

UNIT CODE: IT/CU/ICT/BC/3/6

DEMONSTRATE DIGITAL LITERACY

Unit Description

This unit describes competencies required to use a computer and other digital devices for the purposes of communication, work performance and management at the workplace.

Summary of Learning Outcomes

- Identify computer software and hardware
- Apply security measures to data, hardware software in automated environment
- Apply computer software in solving tasks
- Apply internet and email in communication at workplace
- Apply desktop publishing in official assignments
- Prepare presentation packages

Recommended Resources for the unit

- Desk top computers or Laptop computers
- Other digital devices
- Printers
- Storage devices
- Internet access
- Computer software

LECTURE 1

Lesson objectives:

- Understand the concepts of ICT
- Understand computer definition and its features
- Describe the history of computers

Why is this unit relevant in your area of specialization/ career?

Answ: How are computers used in the tourism industry?

Definition of Terminologies

What is a Computer

- Computer is an electronic device.
- Can store large amounts of data.
- Can perform operations on data.
- Performs given function on the data & displays the result as output.
- Process data whenever needed.

- A computer is an electronic device / machine that works under the control of installed programs, automatically accepts data, processes it and produces information which is a result of that process and stores that information for future retrieval if need be.

OR

- An **electronic device** that accepts data as input, and transforms it under the influence of a set of special instructions called **Programs**, to produce the desired output (referred to as **Information**).

Explanations;

- A computer is described as an *electronic device* because; it is made up of electronic components and uses **electric energy** (such as electricity) to operate.
- A computer has an internal memory, which stores data & instructions temporarily awaiting processing, and even holds the intermediate result (information) before it is communicated to the recipients through the **Output devices**.

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- It works on the data using the instructions issued, means that, the computer cannot do any useful job on its own. It can only work as per the set of instructions issued.
- A computer will accept data in one form and produce it in another form. The data is normally held within the computer as it is being processed.

Program:

- A computer **Program** is a set of related instructions written in the language of the computer & is used to make the computer perform a specific task (or, to direct the computer on what to do).
- A set of related instructions which specify how the data is to be processed.
- A set of instructions used to guide a computer through a process.

What is Process?

- A series of activities performed by computers to convert data into information (Also Known As algorithm)
- Computer works on data as per programs called process.
- Processing means operations like.....
 - Calculations,
 - Logical decision making,
 - Outputting data,
 - Communicating with others computer etc.

Data:

- ***Data*** is a collection of raw facts, figures or instructions that do not have much meaning to the user.
- Data may be in form of numbers, alphabets/letters or symbols, and can be processed to produce information.

Types of data

There are two types/forms of data:

Digital (discrete) data:

- *Digital data* is discrete in nature. It must be represented in form of numbers, alphabets or symbols for it to be processed by a computer.
- Digital data is also viewed as data represented in binary (i.e 1's and Zeros). Binary representation of data is the primary language of computers.
 - Digital data is obtained by counting. E.g. 1, 2, 3 ...

Analogue (continuous) data:

- *Analogue data* is continuous in nature. It must be represented in physical nature in order to be processed by the computer.
 - Analogue data is obtained by measurement. E.g. Pressure, Temperature, Humidity, Lengths or currents, etc
 - The output is in form of smooth graphs from which the data

can be read.

- Analogue data can also be viewed as data that is not in binary form. For example, records in a cassette can be said to be analogue data while records in a computer memory are in digital data format.

Data Processing:

- It is the process of collecting all items of data together & converting them into information.
- *Processing* refers to the way the data is manipulated (or handled) to turn it into information.
- The processing may involve calculation, comparison or any other logic to produce the required result. The processing of the data usually results in some meaningful information being produced.

Information:

- *Information* is the data which has been refined, summarized & manipulated in the way you want it, or into a more meaningful form for decision-making.
- The information must be accurate, timely, complete and relevant.

Comparison between Data and Information

Data	Information
<ol style="list-style-type: none">1. Unprocessed (raw) facts or figures.2. Not arranged.3. Does not have much meaning to the user.4. Cannot be used for decision-making.	<ol style="list-style-type: none">1. It is the end-product of data processing (processed data)2. Arranged into a meaningful format.3. More meaningful to the user.4. Can be used to make decisions.

Characteristics of computer

- Speed
- Retrieving Data and Programme
- Arithmetical and Logical Operations
- Automation
- Accuracy
- Versatility (Flexible)
- Reliability
- Consistency
- Storage
- Communications

Speed.

Computers operate at very high speeds, and can perform very many functions within a very short time.

They can perform a much-complicated task much faster than a human being.

The speed of a computer is measured in **Fractions of seconds.**

Millisecond - a thousandth of a second (10^{-3})

Microsecond - a millionth of a second (10^{-6})

Nanosecond - a thousand millionth of a second (10^{-9})

Picosecond - a million millionth of a second (10^{-12})

The speed of a computer is usually linked to the technology used to build it.

1st Generation computers (1940s & early 1950s).

The computers were built using **Vacuum tubes**, and the speed was measured in **Milliseconds**. E.g., a computer could perform 5,000 additions & 300 multiplications per second.

2nd Generation computers (1950s & early 1960s).

Were built using **Transistors**(A transistor is a device that regulates current or voltage flow and acts as a switch or gate for electronic signals. Transistors consist of three layers of a semiconductor material, each capable of carrying a current.). Their operation speeds increased & were measured in **Microseconds**. E.g., a computer could perform 1 million additions per second.

Mid 1960s.

- **Integrated Circuit (IC)**, which combined a number of transistors & diodes together on a silicon chip, was developed.
- The speed increased to tens of millions of operations per second.
 - In **1971**, **Intel Corporation** produced a very small, single chip called a **Microprocessor**, which could perform all the operations on the computer's processor. The chip contained about 1,600 transistors.
 - Today's microprocessors are very powerful, cheaper & more reliable due to the use of the **Large Scale Integration (LSI)** & **Very Large scale Integration (VLSI)** technologies, which combines hundreds of thousands of components onto a single chip. Also **Nano Technology** has played a key role in reducing size and cost of processors
- The computer speeds are now measured in **Nanoseconds** & **Picoseconds**.

Accuracy:

- Unlike human beings, computers are very accurate, i.e., they never make mistakes.
- A computer can work for very long periods without going wrong. However, when an error occurs the computer has a number of in-built, self-checking features in their electronic components that can detect & correct such errors.
- Usually errors are committed by the users entering the data to the computer, thus the saying **Garbage in Garbage Out (GIGO)**.
- This means that, if you enter incorrect data into the computer and have it processed, the computer will give you misleading information.

Reliability.

- The computer can be relied upon to produce the correct answer if it is given the correct instructions & supplied with the correct data.
- Therefore, if you want to **add** two numbers, but by mistake, give the computer a “*Multiply*” instruction, the computer will not know that you intended to “ADD”; it will multiply the numbers supplied.
- Similarly, if you give it the ADD instruction, but make a mistake and enter an incorrect data; let say, 14 & 83 instead of 14 & 38; then the computer will produce the “wrong” answer 97 instead of 52. However, note that, 97 is ‘correct’ based on the data supplied.
- Therefore, the output produced by a computer is only as reliable as the instructions used & the data supplied.

- **Consistency:**
- Computers are usually **consistent**. This means that, given the same data & the same instructions, they will produce the same answer every time that particular process is repeated.
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- **Storage:**
 - A computer is capable of storing large amounts of data or instructions in a very small space.
 - A computer can store data & instructions for later use, and it can produce/ retrieve this data when required so that the user can make use of it.
 - Data stored in a computer can be protected from unauthorized individuals through the use of passwords.

- **Diligence:**
- Unlike human beings, a computer can work continuously without getting tired or bored. Even if it has to do a million calculations, it will do the last one with the same speed and accuracy as the first one.
- **Automation:**
- A computer is an **automatic device**. This is because, once given the instructions, it is guided by these instructions and can carry on its job automatically until it is complete.
- It can also perform a variety of jobs as long as there is a well-defined procedure.

Versatile:

- A computer can be used in different places to perform a large number of different jobs depending on the instructions fed to it.

Imposition of a formal approach to working methods:

- Because a computer can only work with a strict set of instructions, it identifies and imposes rigid rules for dealing with the data it is given to process.
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Applications of Computer

- Science research
- Education
- Business applications
- Banking
- Office Automation
- Desktop publishing
- Management aids
- Engineering designing
- Road traffic control
- Railway
- Medicine
- Information services

PARTS OF A COMPUTER

- A computer is made up of a collection of different components that are interconnected together in order to work as a single entity.
- A Computer consists of the following parts/devices: -
 - The System Unit.
 - Input devices.
 - Output devices.
 - Storage devices.

System Unit

- This is the casing (unit) that houses electronic components such as the '*brain*' of the computer called the **Central processing Unit (CPU)** and storage devices.

The components in the System unit include: -

- Central Processing Unit (CPU), which is also referred to as **Processor**.
- Motherboard.
- Power supply unit.
- Memory storage devices.
- Disk drives, which are used to store, record and read data.

Types of System units

Tower style system unit

- This system unit is made to stand alone. They are designed to be placed on the floor.
 - Tower style units have more space for expansion than the typical desktop units.

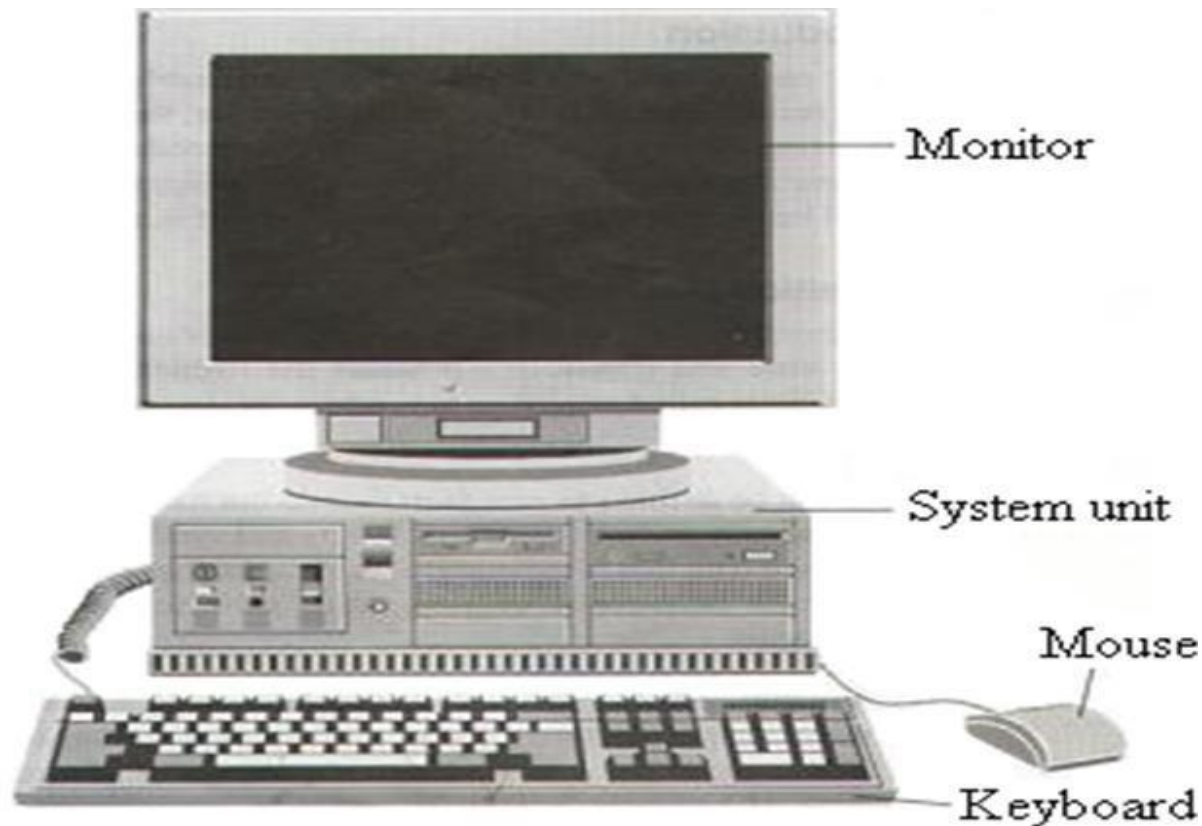
Desktop system units

- Desktop units lie on the desk with the monitor resting on top of the system unit.

Features of the System unit

- It houses the CPU.
- It connects to all peripheral devices using ports.
- It has the computer's Power switch.

Main Components of a Computer



The Central processing unit (CPU)

- This is the brain of the computer, and carries out all the processing within the computer.

Input devices.

- These are the devices used to enter/put data into the computer.
- They accept data for processing & convert it into a suitable form that the computer can understand. **Examples:** Keyboard, Mouse, Joysticks, Light pen, Scanner, etc.

The Keyboard

- The keyboard looks like a typewriter, and has letters, numbers and other keys through which data is entered into the computer.
- To enter data & instructions into the computer, the user should press the required keys.

The Mouse

- It is a pointing device that enables the user to issue instructions to the computer by controlling a special mouse pointer displayed on the screen. It can be a cabled or a wireless mouse.

Output devices

- *Output devices* are used to give the end results of data that was entered into the computer.
- They extract/ disseminate processed data (information) from the computer.
- They accept data from processing devices & convert it into human sensible form.

Examples: Monitors, Printers, Graph plotters, Speakers, etc

The Monitor

- It is a television like screen used for displaying output. When you type a letter or number on the keyboard, it shows up on the monitor.

Note. The monitor enables the user to monitor/track or see what is going on in the computer.

Printer

- Printers are used to create permanent copies of output on paper.

Memory storage devices

- These are devices used to store programs & data in computers.
- They hold data & programs until they are needed for processing.
- They also hold the results after processing. Computer storage is divided into 2:

Primary (main) storage.

- This is the storage found within the computer itself. It is used to hold data, programs & instructions required immediately (or currently being used) by the Processor.
- **Examples:** Random Access Memory (RAM) & Read Only Memory (ROM).

1. Random Access Memory (RAM) –

- It is also known read write memory or the main memory.
- The programs and data that the CPU requires during execution of a program are stored in this memory.
- It is a volatile memory as the data loses when the power is turned off.
- RAM is further classified into two types- SRAM (Static Random-Access Memory) and DRAM (Dynamic Random-Access Memory).

2. Read Only Memory (ROM) –

- Stores crucial information essential to operate the system, like the program essential to boot the computer.
- It is not volatile.
- Always retains its data.

- Used in embedded systems or where the programming needs no change.
- Used in calculators and peripheral devices.
- ROM is further classified into 4 types- ROM, PROM, EPROM, and EEPROM.

Types of Read Only Memory (ROM) –

1. *PROM (Programmable read-only memory)* – It can be programmed by user. Once programmed, the data and instructions in it cannot be changed.
2. *EPROM (Erasable Programmable read only memory)* – It can be reprogrammed. To erase data from it, expose it to ultra violet light. To reprogram it, erase all the previous data.
3. *EEPROM (Electrically erasable programmable read only memory)* – The data can be erased by applying electric

field, no need of ultra violet light. We can erase only portions of the chip.

RAM	ROM
1. Temporary Storage.	1. Permanent storage.
2. Store data in MBs.	2. Store data in GBs.
3. Volatile.	3. Non-volatile.
4.Used in normal operations.	4. Used for startup process of computer.
5. Writing data is faster.	5. Writing data is slower.

Difference between RAM and ROM

3. Cache Memory

Cache memory is a very high-speed semiconductor memory which can speed up the CPU. It acts as a buffer between the CPU and the main memory. It is used to hold those parts of data and program which are most frequently

used by the CPU. The parts of data and programs are transferred from the disk to cache memory by the operating system, from where the CPU can access them.

Advantages

The advantages of cache memory are as follows –

- Cache memory is faster than main memory.
- It consumes less access time as compared to main memory.
- It stores the program that can be executed within a short period of time.
- It stores data for temporary use.

Disadvantages

The disadvantages of cache memory are as follows –

- . Cache memory has limited capacity.
- . It is very expensive.

Secondary Backup Memory

- It is used by the computer to store backup information that is not needed immediately by the Processor. It is also used by the computer to supplement the computer's main memory/ internal memory in case of mass storage purposes.
- Secondary storage units provide permanent data storage facilities. They allow large quantities of information to be stored permanently on some form of magnetic media such **Magnetic tapes** or **disks**.
- The programs & data are transferred to & from the secondary storage units to the Main memory only when they are required; hence the information is said to be **online** to the computer.

Examples of secondary storage devices:

- Hard disk
- Floppy disks
- Magnetic Tapes
- Cassette tapes
- Punched cards
- Zip disks.
- Compact disks
- Digital Video Disks (DVDs)

Computer peripherals

- A computer is basically made up of a system unit and other devices connected to the system unit called ***Peripheral devices***.
- ***Peripheral devices*** are the elements (components) connected to the system unit so as to assist the computer satisfy its users.

Peripheral devices are connected to the System unit using special cables called ***data interface cables*** that carry data, programs & information to and from the processor. The cables are connected to the system unit using connectors called ***Ports***.

Examples of peripheral devices include;

- Monitor
- Keyboard
- Mouse
- Printer
- Modem
- Speakers

REVIEW QUESTIONS

1. What is a Computer?
2. Why is a computer referred to as an electronic device?
3. Briefly explain the two forms of data.
4. Give THREE differences between Data and Information.
5. The speed of a computer is measured in
6. What does the term GIGO stands for?
7. List and explain 4 salient features/ properties of a computer.
8. List FIVE advantages of a computerized system over a manual system

- List down the components that make up a computer.
- Clearly draw and label the main physical parts of a simple computer system.
- What are computer peripherals?
- Name and explain the two main divisions of computer storage.
- Give two common examples of secondary storage devices.
- Name two output devices.
- Explain the term System unit.
- Name some of the components found in the System unit.
- Give three features of a computer's System Unit.
- Why is the screen also called a Monitor?
- What is a Mouse in relation to computing?