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Assignment: Assignment 04

Self-Review Exercises 3.1 Fill in the blanks in each of the following:

a) A house is to a blueprint as a(n) is to a class.

ANS: object.

b) Each class declaration that begins with keyword must be stored in a file that has exactly the same name as the class and ends with the .java file-name extension.

ANS: public.

c) Keyword in a class declaration is followed immediately by the class's name.

ANS: class.

d) Keyword requests memory from the system to store an object, then calls the corresponding class's constructor to initialize the object.

ANS: new.

e) Each parameter must specify both a(n) and a(n) .

ANS: type, name.

f) By default, classes that are compiled in the same directory are considered to be in the same package, known as the .

ANS: default package.

g) When each object of a class maintains its own copy of an attribute, the field that represents the attribute is also known as a(n) .

ANS: instance variable.

h) Java provides two primitive types for storing floating-point numbers in memory: and .

ANS: float, double.

i) Variables of type double represent floating-point numbers.

ANS: double-precision.

j) Scanner method returns a double value.

ANS: nextDouble.

k) Keyword public is an access .

ANS: modifier.

l) Return type indicates that a method will not return a value.

ANS: void..

m) Scanner method reads characters until a newline character is encountered, then returns those characters as a String.

ANS: nextLine.

n) Class String is in package .

ANS: java.lang.

o) A(n) is not required if you always refer to a class with its fully qualified class name.

ANS: import declaration.

p) A(n) is a number with a decimal point, such as 7.33, 0.0975 or 1000.12345.

ANS: floating-point number.

q) Variables of type float represent floating-point numbers.

ANS: single-precision.

r) The format specifier is used to output values of type float or double.

ANS: %f.

s) Types in Java are divided into two categories— types and types.

ANS: primitive, reference.

Self-Review Exercises 3 3.2 State whether each of the following is true or false. If false, explain why.

a) By convention, method names begin with an uppercase first letter, and all subsequent words in the name begin with a capital first letter.

ANS: False. By convention, method names begin with a lowercase first letter and all subsequent words in the name begin with a capital first letter.

b) An import declaration is not required when one class in a package uses another in the same package.

ANS: True.

c) Empty parentheses following a method name in a method declaration indicate that the method does not require any parameters to perform its task.

ANS: True.

d) Variables or methods declared with access modifier private are accessible only to methods of the class in which they are declared.

ANS: True.

e) A primitive-type variable can be used to invoke a method.

ANS: False. A primitive-type variable cannot be used to invoke a method—a reference to an object is required to invoke the object's methods.

f) Variables declared in the body of a particular method are known as instance variables and can be used in all methods of the class.

ANS: False. Such variables are called local variables and can be used only in the method in which they are declared.

g) Every method's body is delimited by left and right braces ({ and }).

ANS: True.

h) Primitive-type local variables are initialized by default.

ANS: False. Primitive-type instance variables are initialized by default. Each local variable must explicitly be assigned a value.

i) Reference-type instance variables are initialized by default to the value null.

ANS: True.

j) Any class that contains `public static void main(String[] args)` can be used to execute an application.

ANS: True.

k) The number of arguments in the method call must match the number of parameters in the method declaration's parameter list.

ANS: True.

l) Floating-point values that appear in source code are known as floating-point literals and are type float by default.

ANS: False. Such literals are of type double by default.

3.3 What is the difference between a local variable and a field?

ANS: A local variable is declared in the body of a method and can be used only from the point at which it is declared through the end of the method declaration. A field is declared in a class, but not in the body of any of the class's methods. Also, fields are accessible to all methods of the class. (We'll see an exception to this in Chapter 8, *Classes and Objects: A Deeper Look: Solutions*.)

3.4 Explain the purpose of a method parameter. What is the difference between a parameter and an argument?

ANS: A parameter represents additional information that a method requires to perform its task. Each parameter required by a method is specified in the method's declaration. An argument is the actual value for a method parameter. When a method is called, the argument values are passed to the corresponding parameters of the method so that it can perform its task.

3.5 What is the purpose of keyword new? Explain what happens when you use it.

ANS: The purpose of keyword new is to create an object of a class. When keyword new is used in an application, first a new object of the class to the right of new is created, then the class's constructor is called to initialize the object.

3.6 What is a default constructor? How are an object's instance variables initialized if a class has only a default constructor?

ANS: A default constructor is provided by the compiler when you do not specify any constructors in the class. When a class has only the default constructor, its instance variables are initialized to their default values. Variables of types char, byte, short, int, long, float and double are initialized to 0, variables of type boolean to false, and reference-type variables to null.

3.7 Explain the purpose of an instance variable.

ANS: A class provides an instance variable (or several instance variables) when each object of the class must maintain information separately from all other objects of the class. For example, a class called Account that represents a bank account provides an instance variable to represent the balance of the account. Each Account object maintains its own balance but does not know the balances of the bank's other accounts.

3.8 Most classes need to be imported before they can be used in an application. Why is every application allowed to use classes System and String without first importing them?

ANS: Classes System and String are both in package java.lang, which is implicitly imported into every Java source-code file.

3.9 Explain how a program could use class Scanner without importing the class.

ANS: If every use of a class's name in a program is fully qualified, there is no need to import the class. A class's fully qualified name consists of the class's package followed by the class name. For example, a program could use class Scanner without importing it if every use of Scanner in the program were specified as java.util.Scanner.

3.10 Explain why a class might provide a set method and a get method for an instance variable.

ANS: An instance variable is typically declared private in a class so that only the methods of the class in which the instance variable is declared can manipulate it. This prevents the variable from being modified accidentally by a class in another part of the program. In some cases, it may be necessary for an application to modify the private data. For example, the owner of a bank account should be able to deposit or withdraw funds and check the account's balance. A class's designer can provide public set and get methods that enable an application to specify the value for, or retrieve the value of, a particular object's private instance variable.