

Computer Parts

Textbook

Computer Parts



A computer is a complex machine with interconnected parts, each with a specific job. Understanding these components is key to how computers function.

Central Processing Unit (CPU)

The **CPU** is the "brain," executing instructions and processing data. CPUs, like those from Intel and AMD, vary in architecture, speed, and core count. Modern CPUs use **multi-core processing** (multiple independent processing units) and **hyper-threading** (allowing one core to handle two threads) for enhanced multitasking. **Socket type** determines CPU-motherboard compatibility.

Memory (RAM)

RAM is the computer's temporary, volatile workspace, storing active data for quick CPU access. **RAM speed** (MHz/MT/s) dictates how quickly data transfers to/from the CPU, impacting overall responsiveness. Larger **RAM sizes** (e.g., 16GB, 32GB) allow more active programs and data, reducing reliance on slower storage. RAM temporarily holds program instructions, OS data, user data, and temporary files.

Storage Devices

Storage devices (HDDs, SSDs) provide long-term data and program storage, even when the computer is off, interacting with the CPU and RAM to load/save files.

Motherboard

The **motherboard** is the main circuit board, connecting all components (CPU, RAM, storage, expansion cards) via "buses" for data flow.

Graphics Processing Unit (GPU)

The **GPU** is a specialized circuit for rapidly creating images, frames, and videos. It's optimized for parallel processing, essential for gaming and visual applications.

Power Supply Unit (PSU)

The **PSU** converts wall AC electricity into the DC needed by computer components. An adequate **wattage** is crucial to prevent instability or damage, ensuring the PSU meets the combined power demands of all components. PSUs come in **non-modular**, **semi-modular**, and **fully modular** types, offering varying cable management flexibility. Different **connector types** power specific components (e.g., 20+4 Pin ATX for motherboard, 6+2 Pin PCIe for GPU).

The Relationship Between Drivers, Hardware, and Operating Systems

Hardware (physical components) and the **Operating System (OS)** (manages resources) need **drivers** to communicate. Drivers are software programs that translate OS requests into hardware-specific instructions, enabling seamless operation.

Input and Output (IO)

Input/Output (I/O) refers to data exchange with the computer.

- **Input devices** send data *into* the computer for processing: keyboard (text), mouse (movement), microphone (audio), webcam (video), scanner (images), touchscreen (gestures).
- **Output devices** display or send data *out* from the computer after processing: monitor (visuals), speakers (audio), printer (physical copies), projector (large display), haptic feedback (tactile sensations).

Protecting Computer Hardware from Exploitation

Protecting computer hardware from exploitation requires a combination of physical and digital safeguards to ensure data security and system integrity.

Physical Security: Control access to devices through methods like:

- Managing access to restricted areas.
- Implementing lock screens.
- Disabling unused USB ports.
- Using tamper-evident seals and secure enclosures.
- Employing secure boot mechanisms and supply chain integrity checks.

Digital Security (Cybersecurity Software and Practices): Essential digital defenses include:

- **Antivirus/Anti-malware:** Protecting against malicious software with regular updates.
- **Firewalls:** Controlling network traffic and blocking unauthorized access.
- **Intrusion Detection/Prevention Systems (IDS/IPS):** Monitoring for and blocking suspicious activities.
- **Regular Updates:** Patching vulnerabilities in OS, applications, and firmware.
- **Strong Passwords & MFA:** Enforcing complex passwords and multi-factor authentication.
- **Data Encryption:** Securing data at rest and in transit.

- **Network Security:** Protecting Wi-Fi and other network connections.
- **Least Privilege:** Limiting user/process access rights.
- **Regular Audits & Training:** Continuously checking for weaknesses and educating users.
- **Data Backups:** Crucial for recovery in case of data loss or attacks.

By combining these physical and digital measures, the risk of hardware exploitation is significantly reduced, safeguarding data and system integrity.

Critical Thinking Questions

- If your new graphics card shows low resolution and slow games, what's the likely problem, and how would you fix it?
- Why does a computer need both RAM (short-term) and a hard drive (long-term)? What happens with very little RAM but a large hard drive?
- How do smartphone component design and driver selection differ from a desktop, considering trade-offs like size and power consumption?

Questions (5)

1. A user's computer frequently freezes or crashes when they try to run multiple applications simultaneously, even though they have a fast CPU and a large hard drive. Based on the passage, what component is most likely insufficient for their needs?

MULTIPLE CHOICE

Choose the correct answer:

- A. Graphics Processing Unit (GPU)
- B. Power Supply Unit (PSU)
- C. Random Access Memory (RAM)
- D. Motherboard

2. Why does a computer need both RAM (short-term, volatile) and a hard drive (long-term, non-volatile)?

MULTIPLE CHOICE

Choose the correct answer:

- A. RAM stores data for quick CPU access during active use, while a hard drive provides permanent storage for files and programs.
- B. RAM runs the operating system, and the hard drive runs applications.
- C. RAM is for input devices, and the hard drive is for output devices.
- D. They both perform the same function but for different types of data.

3. A company wants to physically secure their sensitive computer hardware in a data center. Which measure would not be considered a physical security safeguard according to the passage?

MULTIPLE CHOICE

Choose the correct answer:

- A. Implementing locks on individual computers.
- B. Managing access to restricted areas.
- C. Using antivirus software on the servers.
- D. Employing tamper-evident seals on enclosures.

4. A user wants to play very demanding video games and work with high-resolution video editing software. Which component should they prioritize for its ability to rapidly create images, frames, and videos, optimized for parallel processing?

MULTIPLE CHOICE

Choose the correct answer:

- A. Central Processing Unit (CPU)
- B. Random Access Memory (RAM)
- C. Graphics Processing Unit (GPU)
- D. Power Supply Unit (PSU)

5. A user types an essay on their keyboard. This action represents which type of data exchange with the computer?

MULTIPLE CHOICE

Choose the correct answer:

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

Answer Keys & Solutions

Questions

1. A user's computer frequently freezes or crashes when they try to run multiple applications simultaneously, even though they have a fast CPU and a large hard drive. Based on the passage, what component is most likely insufficient for their needs?

MULTIPLE CHOICE

Correct Answer:

- A. Graphics Processing Unit (GPU) ✗ Incorrect
- B. Power Supply Unit (PSU) ✗ Incorrect
- C. Random Access Memory (RAM) ✓ Correct
- D. Motherboard ✗ Incorrect

Explanation:

Think about the component responsible for temporary storage of active programs and data.

2. Why does a computer need both RAM (short-term, volatile) and a hard drive (long-term, non-volatile)?

MULTIPLE CHOICE

Correct Answer:

- A. RAM stores data for quick CPU access during active use, while a hard drive provides permanent storage for files and programs. ✓ Correct
- B. RAM runs the operating system, and the hard drive runs applications. ✗ Incorrect
- C. RAM is for input devices, and the hard drive is for output devices. ✗ Incorrect
- D. They both perform the same function but for different types of data. ✗ Incorrect

Explanation:

Consider the distinct purposes of temporary, fast memory versus permanent, slower storage.

3. A company wants to physically secure their sensitive computer hardware in a data center. Which measure would not be considered a physical security safeguard according to the passage?

MULTIPLE CHOICE

Correct Answer:

- | | |
|--------------------------------------------------|-------------|
| A. Implementing locks on individual computers. | ✗ Incorrect |
| B. Managing access to restricted areas. | ✗ Incorrect |
| C. Using antivirus software on the servers. | ✓ Correct |
| D. Employing tamper-evident seals on enclosures. | ✗ Incorrect |

Explanation:

Distinguish between physical controls and software-based cybersecurity.

4. A user wants to play very demanding video games and work with high-resolution video editing software. Which component should they prioritize for its ability to rapidly create images, frames, and videos, optimized for parallel processing?

MULTIPLE CHOICE

Correct Answer:

- | | |
|-----------------------------------|-------------|
| A. Central Processing Unit (CPU) | ✗ Incorrect |
| B. Random Access Memory (RAM) | ✗ Incorrect |
| C. Graphics Processing Unit (GPU) | ✓ Correct |
| D. Power Supply Unit (PSU) | ✗ Incorrect |

Explanation:

Think about the component specifically designed for visual tasks and parallel processing.

5. A user types an essay on their keyboard. This action represents which type of data exchange with the computer?

MULTIPLE CHOICE

Correct Answer:

A. Output

✗ Incorrect

B. Processing

✗ Incorrect

C. Storage

✗ Incorrect

D. Input

✓ Correct

Explanation:

Consider whether data is being sent into or out of the computer.