Technology In Action
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Chapter 6
Evaluating Your System:
Understanding and Assessing Hardware
Chapter Topics

• To buy or upgrade?
• Evaluating your system:
  – CPU
  – RAM
  – Storage devices
  – Video output
  – Sound systems
  – Computer ports
• System reliability
To Buy or To Upgrade?

• Things to consider:
  – Moore’s Law
  – Cost of upgrading vs. buying
  – Time installing software and files
  – Needs and wants
Assessing Your Hardware: Evaluating Your System

• Assess the computer’s subsystems
• The subsystems include
  – CPU
  – RAM
  – Virtual memory
  – Storage devices
  – Video
  – Audio
  – Ports
Evaluating the CPU

• How does the CPU work?
  – Control unit
  – Arithmetic logic unit (ALU)
  – Machine cycle:
    • Instruction Cycle
      – Fetch
      – Decode
    • Execution Cycle
      – Execute
      – Store
  – Speed:
    • MHz
    • GHz
Evaluating Other CPU Features

• Some CPUs are optimized to process multimedia instructions

• Intel CPUs called Core Duo processors
  – Use less power than dual processors
  – Increase multitasking performance

• Intel has more than 17 other designs for chips with more than one core
Upgrading the CPU

- Expensive
- Easy to install
- Motherboard compatibility
Evaluating RAM

- Random access memory (RAM):
  - Temporary storage (memory)
  - Volatile

- Memory modules:
  - SIMM
  - DIMM
  - RIMM

- Types of RAM:
  - SRAM
  - DRAM
  - SDRAM
How Much Ram is Needed?

- RAM for System Software
- RAM for Productivity Software
- RAM for Entertainment
- RAM for Graphics Programs

<table>
<thead>
<tr>
<th>System Software</th>
<th>Windows XP</th>
<th>128 MB</th>
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<tbody>
<tr>
<td>Productivity Software</td>
<td>MS Office Pro</td>
<td>128 MB</td>
</tr>
<tr>
<td>Entertainment Software</td>
<td>Windows Media Player</td>
<td>64 MB</td>
</tr>
<tr>
<td>Graphics</td>
<td>MS Picture It!</td>
<td>128 MB</td>
</tr>
</tbody>
</table>
Adding RAM

• Increase system performance

• Things to consider:
  – Type of RAM module
  – Amount of RAM:
    • Maximum limit
    • Number of slots
    • Operating system
    • Applications running at the same time
Evaluating Storage

• Types of storage devices:
  – Hard drive
  – Floppy drive
  – Zip disk drive
  – CD/DVD
  – Flash memory

• Nonvolatile storage
The Hard Disk Drive

- Storage capacity up to 500 GB
- Access time is measured in milliseconds
- Data transfer rate is measured in megabits or megabytes per second
- Spindle speed is measured in revolutions per minute (rpm)
How a Hard Disk Works

- Composed of several coated platters stacked on a spindle
- Data saved to the disk: pattern of magnetized spots
  - Spots = 1
  - Spaces = 0
- Between platters are read/write heads that read and write magnetized data
- Spots are translated into data
Portable Storage

- Gives us the ability to move data from one computer to another
- Types of portable storage devices:
  - Floppy disk:
    - Capacity 1.44 MB
  - Zip disk:
    - Capacity 100 MB to 750 MB
  - CD-R, CD-RW, DVD-R, DVD-RW:
    - Capacity 700 MB to 9.4 GB
  - Flash drive:
    - Capacity 32 MB to 1 GB
  - Flash memory Card:
    - Up to 4 GB
Magnetic Storage

• Magnetic media:
  – Metal platters:
    • Hard disks
  – Plastic film:
    • Floppy disks
    • Zip disks

• Tracks
• Sectors
• File Allocation Table
Optical Storage

- **Optical media:**
  - CD-ROM
  - CD-R
  - CD-RW
  - DVD-ROM
  - DVD-R
  - DVD-RW

- **Laser**
  - Pits scatter laser light equaling a 1
  - Nonpitted area reflects laser light equaling a 0
Upgrading Storage

• Hard drive options:
  – Replace current drive with a larger capacity drive
  – Install an additional hard drive

• Other options:
  – Zip drive
  – Replace CD ROM with CD-R/RW or DVD-R/RW
  – Flash card reader
  – Flash memory drive
Evaluating Video

• Two components:
  – Video card (adapter)
  – Monitor
Video Cards

- Process binary data into images
- Contain memory known as video RAM (VRAM)
- Control the number of colors a monitor can display (bit depth)
  - Standard VGA
    - 4 bits
    - 16 colors
  - True color (SVGA)
    - 24 bits
    - 16 million colors
Monitors

• Things to consider:
  – Types:
    • CRT or LCD
  – Size:
    • 15, 17, 19, or 21 inch
  – Resolution:
    • Increasing resolution allows more to be displayed
  – Dot pitch:
    • .31mm or less
  – Refresh rate:
    • 75 Hz or higher
Evaluating Audio

• Sound card:
  – Process digital data into sounds
  – 3D sound cards
  – Surround sound
• Dolby Digital 5.1
Evaluating Audio

- **Speakers:**
  - Amplified
  - Not amplified
  - Subwoofer
  - Surround sound
Evaluating Ports

- Ports are used to connect peripheral devices to the computer
- Things to consider:
  - Devices you want to use
  - Ports needed for the devices
Types of Ports

- **Serial Port**
  - Transfers data one bit at a time; 56Kbps
Types of Ports

- **Parallel**
  - Transfers eight bits of data simultaneously; 12 Mbps
Types of Ports

• Universal serial bus
  – Transfer speed up to 480 Mbps; hot swapping
Types of Ports

• FireWire
  – Transfer rate of 400 Mbps; Digital cameras
  – Newer FireWire 800 is fastest
  • Available only on the Apple Mac
Types of Ports

• Ethernet
  – Transfer rate of 100 Mbps; connects computers to networks
Types of Ports

- **IrDA**
  - Transfer rate of 4 Mbps; Uses infrared light waves
Types of Ports

• Bluetooth
  – Transfer rate of 1 Mbps; radio waves send data over short distances
Types of Ports

• MIDI Port
  – Musical Instrument Digital Interface
  – 31.5 Kbps transfer rate
Adding Ports

• **Expansion cards:**
  – New port standards

• **Expansion hubs:**
  – Enables several devices to be connected to a port
Evaluating System Reliability

• Performance:
  – Slow
  – Freezes
  – Crashes

• Upkeep and maintenance:
  – System tools
  – Control panel
  – Update software and hardware drivers
Upkeep and Maintenance

- **System tools:**
  - Disk defragmenter
  - Disk cleanup
    - Unnecessary files

- **Control panel:**
  - Add/remove programs
  - Display
  - System
    - Device manager
Update Software and Hardware Drivers

- **Software:**
  - Automatic updates
  - Patches
- **Hardware:**
  - Download updated drivers
The Last Resort

• If problems persist:
  – Reinstall the operating system
  – Upgrade the operating system to the latest version
The Final Decision

• How closely does your system come to meeting your needs?
• How much would it cost to upgrade your system?
• How much would it cost to purchase a new system?