

## CIS1068, Program Design and Abstraction

Write a class `ArrayOperation` with an array that is initiated with a sequence of integers in its constructor. The program of constructor will check with the user how many numbers are needed and then store them in a **private** attribute (`private int [] data`). The class should also have the following methods (instance):

- `getTotal()`, which should return total of the values in the array *data*.
- `getAverage()`, which should return the average of the values in the array *data*.
- `getHighest()`, which should return the highest value in the array *data*.
- `getLowest()`, which should return the lowest value in the array *data*.
- Accessor (`toString`) and mutator (`setData`) of such an array *data*, so that the entire array can be return and any element of such an array can be updated.

Then this class should support another class `ArrayOperations` with the only static main method that can test all the above methods (constructor, accessor, mutator, and other 4 methods).

```
1 package ArrayOperation;
2 import java.util.Scanner;
3
4 public class ArrayOperations {
5
6     public static void main(String [] args){
7         Scanner kb = new Scanner(System.in);
8         System.out.println("Before the test, build your array object for ?
integers!");
9         System.out.print("Input the number of integers:");
10
11         int index = kb.nextInt();
12         ArrayOperation a = new ArrayOperation(index);
13         String str = "";
14         kb.nextLine(); // to consume the end of line for the above print, not
println
15
16         System.out.println("Do you want to start the test, Y/N or y/n?");
17         str = kb.nextLine();
18         while ((str.toUpperCase()).charAt(0)=='Y'){
19             System.out.println("1: what are in the array now?");
20             System.out.println("2: change the value of an element.");
21             System.out.println("3: total of the array values.");
22             System.out.println("4: average of the array values.");
23             System.out.println("5: highest of the array values.");
24             System.out.println("6: lowest of the array values.");
25             System.out.println("other number: quit!");
26
27             int event = kb.nextInt();
28
29             switch(event){
30                 case 1:
31                     System.out.println(a.toString()); // inside toString method, first
call
32
33                     // the accessor to get the array value,
// then, convert to a string for the
return.
```

```
34     break;
35 case 2:
36     System.out.print("Please key-in the position:");
37     index = kb.nextInt();
38     System.out.print("Please key-in the new value:");
39     int value = kb.nextInt(); // the value inputed can be out of range!
40     a.setData(index, value);
41     System.out.print("After the change:");
42     System.out.println(a.toString());
43     break;
44 case 3:
45     System.out.println("Total of the values is: "+a.getTotal());
46     break;
47 case 4:
48     System.out.println("Average of the values is: "+a.getAverage());
49     break;
50 case 5:
51     System.out.println("Highest of the values is: "+a.getHighest());
52     break;
53 case 6:
54     System.out.println("Lowest of the values is: "+a.getLowest());
55     break;
56 }
57 if(event < 1 || event >6 ) str = "N";
58 else{
59     System.out.println("Do you want to continue the test, Y/N or y/n?");
60     kb.nextLine(); //consume the print-out information for the below
reading
61     str = kb.nextLine();
62 }
63 }
64 }
65 }
66
```

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