G.C.E. O/L Grade 10 ICT · Lesson 2

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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