**Chapter 1**

***Self-Review Exercises 1.1***

1. programs
2. input unit, output unit, memory unit, arithmetic and logic unit (ALU), central processing unit (CPU), and secondary storage unit
3. machine language, assembly language, and high-level language
4. compilers
5. Android
6. Release
7. Accelerometer

***Self-Review Exercises 1.2***

1. java
2. javac
3. .java
4. .class
5. Bytecodes

***Self-Review Exercises 1.3***

***See answers below in red font.***

**1.3 Fill in the blanks in each of the following statements**

a) Objects enable the design practice of **encapsulation** —although they may know how to communicate with one another across well-defined interfaces, they normally are not allowed to know how other objects are implemented.  
b) Java programmers concentrate on creating **classes**, which contain fields and the set of methods that manipulate those fields and provide services to clients.  
c) The process of analyzing and designing a system from an object-oriented point of view is called **object-oriented analysis and design (OOAD)**.  
d) A new class of objects can be created conveniently by **inheritance** —the new class (called the subclass) starts with the characteristics of an existing class (called the superclass), possibly customizing them and adding unique characteristics of its own.  
e) **UML (Unified Modeling Language)** is a graphical language that allows people who design software systems to use an industry-standard notation to represent them.  
f) The size, shape, color and weight of an object are considered **attributes** of the object’s class.

***Self-Review Exercises 1.4***

**Exercises 1.4**

**Fill in the blanks in each of the following statements:**

**a)** The logical unit that receives information from outside the computer for use by the computer is the **input unit**.

**b)** The process of instructing the computer to solve a problem is called **programming**.

**c)** **Assembly language** is a type of computer language that uses English-like abbreviations for machine-language instructions.

**d)** **Output unit** is a logical unit that sends information which has already been processed by the computer to various devices so that it may be used outside the computer.

**e)** **Primary storage** and **secondary storage** are logical units of the computer that retain information.

**f)** **Arithmetic unit** is a logical unit of the computer that performs calculations.

**g)** **Logic unit** is a logical unit of the computer that makes logical decisions.

**h)** **High-level** languages are most convenient to the programmer for writing programs quickly and easily.

**i)** The only language a computer can directly understand is that computer’s **machine language**.

**j)** **Central processing unit (CPU)** is a logical unit of the computer that coordinates the activities of all the other logical units.

***Self-Review Exercises 1.5***

1. Java
2. C
3. Transmission Control Protocol (TCP)
4. C++

***Self-Review Exercises 1.6***

1. edit, compile, load, verify, and execute
2. Integrated Development Environment (IDE)
3. Java Virtual Machine (JVM)
4. virtual machine (VM)
5. class loader
6. bytecode verifier

***Self-Review Exercises 1.7***

* Compilation Phase: The Java source code (.java file) is compiled using the javac compiler. The compiler translates the Java code into bytecode stored in a .class file.
* Execution Phase: The JVM loads the .class file, the bytecode verifier checks the bytecode for security issues, and the Java interpreter (JVM) executes the bytecode line by line or optimizes it using Just-In-Time (JIT) compilation.

***Self-Review Exercises 1.8***

Object: A wristwatch

Attributes: Color, size, material, brand, battery life

Behaviors: Telling time, setting an alarm, displaying date

Class: A general category of watches (e.g., digital watches, analog watches)

Inheritance: An alarm clock is a subclass of a watch with additional features

Modeling: Designing different types of watches before production

Messages: User interactions, such as setting the time

Encapsulation: The internal mechanism of the watch is hidden from the user

Interface: The display and buttons that allow interaction

Information Hiding: The battery mechanism is not visible to the user