

UNIT 3

INSIDE THE COMPUTER

Objectives: at the end of the lesson, students will be able to:

1. identify and describe the primary internal components of a computer;
2. differentiate present simple in the active and passive voice;
3. discuss the principles, challenges, and applications of computing systems looking at some case studies.

Lead-in: Watch a video about “Inside a computer” and write the main components of a computer as many as you hear.

https://youtu.be/HB4I2CgkcCo?si=4ERVmY0c7-zK-A_g

Vocabulary Building

Key Terms

Heat sink – it transfers heat away from nearby components of a computer.

***Example:** The purpose of using a heat sink is to properly remove heat from device components to improve device performance and extend its life.*

RAM – (Random Access Memory) is a memory that can be quickly accessed.

***Example:** RAM is your computer or laptop's short-term memory. It's where the data is stored that your computer processor needs to run your applications and open your files.*

Expansion cards – extra circuit boards that are used to increase the functions of a computer.

***Example:** An expansion card, also known as an expansion board or add-on card, is a hardware component that you can insert into a computer's expansion slot to enhance its functionality.*

Processor – holds the instructions of computer programs.

***Example:** A processor (CPU) is the logic circuitry that responds to and processes the basic instructions that drive a computer.*

Hard drive – equipment that stores data electronically.

***Example:** A hard drive is the hardware component that stores all of your digital content. Your documents, pictures, music, videos,*

programs, application preferences, and operating system represent digital content stored on a hard drive.

Motherboard – a firm slotted board onto which computer circuitry is attached.

Example: *The motherboard is a computer's central communications backbone connectivity point, through which all components and external peripherals connect.*

Case – an enclosure that holds the computer's components.

Example: *A computer case, also known as a computer chassis, is the enclosure that contains most of the hardware of a personal computer.*

Fan – an equipment that moves cool air onto computer components inside the case.

Example: *The computer fan works by spinning its blades, which creates airflow inside the computer case.*

Power supply – it delivers electricity to all parts of a computer.

Example: *A power supply unit (PSU) is a hardware device that converts AC electricity into DC electricity and then distributes it to the rest of the computer.*

Activity: Write a word that is similar in meaning to the underlined part.

1. The central processing unit in the data center processes large volumes of information. m _ _ _ _ _ _ _ _.

2. Spinning blades keep the computer from overheating. f _ _.

3. Joey purchased a protective bag for his computer. _ a _ _.

4. The technical staff gathered around the desktop computer to collaborate on the project. _ o _ _ s _ _ _ _ _ _.

5. Make sure to back up your important files regularly on the disk drive. _ _ _ d _ d _ _ _ _.

6. The mainboard is the main circuit board that connects all the components. _ _ _ h _ _ b _ _ _ _.

7. The electrical source directs power throughout the computer. _ _ w _ r _ _ p p _ _.

8. Make sure the add-on cards are securely installed in the motherboard. _ _ p _ _ s _ _ _ _ _ _ _ _ s.

Reading

Inside the Computer

In a computing system, the mainframe is used by large organizations for handling massive data processing tasks. Workstations are powerful computers designed for professionals working on complex projects. Tablets are portable devices favored for their convenience and mobility. RAM serves as the computer's temporary memory, while expansion cards enhance its functionality. The processor is the brain of the system, executing instructions at lightning speed. Data is stored on the hard drive, and the motherboard acts as the central hub connecting all components. The power supply ensures a steady flow of electricity to keep the system running smoothly, while the heat sink dissipates heat generated by the processor, preventing overheating issues. Each component plays a vital role in the seamless operation of a computing system.

Activity to check comprehension: Read the text and answer the questions.

1. Which type of computer is used by large organizations for handling massive data processing tasks?

- a) Workstation
- b) Tablet
- c) Mainframe
- d) Expansion card

2. What component of a computing system acts as the computer's temporary memory?

- a) Hard drive
- b) Processor
- c) RAM
- d) Motherboard

3. What is the role of the motherboard in a computing system?

- a) Acts as the computer's temporary memory
- b) Connects all components together
- c) Processes instructions at lightning speed
- d) Prevents overheating issues

4. Which component of a computing system dissipates heat generated by the processor?

- a) RAM
- b) Power supply
- c) Heat sink
- d) Expansion card

5. What type of computer is favored for its convenience and mobility?

- a) Workstation
- b) Mainframe
- c) Tablet
- d) Expansion card

6. Which component of a computing system ensures a steady flow of electricity to keep the system running smoothly?

- a) RAM
- b) Heat sink
- c) Power supply
- d) Processor

Grammar Focus: Present Simple in the passive voice

In passive voice, the present simple tense is used to describe actions that are performed on the subject by an unspecified or unknown agent (person). This can be helpful when discussing general processes or actions without specifying who is performing them.

Example:

Active Voice: *The program compiles the code every hour.*

Passive Voice: *The code is compiled every hour.*

In this example, the focus is on the action of compiling, and the subject “the code” becomes the object in the passive construction. This helps computer science students understand how tasks are completed within a system without needing to specify the person (actor) carrying out the action.

Structure: to be (am, is, are) + Past Participle

Present Simple in Active Voice:

Affirmative sentence	Negative sentence	Interrogative sentence
I (you, we, they) load the computer every day.	I don't load the computer every day.	Do you load the computer every day?
She (he, it) loads the computer every day.	She doesn't load the computer every day.	Does she load the computer every day?

Present Simple in Passive Voice:

Affirmative sentence	Negative sentence	Interrogative sentence
I am asked to load the computer every day.	I am not asked to load the computer every day.	Am I asked to load the computer every day?
You (we, they) are asked to load the computer every day.	You (we, they) are not asked to load the computer every day.	Are you (we, they) asked to load the computer every day?
She (he, it) is asked to load the computer every day.	She (he, it) is not asked to load the computer every day.	Is she (he, it) asked to load the computer every day?

Activity: Write the correct form of the verbs and complete the sentences.

1. RAM (store) temporary data in the computer, while expansion cards (enhance) its capabilities. 2. Mainframes (utilize) by large organizations for their powerful computing needs. 3. Workstations (use) by professionals for their high-performance capabilities. 4. Tasks (execute) quickly by the processor, and data (store) on the hard drive, while all components (connect) by the motherboard.

Activity: Let's look at some cases to study the usage of computing systems.

Computing Systems

Computing systems can range from simple personal computers to large-scale data centers and cloud computing environments. They can be used for a wide range of applications, including communication, entertainment, education, business operations, scientific research, and more.

Case Study on Smart Home Security

Smart Home Systems leverage computing technology to provide homeowners with advanced control over various aspects of their living environment, such as lighting, temperature, security, and appliances. These systems typically incorporate a combination of sensors, actuators, communication devices, and centralized control units to automate and manage home functions.

Principles:



1. **Interconnectivity:** Smart Home Systems rely on interconnected devices that communicate with each other to enable automation and synchronization of various home functions.

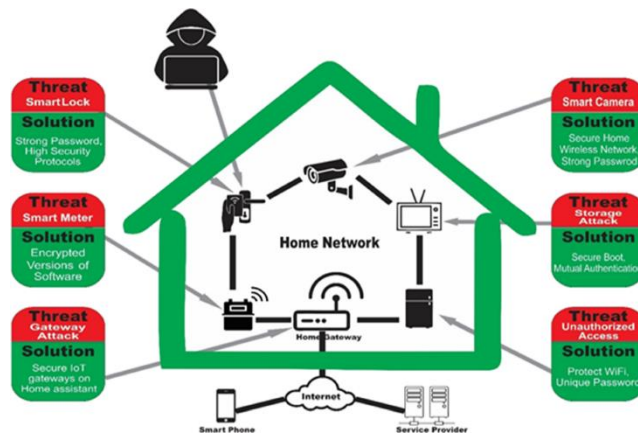
2. **Monitoring and Control:** Sensors embedded in the system monitor environmental conditions and user preferences, while actuators control devices such as thermostats, lights, and locks based on the data received.

3. **Data Analysis:** Smart Home Systems use computing technology to analyze data collected from sensors to optimize energy usage, improve security, and enhance user comfort.

4. User Interface: The system provides users with a user-friendly interface, often accessible through smartphones or tablets, to control and monitor their smart devices remotely.

5. Integration: Computing technology facilitates the integration of various devices and systems within the smart home ecosystem, enabling seamless operation and coordination.

Challenges:



1. Interoperability: Compatibility issues may arise when devices from different manufacturers use different communication protocols, leading to challenges in integrating them into a cohesive system.

2. Data Security: Smart Home Systems collect sensitive data about occupants and their habits, making them potential targets for hackers. Ensuring data security and privacy is a major challenge.

3. Reliability: System failures or malfunctions can disrupt essential home functions, such as heating or security, highlighting the importance of building robust and reliable systems.

4. Complexity: Managing a network of interconnected devices and systems can be complex for users, requiring technical expertise and troubleshooting skills.

5. Scalability: As the number of connected devices increases, scaling the system and ensuring efficient communication among all devices becomes a challenge.

Applications:



1. **Energy Efficiency:** Smart Home Systems can optimize energy consumption by automatically adjusting lighting, heating, and cooling based on occupancy and environmental conditions.

2. **Home Security:** These systems enhance security through features like smart locks, surveillance cameras, and motion sensors that alert homeowners to potential threats.

3. **Convenience and Comfort:** Smart Home Systems offer convenience by allowing users to control devices remotely, set automated schedules, and personalize settings according to their preferences.

4. **Health Monitoring:** Some smart home devices can monitor occupants' health metrics, such as sleep patterns, heart rate, and physical activity, providing valuable insights into well-being.

5. **Home Automation:** Smart Home Systems automate routine tasks, such as watering plants, feeding pets, or adjusting window blinds, to simplify daily chores and enhance the overall living experience.

In conclusion, computing technology plays a crucial role in the development and operation of Smart Home Systems, enabling efficient automation, intelligent control, and seamless integration of various components. While these systems offer numerous benefits, addressing challenges related to interoperability, security, reliability, complexity, and scalability is essential to ensuring their widespread adoption and success.

Group Activity: Discuss and describe some case study examples covering various aspects of computing systems. Provide the

principles, challenges, and applications of chosen technologies' computing systems.

Home assignment:

In a group write a summary of the chosen computing technology by providing the principles, challenges, and applications.