# Unit 1—Getting Started with Java

# Chapter 1—Background

EXERCISE 1.2

1. A bit is a single binary digit, 1 or 0. A byte is a sequence of bits.
2. Two input devices are a keyboard and a mouse. Two output devices are a printer and a monitor.
3. There are many purposes for auxiliary storage devices. One reason is that it makes programs portable, for most computer software is now purchased on CD-ROMs.
4. RAM is random access memory. RAM is internal memory that is used to store information needed to run programs.
5. Hardware is the physical components of a computer, whereas software is the programs that use the hardware in order to operate.

exercise 1.3

1. 227
2. 1115
3. Unicode is the encoding scheme that Java uses in which each character is represented by a pattern of 16 bits. ASCII uses 8 bits (or a byte).
4. 12 bits or 4096 color values
5. 216 or 65,536

EXERCISE 1.4

1. Answers will vary. Students could list any two (2) of the following:

* Coding is error prone.
* Coding is tedious and slow.
* It is extremely difficult to modify programs.
* It is nearly impossible for one person to decipher another person’s program.
* A program is not portable to a different type of computer because each type has its own unique machine language

1. Answers will vary. Possible answers may be:

* Uses mnemonic symbols to represent instructions and data.
* The instruction given in assembly language corresponds to one machine language instruction

1. A loader is a program that will load and run a machine language program.
2. High-level languages are portable and use compilers to translate to machine language.

EXERCISE 1.5

1. During the analysis phase, the programmer decides what the program will do. During the design phase, s/he determines how that task will be carried out.
2. The maintenance phase incurs the highest cost to developers.
3. The waterfall model of software development describes the interaction between the phases of software development. A mistake detected in one phase often requires the developer to back up and redo some of the work from the previous phase. Any time something is modified, maintenance also will require backing up to earlier phases.
4. During the analysis phase of development, detection and correction of errors is least expensive.

EXERCISE 1.6

1. Programming is like planning in that in both you must determine the different parts (resources) needed. You then define a list of the responsibilities of each part or resource.
2. There are possibly many different objects in a program that may rely on each other to solve a task. Different objects have different roles and responsibilities.
3. A class is a type of software component that defines or describes a set of data resources and rules of behavior.
4. Inheritance is a classification technique that views a set of objects as supplementing the features and behavior of other sets of objects with new, “extra” features and behavior. For example, all employees have names and pay rates. Managers are a subset of employees that have a bonus in addition to a pay rate. When the annual salary for an employee is determined, if that employee happens to be a manager, the bonus is added to the total amount.
5. When clients use objects, the details of the objects’ data representation and the algorithms for carrying out their operations are not visible or known. For example, when a client asks an employee object for an annual salary, the details of how this is calculated are not seen by that client.

Review Questions

## Written Questions

1. The memory, the central processing unit (CPU), and input/output devices are the three hardware components of a computer.
2. Input devices include a keyboard, mouse, and microphone.
3. Output devices include a monitor, speakers, and printer.
4. Application software is used to solve specialized problems for users, such as maintaining a payroll account. System software manages the resources of the computer, such as files on a disk.
5. Machine language (first generation); assembly language (second generation); FORTRAN, COBOL, Pascal, C (third generation).

## Fill in the Blank

1. binary
2. implementation
3. maintenance
4. Association for Computing Machinery
5. authors and publishers