Department of Computing

COMP125 Fundamentals of Computer Science
Workshop - Array of objects, Class containing array(s)

Learning outcomes

Following are this week's learning outcomes,

  a. Create an array of objects and operate on it

  b. Create a class containing an array, create an object of this class, and operate on it.

Questions

1. Consider the class definition from `RegularPolygon`.

   You job is to complete the incomplete client code in `RegularPolygonClient` that does the following,

   a. create an array of 100 RegularPolygon objects

   b. instantiate each item such that it has,

      (a) `numberOfSides` a random integer between 3 and 10. You can get a random integer `n` in this range using,

      ```
      int n = 3 + rand.nextInt(8);
      ```

      (b) `sideLength` a random real number between 1 and 20 in multiples of 0.5. You can get a real number in this range using,

      ```
      double s = 1 + (0.5 * (rand.nextInt(39)));
      ```

   c. Display the items that have an area of 50 or more.

   You'll need to study section "Array of objects" from lecture notes "Classes and Objects" in order to complete these tasks.

   Solution:

   ```
   import java.util.Random;

   public class RegularPolygonClient {
           public static void main(String[] args) {
                   Random rand = new Random();
                   RegularPolygon[] items = new RegularPolygon[100];
                   for(int i=0; i < items.length; i++) {
                           int n = 3 + rand.nextInt(8);
                           double s = 1 + (0.5 * (rand.nextInt(39)));
                           items[i] = new RegularPolygon(n, s);
                           if(items[i].area() > 50) {
                                   System.out.println(items[i]);
                           }
   ```

```
14                    }
15              }
16  }
```

2. a. Implement the constructor and the `average` instance method in the class `DiceRollRecord`.

   b. In a client outside the class `DiceRollRecord`, create an object `myRecord` of class `DiceRollRecord` that holds a simulation of 500 dice rolls and display the average roll on the console.

   You'll need to study section "Class containing arrays" from lecture notes "Classes and Objects" in order to complete these tasks.

Solution:

```java
public class DiceRollRecord {
        private int[] log;

        public DiceRollRecord(int n) {
                log = new int[Math.max(0, n)];
                Random rand = new Random();
                for(int i=0; i < log.length; i++) {
                        log[i] = 1 + rand.nextInt(6);
                }
        }

        public double average() {
                if(log.length == 0) {
                        return 0;
                }
                int total = 0;
                for(int i=0; i < log.length; i++) {
                        total+=log[i];
                }
                return total * 1.0 / log.length;
        }
}
```

```java
import java.util.Random;

public class DiceRollRecordClient {
        public static void main(String[] args) {
                DiceRollRecord myRecord = new DiceRollRecord(500);
                System.out.println(myRecord.average());
        }
}
```