CSC 1109 Lab 9

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Question 1

Listing 1: RandomCharacter.java

```
1
2  public class RandomCharacter {
3
4      public static char getRandomLowerCaseLetter(){
5          return (char)('a' + Math.random() * ('z' - 'a' + 1));
6      }
7      public static char getRandomUpperCaseLetter(){
8          return (char)('A' + Math.random() * ('Z' - 'A' + 1));
9      }
10     public static char getRandomDigitCharacter(){
11         return (char)('0' + Math.random() * ('9' - '0' + 1));
12     }
13     public static char getRandomCharacter(){
14         int num = (int)(Math.random() * 3);
15         return switch (num) {
16             case 0 -> getRandomLowerCaseLetter();
17             case 1 -> getRandomUpperCaseLetter();
18             case 2 -> getRandomDigitCharacter();
19             default -> ' ';
20         };
21     }
22
23     public int genPrime() {
24         int num;
25         do {
26             num = 0;
27             for (int i = 0; i < 10; i++) {
28                 num = num * 10 + (getRandomDigitCharacter() - '0');
29             }
30         } while (!isPrime(num) || (int) (Math.log10(num) + 1) != 10);
31         return num;
32     }
33
34     public boolean isPrime(int inputNum){
35         if (inputNum <= 3 || inputNum % 2 == 0)
```

```
36              return inputNum == 2 || inputNum == 3;
37
38          int divisor = 3;
39          while ((divisor <= Math.sqrt(inputNum)) && (inputNum % divisor != ↩
                0))
40              divisor += 2;
41          return inputNum % divisor != 0;
42      }
43
44      public static void main(String[] args) {
45          for (int i = 0; i < 15; i++){
46              System.out.print(getRandomLowerCaseLetter() + " ");
47          }
48          System.out.println();
49
50          for (int i = 0; i < 15; i++){
51              System.out.print(getRandomUpperCaseLetter() + " ");
52          }
53          System.out.println();
54
55          for (int i = 0; i < 15; i++){
56              System.out.print(getRandomDigitCharacter() + " ");
57          }
58          System.out.println();
59
60          for (int i = 0; i < 15; i++){
61              System.out.print(getRandomCharacter() + " ");
62          }
63          System.out.println();
64
65          System.out.println(new RandomCharacter().genPrime());
66
67      }
68  }
```

Listing 2: Output of RandomCharacter.java

```
1  //Output 1
2  q e s o u e b e j j o s l c t
3  M G G C J Q T F F W Z A A J E
4  8 0 7 7 8 9 3 8 9 7 2 2 3 6 7
5  u R 7 G 4 b 2 0 n 7 a 8 6 6 X
6  1174095277
7
8  //Output 2
9  s b w w j q z u t a q l t t o
10 I R C J K D Z S O E Z G D B I
11 9 3 0 8 9 2 1 9 8 9 2 0 6 6 2
12 Y k N l b T M 9 R 4 8 8 d G H
13 1293553021
```

Listing 3: Test cases of RandomCharacter.java

```java
import org.junit.Test;
import static org.junit.Assert.*;

public class RandomCharacterTest {
    @Test
    public void testGetRandomLowerCaseLetter() {
        for (int i = 0; i < 1000;i++){
            char c = RandomCharacter.getRandomLowerCaseLetter();
            assertTrue(c >= 'a' && c <= 'z');
        }
    }

    @Test
    public void testGetRandomUpperCaseLetter() {
        for (int i = 0; i < 1000;i++){
            char c = RandomCharacter.getRandomUpperCaseLetter();
            assertTrue(c >= 'A' && c <= 'Z');
        }
    }

    @Test
    public void testGetRandomDigitCharacter() {
        for (int i = 0; i < 1000;i++){
            char c = RandomCharacter.getRandomDigitCharacter();
            assertTrue(c >= '0' && c <= '9');
        }
    }

    @Test
    public void testGetRandomCharacter() {
        for (int i = 0; i < 1000;i++){
            char c = RandomCharacter.getRandomCharacter();
            assertTrue((c >= 'A' && c <= 'Z') ||
                    (c >= 'a' && c <= 'z') ||
                    (c >= '0' && c <= '9')
            );
        }
    }
}
```

RandomCharacterTest.java Output

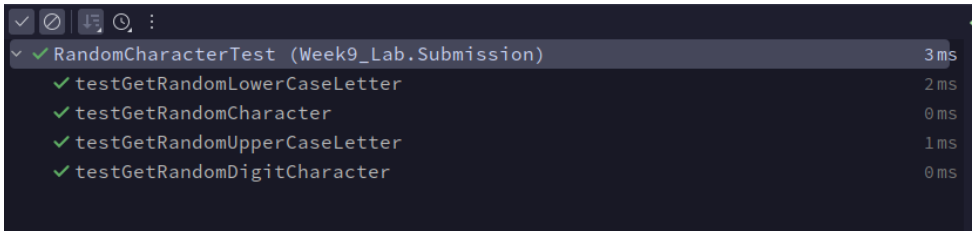

Figure 1: Output of RandomCharacterTest.java