

Lab Assignment #02

2023 Spring SENG102

Question 01

Submission

1. Write the program as directed below:

- (a) Declare two String variables named string1 and string2.
- (b) Ask the user to enter both string variables.
- (c) Compare two variables. If the first string is lexicographically smaller than the second string print "<string1> comes first". If the second string is lexicographically smaller, print "<string2> comes first".
If they are the same strings, concatenate them and print it on the screen.

Note: All the string comparisons should be done in a **case-insensitive** way.

Sample Case 1:

Enter string1:

abC123

Enter string2:

ABC124

abC123 comes first

Sample Case 2:

Enter string1:

jAva987

Enter string2:

java123

java123 comes first

Sample Case 3:

Enter string1:

SENG102

Enter string2:

seng102

SENG102seng102

Question 2

Read a string of mathematical operators from the user (e.g., “++-/*+”). Then, read an integer from the user. The number of digits of the integer should be one more than the length of the string of the operators. Starting from the first digit, apply the mathematical operations in order and print the result. The program should print the appropriate warning message if the string contains characters other than mathematical operations or the length of the integer is too big or too small.

Example: “++-/*+”, “2346225”

$$2 + 3 = 5$$

$$5 + 4 = 9$$

$$9 - 6 = 3$$

$$3 / 2 = 1.5$$

$$1.5 * 2 = 3$$

$$3 + 5 = 8$$

Sample Case 1:

Enter the string of operations:

++-/*+

Enter the integer:

2346225

Result: 8,0

Sample Case 2:

Enter the string of operations:

++5

Invalid string

Sample Case 3:

Enter the string of operations:

++-/*+

Enter the integer:

99

The length of the integer is inappropriate

Question 3

The program should keep asking for integers to the user until 'x' character is entered. Then, the following equation should be calculated using the minimum and maximum entered integers.

$$\sin^{\min}(\max)$$

Sample case 1:

Enter an integer:

8

Enter an integer:

80

Enter an integer:

23

Enter an integer:

x

Result: 0.95214

Question 04

Submission

You need to implement the question and upload your Java source file (StringManips.java) into the available LMS submission.

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; //a new phrase with original halves switched
        // 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);
        // concatenate the firstHalf at the end of the secondHalf
        switchedPhrase = secondHalf.concat(firstHalf);
```

```

        // 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();
    }
}

```

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.
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).
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

Sample Case:

Original phrase: This is a String test.
Length of the phrase: 22 characters
Index of the middle: 11
Character at the middle index: t
Switched phrase: tring test.This is a S

Str
tring*test.This*is*a*S
Please enter a city:
adana
Please enter a state:
turkey
TURKEYadanaTURKEY