Computer Science 3A

Practical Assignment 3

23 February 2017

Time: 23 February 2017 13:45 – 17:00 Marks: 50

Practical assignments must be uploaded to `eve.uj.ac.za` **before** 17h00 in the practical session.

Late submissions **will not be accepted**, and will therefore not be marked. You are **not allowed to collaborate** with any other student. You **must** upload your assignment to Eve **before** it will be marked.

An old favourite TV game show called Conundrum involved participants solving for dictionary words contained in 9 random letters. The main aim of the game was to find a word that fulfills the maximum letter count (9). Human beings found trouble doing this task so making a machine perform the task would be even more interesting. You are required to complete a Java program that solves for the full 9 letter Conundrum using a predefined dictionary provided.

You are required to implement the following functions:

- **clone** - A function that makes a copy of DList.
- **addBefore** - A function that adds an element before a given node in a list.
- **remove** - A function that removes a specified node from the list. The removed element is returned
- **recursiveBinarySearch** - A method for recursively searching for a String in an array of Strings using the binary search approach.
- **mixCharacterOrder** - A function that can mix up chracters in a String (e.g. "hello" to "elloh").
- **solveConundrum1** - The conundrum solver that uses the array dictionary, mixCharacterOrder and recursive binary search.
- **loadPotentialDicitonary1** - A function that loads the textfile-based dictionary and adds them to a String array.

You are required to implement a Java Program that realises the above operations. The output looks similar to:

```
Dictionary Load 1 begin
2659 entries loaded
Dictionary Load 1 completed in 0.134 seconds
Dictionary Load 2 begin
2659 entries loaded
Dictionary Load 2 completed in 0.023 seconds
Algorithm 1 Test begin
The found word is: abolition
Algorithm 1 Test completed in 10.112 seconds
Algorithm 2 Test begin
The found word is: abolition
Algorithm 2 Test completed in 1.201 seconds
```

The following files must be submitted to EVE:

1. *studentnumber*_p3.zip

Bonus

Write a *loadPotentialDictionaryBonus* function and *solveConundrumBonus* function that beats the existing two function performance in computation time.

Marksheet

1. DList: clone [5]
2. DList: addBefore [5]
3. DList: remove [5]
4. Main: recursiveBinarySearch [10]
5. Main: mixCharacterOrder [5]
6. Main: solveConundrum1 [5]
7. Main: loadPotentialDicitonary1 [5]
8. Compilation and Correct execution. [10]