Joao Paulo Dos Santos Ferreira
Fundamentals of Programing I – CSIT 111_04
Professor Jiayin Wang
October 8, 2017

Lab 03 Report

Exercise 1: Working with Strings

The following program illustrates the use of some of the methods in the String class. Study the program to see what it is doing.

```
// ********************************************************************
// StringManips.java
//
// Test several methods for manipulating String objects
// ********************************************************************
import java.util.Scanner;

public class StringManips
{
	public static void main (String[] args)
	{
		String phrase = new String ("This is a String test.");
		int phraseLength; // number of characters in the phrase String
		int middleIndex; // index of the middle character in the String
		String firstHalf; // first half of the phrase String
		String secondHalf; // second half of the phrase String
		String switchedPhrase; //new phrase with original halves switched

		// Declare three new variables: middle3, city and state of type String
		// Create a new Scanner object

		// compute the length and middle index of the phrase
		phraseLength = phrase.length();
		middleIndex = phraseLength / 2;

		// get the substring for each half of the phrase
		firstHalf = phrase.substring(0,middleIndex);
		secondHalf = phrase.substring(middleIndex, phraseLength);

		// get middle 3 characters
```

```
            // concatenate the firstHalf at the end of the secondHalf
            switchedPhrase = secondHalf.concat(firstHalf);

            // replace all blank characters in switchedPhrase with asterisks

            // print information about the phrase
            System.out.println();
            System.out.println ("Original phrase: " + phrase);
            System.out.println ("Length of the phrase: " + phraseLength +
            " characters");
            System.out.println ("Index of the middle: " + middleIndex);
            System.out.println ("Character at the middle index: " +
            phrase.charAt(middleIndex));
            System.out.println ("Switched phrase: " + switchedPhrase);
            System.out.println();

            // prompt for and read in the hometown city and state
            // covert the city name to lowercase letters
            // covert the state name to uppercase letters
            // print state name followed by the city name followed again
            // by the state name
        }
}
```

The file ***StringManips.java*** contains this program. Save the file to your directory and compile and run it. Study the output and make sure you understand the relationship between the code and what is printed. Now modify the file as follows:

1. Declare a variable of type String named *middle3* (put your declaration with the other declarations near the top of the program) and use an assignment statement and the substring method to assign *middle3* the substring consisting of the middle three characters of *phrase* (the character at the middle index together with the character to the left of that and the one to the right - use variables, not the literal indices for this particular string). Add a ***println*** statement to print out the result. Save, compile, and run to test what you have done so far.
2. Add an assignment statement to replace all blank characters in *switchedPhrase* with an asterisk (*). The result should be stored back in *switchedPhrase* (so *switchedPhrase* is actually changed). (Do not add another print—place your statement in the program so that this new value of *switchedPhrase* will be the one printed in the current ***println*** statement.) Save, compile, and run your program.
3. Declare two new variables *city* and *state* of type String. Add statements to the program to prompt the user to enter their hometown—the city and the state. Read in the results using the appropriate Scanner class method - you will need to have the user enter city and state on separate lines. Then using String class methods create and print a new string that consists of the state name (all in uppercase letters) followed by the city name (all in lowercase letters) followed again by the state name (uppercase). So, if the user enters Lilesville for the city and North Carolina for the state, the program should create and print the string

NORTH CAROLINAlilesvilleNORTH CAROLINA

Answer:

```
// ********************************************************************
// StringManips.java
//
// Test several methods for manipulating String objects
// ********************************************************************
import java.util.Scanner;
public class StringManips
{
   public static void main (String[] args)
   {

      String phrase = new String ("This is a String test.");

      int phraseLength; // number of characters in the phrase String
      int middleIndex; // index of the middle character in the String
      String firstHalf; // first half of the phrase String
      String secondHalf; // second half of the phrase String
      String switchedPhrase; //new phrase with original halves switched

      // Declare three new variables: middle3, city and state of type String
      String middle3;
      String city;
      String state;

      // Create a new Scanner object
      Scanner strng = new Scanner(System.in);

      // compute the length and middle index of the phrase
      phraseLength = phrase.length();
      middleIndex = phraseLength / 2;

      // get the substring for each half of the phrase
      firstHalf = phrase.substring(0,middleIndex);
      secondHalf = phrase.substring(middleIndex, phraseLength);

      // get middle 3 characters
      middle3 = phrase.substring(middleIndex - 1, middleIndex + 2);
      System.out.println("The middle three indexes are: " + middle3);

      // concatenate the firstHalf at the end of the secondHalf
      switchedPhrase = secondHalf.concat(firstHalf);

      // replace all blank characters in switchedPhrase with asterisks
      switchedPhrase = switchedPhrase.replace(' '  , '*');

      // print information about the phrase
      System.out.println();
      System.out.println ("Original phrase: " + phrase);
      System.out.println ("Length of the phrase: " + phraseLength +
            " characters");
```

```
      System.out.println ("Index of the middle: " + middleIndex);
      System.out.println ("Character at the middle index: " +
            phrase.charAt(middleIndex));
      System.out.println ("Switched phrase: " + switchedPhrase);
      System.out.println();

      // prompt for and read in the hometown city and state
      System.out.print("Enter your hometown City: ");
      city = strng.nextLine();
      System.out.print("Enter your hometwon State: ");
      state = strng.nextLine();

      // covert the city name to lowercase letters
      state = state.toUpperCase();

      // covert the state name to uppercase letters
      city = city.toLowerCase();

      // print state name followed by the city name followed again by the
      // state name
      System.out.println(state+city+state);
   }
}
```

Exercise 2: Rolling Dice

Write a complete Java program called Dice.java that simulates the rolling of a pair of dice. For each die in the pair, the program should generate a random number between 1 and 6 (inclusive). It should print out the result of the roll for each die and the total roll (the sum of the two dice), all appropriately labeled. You must use the Random class. The RandomNumbers program in listing 3.2 of the text may be helpful.

Answer:

```
// ********************************************************
// Dice.java
//
// Rolls two dice and adds the value shown on both
// ********************************************************
import java.util.Random;

public class Dice {
   public static void main(String args[]) {

      // Declaring the variables
      Random generator = new Random();
      int die1;
      int die2;
      int dieSum;
```

```
        // Getting random values for each die
        die1 = generator.nextInt(6) + 1;
        die2 = generator.nextInt(6) + 1;

        // Adding both results for each die
        dieSum = die1 + die2;

        // Printing out the results
        System.out.println("Frist die roll: " + die1);
        System.out.println("Second die roll: " + die2);
        System.out.println("Sum of the rolls: " + dieSum);
    }
}
```

Exercise 3: Computing Distance

The file ***Distance.java*** contains an incomplete program to compute the distance between two points. Recall that the distance between the two points (x1, y1) and (x2, y2) is computed by taking the square root of the quantity (x1 - x2)^2 + (y1 - y2)^2 . The program already has code to get the two points as input. You need to add an assignment statement to compute the distance and then a print statement to print it out (appropriately labeled).

```
// ********************************************************************
// Distance.java
//
// Computes the distance between two points
// ********************************************************************
import java.util.Scanner;
public class Distance
{
        public static void main (String[] args)
        {
                double x1, y1, x2, y2; // coordinates of two points
                double distance; // distance between the points
                Scanner scan = new Scanner(System.in);
                // Read in the two points
                System.out.print ("Enter the coordinates of the first point " +
                "(put a space between them): ");
                x1 = scan.nextDouble();
                y1 = scan.nextDouble();
                System.out.print ("Enter the coordinates of the second point: ");
                x2 = scan.nextDouble();
                y2 = scan.nextDouble();
                // Compute the distance
                // Print out the answer
        }
}
```

Answer:

```
// ********************************************************************
// Distance.java
//
// Computes the distance between two points
// ********************************************************************
import java.util.Scanner;

public class Distance
{
   public static void main (String[] args)
   {
      double x1, y1, x2, y2; // coordinates of two points
      double distance; // distance between the points
      Scanner scan = new Scanner(System.in);
      // Read in the two points
      System.out.print ("Enter the coordinates of the first point " +
           "(put a space between them): ");
      x1 = scan.nextDouble();
      y1 = scan.nextDouble();
      System.out.print("Enter the coordinates of the second point: ");
      x2 = scan.nextDouble();
      y2 = scan.nextDouble();

      // Compute the distance
      System.out.print("The distance between the points is: ");
      distance = Math.sqrt(Math.pow(x1-x2, 2)+ Math.pow(y1-y2, 2));

      // Print out the answer
      System.out.println(distance);
   }
}
```