Instructor Materials
Chapter 1: Introduction to the Personal Computer

IT Essentials v6.0
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Chapter 1 - Sections & Objectives

- **1.1 Personal Computer Systems**
  - Explain how personal computer systems work together

- **1.2 Select Computer Components**
  - Select appropriate computer components

- **1.3 Configurations for Specialized Computer Systems**
  - Explain how hardware is configured for task-specific computers
1.1 Personal Computer Systems
Personal Computer Systems
Cases and Power Supplies

- **Cases**
  - Influences the motherboard form factor choice
  - Must allow for good air flow
  - Available in different sizes

- **Power Supplies**
  - Provides power to all computer components.
  - Must be chosen based on current and future needs.
  - Deliver different voltage levels to meet different internal component needs.

- **Power Supply Wattage**
  - $P = V \times A$
Personal Computer Systems

Internal PC Components

- Motherboards
  - Backbone of the computer
  - Interconnects computer components

- CPU
  - The brain of the computer
  - Most processing is done by the CPU

- Cooling Systems
  - Dissipates the heat generated by computer components.

- Memory (ROM and RAM)
  - RAM: Stores data temporarily, aiding processing
  - ROM: Stores data permanently; often storing firmware and low level programs.
Personal Computer Systems

Internal PC Components (Cont.)

- **Adapter Cards and Expansion Slots**
  - Adapter Cards extend computer functionality
  - Adapter Cards connect to the motherboard through Expansion Slots

- **Storage Devices**
  - Designed to permanently store user data, user applications and the Operating System
  - Can be internal or external to the computer

- **Video Ports**
  - Connects a video system to an external display device such as a monitor or projector
  - Video systems are often designed as an adapter card.

- **General Ports**
  - Provide connectivity between the motherboard and various external devices such as printers, external storage and video cameras.
Personal Computer Systems

External Ports and Cables

- Video Ports and Related Cables
  - A few different standards govern video traffic between the computer and external video devices.
  - HDMI and displayPort are examples of video ports that require a specific cable to operate.

- Other Ports and Related Cables
  - Motherboards have a number of other ports used for device connectivity; USB is a common example.

- Adapters and Converters
  - Adapters and converters can be a solution if a motherboard does not have the proper port to connect to a device.
  - Adapters do not usually process the signal; they simply redirect it to another pin.
  - Converters are more likely to process and transform the signal, converting it to be accepted by an existing port.
1.2 Select Computer Components
Select Computer Components

Select PC Components

- Select the Motherboard, CPU, Case and Memory
  - CPU, memory, motherboard and case choices are inter-related.
  - The motherboard should support all customer required applications and still fit properly in the case.
  - The case should host the motherboard, the proper power supply and provide good airflow for the internal components.
  - The CPU must be compatible with motherboard CPU slot and voltage; it should be compatible with the chosen memory speed for maximum performance.
  - The memory must also be compatible with motherboard memory slots and voltage.
  - The amount of memory will depend on the type of applications requested by the customer.
Select Computer Components

Select PC Components (Cont.)

- Select the Case and Fans
  - Case and fans must be chosen to maximize internal airflow.
  - The fans must fit the case and be within the power limits provided by the power supply.

- Select the Power Supply
  - The power supply should be selected based on the maximum amount of power required by all the internal components.
  - Remember that some components will draw more power while under heavy load.

- Select Adapter Cards
  - Make sure the motherboard has compatible expansion slots to support the adapter cards.
  - The motherboard must also have enough expansion slots to receive all the required adapter cards.
  - Customer needs will define what adapter cards must be procured and installed.
Select Computer Components

Select PC Components (Cont.)

- **Select Hard Drives**
  - Important hard drive factors to be considered are speed, storage space and communication interface type.
  - The drive’s underlying technology (HDD vs SSD) directly impacts speed.

- **Select a Media Reader**
  - The media reader must be compatible with customer media.

- **Select Optical Drives**
  - Make sure the drive is compatible with customer media.
  - Other factors to consider are speed, communication interface type and the ability to write to the media.
Select Computer Components

Select PC Components (Cont.)

- **Select External Storage**
  - Important factors when selecting external storage are storage space, speed and communication interface.
  - Make sure the computer has enough ports to accommodate the external devices and peripherals.
  - **Note:** Some external devices do not require an external power supply but rely on a second USB port for power.

- **Select I/O Devices**
  - The selection of I/O devices is application specific and will depend on customer requirements.
  - Make sure the computer has enough communication ports and that they are compatible with the types required by the I/O devices.
1.3 Configurations for Specialized Computer Systems
Configurations for Specialized Computer Systems

Specialized Computer Systems

- Thick and Thin Clients
  - Thin clients have little processing power and are designed to act as a terminal to a server (thick client).
  - Thick clients have more powerful CPUs, more memory and their own storage. They serve as processing stations for thin clients.

- CAx Workstations
  - Designed to support CAD and CAM applications.
  - Plenty of RAM, fast disks, powerful CPU and special input devices are common resources.

- Audio and Video Editing Workstations
  - Common editing workstation resources include much RAM, fast disks, powerful CPU and special adapter cards such as audio and video capture.
Configurations for Specialized Computer Systems

Specialized Computer Systems (Cont.)

- **Virtualization Workstations**
  - These workstations are designed to run virtual computers.
  - Virtual computers use and share the workstation’s physical resources such as CPU, memory, and disks.
  - The selection of physical resources will depend on the number and purpose of the virtual machines.

- **Gaming PCs**
  - Due to high resource requirements of modern games, gaming PCs are very resource demanding.
  - A few requirements of gaming PCs are: top end CPU, lots of fast RAM, fast disks, high performance input devices and audio systems.

- **Home Theatre PCs**
  - These computers must be able to play various media formats and, in some cases, receive TV signals.
  - Common HTPC requirements include powerful CPU, fast RAM, large disks, fast NIC and video card with TV input.
1.4 Chapter Summary
This chapter introduced the components that comprise a personal computer system and what to consider when choosing upgrade components.

Information technology encompasses the use of computers, network hardware, and software to process, store, transmit, and retrieve information.

A personal computer system consists of hardware components and software applications.

The computer case and power supply must be chosen carefully to support the hardware inside the case and allow for the addition of components.

The internal components of a computer are selected for specific features and functions. All internal components must be compatible with the motherboard.

Use the correct type of ports and cables when connecting devices.

Typical input devices include the keyboard, mouse, touch screen, and digital cameras.

Typical output devices include monitors, printers, and speakers.

Cases, power supplies, the CPU and cooling system, RAM, hard drives, and adapter cards, must be upgraded when devices fail or no longer meet customer needs.

Specialized computers require hardware specific to operate. The type of hardware used in specialized computers is determined by how a customer works and what a customer wants to accomplish.