PS 4 - CMPE 160.01: Introduction to Object Oriented Programming

Methods Continued - File Reading:

25/03/2022

1 File Reading:

Example code to read a text file named 'filename.txt' line by line, and adding the contents to an array list:

Try-catch statement in Java allows us to run a block of code and test it for the potential errors at the same time. This code is written in **try** block. If the error happens, code in the **catch** block will be executed. We can optionally have a **finally** statement after catch, and it will be executed after try-catch, regardless of what happens.

If we do not use **catch** block, we have to add **throws** keyword to our method signature. Since on our homeworks and exams we usually do not want you to change the method signature, keep this in mind.

```
/* Reads given file and returns the contents */
   public static ArrayList<String> readFile(){
      ArrayList<String> list = new ArrayList<String>();
      try
      {
         //the file to be opened for reading
         FileInputStream fis=new FileInputStream("filename.txt");
         Scanner sc=new Scanner(fis); //file to be scanned
         //returns true if there is another line to read
         while(sc.hasNextLine())
         {
            String line = sc.nextLine();
            list.add(line);
         }
         sc.close();    //closes the scanner
      }
      catch(IOException e)
      {
         e.printStackTrace();
      }
      return list;
```

```
}
```

2 Counting the Occurrences of Each Letter:

We want to write a program which:

1. Generates 100 lowercase letters randomly and assigns them to an array of characters, as shown in the figure.

2. Counts the occurrences of each letter in the array. To do so, create an array, say counts, of 26 int values, each of which counts the occurrences of a letter, as shown in the figure. That is, counts[0] counts the number of a's, counts[1] counts the number of b's, and so on.

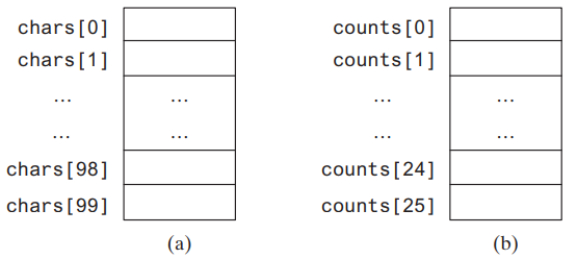

Figure 1: The chars array stores 100 characters, and the counts array stores 26 counts, each of which counts the occurrences of a letter

Output of the program should be as follows:

```
The lowercase letters are:
e y l s r i b k j v j h a b z n w b t v
s c c k r d w a m p w v u n q a m p l o
a z g d e g f i n d x m z o u l o z j v
h w i w n t g x w c d o t x h y v z y z
q e a m f w p g u q t r e n n w f c r f
The occurrences of each letter are:
5 a 3 b 4 c 4 d 4 e 4 f 4 g 3 h 3 i 3 j
2 k 3 l 4 m 6 n 4 o 3 p 3 q 4 r 2 s 4 t
3 u 5 v 8 w 3 x 3 y 6 z
```

An example code is as follows:

```
import java.util.Arrays;
import java.util.Random;

public class CountLettersInArray {

   /** Main method */
   public static void main(String[] args) {
      // Declare and create an array
```

```
    char[] chars = createArray();
    System.out.println("Chars are:" + Arrays.toString(chars));

    // Display the array
    System.out.println();
    System.out.println("The lowercase letters are:");
    displayArray(chars);

    //Count the occurrences of each letter
    int[] counts = countLetters(chars);

    // Display counts
    System.out.println();
    System.out.println("The occurrences of each letter are:");
    displayCounts(counts);
}

/** Create an array of characters */
public static char[] createArray() {
    // Declare an array of characters and create it
    char[] chars = new char[100];

    // Create lowercase letters randomly and assign
    // them to the array
    for (int i = 0; i < chars.length; i++) {

        Random r = new Random();
        char c = (char)(r.nextInt(26) + 'a');

        //chars[i] = RandomCharacter.getRandomLowerCaseLetter();
        chars[i] = c;
    }

    // Return the array
    return chars;
}

/** Display the array of characters */
public static void displayArray(char[] chars) {
    // Display the characters in the array 20 on each line
    for (int i = 0; i < chars.length; i++) {
        if ((i + 1) % 20 == 0)
            System.out.println(chars[i]);
        else
            System.out.print(chars[i] + " ");
    }
}

/** Count the occurrences of each letter */
public static int[] countLetters(char[] chars) {
```

```
      // Declare and create an array of 26 int
      int[] counts = new int[26];

      // For each lowercase letter in the array, count it
      for (int i = 0; i < chars.length; i++)
         counts[chars[i] - 'a']++;
      return counts;
   }

   /** Display counts */
   public static void displayCounts(int[] counts) {
      for (int i = 0; i < counts.length; i++) {
         if ((i + 1) % 10 == 0)
            System.out.println(counts[i] + " " + (char)(i + 'a'));
         else
            System.out.print(counts[i] + " " + (char)(i + 'a') + " ");
      }
   }
}
```