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Student Engagement & Mentoring in Technology

Notes: Chapter 12 – Computing Devices

Compare and Contrast Common Computing Devices and Their Purposes

1. Overview of Computing Devices

We rely on various computing devices to work, organize our lives, and entertain ourselves. Different devices serve different purposes based on their portability, processing power, and intended use.

Key Computing Devices Covered in This Chapter:

- Mobile Phones
- Tablets
- Laptops
- Workstations
- Servers
- Gaming Consoles
- Internet of Things (IoT) Devices

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2. Computing Device Types & Functions

All computing devices perform four basic operations:

- Input – Receiving data from users or other sources
- Storage – Keeping data for immediate or future use
- Processing – Computing operations performed by the CPU
- Output – Displaying or transmitting results

The operating system (OS) is the software that manages these functions and ensures that applications run smoothly. It controls hardware, manages memory, and allows multiple programs to operate simultaneously.

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3. Desktop Computers vs. Workstations

Desktop Computers

- Used in offices and homes for general computing
- Typically less expensive than portable devices
- Require external monitor, keyboard, and mouse

- Less common in offices due to increased use of mobile devices

Workstations

- Specialized computers designed for high-performance tasks
- Used by graphic designers, video editors, engineers, and scientists
- Have enhanced graphics processing and computing power
- Still stationary but more powerful than standard desktops

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4. Servers

- Powerful computers designed to perform dedicated tasks
- Found in data centers rather than individual workspaces
- Common server functions:
    - File sharing
    - Website hosting
    - Database management
    - Cloud computing services

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5. Mobile Computing Devices

Laptops

- Portable versions of desktops with a built-in screen, keyboard, and battery
- Can be as powerful as desktops but are usually more expensive
- Ideal for professionals who need mobility
- Often connected to external monitors at workstations

Smartphones

- Small, highly portable computing devices
- More powerful than desktops from a decade ago
- Use mobile operating systems like iOS (Apple) and Android (Google)
- Used for communication, apps, and Internet browsing

Tablets

- Larger than smartphones but smaller than laptops
- Touchscreen-based, lacking a built-in physical keyboard
- Used in customer service, healthcare, and interactive kiosk systems

- Less powerful than laptops but more portable

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6. Gaming Consoles

- Specialized computers optimized for graphics and audio
- Designed for entertainment rather than business use
- Common in home networks

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7. Internet of Things (IoT) Devices

IoT refers to embedded computers in everyday devices that connect to the Internet.

Home IoT Devices

- Smart home appliances: Refrigerators, ovens, washing machines
- Security systems: IP cameras, smart door locks
- Smart thermostats: Control temperature based on weather and user preferences
- Streaming media devices: Connect to online entertainment services

Workplace IoT Devices

- Used in manufacturing, power plants, and healthcare
- Industrial Control Systems (ICS) manage:
    - Power grids, water treatment, gas pipelines
    - Factory automation and production lines
- Healthcare IoT: Medical devices that monitor and report patient data

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8. Key Takeaways for the Exam

- Desktop computers and workstations serve users who work from a single location.
- Laptops, tablets, and smartphones are designed for users who need portability.
- Servers provide essential network services and are housed in data centers.
- IoT devices connect everyday objects to the Internet, enhancing automation in homes and workplaces.
- Understand user needs:
    - A desktop is good for a user who stays in one place.
    - A tablet may be better for mobile workers interacting with customers.

- A laptop is ideal for frequent travelers.

Exam Tip:

Be prepared to choose the most appropriate device based on the user's needs and budget. Balance usability and cost when making recommendations.

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Assignments

Pick three of the first four assignments or pick one assignment (number 5).

1. Device Comparison Chart (Research & Analysis Assignment)

Objective: Compare and contrast different computing devices based on specifications, cost, and intended use.
Instructions:

- Create a comparison chart that includes at least five computing devices (e.g., laptop, workstation, tablet, smartphone, and server).
- Include columns for:
  - Device Name
  - Primary Use Case
  - Processing Power
  - Portability
  - Average Cost
  - Example Users (e.g., graphic designers, business professionals, gamers, etc.)
- Summarize your findings in one paragraph, explaining which device is best for different user needs.

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2. Choosing the Right Device for a User (Scenario-Based Writing Assignment)

Objective: Identify the most suitable computing device for a given situation.
Instructions:

- Read the following user scenarios and choose the best computing device for each.
- Explain why your choice is the most appropriate, considering factors like cost, performance, and usability.

Scenarios:

1. A traveling salesperson needs a device to check emails, make video calls, and edit documents while on the road.
2. A graphic designer works on high-resolution images and 3D models and requires a high-performance machine.
3. A homeowner wants a smart home system that can adjust lighting, temperature, and security settings remotely.
4. A large company needs to store and manage customer databases securely and allow employees to access them remotely.
5. A college student needs a budget-friendly device for taking notes, browsing the web, and streaming videos.

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3. Hands-On Assignment: Identifying Computing Devices in Your Environment (Real-World Application)

Objective: Recognize different computing devices in daily life and categorize them.
Instructions:

- Observe five different computing devices in your home, school, or workplace.
- For each device, write a short report (2–3 sentences) including:
    - Device name and type (e.g., laptop, gaming console, smart thermostat, etc.)
    - Primary use case
    - How it connects to the Internet (if applicable)
    - One advantage and one disadvantage of using this device

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4. IoT Security Risks and Solutions (Critical Thinking & Cybersecurity Focused Assignment)

Objective: Analyze security risks associated with IoT devices and propose solutions.
Instructions:

- Research common security risks associated with IoT devices (e.g., hacking, privacy concerns, data breaches).
- Choose one IoT device (e.g., smart thermostat, security camera, medical device) and explain:
    - How it works
    - The potential cybersecurity risks it faces
    - Three security measures that can be implemented to protect it
- Write a 500-word report or create a poster presenting your findings.

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5. Research-Based Assignment – (for the creative thinkers)

Objective: Predict how computing devices will evolve in the next 10–20 years.
Instructions:

- Research emerging trends in computing, such as:
    - Artificial intelligence in computing devices
    - Quantum computing
    - Wearable technology
    - Advanced IoT and smart cities
- Write a futuristic essay (500–700 words) imagining what computing devices might look like in 2040.
- Include how they might impact daily life, workplaces, and cybersecurity.