Unit 3

Information and Communication Technology Skills

SESSION 1: BASIC COMPUTER OPERATIONS

ICT stands for Information and Communication Technology. ICT refers to all the methods, tools, concepts related to storing, recording and sending digital information.

Information can be recorded or stored in many ways, handwritten on paper, written using a typewriter and so on. When information is stored and recorded on electronic devices, it takes on a 'digital' form. ICT devices are tablets, smartphones and laptops as shown in Figure 3.1.

ICT skills help us to communicate, run our business and stay connected with our family and friends. Hence, every person needs to acquire ICT skills and build them to stay updated with the latest software and applications (apps).

Computer Hardware and Software

A computer system consists of two main parts— the hardware and the software. The physical parts that we can see and touch are called

Figure 3.1: ICT Devices

hardware. It is the machinery of a computer. These are the keyboard, monitor, CPU, etc.

There is another important part i.e., the software. Though we cannot see it, it makes the hardware work the way we want.

The monitor is a physical device or the hardware. When we start a program, for example, a game, it is displayed on the monitor. This is done by the software which displays text, images and videos on the monitor as shown in Figure 3.2. Hardware would not be able to function without software.

Figure 3.2: Hardware and Software

Mobile devices, such as smartphones and tablets are also computer systems with hardware and software. They are simply smaller in size and can be easily carried around.

The most important software in any computer is the Operating System (OS). This is the software that starts working as soon as we switch on a computer. It displays the desktop on the monitor. Some of the most commonly used operating systems for laptops and desktop are Ubuntu, Microsoft Windows and Mac OS.

Mobile devices also have an operating system that helps them perform their functions. Some of the mobile operating systems are Apple iOS and Google Android (as shown in Figure 3.3).

All the computer applications, such as browsers, games, Office tools, etc., are also software programs that perform particular functions.

Figure 3.3: Mobile Android OS

Starting a Computer

What is the first thing you do after you wake up in the morning? What if your father tells you to do your homework immediately? Can you do it? Normally you would do some daily activities and get ready before you start working? Similarly, when a computer is switched on, it performs some basic processes/functions before it is ready to take instructions from the user.

To start a computer, press the Power button on the CPU. This will start the operating system and display the Ubuntu desktop as shown in Figure 3.4 or the main screen on the monitor.
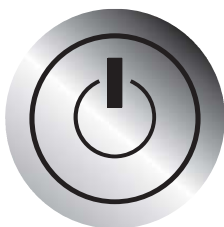

Figure 3.4: Power Button

Basic Functions performed when a computer starts

Just as we go about our morning routine without anyone telling us what to do, a computer automatically runs a basic program called BIOS (Basic Input/Output System) as soon as it is switched on or the power button is pushed on.

The BIOS first does a self-test. If the self-test shows that the system is fine, the BIOS will load the Operating System. This means that the computer's operating system, for example, Ubuntu, is now ready to take user inputs.

Login and Logout

Just like we keep our cupboards locked at home we need to keep our computer locked when we are not working on it. This will ensure that no unauthorised person can see or make changes to our information without taking our permission. To make sure your computer is locked, you have login-IDs and passwords. A login and password is like a key to the lock which allows you to use the computer.

When you login to the computer with your login-ID and password (as shown in Figure 3.5), the computer knows that you are an authorised person and allows you to work on the applications in the computer. Once you finish working, you must log out or sign out so that no one else can see your work.
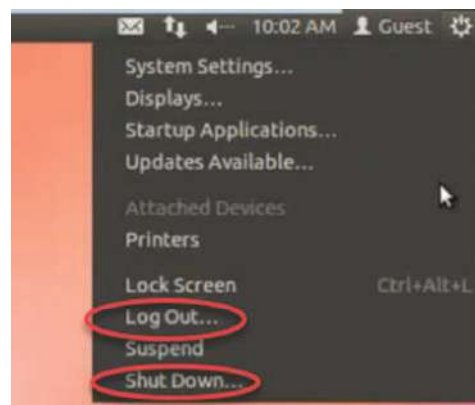
Figure 3.5: Login Screen

Figure 3.6: Log Out

Shutting Down a Computer

You can shut down the computer in Ubuntu by clicking Systems button at the top right and then click Shut Down as shown in Figure 3.6. When you click Shut down, the Operating System will close all the applications and turn off the computer.

Using the Keyboard

A keyboard is an input device used to type text, numbers and commands into the computer. It is shown in Figure 3.7.

Figure 3.7: Parts of a Keyboard

Function Keys

Keys labeled from F1 to F12 are function keys. You use them to perform specific functions. Their functions differ from program to program. The function of the F1 key in most programs is to get help on that program. Some keyboards may have fewer function keys.

(a) **Control keys:** Keys, such as Control (CTRL), SHIFT, SPACEBAR, ALT, CAPS LOCK and TAB, are special control keys that perform special functions depending on when and where they are used.

(b) **Enter key:** The label on this key can be either ENTER or RETURN, depending on the brand of computer that you are using. You use the ENTER or the RETURN key to move the cursor to the beginning of a new line. In some programs, it is used to send commands and to confirm a task on a computer.

(c) **Punctuation keys:** Punctuation keys include keys for punctuation marks, such as colon (:), semicolon (;), question mark (?), single quotation marks (' '), and double quotation marks (" ").

(d) **Navigation keys:** Keys, such as the arrow keys, HOME, END, PAGE UP, and PAGE DOWN are navigation keys. These are used to move up and down, right and left in a document. The HOME and END keys move the cursor to the left/right end of a line of text, respectively. The PAGE UP and PAGE DOWN keys are used to move one page up and one page down, respectively.

(e) **Command keys:** Keys, such as INSERT (INS), DELETE (DEL), and BACKSPACE are command keys. When the INSERT key is turned ON, it helps you overwrite characters to the right of the cursor. The DELETE key and the BACKSPACE key are used to remove typed text, characters and other objects on the right and left side of the cursor, respectively.

(f) **Windows key:** Pressing this key opens the Start menu

Using a Mouse

A mouse as shown in Figure 3.8 is a small device that you can use to move, select and open items on your computer screen. Let us see some of the functions that can be performed using a mouse. Different application will behave differently to the mouse actions. Here we use the File Explorer to see the effect of the mouse action.
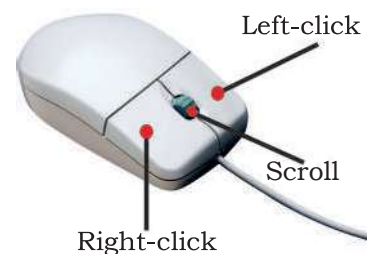

Figure 3.8: Mouse

Roll Over or Hover

Some actions can be done by simply rolling over or hovering over an item. When you bring the mouse over a file in File Explorer, it will show the details of that file as shown in Figure 3.9.

Point and Click

As you move the mouse on your desk, a pointer moves correspondingly on your screen. The mouse allows you to select an item on the

Figure 3.9 Roll Over

Figure 3.10 Point and Click

Figure 3.11 Drag and Drop

screen. When you click a particular file, it gets selected as shown in Figure 3.10.

Drag and Drop

To move an item, you need to click it, and then holding the mouse button down, move the item to a new location. After you move the item to the new location, you release the mouse button. This is called drag and drop. When you drag a file in File Explorer, you can pick it up from the present location and drop it in a new location where you release the mouse as shown in Figure 3.11.

Double-click

Double-clicking means to quickly click the left mouse button twice. When we double-click on a file, it will open the file.

Practical Exercise

The teacher will facilitate these activities by showing you the e-Learning lesson athttp://www.psscive.ac.in/stud_text_book.html ->Using a Computer. This will include videos and e-content for the above topics as well as detailed instructions for some activities below.

Initial Thinking Activity

After watching the initial video write what do you think happens when you start a computer and enter data using a keyboard and mouse?

Activity 1

Group Demo on Use of Computer

Material required

Pen, notebook, computer

Procedure

- Form groups depending on the number of computers available. One student starts the computer and logs in.
- Another student identifies the keys on the keyboard. A third student then performs all the functions of the mouse such as hover, click, double-click, etc.
- Discuss and note differences between hardware and software and also how they work together to perform a task on the computer.

- After you have performed all the activities, another student shuts down the computer.
- Other students watch and give feedback on what was done right and which tasks can be improved.

Activity 2

Group Practice: Using the Keyboard

Material required

Computer

Procedure

- Form groups depending on the number of computers available.

Figure 3.12 Typing

- Open a text editor in Ubuntu by typing 'editor' in the search bar and then selecting the Text Editor. You can also open Notepad in Windows by typing Notepad on the Windows Search bar and then selecting Notepad from the search result.
- One student positions his or her hands on the keyboard as shown in Figure 3.12 and types the following paragraph in the text editor.

"People use computers at work, at school and at home every day. In factories computers are used to control the manufacturing process and in offices to make documents, such as reports. We also use computers for sending e-mails and playing games."

Now, another student in the group will check the paragraph and correct the grammar and spelling mistakes.

Check Your Progress

A. Multiple choice questions

Read the questions carefully and circle the letter (a), (b), (c) or (d) that best answers the question.

1. Which of the following functions is not performed using a mouse?
   (a) Turn on
   (b) Hover
   (c) Right click
   (d) Drag and Drop

2. What is the term used when you press and hold the left mouse key and move the mouse around?
   (a) Highlighting
   (b) Dragging
   (c) Selecting
   (d) Moving

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3. Here are the steps that take place when starting a computer. Rearrange the steps in the correct order.

   (a) Desktop appears after login
   (b) Login screen appears
   (c) Power on Self-Test (POST) starts
   (d) Operating system starts
   (e) Welcome screen appears

B. Subjective questions

   1. What is the function of the ENTER key?

   2. How will you prevent others from using your computer?

What Have You Learnt?

After completing this session, you will be able to

- demonstrate the process of starting a computer.
- identify the various keys on a keyboard and their associated functions.
- perform various mouse functions.

SESSION 2: PERFORMING BASIC FILE OPERATIONS

Basic File Operations

Figure 3.13 File Cabinet

In any school (or office), each teacher has a separate cabinet as shown in Figure 3.13 where they keep the files of different students or classes on separate shelves. Similarly, information on a computer is stored in electronic files, which can be put into separate folders. It is easier to manage the electronic files as they can be simply copied, moved, renamed or even deleted.

Files and Folders

All information stored in a computer is kept in **files**. Different types of files store different types of information. Each file is given a **file name** and has a **file name extension** that identifies the file type. The file name and file name extension are separated by a period or a 'dot'. For example, a document (e.g., Neha) created using **Notepad** (a type of computer application to create simple text files) will have the extension **.txt**. There are other types like .doc, .xls, etc. An image file usually has an extension **.jpg** while a sound file usually has **.mp3**. A **folder** is a location where a group of files can be stored.

EMPLOYABILITY SKILLS – CLASS X

Creating a File (Using a Text Editor in Ubuntu)

When a student, Neha, joins a class, the teacher creates a file on the computer to store Neha's information, such as name, address, phone number, etc. Let us create a new file using a text editor in Ubuntu.

- To open **a text editor**, type 'editor' in the search dialog box. Then double-click the **text editor** option as shown in Figures 3.14 and 3.15. This will open a blank document. In Windows, you can open Notepad and type in the text.

- Here you can add text, such as 'Neha Tiwari Shakti Nagar, New Delhi, 7856453451'

- To save the file click **Save**. In the Save As dialog box, browse to the Desktop folder, type the name as 'Neha' and click **Save** as shown in Figure 3.16.
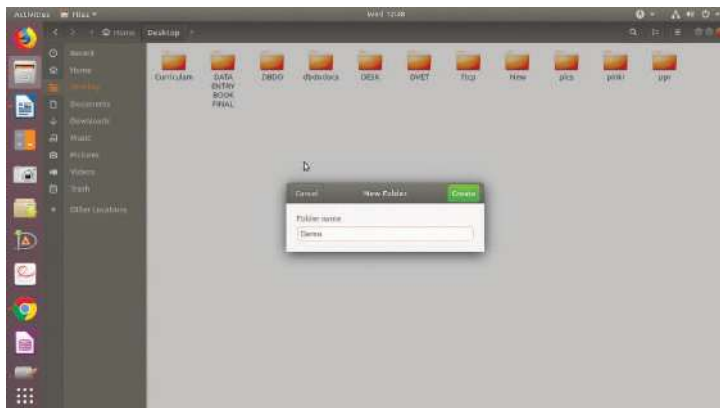

Figure 3.14 Opening Text Editor

Figure 3.15 Text Editor

Figure 3.16 Saving a File

Creating a Folder (in Ubuntu)

Folder is a location where a group of files can be stored. For example, we can create a folder where all the files for all the students can be stored.

Let us create a new folder in Ubuntu.

- To open **file explorer** in Ubuntu, click **Files** option on the left as shown in Figure 3.7.
- File explorer opens up as shown in Figure 3.18.
- To create a folder:
  - (a) Choose a location where the folder has to be created for example 'Desktop'.
  - (b) Right-click and then choose the 'New Folder'.
  - (c) Type the name of the folder as 'Demo'.
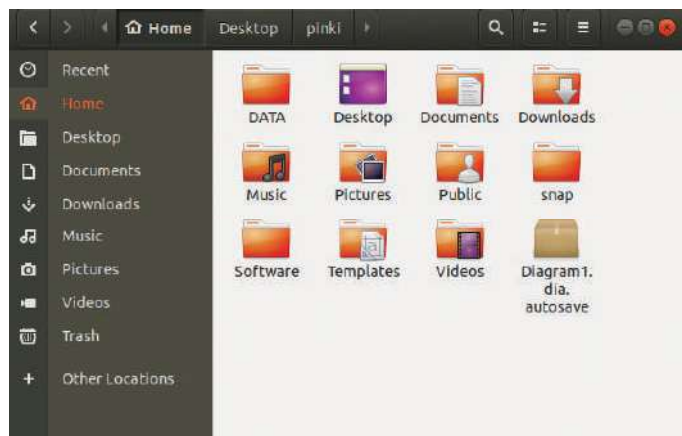

Figure 3.17: Choose the File Option
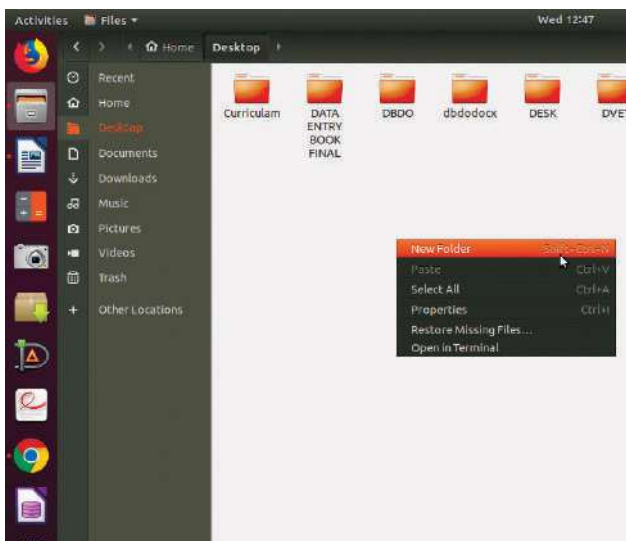

Figure 3.18: File Explorer

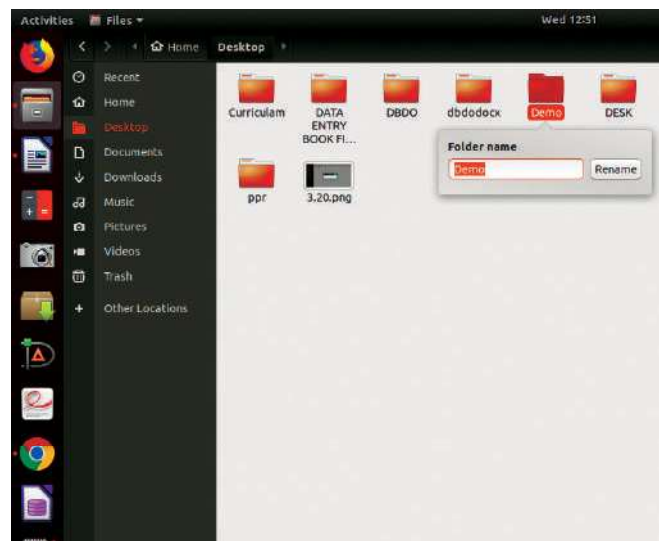*Figure 3.19: Right-click on Desktop and click New Folder*

Figure 3.20: Type Demo as the name of the new folder

Practical Exercise

The teacher will facilitate these activities – by showing you the e-Learning lesson athttp://www.psscive.ac.in/stud_text_book.html ->Performing Basic File Operations. This will include videos and e-content for the above topics as well as detailed instructions for some activities below.

Initial Thinking Activity

After watching the initial video in the e-learning lesson for this topic why do you think it is important to know how files are stored in a computer?

Activity 1

Creating a folder

Material required

Pen, notebook, computer

Procedure

- Form groups depending on the number of computers available. Each member of the group creates a new folder. Others can watch and give feedback on what was done correctly and what can be improved.
- Open a text editor in Ubuntu or Notepad in Windows
- Create a 2 folders Demo1 and Test1
- Now delete the folder Test1

Each group can study the following shortcut commands together.

CTRL+z — undo	CTRL+c — copy
CTRL+y — redo	CTRL+v — paste
CTRL+a — select all	CTRL+p — print
CTRL+x — cut	CTRL+s — save

- The first group asks the other groups a question (e.g. what does CRTL+z do? (Answer is Undo) or what is the shortcut for Copy (CTRL+c). Whichever group answers correctly gets one point otherwise the next group answers and so on. Whichever group gets most points, wins.

Check Your Progress

A. Multiple choice questions

Read the questions carefully and circle the letter (a), (b), (c) or (d) that best answers the question.

1. Which one of the following shortcut keys is used to paste a file?
   - (a) Ctrl + c
   - (b) Ctrl + p
   - (c) Ctrl + v
   - (d) Ctrl + x

2. Which of the following is a valid file extension for Notepad file?

    (a) .jpg
    (b) .doc
    (c) .text
    (d) .txt

3. What keys do you use to copy something?

    (a) Ctrl+x
    (b) Ctrl+c
    (c) Ctrl+z
    (d) Ctrl+y

B. Subjective questions

1. How is a computer file system similar to our physical file system in a school?

2. What are the steps you will perform to save a text file in Ubuntu?

What have you learnt?

After completing this session, you will be able to

- describe what computer files and folders are.
- open a new file in a text editor, type in your details and save the file.

SESSION 3: COMPUTER CARE AND MAINTENANCE

Importance of Care and Maintenance of Computers

Taking care of our things whether it's our books, clothes, furniture or gadgets is important. Taking care of electronic devices, such as computer and mobiles helps them to work properly. Just as we take care of our body by taking bath, brushing our teeth and eating food every day we need to take care of our machines. A computer is a delicate machine with a lot of moving electronic parts. We need to protect it from dust and damage. If we are careless, it will not work efficiently.

Computers and mobiles are very expensive. When we take good care of them on a regular basis, we can use them for a longer time. This will help us save money as we do not need to buy new devices too often.

Basic Tips for Taking Care of Devices

Here are some simple ways that you can follow to take care of your computer.

Keeping a Device Clean

Cleaning a device, such as a computer or mobile means to keep the screen, keyboard and mouse clean.

Figure 3.21: Cleaning keyboard with soft brush

  (i) **Keyboard:** First we should not eat anything over a keyboard. Crumbs can damage the internal parts of a keyboard. You can clean a keyboard with a soft brush as shown in Figure 3.21 to remove crumbs and dust particles.

 (ii) **Screen:** You can wipe the screen with a soft cloth to remove any finger marks.

(iii) **Be careful with food and drinks:** Avoid eating and keeping glasses of water or cups of coffee near a computer as shown in Figure 3.22. Any liquid spilt over an electronic device can spoil it beyond repair.

Figure 3.22: Avoid keeping food near a computer

 (iv) **Handle devices carefully:** Handle and move your laptop carefully and avoid dropping or banging it against a hard surface. Even a short fall can damage the screen or the hard disk and make the device useless. Using a cover for your mobile and a padded case for moving your laptop as shown in Figure 3.23 protects the device from damage.

Figure 3.23: Avoid dropping bag containing laptop

  (v) **Keep the computer cool:** If a computer, laptop or mobile device gets overheated, the internal parts can be damaged. The CPU has an internal fan to keep it cool. We should make sure the fan is functioning. You can also use an external fan as shown in Figure 3.24. Avoid leaving a device in the sun or in a closed car. We should be careful when using a laptop while sitting in bed and make sure that the fan in not covered.

Figure 3.24: Keep device cool

 (vi) **Do not overcharge your battery:** Sometimes we keep a device plugged in for charging even after it is fully charged. If we leave the device plugged in for a long time as shown in Figure 3.25, it can overheat the battery. This reduces
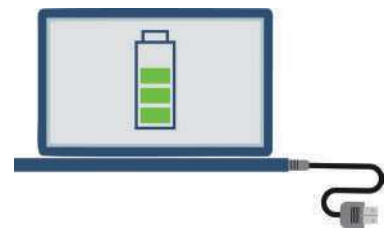

Figure 3.25: Do not over charge your battery

Figure 3.26: Too many programs running at a time

the battery life. Always unplug the device once it is charged 100%.

(vii) **Always plug in devices carefully:** Any device being connected to a laptop or computer such as a USB drive or headphones, should be done gently. It should not be forced into the port. If you find it difficult to plug in a device, change the direction and try instead of trying to force it in.

(viii) **Do not run too many programs at a time:** When too many programs are running at the same time as shown in Figure 3.26, the computer can become slow and even crash. If a program/app is not being used, it should be closed so that other programs can work smoothly.

Prepare a Maintenance Schedule

We need to prepare a plan or a schedule for maintenance to keep the computer running in perfect condition for a long time. This can include:

(a) Daily Maintenance

    i. Clean up your e-mail inbox

    ii. Download e-mail attachments and save in proper folders

(b) Weekly Maintenance

    i. Clean your keyboard

    ii. Clean your monitor

    iii. Dust CPU and printer

    iv. Backup your data to an external drive

(c) Monthly Maintenance

    i. Transfer photographs to computer and delete from drive

    ii. Organise photos into folders or albums

    iii. Clean up 'Download' folder

    iv. Uninstall unused programs and apps

    v. Run disk-cleaner software

    vi. Run full system virus scan

(d) Yearly/Annual Maintenance

    (a) Clean up contacts list on social media accounts

(b) Clean up e-mail contact list

(c) Update your operating system

(d) Check for expiry of anti-virus software and renew

Backup Your Data

Backing up data means to save the information present on your computer on another device, such as CD/DVD drives as shown in Figure 3.28 or hard disk. Data can recovered from here in case the computer stops working completely. Computers can crash, humans can make mistakes and natural disasters, such as floods can happen. So, it is important for companies, hospitals, banks, etc., to keep their information safe — so that their business can continue to function smoothly and their customers do not face problems.

Figure 3.27: Backup Data on CD/DVD

Scanning and Cleaning Viruses

Sometimes computer viruses can enter a computer from such attacks we can install anti-virus software. This will prevent any viruses from entering and will also clean any viruses that may enter our system before they affect the data.

Increasing Computer Performance

If we have been using a computer for a long time we have a lot of unnecessary files and data, such as temporary files and images. When they use too much hard-disk space, the performance of the computer goes down. It is important that we keep cleaning by removing any extra files. We can use some disk cleaner software, which help us clean up the unnecessary files.

Removing SPAM from your Computer

Sometimes we get mails from companies who are advertising a product or trying to attract you to their website. Such mails are called SPAM.

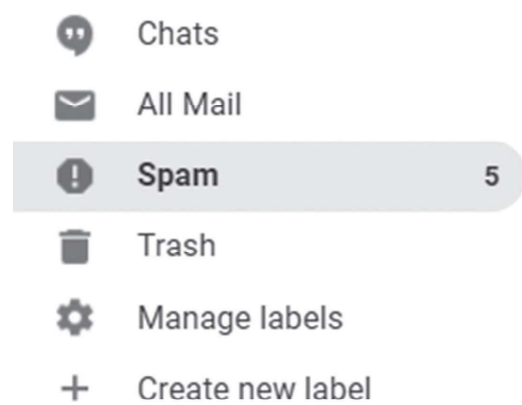We should never respond to SPAM and delete it on a regular basis.

Figure 3.28: SPAM folder

It is possible to set filters in the settings to prevent SPAM from entering our mail box. Most e-mail software have a SPAM folder as shown in Figure 3.28 and automatically put all such emails into this folder.

Practical Exercise

Activity 1

Making a Chart

Material required

Pen, notebook, chart paper, pictures.

Procedure

- Form groups and make a chart to list down all the ways in which a device can be damaged and how it can be prevented.
- Make sure all students in the group get a chance to participate.

Check Your Progress

A. **Multiple choice questions**

Read the questions carefully and circle the letter (a), (b), (c) or (d) that best answers the question.

1. What happens if you leave a device plugged in even after it is charged 100%?

    (a) It can break.
    (b) It can stop functioning.
    (c) It can over-heat.
    (d) Data can get corrupt.

2. How can an anti-virus protect your device?

    (a) It can protect it from over-heating.
    (b) It can increase its performance.
    (c) It can prevent data from getting corrupt.
    (d) It can backup data.

3. Which option is not required to keep a device cool?

    (a) Keep the device unplugged when in use.
    (b) Do not cover a laptop with a blanket.
    (c) Make sure computer's CPU fan is working.
    (d) Avoid leaving the device in the sun.

4. Which of the following is essential for maintaining keyboard?

    (a) Turn the keyboard upside down and shake it to remove foreign material.

    (b) Blow dust and other particles with help of a blower.
    (c) Use a very dilute combination of soap and water applied with a non-abrasive cloth to remove stains from the keycaps.
    (d) All of the above.

B. Subjective questions

1. Explain how to clean a computer on a daily basis.

2. How can you increase the performance of a computer?

What Have You Learnt?

> **After completing this session, you will be able to**
>
> • identify the importance of taking care of computers.
> • list the various ways in which computers can be damaged.
> • demonstrate how to prevent damage and take care of computers.

SESSION 4: COMPUTER SECURITY AND PRIVACY

We store a lot of information on our computers and electronic devices. For example, we keep our photos on our mobiles, school computers store personal information regarding every student and their parents, computers used in banks store the financial information of their clients and computers in hospital have important information about patients. If any of this information gets lost or leaked and falls into the wrong hands, it can cause a lot of harm to the people.

Figure 3.29: Computer Security

    For example, if information stored in a bank's computer gets leaked it can cause many people to lose a lot of money. Hence, it is essential to keep computers secure and our data safe.

Computer Security Deals with Protecting Computers

Computer security and privacy deals with the measures used to prevent loss of data.

Reasons for Security Break

Security break is leakage of information stored in a computer.

Figure 3.30: Security Breach

Figure 3.31: Physical stealing

Figure 3.32: Online stealing

Figure 3.33: Worm virus

Personal information can be lost or leaked in two ways:

1. We are not careful in giving out personal information over the Internet. For example, we share our account details and password on unsecure sites.

2. A person gets unauthorised access to our computer. This can happen in the office if we leave are computer without logging out.

Computer security and privacy is about measures we can take to restrict access to personal data stored in a computer.

Threats to Computer

Threats are the ways in which personal information can be leaked from a computer without our knowing.

(a) **Theft:** Theft means stealing of information or hardware. These maybe of three types:

- **Physical:** Where a person may steal your desktop computer or laptop.

- **Identity:** Where a hacker steals your personal information and assumes your identity. Using this false identity, the hacker can gain access to your account information or perform illegal activity.

- **Software Piracy:** This is stealing of software and includes using or distributing unlicensed and unauthorised copies of a computer program or software.

(b) **Virus:** Viruses are computer programs that can damage the data and software programs or steal the information stored on a computer. Major types of viruses are Worms and Trojan Horse.

- **Worms:** These are viruses that replicate themselves and spread to all files once they

attack a computer. This makes it very difficult to remove them.

- **Trojan Horse:** A Trojan Horse disguises itself i.e., it appears to be a useful software program but once it reaches a computer it starts behaving like a virus and destroying data.

- **Online Predator:** Online predators are people who trap you into inappropriate relationships. They may be older people posing to be your age, bullying you into doing illegal activities online and sometimes face to face.

- **Internet Scams:** Sometimes you may receive very attractive offers saying you have won a huge money in a lottery and that you can claim the prize by depositing a certain amount of money. When you deposit the money using credit card or online banking, you not only lose the deposit money but your card / account information may be misused later.

Protecting your Data

To protect our data from theft and viruses we can take the following measures:

(a) **Use passwords to login to your computer:** Use passwords that are difficult to guess. Passwords are difficult to hack if they are a mix of small (For example 'a b c d') and capital letters (For example, 'H J E R'), numbers (For example '8 7 6 5') and special characters (For example, '% ^ # $'). This would prevent unauthorised people from using your computer.

Figure 3.34: Antivirus

(b) **Install Anti-virus and Firewall:** Anti-viruses and Firewall monitor the data coming in and out of a computer and prevent and viruses from entering. Anti-viruses can also detect and clean viruses that may have entered a computer.

(c) **Encrypt Data:** This is usually done by banks and companies in which important customer information is stored. They can encrypt their entire hard disk using encrypting feature in

Figure 3.35: Data encryption

Windows (Bitlocker). This would force users to use a decryption password (or key) before starting the computer thus preventing unauthorised usage.

(d) **Secure sites:** Give details of your credit card or bank account only on secure sites. See in the address bar of the browser. If the site address starts with https://and a lock symbol, then it is safe to give your credit card and bank details.

Practical Exercise

The teacher will facilitate these activities by showing you the e-learning lesson athttp://www.psscive.ac.in/stud_text_book. html. This will include videos and e-content for the above topics as well as detailed instructions for some activities below.

Initial Thinking Activity

After watching the initial video write down the type of risk present to the data available in different places, for example in a school, hospital, bank, etc.

Activity 1

Group Chart Making

Material required

Pen, notebook, computer, Chart paper, colours

Procedure

• Form groups depending on the number of students available. Make a chart to show all the different threats faced by a computer and how you can protect a computer from such treats.

Check Your Progress

A. Multiple choice questions

Read the questions carefully and circle the letter (a), (b), (c) or (d) that best answers the question

1. What should you do to ensure secure online transactions?
   (a) Lock your computer
   (b) Give credit card or bank details only on safe websites
   (c) Use anti-virus
   (d) Do not use pirated software

2. Which of the following trap small children into inappropriate relations?
   (a) Online predators
   (b) Worms
   (c) Trojan Horse
   (d) Anti-Virus

3. What should a strong password consist of?
   (a) Only letters
   (b) Numbers and special characters
   (c) Name of a person
   (d) Letters, numbers and special characters

B. Subjective questions

1. Explain how Trojan Horse virus works.

2. List the various ways you can use to protect your data.

What Have You Learnt?

After completing this session, you will be able to

- identify the importance of securing our computers and data.
- list the various threats to a computer and its data.
- list the various ways to protect data.