G.C.E. O/L Grade 10 ICT

Lesson 2: Selects and Uses Computer Hardware

- 2.1 Classification of Computers
- 2.2 Computer System Functions: Input, Process, Output, Storage, Communication
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2.1 Classification of Computers

There are many kinds of computers – from the phone in your pocket to giant supercomputers that forecast the weather. In this note you will learn how we group (classify) computers: by **size and power** (super, mainframe, mini, micro) and by **the type of data they use** (digital, analog, hybrid).

1. Why do we classify computers?

Computers are not all the same. Some are tiny and cheap, some fill a whole room and cost millions. **Classifying** means putting computers into groups that share the same features. This helps us choose the right computer for a job.

- By **size, power and cost**: supercomputer, mainframe, minicomputer, microcomputer.
- By **type of data (technology)**: digital, analog, hybrid.

2. Classification by size and power

Supercomputer
The fastest and most powerful. Does trillions of calculations per second. Used for weather forecasting, space research, climate and AI research.

Mainframe
Large and very reliable. Serves thousands of users at the same time. Used by banks, airlines and big government offices.

Minicomputer
Medium size. Serves tens to hundreds of users. Used in a factory, a university department or a medium business. Today mostly replaced by servers.

Microcomputer
Small, cheap, for one user. Has a microprocessor. Desktop PC, laptop, tablet and smartphone are all microcomputers.

Feature	Super	Mainframe	Mini	Micro
Size	Very large (many cabinets)	Large (room)	Medium	Small (desk / hand)
Speed	Fastest	Very fast	Fast	Enough for one user
Users at a time	Runs one huge task	Thousands	Tens–hundreds	One
Cost	Highest	Very high	Medium	Low
Example use	Weather forecast, AI research	Bank ATM network, airline booking	Factory control	Home, school, office

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💡 Think of it like vehicles: a supercomputer is a rocket (fastest, one big mission), a mainframe is a train (carries thousands), a mini is a bus, and a micro is your bicycle or tuk-tuk (one person, cheap, everywhere).

Microcomputers today come in many forms: desktop, laptop, tablet, smartphone, smart watch and even tiny boards like Raspberry Pi and Arduino used in school robotics clubs. **Embedded computers** are microcomputers hidden inside other machines – a washing machine, a car or a smart TV.

NEW 2026 Servers and the cloud: big companies now use rooms full of powerful servers (data centres) instead of minicomputers. When you use Google Drive or Microsoft 365 you use these cloud servers. Supercomputers are also used to train AI models.

3. Classification by type of data

Digital computer
Works with **discrete** values – numbers in binary (0 and 1). Very accurate. Examples: PC, laptop, smartphone, calculator.

Analog computer
Works with **continuous** values that change smoothly – like temperature, speed or pressure. Less accurate. Examples: old speedometer with a needle, mercury thermometer, slide rule.

Hybrid computer
Has **both** analog and digital parts. Measures continuous signals and changes them into digital numbers. Examples: ECG / ICU patient monitor in a hospital, petrol pump, modern car engine control.

Feature	Analog	Digital	Hybrid
Data	Continuous	Discrete (0/1)	Both
Accuracy	Lower	High	High
Output	Needle / dial / graph	Numbers on a screen	Both
Example	Analog speedometer	Smartphone	ICU monitor

💡 A clock with hands is analog (the hands move smoothly). A clock showing 10:45 in numbers is digital (it jumps from one number to the next).

NEW 2026 IoT sensors are hybrid in action: a soil-moisture sensor on a smart farm in Anuradhapura measures a continuous (analog) value and a small digital chip turns it into numbers sent to the farmer's phone.

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Key Words

Supercomputer – The fastest, most powerful computer, used for huge calculations like weather forecasting.

Mainframe – A large, reliable computer that serves thousands of users at once (banks, airlines).

Minicomputer – A medium-size multi-user computer for a department or medium business.

Microcomputer – A small single-user computer with a microprocessor (PC, laptop, phone).

Digital computer – A computer that works with discrete data (0s and 1s).

Analog computer – A computer that works with continuous, smoothly changing data.

Hybrid computer – A computer with both analog and digital features (e.g. ICU monitor).

Embedded computer – A small computer built inside another device (washing machine, car).

Server – A powerful computer that gives services or files to other computers on a network.

Continuous data – Data that can take any value in a range (e.g. 36.6 °C).

Discrete data – Data with separate, countable values (e.g. 0 or 1, number of students).

Data centre – A building full of servers that run cloud services.

Sample Q&A

1. Name the four classes of computers by size.

> **Answer:** Supercomputer, mainframe, minicomputer and microcomputer.

2. Why does a bank use a mainframe?

> **Answer:** Because thousands of ATMs, branches and app users must be served at the same time, reliably and safely.

3. Give two examples of microcomputers.

> **Answer:** Laptop and smartphone (also desktop PC, tablet).

4. What is the difference between analog and digital data?

> **Answer:** Analog data is continuous (changes smoothly); digital data is discrete (separate values, 0 and 1).

5. Why is an ICU patient monitor called a hybrid computer?

> **Answer:** It measures continuous body signals (analog) like heartbeat, and shows them as digital numbers on a screen.

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6. What is a supercomputer used for? Give one example.

> **Answer:** Very large calculations, e.g. weather forecasting, climate study or training AI models.

MCQ

1. Which is the fastest and most powerful type of computer?

A. Supercomputer
B. Microcomputer
C. Minicomputer
D. Mainframe

2. A bank needs one computer to handle thousands of ATM and branch users at the same time. Which type is best?

A. Analog computer
B. Mainframe
C. Microcomputer
D. Smartphone

3. Which of these is a microcomputer?

A. Mercury thermometer
B. Airline mainframe
C. Laptop
D. Weather-forecast supercomputer

4. Weather forecasting by the Department of Meteorology needs huge calculations. Which computer is most suitable?

A. Supercomputer
B. Minicomputer
C. Tablet
D. Analog clock

5. A medium-size computer used by a factory department with about 50 users is a:

A. Minicomputer
B. Microcomputer
C. Supercomputer
D. Hybrid computer

6. Which type of computer works with continuous data?

A. Mainframe
B. Digital
C. Analog
D. Microcomputer

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7. A digital computer represents data using:

A. Continuous waves only
B. Binary digits 0 and 1
C. Mercury levels
D. A moving needle

8. An ICU monitor measures heartbeat signals and shows them as numbers. It is a:

A. Analog computer only
B. Supercomputer
C. Mainframe
D. Hybrid computer

9. Which is an example of an analog device?

A. Laptop
B. Smartphone
C. Speedometer with a needle
D. Digital calculator

10. Which statement about digital computers is correct?

A. They work only with continuous data
B. They do not use electricity
C. They can only measure temperature
D. They are more accurate than analog computers

11. A small computer built inside a washing machine to control it is called a(n):

A. Embedded computer
B. Supercomputer
C. Minicomputer
D. Mainframe

12. Today, many tasks once done by minicomputers are done by:

A. Floppy disks
B. Servers and cloud data centres
C. Typewriters
D. Analog clocks

13. Arrange from MOST powerful to LEAST powerful.

A. Mainframe, super, micro, mini
B. Mini, micro, super, mainframe
C. Micro, mini, mainframe, super
D. Super, mainframe, mini, micro

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14. A soil-moisture IoT sensor measures a continuous value and sends numbers to a phone. This shows which idea?

A. Storing data on a floppy disk
B. Changing analog data into digital data (hybrid)
C. Using a supercomputer
D. Using a mainframe

Structured Questions

1. (i) Name the four classes of computers by size. (2 marks)
(ii) Give one use for each class. (4 marks) *(6 marks)*

> (i) Supercomputer, mainframe, minicomputer, microcomputer.
> (ii) Super – weather forecasting; Mainframe – bank / airline booking; Mini – factory department; Micro – home / school PC, smartphone.

2. Compare analog and digital computers under: (i) type of data (ii) accuracy (iii) one example each. *(6 marks)*

> (i) Analog – continuous; digital – discrete (0/1). (ii) Analog – lower; digital – high. (iii) Analog – needle speedometer / thermometer; digital – laptop / calculator.

3. (i) What is a hybrid computer? (2 marks)
(ii) Give two examples. (2 marks) *(4 marks)*

> (i) A computer with both analog and digital features – it measures continuous data and processes/shows it digitally.
> (ii) ICU / ECG monitor, petrol pump, car engine control unit.

4. State two features of a mainframe computer and explain why an airline uses one. *(4 marks)*

> Features: large and very reliable; serves thousands of users at the same time; large storage.
> Airline: thousands of agents and online users book seats at the same moment – needs speed, reliability and no double booking.

5. A school robotics club uses an Arduino board to control a smart plant-watering system. (i) Which class of computer is the Arduino? (1 mark) (ii) What is an embedded computer? (2 marks) (iii) Give one other example of an embedded computer at home. (1 mark) *(4 marks)*

> (i) Microcomputer.
> (ii) A small computer built inside another device to control it.
> (iii) Washing machine, microwave oven, smart TV, air conditioner.

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6. Explain why supercomputers are important for Artificial Intelligence (AI) today. (3 marks)
(3 marks)

> AI models learn from huge amounts of data. Training needs trillions of calculations. Supercomputers (and cloud data centres) are fast enough to do this in days instead of years.

Summary

- Computers are classified by size/power and by type of data.
- Supercomputer: fastest; weather, space, AI research.
- Mainframe: thousands of users at once; banks, airlines.
- Minicomputer: medium, tens–hundreds of users; now replaced by servers.
- Microcomputer: one user; PC, laptop, tablet, smartphone, embedded boards.
- Analog = continuous data; digital = discrete 0/1 data, more accurate.
- Hybrid = both, e.g. ICU monitor, petrol pump, IoT sensor systems.
- Cloud data centres and servers power Google Drive, Microsoft 365 and AI.

MCQ answer key – 2.1

1. **A** – Supercomputers do trillions of calculations per second.
2. **B** – Mainframes are built to serve thousands of users reliably.
3. **C** – A laptop is a small single-user computer with a microprocessor.
4. **A** – Weather models need the speed of a supercomputer.
5. **A** – Minicomputers are medium-size multi-user computers.
6. **C** – Analog computers measure smoothly changing quantities.
7. **B** – Digital = discrete binary values.
8. **D** – It uses both analog measuring and digital display.
9. **C** – The needle moves smoothly – continuous output.
10. **D** – Discrete digital values give high accuracy.
11. **A** – Embedded computers are hidden inside other devices.
12. **B** – Servers and the cloud replaced most minicomputers.
13. **D** – Supercomputer is most powerful, microcomputer least.
14. **B** – Analog measuring + digital sending = hybrid idea.

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2.2 Computer System Functions: Input, Process, Output, Storage, Communication

Every computer – a laptop, a phone or an ATM – does five main jobs: it takes **input**, **processes** it, gives **output**, **stores** data and **communicates** with other devices. In this note you will learn these five functions and the devices (peripherals) that do each job.

1. The five functions of a computer

Input
Getting data and instructions into the computer.

Processing
Working on the data – calculating, comparing, sorting. Done by the CPU.

Output
Giving the results to the user as text, pictures, sound or movement.

Storage
Keeping data and programs to use now or later.

Communication
Sending and receiving data to and from other devices and networks.

💡 Think of a kottu shop: the customer's order is input, the cook chopping and mixing is processing, the plate of kottu is output, the fridge with ingredients is storage, and the phone for delivery orders is communication.

2. Input devices

An **input device** sends data into the computer. Common ones: **keyboard**, **mouse**, **touch screen**, **microphone**, **webcam / camera**, **scanner**, **barcode reader**, **QR code scanner**, **fingerprint reader**, **sensors** (temperature, motion, light).

3. Processing

The **CPU (Central Processing Unit)** is the brain of the computer. It follows program instructions to process data. A phone or laptop CPU is a small chip called a **microprocessor**. Many new chips also have an **NPU** (AI engine) to run AI tasks like face unlock.

4. Output devices

An **output device** shows or gives results. Common ones: **monitor / display** (LED, OLED), **printer** (inkjet, laser), **3D printer**, **speakers / headphones**, **projector**, and **actuators** like motors that

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move things.

5. Storage

Type	What it is	Example
Primary (main memory)	Fast memory used while working. RAM loses data when power is off; ROM keeps start-up instructions.	8 GB RAM in a laptop
Secondary storage	Keeps data permanently, even when power is off.	SSD, NVMe SSD, hard disk (HDD), pen drive, memory card
Cloud storage	Data kept on Internet servers; open from any device.	Google Drive, OneDrive, iCloud

6. Communication

Communication devices connect the computer to other devices: **network card (NIC)**, **Wi-Fi**, **Bluetooth**, **modem / router**, **4G/5G SIM** in phones. They let you send WhatsApp messages, join a Zoom class or print to a Wi-Fi printer.

Device	Input	Process	Output	Storage / Communication
ATM	Card, PIN keypad, touch screen	Check PIN and balance	Cash, screen, receipt	Bank server over network
Supermarket POS	Barcode scanner	Add prices, discount	Bill printer, display	Stock database
Smart speaker	Microphone (voice)	AI understands the request	Speaker (answer)	Wi-Fi to cloud

> **NEW 2026** IoT and AI devices use all five functions: a smart door camera senses motion (input), an AI chip recognises a face (process), sends an alert to your phone (communication), saves the video to the cloud (storage) and sounds a chime (output).

Some devices do **both input and output**: a **touch screen** (you touch = input, it shows = output), a **headset with microphone**, and a multifunction printer that also scans.

Key Words

Input – Data or instructions entered into a computer.

Processing – Working on data to produce information, done by the CPU.

Output – Results given by a computer (screen, print, sound).

Storage – Keeping data and programs for now or later.

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Communication – Sending and receiving data between devices.

CPU – Central Processing Unit – the 'brain' that processes data.

Peripheral – A device connected to the computer, e.g. keyboard, printer.

RAM – Main memory that loses its data when power is off.

SSD – Solid State Drive – fast storage with no moving parts.

Cloud storage – Saving files on Internet servers, e.g. Google Drive.

Sensor – An input device that measures things like heat, light or motion.

Actuator – An output device that makes movement, e.g. a motor or valve.

Sample Q&A

1. List the five functions of a computer.

> **Answer:** Input, processing, output, storage and communication.

2. Give three input devices.

> **Answer:** Keyboard, mouse, microphone (also scanner, webcam, sensor, barcode reader).

3. Which part of the computer processes data?

> **Answer:** The CPU (Central Processing Unit).

4. What is the difference between RAM and an SSD?

> **Answer:** RAM is fast working memory that loses data when power is off; an SSD keeps data permanently.

5. Why is a touch screen both input and output?

> **Answer:** You give input by touching it, and it shows output on the same screen.

6. Name two communication devices.

> **Answer:** Network interface card (NIC) and router (also modem, Wi-Fi adapter, Bluetooth).

MCQ

1. Which is an input device?

A. Printer
B. Speaker
C. Projector
D. Microphone

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2. Which device is used for output?

A. Monitor
B. Barcode reader
C. Scanner
D. Keyboard

3. Which part processes data in a computer?

A. Mouse
B. CPU
C. Monitor
D. Router

4. Which memory loses its data when power is switched off?

A. SSD
B. Pen drive
C. Hard disk
D. RAM

5. Saving a school project on Google Drive is an example of:

A. Input
B. Cloud storage
C. RAM
D. Processing

6. At a supermarket, the barcode scanner performs which function?

A. Input
B. Storage
C. Output
D. Processing

7. Which device can do BOTH input and output?

A. Touch screen
B. Speaker
C. Webcam
D. Mouse

8. A temperature sensor in a smart greenhouse is a(n):

A. Output device
B. Input device
C. Storage device
D. Processor

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9. A motor that opens a water valve on a smart farm is a(n):

A. Actuator (output)
B. Storage device
C. Sensor (input)
D. CPU

10. Which is a modern secondary storage device with no moving parts?

A. RAM
B. Hard disk (HDD)
C. SSD
D. Floppy disk

11. Joining a Zoom class through home Wi-Fi mainly uses which function?

A. Storage
B. Processing only
C. Communication
D. Printing

12. In an ATM, checking the PIN against the bank record is:

A. Input
B. Processing
C. Output
D. Storage

13. A smart speaker answers ‘What is the weather today?’. The spoken answer is:

A. Storage
B. Processing
C. Input
D. Output

14. Which is the correct order of the basic data flow?

A. Output → Input → Process
B. Input → Output → Process
C. Input → Process → Output
D. Process → Output → Input

Structured Questions

1. (i) List the five functions of a computer system. (5 marks)
(ii) Give one device for input and one for output. (2 marks) *(7 marks)*

> (i) Input, processing, output, storage, communication.
> (ii) Input – keyboard / mouse / microphone; output – monitor / printer / speaker.

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2. A supermarket uses a POS system. Name the device used for: (i) input (ii) output (iii) storage, and explain what is processed. (4 marks) *(4 marks)*

> (i) Barcode scanner. (ii) Bill printer / customer display. (iii) Hard disk / SSD / server database. Processing: finding the price, adding the total, applying discounts, updating stock.

3. Compare primary memory (RAM) and secondary storage (SSD) under two points. *(4 marks)*

> RAM – loses data when power is off; very fast; smaller (e.g. 8 GB). SSD – keeps data permanently; slower than RAM; larger (e.g. 512 GB).

4. Give two advantages and one disadvantage of cloud storage. *(3 marks)*

> Advantages: open from any device anywhere; easy sharing; automatic backup. Disadvantage: needs Internet; privacy / security risk; monthly cost for more space.

5. A smart greenhouse waters plants automatically. (i) Name the input device. (ii) Name the output device. (iii) Explain the processing. (3 marks) *(3 marks)*

> (i) Soil-moisture / temperature sensor. (ii) Motor / pump / valve (actuator). (iii) The microcontroller compares the moisture value with a set level; if it is too dry it switches the pump on.

6. Name two devices that work as both input and output and explain one. (3 marks) *(3 marks)*

> Touch screen, headset with microphone, multifunction printer (print + scan). Touch screen: finger touch gives input; the same screen displays output.

Summary

- Five functions: input, processing, output, storage, communication.
- Input devices: keyboard, mouse, touch screen, microphone, scanner, sensors.
- Processing is done by the CPU (microprocessor); new chips add an AI NPU.
- Output devices: LED/OLED monitor, printer, 3D printer, speaker, actuators.
- Primary memory: RAM (volatile), ROM. Secondary: SSD, NVMe, HDD, flash.
- Cloud storage keeps files on Internet servers (Google Drive, OneDrive).
- Communication: NIC, Wi-Fi, Bluetooth, router, 4G/5G.
- IoT and AI devices like smart cameras use all five functions.

MCQ answer key – 2.2

1. **D** – A microphone sends sound into the computer.
2. **A** – A monitor shows results.
3. **B** – The CPU is the brain that processes.
4. **D** – RAM is volatile.
5. **B** – Google Drive keeps files on Internet servers.

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6. **A** – It reads the product code into the computer.
7. **A** – Touch = input, display = output.
8. **B** – Sensors measure and send data in.
9. **A** – Actuators produce movement – output.
10. **C** – An SSD uses flash memory chips.
11. **C** – Data is sent and received over a network.
12. **B** – Comparing data is processing.
13. **D** – Sound from the speaker is output.
14. **C** – Data goes in, is processed, then results come out.

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2.3 Computer Ports and Peripherals

A desktop computer has a **system unit**, a **monitor**, a **keyboard** and a **mouse**, plus other devices joined using **ports**. In this note you will learn the main parts, the modern ports (USB-C, HDMI, Thunderbolt, RJ45…), today's displays, 3D printers and storage devices.

1. Main parts of a desktop computer

System unit
The box (case) that holds the motherboard, CPU, RAM, storage, power supply and fans.

Monitor
The screen that shows output. Today mostly LED or OLED flat panels.

Keyboard
Main input device for typing letters, numbers and commands. Can be wired (USB) or wireless (Bluetooth).

Mouse
Pointing device to move the pointer, click and drag. Optical mice use a light sensor.

Inside the system unit, the **motherboard** is the main circuit board. The CPU, RAM, storage and expansion cards plug into it. The **power supply unit (PSU)** changes mains electricity (230 V in Sri Lanka) into low voltages the parts need.

2. Modern ports

A **port** is a socket on the computer where you plug in a cable or device.

Port	Used for	Notes
USB Type-A	Pen drive, keyboard, mouse, printer	Flat rectangle; fits only one way
USB Type-C	Charging, data, display on phones and laptops	Small oval; reversible (fits both ways)
HDMI	Video + sound to TV, monitor, projector	Common on TVs and laptops
DisplayPort	High-quality video to monitors	Popular for gaming / office monitors
Thunderbolt	Very fast data, display and charging in one cable	Uses the USB-C shape
RJ45 (Ethernet)	Wired network / Internet cable	Looks like a wide phone plug
Audio jack (3.5 mm)	Headphones, speakers, microphone	Round small hole

💡 Easy way to remember: USB-C = one plug for everything on new phones and laptops. HDMI = to the TV or classroom projector. RJ45 = network cable.

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Legacy ports (old, just know the names): PS/2 (old round keyboard/mouse port), serial and parallel ports (old printers, modems), VGA (old blue analog video port). USB and HDMI replaced most of them.

3. Displays and printers

LED display
An LCD panel lit by LEDs from behind. Thin, low power, cheap. Most monitors and TVs.

OLED display
Each pixel makes its own light. Deep blacks, very thin, can bend. Used in many smartphones.

Inkjet / laser printer
Inkjet sprays ink drops (good for photos). Laser uses toner powder (fast, sharp text for offices).

3D printer
Builds a solid object layer by layer from melted plastic using a 3D design. Used for models, spare parts and school projects.

4. Storage devices

Device	How it works	Good points
HDD (hard disk)	Spinning magnetic disks	Cheap for large size (1–4 TB)
SSD	Flash memory chips, no moving parts	Fast, silent, strong
NVMe SSD	SSD that plugs straight into the motherboard (M.2)	Fastest storage in new laptops
Flash drive / memory card	Small flash memory	Portable, carry in pocket
Cloud storage	Files on Internet servers	Access anywhere, auto backup

NEW 2026 2026 trend: new laptops have only USB-C/Thunderbolt ports and an NVMe SSD. Wireless peripherals (Bluetooth keyboard, mouse, earbuds) and Wi-Fi printers are now normal in Sri Lankan homes and schools.

Key Words

System unit – The case holding the motherboard, CPU, RAM, storage and power supply.

Motherboard – The main circuit board that connects all parts.

Port – A socket where a cable or device is plugged in.

USB Type-C – Small reversible port for charging, data and display.

HDMI – Port that carries video and sound to a TV, monitor or projector.

Thunderbolt – Very fast port (USB-C shape) for data, display and power.

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RJ45 – The plug/port used for a wired Ethernet network cable.

OLED – Display where each pixel gives its own light.

3D printer – Output device that builds solid objects layer by layer.

NVMe SSD – Very fast SSD connected directly to the motherboard.

HDD – Hard disk drive using spinning magnetic disks.

Legacy port – An old port now rarely used, e.g. VGA, PS/2, serial, parallel.

Sample Q&A

1. Name the four main parts of a desktop computer.

> **Answer:** System unit, monitor, keyboard and mouse.

2. Which port connects a laptop to a classroom projector?

> **Answer:** HDMI (or USB-C / DisplayPort with an adapter).

3. Give one advantage of USB Type-C over USB Type-A.

> **Answer:** It is reversible (fits both ways) and can carry charging, data and video in one cable.

4. Why is an SSD faster than an HDD?

> **Answer:** An SSD uses flash chips with no moving parts; an HDD must spin disks and move a head.

5. What does a 3D printer do?

> **Answer:** It makes a solid object layer by layer from a 3D design, usually using melted plastic.

6. Name two legacy ports.

> **Answer:** VGA and PS/2 (also serial, parallel).

MCQ

1. Which part holds the motherboard, CPU and power supply?

A. System unit
B. Keyboard
C. Monitor
D. Mouse

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2. Which port is small, oval and reversible, used on new phones?

A. PS/2
B. VGA
C. USB Type-C
D. RJ45

3. To show a laptop screen on a TV with sound, which port is best?

A. HDMI
B. PS/2
C. RJ45
D. Audio jack

4. Which port is used for a wired Ethernet network cable?

A. HDMI
B. RJ45
C. DisplayPort
D. USB Type-A

5. Which port uses the USB-C shape but gives very high speed for data, display and charging?

A. VGA
B. PS/2
C. Thunderbolt
D. Serial

6. Which is a legacy (old) video port?

A. USB Type-C
B. DisplayPort
C. HDMI
D. VGA

7. In an OLED display:

A. Only black and white is shown
B. There are no pixels
C. Each pixel makes its own light
D. A big glass tube is used

8. Which device builds a solid object layer by layer?

A. Scanner
B. Laser printer
C. Projector
D. 3D printer

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9. Which storage device has spinning magnetic disks?

A. NVMe SSD
B. HDD
C. SSD
D. Flash drive

10. Which is the fastest storage in most new laptops?

A. NVMe SSD
B. DVD
C. Floppy disk
D. HDD

11. Which printer is best for fast, sharp text in a busy office?

A. 3D printer
B. Laser printer
C. Inkjet photo printer
D. Plotter for maps only

12. Headphones are usually plugged into the:

A. PS/2 port
B. VGA port
C. 3.5 mm audio jack
D. RJ45 port

13. Which is the main circuit board inside the system unit?

A. Motherboard
B. Router
C. Monitor
D. Keyboard

14. A wireless mouse usually connects using:

A. An HDMI cable
B. An RJ45 cable
C. A VGA cable
D. Bluetooth or a USB receiver

15. Which storage lets you open your files from any device with Internet?

A. ROM
B. Cloud storage
C. HDD inside one PC
D. RAM

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Structured Questions

1. (i) Name four ports found on a modern laptop. (2 marks)
(ii) State one use of each. (4 marks) *(6 marks)*

> Any four: USB-A – pen drive; USB-C – charging/data; HDMI – projector/TV; Thunderbolt – fast dock/display; RJ45 – network cable; audio jack – headphones.

2. Compare HDD and SSD under: (i) how data is stored (ii) speed (iii) cost per GB. *(6 marks)*

> (i) HDD – spinning magnetic disks; SSD – flash memory chips. (ii) HDD slower; SSD much faster. (iii) HDD cheaper per GB; SSD more expensive.

3. (i) What is a 3D printer? (2 marks)
(ii) Give two uses in Sri Lanka. (2 marks) *(4 marks)*

> (i) An output device that builds solid objects layer by layer from a digital 3D design.
> (ii) School science models; spare parts for machines; artificial limbs / dental models; architecture models.

4. State the difference between LED and OLED displays and give one place each is used. *(4 marks)*

> LED: LCD panel with LED backlight – cheaper; office monitors, TVs. OLED: each pixel lights itself – thinner, deep black, can bend; smartphones, premium TVs.

5. What are legacy ports? Name two and the modern port that replaced each. *(4 marks)*

> Old ports rarely used today. VGA → HDMI / DisplayPort; PS/2 → USB; parallel → USB (printers); serial → USB.

6. A student wants one cable to charge a laptop, connect a monitor and transfer files fast. Suggest the port and explain. (3 marks) *(3 marks)*

> USB-C with Thunderbolt (or USB-C with Power Delivery and DisplayPort mode). It carries power, video and high-speed data in one reversible cable.

Summary

- Desktop parts: system unit, monitor, keyboard, mouse.
- Motherboard connects CPU, RAM, storage; PSU gives power.
- Modern ports: USB-A, USB-C, HDMI, DisplayPort, Thunderbolt, RJ45, audio jack.
- Legacy ports (VGA, PS/2, serial, parallel) are mostly replaced.
- Displays: LED (backlit LCD) and OLED (self-lit pixels).
- Printers: inkjet, laser, and 3D printers that build objects.
- Storage: HDD, SSD, NVMe SSD, flash drives, cloud.

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- New laptops: USB-C/Thunderbolt, NVMe SSD, wireless peripherals.

MCQ answer key – 2.3

1. **A** – The system unit is the main case.
2. **C** – USB-C fits both ways.
3. **A** – HDMI carries both video and audio.
4. **B** – RJ45 is the network port.
5. **C** – Thunderbolt shares the USB-C connector.
6. **D** – VGA is an old analog video port.
7. **C** – OLED pixels are self-lit.
8. **D** – 3D printers add layers of material.
9. **B** – HDD = hard disk drive with platters.
10. **A** – NVMe SSDs connect directly to the motherboard.
11. **B** – Laser printers are fast for text.
12. **C** – The audio jack is for sound.
13. **A** – All parts plug into the motherboard.
14. **D** – Wireless peripherals use Bluetooth or a small dongle.
15. **B** – Cloud files live on Internet servers.

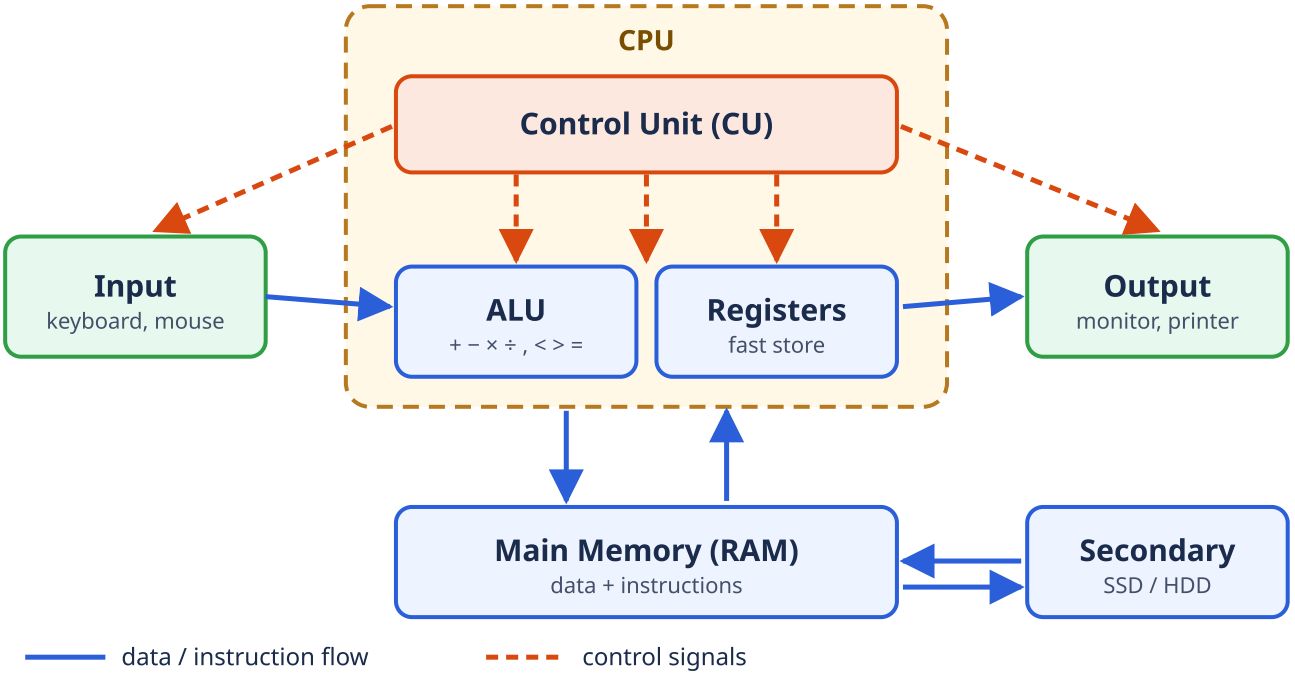
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G.C.E. O/L Grade 10 ICT · Lesson 2

2.4 Computer Block Diagram: ALU, Control Unit and Memory

A **block diagram** is a simple picture that shows the main parts of a computer as boxes and how data, instructions and control signals move between them. In this note you will learn the parts of the CPU – the **ALU**, the **Control Unit** and **registers** – and how they work with memory, input and output.

1. The block diagram



Block diagram of a computer. Solid blue arrows = data and instructions; dashed orange arrows = control signals from the Control Unit.

The diagram has **input** on the left, **output** on the right and the **CPU** in the middle. The CPU works closely with **main memory (RAM)**, and RAM gets programs and files from **secondary storage** (SSD/HDD).

2. Parts of the CPU

Control Unit (CU)
The 'manager'. Reads each instruction from memory, decodes it and sends **control signals** to tell every other part what to do and when.

Arithmetic Logic Unit (ALU)
The 'calculator'. Does **arithmetic** (+ − × ÷) and **logic** operations (compare: greater than, less than, equal; AND, OR, NOT).

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Registers
Very small, very fast memory places **inside** the CPU. They hold the instruction and the data being worked on right now.

💡 Think of a school canteen: the Control Unit is the manager giving orders, the ALU is the cashier doing the sums, registers are the cashier's hand holding the coins right now, and RAM is the counter where today's items are kept.

3. Memory in the diagram

- **Main memory (RAM)** holds the programs and data the CPU is using now. It is fast but loses data when power is off.
- **ROM** keeps start-up (boot) instructions permanently.
- **Cache** is very fast memory between RAM and the CPU to save time.
- **Secondary storage** keeps everything permanently; files are loaded from it into RAM.

4. Three kinds of flow (signals)

Flow	What moves	Example
Data flow	Numbers, text, pictures being processed	Marks 45 and 38 go from RAM to the ALU
Instruction flow	Program steps (what to do)	'ADD the two marks' goes from RAM to the CU
Control signals	Commands from the CU (read, write, start, stop)	CU tells the ALU 'add now' and RAM 'store result'

5. The machine cycle (fetch – decode – execute)

Fetch
The CU gets the next instruction from RAM.

Decode
The CU works out what the instruction means.

Execute
The ALU (or another part) does the job and the result is stored.

Example: adding two marks. **Input** – the teacher types 45 and 38. They go to **RAM**. The **CU** fetches the 'add' instruction, the **ALU** adds them (83), the answer is kept in a **register**, then stored in RAM and shown on the **monitor** (output).

NEW 2026 Modern CPUs have many **cores** (each core is like a mini CPU with its own CU and ALU) so phones and laptops can do many jobs at once. Many also have a **GPU** for graphics and an **NPU** for AI tasks like voice typing in Sinhala.

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Key Words

Block diagram – A diagram that shows the main parts of a system as boxes joined by arrows.

Control Unit – Part of the CPU that fetches and decodes instructions and sends control signals.

ALU – Arithmetic Logic Unit – does calculations and comparisons.

Register – A tiny, very fast memory location inside the CPU.

Main memory – RAM – holds programs and data the CPU is using now.

Cache – Very fast memory between the CPU and RAM.

Control signal – A command sent by the CU to other parts (read, write, start).

Data flow – Movement of data between parts of the computer.

Instruction – One step of a program telling the CPU what to do.

Fetch-decode-execute – The repeating cycle the CPU uses to run each instruction.

Core – A processing unit inside a CPU; multi-core CPUs do many jobs at once.

Logic operation – A comparison or decision such as greater than, equal, AND, OR.

Sample Q&A

1. Name the three main parts of the CPU.

> **Answer:** Control Unit (CU), Arithmetic Logic Unit (ALU) and registers.

2. What is the job of the Control Unit?

> **Answer:** It fetches and decodes instructions and sends control signals to manage all parts.

3. Give two operations done by the ALU.

> **Answer:** Arithmetic (e.g. addition) and logic (e.g. comparing if A > B).

4. What are registers?

> **Answer:** Tiny, very fast memory locations inside the CPU that hold the current instruction and data.

5. List the steps of the machine cycle.

> **Answer:** Fetch, decode, execute (then store the result).

6. What is the difference between data flow and control signals?

> **Answer:** Data flow carries the data being processed; control signals are commands from the CU telling parts what to do.

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MCQ

1. Which part of the CPU does calculations and comparisons?

A. RAM
B. Monitor
C. ALU
D. Control Unit

2. Which part sends control signals to all other parts?

A. ALU
B. Hard disk
C. Control Unit
D. Keyboard

3. Tiny, very fast memory locations inside the CPU are called:

A. Registers
B. Ports
C. Peripherals
D. SSDs

4. Comparing whether 45 is greater than 38 is a(n):

A. Input operation
B. Storage operation
C. Output operation
D. Logic operation

5. What is the correct order of the machine cycle?

A. Decode → Execute → Fetch
B. Fetch → Execute → Decode
C. Fetch → Decode → Execute
D. Execute → Fetch → Decode

6. In a block diagram, the dashed arrows from the CU usually show:

A. Printer paper
B. Control signals
C. Internet links
D. Electricity cables

7. Which memory holds the program the CPU is running right now?

A. Cloud storage
B. Pen drive
C. DVD
D. RAM (main memory)

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8. Which memory stores the start-up (boot) instructions permanently?

A. ROM
B. Cache
C. RAM
D. Register

9. Very fast memory placed between the CPU and RAM is:

A. Flash drive
B. Cache
C. HDD
D. ROM

10. During ‘decode’, the Control Unit:

A. Turns off the computer
B. Works out what the instruction means
C. Prints the result
D. Saves to the cloud

11. Data typed on the keyboard goes FIRST to:

A. Main memory (RAM)
B. The ALU directly, skipping memory always
C. The printer
D. The monitor only

12. A multi-core CPU means:

A. It uses only analog data
B. It has several processing units to do many jobs at once
C. It has many keyboards
D. It has no memory

13. Which of these is NOT part of the CPU?

A. Control Unit
B. Registers
C. ALU
D. Hard disk

14. ‘ADD the two numbers’ is an example of a(n):

A. Instruction
B. Port
C. Peripheral
D. Network

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Structured Questions

1. (i) Draw a labelled block diagram of a computer. (4 marks)
(ii) Show data flow and control signals using two kinds of arrows. (2 marks) *(6 marks)*

> (i) Boxes: Input → CPU (Control Unit, ALU, registers) ↔ Main memory → Output; secondary storage ↔ memory.
> (ii) Solid arrows for data/instructions; dashed arrows from CU to all parts for control signals; include a key.

2. State the function of: (i) Control Unit (ii) ALU (iii) registers. *(6 marks)*

> (i) Fetches and decodes instructions; sends control signals to coordinate all parts. (ii) Does arithmetic (+ − × ÷) and logic (compare, AND/OR/NOT). (iii) Hold the current instruction, data and results temporarily inside the CPU.

3. Explain the fetch-decode-execute cycle with an example. *(4 marks)*

> Fetch – CU gets the instruction (e.g. ADD 45, 38) from RAM; Decode – CU understands it is an addition; Execute – ALU adds and gives 83; result stored in a register/RAM. The cycle repeats for the next instruction.

4. Distinguish between data flow, instruction flow and control signals. (3 marks) *(3 marks)*

> Data flow – values being processed (e.g. marks). Instruction flow – program steps going from memory to the CU. Control signals – commands from the CU (read, write, add) to other parts.

5. Give two differences between RAM and registers. *(4 marks)*

> Location: registers are inside the CPU, RAM is outside on the motherboard. Size: registers are tiny (bytes), RAM is large (GB). Speed: registers are faster.

6. Why do modern phones have multi-core CPUs and an NPU? (3 marks) *(3 marks)*

> Multi-core: several cores run many apps/tasks at the same time, so the phone is faster. NPU: special unit for AI tasks (face unlock, voice typing, photo enhancement) – faster and uses less battery.

Summary

- A block diagram shows input, CPU, memory, storage and output with arrows.
- CPU = Control Unit + ALU + registers.
- Control Unit fetches/decodes instructions and sends control signals.
- ALU does arithmetic and logic (comparisons).
- Registers and cache are tiny, very fast memories; RAM holds running programs; ROM holds boot instructions.

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- Three flows: data, instructions and control signals.
- Machine cycle: fetch → decode → execute → store.
- Modern CPUs: many cores, GPU for graphics, NPU for AI.

MCQ answer key – 2.4

1. **C** – ALU = Arithmetic Logic Unit.
2. **C** – The CU is the manager.
3. **A** – Registers hold current data and instructions.
4. **D** – Comparisons are logic operations done by the ALU.
5. **C** – First get, then understand, then do.
6. **B** – Control signals are drawn differently from data flow.
7. **D** – Programs are loaded into RAM to run.
8. **A** – ROM is non-volatile.
9. **B** – Cache speeds up access.
10. **B** – Decode = understand the instruction.
11. **A** – Input data is stored in memory before processing.
12. **B** – Each core can process separately.
13. **D** – The hard disk is secondary storage outside the CPU.
14. **A** – An instruction tells the CPU what to do.

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G.C.E. O/L Grade 10 ICT · Lesson 2

2.5 Computer Networks: LAN, MAN, WAN and Devices

A **computer network** is two or more computers or devices connected to share data and resources. Your school lab, your home Wi-Fi and the Internet are all networks. In this note you will learn why we use networks, the cables and wireless media, network devices (NIC, modem, hub, switch, router), types of networks (PAN, LAN, MAN, WAN) and staying safe online.

1. Why do we use networks?

- **Data communication** – send messages, emails and files (WhatsApp, Gmail).
- **Resource sharing** – share one printer, one Internet connection or files in a school lab.
- **Collaboration** – work together online with Google Docs, Zoom, Microsoft Teams or Google Meet.
- **Central storage and backup** – keep files on a server or in the cloud.

2. Transmission media

Data travels through a **medium**. **Guided (wired)** media use cables. **Unguided (wireless)** media send signals through the air.

Medium	Type	Features / use
Twisted pair (UTP, Cat6)	Guided	Cheap, easy; LAN cables in labs and offices with RJ45 plugs
Coaxial cable	Guided	Thick copper core with shield; cable TV, CCTV
Fibre optic	Guided	Light through glass; fastest, long distance, no electrical noise; fibre broadband
Wi-Fi (radio)	Unguided	Home and school wireless LAN; Wi-Fi 6 is faster and handles many devices
Bluetooth	Unguided	Short range (about 10 m); earbuds, smart watch, file sharing
Mobile 4G / 5G	Unguided	Mobile data from towers; 5G is very fast with low delay
Microwave / satellite	Unguided	Long-distance links, TV broadcast, satellite Internet

3. Network devices

NIC (Network Interface Card)
Lets a computer join a network. **Internal** NIC is built into the motherboard; **external** NIC plugs into USB (e.g. USB Wi-Fi adapter).

Modem
Changes digital computer signals to signals for the phone line/fibre/mobile network and back (modulate–demodulate).

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Hub
Connects computers in a LAN but sends data to **all** ports. Simple, old, slower.

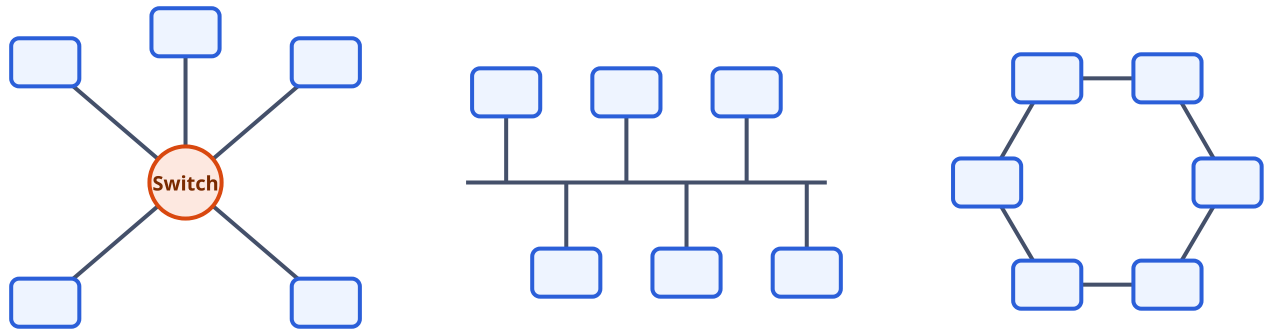
Switch
Connects computers in a LAN and sends data **only** to the correct computer. Faster and safer than a hub.

Router
Connects different networks (e.g. home LAN to the Internet) and finds the best path for data. Home routers often include Wi-Fi and a modem.

A **Network Operating System (NOS)** manages users, security, files and printers on a network server – for example Windows Server or Linux server.

4. Types of networks by area

Type	Area	Example
PAN – Personal Area Network	A few metres around one person	Phone + Bluetooth earbuds + smart watch
LAN – Local Area Network	One building or campus	School computer lab, home Wi-Fi
MAN – Metropolitan Area Network	A city	Network linking bank branches or university campuses across Colombo
WAN – Wide Area Network	Country or world	The Internet; a bank network across Sri Lanka



Common LAN layouts (topologies): star (all computers to a switch – most common today), bus (one shared cable) and ring.

5. Advantages and disadvantages of networks

Advantages	Disadvantages
Share printers, files and Internet – saves money	Viruses and malware can spread quickly
Fast communication (email, chat, video calls)	Hacking and data theft risk
Central backup and security control	Cost of cables, devices and skilled staff

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Online learning and collaboration	If the server or router fails, many users are affected

NEW 2026 Sri Lanka 2026: fibre broadband (FTTH) reaches many homes, 4G covers most of the island and 5G trials are running in cities. Wi-Fi 6 routers are common. Students use Zoom, Teams and Google Meet for classes and Google Drive / OneDrive for shared work.

6. Stay safe on networks

- **Phishing** – fake messages or websites that trick you into giving passwords or bank details. Check the link; never share OTPs.
- **Ransomware** – malware that locks your files and asks for money. Keep backups and update software.
- Use strong Wi-Fi passwords (WPA3/WPA2), a firewall and two-step verification.

Key Words

Computer network – Two or more connected devices that share data and resources.	**Resource sharing** – Using one printer, file or Internet connection from many computers.
NIC – Network Interface Card – hardware that connects a computer to a network.	**Guided media** – Wired media such as twisted pair, coaxial and fibre optic cable.
Unguided media – Wireless media such as Wi-Fi, Bluetooth, 4G/5G and satellite.	**Fibre optic** – Cable that carries data as light; fastest and long distance.
Modem – Converts digital signals to line signals and back.	**Switch** – Connects LAN devices and sends data only to the right one.
Router – Connects different networks and chooses the best path.	**LAN** – Local Area Network in one building, e.g. a school lab.
WAN – Wide Area Network covering a country or the world, e.g. the Internet.	**Phishing** – A trick using fake messages to steal passwords or bank details.

Sample Q&A

1. What is a computer network?

Answer: Two or more computers or devices connected to share data and resources.

2. Give two purposes of a network.

Answer: Data communication and resource sharing (also collaboration, central backup).

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3. What is the difference between a hub and a switch?

> **Answer:** A hub sends data to all computers; a switch sends data only to the correct computer.

4. Name two guided and two unguided media.

> **Answer:** Guided: twisted pair, fibre optic (coaxial). Unguided: Wi-Fi, Bluetooth (4G/5G, satellite).

5. Give an example of a PAN, LAN and WAN.

> **Answer:** PAN – phone with Bluetooth earbuds; LAN – school computer lab; WAN – the Internet.

6. What is phishing and how can you avoid it?

> **Answer:** Fake messages/websites that steal passwords. Check links, never share OTPs or passwords, use two-step verification.

MCQ

1. The main purpose of a computer network is to:

A. Stop using printers
B. Make computers heavier
C. Replace the CPU
D. Share data and resources

2. Which hardware lets a computer connect to a network?

A. Monitor
B. ALU
C. NIC
D. ROM

3. Which cable carries data as pulses of light?

A. Fibre optic
B. Coaxial
C. Power cable
D. Twisted pair

4. Which is an unguided (wireless) medium?

A. Twisted pair
B. Bluetooth
C. Coaxial cable
D. Fibre optic

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5. Which device sends data ONLY to the correct computer in a LAN?

A. Switch
B. Modem
C. Speaker
D. Hub

6. Which device connects a home network to the Internet and chooses the best path?

A. Printer
B. Keyboard
C. Router
D. Hub

7. A modem is used to:

A. Store files permanently
B. Print documents
C. Convert digital signals to line signals and back
D. Do calculations

8. A school computer lab network in one building is a:

A. WAN
B. Satellite
C. MAN
D. LAN

9. The Internet is the best example of a:

A. LAN
B. PAN
C. WAN
D. Hub

10. A phone connected to Bluetooth earbuds and a smart watch forms a:

A. PAN
B. MAN
C. Mainframe
D. WAN

11. A network linking bank branches across Colombo city is a:

A. Bluetooth
B. MAN
C. LAN
D. PAN

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12. Which is a disadvantage of computer networks?

A. Messages are sent fast
B. Viruses can spread quickly
C. Printers can be shared
D. Files can be backed up centrally

13. You get an SMS: 'Your bank account is blocked. Click this link and enter your PIN.' This is:

A. Phishing
B. Resource sharing
C. A software update
D. Data backup

14. Malware that locks files and asks for payment is called:

A. Router
B. Firewall
C. Cloud
D. Ransomware

15. Which software manages users, files and security on a network server?

A. Word processor
B. Network Operating System
C. Web browser only
D. Photo editor

Structured Questions

1. (i) Define a computer network. (2 marks)
(ii) Give two advantages and two disadvantages of networks. (4 marks) *(6 marks)*

> (i) Two or more computers/devices connected by a medium to share data and resources.
> (ii) Advantages: share printers/Internet/files; fast communication; central backup; collaboration.
> Disadvantages: virus spread; hacking; setup cost; server failure affects all.

2. Compare twisted pair, coaxial and fibre optic cables under speed and one use each. *(6 marks)*

> Twisted pair – moderate speed; LAN in labs. Coaxial – moderate; cable TV / CCTV. Fibre optic – fastest, long distance; fibre broadband / backbone links.

3. State the function of: (i) NIC (ii) switch (iii) router (iv) modem. *(4 marks)*

> (i) Connects a computer to a network. (ii) Connects LAN devices, sends data only to the destination. (iii) Connects different networks, chooses best path (home to Internet). (iv) Converts digital ↔ line signals.

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4. Classify these as PAN, LAN, MAN or WAN: (a) school lab (b) Internet (c) smart watch with phone (d) university campuses linked across Kandy city. *(4 marks)*

> (a) LAN (b) WAN (c) PAN (d) MAN.

5. Explain two ways a student can stay safe from phishing and ransomware. (4 marks) *(4 marks)*

> Check links/sender before clicking and never share passwords or OTPs; use two-step verification; keep regular backups (cloud/external); update OS and antivirus; don't open unknown attachments.

6. Give two ways new technologies (Wi-Fi 6, 5G, fibre, cloud) help students in Sri Lanka. (3 marks) *(3 marks)*

> Faster, stable Internet for Zoom/Teams/Meet online classes; many devices in a home/lab work together (Wi-Fi 6); share and edit projects in Google Drive/OneDrive; access e-learning (e-thaksalawa) anywhere.

Summary

- A network connects devices to share data and resources.
- Guided media: twisted pair, coaxial, fibre optic (fastest).
- Unguided media: Wi-Fi (Wi-Fi 6), Bluetooth, 4G/5G, microwave, satellite.
- Devices: NIC (internal/external), modem, hub, switch, router; NOS manages the server.
- Hub sends to all; switch sends only to the right computer.
- By area: PAN < LAN < MAN < WAN (Internet).
- Advantages: sharing, communication, backup; disadvantages: viruses, hacking, cost.
- Stay safe: spot phishing, back up against ransomware, use strong passwords.

MCQ answer key – 2.5

1. **D** – Networks let devices communicate and share.
2. **C** – Network Interface Card.
3. **A** – Fibre uses light through glass.
4. **B** – Bluetooth uses radio waves.
5. **A** – A switch learns addresses.
6. **C** – Routers join different networks.
7. **C** – Modulator–demodulator.
8. **D** – Local Area Network.
9. **C** – It covers the whole world.
10. **A** – Personal Area Network.
11. **B** – Metropolitan Area Network = city.
12. **B** – Malware spreads over networks.

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13. **A** – Fake messages asking for secrets are phishing.
14. **D** – Ransom = payment demand.
15. **B** – A NOS such as Windows Server or Linux.

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