**Chapter 2**

**Self-Review Exercises**

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

a) A(n) **left brace ({)** begins the body of every method, and a(n) **right brace (})** ends the body of every method.

b) You can use the **if** statement to make decisions.

c) **//** begins an end-of-line comment.

d) **Blank lines, space characters, tab characters** are called white space.

e) **Keywords** are reserved for use by Java.

f) Java applications begin execution at method **main**.

g) Methods **System.out.print**, **System.out.println** and **System.out.printf** display information in a command window.

**2.2 State whether each of the following is *true* or *false*. If *false*, explain why.**

a) **False**. Comments do not cause any action when the program executes; they are ignored by the compiler.  
b) **True**.  
c) **False**. Java is case-sensitive, so number and NuMbEr are different identifiers.  
d) **False**. The remainder operator (%) can also be used with non-integer operands.  
e) **False**. The operators \*, /, and % have the same level of precedence, which is higher than that of + and -.

**2.3 Write statements to accomplish each of the following tasks:**

a) int c, thisIsAVariable, q76354, number;  
b) System.out.print("Enter an integer: ");  
c) int value = input.nextInt();  
d) System.out.println("This is a Java program");  
e) System.out.printf("%s%n%s%n", "This is a Java", "program");  
f) if (number != 7) { System.out.println("The variable number is not equal to 7"); }

**2.4 Identify and correct the errors in each of the following statements:**

a) **Error:** Semicolon (;) at the end of the if condition.  
**Correction:** Remove the semicolon.  
if (c < 7) System.out.println("c is less than 7");

b) **Error:** The "greater than or equal to" operator is >=, not =>.  
**Correction:** Change => to >=.  
if (c >= 7) System.out.println("c is equal to or greater than 7");

**2.5 Write declarations, statements or comments that accomplish each of the following tasks:**

a) // Calculate the product of three integers  
b) Scanner input = new Scanner(System.in);  
c) int x, y, z, result;  
d) System.out.print("Enter first integer: ");  
e) x = input.nextInt();  
f) System.out.print("Enter second integer: ");  
g) y = input.nextInt();  
h) System.out.print("Enter third integer: ");  
i) z = input.nextInt();  
j) result = x \* y \* z;  
k) System.out.printf("Product is %d%n", result);

**2.6 Using the statements you wrote in Exercise 2.5, write a complete program that calculates and prints the product of three integers.**  
*(See attached*ProductCalculator.java*file)*

**Exercises**

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

a) **Comments** are used to document a program and improve its readability.  
b) A decision can be made in a Java program with a(n) **if statement**.  
c) Calculations are normally performed by **assignment** statements.  
d) The arithmetic operators with the same precedence as multiplication are **division (/)** and **remainder (%)**.  
e) When parentheses in an arithmetic expression are nested, the **innermost** set of parentheses is evaluated first.  
f) A location in the computer's memory that may contain different values at various times throughout the execution of a program is called a(n) **variable**.

**2.8 Write Java statements that accomplish each of the following tasks:**

a) System.out.print("Enter an integer: ");  
b) a = b \* c;  
c) // This program performs a sample payroll calculation.

**2.9 State whether each of the following is *true* or *false*. If *false*, explain why.**

a) **False**. Java operators are evaluated according to operator precedence and associativity, not strictly left-to-right.  
b) **True**.  
c) **False**. Without parentheses, an arithmetic expression is evaluated based on operator precedence.  
d) **False**. h22 is a valid variable name because it does not start with a digit.

**2.10 Assuming that x=2 and y=3, what does each of the following statements display?**

a) x = 2  
b) Value of 2 + 2 is 4  
c) x =  
d) 5 = 5

**2.11 Which of the following Java statements contain variables whose values are modified?**

a) p=i+j+k+ 7; → **Yes** (p is modified)  
d) value = input.nextInt(); → **Yes** (value is modified)

**2.12 Given that y = ax3 + 7, which of the following are correct Java statements for this equation?**

**Correct statements: a, d, e**

**2.13 State the order of evaluation of the operators in each of the following Java statements, and show the value of x after each statement is performed:**

a) x = 7 + 3 \* 6 / 2 - 1;  
*Order:* \*, /, +, -  
x = 7 + (18 / 2) - 1 → x = 7 + 9 - 1 → x = 15

b) x = 2 % 2 + 2 \* 2 - 2 / 2;  
*Order:* %, \*, /, +, -  
x = 0 + 4 - 1 → x = 3

c) x=(3 \* 9 \* (3 + (9 \* 3 / (3))));  
*Order:* Innermost (), \*, /, +, then outer \*  
x = (3 \* 9 \* (3 + (27 / 3))) → x = (3 \* 9 \* (3 + 9)) → x = (3 \* 9 \* 12) → x = 324

**2.14 Write an application that displays the numbers 1 to 4 on the same line, with each pair of adjacent numbers separated by one space. Use the following techniques:**

a) System.out.println("1 2 3 4");  
b) System.out.print("1 "); System.out.print("2 "); System.out.print("3 "); System.out.println("4");  
c) System.out.printf("%d %d %d %d%n", 1, 2, 3, 4);

**2.15 (Arithmetic) Write an application that asks the user to enter two integers, obtains them from the user and prints their sum, product, difference and quotient (division).**  
*(See attached*Arithmetic.java*file)*

**2.16 (Comparing Integers) Write an application that asks the user to enter two integers, obtains them from the user and displays the larger number followed by the words "is larger". If the numbers are equal, print the message "These numbers are equal".**  
*(See attached*CompareIntegers.java*file)*

**2.17 (Arithmetic, Smallest and Largest) Write an application that inputs three integers from the user and displays the sum, average, product, smallest and largest of the numbers.**  
*(See attached*ArithmeticSmallestLargest.java*file)*

**2.18 (Displaying Shapes with Asterisks) Write an application that displays a box, an oval, an arrow and a diamond using asterisks (\*).**  
*(See attached*Shapes.java*file)*

**2.19 What does the following code print?**  
System.out.printf("\*%n\*\*%n\*\*\*%n\*\*\*\*%n\*\*\*\*\*%n");

text

\*

\*\*

\*\*\*

\*\*\*\*

\*\*\*\*\*

**2.20 What does the following code print?**

System.out.println("\*");

System.out.println("\*\*\*");

System.out.println("\*\*\*\*\*");

System.out.println("\*\*\*\*");

System.out.println("\*\*");

\*

\*\*\*

\*\*\*\*\*

\*\*\*\*

\*\*

**2.21 What does the following code print?**

System.out.print("\*");

System.out.print("\*\*\*");

System.out.print("\*\*\*\*\*");

System.out.print("\*\*\*\*");

System.out.println("\*\*");

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

**2.22 What does the following code print?**

System.out.print("\*");

System.out.println("\*\*\*");

System.out.println("\*\*\*\*\*");

System.out.print("\*\*\*\*");

System.out.println("\*\*");

\*\*\*\*

\*\*\*\*\*

\*\*\*\*\*\*

**2.23 What does the following code print?**  
System.out.printf("%s%n%s%n%s%n", "\*", "\*\*\*", "\*\*\*\*\*");

\*

\*\*\*

\*\*\*\*\*

**2.24 (Largest and Smallest Integers) Write an application that reads five integers and determines and prints the largest and smallest integers in the group.**  
*(See attached*LargestSmallest.java*file)*

**2.25 (Odd or Even) Write an application that reads an integer and determines and prints whether it's odd or even.**  
*(See attached*OddEven.java*file)*

**2.26 (Multiples) Write an application that reads two integers, determines whether the first is a multiple of the second and prints the result.**  
*(See attached*Multiples.java*file)*

**2.27 (Checkerboard Pattern of Asterisks) Write an application that displays a checkerboard pattern.**  
*(See attached*Checkerboard.java*file)*

**2.28 (Diameter, Circumference and Area of a Circle) Write an application that inputs from the user the radius of a circle as an integer and prints the circle's diameter, circumference and area.**  
*(See attached*CircleCalculations.java*file)*

**2.29 (Integer Value of a Character) Write an application that displays the integer equivalents of some uppercase letters, lowercase letters, digits and special symbols.**  
*(See attached*CharacterCodes.java*file)*

**2.30 (Separating the Digits in an Integer) Write an application that inputs one number consisting of five digits from the user, separates the number into its individual digits and prints the digits separated from one another by three spaces each.**  
*(See attached*SeparateDigits.java*file)*

**2.31 (Table of Squares and Cubes) Write an application that calculates the squares and cubes of the numbers from 0 to 10 and prints the resulting values in table format.**  
*(See attached*TableSquaresCubes.java*file)*

**2.32 (Negative, Positive and Zero Values) Write a program that inputs five numbers and determines and prints the number of negative numbers input, the number of positive numbers input and the number of zeros input.**  
*(See attached*CountNumbers.java*file)*

**Making a Difference**

**2.33 (Body Mass Index Calculator)**  
*(See attached*BMI.java*file)*

**2.34 (World Population Growth Calculator)**  
*(See attached*PopulationGrowth.java*file)*

**2.35 (Car-Pool Savings Calculator)**  
*(See attached*CarPoolSavings.java*file)*