplying current when power is lost.
- It provides power with a 4-6 millisecond break in power when transferring to battery back-up.
- Here the UPS also monitors the voltage level and balances under and over voltages.
- Line Interactive UPS are typically used in smaller, less critical applications, such as PCs, telephone systems, non-critical networking equipment and small motor loads.

Intelligent UPS:

- Intelligent UPS systems are designed with line interactive or standby topology.
- It offer guaranteed power protection for computers, routers, modems, and home theater equipment.
- Intelligent UPS is also known as smart UPS.
- It include an LCD status panel, Automatic Voltage Regulation (AVR), energy-saving Green Power UPS Design, data line protection, and management software to easily control and monitor your UPS.
- A smart UPS that integrates with your network can provide real-time status updates, giving you better visibility into device health and performance.