# Chapter 2 Answers

**2.**1 Fill in the blanks  
a) {, }

b) if

c) //

d) space, tab, newline

e) Keywords

f) main

g) System.out.print, System.out.println, System.out.printf

**2.**2 True / False  
a) False  
b) True  
c) False  
d) False  
e) False  
  
**2**.3 Statements  
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 Corrections  
a) if (c < 7) System.out.println("c is less than 7");  
b) if (c >= 7) System.out.println("c is equal to or greater than 7");  
  
2.5 Declarations / Statements / Comments  
a) // Program will calculate the product of three integers.  
b) Scanner input = new Scanner(System.in);  
c) int x, y, z, result;  
d) System.out.print("Enter the first integer: ");  
e) x = input.nextInt();  
f) System.out.print("Enter the second integer: ");  
g) y = input.nextInt();  
h) System.out.print("Enter the third integer: ");  
i) z = input.nextInt();  
j) result = x \* y \* z;  
k) System.out.printf("Product is %d%n", result);  
  
2.6 Complete program  
public class ProductOfThree {  
 public static void main(String[] args) {  
 java.util.Scanner input = new java.util.Scanner(System.in);  
 System.out.print("Enter the first integer: ");  
 int x = input.nextInt();  
 System.out.print("Enter the second integer: ");  
 int y = input.nextInt();  
 System.out.print("Enter the third integer: ");  
 int z = input.nextInt();  
 int result = x \* y \* z;  
 System.out.printf("Product is %d%n", result);  
 }  
}  
  
2.7 Fill in the blanks  
a) Comments  
b) if statement  
c) assignment statements  
d) / and %  
e) innermost  
f) variable  
  
2.8 Statements  
a) System.out.print("Enter an integer: ");  
b) a = b \* c;  
c) // This program performs a sample payroll calculation  
  
2.9 True / False  
a) False  
b) True  
c) False  
d) False  
  
2.10 Assuming x=2 and y=3 output  
a) x = 2  
b) Value of 2 + 2 is 4  
c) x =  
d) 5 = 5  
  
2.11 Variables modified?  
a) Yes  
b) No  
c) No  
d) Yes  
  
2.12 Correct statements for y = a x^3 + 7  
Correct: a), d), e)  
  
2.13 Order of evaluation and x value  
a) Order: \* then / then + then - ; x = 15  
b) Order: % then \* then / then + then - ; x = 3  
c) Order: inner parentheses then multiplications ; x = 324  
  
2.14 Display 1 to 4 on same line  
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 Sum, product, difference and quotient (example program)  
public class Arithmetic {  
 public static void main(String[] args) {  
 java.util.Scanner input = new java.util.Scanner(System.in);  
 System.out.print("Enter first integer: ");  
 int a = input.nextInt();  
 System.out.print("Enter second integer: ");  
 int b = input.nextInt();  
 System.out.printf("Sum = %d%n", a + b);  
 System.out.printf("Product = %d%n", a \* b);  
 System.out.printf("Difference = %d%n", a - b);  
 System.out.printf("Quotient = %d%n", a / b);  
 }  
}  
  
2.16 Comparing Integers (example)  
public class Larger {  
 public static void main(String[] args) {  
 java.util.Scanner input = new java.util.Scanner(System.in);  
 System.out.print("Enter first integer: ");  
 int a = input.nextInt();  
 System.out.print("Enter second integer: ");  
 int b = input.nextInt();  
 if (a > b)  
 System.out.println(a + " is larger");  
 else if (b > a)  
 System.out.println(b + " is larger");  
 else  
 System.out.println("These numbers are equal");  
 }  
}  
  
2.17 Sum, average, product, smallest and largest (integer average)  
public class Stats3 {  
 public static void main(String[] args) {  
 java.util.Scanner input = new java.util.Scanner(System.in);  
 System.out.print("Enter three integers: ");  
 int x = input.nextInt();  
 int y = input.nextInt();  
 int z = input.nextInt();  
 int sum = x + y + z;  
 int average = sum / 3;  
 int product = x \* y \* z;  
 int smallest = Math.min(x, Math.min(y, z));  
 int largest = Math.max(x, Math.max(y, z));  
 System.out.printf("Sum = %d%nAverage = %d%nProduct = %d%nSmallest = %d%nLargest = %d%n", sum, average, product, smallest, largest);  
 }  
}  
  
2.18 Display shapes with asterisks  
  
  
2.19 Prints:  
\*  
\*\*  
\*\*\*  
\*\*\*\*  
\*\*\*\*\*  
  
2.20 Prints:  
\*  
\*\*\*  
\*\*\*\*\*  
\*\*\*\*  
\*\*  
  
2.21 Prints (all on same line because print used):  
\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*?   
// Actually concatenation: "\*" + "\*\*\*" + "\*\*\*\*\*" + "\*\*\*\*" + "\*\*" -> "\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*" (15 stars) and no newline.  
System.out.print("\*"); System.out.print("\*\*\*"); System.out.print("\*\*\*\*\*"); System.out.print("\*\*\*\*"); System.out.println("\*\*");  
// Output: "\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*" followed by newline.  
  
2.22 Prints:  
System.out.print("\*");  
System.out.println("\*\*\*");  
System.out.println("\*\*\*\*\*");  
System.out.print("\*\*\*\*");  
System.out.println("\*\*");  
// Output lines:  
// \*  
// \*\*\*  
// \*\*\*\*\*  
// \*\*\*\*\*\*  
// Wait calculate: After print("\*\*\*\*") then println("\*\*") -> "\*\*\*\*\*\*" on same line as "\*\*\*\*" then newline.  
// So lines:  
// \*  
// \*\*\*  
// \*\*\*\*\*  
// \*\*\*\*\*\*  
  
2.23 Prints:  
\*  
\*\*\*  
\*\*\*\*\*  
  
2.24 Largest and Smallest of five integers (example)  
public class MinMax5 {  
 public static void main(String[] args) {  
 java.util.Scanner input = new java.util.Scanner(System.in);  
 System.out.print("Enter five integers: ");  
 int a = input.nextInt();  
 int b = input.nextInt();  
 int c = input.nextInt();  
 int d = input.nextInt();  
 int e = input.nextInt();  
 int smallest = Math.min(a, Math.min(b, Math.min(c, Math.min(d, e))));  
 int largest = Math.max(a, Math.max(b, Math.max(c, Math.max(d, e))));  
 System.out.printf("Smallest = %d%nLargest = %d%n", smallest, largest);  
 }  
}  
  
2.25 Odd or Even  
System.out.print("Enter an integer: ");  
int n = input.nextInt();  
if (n % 2 == 0) System.out.println("Even");  
else System.out.println("Odd");  
  
2.26 Multiples  
System.out.print("Enter two integers: ");  
int a = input.nextInt();  
int b = input.nextInt();  
if (a % b == 0) System.out.println(a + " is a multiple of " + b);  
else System.out.println(a + " is not a multiple of " + b);  
  
2.27 Checkerboard pattern  
System.out.println("\* \* \* \* ");  
System.out.println(" \* \* \* \*");  
System.out.println("\* \* \* \* ");  
System.out.println(" \* \* \* \*");  
  
2.28 Diameter, Circumference and Area of a Circle  
System.out.print("Enter radius (integer): ");  
int r = input.nextInt();  
System.out.printf("Diameter = %d%n", 2 \* r);  
System.out.printf("Circumference = %f%n", 2 \* 3.14159 \* r);  
System.out.printf("Area = %f%n", 3.14159 \* r \* r);  
  
2.29 Integer equivalents of characters  
System.out.printf("A %d%n", (int) 'A');  
System.out.printf("B %d%n", (int) 'B');  
System.out.printf("C %d%n", (int) 'C');  
System.out.printf("a %d%n", (int) 'a');  
System.out.printf("b %d%n", (int) 'b');  
System.out.printf("c %d%n", (int) 'c');  
System.out.printf("0 %d%n", (int) '0');  
System.out.printf("1 %d%n", (int) '1');  
System.out.printf("2 %d%n", (int) '2');  
System.out.printf("$ %d%n", (int) '$');  
System.out.printf("\* %d%n", (int) '\*');  
System.out.printf("+ %d%n", (int) '+');  
System.out.printf("/ %d%n", (int) '/');  
System.out.printf("space %d%n", (int) ' ');  
  
2.30 Separate digits of a five-digit number (example)  
System.out.print("Enter a five-digit number: ");  
int number = input.nextInt();  
int d1 = number / 10000;  
int d2 = (number / 1000) % 10;  
int d3 = (number / 100) % 10;  
int d4 = (number / 10) % 10;  
int d5 = number % 10;  
System.out.printf("%d %d %d %d %d%n", d1, d2, d3, d4, d5);  
  
2.31 Table of squares and cubes 0 to 10 (example)  
System.out.println("n n^2 n^3");  
for (int n = 0; n <= 10; n++) {  
 System.out.printf("%d %d %d%n", n, n\*n, n\*n\*n);  
}  
  
2.32 Count negative, positive and zeros  
int negatives=0, positives=0, zeros=0;  
for (int i=0;i<5;i++){  
 int v = input.nextInt();  
 if (v<0) negatives++;  
 else if (v>0) positives++;  
 else zeros++;  
}  
System.out.printf("Negatives: %d%nPositives: %d%nZeros: %d%n", negatives, positives, zeros);  
  
2.33 BMI Calculator (pounds/inches)  
System.out.print("Enter weight in pounds: ");  
double w = input.nextDouble();  
System.out.print("Enter height in inches: ");  
double h = input.nextDouble();  
double bmi = (w \* 703) / (h \* h);  
System.out.printf("BMI = %f%n", bmi);  
  
2.34 World Population Growth Calculator (outline)  
System.out.print("Enter current world population: ");  
long pop = input.nextLong();  
System.out.print("Enter annual growth rate (percent): ");  
double rate = input.nextDouble() / 100.0;  
for (int year = 1; year <= 5; year++) {  
 pop = (long)(pop \* (1 + rate));  
 System.out.printf("Population after %d year(s): %d%n", year, pop);  
}  
  
2.35 Car-Pool Savings Calculator (outline)  
System.out.print("Total miles driven per day: ");  
double miles = input.nextDouble();  
System.out.print("Cost per gallon of gasoline: ");  
double costPerGallon = input.nextDouble();  
System.out.print("Average miles per gallon: ");  
double mpg = input.nextDouble();  
System.out.print("Parking fees per day: ");  
double parking = input.nextDouble();  
System.out.print("Tolls per day: ");  
double tolls = input.nextDouble();  
double costPerDay = (miles / mpg) \* costPerGallon + parking + tolls;  
System.out.printf("Cost per day = %f%n", costPerDay);