Practical Exercise 5 – Strings

The purpose of this task is to introduce you to Strings and some of the methods that can be used to manipulate them.

# String methods

Assume the following variables have been declared for each of examples below.

String s = “Everybody! ”;

String s1;

char ch;

int n;

boolean b;

|  |  |
| --- | --- |
| **A selection of String methods** | **Example** |
| int length  *returns the number of characters in the String.* | n = s.length;  // n = 11 |
| String toUpperCase()  *Converts all the characters in the String to upper case.* | s1 = s.toUpperCase();  // s1 = “EVERYBODY! ” |
| String toLowerCase()  *Converts all the characters in the String to lower case.* | s1 = s.toLowerCase();  // s1 = “everybody! ” |
| String replace(char oldChar, char NewChar)  *Returns a new string resulting from replacing all occurrences of oldChar in this string with newChar.* | s1 = s.replace(‘e’, ’a’);  // s1 = “Evarybody! ” |
| String trim()  *Removes all spaces and return lines at the start and end of a string* | s1 = s.trim();  // s1 = “Everybody!” |
| char charAt(int index)  *Gives the character at position number n in a string* | ch = s.charAt(5);  // ch = ‘b’ |
| String substring(int beginIndex)  *Returns a substring of this string, starting at beginIndex.* | s1 = s.substring(5);  // s1 = “body! ” |
| String substring(int beginIndex, int endIndex)  *Returns a substring of this string, starting at beginIndex, and finishing at endIndex-1.* | s1 = s.substring(0,5);  // s1 = “Every” |
| boolean startsWith(String str)  *Returns true if, and only if, the String starts with str.* | b = s.startsWith(“Every”);  // b = true |
| boolean endsWith(String str)  *returns Boolean, true if s starts with s1* | b = s.endsWith(“body!”);  // b = false |
| int indexOf(String str)  *Returns the index within this string of the first occurrence of the specified substring. Returns -1 if the substring isn’t found.* | n = s.indexOf(“very”);  // n = 1 |
| int indexOf(String str, int fromIndex)  *Returns the index within this string of the first occurrence of the specified character, starting the search at the specified index. Returns -1 if the substring isn’t found.* | s.indexOf(“very”,4);  // n = -1 |
| boolean isEmpty()  *Returns true if, and only if, length() is 0.* | b = s.isEmpty();  // b = false |

For details of many, many more String methods, see:

https://docs.oracle.com/javase/7/docs/api/java/lang/String.html

# Tasks

*Remember to include your code and a screenshot for each task.*

## Task 1: Excuse Generator (Fix the cases and remove the blanks)

The following code fragment provides an example of how to create a sample Mad Lib in Java.

***“Mad Libs*** *is a phrasal template word game where one player prompts others for a list of words to substitute for blanks in a story, before reading the – often comical or nonsensical – story aloud. The game is frequently played as a party game or as a pastime.” - Wikipedia*

1. In your Eclipse workspace, create a new Java Project called ***Prac 5 – Strings***.
2. Create a new class called ExcuseGenerator and get things ready…
   1. You need to set up a class that extends JPanel (e.g. MyCanvas), implements the ActionListener, and contains the relevant imports.

**import** java.awt.\*;

**import** java.awt.event.\*;

**import** javax.swing.\*;

**class** MyCanvas **extends** JPanel **implements** ActionListener

{

// insert the sample code here

}

* 1. You will also need an ExcuseGenerator class with its own main() method that declares, instantiates, and initialises the canvas you’ve created like normal. E.g.

**public** **class** ExcuseGenerator {

**public** **static** **void** main(String[] a) {

MyCanvas myCanvas = **new** MyCanvas();

myCanvas.init();

JFrame window = **new** JFrame();

window.setDefaultCloseOperation(JFrame.***EXIT\_ON\_CLOSE***);

window.setBounds(30, 30, 300, 600);

window.getContentPane().add(myCanvas);

window.setVisible(**true**);

}

}

1. Copy in the sample code below, and get the excuse generator working.
2. Modify it so that regardless of the text entered…

* Words are converted to the appropriate case. For example, if a medical condition is named after a person, the person’s name is capitalised (but not the word after it), e.g. “torok’s syndrome” becomes “Torok’s syndrome”.
* Leading and trailing spaces are removed from all words. e.g. “run uncontrollably” should display as “run uncontrollably”

TextField nameTextField;

String fullName, firstName, lastName;

TextField conditionTextField, verbTextField, sillyTextField;

String condition, verb, silly;

Button generateButton;

TextArea outputTextArea;

String output;

String[] randomExcuses = {"A dog ate my homework. ",

"I don't remember getting any homework! ",

"I'm sorry I left it at home. ",

"I didn't understand how to do it. "

+ "Could you explain it to me, and let me hand it in tomorrow? ",

"My computer crashed before I'd saved it. ",

"I lost my USB stick. ",

"I stayed at a friend's house last night, "

+ "so wasn't able to pick it up this morning. ",

"I wasn't here when you handed it out, so didn't know about it. ",

"I had to do an extra shift at work last night. "};

**public** **void** init()

{

generateButton = **new** Button("Generate excuse");

outputTextArea = **new** TextArea("",15,30,TextArea.***SCROLLBARS\_VERTICAL\_ONLY***);

outputTextArea.setEditable(**false**);

nameTextField = **new** TextField(30);

conditionTextField = **new** TextField(30);

verbTextField = **new** TextField(30);

sillyTextField = **new** TextField(30);

add(**new** Label("HOMEWORK EXCUSE GENERATOR"));

add(**new** Label("Enter your full name: "));

add(nameTextField);

add(**new** Label("Enter a medical condition: "));

add(conditionTextField);

add(**new** Label("Enter a verb (e.g. run, hop): "));

add(verbTextField);

add(**new** Label("Enter a silly word: "));

add(sillyTextField);

add(generateButton);

add(outputTextArea);

generateButton.addActionListener(**this**);

}

**public** **void** paint(Graphics g)

{

}

**public** **void** actionPerformed(ActionEvent e)

{

fullName = nameTextField.getText();

fullName = fullName.trim();

condition = conditionTextField.getText();

condition.toLowerCase();

verb = verbTextField.getText();

silly = sillyTextField.getText();

if (!fullName.isEmpty())

{

**int** n = fullName.indexOf(" ");

**if** (n == -1)

{

firstName = fullName;

lastName = fullName;

}

**else**

{

firstName = fullName.substring(0, n);

lastName = fullName.substring(n+1, fullName.length());

}

firstName = firstName.substring(0, 1).toUpperCase()

+ firstName.substring(1, firstName.length()).toLowerCase();

}

output = "";

output += "I'm sorry, I don't have anything to hand in. ";

output += randomExcuses[(**int**) (Math.*random*()\*randomExcuses.length)];

output += "Furthermore, I have been suffering from " + condition + ". ";

output += "It's a rare form known as " + lastName + "'s " + silly + ". ";

output += "It causes victims to " + verb + " uncontrollably, "

+ "but usually passes within " + fullName.length() + " days. ";

output += "\n\n" + "Yours sincerely, \n" + firstName;

outputTextArea.setText(output);

}

## Task 2: Free for all

Create your own Mab Lib. It can be a story, poem, or {insert noun here}.

Use your imagination and have some fun! Impress me!

## Task 3: Find and Replace (The Fellowship of the String)

Create a program that automatically replaces specified input text in a passage of text.

The user needs to be able to enter a few paragraphs of text (TextArea), as well as a search string and a replacement string (TextFields).

To demonstrate this working, copy & paste the following text and replace the word “ring” (keep it clean!)

(Alternatively, pick some text from a book or song lyrics and replace a repeating word or phrase. E.g. see <http://www.gutenberg.org/> for the text of many classic books).

And he was a miserable wicked creature, and already he had a plan. Not far away was his island, of which Bilbo knew nothing, and there in his hiding-place he kept a few wretched oddments, and one very beautiful thing, very beautiful, very wonderful. He had a ring, a golden ring, a precious ring.  
  
"My birthday-present!" he whispered to himself, as he had often done in the endless dark days. "That's what we wants now, yes; we wants it!" He wanted it because it was a ring of power, and if you slipped that ring on your finger, you were invisible; only in the full sunlight could you be seen, and then only by your shadow, and that would be shaky and faint. "My birthday-present! It came to me on my birthday, my precious," So he had always said to himself. But who knows how Gollum came by that present, ages ago in the old days when such rings were still at large in the world?

## Task 4: No blanks (stretch goal – bonus marks)

The sample excuse generator creates an excuse even if nothing has been entered into the text fields.

Modify either the excuse generator from task 1 (or your work from tasks 2 or 3), so that the output will be generated only if all the fields have text in them, otherwise display a gentle error message.