

# A TOTAL SOLUTION

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## ***Key Skills and Concepts***

Outlines the main topics and techniques presented in the chapter.

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### **Key Skills and Concepts**

- Know the major components of the computer
- Understand bits, bytes, and the binary number system
- Know the two forms of a program
- Know the history and philosophy of Java
- Understand the foundational principles of object-oriented programming
- Create, compile, and run a simple Java program
- Use variables
- Use the **if** and **for** control statements
- Create blocks of code
- Understand how statements are positioned, indented, and terminated
- Know the Java keywords
- Understand the rules for Java identifiers

```

/*
  Try This 1-2

  This program displays a conversion
  table of gallons to liters.

  Call this program "GalToLitTable.java".
*/
class GalToLitTable {
  public static void main(String[] args) {
    double gallons, liters;           Line counter is initially set to zero.
    int counter;

    counter = 0; ←
    for(gallons = 1; gallons <= 100; gallons++) {
      liters = gallons * 3.7854; // convert to liters
      System.out.println(gallons + " gallons is " +
        liters + " liters.");

      counter++; ← Increment the line counter
      // every 10th line, print a blank line with each loop iteration.
      if(counter == 10) { ← If counter is 10,
        System.out.println();           output a blank line.
        counter = 0; // reset the line counter
      }
    }
  }
}

```

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## ***Code Listings***

Examples that show program elements and techniques in action. Call-outs point to key features, where appropriate.

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### Ask the Expert

Additional information or commentary from an “expert” perspective related to the topic at hand.

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### Ask the Expert

**Q** I have heard programmers use the phrase “writing code.” What does this mean?

**A** professional programmers often refer to the act of programming (i.e., creating source code) as “writing code.” Another phrase you will commonly hear is “coding a program.” It too refers to creating source code. In fact, it is not uncommon to hear an excellent programmer referred to as a “great coder.”



### Try This 1-1 Converting Gallons to Liters

GalToLit.java

Although the preceding sample programs illustrate several important features of the Java language, they are not very useful. Even though you do not know much about Java at this point, you can still put what you have learned to work to create a practical program. In this project, we will create a program that converts gallons to liters. The program will work by declaring two **double** variables. One will hold the number of the gallons, and the second will hold the number of liters after the conversion. There are approximately 3.7854 liters in a gallon. Thus, to convert gallons to liters, the gallon value is multiplied by 3.7854. The program displays both the number of gallons and the equivalent number of liters.

#### STEP-BY-STEP

1. Create a new file called **GalToLit.java**.
2. Enter the following program into the file:

```

/*
 Try This 1-1
 This program converts gallons to liters.
 Call this program GalToLit.java.
*/
class GalToLit {
 public static void main(String[] args) {
  double gallons; // holds the number of gallons
  double liters; // holds conversion to liters
  gallons = 10; // start with 10 gallons

```

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### Try This

Step-by-step examples that demonstrate a key feature or technique.

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### Progress Check

These short self-tests let students test their understanding of the material as the chapter progresses.

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### Progress Check

1. What is an applet?
2. What is a Java bytecode?
3. Which two Internet programming problems can be solved using bytecode?

**VIVA VOCE QUESTIONS**

1. What are Semaphores? How can they be implemented in Java? (Pg. 1012).
2. Name the important classes that are used for synchronization using concurrent API. (Semaphore, CountdownLatch, CyclicBarrier, Exchanger and Phaser Classes.)
3. What is the primary purpose of a Phaser? (Pg. 1023).

**Viva Voce Questions**

These provide students with frequently asked questions in examinations and interviews.

**Objective Questions**

Multiple-choice questions serve as an exercise for quick understanding and analysis

**OBJECTIVE QUESTIONS**

1. Which of the following packages define the core features to concurrency?
  - a. `Java.io.concurrent`
  - b. `Java.util.concurrent`
  - c. `Java.lang.concurrent`
  - d. `Java.net.concurrent`
2. What methods of Semaphore are to be called to get and release the permit?
  - a. `acquire()` and `release()`
  - b. `down()` and `up()`
  - c. `wait()` and `signal()`
  - d. `P()` and `V()`

**EXERCISES**

1. Name the three necessary pieces of a computer.
2. What is source code? What is object code?
3. What is the value 14 in binary? What is the decimal equivalent of this binary number 1010 0110?
4. As a general rule, a byte is comprised of \_\_\_\_\_ bits.
5. What is bytecode and why is it important to Java's use for Internet programming?
6. What are the three main principles of object-oriented programming?
7. Where do Java programs begin execution?
8. What is a variable?
9. Which of the following variable names is invalid?
  - A. `count`
  - B. `Scount`
  - C. `count27`
  - D. `67count`
10. How do you create a single-line comment? How do you create a multiline comment?
11. Show the general form of the `if` statement. Show the general form of the `for` loop.
12. How do you create a block of code?
13. The Moon's gravity is about 17 per cent that of Earth's. Write a program that computes your effective weight on the Moon.
14. Adapt Try This 1-2 so that it prints a conversion table of inches to meters. Display 12 feet of conversions, inch by inch. Output a blank line every 12 inches. (One meter equals approximately 39.37 inches.)

**End-of-Chapter Exercises**

Questions and coding exercises that test the student's grasp of the material discussed in the chapter.