**Quiz Questions  
For Chapter 1**

THIS PAGE CONTAINS A SAMPLE quiz on material from [Chapter 1](file:///C:\Users\khalid\Desktop\java\javanotes4.1\c1\index.html) of this [on-line Java textbook](file:///C:\Users\khalid\Desktop\java\javanotes4.1\index.html). You should be able to answer these questions after studying that chapter. Sample answers to all the quiz questions can be found [here](file:///C:\Users\khalid\Desktop\java\javanotes4.1\c1\quiz-answers.html).

**Question 1:** One of the components of a computer is its *CPU.* What is a CPU and what role does it play in a computer?

**Question 2:** Explain what is meant by an "asynchronous event." Give some examples.

**Question 3:** What is the difference between a "compiler" and an "interpreter"?

**Question 4:** Explain the difference between *high-level languages* and *machine language.*

**Question 5:** If you have the source code for a Java program, and you want to run that program, you will need both a *compiler* and an *interpreter.* What does the Java compiler do, and what does the Java interpreter do?

**Question 6:** What is a *subroutine?*

**Question 7:** Java is an object-oriented programming language. What is an *object?*

**Question 8:** What is a *variable?* (There are four different ideas associated with variables in Java. Try to mention all four aspects in your answer. Hint: One of the aspects is the variable's name.)

**Question 9:** Java is a "platform-independent language." What does this mean?

**Question 10:** What is the "Internet"? Give some examples of how it is used. (What kind of services does it provide?)

### Sample Quiz Answers For Chapter 1

THIS PAGE CONTAINS SAMPLE ANSWERS to the Quiz on [Chapter 1](file:///C:\Users\khalid\Desktop\java\javanotes4.1\c1\index.html) of this [on-line Java textbook](file:///C:\Users\khalid\Desktop\java\javanotes4.1\index.html). Note that in many cases, there are lots of correct answers to a given question.

**Question 1:** One of the components of a computer is its *CPU.* What is a CPU and what role does it play in a computer?

**Answer:** The CPU, or Central Processing Unit, is the active part of the computer. Its function is to execute programs that are coded in machine language and stored in the main memory (RAM) of the computer. It does this by repeating the fetch-and-execute cycle over and over; that is, it repeatedly fetches a machine language instruction from memory and executes it.

**Question 2:** Explain what is meant by an "asynchronous event." Give some examples.

**Answer:** An asynchronous event is one that occurs at an unpredictable time outside the control of the program that the CPU is running. It is not "synchronized" with the program. An example would be when the user presses a key on the keyboard or clicks the mouse button. (These events generate "interrupts" that cause the CPU to interrupt what it is doing and to take some action to handle the asynchronous event. After handling the event, the CPU returns to what it was doing before it was interrupted.)

**Question 3:** What is the difference between a "compiler" and an "interpreter"?

**Answer:** Compilers and interpreters have similar functions: They take a program written in some programming language and translate it into machine language. A compiler does the translation all at once. It produces a complete machine language program that can then be executed. An interpreter, on the other hand, just translates one instruction at a time, and then executes that instruction immediately. (Java uses a compiler to translate java programs into Java Bytecode, which is a machine language for the imaginary Java Virtual Machine. Java Bytecode programs are then executed by an interpreter.)

**Question 4:** Explain the difference between *high-level languages* and *machine language.*

**Answer:** Programs written in the machine language of a given type of computer can be directly executed by the CPU of that type of computer. High-level language programs must be translated into machine language before they can be executed. (Machine language instructions are encoded as binary numbers that are meant to be used by a machine, not read or written by people. High-level languages use a syntax that is closer to human language.)

**Question 5:** If you have the source code for a Java program, and you want to run that program, you will need both a *compiler* and an *interpreter.* What does the Java compiler do, and what does the Java interpreter do?

**Answer:** The Java compiler translates Java programs into a language called Java bytecode. Although bytecode is similar to machine language, it is not the machine language of any actual computer. A Java interpreter is used to run the compiled Java bytecode program. (Each type of computer needs its own Java bytecode interpreter, but all these interpreters interpret the same bytecode language.)

**Question 6:** What is a *subroutine?*

**Answer:** A subroutine is a set of instructions for performing some task that have been grouped together and given a name. Later, when that task needs to be performed, it is only necessary to call the subroutine by giving its name, rather than repeating the whole sequence of instructions.

**Question 7:** Java is an object-oriented programming language. What is an *object?*

**Answer:** An object consists of some data together with a set of subroutines that manipulate that data. (An object is a kind of "module," or self-contained entity that communicates with the rest of the world through a well-defined interface. An object should represent some coherent concept or real-world object.)

**Question 8:** What is a *variable?* (There are four different ideas associated with variables in Java. Try to mention all four aspects in your answer. Hint: One of the aspects is the variable's name.)

**Answer:** A variable is a memory location that has been given a name so that it can easily be referred to in a program. The variable holds a value, which must be of some specified type. The value can be changed during the course of the execution of the program.

**Question 9:** Java is a "platform-independent language." What does this mean?

**Answer:** A Java program can be compiled once into a Java Bytecode program. The compiled program can then be run on any computer that has an interpreter for the Java virtual machine. Other languages have to be re-compiled for each platform on which they are going to run. The point about Java is that it can be executed on many different types of computers without being recompiled.

**Question 10:** What is the "Internet"? Give some examples of how it is used. (What kind of services does it provide?)

**Answer:** The Internet is a network connecting millions of computers around the world. Computers connected to the Internet can communicate with each other. The Internet can be used for Telnet (which lets a user of one computer log onto another computer remotely), FTP (which is used to copy files between computers), and the World Wide Web (which lets a user view "pages" of information published on computers around the world).

**Quiz Questions  
For Chapter 2**

THIS PAGE CONTAINS A SAMPLE quiz on material from [Chapter 2](file:///C:\Users\khalid\Desktop\java\javanotes4.1\c2\index.html) of this [on-line Java textbook](file:///C:\Users\khalid\Desktop\java\javanotes4.1\index.html). You should be able to answer these questions after studying that chapter. Sample answers to all the quiz questions can be found [here](file:///C:\Users\khalid\Desktop\java\javanotes4.1\c2\quiz-answers.html).

**Question 1:** Briefly explain what is meant by the *syntax* and the *semantics* of a programming language. Give an example to illustrate the difference between a syntax error and a semantics error.

**Question 2:** What does the computer do when it executes a variable declaration statement. Give an example.

**Question 3:** What is a *type,* as this term relates to programming?

**Question 4:** One of the primitive types in Java is *boolean.* What is the boolean type? Where are boolean values used? What are its possible values?

**Question 5:** Give the meaning of each of the following Java operators:

**a)** ++

**b)** &&

**c)** !=

**Question 6:** Explain what is meant by an *assignment statement,* and give an example. What are assignment statements used for?

**Question 7:** What is meant by *precedence* of operators?

**Question 8:** What is a *literal?*

**Question 9:** In Java, classes have two fundamentally different purposes. What are they?

**Question 10:** What is the difference between the statement "x = TextIO.getDouble();" and the statement "x = TextIO.getlnDouble();"

To view the answers visit this website <http://www.java2s.clanteam.com>

**Quiz Questions  
For Chapter 3**

THIS PAGE CONTAINS A SAMPLE quiz on material from [Chapter 3](file:///C:\Users\khalid\Desktop\java\javanotes4.1\c3\index.html) of this [on-line Java textbook](file:///C:\Users\khalid\Desktop\java\javanotes4.1\index.html). You should be able to answer these questions after studying that chapter. Sample answers to all the quiz questions can be found [here](file:///C:\Users\khalid\Desktop\java\javanotes4.1\c3\quiz-answers.html).

**Question 1:** Explain briefly what is meant by "pseudocode" and how is it useful in the development of algorithms.

**Question 2:** What is a *block statement?* How are block statements used in Java programs.

**Question 3:** What is the main difference between a while loop and a do..while loop?

**Question 4:** What does it mean to *prime* a loop?

**Question 5:** Explain what is meant by an *animation* and how a computer displays an animation.

**Question 6:** Write a for loop that will print out all the multiples of 3 from 3 to 36, that is: 3 6 9 12 15 18 21 24 27 30 33 36.

**Question 7:** Fill in the following main() routine so that it will ask the user to enter an integer, read the user's response, and tell the user whether the number entered is even or odd. (You can use TextIO.getInt() to read the integer. Recall that an integer n is even if n % 2 == 0.)

public static void main(String[] args) {

// Fill in the body of this subroutine!

}

**Question 8:** Show the exact output that would be produced by the following main() routine:

public static void main(String[] args) {

int N;

N = 1;

while (N <= 32) {

N = 2 \* N;

System.out.println(N);

}

}

**Question 9:** Show the exact output produced by the following main() routine:

public static void main(String[] args) {

int x,y;

x = 5;

y = 1;

while (x > 0) {

x = x - 1;

y = y \* x;

System.out.println(y);

}

}

**Question 10:** What output is produced by the following program segment? **Why?** (Recall that name.charAt(i) is the i-th character in the string, name.)

String name;

int i;

boolean startWord;

name = "Richard M. Nixon";

startWord = true;

for (i = 0; i < name.length(); i++) {

if (startWord)

System.out.println(name.charAt(i));

if (name.charAt(i) == ' ')

startWord = true;

else

startWord = false;

}

To view the answers visit this website <http://www.java2s.clanteam.com>

**Quiz Questions  
For Chapter 4**

THIS PAGE CONTAINS A SAMPLE quiz on material from [Chapter 4](file:///C:\Users\khalid\Desktop\java\javanotes4.1\c4\index.html) of this [on-line Java textbook](file:///C:\Users\khalid\Desktop\java\javanotes4.1\index.html). You should be able to answer these questions after studying that chapter. Sample answers to all the quiz questions can be found [here](file:///C:\Users\khalid\Desktop\java\javanotes4.1\c4\quiz-answers.html).

**Question 1:** A "black box" has an interface and an implementation. Explain what is meant by the terms *interface* and *implementation*.

**Question 2:** A subroutine is said to have a *contract*. What is meant by the contract of a subroutine? When you want to use a subroutine, why is it important to understand its contract? The contract has both "syntactic" and "semantic" aspects. What is the syntactic aspect? What is the semantic aspect?

**Question 3:** Briefly explain how subroutines can be a useful tool in the top-down design of programs.

**Question 4:** Discuss the concept of *parameters.* What are parameters for? What is the difference between *formal parameters* and *actual parameters?*

**Question 5:** Give two different reasons for using named constants (declared with the final modifier).

**Question 6:** What is an API? Give an example.

**Question 7:** Write a subroutine named "stars" that will output a line of stars to standard output. (A star is the character "\*".) The number of stars should be given as a parameter to the subroutine. Use a *for* loop. For example, the command "stars(20)" would output

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

**Question 8:** Write a main() routine that uses the subroutine that you wrote for Question 7 to output 10 lines of stars with 1 star in the first line, 2 stars in the second line, and so on, as shown below.

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**Question 9:** Write a function named countChars that has a String and a char as parameters. The function should count the number of times the character occurs in the string, and it should return the result as the value of the function.

**Question 10:** Write a subroutine with three parameters of type *int.* The subroutine should determine which of its parameters is smallest. The value of the smallest parameter should be returned as the value of the subroutine.

To view the answers visit this website <http://www.java2s.clanteam.com>

**Quiz Questions  
For Chapter 5**

THIS PAGE CONTAINS A SAMPLE quiz on material from [Chapter 5](file:///C:\Users\khalid\Desktop\java\javanotes4.1\c5\index.html) of this [on-line Java textbook](file:///C:\Users\khalid\Desktop\java\javanotes4.1\index.html). You should be able to answer these questions after studying that chapter. Sample answers to all the quiz questions can be found [here](file:///C:\Users\khalid\Desktop\java\javanotes4.1\c5\quiz-answers.html).

**Question 1:** Object-oriented programming uses *classes* and *objects*. What are classes and what are objects? What is the relationship between classes and objects?

**Question 2:** Explain carefully what *null* means in Java, and why this special value is necessary.

**Question 3:** What is a *constructor?* What is the purpose of a constructor in a class?

**Question 4:** Suppose that Kumquat is the name of a class and that fruit is a variable of type Kumquat. What is the meaning of the statement "fruit = new Kumquat();"? That is, what does the computer do when it executes this statement? (Try to give a complete answer. The computer does several things.)

**Question 5:** What is meant by the terms *instance variable* and *instance method*?

**Question 6:** Explain what is meant by the terms *subclass* and *superclass.*

**Question 7:** Explain the term *polymorphism.*

**Question 8:** Java uses "garbage collection" for memory management. Explain what is meant here by garbage collection. What is the alternative to garbage collection?

**Question 9:** For this problem, you should write a very simple but complete class. The class represents a counter that counts 0, 1, 2, 3, 4,.... The name of the class should be Counter. It has one private instance variable representing the value of the counter. It has two instance methods: increment() adds one to the counter value, and getValue() returns the current counter value. Write a complete definition for the class, Counter.

**Question 10:** This problem uses the Counter class from Question 9. The following program segment is meant to simulate tossing a coin 100 times. It should use two Counter objects, headCount and tailCount, to count the number of heads and the number of tails. Fill in the blanks so that it will do so.

Counter headCount, tailCount;

tailCount = new Counter();

headCount = new Counter();

for ( int flip = 0; flip < 100; flip++ ) {

if (Math.random() < 0.5) // There's a 50/50 chance that this is true.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ; // Count a "head".

else

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ; // Count a "tail".

}

System.out.println("There were " + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ + " heads.");

System.out.println("There were " + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ + " tails.");

To view the answers visit this website <http://www.java2s.clanteam.com>

**Quiz Questions  
For Chapter 6**

THIS PAGE CONTAINS A SAMPLE quiz on material from [Chapter 6](file:///C:\Users\khalid\Desktop\java\javanotes4.1\c6\index.html) of this [on-line Java textbook](file:///C:\Users\khalid\Desktop\java\javanotes4.1\index.html). You should be able to answer these questions after studying that chapter. Sample answers to all the quiz questions can be found [here](file:///C:\Users\khalid\Desktop\java\javanotes4.1\c6\quiz-answers.html).

**Question 1:** Programs written for a graphical user interface have to deal with "events." Explain what is meant by the term *event.* Give at least two different examples of events, and discuss how a program might respond to those events.

**Question 2:** What is an *event loop?*

**Question 3:** Explain carefully what the repaint() method does.

**Question 4:** What is HTML?

**Question 5:** Draw the picture that will be produced by the following paint() method:

public static void paint(Graphics g) {

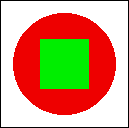
for (int i=10; i <= 210; i = i + 50)

for (int j = 10; j <= 210; j = j + 50)

g.drawLine(i,10,j,60);

}

**Question 6:** Suppose you would like an applet that displays a green square inside a red circle, as illustrated. Write a paint() method that will draw the image.



**Question 7:** Suppose that you are writing an applet, and you want the applet to respond in some way when the user clicks the mouse on the applet. What are the four things you need to remember to put into the source code of your applet?

**Question 8:** Java has a standard class called MouseEvent. What is the purpose of this class? What does an object of type MouseEvent do?

**Question 9:** Explain what is meant by *input focus.* How is the input focus managed in a Java GUI program?

**Question 10:** Java has a standard class called JPanel. Discuss *two* ways in which JPanels can be used.

To view the answers visit this website <http://www.java2s.clanteam.com>

**Quiz Questions  
For Chapter 7**

THIS PAGE CONTAINS A SAMPLE quiz on material from [Chapter 7](file:///C:\Users\khalid\Desktop\java\javanotes4.1\c7\index.html) of this [on-line Java textbook](file:///C:\Users\khalid\Desktop\java\javanotes4.1\index.html). You should be able to answer these questions after studying that chapter. Sample answers to all the quiz questions can be found [here](file:///C:\Users\khalid\Desktop\java\javanotes4.1\c7\quiz-answers.html).

**Question 1:** What is the FontMetrics class used for?

**Question 2:** An *off-screen image* can be used to do *double buffering.* Explain this. (What are off-screen images? How are they used? Why are they important? What does this have to do with animation?)

**Question 3:** One of the main classes in Swing is the JComponent class. What is meant by a component? What are some examples?

**Question 4:** What is the function of a *LayoutManager* in Java?

**Question 5:** What does it mean to use a null layout manager, and why would you want to do so?

**Question 6:** What is a JCheckBox and how is it used?

**Question 7:** What is a *thread*

**Question 8:** Explain how Timers are used to do animation.

**Question 9:** Menus can contain *sub-menus.* What does this mean, and how are sub-menus handled in Java?

**Question 10:** What is the purpose of the JFrame class?

To view the answers visit this website <http://www.java2s.clanteam.com>

**Quiz Questions  
For Chapter 8**

THIS PAGE CONTAINS A SAMPLE quiz on material from [Chapter 8](file:///C:\Users\khalid\Desktop\java\javanotes4.1\c8\index.html) of this [on-line Java textbook](file:///C:\Users\khalid\Desktop\java\javanotes4.1\index.html). You should be able to answer these questions after studying that chapter. Sample answers to all the quiz questions can be found [here](file:///C:\Users\khalid\Desktop\java\javanotes4.1\c8\quiz-answers.html).

**Question 1:** What does the computer do when it executes the following statement? Try to give as complete an answer as possible.

Color[] pallette = new Color[12];

**Question 2:** What is meant by the *basetype* of an array?

**Question 3:** What does it mean to sort an array?

**Question 4:** What is meant by a *dynamic array?* What is the advantage of a dynamic array over a regular array?

**Question 5:** What is the purpose of the following subroutine? What is the meaning of the value that it returns, in terms of the value of its parameter?

static String concat( String[] str ) {

if (str == null)

return null;

String ans = "";

for (int i = 0; i < str.length; i++) {

ans = ans + str[i];

return ans;

}

**Question 6:** Show the exact output produced by the following code segment.

char[][] pic = new char[6][6];

for (int i = 0; i < 6; i++)

for (int j = 0; j < 6; j++) {

if ( i == j || i == 0 || i == 5 )

pic[i][j] = '\*';

else

pic[i][j] = '.';

}

for (int i = 0; i < 6; i++) {

for (int j = 0; j < 6; j++)

System.out.print(pic[i][j]);

System.out.println();

}

**Question 7:** Write a complete subroutine that finds the largest value in an array of ints. The subroutine should have one parameter, which is an array of type int[]. The largest number in the array should be returned as the value of the subroutine.

**Question 8:** Suppose that temperature measurements were made on each day of 1999 in each of 100 cities. The measurements have been stored in an array

int[][] temps = new int[100][365];

where temps[c][d] holds the measurement for city number c on the dth day of the year. Write a code segment that will print out the average temperature, over the course of the whole year, for each city. The average temperature for a city can be obtained by adding up all 365 measurements for that city and dividing the answer by 365.0.

**Question 9:** Suppose that a class, *Employee,* is defined as follows:

class Employee {

String lastName;

String firstName;

double hourlyWage;

int yearsWithCompany;

}

Suppose that data about 100 employees is **already** stored in an array:

Employee[] employeeData = new Employee[100];

Write a code segment that will output the first name, last name, and hourly wage of each employee who has been with the company for 20 years or more.

**Question 10:** Suppose that A has been declared and initialized with the statement

double[] A = new double[20];

And suppose that A has **already** been filled with 20 values. Write a program segment that will find the average of all the **non-zero** numbers in the array. (The average is the sum of the numbers, divided by the number of numbers. Note that you will have to count the number of non-zero entries in the array.) Declare any variables that you use.

To view the answers visit this website <http://www.java2s.clanteam.com>

**Quiz Questions  
For Chapter 9**

THIS PAGE CONTAINS A SAMPLE quiz on material from [Chapter 9](file:///C:\Users\khalid\Desktop\java\javanotes4.1\c9\index.html) of this [on-line Java textbook](file:///C:\Users\khalid\Desktop\java\javanotes4.1\index.html). You should be able to answer these questions after studying that chapter. Sample answers to all the quiz questions can be found [here](file:///C:\Users\khalid\Desktop\java\javanotes4.1\c9\quiz-answers.html).

**Question 1:** What does it mean to say that a program is *robust?*

**Question 2:** Why do programming languages require that variables be declared before they are used? What does this have to do with correctness and robustness?

**Question 3:** What is "Double.NaN"?

**Question 4:** What is a *precondition?* Give an example.

**Question 5:** Explain how preconditions can be used as an aid in writing correct programs.

**Question 6:** Java has a predefined class called Throwable. What does this class represent? Why does it exist?

**Question 7:** Write a subroutine that prints out a 3N+1 sequence starting from a given integer, N. The starting value should be a parameter to the subroutine. If the parameter is less than or equal to zero, throw an IllegalArgumentException. If the number in the sequence becomes too large to be represented as a value of type int, throw an ArithmeticException.

**Question 8:** Some classes of exceptions require *mandatory exception handling.* Explain what this means.

**Question 9:** Consider a subroutine processData that has the header

static void processData() throws IOException

Write a try...catch statement that calls this subroutine and prints an error message if an IOException occurs.

**Question 10:** Why should a subroutine throw an exception when it encounters an error? Why not just terminate the program?

To view the answers visit this website <http://www.java2s.clanteam.com>

**Quiz Questions  
For Chapter 10**

THIS PAGE CONTAINS A SAMPLE quiz on material from [Chapter 10](file:///C:\Users\khalid\Desktop\java\javanotes4.1\c10\index.html) of this [on-line Java textbook](file:///C:\Users\khalid\Desktop\java\javanotes4.1\index.html). You should be able to answer these questions after studying that chapter. Sample answers to all the quiz questions can be found [here](file:///C:\Users\khalid\Desktop\java\javanotes4.1\c10\quiz-answers.html).

**Question 1:** In Java, input/output is done using streams. Streams are an *abstraction.* Explain what this means and why it is important.

**Question 2:** Java has two types of streams: character streams and byte streams. Why? What is the difference between the two types of streams?

**Question 3:** What is a *file?* Why are files necessary?

**Question 4:** What is the point of the following statement?

out = new PrintWriter( new FileWriter("data.dat") );

Why would you need a statement that involves two different stream classes, PrintWriter and FileWriter?

**Question 5:** The package java.io includes a class named URL. What does an object of type URL represent, and how is it used?

**Question 6:** Explain what is meant by the *client / server* model of network communication.

**Question 7:** What is a *Socket?*

**Question 8:** What is a *ServerSocket* and how is it used?

**Question 9:** Network server programs are often *multithreaded.* Explain what this means and why it is true.

**Question 10:** Write a complete program that will display the first ten lines from a text file. The lines should be written to standard output, System.out. The file name is given as the command-line argument args[0]. You can assume that the file contains at least ten lines. Don't bother to make the program robust.

To view the answers visit this website <http://www.java2s.clanteam.com>

**Quiz Questions  
For Chapter 11**

THIS PAGE CONTAINS A SAMPLE quiz on material from [Chapter 11](file:///C:\Users\khalid\Desktop\java\javanotes4.1\c11\index.html) of this [on-line Java textbook](file:///C:\Users\khalid\Desktop\java\javanotes4.1\index.html). You should be able to answer these questions after studying that chapter. Sample answers to all the quiz questions can be found [here](file:///C:\Users\khalid\Desktop\java\javanotes4.1\c11\quiz-answers.html).

**Question 1:** Explain what is meant by a *recursive* subroutine.

**Question 2:** Consider the following subroutine:

static void printStuff(int level) {

if (level == 0) {

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

}

else {

System.out.print("[");

printStuff(level - 1);

System.out.print(",");

printStuff(level - 1);

System.out.println("]");

}

}

Show the output that would be produced by the subroutine calls printStuff(0), printStuff(1), printStuff(2), and printStuff(3).

**Question 3:** Suppose that a linked list is formed from objects that belong to the class

class ListNode {

int item; // An item in the list.

ListNode next; // Pointer to next item in the list.

}

Write a subroutine that will find the sum of all the ints in a linked list. The subroutine should have a parameter of type ListNode and should return a value of type int.

**Question 4:** What are the three operations on a *stack?*

**Question 5:** What is the basic difference between a stack and a queue?

**Question 6:** What is an *activation record?* What role does a stack of activation records play in a computer?

**Question 7:** Suppose that a binary tree is formed from objects belonging to the class

class TreeNode {

int item; // One item in the tree.

TreeNode left; // Pointer to the left subtree.

TreeNode right; // Pointer to the right subtree.

}

Write a recursive subroutine that will find the sum of all the nodes in the tree. Your subroutine should have a parameter of type TreeNode, and it should return a value of type int.

**Question 8:** What is a *postorder traversal* of a binary tree?

**Question 9:** Suppose that a <multilist> is defined by the BNF rule

<multilist> ::= <word> | "(" [ <multilist> ]... ")"

where a <word> can be any sequence of letters. Give five different <multilist>'s that can be generated by this rule. (This rule, by the way, is almost the entire syntax of the programming language LISP! LISP is known for its simple syntax and its elegant and powerful semantics.)

**Question 10:** Explaining what is meant by *parsing* a computer program.

**Quiz Questions  
For Chapter 12**

THIS PAGE CONTAINS A SAMPLE quiz on material from [Chapter 12](file:///C:\Users\khalid\Desktop\java\javanotes4.1\c12\index.html) of this [on-line Java textbook](file:///C:\Users\khalid\Desktop\java\javanotes4.1\index.html). You should be able to answer these questions after studying that chapter. Sample answers to all the quiz questions can be found [here](file:///C:\Users\khalid\Desktop\java\javanotes4.1\c12\quiz-answers.html).

**Question 1:** What is meant by *generic programming* and what is the alternative?

**Question 2:** Java does not support generic programming with the primitive types. Why not? What is it about generic programming in Java that prevents it from working with primitive types such as int and double.

**Question 3:** What is an *iterator* and why are iterators necessary for generic programming?

**Question 4:** Suppose that integers is a variable of type Collection and that every object in the collection belongs to the wrapper class Integer. Write a code segment that will compute the sum of all the integer values in the collection.

**Question 5:** Interfaces such as List, Set, and Map define *abstract data types.* Explain what this means.

**Question 6:** What is the fundamental property that distinguishes Sets from other types of Collections?

**Question 7:** What is the essential difference in functionality between a TreeMap and a HashMap?

**Question 8:** Explain what is meant by a *hash code.*

**Question 9:** Modify the following Date class so that it implements the Comparable interface. The ordering on objects of type Date should be the natural, chronological ordering.

class Date {

int month; // Month number in range 1 to 12.

int day; // Day number in range 1 to 31.

int year; // Year number.

Date(int m, int d, int y) { // Convenience constructor.

month = m;

day = d;

year = y;

}

}

**Question 10:** Suppose that syllabus is a variable of type TreeMap, the keys in the map are objects belonging to the Date class from the previous problem, and the values are of type String. Write a code segment that will write out the value string for every key that is in the month of September, 2002.

To view the answers visit this website <http://www.java2s.clanteam.com>

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