

COMPUTER HANDLING

- **INTRODUCTION**

In this chapter, you will learn about

- (i) Computer handling
- (ii) Utility programs
- (iii) Data backup and computer security.

The competencies developed will enable you to manage computer data and increase the lifespan of your computer.

- **The concept of computer handling**

Computer handling means caring for the computer and its accessories so that they perform their work properly.

Computer care measures include power management, using utility programs for backing up data and securing computers from virus and other malware.

POWER FLUCTUATIONS

Is the change in power over time.

Therefore, we need to ensure a continuous and stable power supply to computers.

TYPES OF POWER FLUCTUATIONS

(i) Brownout

This is a reduced voltage level of electric power that lasts for a time period.

Brownouts occur when the power line voltage drops below 80 per cent of the normal voltage level. The normal voltage level for Tanzania ranges from 220V to 240V

(ii) Spike

This is a sudden increase in voltage that lasts for a short period and exceeds 100 percent of the normal voltage on a line.

Spikes can be caused by lightning strikes or may occur when the electricity comes back on after a blackout.

(iii) Electrical surge

This is a drastic increase in voltage above the normal flow of voltage.

Electrical surges can lead to fires, which can affect the entire house.

• Effects of power fluctuations

(i) Hardware failure which can cause data loss.

(ii) Internal power supply failure, stopping the computer from starting.

SEVERAL DEVICES TO CONTROL POWER FLUCTUATIONS

(i) Uninterruptible Power Supply (UPS)

Uninterruptible Power Supply or Uninterruptible Power Source (UPS) is an electrical piece of equipment that provides power backup when the input power source fails.

UPS differs from an auxiliary or emergency power system or a standby generator since it provides near-instantaneous protection from input power interruptions via the energy stored in its batteries.

UPS is typically used to protect hardware such as computers, telecommunication equipment or other electrical equipment where an unexpected power disruption could damage equipment, disrupt business or lose data.

UPSs are illustrated in Figure below.



- **Connecting a computer to the UPS**

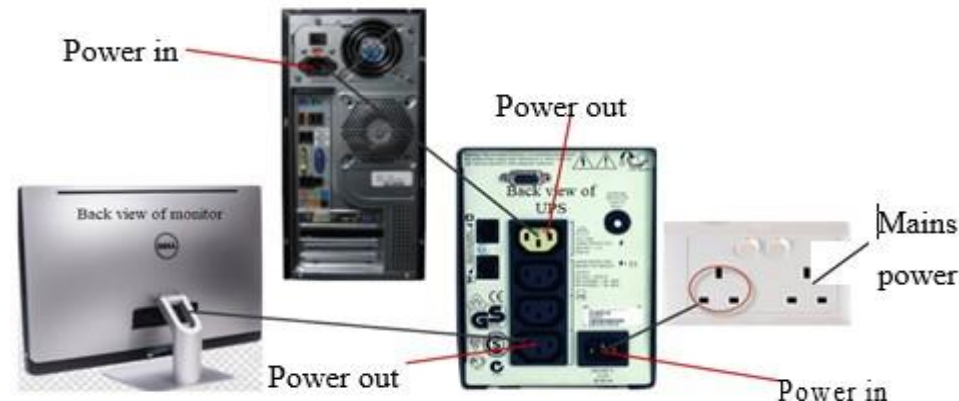
Activity Connecting a computer to the UPS

- **Steps:**

Connect the UPS's input power cable to the power source.

Connect the UPS's output power cable to the input power port of the computer. For a desktop, you may also need to connect the monitor to the UPS.

- **NB:** When all cables are safely connected, you can switch on the power supply and then switch on your computer safely. When there is no mains power, the UPS uses the stored charge to supply power to the computer. Figure below shows ports that are used to connect the computer to the UPS.



(ii) Surge protector

A surge protector is an appliance designed to protect electrical appliances from voltage spikes and surges.

Surge protectors are used to protect our office or home appliances from power damage when there is power fluctuation in the main power source.

Figure below shows different extension cables with in-built surge protectors.

- It is recommended to use a surge protector when using a computer. The following steps guide you through connecting a surge protector to the wall socket to the computing equipment.
 - i. Connect the surge protector to the power supply (wall socket).
 - ii. Connect the UPS to one port of the surge protector.
 - iii. Connect the power cable of your computer to the outlet of the UPS.
 - iv. When all cables are safely connected, switch ON the main power supply and then switch on your computer.



(iii) Voltage Stabiliser or voltage regulator

A voltage stabiliser is an electrical appliance used to feed constant voltage to electrical appliances, such as refrigerators and computers.

It protects them from damage due to voltage fluctuations. It works based on the transformer principle where the input voltage is connected to primary windings and the output is received from secondary windings.

When there is a drop in incoming voltage, it activates electromagnetic relays which add to more number of turns in the secondary winding. Thus, it gives higher voltage which compensates the loss in output voltage.

When there is a rise in the incoming voltage, the reverse happens and the voltage on the output side remains almost unchanged.

Figure below exemplifies voltage stabilisers.



- **Utility programs**

Utility programs are designed to help analyse, optimise or maintain computer resources.

Utility programs focus on making sure that computer hardware, operating systems and application software function properly.

Some examples of utility programs include the following:

(a) Antivirus software: It is used for scanning and removing computer viruses.

(b) Backup and restore software: It is used to make copies of data stored on a disk on a separate disk and restore either all the data or part of it in case of disk failure or accidental deletion.

(c) Disk cleaners: They can find files that are unnecessary to computer operation or take up considerable amounts of space. Disk cleaners help users to decide which files to delete when they need more disk space.

(d) Disk compression utilities: These can compress the contents of a disk, thus increasing the available space on the disk.

(e) Disk utilities: These can divide an individual drive into multiple logical drives, each with its own file system which can be treated as an individual disk drive.

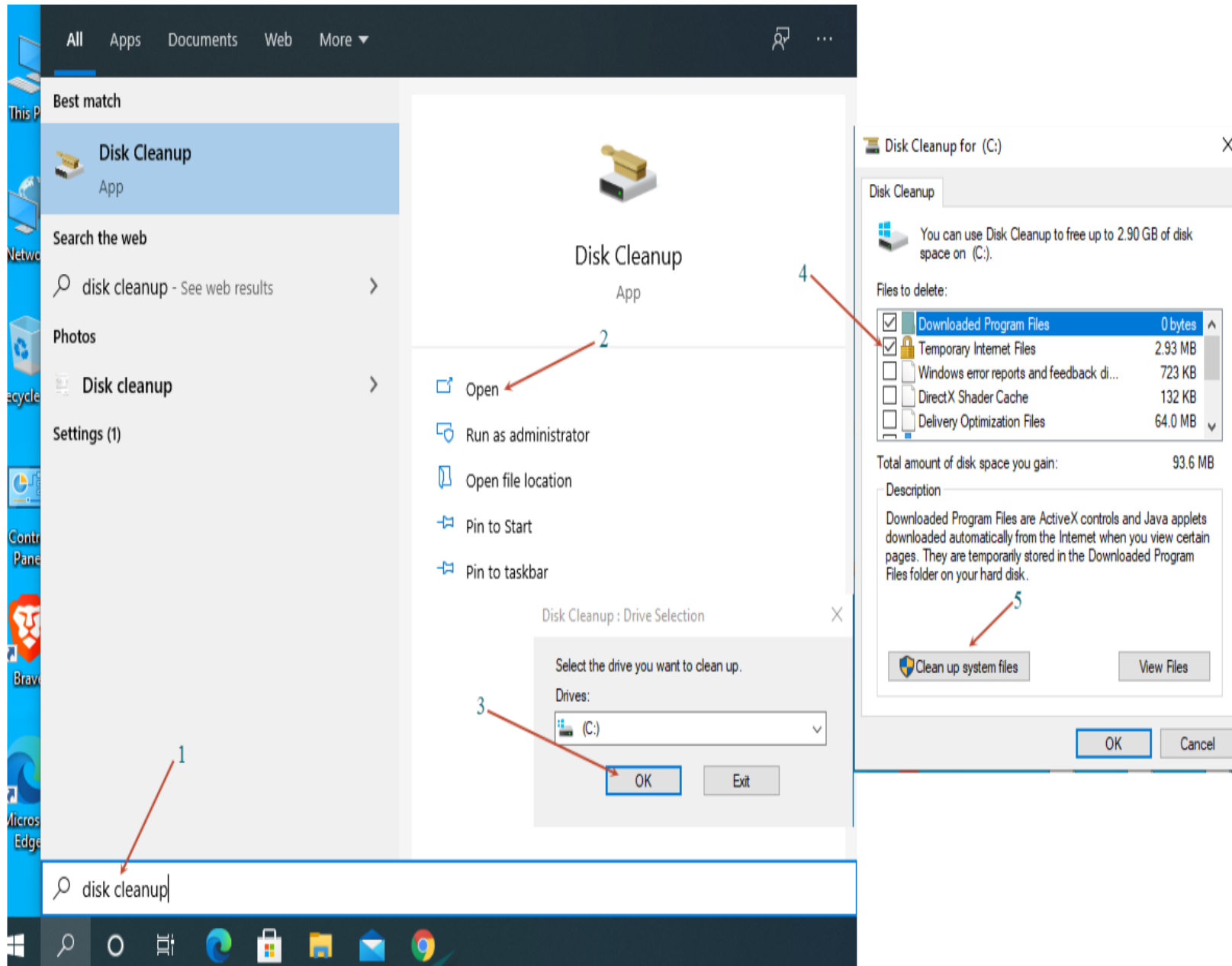
(f) File managers: They provide a convenient method of performing routine file management tasks such as deleting, renaming, cataloguing, moving, copying, merging, generating and modifying files.

(g) Memory testers: They check for memory errors.

(h) Network utilities: They analyse the computer's network connectivity, configure network settings, and check data transfer or log network events.

(i) System monitors: They monitor resources and performance in the computer system.

- **Activity** : Use the disk clean up utility to remove temporary files, file history and unimportant programs.
- **Steps: Refer to Figure below**
 - (i) Click on the search box on the task bar and type the words “disk clean up” and you will see a pop up window,
 - (ii) Click **Open** on the pop up menu,
 - (iii) Click **OK**, a pop up window will appear,
 - (iv) Select “Temporary files,”
 - (v) Click **OK** to start cleaning. All selected files will be deleted.



- **Computer malware**

Computer malware is a malicious program which is written by people aiming to conduct unwanted operations such as damaging disks and deleting data. Examples of computer malware are computer viruses, trojan horses, worms and ransomware.

Most people use the term *virus* to mean malware. Malware can spread through downloading attachments from emails, visiting an infected website, opening an infected program, viewing an infected advertisement and infected removable storage devices such as USB drives. These can transfer viruses between computers on which they were used.

- **Signs of computer malware infection**

A computer user should be aware of some warning signs from a computer infected by malware. Some of the signs are low system performance, programs running on their own, files multiplying on their own, unexpected new files or programs in the computer and folders or programs getting deleted or corrupted.

- **Computer malware prevention**

It is important to protect your computer from malware attacks. To do this, you should regularly do the following:

- i. Update your antivirus software.
- ii. Avoid opening email attachments from unknowing sources.
- iii. Scan removable devices or media using antivirus software before opening them.
- iv. Avoid visiting untrusted websites

- **Data backup**

Backing up data involves copying data to a second medium such as a hard disk or other storage media. Data loss can be a common experience among computer users. One of the cardinal rules in using computers is doing regular data backup. Data backup has two distinct purposes:

The primary purpose is to create a copy of data that can be used to recover data in case of loss, data deletion or corruption.

The secondary purpose is to restore data from an earlier working state for reasons other than those mentioned in (i) above.

- **Backup devices**

Many devices can be used for backing up data from your computer. These are like hard disks, CDs, DVDs, flash drives and cloud servers (computers on the Internet).

- **Types of data backups**

There are three types of data backup, namely a full backup, incremental backup and differential backup.

(i) A full backup is a type of backups in which all selected files and folders are backed up.

(ii) An incremental backup is a type of backups which accommodates all changes made since the last full backup.

(iii) A differential backup is a backup of all changes made since the last *full* backup.

- **Methods of data backup**

- 1. Local data backup**

A local or onsite data backup is any backup where the storage medium is kept close to the computer. Typically, the storage medium is plugged in directly to the computer being backed up or is connected through a Local Area Network to the computer being backed up as shown in Figure below. Examples of local data backup devices include the following:

- (i) External hard drive
- (ii) Optical disk drives like CDs, DVDs and Blue Ray discs
- (iii) USB drives
- (iv) Network Attached Storage (NAS)



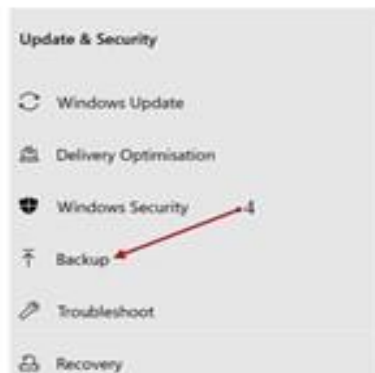
Activity 6.3: Data Backup and Restore on Windows 10

To backup files on Windows 10

Select Start > Settings > Update & Security



From the left pane, click “Backup” >; Add a drive from “More option;” choose “External drive,” and then click > “Back up now.”



Back up using File History

Back up your files to another drive and restore them if the originals are lost, damaged or deleted.

Automatically back up my files

On

More options

Looking for an older backup?

If you created a backup using the Windows 7 Backup and Restore tool, it'll still work in Windows 10.

[Go to Backup and Restore \(Windows 7\)](#)

← Settings

Back-up options

Overview

Size of backup: 0 bytes

Total space on TOSHIBA EXT (E:) (E:): 465 GB

Your data is not yet backed up.

[Back up now](#)

Back up my files

Every hour (default)

Keep my backups

Forever (default)

Back up these folders

[+](#) Add a folder

RESTORING FILES

- **To restore backup files, follow the following steps:**

1. In the search box on the taskbar, type “restore files” and then select “Restore your files.”
2. Look for the file you need; then, use the arrows to see all its versions.
3. Select “Restore” to save it to its original location. To save it to a different place, right-click “Restore,” select “Restore to,” and then choose a new location.

- **Advantages of a local data backup**

- (i) It offers good protection from hard drive failures, virus attacks, accidental deletion and sabotage of the source data.
- (ii) It is very fast to backup and restore.
- (iii) It is cost effective when appropriate storage media are used.
- (iv) Data transfer cost to the backup storage medium may be negligible or low.
- (v) Since the backup is stored close by, it is conveniently obtained whenever needed for restoration.
- (vi) It ensures full internal control over the data backup storage media.
- (vii) There is no need to entrust the storage media to third parties. Therefore, it is more secure.

Disadvantage of local data backups

Since the backup is stored in the same environment as the source, it does not offer good protection against disasters such as fire, floods and earthquakes.

2. Cloud data backup

The term ***cloud storage*** refers to the backup storage facility accessible from the Internet.

“A cloud data backup” is also called an online data backup or remote data backup. An illustration of cloud data backup is shown in Figure below.



Advantages of cloud data backup

1. Since this is an online data backup, it offers protection from fire, floods, earth quakes and other natural disasters.
2. It is easier to connect and access the backed up data from different devices with an Internet connection.
3. Data are replicated across several storage devices, and they are usually serviced by multiple Internet connections so the system is not a single point of failure.
4. When the service is provided by a reliable or credible commercial data centre, the service is managed and protected.

• Disadvantages of a cloud data backup

1. It poses security risks since the data are managed by someone else (a third party).
2. It needs Internet connection.
3. It requires some expert skills to backup the data.

- **Disk formatting**

Disk formatting is a process of preparing data storage devices such as a hard disk drive or USB flash drive for initial use.

A hard disk, which is the main secondary storage device on your computer, needs to be formatted before use.

Formatting the disk means preparing it into a format that the operating system can store information on it.

Some storage devices, including USB disk drives and memory cards, might come preformatted by the manufacturer.

CDs and DVDs use formats that are different from hard disks and other removable storage devices.

Formatting can also be used to re-initialise the storage device, a process that erases all existing files on the storage device.

- **Activity** : Formatting a flash disk

Open **File Explorer**.

1. Click on “This PC” from the left pane.
 2. Under the “Devices and drivers” section, right-click and from the pop-up menu select the “Format” option.
 3. Use the “File system” drop-down menu and select the “NTFS” option. In the “Allocation unit size” drop-down menu, use the default selection.
- **NB:** In the “Volume label” field, type a label to quickly identify the flash drive in File Explorer. Such as My flash. Under the “Format options” section, select the Quick format option.
4. Click the “Start” button.
 5. On the pop-up window that appears, Click the “Yes” button.

- **Computer security**

Computer security means ensuring physical and system safety of computer resources against threats such as theft, unauthorised access and virus.

It is crucial to protect your computer against theft, viruses, worms and intruders which can damage it. The data stored on the computer are important and sensitive. Therefore, if the computer is not well secured, strangers might access your data, use your computer to attack other systems, send forged emails from your computer, or examine personal information stored on your computer. Computer security is concerned with four main issues:

1. Authentication: Ensure the identity of the person with whom you are communicating.
2. Confidentiality: authorised users can access data and information stored on a computer.
3. Integrity: Assurance that authorised users can access or modify the data.
4. Availability: Data and resources should be available to the right users when needed.

- **The effects of dust, liquids, temperature and humidity on computers and other accessories**

Computers and other accessories have to be kept in a clean and conducive environment to function properly.

Environmental factors such as heat, cold, dust and excessive humidity can damage and thus affect the performance of the computer.

External and internal temperature can cause variations in performance, although the computer is more vulnerable to heat than it is to cold. The ideal environment for the computer should be ***dry, cool and clean***.

Activity : Effect of dust, liquids and temperature on computers and other accessories

- Outline the effects of dust, humidity and temperature on computers and other accessories.
- ***Hint:*** You can use the Internet or other reference resources to search for answers

- **Computer security recommendations**

To ensure the security of a computer system, do the following:

- (i) Back up computer files regularly.
- (ii) Do not keep important data on portable devices only. Make several copies and save them on different devices.
- (iii) Use strong passwords that cannot be easily guessed.
- (iv) Make sure your computer has genuine and updated antivirus software.
- (v) Scan your computer regularly for viruses.
- (vi) Do not install programs from untrusted sources.
- (vii) Keep your computer in a clean environment with a regulated room temperature.