

AP Computer Science A@Beijing National Day School

Lab 10: WordScrambler

Due date: Friday, March 1, 2019

Instructor: Mr. Alwin Tareen

Total Points: 15

Task Overview

- Implement a program that combines parts of words together, according to a particular set of rules.

Background

- Consider the following partial declaration for a `WordScrambler` class. The constructor for the `WordScrambler` class takes an even-length array of `String` objects and initializes the instance variable `scrambledWords`.

```
1 public class WordScrambler
2 {
3     private String[] scrambledWords;
4
5     /** @param wordArr an array of String objects.
6      * Precondition: wordArr.length is even.
7      */
8     public WordScrambler(String[] wordArr)
9     {
10         scrambledWords = mixedWords(wordArr);
11     }
12
13     /** @param word1 a String of characters.
14      * @param word2 a String of characters.
15      * @return a String that contains the first half of word1 and the second half of word2.
16      */
17     private String recombine(String word1, String word2)
18     { /* to be implemented in part (a) */ }
19
20     /** @param words an array of String objects.
21      * Precondition: words.length is even.
22      * @return an array of String objects created by recombining pairs of strings
23      * in array words.
24      * Postcondition: the length of the returned array is words.length.
25      */
26     private String[] mixedWords(String[] words)
27     { /* to be implemented in part (b) */ }
28
29     // There may be instance variables, constructors, and methods that are not shown.
30 }
```

- (a) Write the `WordScrambler` method `recombine`. This method returns a `String` created from its two `String` parameters as follows.
- take the first half of `word1`
 - take the second half of `word2`
 - concatenate the two halves and return the new string.

For example, the following table shows some results of calling `recombine`. Note that if a word has an odd number of letters, the second half of the word contains the extra letter.

word1	word2	recombine(word1, word2)
"apple"	"pear"	"apar"
"pear"	"apple"	"peple"

- (b) Write the `WordScrambler` method `mixedWords`. This method creates and returns a new array of `String` objects as follows.

It takes the first pair of strings in `words` and combines them to produce a pair of strings to be included in the array returned by the method. If this pair of strings consists of `w1` and `w2`, the method should include the result of calling `recombine` with `w1` and `w2` as arguments, and should also include the result of calling `recombine` with `w2` and `w1` as arguments.

The next two strings, if they exist, would form the next pair to be processed by this method. The method should continue until all the strings in `words` have been processed in this way, and the new array has been filled.

For example, if the array `words` contains the following elements:

```
{"apple", "pear", "this", "cat"}
```

then the call `mixedWords(words)` should return the following array.

```
{"apar", "peple", "that", "cis"}
```

In writing `mixedWords`, you may call `recombine`. Assume that `recombine` works as specified, regardless of what you wrote in part (a).

Specification

The Information Box Which Includes Your Name[5 points]

- Type your English and Pinyin name into the Author field, where it says: YOUR NAME HERE

Combine Parts of Words Together [10 points]

- Write a Java program in the file `WordScrambler.java` that combines parts of words together, depending on a particular set of rules.
- You will write your solution in a class called: `public class WordScrambler` right below the place where it says: YOUR CODE HERE.
- Make sure that you run your Java program, and ensure that it is free of errors.

Testing

- The file `WordScramblerJUnitTest.java` contains the `JUnit` test cases which verify the correct functionality of the program.

Submission

- Submit your Java program by uploading it to the Web-CAT automated grading platform:
`http://ec2-54-65-207-33.ap-northeast-1.compute.amazonaws.com:8080/Web-CAT/WebObjects/Web-CAT.woa`