Introductory Java Programming

Queen Mary
University of London

School of Electronic Engineering
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Course Code: EBU4201

Lab Sheet 4: Arrays

1. For this question, you will need to use and modify the file **Cat.java** that you wrote in *Lab Sheet 3 – Q1*. You will also need to write a new test class named **CatTest2**, to be stored in file **CatTest2.java**.

   i) Add a **toString()** method in the **Cat** class, such that this method provides a **String** representation of the **Cat** object. This method should return all the **Cat** attributes in a **String**.

   ii) Write a new test program called **CatTest2**, such that it creates an array of **6 Cat** objects. Using a **for** loop, the test program should loop through the array of **Cat** objects and print out the details of each **Cat** object[1].

2. Download the file **RandomArray.java** from the course area in QMplus; this class does NOT currently compile. You need to fill in the FOUR incomplete methods in that file so it produces similar output to the indicated below, when you run the program on the command line:

   ```
   > java RandomArray 5
   9 7 2 1 4
   Sum: 23
   Mean: 4.6
   ```

   ```
   > java RandomArray 8
   0 9 5 3 5 6 0 8
   Sum: 36
   Mean: 4.5
   ```

   i) Complete the code for the constructor **public RandomArray(int size)**, such that:
      - it initialises the instance variable called **array** to an array of **int** values of length **size**;
      - each value stored in the array is a randomly generated number[2] between **0** and **9**.

   ii) Complete the code for the method **public void printArray()**, such that it simply prints out the value of each array element.

   iii) Complete the code for the method **public int calcSum()**, such that it calculates the sum of all the values in the array and returns their sum.

   iv) Complete the code for the method **public double calcMean()**, such that it calculates the mean of all the values in the array and returns their mean (or average)[3].

   Ensure that all your programs contain both internal comments and *Javadoc* comments.

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[1] **Hint**: If you have the **toString()** method in the **Cat** class, you can print out the whole object directly using **System.out.print()**.

[2] **Hint**: You can use **Math.random()*10** to generate a random number in the range **0-9**, but you will need to convert it into an **int**. See the API for this more information for the **Math** class at https://docs.oracle.com/javase/8/docs/api/index.html?java/lang/Math.html; find the **random()** method and then read about it.

[3] **Hint**: Consider the concept of *reusing code*; e.g. you should call the method **calcSum()** to get the sum value.