Chapter 1 Introduction to Computers, Programs, and Java

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.

2. The hardware of a computer consists of a CPU, cache, memory, hard disk, floppy disk, monitor, printer, and communication devices.

3. The *machine language* is a set of primitive instructions built into every computer. *Assembly language* is a low-level programming language in which a mnemonic is used to represent each of the machine language instructions. The *high-level languages* are English-like and easy to learn and program.

4. Source program means the original program written in a high-level language. A compiler is a program that translates source program into executable code.

5. Java source programs are compiled into bytecode. The JVM is the interpreter that interprets Java bytecode.

6. 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.

7. Developed by a team led by James Gosling at Sun Microsystems in 1991. Originally called Oak, it became Java in 1995 when it was redesigned for developing Internet applications.

   Java can run on any platform with a Java Virtual Machine. The minimum requirement is the Java Runtime Environment, free from the www.javasoft.com.

8. The input is the Java source code and the output is the Java bytecode (if compiled successfully).

9. JBuilder by Borland, Sun ONE Studio by Sun, Café by WebGain, Visual Age for Java by IBM are the tools for developing Java programs, not dialects of Java. These tools make developing Java programs easier and more productive.

10. HTML is a markup language for displaying static Web pages. Java is a full-fledged programming language that can be used to develop dynamic Web pages. The Java programs that run from a Web browser are called applets. Java applets must be embedded in HTML files using the <applet> tag.

11. Keywords have specific meaning to the compiler and cannot be used for other purposes in the program such as variables or method names. Examples of keywords are `class`, `static`, and `void`.

12. Java source code is case sensitive. Java keywords are always in lowercase.

13. The source file extension is .java and the bytecode file extension is .class.

14. 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 Java, comments are preceded by two forward slashes (//) in a line or enclosed between /* and */ in multiple lines. When the compiler sees //, it ignores all text after // in the same line. When it sees /*, it scans for the next */ and ignores any text between /* and */.

15. `System.out.println(...);`
`JOptionPane.showMessageDialog(null,` "Hello world");

16.

```
public class Welcome {
  public static void main(String[] args) {
    System.out.println("morning");
    System.out.println("afternoon");
  }
}
```

17. Line 2. Main should be main.
Line 2. static is missing.
Line 3: Welcome to Java! should be enclosed inside double quotation marks.
Line 5: The last) should be }.

18. javac is the JDK command to compile a program. java is the JDK command to run a program.

19. Java interpreter cannot find the .class file. Make sure you placed the .class in the right place, and invoked java command with appropriate package name.

20. The class does not have a main method, or the signature of the main method is incorrect.

21. The System class is in the java.lang package. This package is implicitly imported. So, there is no need to explicitly import it.

22. No performance difference.

23. Output is

```
3.5 * 4 / 2 – 2.5 is
4.5
```