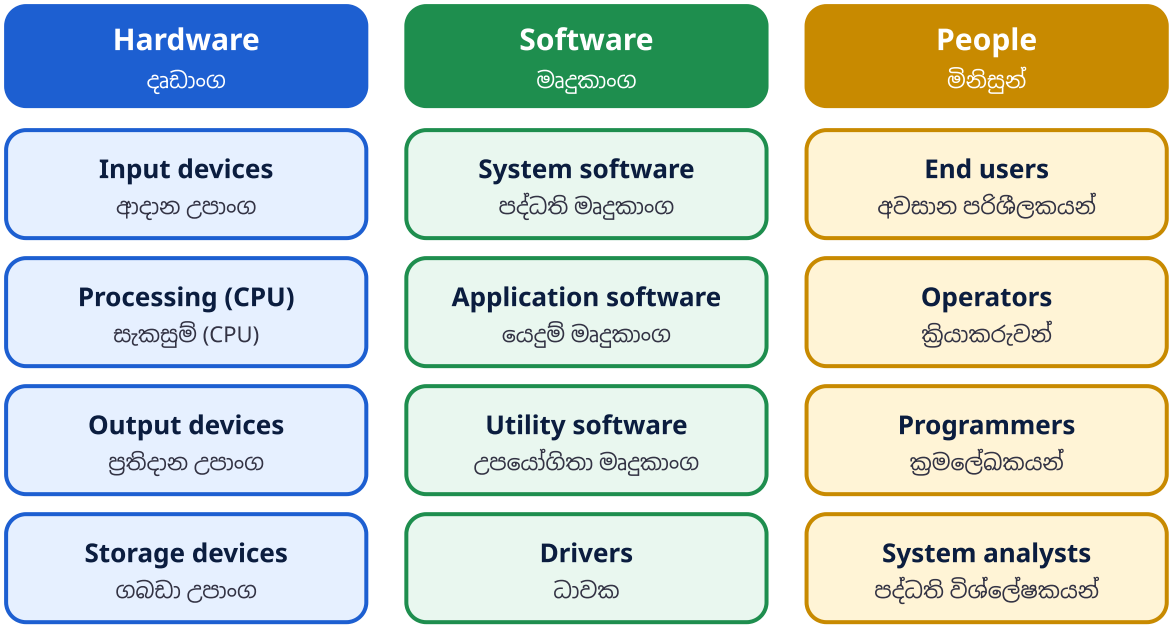
Grade 12 A/L ICT · Lesson 1

# 1.4 Components of a Computer System: Hardware, Software and People

**Syllabus 1.4.** A computer system has three main kinds of parts: **hardware** (the parts you can touch), **software** (the programs that tell the hardware what to do) and **people** (the human operators who use and look after the system). In this part you classify hardware and software, compare **proprietary** and **open source** software, and see why people are still needed.




The three components of a computer system.

## 1. Hardware

**Hardware** is the physical parts of a computer. We classify hardware by its job in the IPO model:

| Class | Job | Examples |
|---|---|---|
| Input devices | Enter data | Keyboard, mouse, scanner, microphone, touch screen, sensors |
| Processing devices | Process data | CPU, GPU |
| Output devices | Show results | Monitor, printer, speaker, projector |
| Storage devices | Keep data | RAM (primary), hard disk, SSD, flash drive (secondary) |
| Communication devices | Connect to networks | Network card, router, modem |

💡 Some devices do two jobs: a touch screen is both input and output.

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## 2. Software

**Software** is the set of programs (instructions) that make the hardware work. It is classified into:

| Class | Purpose | Examples |
|---|---|---|
| System software – operating system | Manages hardware and runs other programs | Windows, Linux, Android, macOS |
| System software – utility software | Maintains and protects the computer | Antivirus, disk cleanup, backup, compression |
| System software – device drivers | Let the OS talk to a device | Printer driver, graphics driver |
| System software – language translators | Change program code to machine code | Compiler, interpreter, assembler |
| Application software | Does a task for the user | Word processor, spreadsheet, web browser, games, payroll |

Application software can be **general purpose** (word processors, spreadsheets – many users) or **special purpose / tailor-made** (a hospital patient system made for one organisation).

## 3. Proprietary software and open source software

**Proprietary (closed source) software** is owned by a company. Users buy a **licence** to use it, but cannot see or change the source code. Examples: Microsoft Windows, Microsoft Office, Adobe Photoshop. **Open source software (OSS)** has its source code freely available; anyone can use, study, change and share it under its licence. Examples: Linux, LibreOffice, Mozilla Firefox, GIMP, Python.

| | Proprietary | Open source |
|---|---|---|
| Source code | Hidden | Open to all |
| Cost | Usually must buy a licence | Usually free |
| Advantages | Official support, tested, easy to use, regular updates | Free, can be changed, many people check for bugs, no vendor lock-in |
| Disadvantages | Costly, cannot change it, depends on one company | Support may be only from the community, some may be harder to learn |

> 🧮 **Worked example: A school needs an office suite for 40 computers. A proprietary licence costs Rs. 25,000 per computer.**
> Proprietary cost = 40 × 25,000 = **Rs. 1,000,000**. An open source office suite such as LibreOffice costs **Rs. 0** for licences. The school must still think about training and support.

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> 💡 Free of cost (freeware) is not the same as open source. Freeware can be free to use while its code is still closed.

### 4. Human operators (people)

Hardware and software do nothing useful without people. Information systems need people to give instructions, enter data, make decisions, handle unusual cases and take responsibility.

| Role | What they do |
|---|---|
| End user | Uses the system for daily work (cashier, teacher) |
| Data entry operator | Types data into the system accurately |
| System analyst | Studies needs and designs the system |
| Programmer / software engineer | Writes and tests programs |
| System / network administrator | Keeps computers and networks running and secure |
| Database administrator | Manages and protects the database |

🚀 **Beyond the syllabus (2026 update)** *Not required for the exam – read for interest.* **Open source licences.** Open source software comes with a licence that sets the rules. **Permissive** licences (MIT, Apache 2.0, BSD) let you reuse the code even in closed products if you keep the copyright notice. **Copyleft** licences (GNU GPL) say that if you share a changed version, you must also share your source code under the GPL. Today many AI models are also released with open licences.

## Key Words

**Hardware** – The physical parts of a computer that can be touched.

**Software** – Programs that tell the hardware what to do.

**System software** – Software that runs and manages the computer itself.

**Application software** – Software that does a task for the user.

**Operating system** – System software that manages hardware and runs programs.

**Utility software** – Programs that maintain and protect the computer.

**Device driver** – Software that lets the OS control a device.

**Proprietary software** – Software owned by a company with hidden source code.

**Open source software** – Software whose source code anyone may use, change and share.

**Source code** – The program instructions written by programmers.

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**Licence** – Legal permission that sets how software may be used.

**Human operator** – A person who uses or runs an information system.

**System analyst** – A person who studies needs and designs systems.

## Sample Q&A

**1. Name the three main components of a computer system.**

> **Answer:** Hardware, software and people (human operators).

**2. Classify hardware into four groups with one example each.**

> **Answer:** Input – keyboard; processing – CPU; output – printer; storage – SSD.

**3. Distinguish system software from application software.**

> **Answer:** System software runs and manages the computer (e.g. an OS). Application software does a task for the user (e.g. a spreadsheet).

**4. Give two advantages of open source software.**

> **Answer:** It is usually free, and the source code can be studied and changed to suit the user.

**5. Give two disadvantages of proprietary software.**

> **Answer:** Licences cost money, and users cannot change the code and depend on one company.

**6. Why are human operators needed in ICT systems?**

> **Answer:** To give instructions, enter data, make decisions, handle unusual cases, maintain the system and take responsibility.

## MCQ

**1. Which is an example of system software?**

A. A web browser
B. A spreadsheet
C. Linux
D. A payroll system
E. A game

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**2. Antivirus software belongs to:**

A. Utility software
B. Hardware
C. Device drivers
D. Input devices
E. Application software only

**3. Which software lets the OS control a new printer?**

A. Word processor
B. Firewall
C. Spreadsheet
D. Compiler
E. Device driver

**4. Which of these is open source?**

A. Microsoft Windows
B. LibreOffice
C. macOS
D. Microsoft Office
E. Adobe Photoshop

**5. 40 computers × Rs. 25,000 licence each = ?**

A. Rs. 625,000
B. Rs. 100,000
C. Rs. 1,000,000
D. Rs. 10,000,000
E. Rs. 25,040

**6. A touch screen is:**

A. System software
B. Only storage
C. Only an input device
D. Both an input and an output device
E. A processing device

**7. The main feature of proprietary software is:**

A. Anyone can change it
B. It is always free
C. It is hardware
D. Its source code is hidden and owned by a company
E. It has no licence

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**8. Who studies user needs and designs a new information system?**

A. Cashier
B. System analyst
C. Printer
D. Data entry operator
E. End user

**9. RAM is classified as:**

A. Secondary storage
B. A network
C. Output device
D. Application software
E. Primary storage

**10. Freeware is:**

A. Free to use but may still be closed source
B. A type of hardware
C. Always proprietary and paid
D. Always open source
E. Illegal software

**11. A hospital system made only for one hospital is:**

A. Hardware
B. Tailor-made (special purpose) software
C. A device driver
D. General purpose software
E. Utility software

**12. Which translates a whole program into machine code before running?**

A. Interpreter
B. Browser
C. Compiler
D. Antivirus
E. Device driver

**13. Which term means: “The physical parts of a computer that can be touched”?**

A. System software
B. Proprietary software
C. Licence
D. Utility software
E. Hardware

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**14. Which term means: “Programs that tell the hardware what to do”?**

A. Software
B. Open source software
C. Human operator
D. Application software
E. Device driver

**15. Which term means: “Software that runs and manages the computer itself”?**

A. System analyst
B. Proprietary software
C. Source code
D. System software
E. Operating system

**16. Which term means: “Software that does a task for the user”?**

A. Hardware
B. Open source software
C. Licence
D. Application software
E. Utility software

**17. Which term means: “System software that manages hardware and runs programs”?**

A. Software
B. Source code
C. Human operator
D. Device driver
E. Operating system

**18. Which term means: “Programs that maintain and protect the computer”?**

A. System software
B. Utility software
C. Proprietary software
D. System analyst
E. Licence

**19. Which term means: “Software that lets the OS control a device”?**

A. Human operator
B. Hardware
C. Device driver
D. Application software
E. Open source software

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**20. Which term means: "Software owned by a company with hidden source code"?**

A. Proprietary software
B. Operating system
C. System analyst
D. Software
E. Source code

## Structured Questions

**1. Classify software into system and application software. Give two examples of each and explain the purpose of each class.** *(2 marks)*

> System software runs and manages the computer – Windows, antivirus; application software does tasks for users – spreadsheet, web browser

**2. Distinguish proprietary software from open source software and give one advantage and one disadvantage of each.** *(6 marks)*

> Proprietary – owned, hidden code, licence fee; advantage official support; disadvantage cost; open source – code open, usually free; advantage can be changed; disadvantage support mainly from the community

**3. A school has 40 computers. A proprietary office licence is Rs. 25,000 each. (a) Calculate the total cost. (b) Suggest an open source option and one thing the school must still plan for.** *(3 marks)*

> (a) 40 × 25,000 = Rs. 1,000,000; (b) LibreOffice; teacher and student training

**4. Classify the hardware of a supermarket POS system into input, process, output and storage.** *(4 marks)*

> Input – bar code reader, keyboard, card reader; process – CPU; output – receipt printer, customer display; storage – hard disk or SSD holding the product database

**5. Explain the role of three types of human operators in a bank information system.** *(3 marks)*

> End users (tellers) enter transactions and serve customers; the database administrator protects account data; the network administrator keeps branch networks and ATMs connected and secure

## Summary

- A computer system = hardware + software + people.
- Hardware: input, processing, output, storage and communication devices.
- Software: system (OS, utilities, drivers, translators) and application.

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- Proprietary: closed code, licence fee. Open source: open code, usually free.
- People give instructions, enter data, decide and maintain systems.

## MCQ answer key – 1.4

1. **C** – Linux is an operating system.
2. **A** – It maintains and protects the computer.
3. **E** – Drivers connect OS and device.
4. **B** – Its source code is open.
5. **C** – 40 × 25,000 = 1,000,000.
6. **D** – You touch (input) and see (output).
7. **D** – Closed source.
8. **B** – Analysis and design.
9. **E** – Main memory.
10. **A** – Free price ≠ open code.
11. **B** – Built for one organisation.
12. **C** – An interpreter translates line by line.
13. **E** – Hardware – The physical parts of a computer that can be touched.
14. **A** – Software – Programs that tell the hardware what to do.
15. **D** – System software – Software that runs and manages the computer itself.
16. **D** – Application software – Software that does a task for the user.
17. **E** – Operating system – System software that manages hardware and runs programs.
18. **B** – Utility software – Programs that maintain and protect the computer.
19. **C** – Device driver – Software that lets the OS control a device.
20. **A** – Proprietary software – Software owned by a company with hidden source code.

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