Chapter 1 Introduction to Computers, Programs, and Python

1. A computer is an electronic device that stores and processes data. A computer includes both *hardware* and *software*. In general, hardware is the physical aspect of the computer that can be seen, and software is the invisible instructions that control the hardware and make it work. The hardware of a computer consists of a CPU, cache, memory, hard disk, floppy disk, monitor, printer, and communication devices.
2. Five major hardware components: CPU, Memory, Storage Devices, Input/Out Devices, and Communication Devices.
3. CPU stands for Central Processing Unit. It is the brain of the computer.
4. The unit of measurement of clock speed is the hertz (Hz), with 1 hertz equaling 1 pulse per second. The clock speed of a computer is usually stated in megahertz (MHz) (1 MHz is 1 million Hz).
5. A bit is a binary digit 0 or 1. A byte is a sequence of 8 bits.
6. Memory is like a work area for programs. Before a program is executed, it is brought into the memory. RAM stands for random-access memory. It is called RAM because a memory cell can be accessed directly.
7. Memory size is measured in bytes.
8. Disk size is measured in bytes.
9. Memory is volatile, because information is lost when the power is turned off. Programs and data are permanently stored on storage devices and are moved, when the computer actually uses them, to memory, which is much faster than storage devices.
10. The *machine language* is a set of primitive instructions built into every computer. This is the language understood by a computer and executed by a computer.
11. *Assembly language* is a low-level programming language in which a mnemonic is used to represent each of the machine language instructions.
12. Assembler is a software that translates assembly language into machine language.
13. The *high-level languages* are English-like and easy to learn and program.
14. The program written in a programming language is called a source program.
15. An interpreter is a software that reads one statement from the source code, translates it to the machine code or virtual machine code, and then executes it right away
16. A compiler is a software that translates a program in high-level language into machine language code.
17. An interpreter reads one statement from the source code, and translates it to the machine code or virtual machine code, and then executes it right away. A compiler translates the entire source code into a machine code file, and the machine code file is then executed.
18. The *operating system* (OS) is a program that manages and controls a computer's activities. The examples of OS are Windows 98, NT, 2000, XP, or ME. Windows. Application programs such as an Internet browser and a word processor run on top of an operating system.
19. Major responsibilities:
    a. Controlling and monitoring system activities

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      b. Allocating and assigning system resources
      c. Scheduling operations
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20. Multiprogramming allows multiple programs to run simultaneously by sharing the CPU. Multithreading allows concurrency within a program, so that its subtasks can run at the same time. Multiprocessing, or parallel processing, uses two or more processors together to perform a task.
21. Python is interpreted, which means that python code is translated and executed by an interpreter one statement at a time. In a compiled language, the entire source code is compiled and then executed altogether.
22. No. Python 3 is a newer version, but it is not backward-compatible with Python 2.
23. No.
24. You can run Python in script mode or interactive mode. Running a Python program from a script file is known as running Python in *script mode*. Typing a statement at the >>> prompt and executing it is called running Python in *interactive mode*.
25. Python code is case-sensitive.
26. The Python source code filename extension is .py.
27. The command to run a Python source file is python filename.py.
28. Comments are used to document what a program is for and how a program is constructed. Comments help the programmers or users to communicate and understand the program. Comments are not programming statements and are ignored by the compiler. In Python, comments are preceded by pound sign (#) on a line, called a line comment, or enclosed between ''' (triple quotation marks on one or several lines, called a paragraph comment. When the Python sees #, it ignores all text after # on the same line. When it sees ''', it scans for the next ''' and ignores any text between triple quotation marks.
29. print("Hello World")
30. The second line is not indented correctly. The period (.) in the third line should be removed.
31.
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   3.5 * 4 / 2 - 2.5 is
   4.5
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32. Three kinds of program errors: syntax errors, runtime errors, and logic errors.
33. It is a syntax error
34. It is a runtime error
35. It is a logic error
36. Use the statement "import turtle"
37. turtle.write(string)
38. turtle.forward(length)
39. turtle.color("red")
40. lift the pen, then move it, turtle.penup(), then turtle.forward(length)
41. turtle.circle(radius)
42. The purpose of this is to give the user time to view the graphics. Without this line, the graphics window would be closed right after the program is finished.