COMPLETE

Technology
in Action

7th Edition

CD Included

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Technology in Action

Chapter 6
Understanding and Assessing Hardware:
Evaluating Your System
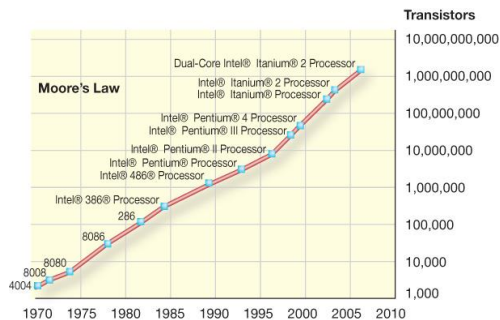
Chapter Topics

- To buy or to upgrade?
- Evaluating your system
  - CPU
  - RAM
  - Storage devices
  - Video card
  - Sound card
- System reliability

To Buy or to Upgrade?

- Things to consider
  - Moore's Law
  - Cost of upgrading vs. buying
  - Time to install software and files
  - Needs and wants

To Buy or to Upgrade?

- Determine your ideal computer system
- Assess existing computer's subsystems
  - CPU
  - RAM
  - Storage devices
  - Video
  - Audio
- Consider training needs

Desktop or Notebook

- Desktop
  - Hard to move around
  - Less expensive
  - Harder to steal
  - Easier to expand and upgrade
  - Difficult to transport

- Notebook
  - Portable
  - More expensive
  - Easily stolen
  - Difficult to upgrade
  - Easy external expansion
  - Prone to damage

How Does the CPU Work?

- Control unit
- Arithmetic logic unit (ALU)
- Machine cycle
  - Fetch
  - Decode
  - Execute
  - Store

Differentiating CPUs

- Processing power
  - Core: A complete processing section from a CPU embedded into the same physical chip
  - Clock speed: How quickly the processor works
  - Cache: The amount of immediate access memory the CPU has
 - Front side bus: connects the processor to system memory

Evaluating the CPU

- Identify your current CPU
- Determine whether it is meeting your needs
  – Go to Task Manager to review CPU usage
- Consider how quickly data moves to or from the CPU

Evaluating RAM

- Random access memory (RAM)
  – Temporary storage (memory)
  – Volatile
- Memory modules fit on motherboard
  – Most are called dual inline memory modules (DIMMs)
    - DDR2
    - DDR3
    - SRAM
    - DRAM
    - SDRAM
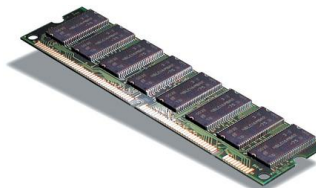
How Much RAM Do You Need?

- Physical memory vs. kernel memory
- Need RAM for operating system, application software, and data
- Sample RAM requirements:

Application	Minimum RAM Required
Windows 7	1000 MB
Microsoft Office Professional 2007	256 MB
Internet Explorer 8	128 MB
iTunes	256 MB
Adobe Photoshop Elements	512 MB
Total RAM required to run all programs simultaneously	2,152 MB or 2.15 GB

Virtual Memory

- Memory-bound system
- Virtual memory
- Page file
- Drawback = speed
- Increasing RAM can avoid this problem

Adding RAM

- Things to consider
  - Type of RAM module
  - Amount of RAM
    - Maximum limit
    - Number of slots
    - Operating system

Storage

- Types of storage devices
  - Hard drive
  - USB flash drive
 - Optical drive
  - External hard drive
- Nonvolatile storage

The Hard Drive

- Storage capacity is up to 2 terabytes (TB)
- Access time is measured in milliseconds
- Data transfer rate is measured in megabits or megabytes per second

How a Hard Disk Works

- Composed of coated platters stacked on a spindle
- Data saved to the disk: Pattern of magnetized spots
  – Spots = 1
  – Spaces = 0
- Spots are translated into data
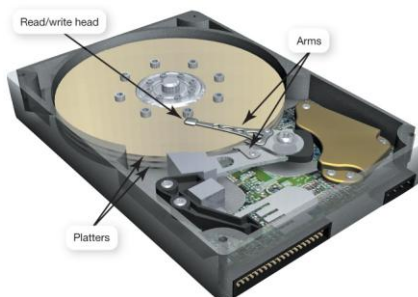
Evaluating Storage

- Identify your hard drive's total capacity
- Determine your storage capacity needs
- Consider data transfer rates
  - Internal
  - External

Optical Storage

- Optical media: Store data as tiny pits burned into a disc by a laser
  - Prerecorded
    - CD-ROM, DVD-ROM, BD-ROM
  - Recordable
    - CD-R, DVD-R, BD-R
  - Rewritable
    - CD-RW, DVD-RW, BD-RE
- Consider replacing CD/DVD drive with BD burner

Evaluating Video

- Two components
 - Video card (adapter)
  - Monitor

Video Cards

- Process binary data into images
- Contain memory known as video memory
- Control the number of colors a monitor can display (bit depth)
  - Standard VGA
  - True color
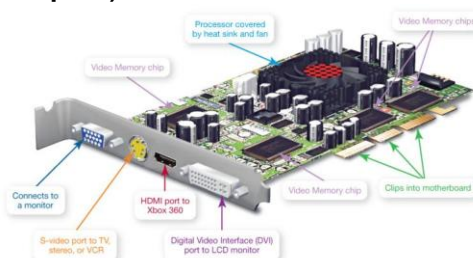
Graphics Processing Unit

- Performs the same work as a CPU
- Specialized to handle
  - 3D graphics
  - Image and video processing
- CPUs perform better with a GPU handling graphics computation.
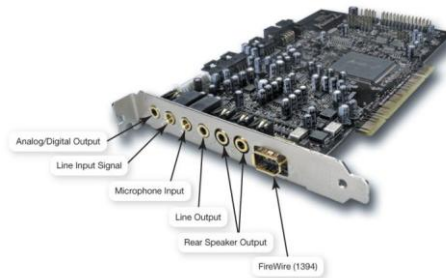

Without a GPU   With a GPU
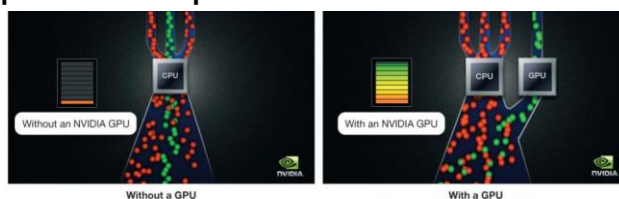
Evaluating Video

- Identify the amount of video memory on your video card
- Determine your video needs
- Consider how many monitors you want to use

Evaluating Audio

- Sound cards
  - Attach to motherboard
  - Process digital data into sounds
  - 3D sound cards
  - Surround sound
  - Allow you to connect audio devices

Analog/Digital Output
Line Input Signal
Microphone Input
Line Output
Rear Speaker Output
FireWire (1394)

Evaluating System Reliability

- Performance problems
  - Slow
  - Freezes
  - Crashes
- Upkeep and maintenance
  - System tools
  - Control Panel
  - Update software

Upkeep and Maintenance

- Clean out your Startup folder
- Clear out unnecessary files
- Run spyware/adware programs
- Run the Disk Defragmenter utility

Update Software and Hardware Drivers

- Software
  - Patches
  - Automatic updates
- Hardware
  - Download updated drivers

The Last Resort

- If problems persist:
  - Upgrade the operating system to the latest version
  - Reinstall the operating system

The Final Decision

- How closely does your system meet your needs?
- How much would it cost to upgrade your system?
- How much would it cost to purchase a new system?

Chapter 6 Summary Questions

- How can I determine whether I should upgrade my existing computer or buy a new one?

Chapter 6 Summary Questions

- What does the CPU do, and how can I evaluate its performance?

Chapter 6 Summary Questions

- How does memory work in my computer, and how can I evaluate how much memory I need?

Chapter 6 Summary Questions

- What are the computer's main storage devices, and how can I evaluate whether they match my needs?

Chapter 6 Summary Questions

- What components affect the output of video on my computer, and how can I evaluate whether they match my needs?
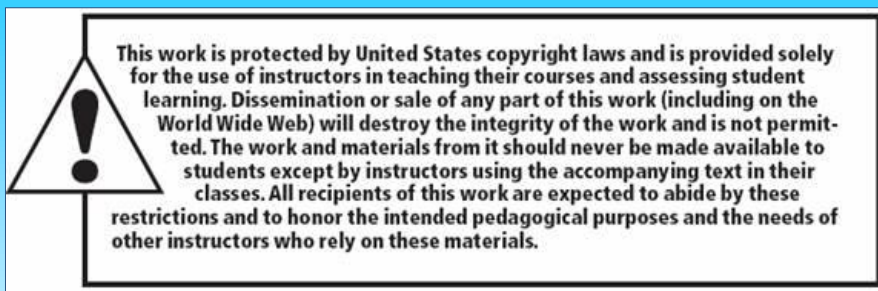
Chapter 6 Summary Questions

- What components affect the quality of sound on my computer, and how can I evaluate whether they match my needs?

Chapter 6 Summary Questions

- How can I improve the reliability of my system?

Chapter 6

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