Classes

Exercises and solutions

1. What is an instance variable of a class? What is another name used for an instance variable?

**Answer:**

An instance variable is a variable defined in a class; each instance of the class contain a separate copy of each instance variable in a class. Instance variables are known non-static variables.

1. What is a class variable of a class? What is another name used for a class variable?

**Answer:**

A class variable is a variable defined in a class using the static keyword; only one copy of the class variable exists per class loaded into the JVM. Class variables are also known as static variables.

1. What are the default values of different types of fields of a class?

**Answer:**

Class fields and instance fields are initialized based on their data type using the following rules:

* A numeric field (byte, short, char, int, long, float, and double) is initialized to zero.
* A boolean field is initialized to false.
* A reference type field is initialized to null.

1. Create a class named Point with two int instance variables named x and y. Both instance variables should be declared public. Do not initialize the two instance variables.

**Solution:**

public class Point {

public int x;

public int y;

}

1. Add a main() method to the Point class that you created in the previous exercise. Create an object of the Point class and print the default values for the x and y instance variables. Set the values of x and y to 5 and 10, respectively and print their values by reading them back in the program.

**Solution:**

public class Point {

public int x;

public int y;

public static void main(String[] args) {

Point p = new Point();

System.out.println("x = " + p.x + ", y = " + p.y);

p.x = 5;

p.y = 10;

System.out.println("x = " + p.x + ", y = " + p.y);

}

}

1. What will happen when the following snippet of code is run, assuming that Point is the class name that you created in the previous exercise?  
     
   Point p = null;  
   int x = p.x;

**Answer:**

Accessing instance variable x results in a NullPointerException.

1. What is the output of the following code?  
     
   public class Employee {  
    String name;  
    boolean retired;  
    double salary;  
     
    public static void main(String[] args) {  
    Employee emp = new Employee();  
    System.out.println(emp.name);  
    System.out.println(emp.retired);  
    System.out.println(emp.salary);  
    }  
   }

**Answer:**

null

false

0.0

1. The java.time package contains a LocalDate class. The class contains a now() method that returns the current local date. The CurrentDate class uses the simple name of the class, LocalDate, in its main() method. The code in the current form will not compile. Complete and run the following code by adding an import statement – once a single-type import statement and once an import-on-demand statement – to import the LocalDate class. When you run the CurrentDate class, it will print the current local date in ISO format such as 2017-08-27.  
     
   // CurrentDate.java  
   package com.jdojo.cls.excercise;  
     
   /\* Add an import statement here. \*/  
     
   public class CurrentDate {  
    public static void main(String[] args) {  
    LocalDate today = LocalDate.now();  
    System.out.println(today);  
    }  
   }

**Solution:**

You need to add one of the following two statements in the code.

import java.time.LocalDate; // single-type import

import java.time.\*; // on-demand import

1. Consider the following code for a class named StaticImport. The code does not compile because it uses out.println() instead of System.out.println() method in its main() method. Complete the code by adding a static import statement. The System class is in the java.lang package and out is a static variable in the System class.  
     
   // StaticImport.java  
   package com.jdojo.cls.excercise;  
     
   /\* Add a static import statement here. \*/  
     
   public class StaticImport {  
    public static void main(String[] args) {  
    out.println("Hello static import");  
    }  
   }

**Solution:**

import static java.lang.System.out; // import static variable ‘out’ in

1. The following code for a class named MathStaticImport class does not compile. Add a static-import-on-demand statement to complete the code, so it compiles. The java.lang.Math class contains a static variable named PI and a static method named sqrt().  
     
   // MathStaticImport.java  
   package com.jdojo.cls.excercise;  
   /\* Add a static-import-on-demand statement here. \*/  
     
   public class MathStaticImport {  
    public static void main(String[] args) {  
    double radius = 2.0;  
    double perimeter = 2 \* PI \* radius;  
    System.out.println("Value of PI is " + PI);  
    System.out.println("Square Root of 2 is " + sqrt(2));  
    System.out.println("Perimeter of a circle of radius 2.0 is "   
    + perimeter);  
    }  
   }

**Solution:**

import static java.lang.Math.\*; // static-import-on-demand for PI & sqrt()

11. Define a public Record class named Computer, with the following fields and types: String name, int numberOfProcessors, int memory, int diskSpace, String brand.

public record Computer(String name, int numberOfProcessors, int memory, int diskSpace, String brand) {}