**use chocobytes;**

**select \* from java;**

**insert into java (title,content) values ("Introduction","This chapter introduces Java application programming. We begin with examples of programs**

**that display (output) messages on the screen. We then present a program that obtains**

**(inputs) two numbers from a user, calculates their sum and displays the result. You'll**

**learn how to instruct the computer to perform arithmetic calculations and save their results**

**for later use. The last example demonstrates how to make decisions. The application**

**compares two numbers, then displays messages that show the comparison results. You'll**

**use the JDK command-line tools to compile and run this chapter's programs.**

**");**

**insert into java (title,content) values ("Your First Program in Java: Printing a Line of Text","**

**A Java application is a computer program that executes when you use the java command**

**to launch the Java Virtual Machine (JVM). Later in this section we'll discuss how to compile**

**and run a Java application. First we consider a simple application that displays a line**

**of text. Figure 2.1 shows the program followed by a box that displays its output.**

**<code>**

**public class Welcome1**

**{**

**// main method begins execution of Java application**

**public static void main(String[] args)**

**{**

**System.out.println(\"Welcome to Java Programming!\");**

**} // end method main**

**} // end class Welcome1**

**</code>**

**");**

**insert into java (title,content) values ("Commenting Your Programs","**

**We insert comments to document programs and improve their readability. The Java compiler**

**ignores comments, so they do not cause the computer to perform any action when the**

**program is run.**

**By convention, we begin every program with a comment indicating the figure number**

**and filename.**

**begins with //, indicating that it's an end-of-line comment-it terminates at the end of**

**the line on which the // appears. An end-of-line comment need not begin a line; it also**

**can begin in the middle of a line and continue until the end**

**<code> // Fig. 2.1: Welcome1.java </code>**

**");**

**insert into java (title,content) values ("Performing Output with System.out.println","**

**<code>System.out.println(\"Welcome to Java Programming!\"); </code>**

**instructs the computer to perform an action-namely, to display the characters contained**

**between the double quotation marks (the quotation marks themselves are not displayed).**

**Together, the quotation marks and the characters between them are a string-also known**

**as a character string or a string literal. White-space characters in strings are not ignored**

**by the compiler. Strings cannot span multiple lines of code.**

**The System.out object-which is predefined for you-is known as the standard**

**output object. It allows a Java application to display information in the command**

**window from which it executes. In recent versions of Microsoft Windows, the command**

**window is the Command Prompt. In UNIX/Linux/Mac OS X, the command window is**

**called a terminal window or a shell. Many programmers call it simply the command line.**

**Method System.out.println displays (or prints) a line of text in the command**

**window. The string in the parentheses in line 9 is the argument to the method. When**

**System.out.println completes its task, it positions the output cursor (the location where**

**the next character will be displayed) at the beginning of the next line in the command**

**window. This is similar to what happens when you press the Enter key while typing in a**

**text editor-the cursor appears at the beginning of the next line in the document.**

**The entire line 9, including System.out.println, the argument \"Welcome to Java**

**Programming!\" in the parentheses and the semicolon (;), is called a statement. A method**

**typically contains one or more statements that perform its task. Most statements end with**

**a semicolon. When the statement in line 9 executes, it displays Welcome to Java Programming!**

**in the command window.**

**When learning how to program, sometimes it's helpful to "break" a working program**

**so you can familiarize yourself with the compiler's syntax-error messages. These messages do**

**not always state the exact problem in the code. When you encounter an error, it will give you**

**an idea of what caused it. [Try removing a semicolon or brace from the program of Fig. 2.1,**

**then recompile the program to see the error messages generated by the omission.]**

**");**

**insert into java (title,content) values ("Scanner Object for Receiving Input from the User","**

**You can Create a Scanner object named input for inputting the name from the user.then prompt the user to enter a name. and uses the Scanner object's nextLine method to**

**read the name from the user and assign it to the local variable theName. You type the name**

**and press Enter to submit it to the program. Pressing Enter inserts a newline character after**

**the characters you typed. Method nextLine reads characters (including white-space characters,**

**such as the blank in \"Jane Green\") until it encounters the newline, then returns a**

**String containing the characters up to, but not including, the newline, which is discarded.**

**Class Scanner provides various other input methods, as you'll see throughout the**

**book. A method similar to nextLine-named next-reads the next word. When you press**

**Enter after typing some text, method next reads characters until it encounters a white-space**

**character (such as a space, tab or newline), then returns a String containing the characters**

**up to, but not including, the white-space character, which is discarded. All information**

**after the first white-space character is not lost-it can be read by subsequent statements that**

**call the Scanner's methods later in the program.**

**");**

**insert into java (title,content) values ("Instantiating an Object-Keyword new and Constructors","create an Account object and assigns it to variable myAccount of type Account.**

**Variable myAccount is initialized with the result of the class instance creation expression**

**new Account(). Keyword new creates a new object of the specified class-in this case, Account.**

**The parentheses to the right of Account are required. As you'll learn in Section 3.4,**

**those parentheses in combination with a class name represent a call to a constructor, which**

**is similar to a method but is called implicitly by the new operator to initialize an object's**

**instance variables when the object is created. In Section 3.4, you'll see how to place an argument**

**in the parentheses to specify an initial value for an Account object's name instance**

**variable-you'll enhance class Account to enable this. For now, we simply leave the parentheses**

**empty. Line 10 contains a class instance creation expression for a Scanner object the expression initializes the Scanner with System.in, which tells the Scanner where to**

**read the input from (i.e., the keyboard).**

**");**

**insert into java (title,content) values ("Software Engineering with private Instance Variables and**

**public set and get Methods**

**","**

**As you'll see, through the use of set and get methods, you can validate attempted modifications**

**to private data and control how that data is presented to the caller-these are**

**compelling software engineering benefits. We'll discuss this in more detail in Section 3.5.**

**If the instance variable were public, any client of the class-that is, any other class**

**that calls the class's methods-could see the data and do whatever it wanted with it,**

**including setting it to an invalid value.**

**You might think that even though a client of the class cannot directly access a private**

**instance variable, the client can do whatever it wants with the variable through public set**

**and get methods. You would think that you could peek at the private data any time with**

**the public get method and that you could modify the private data at will through the**

**public set method. But set methods can be programmed to validate their arguments and**

**reject any attempts to set the data to bad values, such as a negative body temperature, a day**

**in March out of the range 1 through 31, a product code not in the company's product**

**catalog, etc. And a get method can present the data in a different form. For example, a**

**Grade class might store a grade as an int between 0 and 100, but a getGrade method**

**might return a letter grade as a String, such as \"A\" for grades between 90 and 100, \"B\"**

**for grades between 80 and 89, etc. Tightly controlling the access to and presentation of private data can greatly reduce errors, while increasing the robustness and security of**

**your programs.**

**Declaring instance variables with access modifier private is known as data hiding or**

**information hiding. When a program creates (instantiates) an object of class Account, variable**

**name is encapsulated (hidden) in the object and can be accessed only by methods of**

**the object's class.**

**");**

**insert into java (title,content) values ("Primitive Types vs. Reference Types","**

**Java's types are divided into primitive types and reference types. In Chapter 2, you worked**

**with variables of type int-one of the primitive types. The other primitive types are**

**boolean, byte, char, short, long, float and double, each of which we discuss in this**

**book-these are summarized in Appendix D. All nonprimitive types are reference types, so**

**classes, which specify the types of objects, are reference types.**

**A primitive-type variable can hold exactly one value of its declared type at a time. For**

**example, an int variable can store one integer at a time. When another value is assigned**

**to that variable, the new value replaces the previous one-which is lost.**

**Recall that local variables are not initialized by default. Primitive-type instance variables**

**are initialized by default-instance variables of types byte, char, short, int, long,**

**float and double are initialized to 0, and variables of type boolean are initialized to**

**false. You can specify your own initial value for a primitive-type variable by assigning the**

**variable a value in its declaration, as in**

**Programs use variables of reference types (normally called references) to store the**

**addresses of objects in the computer's memory. Such a variable is said to refer to an object**

**in the program. Objects that are referenced may each contain many instance variables.**

**creates an object of class Scanner, then assigns to the variable input a reference to that**

**Scanner object. creates an object of class Account, then assigns to the variable myAccount a reference to that**

**Account object. Reference-type instance variables, if not explicitly initialized, are initialized**

**by default to the value null-which represents a "reference to nothing." That's why the**

**first call to getName in line 16 of Fig. 3.2 returns null-the value of name has not yet been**

**set, so the default initial value null is returned.**

**To call methods on an object, you need a reference to the object. In Fig. 3.2, the statements**

**in method main use the variable myAccount to call methods getName (lines 16 and**

**26) and setName (line 21) to interact with the Account object. Primitive-type variables do**

**not refer to objects, so such variables cannot be used to call methods.**

**");**

**select \* from java;**

Header

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public class Welcome1

main method begins execution of Java application

public static void main String args

System out println Welcome to Java Programming

end method main

end class Welcome1

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Programs use variables of reference types normally called references to store the

addresses of objects in the computer s memory Such a variable is said to refer to an object

in the program Objects that are referenced may each contain many instance variables

creates an object of class Scanner then assigns to the variable input a reference to that

Scanner object creates an object of class Account then assigns to the variable myAccount a reference to that

Account object Reference type instance variables if not explicitly initialized are initialized

by default to the value null which represents a reference to nothing That s why the

first call to getName in line 16 of Fig 3 2 returns null the value of name has not yet been

set so the default initial value null is returned

To call methods on an object you need a reference to the object In Fig 3 2 the statements

in method main use the variable myAccount to call methods getName lines 16 and

26 and setName line 21 to interact with the Account object Primitive type variables do

not refer to objects so such variables cannot be used to call methods

select from java