Visualizing Technology 10th edition Geoghan Solutions Manual

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Summary

1. **Explain the Functions of a Computer**

   A computer is a device that converts raw data into information using the information processing cycle. The four steps of the IPC are input, processing, storage, and output. Computers can be programmed to perform different tasks.

2. **Describe the Evolution of Computer Hardware**

   The earliest computers used vacuum tubes, which are inefficient, large, and prone to failure. Second-generation computers used transistors, which are small electric switches. Third-generation computers used integrated circuits—silicon chips containing multiple tiny transistors. Fourth-generation computers use microprocessors—complex integrated circuits containing processing circuitry. The central processing unit (CPU) is the primary microprocessor of a computer.

   Moore's Law states that the number of transistors that can be placed on an integrated circuit has doubled roughly every two years. The increase in the capabilities of integrated circuits directly affects the processing speed and storage capacity of modern electronic devices.

3. **Describe How Computers Represent Data Using Binary Code**

   A single bit (or switch) has two possible states—on or off—and can be used for situations with two possibilities, such as yes/no or true/false. Digital data is represented by 8-bit binary code on most modern computers. The 8-bit ASCII system originally had binary codes for 256 characters. Unicode is an extended ASCII set with codes for more than 100,000 characters.

4. **List the Various Types and Characteristics of Personal Computers**

   Personal computers include desktop computers, which offer the most speed, power, and upgrade for the lowest cost; workstations, which are high-end desktop computers; and all-in-ones, compact desktop computers with the computer case integrated into the monitor. Portable personal computers include notebooks and tablets.

5. **Give Examples of Other Computing Devices**

   Other computing devices include smartphones, wearables, GPS, video game systems, and simulators. Virtual reality is an immersive technology, while augmented reality and mixed reality mix virtual content over the physical world.

6. **List the Various Types and Characteristics of Multiuser Computers**

   Multiuser computers allow multiple simultaneous users to connect to the system. They include servers, midrange servers, mainframe computers, and enterprise servers. Supercomputers perform complex mathematical calculations. They perform a limited number of tasks as quickly as possible. Distributed computing uses the processing of multiple computers to perform complex tasks.

7. **Explain Ubiquitous Computing and Convergence**

   Ubiquitous computing means the technology recedes into the background so that you no longer notice it as you interact with it. The Internet of Things is the connection of the physical world to the Internet. Convergence is the integration of multiple technologies, such as cell phones, cameras, and music players, on a single device.

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CHAPTER QUIZ

Multiple Choice

Answer the following multiple-choice questions for more practice with key terms and concepts from this chapter.

1. The _____ is a measure of a computer's ability to display intelligent behavior.
   a. Analytical Engine
   b. artificial intelligence
   c. Bernoulli numbers program
   d. Turing test
2. Second-generation computers used _____ to process data.
   a. integrated circuits
   b. microprocessors
   c. transistors
   d. vacuum tubes
3. A _____ is a complex integrated circuit that contains processing circuitry.
   a. microprocessor
   b. silicon
   c. transistor
   d. vacuum tube
4. What binary code can represent most currently used language characters and is the standard used on the Internet?
   a. ASCII
   b. Base 2
   c. International Standards
   d. Unicode
5. What is a compact desktop computer with an integrated monitor and system unit?
   a. All-in-one
   b. Mainframe
   c. Supercomputer
   d. Workstation
6. _____ is an overlay of virtual content on the physical world.
   a. Artificial intelligence
   b. Augmented reality
   c. Convergence
   d. Virtual reality
7. _____ consists of 24 satellites that transmit signals to determine the receiver's current location, time, and velocity through triangulation of the signals.
   a. UAS
   b. GPS
   c. A wearable system
   d. A flight simulator
8. _____ perform complex mathematical calculations, such as those used in weather forecasting and medical research.
   a. Enterprise servers
   b. Mainframes
   c. GPS
   d. Supercomputers
9. _____ is the study of the relationship between workers and their workspaces.
   a. Bioinformatics
   b. Distributed computing
   c. Ergonomics
   d. Ubicomp
10. A(n) _____ is an example of convergence.
    a. smart grid
    b. smartphone
    c. traffic light
    d. ubicomp

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True or False

Answer the following questions with *T* for true or *F* for false for more practice with key terms and concepts from this chapter.

_____ **1.** Computers convert data into information using the information processing cycle.

_____ **2.** Third-generation computers used transistors.

_____ **3.** Today's computers use microprocessors.

_____ **4.** Moore's Law states that the number of transistors that can be placed on an integrated circuit will double roughly every 18 years.

_____ **5.** ASCII contains codes for most of the languages in use today.

_____ **6.** Bioinformatics allows you to design a workspace for your comfort and health.

_____ **7.** All-in-one is a type of desktop computer.

_____ **8.** Users connect to servers via clients.

_____ **9.** Volunteer computing projects harness the idle processing power of hundreds or thousands of personal computers.

_____ **10.** The idea that computers are all around us is called convergence.

Running Project . . .

. . . The Finish Line

Use your answers from the previous sections of the chapter project to discuss the evolution of computers in the past few centuries. Write a report responding to the questions raised throughout the chapter project. Save your file as **lastname_firstname_ch01_project**, and submit it to your instructor as directed.

Do It Yourself 1

Consider the features available on the personal computing device you use the most. From your student data files, open the file *vt_ch01_DIY1_answersheet* and save it as **lastname_firstname_ch01_DIY1_answersheet**.

What device did you choose? Is it a desktop, a notebook, a tablet, or some other type of system? Where is it located? How long have you had it? Did you research the computer before you made your purchase? What made you purchase it?

What do you use the computer for the most? What are the five features you use most frequently? Why? What are the three you use the least? Why? How could this device be improved to make your life more convenient? Describe one way life would be easier and one way your life would be more difficult without this device. Save your answers and submit your work as directed by your instructor.

Do It Yourself 2

Use an online mind mapper or presentation tool, such as Mindomo, MindMeister, Prezi, or PowerPoint, to create a mind map to compare desktop, notebook, and mobile devices. A mind map is a visual outline. From your student data files, open the file *vt_ch01_DIY2_answersheet* and save it as **lastname_firstname_ch01_DIY2_answersheet**.

Your map should have three main branches: desktop, notebook, and mobile devices. Each branch should have at least three leaves: characteristics, advantages, and disadvantages.

When you are finished with your map, take a screenshot of this window and paste it into your answer sheet, or, if available, export your mind map as a PNG or JPG file.

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Critical Thinking

Convergence has led to smaller devices that cost less and do more. From your student data files, open the file *vt_ch01_CT_answersheet* and save it as **lastname_firstname_ch01_CT_answersheet**.

Research two of the newest smartphones or tablets on the market—one from each mobile platform: iOS and Android. Complete the following table, comparing the features of each device. Use this research to decide which device would best meet your personal needs. Which device should you buy, and why? What other accessories will you need to purchase? Do you need to purchase a service plan to take advantage of all the device's features? Save your file and submit it as directed by your instructor.

	Device 1: iOS	Device 2: Android
Website or store		
Brand		
Model		
Price		
Phone		
Processor		
Camera/video		
Memory		
Internet		
Downloadable apps		
Additional features		
Additional purchases required		

Ethical Dilemma

The term *digital divide* refers to the gap in technology access and literacy. There have been many types of programs designed to close this gap. The COVID-19 pandemic sent millions of students home to finish the 2020 school year, and for much of the following school year. The lack of computers and Internet access highlighted the digital divide in many communities. Schools rushed to purchase and loan out inexpensive Chromebooks and other devices, but many students lost weeks of learning during this time. From your student data files, open the file *vt_ch01_ethics_answersheet* and save it as **lastname_firstname_ch01_ethics_answersheet**.

Use the Internet to find a school program that supplies all students with tablets or notebooks. What are the goals of the program? How was it funded? Has it been successful? How has its success or failure been measured? Do you think programs like this one can solve the digital divide? Why or why not? Type your answers; be sure to cite your sources. Save the file and submit your work as directed by your instructor.

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On the Web

Many famous people and events led to our modern computers. In this exercise, you will create a timeline that illustrates those you feel are most significant. From your student data files, open the file *vt_ch01_web_answersheet* and save it as **lastname_firstname_ch01_web_answersheet**.

Visit **computerhope.com/history**, and under *Timeline*, select the link to open the year you were born. Create a timeline showing five to seven milestones in the development of computers that occurred in this decade. Use a free online timeline generator or an online presentation tool, such as Prezi or PowerPoint, to create your timeline. Share the URL and present your findings to the class. Prepare a summary of your timeline and include the URL where it can be viewed. Save the file and submit your work as directed by your instructor.

Collaboration

With a group of three to five students, research a famous computer pioneer. Write and perform a news interview with this person. If possible, video record the interview. Present your newscast to the class.

Instructors: Divide the class into groups of three to four students and assign each group a famous computing pioneer from the list at computerhope.com/people.

The Project: As a team, prepare a dialogue depicting a news reporter interviewing this person. Use at least three references. Use Google Drive or Microsoft Office to prepare the presentation and provide documentation that all team members have contributed to the project.

Outcome: Perform the interview in a newscast format using the dialogue you have written. The interview should be 3 to 5 minutes long. If possible, record the interview and share the newscast with the rest of the class. Save this video as **teamname_ch01_video**. Turn in a final text version of your presentation named **teamname_ch01_interview**. Be sure to include the name of your presentation and a list of all team members. Submit your presentation to your instructor as directed.

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Multiple Choice

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d. Workstation

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b. Augmented reality
c. Convergence
d. Virtual reality

7. _____ consists of 24 satellites that transmit signals to determine the receiver's current location, time, and velocity through triangulation of the signals.

a. UAS
b. GPS

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c. A wearable system

d. A flight simulator

8. _____ perform complex mathematical calculations, such as those used in weather forecasting and medical research.

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b. Mainframes

c. GPS

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9. _____ is the study of the relationship between workers and their workspaces.

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b. Distributed computing

c. Ergonomics

d. Ubicomp

10. A(n) _____ is an example of convergence.

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b. smartphone

c. traffic light

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True or False

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5. ASCII contains codes for most of the languages in use today.

6. Bioinformatics allows you to design a workspace for your comfort and health.

7. All-in-one is a type of desktop computer.

8. Users connect to servers via clients.

9. Volunteer computing projects harness the idle processing power of hundreds or thousands of personal computers.

10. The idea that computers are all around us is called convergence.

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True or False

Answer the following questions with T for true or F for false for more practice with key terms and concepts from this chapter.

True 1. Computers convert data into information using the information processing cycle.

False 2. Third-generation computers used transistors.

True 3. Today's computers use microprocessors.

False 4. Moore's Law states that the number of transistors that can be placed on an integrated circuit will double roughly every 18 years.

False 5. ASCII contains codes for most of the languages in use today.

False 6. Bioinformatics allows you to design a workspace for your comfort and health.

True 7. All-in-one is a type of desktop computer.

True 8. Users connect to servers via clients.

True 9. Volunteer computing projects harness the idle processing power of hundreds or thousands of personal computers.

False 10. The idea that computers are all around us is called convergence.