Chapter 1

Exercises 1.1

a. Program.

b. Input unit, Output unit, Memory unit, Central processing unit (CPU), Arithmetic and logic unit (ALU), Secondary storage unit.

c. Machine languages, Assembly languages, High-level languages.

d. Compilers.

e. Android.

f. Release.

g. Accelerometer.

Exercises 1.2

a. java.

b. javac.

c. .java

d. .class

e. bytecodes.

Exercises 1.3

a. encapsulation

b. classes

c. object-oriented analysis and design (OOAD

d. inheritance

e. Unified Modeling Language (UML)

f. attributes

Exercises 1.4

a. input unit

b. programming

c. Assembly Language

d. Output unit.

e. Primary storage (RAM) and secondary storage (hard disk, SSD)

f. Arithmetic and Logic Unit (ALU).

g. Central Processing Unit (CPU).

h. High-level language.

i. Machine language.

j. Control unit.

Exercises 1.5

a. java

b. C

c. Transmission Control Protocol (TCP).

d. C++

Exercises 1.6

a. edit, compile, load, verify and execute.

b. Integrated Development Environment (IDE).

c. Java Virtual Machine (JVM)

d. Virtual Machine (VM)

e. class loader.

f. bytecode

Exercises 1.7

The two compilation phases of Java programs:

1. 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.

2. Execution Phase:

The JVM loads the .class file.

The bytecode verifier checks the bytecode for security issues.

The Java interpreter (JVM) executes the bytecode line by line or optimizes it using Just-In-Time (JIT) compilation.

Exercise 1.8

Applying object-oriented concepts to a wristwatch:

Object: A wristwatch is an object.

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.