*Technology in Action*

Chapter 1

Why computers matter to you:   
becoming Computer Fluent

# ChAPTER REVIEW

**Buzz Words/Word Bank**

|  |  |  |
| --- | --- | --- |
| artificial intelligence (AI) | data | nanotechnology |
| bit | gigabyte | output |
| byte | information | processing |
| computer forensics | input | server |
| CPU | megabyte | storage |

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

Because of the integration of computers into business and society, many fields of study are available now that were unheard of a few years ago. **(1)** **Nanotechnology**, the study of very small computing devices built at the molecular level, will provide major advances in the miniaturization of computing. **(2)** **Computer forensics** is already taking criminologists beyond what they could accomplish with conventional investigation techniques. And as the science of **(3) artificial intelligence (AI)** advances, robots will perform more and different tasks than humans currently perform.

At the lowest level, computers manipulate data in units called **(4)** **bit**s. Because these units are too small to define data on their own, they are grouped together to form **(5)** **byte**s. **(6)** **Data** represents raw facts or ideas. **(7) Information** represents facts or ideas that have been organized or processed in some fashion to make them more meaningful. When storing data, large quantities of space are needed. The capacity of most hard drives today is measured in **(8) gigabyte**s, which represents more than 1 billion bytes of information.

For a computer to use data, various components of the computer must interact with the data. Mice and keyboards are **(9) input** devices used to enter data into the computer. The CPU is an example of a(n) **(10) processing** device that helps turn data into information. **(11) Output** devices, such as monitors and printers, enable computers to provide information in a usable format. To save information and data for later use, **(12) storage** devices such as hard disk drives are used.

**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. Which of the following is not one of the four major functions of a computer?
   1. input
   2. storage
   3. enumeration
   4. processing

ANSWER: C

1. Data becomes information when:
   1. it is entered into a computer.
   2. a computer performs calculations with the data.
   3. the data is organized in a specific manner.
   4. the data is output to a computer screen or printer.

ANSWER: C

1. In the binary language, each 0 or 1 is referred to as a:
   1. byte.
   2. bit.
   3. kilobyte.
   4. nanobyte.

ANSWER: B

1. Eight bits combine to create:
   1. one megabyte.
   2. one kilobyte.
   3. one bit.
   4. one byte.

ANSWER: D

1. A kilobyte is approximately:
   1. 100 bytes.
   2. 1,000 bytes.
   3. one million bytes.
   4. one billion bytes.

ANSWER: B

1. A megabyte is approximately:
   1. 100 bytes.
   2. 1,000 bytes.
   3. one million bytes.
   4. one billion bytes.

ANSWER: C

1. Which of the following is not an input device?
   1. keyboard
   2. mouse
   3. digital camera
   4. CD-ROM drive

ANSWER: D

1. Which of these is not an output device?
   1. printer
   2. floppy disk drive
   3. monitor
   4. speakers

ANSWER: B

1. Which of these is not a storage device?
   1. hard disk drive
   2. floppy disk drive
   3. boot drive
   4. CD drive

ANSWER: C

1. Spreadsheet programs (such as Excel) are an example of:
   1. application software.
   2. operating system software.
   3. data mining software.
   4. utility software.

ANSWER: A

**TRUE/FALSE**

**False** 1. The four major functions that a computer performs are input, output, storage, and dissemination.

**True** 2. Computers use a binary language composed of 0s and 1s to perform all calculations and functions.

**False** 3. Microsoft Windows is the most popular piece of application software sold today.

**False** 4. The CPU is located on RAM.

**True** 5. PCs and Macs are the two most common types of computer platforms.

**Critical Thinking Questions**

**1. Rating Your Computer Fluency**

This chapter lists a number of ways in which knowing about computers (or becoming computer fluent) will help you. How much do you know about computers? What else would you like to know? How do you think learning more about computers will help you in the future?

It might be interesting at this stage of the course to create a survey to find out what the students’ skill sets and interests are. Their skills and interests will likely vary widely, and it is beneficial to know that in advance. Use this information to lead a discussion that addresses how the course will fit in with their existing knowledge, and proceed to build on that.

**2. Data Mining**

This chapter briefly discusses data mining, a technique companies use to study sales data and gather information from it. Have you heard of data mining before? How might a company like Wal-Mart or Target use data mining to better run their business? Can you think of any privacy risks data mining might pose?

Some students may have heard the term mentioned in the media or on the Web. One possibility is that companies may gather information about your shopping habits, preferences, and so on, and sell it without your consent to others along with your personal information. This could generate many unwanted solicitations.

**3. Nanotechnology**

As you learned in the chapter, nanotechnology is the science revolving around the use of nanostructures to build devices on an extremely small scale. What applications of tiny computers can you think of? How might nanotechnology impact your life?

Medical advancements using nanotechnology will likely be suggested here. Another possibility is portability of high-powered computing resources. What if you could make a hand-held device behave exactly as your desktop computer at home does?

**4. Biomedical Chips**

This chapter discusses various uses of biomedical chips. Many biomedical chip implants that will be developed in the future will most likely be aimed at correcting vision loss, hearing loss, or other physical impediments. But chips could also be developed to improve physical or mental capabilities of healthy individuals. For example, chips could be implanted in athletes to make their muscles work better together, thereby allowing them to run faster. Or, your memory could be enhanced by providing additional storage capacity for your brain.

1. Should biomedical implant devices that increase athletic performance be permitted in the Olympics?
2. What about devices that repair a problem (such as blindness in one eye) but then increase the level of visual acuity in the affected eye so that it is better than normal vision?
3. Would you be willing to have a chip implanted in your brain to improve your memory?
4. Would you be willing to have a VeriChip implanted under your skin?

These questions should spark a lively debate, and answers may vary wildly. Steroid use by athletes has been an issue for some time now. Ask students about the similarities or differences between the use of steroids and implanted chips in sports. Ask them if they have ever seen A Beautiful Mind with Russell Crowe. In one scene, Crowe’s character is desperately trying to remove what he thinks is an implanted chip from his arm so that his enemies cannot locate him. Discuss how this type of technology could be both a blessing and a curse.

**5. Artificial Intelligence**

Artificial intelligence is the science that attempts to produce machines that display the same type of intelligence that humans do. Do you think humans will ever create a machine that can think? In your opinion, what are the ethical and moral implications associated with artificial intelligence?

Many students may have seen the movie AI, in which a boy is created to replace the ill son of a desperate couple. The boy takes on lifelike qualities and learns to give and receive love. Is this really learned behavior or a feat of programming? Has he become a “real boy”? This is hardly Pinocchio, and the moral implications are frightening. Try to discuss them with your group.

**Team Time**

**Promoting Future Technologies**

This exercise gives students a chance to meet each other and talk informally about technology. 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. | |  |

**Multimedia**

**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:

* Understanding Bits and Bytes

***Understanding Bits and Bytes Helpdesk Cheat Sheet***

***A.******Bits, Bytes, and Binary Language***

***1. Byte:*** *A byte is a term used to represent 8 bits of data. One byte can hold about one character, one number, or one symbol.*

***2.******Bit:*** *A bit is short for binary digit. Each bit represents a 1 or a 0.*

***3. Binary Language:*** *In order to process data, computers use binary language, which consists of just two numbers: 0 and 1. Everything a computer does is broken down into a series of 0s and 1s. Each 0 and 1 is a binary digit, or bit for short. In computers, each letter, number, or special character (such as the @ sign) consists of a unique combination of 8 bits, or 1 byte.*

***B.******Kilobytes, Megabytes, and Gigabytes***

***1. Kilobyte (KB):*** *Approximately 1,000 bytes.*

***2.******Megabyte (MB):*** *About a million bytes.*

***3. Gigabyte******(GB):*** *About a billion bytes.*

***C.******Computer Processing: Data into Information***

***1. Computer Processing:*** *Strictly defined, a computer is a data processing device that performs four major functions: 1. It gathers data (or allows users to input data). 2. It processes that data into information. 3. It outputs data or information. 4. It stores data and information.*

***2.******Data:*** *The representation of a fact or idea. Data can be a number, a word, a picture, or even a recording of sound.*