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:

<table>
<thead>
<tr>
<th>Application</th>
<th>Minimum RAM Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows 7</td>
<td>1000 MB</td>
</tr>
<tr>
<td>Microsoft Office Professional 2007</td>
<td>256 MB</td>
</tr>
<tr>
<td>Internet Explorer 8</td>
<td>128 MB</td>
</tr>
<tr>
<td>iTunes</td>
<td>256 MB</td>
</tr>
<tr>
<td>Adobe Photoshop Elements</td>
<td>512 MB</td>
</tr>
<tr>
<td>Total RAM required to run all programs simultaneously</td>
<td>2,152 MB or 2.15 GB</td>
</tr>
</tbody>
</table>

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.

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

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?

• 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

• How can I improve the reliability of my system?