JAVA PROGRAMMING –QUIZ 4 and EXERCISE 8

WARNING. This test is to be treated as if taken under exam conditions. Any plagiarism or collusion will result in immediate disqualification and zero marks awarded, and will be pursued as a disciplinary matter.

As explained previously, part of the coursework consists of five multiple-choice quizzes, that are designed to test your understanding of Java. They appear in weeks 5, 6, 7, 8 and 11. Each one is worth 2% of the course unit mark, must be undertaken during a lab session, that is between 2.00-4.00pm on the day you attend. Each quiz can only be taken once, and must be completed within 20 minutes of starting. You will need a password to access the quiz, which will be given during the lab.

The fourth of these quizzes is now available under 'Assessment' on Blackboard and should be taken NOW, before attempting the exercises below.

EXERCISE 8

In this lab, we'll be going through various tasks, which will serve to reinforce the concepts you have learnt over the past few weeks.

Instructions:

- Write, compile, run and test these programs using Notepad and command prompt, or ConTEXT.
- There is no Course Marker involved, so you can start coding right away.

Task 1:

Write a program called **Decibels** to convert values of Power Gain or Voltage Gain, into decibels, and prints out the results to 3 decimal places. Use two methods called **power( )** and **voltage( )** to do the actual calculation. Program it such that, if the user enters the number **1**, main calls the power ( ) method which prompts the user to enter a value of power gain, does the conversion and prints it out. Alternatively, if the user enters the number **2**, the main calls the voltage ( ) method which prompts the user to enter a value of voltage gain, does the conversion and prints it out. Test it with positive values for each.

hints:

Power Gain in dB =10 $\log_{10}$ (Power Gain)
Voltage Gain in dB =20 $\log_{10}$ (Voltage Gain)
Use the Math.log10() method to find the log values necessary.

Task 2:

Write a program called **Resistance** which calculates the resistivity (ρ) of a wire of given radius, length and resistance. Prompt the user to input these variables. Use a separate method to calculate ρ, by passing all the required values into the method via parameters.
Extend the program by adding a second method that calculates the resistance at a given heated temperature (see equation below). This second method, called by main, takes the resistance supplied in the first part as a parameter, but also requires the user to supply the initial and heated temperatures, and the value of the temperature coefficient, and returns the new resistance for main to print out.

Remember that $\rho=\frac{RA}{l}$, where R is the resistance of the wire, A is the cross-sectional area and l is the length.

For the temperature dependence method, use the following relationship:
R = Ri [1 + a ((T –Ti)]
Where Ri is the initial resistance, a is the temperature coefficient, T is the heated temperature and Ti is the initial temperature.

HINT: Use double values throughout.

Task 3:

Write a program called **ReversedArray** that contains an additional method called **reverseArray** that reverses the order of an array it receives through a parameter. The original array should be inputted by the user (in the **main** method) by entering integers. The program should print out both the original array and the reversed array, in its final output, as shown in the example below:

<u>Example Output:</u>

```
Enter the no. of elements in the array: 3
Now input the integers one by one:
6
15
2

The original array you entered was: 6,15,2
The reversed array is: 2,15,6
```

NOTE: You should reverse the order of the array, not just print it out in reverse.
HINT: Use a temporary array to help swap values.

Task 4:
There are some additional , “advanced”, java exercises, see “Week 8” under Further Exercises on Blackboard. See how many you can complete.