*technology in action*

Chapter 6

understanding and ASSESSING HARDWARE:

evaluating your system

# ChAPTER REVIEW

**Buzz Words/Word Bank**

|  |  |  |
| --- | --- | --- |
| access time | FireWire | sound card |
| Bluetooth | hard drive | subwoofer |
| CD-RW drive | LCD | system evaluation |
| CPU | monitor | upgrading |
| expansion card | motherboard | USB |
| expansion hub | RAM | Zip drive |

**Instructions:** Fill in the blanks using the words from the Word Bank above.

Joe already has a PC but just heard about a great deal on a new one. He decides to perform a(n) **(1) system evaluation** on his computer to see whether he should keep it or buy the new one. First, he right-clicks the My Computer icon to check his System Properties. By doing so, he can check what **(2) CPU** is in his computer. He sees he has a Pentium 4 processor running at 2.8 GHz. Next, he checks his internal memory, or **(3) RAM**. He then turns to the Task Manager to evaluate his CPU and RAM usage to see if he needs to add more RAM should he keep his PC.

He continues to evaluate his system by checking out what components he has and what he’ll need. He notes the storage capacity of the **(4) hard drive**. Recently, he has been using a(n) **(5) Zip drive** to store files because his hard drive is nearing capacity. But the **(6) access time**, or the amount of time it takes for the disk to find the right data, is so slow that the larger hard drive of a new computer is appealing. Joe also notes that he is unable to download large files from the Internet and save them onto a CD like his friends do. His current system does not have a(n) **(7) CD-RW drive** with which to burn CDs, but the new system would. The new system would also include speakers with a(n) **(8) subwoofer** to improve the sound. He also sees that it would include a(n) **(9) sound card** that would allow him to connect more of his audio equipment to his PC.

Joe’s 15-inch **(10) monitor** doesn’t fit well on his desktop, and having a(n) **(11) LCD** monitor would conserve space. He also knows that if he wants to attach more devices to his PC in the future, he’ll need more **(12) USB** ports, because his current system has only a few of these faster ports. He notes, however, that it may be just as cost effective to install a(n) **(13) expansion card** in his system to give it more ports or to buy a(n) **(14) expansion hub** he could attach to his system unit to add more ports. Finally, Joe considers the cost of buying the new computer versus **(15) upgrading** his current system. He realizes it’s more economical right now to keep his current system.

**Self-Test**

**Instructions:** Answer the multiple choice and true/false questions below for more practice with key terms and concepts from this chapter.

**MULTIPLE CHOICE**

1. Processor speed is measured in which of the following?
   1. megabytes
   2. gigahertz
   3. gigabytes
   4. None of the above

ANSWER: B

1. Upgrading your system by replacing your CPU guarantees:
   1. better processing performance.
   2. better system performance.
   3. that the hard drive access time will improve.
   4. All of the above

ANSWER: A

1. Which is an example of volatile storage?
   1. ROM
   2. hard disk drive
   3. RAM
   4. flash drive

ANSWER: C

1. The amount of RAM that is actually sitting on memory modules in your computer is your computer’s:
   1. physical memory.
   2. kernel memory.
   3. page usage memory.
   4. page file memory.

ANSWER: A

1. The hard drive’s access time is:
   1. the fastest of all permanent storage devices.
   2. measured in milliseconds.
   3. the time it takes it to locate its stored data and make it available for processing.
   4. All of the above

ANSWER: D

1. Zip disks are not examples of optical storage because:
   1. they can hold megabytes of data.
   2. they use magnetized film to record 1s and 0s.
   3. they are not round and shiny.
   4. they are thicker than floppy disks.

ANSWER: B

1. Flash memory storage is available as:
   1. flash memory pens.
   2. compact flash cards.
   3. flash or jump drives.
   4. All of the above

ANSWER: D

1. VRAM, or the RAM on a video card, is:
   1. always the same as the amount of RAM in the system.
   2. always the same speed as the system RAM.
   3. used for virtual memory if system RAM gets full.
   4. used to ensure high-quality images.

ANSWER: D

1. Which of the following is the fastest port?
   1. parallel port
   2. FireWire port
   3. USB 2.0 port
   4. Ethernet port

ANSWER: C

1. To ensure your system runs reliably, you can:
   1. run the Disk Defragmenter utility.
   2. clean out your Startup folder.
   3. clear out unnecessary files on your hard drive.
   4. All of the above

ANSWER: D

**TRUE/FALSE**

**False** 1. In a well-designed computer system, the CPU is always operating near 100 percent utilization.

**True** 2. If you try to run a set of programs that demand more memory than you have, space on the hard disk drive will be used to make up the difference.

**False** 3. The System Properties dialog box tells you what kind of CPU is installed but not how fast it can process data.

**False** 4. DVDs are unlike CDs and cannot be written to. Instead, they provide read-only storage of data.

**True** 5. If you need more USB 2.0 ports, you can add an extension hub and have several new USB ports available.

**Critical Thinking Questions**

**1. Your Ideal System**

If you could buy any new system on the market, not worrying about the price, what would you buy? What kind of monitor would you have? How much RAM and CPU? What kind of ports would you require? Which sound system would fit your needs? Would you know how to use your ideal system?

*Most students would probably want the most RAM and highest speed CPU available. This is especially true for those students interested in gaming, and these features, in addition to a good-sized flat-panel monitor and a number of extra USB ports located on the front of the tower, would suit them very well.*

**2. Future Systems**

Given current trends in technology, what kind of system can you imagine upgrading to or buying new in 10 years? Which components would change the most? Which components would need to stay the same, if any? What do you imagine the entire system would look like?

*All data and programs may be stored remotely (i.e., on a file server or an application server). Students might expect to use a large monitor with connectivity device (wireless), perhaps a wall-mounted, voice-activated system, with no need for a keyboard or mouse.*

**3. Portable Storage Solutions**

Many newer computers no longer include a floppy disk drive as standard component. This is in response to many users requiring portable storage media to hold larger files that cannot fit on a floppy. What other solutions are possible? Are there reasons why floppy disks are still a viable means of portable storage?

*Because almost all late-model computers have USB ports, a USB flash drive is a viable alternative storage source. Alternately, CDs that are burned with data files can typically be played on most computers. Floppy disks are quickly becoming obsolete—they are easy to break or lose and do not have the storage capacity to hold a typical PowerPoint presentation.*

**4. Impacts of New Technology**

We are constantly being bombarded with new technology. We hear of new tools and system improvements from our friends, relatives, and advertisements almost daily. This chapter talks about upgrading current systems so that we can take advantage of some of the newer technology. Some improvements we absolutely need (more RAM, perhaps), others we may just really want (such as an LCD monitor). What do you think are the societal, economic, and environmental impacts of our wanting to have the latest and greatest computers? Do you think the push toward faster and more powerful machines is a good thing?

*Students who are new to computing can be easily confused or overwhelmed by all the bells and whistles that accompany the newest technology, and it is also common for others to be swayed by “computer-envy.” Although basic computers are relatively affordable, many students think they need the top-of-the-line models, but they find the price out of their reach. Additionally, the disposal of older, unwanted, or obsolete components is creating environmental issues due to the potentially hazardous materials in these products. Privacy issues can also be a concern when disposing of materials containing personal or financial data.*

**5. New Technologies: Putting Industries at Risk?**

The Trends in IT feature in this chapter discusses the impact CD and DVD technology has had on the music and entertainment industries. Can you think of other industries that might be at risk because of these new technologies?

Large programs/data files that typically could not be stored on a floppy disk can now be pirated and distributed on CD/DVD, so all industries that make electronic data files are susceptible.

**6. Recycling Computers**

Mercury in screens and switches, cadmium in batteries and circuit boards, and the four to eight pounds of lead in CRT monitors are all toxic. Discarded machines are beginning to create an e-waste crisis. Who do you think should assume the cost of recycling computers? The consumer, the government, the industry? What other options are there besides just throwing older computers away?

Companies such as Dell have programs that allow you to recycle your old computer. Companies should offer a trade-in value on your old computer. This could promote recycling. Perhaps an environmental group such as Sierra Club could come up with a creative use for discarded machines.

**7. System Longevity**

If you purchase a computer system for business purposes, the IRS allows you to depreciate its cost over five years. The IRS considers this a reasonable estimate of the useful lifetime of a computer system. What do you think most home users expect in terms of how long their computer systems should last? How does the purchase of a computer system compare with other major household appliances in terms of cost, value, benefit, life span, and upgrade potential?

The government estimate is probably fair, although many users trade in more frequently than that. Some students have probably had toasters that last longer than that—some would think that they are not a good value for the money. Purchasing a computer and its necessary peripherals probably ranks right behind purchasing a house and purchasing a car in terms of cost. It is often one of the most expensive purchases a consumer will make.

**Team Time**

**Meeting a Corporation’s Computing Needs**

*This exercise allows students to use their observation and assessment skills by putting into practice the concepts covered in this chapter. The following rubric may be useful for grading purposes.*

| **Rubric** | **Beginning**  **1 point** | **Developing**  **2 points** | | **Proficient**  **3 points** | | **Exemplary**  **4 points** | **Score** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Individual Effort** | There was very little effort or understanding of the topic shown. | There was evidence of effort but it lacked in preparation and understanding. | | Clear learning on the topic has occurred. | | A sound understanding of the topic was exhibited with enthusiasm and creativity. |  |
| **Team Effort** | Team members did not function as a group when given the opportunity. There was only individual work with no evidence of collaboration. | Team members had some major problems working as a group. There was little collaboration and teamwork evident. | | The team members mostly worked well together, with few problems. There could have been improvement in the level of teamwork that was utilized. | | The team worked as a cohesive unit. There was mature collaboration, compromise, and discussion evident at all times. |  |
| **Final Product** | The final presentation had major factual, grammatical, spelling, and formatting errors. It seemed rushed and incomplete. | The final presentation had factual, grammatical, spelling, or formatting errors but was complete. | | The final presentation was a carefully developed product with few factual, grammatical, spelling, or formatting errors. | | The presentation was developed with care and creativity making it interesting, polished, and error-free. |  |
| **Instructor Feedback** | Little or no attempt was made to receive or incorporate feedback from the instructor. | Feedback was received, but none of the suggestions were incorporated into the presentation. | | Feedback was received and some suggestions were incorporated into the presentation. | | Feedback was received and the suggestions were incorporated into the presentation. |  |
| **Evaluation** | 0 points  No assessments were completed and handed in to the instructor. | | 1 point  One assessment was completed and handed in to the instructor. | | 2 points  All assessments were completed and handed in to the instructor. | |  |

**ACTIVE HELPDESK**

These exercises are designed to provide the student with an interactive experience that will help them to extend their knowledge of topics in this chapter. The student plays the “role” of a Helpdesk analyst and provides answers to *commonly* asked questions in a rich, simulated online experience. Helpdesk calls can be found on the Train and Assess IT Web site, through your online course, or on the Student CD. After successfully completing the Helpdesk call, students will be able to access the Helpdesk Cheat Sheet, which summarizes the key points in each call.

The Helpdesk calls related to this chapter are:

* Evaluating Your CPU and RAM
* Evaluating Your Storage Subsystem and Ports

***Evaluating Your CPU and RAM******Helpdesk Cheat Sheet***

***A. The CPU Subsystem***

***1. CPU Basics:*** *The central processing unit (CPU) processes instructions, performs calculations, manages the flow of information through the computer, and processes the data you input into information. The CPU is composed of the control unit and the arithmetic logic unit (ALU). The control unit coordinates the activities of all the computer components. The ALU performs all calculations and makes logic and comparison decisions. Every time the CPU performs a program instruction, it goes through a series of steps called the machine cycle.*

***2. CPU Speed and Location:*** *Processor speed is measured in megahertz (MHz), or 1 million hertz, and gigahertz (GHz), or 1 billion hertz. The percentage of time that your CPU is working is referred to as CPU usage. The CPU is located on the motherboard.*

***3. Replacing a CPU:*** *Replacement CPUs are expensive. Not all CPUs are interchangeable, and the replacement CPU must be compatible with the motherboard.*

***B. The RAM Subsystem***

***1. RAM Basics:*** *RAM (random access memory) is the computer’s temporary storage space. RAM remembers everything that the computer needs to process data, but only while the computer is on. This means that RAM is volatile storage. When the power is off, the data stored in RAM is cleared out. Memory modules are the circuit boards that hold RAM chips. They fit into slots on the motherboard. RAM capacity is measured in megabytes (MB) or gigabytes (GB).*

***2. Physical Memory versus Kernel Memory:*** *The amount of RAM that is actually sitting on memory modules in your computer is your computer’s physical memory. The memory that your OS uses is called kernel memory. At a minimum, you need enough RAM to run the OS, run whatever applications you’re using, plus some additional RAM to hold the data you’re inputting.*

***3. Adding RAM:*** *You need to be sure that you’re adding a compatible memory module to your computer. Every computer is designed with a maximum limit on the amount of RAM it can support. In addition, each computer is designed with a specific amount of slots on the memory board in which the memory cards fit, and each slot may have a limit on the amount of RAM it can support.*

***4. Virtual Memory***

*If you don’t have enough RAM to hold all the programs you’re trying to run, the OS stores the data that doesn’t fit in RAM into a space on the hard disk called virtual memory. When it is using virtual memory, your OS builds a page file on the hard drive to allow processing to continue. This enables the system to run more applications than can actually fit in its RAM. Adding RAM greatly affects system performance in this case.*

***Evaluating Your Storage Subsystem and Ports******Helpdesk Cheat Sheet***

***A. Hard Disk Drives***

***1. Basics:*** *With storage capacities of up to 400 GB, the* ***hard disk drive*** *(****hard drive****) has the largest storage capacity of any storage device on the computer. Like all storage devices, the hard disk is a* ***nonvolatile storage device****. This means that when you turn your computer off, the data stored to it is saved.*

***2. Upgrading a Hard Drive:*** *To determine your storage capacity needs, add up the storage space all programs need to reside on your computer. If your hard drive is running out of space, you can replace it with a bigger one, install an additional hard drive if you have an extra drive bay, or buy an external hard drive.*

***3. Hard Drive Speed: Data Transfer Rate*** *is the rate at which a drive transfers data to other computer components (such as RAM). It is expressed in either megabits or megabytes per second.* ***Access Time*** *is the time it takes a storage device to locate stored data and make it available for processing. Hard drive access times are measured in milliseconds.*

***B. Magnetic Media: Floppy and Zip Disks***

***Floppy disks*** *have a capacity of 1.44 MB, and* ***Zip disks*** *have capacities from 100 to 750 MB. Both are being phased out in favor of other forms of portable storage. Because floppies and Zip disks use a magnetized film to store data, they are called* ***magnetic media****.*

***C. Optical Media: CDs and DVDs***

*CDs and DVDs store data as tiny pits that are burned into a disk by a high-speed laser. Data is then read off CDs and DVDs by the laser beam, so they are referred to as* ***optical media****. If you want, you can add a new drive to your system, you can install a drive in an empty drive bay, or you can buy an external unit to attach through a port. When you buy a CD or DVD drive, knowing the drive speed is important. Speeds are listed on the device’s packaging. For CD drives, record (write) speed is listed first, rewrite speed is second, and playback speed is last. DVD drives are much faster than CD drives.*

***D. Flash Memory***

***Flash memory cards*** *are tiny removable memory cards often used in digital cameras and MP3 players. Although many PCs don’t include internal* ***memory card readers****, you can buy external memory card readers that connect to your system via a USB port.*

***E. Ports***

*A* ***port*** *is an interface through which external devices are connected to your computer. There are many ports—serial, parallel, USB, FireWire, Ethernet, MIDI, and IrDA—each of which operates at a certain speed, measured in either Kbps or Mbps.* ***Bluetooth*** *is a technology that uses radio waves to send data over short distances. To add new ports or to expand the number of ports on a computer, you can install a special expansion card in your system unit, you can add an* ***expansion hub,*** *and you can add ports to an empty drive bay.*