**STIW5044 – OBJECT ORIENTED PROGRAMMING DEVELOPMENT**

**EXERCISE 1 – PUBLIC & PRIVATE ACCESS MODIFIER& CONSTRUCTOR**

**TASK 1**

**A Simple Clock Object**

Figure 1 represents a UML class diagram for a clock object. The source code for this simple Java class is in the file named "Clock.java" and is shown in Figure 2 below. Using a Java editor, type "Clock.java" and compile the source code. The source code corresponding to the class does not contain a main method. It only contains the source code pertaining to the object the class file represents.



**Figure 1 : Clock class diagram**

**public class Clock**

**{**

**//Instance variables**

**publicint hours;**

**publicint minutes;**

**publicint seconds;**

**publicbooleandisplaySeconds;**

**//Class Methods**

**public void setHour(int hour)**

**{**

**hours = hour;**

**}**

**public void setMinutes(int min)**

**{**

**minutes = min;**

**}**

**public void setSeconds(int sec)**

**{**

**seconds = sec;**

**}**

**}**

**Figure 2: Source code for Clock.java**

When working with Java objects, a test driver is needed to experiment with the attributes and methods of the class. The test driver for the Clock class is contained in "ClockTest.java". Figure 3 contains the source code for "ClockTest.java”. Compile and run the test driver and observe the output.

**importjava.util.\*;**

**public class ClockTest**

**{**

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

**{**

**Clock myClock = new Clock();**

**myClock.setHour(10);**

**myClock.setMinutes(15);**

**myClock.setSeconds(47);**

**System.out.print("The time is ");**

**System.out.print(myClock.hours + ":");**

**System.out.print(myClock.minutes + ":");**

**System.out.println(myClock.seconds);**

**}**

**}**

**Figure 3: Source code for ClockTest.java**

**Modify the Clock class:**

1. Open the file "Clock.java".

2. Add a method named displayTime( ) that returns void. This method should display the current values of the instance variables. Add this new method after the setSeconds(int sec) method.

Modify the test driver:

1. Open the file "ClockTest.java"

2. Remove the four lines of code that displays the value of the Clock class’s instance variables.

3. Add a line of code to the test driver that calls the method you created below.

**Private Instance Variables**

Instance variables are usually private in scope, so classes are equipped with a group of methods that modifies the values of class instance variables as well as a group or methods that return the value of instance variables. Modify the instance variables by changing the access modifier to “private”. Methods that modify the value of instance variables are called mutator methods and are prefixed with the word **set**. Mutator methods have been provided in the Clock class. Methods that return the value of instance variables are called accessor methods and are prefixed with the word **get**. Add accessor methods for the instance variables hours, minutes and seconds to the Clock class. Compile the Clock class to ensure that there are no syntax errors.

**TASK 2**

Implement a class Product. A product has a name and a price, for example new Product(" Toaster", 29.95). Supply methods getName, getPrice, andreducePrice. You also need to write a program ProductPrinter that makes two products, prints the name and price, reduces their prices byRM5.00, and then prints the prices again.