UNIT 3

BASIC TROUBLESHOOTING

3.1 BASICS OF PREVENTATIVE MAINTENANCE

- Computer is a very sensitive device and needs to be placed very carefully.
- Its physical environment and location requires some special arrangements, protections and precautions.
- These precautions and protections are not only necessary for computers but also equally important for computer users.

Environment and Location of a Computer

- In order to ensure trouble free, prolonged life and smooth working of any computer, you must take into consideration that dust-free environment and proper location are maintained for it.
- You must take care of the following:

i. Always place your computer in open area that allows adequate airflow.
ii. Keep the computer in a cool, dry and dust-free environment.
iii. Keep level, stable floors & tables.
iv. Arrange ergonomic furniture.
v. Keep precautionary fire prevention equipment.
vi. Must have static electricity.

Electric power

- Computers need electric power to work, but it can harm a PC or its data if it does not flow properly.
- The electricity available from a standard wall outlet is AC, but a PC runs on DC.
- The power supply is a device that converts AC to DC to run computer.
- The on/off switch in your computer turns on or shuts off electricity to the power supply.

Electric power

Some causes of power problems

- ***Brownout*** occurs when supply of electricity drops dramatically but does not go out completely. During brownout, you will notice lights flicking or growing dim.
- ***Blackouts*** occur when Power goes out completely. The danger of a blackout is twofold.
  I. You may have data loss or corruption when power goes out.
  II. Your PC may receive electrical damage from power surge when electricity comes back on.
- ***Power spikes/surges*** occur when the voltage on your power line rises suddenly to above-normal levels, power spikes are extremely dangerous & can destroy PCs, monitors & any other

Electric power

Some causes of power problems

- ***Lightning storms*** are underrated hazard. Using a computer or even leaving it plugged in during a lightning storm is asking for trouble. Keep in mind that no accessory can completely protect your PC from damage caused by a lightning strike.
- ***Electromagnetic interference (EMI)*** occurs when two signals get too close together and the noise of one is picked up by the other.

Solution to prevent power problems

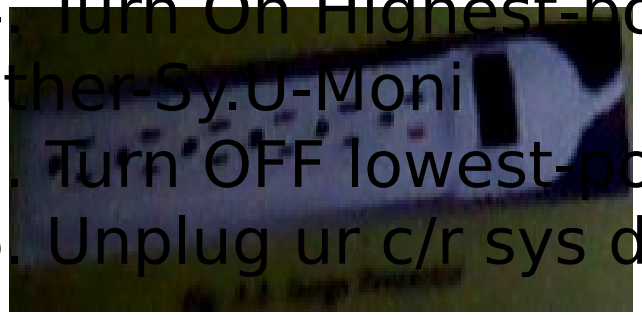
Instead of plugging your computer directly into the wall electrical outlet, it is a good idea to plug it into a power protection device such as surge protector, voltage regulator, UPS (Uninterruptible power supply).

Solution to prevent power problems

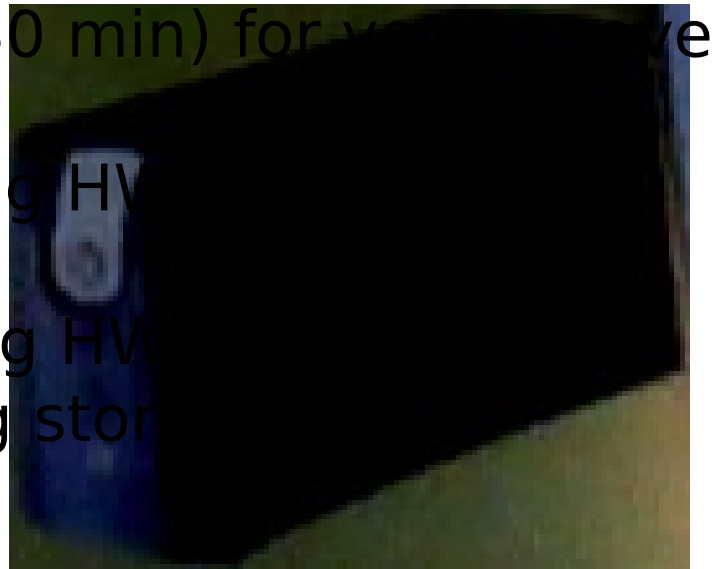
1. Use Surge protector - to protect against too much electricity.
2. Use Voltage Regulator - to protect against too little electricity.

Voltage Stabilizer - to ensure level of voltage being supplied at a desired level.

3. Use UPS - to protect against complete absence of electricity. It helps, when power fails, to keep your computer running lon 0 min) for y e your data before u tu
4. Turn On Highest-pc g HV other-Sy.U-Moni
5. Turn OFF lowest-pc g HV
6. Unplug ur c/r sys d g stor







Backup Methods

- Every computer user must backup his files stored in computer. Because, you can restore files in the event of a hard disk crash.
- Backing up files represents a significant investment of time & effort.
- Some of the best & most secure methods for backing up data are:
  - **I. External hard drives:** are the most reliable, simplest & most affordable method of backup for computer users.
  - **II. Flash drives/USB thumb drives:** If you do not have a massive amount of data to backup, a portable flash drive is a great backup method.
  - **III. Remote data storage via Internet:** Some companies offer services with small monthly fees by encrypting your data for online data storage. If your data is extremely important & you want to keep it safe, remote data storage might be your preferred

Backup Methods

- Good backup habits are a very important part of computer repair & can leave you with some much-deserved peace of mind.
- Data backup is an important part of computer maintenance.
- When choosing a backup method, look at cost & reliability.
- Be sure to develop data backup habits in order to avoid costly recovery.

Manual

- PCs are expensive appliances & risk being damaged from several sources: viruses, electric power disturbances & human error.
- As such, it makes sense to take routine precautionary measures.

i. **Update anti-virus program:** E.g.

ii. **Back-up hard drive:**

iii. **Test electrical surge protector:**

N.B :- A properly maintained surge detector can prevent major damage to your PC.

Using Utility Programs

- Utility programs, also called service programs, perform tasks related to the control & allocation of computer resources.
- Utility programs can perform the following tasks:

i. **Backup:** A backup utility is used to make a backup or duplicate copy of information on the hard disk. E.g., Norton Backup and Colorado Scheduler.

ii. **Data-recovery:** A data-recovery utility is used to restore data that has been physically damaged or corrupted. E.g. RecoverMyFiles, File Scavenger disk recover to pc, EASEUS Data Recovery,etc

iii. **Virus protection:** To protect viruses, you must install antivirus software. *Antivirus software* is a utility program that scans hard disks, floppy disks & memory to detect viruses.

E.g. Norton , McAfee, avast, avira,avg, Eset Smart Security, Kaspersky, Advanced System Care 5, USB Disk Security, eScan Internet Security, etc

iv. **Data compression:** Data compression utilities remove

Improving Hard Disk Performance

- The following steps will help you in cleaning your hard disk from all the junk that it might have accumulated and to improve hard disk performance:

i. Remove duplicate files from hard disk.

ii. Remove temporary files.

iii. Hive off the non-essential files.

   a) Find large files occupying your disk space.
   b) Store all these files online.

iv. Defragment hard disk.

v. Detect & repair disk errors.

Disk Defragmenter

- *Fragmentation is the scattering of portions of files about disk in nonadjacent areas, thus greatly slowing access to the files.*
- *A defragmenter utility program, commonly called a “defragger”, will find all the scattered files on your hard disk and reorganize them as contiguous files.*
- Defragmenting the files will speed up the drive’s operation.

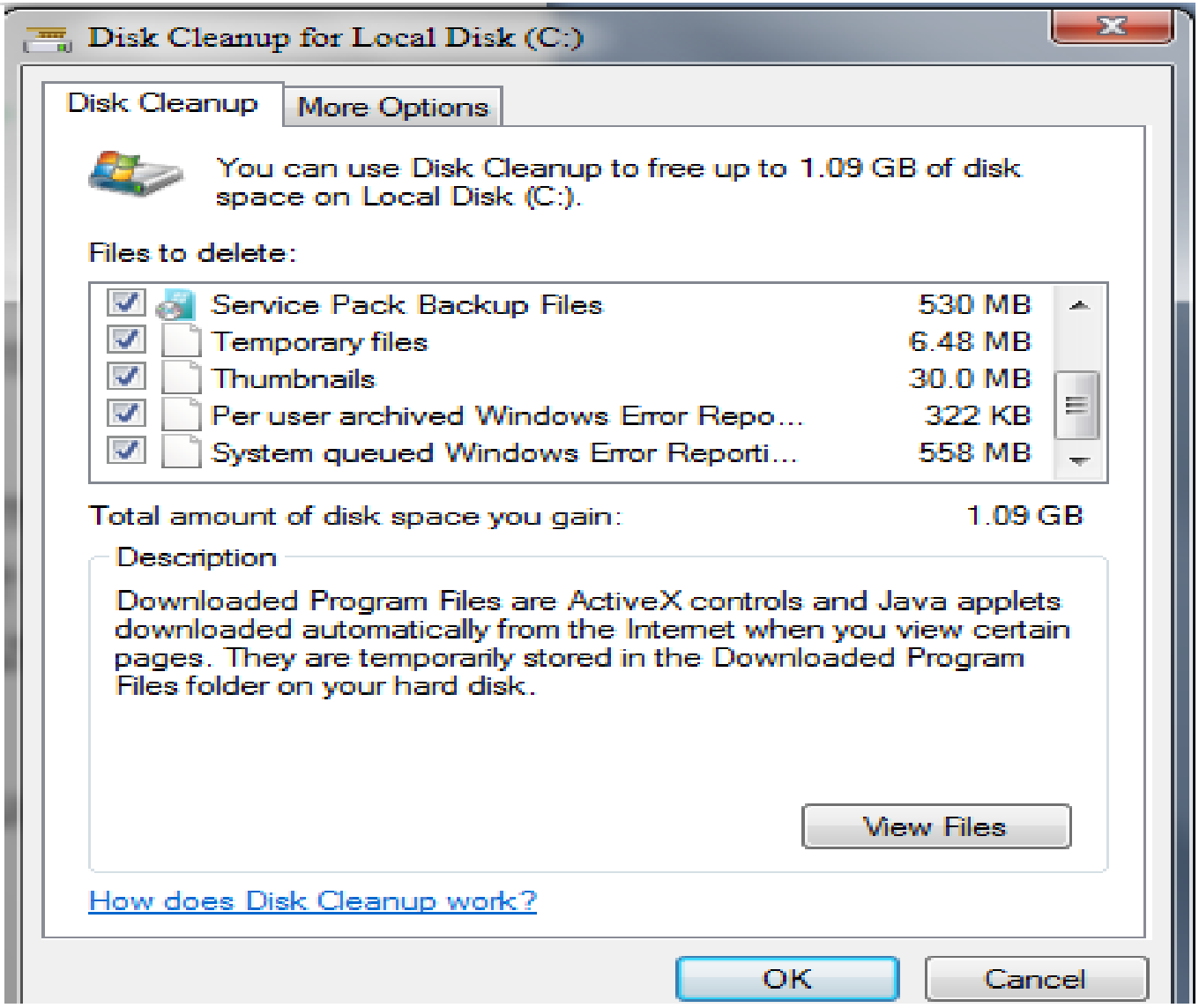
Disk Cleanup

- Disk cleanup utilities can search & remove unnecessary files, such as temporary files, or “temp files”.
- Temporary files or unsaved files are stored in the Temp folder on Local Disk (C) & take up space.
- The computer should delete temp files when a program is closed, but this does not always happen. Also, files will be left in the Temp folder if the computer crashes.



To use Windows Disk Cleanup, Click

Disk Cleanup



3.2 BASIC SAFETY ISSUES

•Overview of Safety Measures

Some safety measures are:

i. Guarding against hardware theft & loss.
ii. Guarding against heat, cold, spills & drops.
iii. Guarding against damage to software.

3.2 BASIC SAFETY ISSUES

- **Electro static discharge (ESD)**

- is the release of static electricity when two objects come into contact.
- a more extreme example of ESD is a lightning bolt.
- is one of the few things an individual can do to damage or destroy his/her computer/HW components.
- will cause components you touch to no longer work properly.
- can occur without user feeling a shock & will only occur while working on inside of computer or handling an expansion card.
- is one of the main enemies of your computer.

3.2 BASIC SAFETY ISSUES

Sources of ESD

The most common sources of ESD are:

i. **Charged person:** A person can become charged due to walking or other movement. ESD damage can be especially severe if the discharge from the person is via a metallic object, such as a tool.

ii. **A cable rubbing across carpet:** If a charged cable is plugged into a conductive contact with any source of charge, ESD will occur.

iii. **An electronic device sliding into or out of a bag or tube** generates an electrostatic charge as the device's case and/or metal leads make multiple contacts & separations with the surface of the container.

3.2 BASIC SAFETY ISSUES

Preventing ESD

- The best method of preventing ESD is to use an ESD *wrist strap* or use a *grounding mat* or *table.*
- Because of most users do not have access to such items, the following steps can help in reducing the chances of ESD as much as possible:

i. **Zero Potential:** Make sure u & ur c/r are zero potential by continuously touching unpainted metal surface of *chassis* or c/r power supply case.

ii. **Standing:** Sitting on a chair can generate more ESD than ***standing*** when working on c/r.

3.2 BASIC SAFETY ISSUES

Preventing ESD

iii. **Cords:** Make sure everything is removed from the back of c/r (power card, mouse, keyboard, etc).

iv. **Closes:** Make sure not to wear any clothing that conducts a lot of electrical charge, such as a woolen sweater.

v. **Weather:** Electrical storms can increase ESD risk; unless absolutely necessary, try not to work on a c/r during an electrical storm.

vi. **Accessories:** To help reduce ESD & help prevent other problem, it is also a good idea to remove all jewelry.

N.B :- Anything that protects sensitive c/r equipment by preventing ESD is termed as **anti-static**.

3.2 BASIC SAFETY ISSUES

•Hidden ESD

- Dust buildup on PC components cause hidden ESD damage.
- Hidden ESD is a good reason to clean your computer regularly.

3.2 BASIC SAFETY ISSUES

- **Catastrophic ESD**

o causes a c/r component to fail immediately. You can remove the component & replace it with a new one, and it most likely will not affect any other component.

o When the heat from ESD visibly melts or welds components & immediately destroys them, it’s k/n as catastrophic ESD event.

o is estimated to blame for 10% of all defects caused by electrostatic faults.

3.2 BASIC SAFETY ISSUES

- **ESD Degradation**
  - occurs when the effects of ESD are cumulative.
  - caused by situations where low levels of ESD occur repeatedly.
  - Damage caused by ESD degradation is not immediately apparent in full force; instead, effects gradually get more & more noticeable.
  - Like hidden ESD, degradation will cause your components to behave erratically & it can make the original problem hard to recognize.

3.2 BASIC SAFETY ISSUES

- **Some Common ESD Protection Devices**

i. Antistatic Wrist & ankle straps
ii. Antistatic floor mats
iii. Antistatic bags
iv. Workbench

N.B :- Any physical device that minimizes static electricity is called an ***antistatic device***.

3.2 BASIC SAFETY ISSUES

i. Antistatic Wrist & ankle straps

- wrap around the users wrist or ankle like a bracelet.
- keep the use… …events electrostatic … …worked on.

❖ Some examp… …roperly use the anti-static wr…



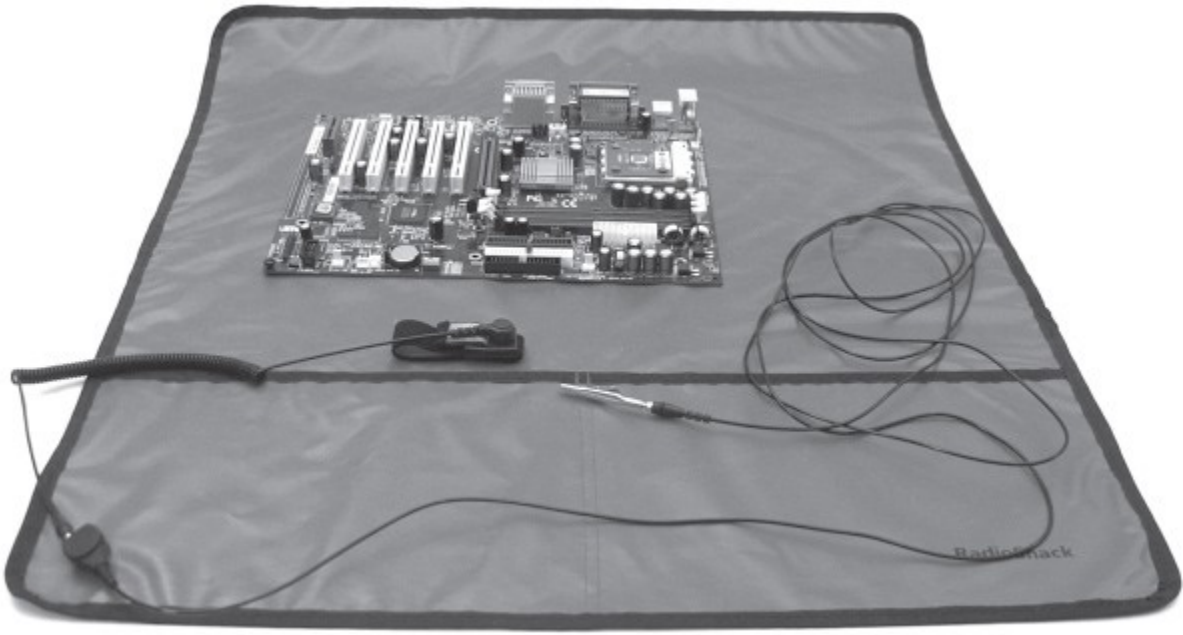
i. While workin… …r wrist or ankle in the strap &… …ten using *alligator clip)* to a metal portion of c/r case.

ii. While working with electrostatic sensitive HW u could place ur wrist or ankle in strap & plug other end into antistatic mat device is lying on or into antistatic workbench.

3.2 BASIC SAFETY ISSUES

ii. Anti-static Mats/Grounding mats

- is a floor or table mat used to help reduce the risk of electrostatic discharge w
other electr



Antistatic Bag



3.2 BASIC SAFETY ISSUES

- **Setting up an Ergonomic Computer and Seating**

- *Ergonomics* is the study of interaction b/n people & machines.
- The purpose of *ergonomics* is to make working conditions & equipment safer & more efficient.
- *Ergonomics* is concerned with designing Hw & Sw i.e. less stressful & more comfortable to use, that blends more smoothly with a person's body or actions.
- Examples of ergonomic Hw are tilting display screens, detachable keyboards, and keyboards hinged in the middle to allow the users' wrists to rest in a more natural position.

3.2 BASIC SAFETY ISSUES

- **Setting up an Ergonomic Computer and Seating**

- Most important than any c/r system &any data is c/r user's health.
- The most serious effects are painful hand & wrist injuries, eyestrain & headache, and back & neck pains. You can avoid most of these problems, if not all, by sitting properly.
- Eyestrain usually arises b/se of improper lighting, screen glare, & long shifts staring at the screen.
- Make sure that windows & lights do not throw a glare on screen & that c/r is not framed by uncovered window.

3.2 BASIC SAFETY ISSUES