

Collegedunia NCERT Notes

NCERT Notes for Class 11 Informatics Practices (2026-27 Syllabus)

Chapter 1: Computer System

Computer System class 11 informatics practices notes for the 2026-27 syllabus. These notes explain hardware, memory, software, data safety, and revision points in a clear exam-ready format.

Also see for this chapter:

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1 Computer System at a Glance

A computer system is a working set of hardware, software, data, and users. The chapter begins with this idea because every later topic depends on the same cycle: input enters, processing happens, output appears, and storage keeps useful results.

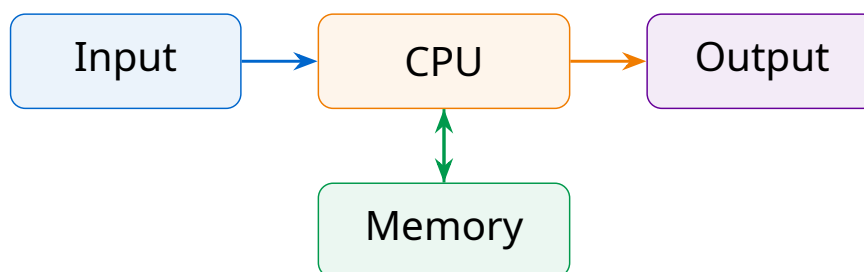
1.1 Meaning and Working Cycle

A computer is an electronic device that accepts data, processes it by following instructions, and produces output. The complete computer system includes the device, its software, stored data, and connected input and output units.

- **Input:** raw facts enter through a keyboard, mouse, scanner, sensor, camera, microphone, or touch screen.
- **Processing:** the CPU performs arithmetic, logic, comparison, and control operations.
- **Output:** processed information appears on a monitor, printer, speaker, projector, or braille display.
- **Storage:** data and programs stay in memory for current work or future use.

Core Idea

A computer system is useful only when hardware and software work together. Hardware gives physical capacity, while software gives instructions that make the hardware perform a task.



Data and instructions move between input, CPU, memory, and output

Input Process Output

For short answers, write the cycle as **Input** → **Process** → **Output** → **Storage**. Then add one example for each stage.

1.2 Main Hardware Parts

The NCERT chapter groups the visible and internal parts into CPU, memory, input devices, output devices, and secondary storage. These parts communicate through electrical signals and data paths.

Part	Role	Examples
CPU	Executes instructions and controls the system	Processor chip, ALU, CU, registers
Primary memory	Holds active data and programs	RAM, ROM, cache
Input devices	Convert user action or data into digital form	Keyboard, mouse, scanner, touch screen
Output devices	Convert digital output into readable form	Monitor, speaker, printer, projector
Secondary storage	Stores data permanently	HDD, SSD, pen drive, DVD, memory card

Daily Example

When a student types a project, the keyboard sends input, the word processor runs in RAM, the CPU processes keystrokes, the monitor shows output, and the file is saved on storage.

1.3 Why the Same System Has Many Forms

Computer systems differ in size and purpose. A server may handle many users at once, while a smartphone handles personal communication, media, apps, and location services.

- **Desktop and laptop:** general study, office, programming, and design work.
- **Server:** shared storage, websites, databases, and user accounts.
- **Tablet and smartphone:** portable computing with touch, camera, sensors, and apps.
- **Embedded computer:** a focused controller inside a car, washing machine, camera, or smart appliance.

Do Not Equate Computer with CPU

The CPU is only one part of the computer system. A complete system also needs memory, input, output, storage, software, and power.

2 Central Processing Unit and Devices

The CPU is the processing centre of the computer system. Input and output devices connect the human world to the digital world, so this section links CPU work with the devices around it.

2.1 CPU, ALU, CU, and Registers

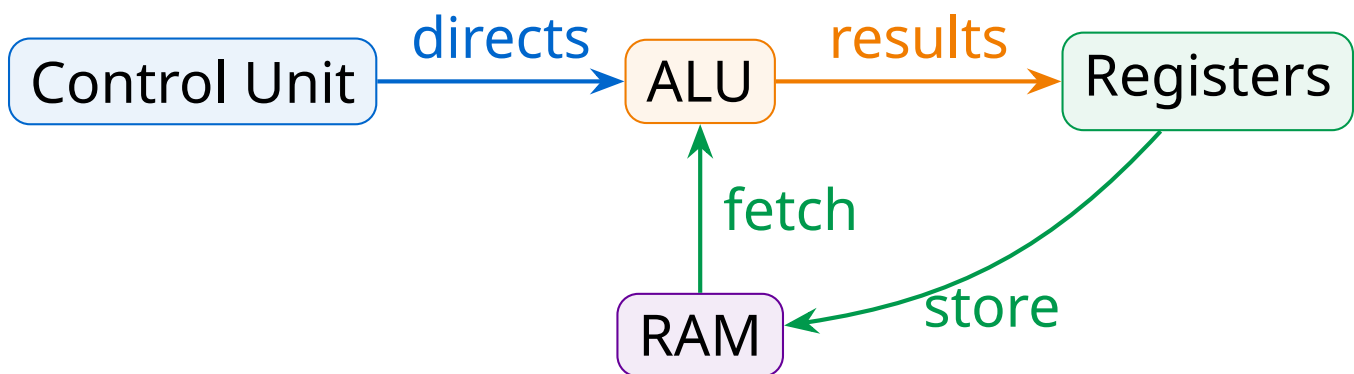
The CPU carries out actual processing and is often called the processor. It fetches instructions and data from memory, performs required operations, and stores results back in memory.

- **Arithmetic Logic Unit:** performs arithmetic operations and logical comparisons.
- **Control Unit:** controls instruction flow, memory access, and communication with input and output devices.
- **Registers:** very small and fast storage locations inside the CPU.
- **Integrated circuit:** the physical chip that contains electronic circuits made from semiconductor material.

Fetch Execute Store Cycle

Instruction cycle = Fetch + Decode + Execute + Store

This expression is not a numerical formula. It is a compact way to remember CPU work.



Registers are Local Memory

Registers reduce delay because the CPU can use them directly during processing. They hold current instructions, data, addresses, or intermediate results.

2.2 Input Devices

Input devices send data or control signals to the computer. They convert human action, printed content, sound, images, or sensor readings into digital form that the system can process.

- **Keyboard:** enters text, numbers, and commands.
- **Mouse and touch screen:** select, drag, scroll, and control the pointer or screen interface.
- **Scanner and camera:** capture printed text, images, or visual data.
- **Microphone:** captures sound for recording, calling, or voice search.
- **Barcode reader:** captures product data in shops and libraries.

Input Device Clue

If a device sends data **to** the computer, classify it as input. If it receives data **from** the computer, classify it as output.

2.3 Output Devices

Output devices receive processed data from the computer and convert it into a form humans can use. The form may be visual, printed, audio, or tactile.

Device	Output Form	Use
Monitor	Soft copy display	Viewing text, images, videos, code, and forms
Printer	Hard copy output	Printing reports, bills, assignments, and designs
Speaker	Audio output	Music, alerts, narration, and calls
Projector	Large visual output	Classroom teaching and presentations
Braille display	Tactile output	Reading text through raised braille cells

3D Printing

A 3D printer creates a physical object from a digital 3D model. It is used for prototypes, models, and medical experiments.

2.4 Device Choice in Real Tasks

The best input or output device depends on the task, accuracy, speed, accessibility, and cost. A school lab may choose durable keyboards and monitors, while a hospital may choose barcode readers, scanners, and specialised displays.

- **Accuracy:** barcode readers reduce typing errors in billing.
- **Accessibility:** braille keyboards and displays help visually challenged users.
- **Speed:** touch screens speed up kiosks and ticket counters.
- **Output quality:** laser printers suit sharp text, while inkjet printers suit colour images.

Printer Type Confusion

Inkjet, laser, and dot matrix are printer types. A scanner is not a printer because it sends image data into the computer.

3 Computer Memory and Storage

Memory stores data and instructions for processing. NCERT separates fast internal memory from larger secondary storage, and this difference is central to the whole chapter.

3.1 Bits, Bytes, and Measurement Units

A computer stores data in binary form. The binary digits 0 and 1 are called bits. Eight bits form one byte, and larger units are built by grouping bytes.

Unit	Relation	Use in Daily Language
Bit	0 or 1	Smallest storage unit
Nibble	4 bits	Half byte, useful in binary grouping
Byte	8 bits	Stores a character in many encodings
KB	1024 bytes	Small documents and icons
MB	1024 KB	Images, songs, app files
GB	1024 MB	Movies, games, phone storage
TB	1024 GB	External drives and servers

Memory Conversion Ladder

$$1 \text{ KB} = 1024 \text{ bytes}, \quad 1 \text{ MB} = 1024 \text{ KB}, \quad 1 \text{ GB} = 1024 \text{ MB}$$

Use the factor 1024 for standard binary memory conversions in school questions.

Bit to Bigger Units

Remember **B-K-M-G-T**: Byte, Kilobyte, Megabyte, Gigabyte, Terabyte. Each step is usually 1024 times the previous unit.

3.2 Primary Memory: RAM and ROM

Primary memory is directly used by the CPU. Programs and data are loaded into primary memory before processing starts.

- **RAM:** volatile memory used for active work. Contents disappear when power turns off.
- **ROM:** non-volatile memory used for permanent startup instructions.
- **Main memory:** common name for RAM because the CPU uses it heavily while the system runs.
- **Boot loader:** startup program stored in ROM that helps load the operating system into RAM.

Volatile and Non-volatile

Volatile memory loses contents when power stops. Non-volatile memory keeps contents even after power is switched off.

3.3 Cache Memory and Speed Gap

The CPU is faster than RAM. Cache memory is placed between the CPU and RAM to store copies of frequently used data, reducing average access time.



Speed falls as capacity and distance from CPU increase

Cache First

When asked why cache is needed, write this sentence: cache reduces the speed gap between CPU and RAM by keeping frequently used data close to the CPU.

3.4 Secondary Memory

Secondary memory stores data permanently and usually has larger capacity than RAM. It is slower than primary memory and cannot be accessed directly by the CPU.

Storage	Main Feature	Common Use
HDD	Magnetic storage, high capacity	Desktop and backup storage
SSD	Fast electronic storage	Laptops and modern desktops
Pen drive	Portable flash storage	File transfer and quick backup
Memory card	Small flash storage	Cameras and phones
CD or DVD	Optical storage	Legacy media and archives

RAM is Not Permanent Storage

Saving a file means writing it to secondary storage. Keeping it open in RAM is temporary and depends on power.

3.5 Data Capture, Storage, Retrieval, Deletion, and Recovery

Data must first be captured in digital form. It is then stored in a file or database, retrieved when needed, processed, protected, and sometimes recovered after deletion or damage.



Data Server

Large organisations use data servers to store and process large collections of records. Servers cost more to set up, but they make search, retrieval, backup, and sharing more efficient.

Deletion Does Not Always Erase Data

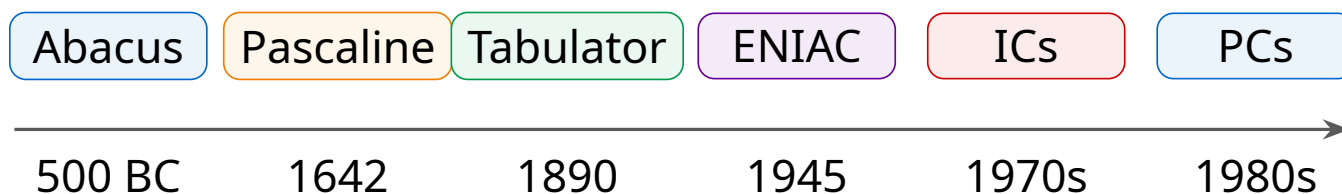
Simple deletion often marks storage space as free. Recovery may be possible until new data overwrites that space.

4 Evolution of Computers

Computing devices developed from simple counting tools to microprocessor-based personal devices. The important idea is not only speed, but also miniaturisation, storage, cost, and user access.

4.1 Major Inventions in Computing

The NCERT timeline begins with the abacus and moves through mechanical calculators, punched cards, stored-program computers, transistors, integrated circuits, personal computers, and smart devices.



Period	Device or Idea	Importance
500 BC	Abacus	Mechanical aid for basic arithmetic
1642	Pascaline	Addition and subtraction by mechanical calculator
1834	Analytical Engine	Basis of modern programmable computer ideas
1890	Tabulating machine	Punched-card data processing
1937	Turing machine concept	General model of computation
1945	EDVAC and ENIAC	Stored-program and binary programmable computer ideas
1947	Transistor	Smaller and more reliable electronic switching
1970s	Integrated circuit	Many components on one silicon chip
1980s	Personal computer	Computing reached homes, schools, and offices

4.2 Von Neumann Architecture

Von Neumann architecture stores both data and programs in memory. A CPU processes instructions, memory stores data and programs, input and output devices communicate with users, and channels carry signals.

Stored Program Concept

A stored-program computer keeps program instructions in memory, just like data. This allows the same hardware to perform many tasks by changing software.

- The CPU fetches an instruction from memory.
- The instruction is decoded and executed.
- Data may move between memory, CPU, input devices, and output devices.
- The result may be displayed, printed, saved, or used by another instruction.

4.3 Integrated Circuits, Moore's Law, and Personal Devices

Integrated circuits reduced size and cost by placing many components on a small silicon chip. Moore's Law predicted rapid growth in the number of transistors on a chip while costs fell.

From Lab to Pocket

Large early computers needed rooms and specialist operators. Modern phones contain processors, memory, sensors, cameras, and wireless communication in a pocket-sized device.

Timeline Answer

In a timeline question, write one line each for invention, person or idea, and impact. Do not only list years.

4.4 Modern Trends

The chapter points towards laptops, smartphones, tablets, wearable gadgets, smart appliances, Internet of Things, and artificial intelligence. These trends make computing more portable and connected.

- **Wearables:** watches, bands, and smart glasses collect sensor data.
- **Smart appliances:** devices connect to networks and respond to commands.
- **Internet of Things:** physical devices communicate and exchange data.
- **Artificial intelligence:** systems analyse data and support automated decisions.

Evolution Flow

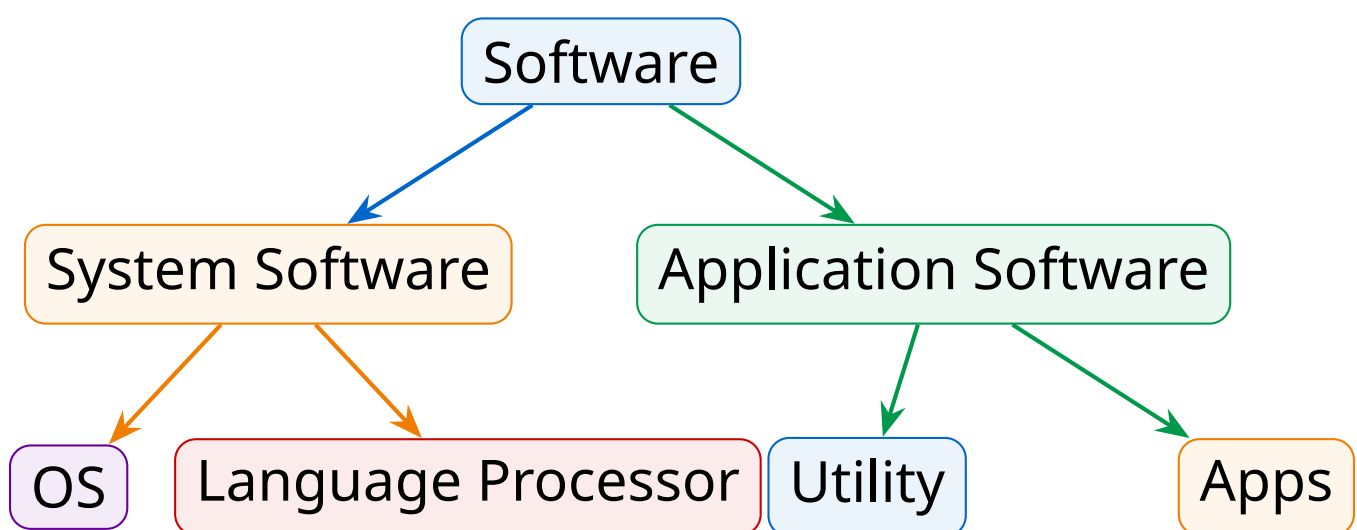
Remember **A-P-T-E-I-P**: Abacus, Pascaline, Tabulator, ENIAC, IC, PC. It gives a quick order for revision.

5 Software and Operating System

Hardware cannot perform meaningful work by itself. Software gives instructions to hardware, manages resources, and provides applications for users.

5.1 Meaning and Types of Software

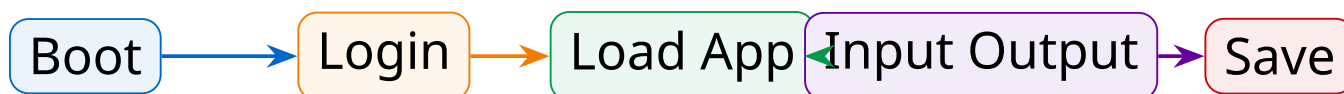
Software is a set of instructions and data that tells the hardware what to do. It cannot be touched physically, but its effects appear through system behaviour and application output.



Type	Purpose	Examples
System software	Runs and controls the computer system	Operating system, language processor, device driver
Application software	Performs user tasks	Word processor, web browser, spreadsheet, media player
Utility software	Maintains and protects the system	Antivirus, backup tool, file compression tool

5.2 Operating System

An operating system acts as an interface between the user and hardware. It manages memory, files, devices, user accounts, processes, and security.



- **Process management:** runs many programs in an organised way.
- **Memory management:** allocates RAM to programs and frees it after use.
- **File management:** creates, stores, searches, copies, and deletes files.
- **Device management:** controls printers, displays, keyboards, and storage devices.
- **Security:** supports passwords, permissions, updates, and user accounts.

Interface Role

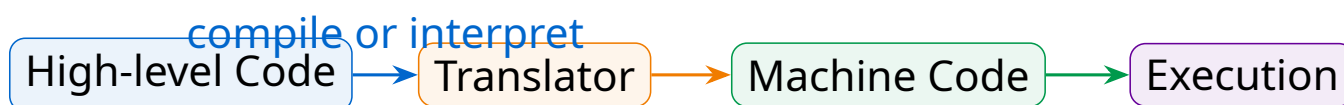
The operating system hides hardware complexity. Users click, type, and choose commands, while the operating system controls the underlying devices.

OS and Application

Windows, Ubuntu, Android, and macOS are operating systems. LibreOffice Writer, VLC Player, and a browser are applications.

5.3 Language Processors

A language processor translates a program written by humans into a form the computer can execute. It may translate the whole program or line by line.



Processor	How it Works	Common Point
Assembler	Converts assembly language to machine code	Close to hardware
Compiler	Converts the complete source program before execution	Finds many errors before running
Interpreter	Translates and executes line by line	Useful for interactive work

Compiler vs Interpreter

Compiler: whole program first. Interpreter: line by line. This simple contrast answers many one-mark questions.

5.4 Utility Software and Device Drivers

Utility software helps maintain, protect, and improve the system. Device drivers help the operating system communicate with specific hardware.

- Antivirus tools scan and remove harmful programs.
- Backup tools copy important data to another location.
- Disk cleanup tools remove unnecessary files.
- Compression tools reduce file size for storage or transfer.
- Device drivers help printers, scanners, display cards, and sound cards work correctly.

Driver Example

A printer may be connected correctly but still not print until its driver is installed. The driver tells the operating system how to send printable data to that printer model.

6 Open Source, Data Safety, and Good Practice

The chapter connects computer systems with responsible use. Students should understand basic software rights, data protection, recovery limits, and safe device disposal.

6.1 Open Source Software

Open source software allows users to access the source code under licence terms. The licence may permit use, study, modification, and sharing.



Open source depends on licence terms and community review

- **Source code:** human-readable program instructions.
- **Licence:** legal terms that define allowed use and sharing.
- **Community:** users and developers who report issues and improve software.
- **Transparency:** code can be examined by others, depending on the licence.

Open Source Freedoms

Remember **Use, Read, Change, Share**. Always add that exact rights depend on the licence.

6.2 Data Protection

Data can be lost through accidental deletion, storage failure, malware, unauthorised access, or careless disposal of old devices. Good practice reduces these risks.

- Use strong passwords for accounts and important files.
- Keep backups on another device or trusted cloud storage.
- Install updates and security patches.
- Encrypt sensitive files where possible.
- Shred or securely erase data before disposing of storage devices.

Deletion Risk

Deleting a file may only remove its address entry. Sensitive storage should be securely erased before sale, repair, or disposal.

6.3 Data Recovery

Data recovery retrieves deleted, corrupted, or lost data from storage devices. Recovery is possible only when the data area has not been overwritten or physically damaged beyond repair.

Recovery Limit

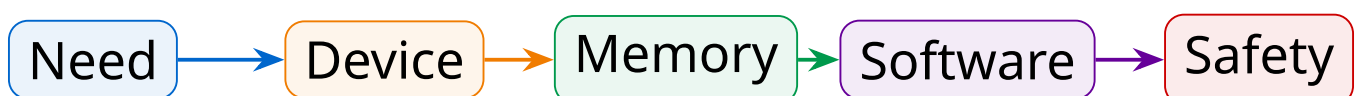
Recovery is not guaranteed. A recent backup is safer than depending on recovery after data loss.

Security Answer Frame

For a security answer, write: threat, protection method, and reason. Example: malware, antivirus and updates, because they detect and remove known harmful programs.

6.4 Choosing a Computer System

A good choice depends on purpose, performance, storage, portability, accessibility, budget, and software needs. The strongest system is not always the best system for every user.



Need	Check	Example Decision
School work	Keyboard, screen, browser, office tools	Laptop or desktop
Graphic work	Better display and memory	Laptop with more RAM and SSD
Portability	Battery and weight	Tablet or light laptop
Shared data	Network and storage capacity	Server or cloud storage
Accessibility	Input and output support	Braille display or speech tools

7 Exam Revision Pack

This pack condenses the chapter into quick tables, high-frequency differences, and short-answer frames. Use it after reading the full notes once.

7.1 Important Differences

Pair	First Term	Second Term
RAM vs ROM	Volatile, read and write, active work	Non-volatile, stores startup instructions
Primary vs Secondary memory	Direct CPU use, faster, smaller	Permanent storage, larger, slower
Input vs Output device	Sends data to computer	Receives data from computer
Hardware vs Software	Physical parts of system	Instructions and data for hardware
Compiler vs Interpreter	Whole program translation	Line by line translation
HDD vs SSD	Magnetic moving parts	Electronic flash storage

One-line Definitions

- **Computer system:** hardware plus software working together to process data.
- **CPU:** electronic circuitry that executes instructions.
- **Cache:** high-speed memory between CPU and RAM.
- **Operating system:** system software that manages resources and user interaction.

7.2 PYQ-style Revision Table

Likely Question	Answer Points	Marks
Define computer system	Electronic device, input, processing, output, storage, hardware and software	2
Differentiate RAM and ROM	Volatile vs non-volatile, active work vs startup content	2
Explain cache memory	Fast memory, between CPU and RAM, stores frequently used data	3
List software types	System software, application software, utility software, examples	3
Explain data recovery	Deleted or corrupted data, possible until overwritten, backup is safer	3
Write uses of output devices	Monitor, printer, speaker, projector, braille display	2

Exam Writing

For a three-mark answer, give definition, two clear points, and one example. Avoid writing a long story without keywords.

7.3 Quick Recall Checklist

- Can you draw the input-process-output-storage cycle?

- Can you name ALU, CU, and registers inside CPU?
- Can you convert KB, MB, and GB using 1024?
- Can you explain why cache memory improves speed?
- Can you classify input, output, primary memory, and secondary memory devices?
- Can you compare system software and application software?
- Can you explain compiler and interpreter in one line each?
- Can you describe safe deletion, backup, and recovery limits?

Final Memory Chain

Use **I-P-O-S, CPU, RAM-ROM, Cache, Storage, Software, Safety**. This chain covers almost every short answer in the chapter.

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8 Practice Drill and Deep Revision

This final section gives additional practice frames. It helps students convert the chapter's ideas into short, correct answers without missing key terms.

8.1 Short Answer Frames

1. **Computer system:** define the system, name hardware and software, then mention input, processing, output, and storage.
2. **CPU:** write full role, then explain ALU, CU, and registers.
3. **Memory:** start with bit and byte, then compare RAM, ROM, cache, and secondary storage.

4. **Software:** classify system, application, and utility software with examples.
5. **Data safety:** mention passwords, backup, encryption, updates, and secure deletion.

Answer Quality

A good answer uses the exact term, gives one function, and adds one example. This pattern is enough for most school-level questions.

8.2 Common Error Repair

Wrong Idea	Why It Is Wrong	Correct Idea
CPU stores all files	CPU has only tiny registers	Files are stored on secondary storage
ROM is empty after shutdown	ROM is non-volatile	RAM loses data after shutdown
Scanner is output device	Scanner sends image data into computer	Scanner is an input device
Interpreter and compiler are same	Translation method differs	Compiler translates whole program, interpreter line by line
Deleted files always vanish	Address may be marked free only	Recovery may work until overwriting

Last-minute Check

Do not use the word memory for only RAM. In this chapter, memory includes primary memory, cache, and secondary memory concepts.

8.3 Numerical Memory Practice

- $2 \text{ KB} = 2 \times 1024 = 2048 \text{ bytes}$.
- $3 \text{ MB} = 3 \times 1024 \text{ KB} = 3072 \text{ KB}$.
- $1 \text{ GB} = 1024 \text{ MB} = 1024 \times 1024 \text{ KB}$.
- A 4-bit group is a nibble and an 8-bit group is a byte.

Conversion Direction

When moving from a larger unit to a smaller unit, multiply by 1024. When moving from a smaller unit to a larger unit, divide by 1024.

8.4 One-page Oral Revision

- Say the working cycle: input, process, output, storage.
- Say CPU parts: ALU, CU, registers.
- Say memory order: registers, cache, RAM, secondary storage.
- Say software types: system, application, utility.
- Say safety methods: password, backup, encryption, secure deletion.

Revision Method

Read one heading, close the PDF, and explain it aloud in three sentences. Then reopen the notes and fill missing terms.