



CHAPTER HIGHLIGHTS

- Computer systems
 - Supercomputer
 - Mainframe computer
 - Personal computer
- Computer platforms
- Hardware components
 - System Unit
 - Peripheral Devices
- Computers & Networks
 - WAN and LAN
 - Client/Server model

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This slide has a light gray background with the same abstract pattern as the first slide. The title 'CHAPTER HIGHLIGHTS' is in a bold blue font. Below it, there are four bullet points, each with a sub-list of items. The text is in a dark gray font. A small number '2' is in the bottom right corner.

COMPUTER SYSTEMS

- An integrated set of hardware and software designed to process data and produce a meaningful result.
- Basic functions:
 - Input
 - Processing
 - Storage
 - Output
 - Transmission



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TYPES OF COMPUTER SYSTEMS

- **Supercomputer.**
 - Offers the fastest processing speeds and performs the most complex calculations.
- **Mainframe computer.**
 - Provides multi-user computing to large organizations for tasks such as managing extensive databases, financial transactions, and communications.
- **Personal computer.**
 - Provides computing to a single user performing multiple tasks.

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COMPUTER PLATFORM

- Platform is a combination of hardware and operating system.
 - Windows/PC platform.
 - Macintosh platform.
- Cross-platform compatibility.
 - Ability of an application to run on different hardware and operating systems.
 - Adobe's Acrobat .pdf files can be opened on Windows or OS X based computers.
 - The WWW provides a cross-platform computing experience.

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INTERFACE PORTS

- Ports are external to the system unit.
 - Peripherals are plugged into the ports.
- Common ports include:
 - SCSI
 - VGA or SVGA
 - USB
 - IEEE 1394 (FireWire)
 - Audio input/output
 - Ethernet and modem connections.



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USB & FIREWIRE: The New Standard

- Offers Plug and Play performance with most operating systems.
- Supports a daisy-chain bus of multiple devices.
- Accepted on PCs and Macs.
- Has hot-swappable capability.
- Powered through the interface port.
 - No more "wall warts."



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PERIPHERAL DEVICES

INPUT, OUTPUT, AND PERMANENTLY
STORED DATA AND APPLICATIONS.

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SECONDARY STORAGE

- Holds data and instructions outside the system unit for long periods of time.
- Advantages over primary storage:
 - Nonvolatile storage
 - Expandable
 - Portable
 - Inexpensive
- Options include magnetic, optical, solid-state storage.

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SECONDARY STORAGE

- Five Main Uses
 - Saving data during edit process.
 - Backup data and applications.
 - Distribute data and applications.
 - Transport data and applications.
 - Archive data and applications.

Storage Devices
Hard drive
Floppy drive
Zip drive
Portable hard drive
CD drive
DVD drive
Flash or thumb drive
Magnetic tape drive

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MAGNETIC STORAGE

- Bits are stored in magnetic form on disk platters or magnetic tape.
- Disk platters are hard or floppy.
 - Data stored in addressable tracks and sectors defined by the operating system.
 - Track — circular paths
 - Sector — pie shaped logical divisions of the track.

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MAGNETIC STORAGE

- Benefits:
 - Large storage capacity
 - Fast access to data
 - Economical
- Challenges:
 - Limited durability
 - Easily damaged

FYI:

The projected cost of a gigabyte of magnetic storage in 2010 is .02 cents.

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OPTICAL STORAGE

- Compact Disc (CD) first used to replace vinyl records in music industry.
 - Stored digital music for permanent, high fidelity recordings.
 - Capacity set at 74 minutes of digital audio.

FYI:

Disc refers to optical storage.

Disk denotes magnetic storage.

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Compact Disc Formats

- Standard physical size:
 - 120 mm, 15mm hole in the center, 1.2 mm thick.
 - Led to rapid development of drives to accept all CD formats.
- CD-DA (Digital Audio format).
- CD-ROM (Read-Only format).
- CD-R (Recordable format).
- CD-RW (Re-Writable format).

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DIGITAL VERSATILE DISC (DVD)

- Optical storage that uses:
 - More precise laser light
 - Multi-layer storage
 - New video compression methods
 - Improved error detection and correction
- Result.
 - Higher storage capacity than compact disc
 - 650MB on CD (74 minutes of music)
 - 17GB on DVD (8 hrs of video)

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DVD FORMATS

- Standards vary by player and data.
- DVD recordable formats:
 - DVD-R: compatible with most players & drives
 - DVD-RW: playable in many DVD drives and players
 - DVD-RAM: Removable storage for computers.

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BLU-RAY: Next Generation

- Optical storage based on blu-ray laser.
 - Shorter wavelength (405nm).
- Massive storage capacity.
 - Single layer can store 27GB of data.
 - Can store 2 hours of high-definition video or
 - 13 hours of standard video.
 - Dual layer stores 50GB of data.
- Currently used for recording high definition video and PlayStation 3 games.

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SOLID-STATE STORAGE

- Computer storage with no moving parts.
- Devices are based on flash memory technology.
 - Contains a grid of cells, each with two transistors separated by a thin layer of insulating oxide.
 - The insulating oxide layer preserves information with no need for external power.



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SOLID-STATE STORAGE

- Benefits:
 - Lightweight
 - Small
 - Low power requirements
 - More durable than devices with movable parts
- Disadvantages:
 - More expensive than magnetic storage
 - Limited capacity
 - Limited life expectancy

FYI:

Labels for solid state storage devices include:

- USB drive
- Flash drive
- Thumb drive
- Memory stick

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SECONDARY STORAGE (Future Digital Data)

- Practical issues surrounding the migration of data to secondary storage include:
 - Effective and efficient data management.
 - Enduring file formats over the years.
 - Ability to access the data on the storage media
 - Hardware requirements
 - Software dependence
 - Data longevity.

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INPUT DEVICES

- Capture and transmit data and instructions to the system used for processing and storage.
- Categories:
 - Keyboard
 - Pointing devices
 - Scanning devices
 - Image capture
 - Audio capture

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INPUT DEVICES

- Keyboard.
 - Capture user text and commands.
- Pointing device.
 - Relies on graphic interface to click or select the input.
 - Devices include:
 - Mouse
 - Pointing stick
 - Stylus
 - Touch screens
 - Touch pads
 - Trackball

FYI:

The Wii Remote is also a pointing device for the popular game console.

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INPUT DEVICES: SCANNER

- Captures text or graphics using a light-sensing device called a Charge-Coupled Device (CCD).
- Types of scanners include:
 - Flat bed
 - Hand held
 - Sheet fed
 - Slide
- Scanner quality depends on:
 - Spatial resolution
 - Color resolution (bit depth)



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SCANNER Settings

- **Spatial Resolution (dpi).**
 - Depends on use of image.
 - 72 dpi for computer display.
 - 300 dpi for printer output.
- **Color resolution (bit depth).**
 - 8 bit setting confines color range to 256.
 - Grayscale setting uses black, white and shades of gray.
- **Scaling.**
 - Set the size larger or smaller before the scan.
- **Tonal quality.**
 - Adjust brightness and contrast based on preview of scan.

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SCANNER & OCR

- **Optical Character Recognition** is a process that converts printed text into an editable word processed digital file.
 - OCR software analyzes the image of a character and translates it to an ASCII code of the character.
- OCR quality depends on software, quality of printed text, and type of paper being scanned.
 - Extensive editing may be required to remove stray characters or misinterpreted text.

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DIGITAL CAMERA

- Captures images in real time at the source.
- Benefits include:
 - Instant review of image
 - Re-capture the image if necessary
 - High quality spatial and color resolution.
- Image file size depends on capture resolution (6 - 12 megapixel) and color depth (16 - 24 bit color) can produce large file sizes.
- Images transferred to hard drive via memory card or USB direct connection.

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DIGITAL VIDEO (DV) CAMERA

- Video captured on built-in hard drive, mini-digital tape, or DVD.
- Transferred to computer through FireWire interface.
- Video editing software enhances digital sequences.



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DV CAMERA PERFORMANCE

- Method used to capture image.
 - Single chip reproduces RGB color.
 - 3-chip have separate CCD for Red, Green, Blue.
- Lens quality.
- Zoom quality.
 - Optical zoom vs. digital zoom.
- Image stabilization.
- Preprogrammed modes.
 - Lighting and weather conditions.

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SOUND CAPTURE

- Devices to transform analog waveforms to digital files.
 - Microphones
 - External vs. internal
 - CD & Tape players
 - Digital Recorders.

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GRAPHICS TABLET

- Flat drawing surface for freehand image creation.
- User draws or traces image with a stylus then enhances the image using software interface.



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OUTPUT DEVICES

- Present processed data in a useful form.
- Devices include:
 - Screen display
 - Audio speakers
 - Hard copy

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DISPLAY DEVICES

- Produce an image on a screen through a series of individual pixels.
 - Display quality is determined by spatial and color resolution.
 - Displays with 1024 X 768 spatial resolution have more addressable pixels than 640 X 480 resolution.
 - 24-bit color graphics display has richer colors than 16-bit color.

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CRT DISPLAY

- Raster scanning technology generates a display.
 - Based on Cathode Ray Tube technology.
- Electronic signal scans horizontal rows from top to bottom of screen.



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LCD DISPLAY

- Transistors control a liquid crystal's molecular structure to display a pixel.
- Two forms of LCD:
 - Active matrix or Thin Film Transistors
 - Passive matrix
- Native display resolution is fixed to specific LCD screen size.
 - Altering the resolution will generate a blurred image.



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SPEAKER SYSTEMS

- Speakers or headsets are plugged into the soundboard where digital data is converted to analog waveforms.
- Sound card circuitry performs four processes:
 - Converts digital sound data into analog with DAC. (digital to analog converter)
 - Records sound in digital form with analog ADC.
 - Amplifies signal.
 - Creates digital sounds using a synthesizer.

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PRINTERS

- Two basic printing technologies:
 - Impact, print head makes contact with the paper.
 - Dot-matrix printer.
 - Nonimpact, print head does not contact paper.
 - Laser printer.
 - Ink-jet printer.
 - Photo printer.

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NON-IMPACT PRINTERS

- Ink-jet printer.
 - Line printer that delivers high quality color.
 - Output quality determined by:
 - Printer resolution measured in dots/inch
 - Paper quality
- Photo printer.
 - Delivers photo-lab-quality output directly from camera or card.
 - Use inkjet cartridges or dye sublimation process to print image.

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NON-IMPACT PRINTERS

- Laser printer.
 - Fuse text and image to paper one page at a time.
 - High quality output resolutions of 600 to 2400 dpi.
 - Deliver high quality color output using cyan, magenta, yellow, and black toner.
- Multifunction printer.
 - Combines printer, scanning, fax, and copier technology in one device.

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NETWORKS

- A collection of computers connected through a communication link to share resources.
- Two main categories:
 - **WAN** - Covers wide geographic area using communication lines of an external service provider.
 - **LAN** - Computers and peripherals connected within an organization on privately owned communication lines.

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INTERNET

- A network of networks built on TCP/IP protocols.
 - Transfer Control Protocol prepares data in packets to distribute on the network.
 - Internet Protocol assigns a numeric address to each packet of data.
- Common Internet protocols:
 - eMail — smtp
 - File transfer — ftp
 - Web — http

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WORLD WIDE WEB — WWW

- WWW built on revolutionary http protocol.
- Hypertext transfer protocols included:
 - Html code that programmed text and images on a web document.
 - Hyperlinks to connect related "pages" on local and external servers.
 - Uniform Resource Locator (URL) as the path address to create the hyperlink.
 - URL includes the protocol, domain name of server, directory location, and the document to view, often a .htm or .html page.

www.com205.safiredesign.com/index.html

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NETWORKS

- Client/Server organization.
 - Efficient means to distribute data from the server and rely on processing at the client (local) computer.
 - Commonly used on LANs and WWW.
- Ethernet.
 - Protocol to control flow of data on LAN.
- WiFi & Bluetooth.
 - Mobile computing network standards.

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WRAP UP

- Computer systems
 - Supercomputer
 - Mainframe
 - Microcomputer
- System unit
 - CPU
 - Primary memory
 - System board
- Interface ports
 - USB
 - FireWire
- Peripherals
 - Storage devices
 - Input devices
 - Output devices
- Networks
 - WAN
 - LAN
 - Internet