GIT Department of Computer Engineering

CSE 222/505 - Spring 2020

Homework #3 Part 2 Report

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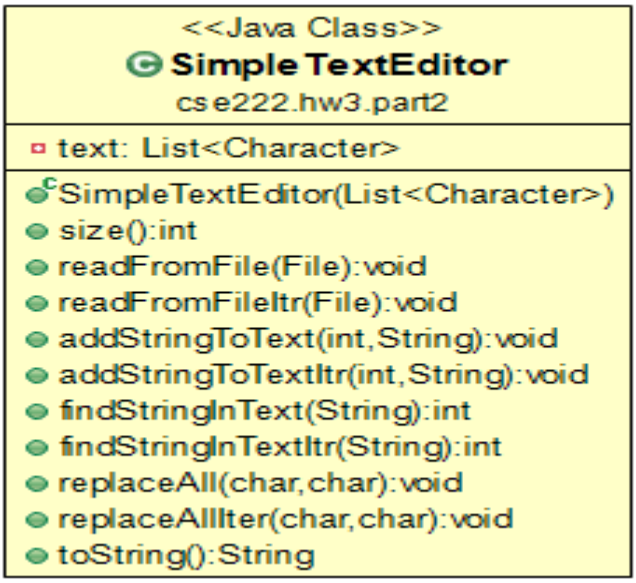
PROBLEM SOLUTION APPROACH

STEP1- Creat a class named SimpleTextEditor

STEP2- Implement all methods which ask for homework (readFromFile, addStringToText, findStringInText, replaceAll) and their iterator versions too (readFromFileItr, addStringToTextItr, findStringInTextItr, replaceAllItr)

STEP3- Test all of functions (including exceptions) , create a log file and write execution results to it

CLASS DIAGRAM



Analysis of the performance of each method theoretically using the most appropriate asymptotic notation.

Methods	LinkedList	ArrayList
readFromFile	readFromFile uses n (number of characters in file) times add(object)(adds at the end) which is **Θ(1),** so readFromFile is **Θ(n)**	readFromFile uses n (number of characters in file) times add(object)(adds at the end) which is **Θ(1),** so readFromFile is **Θ(n)**
readFromFileItr	readFromFileItr uses n (number of characters in file) times	readFromFileItr uses n (number of characters in file) times add(object)(adds

	add(object)(adds at the end) which is **Θ(1),** so readFromFile is **Θ(n)**	at the end) which is **Θ(1),** so readFromFile is **Θ(n)**
addStringToText	addStringToText uses str.length(we call it s) times add(index,object) which is **Θ(index+i),** i is 0 to s, so the equation is (index*str)+(s*(s+1))/2 , so addStringToText is **max(O(index*str), O((s*(s+1))/2))**	addStringToText uses str.length(we call it s) times add(index,object) which is **Θ(index+i),** i is 0 to s, so the equation is (index*str)+(s*(s+1))/2 , so addStringToText is **max(O(index*str), O((s*(s+1))/2))**
addStringToTextItr	addStringToTextItr uses listIterator(index) which is **Θ(index)** 1 time and uses ListIterator.add(object) which is **Θ(str.length)** , so addStringToTextItr **max(O(index), O(str.length))**	addStringToTextItr uses listIterator(index) which is **Θ(index)** 1 time and uses ListIterator.add(object) which is **Θ(str.length)** , so addStringToTextItr max(O(index), **O(str.length))**
findStringInText	findStringInText uses get(index+i) which is **Θ (n)** i is 0 to n(n is size of characters in text), so equation is (n*(n+1))/2, but if finds the string it breaks the loop so it is not **Θ,** so findStringInText is **O(**n^2**)**	findStringInText uses get(index+i) which is constant time i is 0 to n(n is size of characters in text), but if finds the string it breaks the loop so it is not **Θ,** so findStringInText is **O(**n**)**
findStringInTextItr	findStringInTextItr uses next n (n is size of characters in text) times, so findStringInText is **O(**n**)**	findStringInTextItr uses get(index+i) which is constant time i is 0 to n(n is size of characters in text), so findStringInText is **O(**n**)**
replaceAll	replaceAll uses get(index+i) which is **Θ(n)** i is 0 to n(n is size of characters in text), so equation is (n*(n+1))/2, so replaceAll is **Θ(**n^2**)**	replaceAll uses get(index+i) which is constant time i is 0 to n(n is size of characters in text), so replaceAll is **O(**n**)**
replaceAllItr	replaceAllItr uses next n (n is size of characters in text) times, so replaceAllItr is **Θ (**n**)**	replaceAllItr uses get(index+i) which is constant time i is 0 to n(n is size of characters in text), so replaceAllItr is **Θ (**n**)**

Comparison of the experimental performance of each operation.

Methods	LinkedList \testFile1	ArrayList \testFile1	LinkedList \testFile2	ArrayList \testFile2	LinkedList \testFile3	ArrayList \testFile3
readFromFile	528	726	932	793	1592	1435
readFromFileItr	400	709	685	1391	790	977
addStringToText	11	7	14	3	19	5
addStringToTextItr	15	14	14	24	15	20
findStringInText	5	6	8	2	8	2
findStringInTextItr	6	3	4	3	4	4
replaceAll	251	62	314	69	1348	155
replaceAllItr	27	23	73	72	110	126

Test cases

Test ID	Scenario	Test Data	Expected Results	Actual Results	Pass/ Fail
TEST01	readFromFile(invalidFile)	invalidFile	Exception throwed	As expected	Pass
TEST02	readFromFile(testFile1)	testFile1	Successfully readed	As expected	Pass
TEST03	readFromFileItr(invalidFile)	invalidFile	Exception throwed	As expected	Pass
TEST04	readFromFileItr(testFile1)	testFile1	Successfully readed	As expected	Pass
TEST05	addStringToText(test.size()+5 ,*TEST*)	İndex: testItr.size()+5 String : *TEST*	Exception throwed	As expected	Pass
TEST06	addStringToText(test.size()-5,*TEST*)	İndex: testItr.size()+5 String : *TEST*	Successfully added	As expected	Pass
TEST07	addStringToTextItr(test.size() +5,*TEST*)	İndex: testItr.size()+5 String : *TEST*	Exception throwed	As expected	Pass
TEST08	addStringToTextItr (test.size()-5,*TEST*)	İndex: testItr.size()+5 String : *TEST*	Successfully added	As expected	Pass
TEST09	findStringInText(sasdsadsa)	String : sasdsadsa	Returned -1	As expected	Pass
TEST10	findStringInText(quick)	String : sasdsadsa	Returned 4	As expected	Pass
TEST11	findStringInTextItr(sasdsadsa)	String : sasdsadsa	Returned -1	As expected	Pass
TEST12	findStringInTextItr (quick)	String : sasdsadsa	Returned 4	As expected	Pass
TEST13	replaceAll(a,-)	Replace a with – in text	Successfully Replaced	As expected	Pass
TEST14	replaceAllItr (a,-)	Replace a with – in text	Successfully Replaced	As expected	Pass

Running and Results

```
TEST01 - readFromFile(invalidFile) method called with a file which is not exist

java.io.FileNotFoundException: invalidFile.txt (Sistem belirtilen dosyayı bulamıyor)
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 TEST02 - readFromFile(testFile1.txt) method called with an exist file and executed in 447 microseconds

-----Text -----

The quick, brown fox jumps over a lazy dog.
DJs flock by when MTV ax quiz prog.
Junk MTV quiz graced by fox whelps.
Bawds jog, flick quartz, vex nymphs.
Waltz, bad nymph, for quick jigs vex!
Fox nymph

TEST03 - readFromFileItr(invalidFile) method called with a file which is not exist

java.io.FileNotFoundException: invalidFile.txt (Sistem belirtilen dosyayı bulamıyor)

TEST04 - readFromFileItr(testFile1.txt) method called and executed in 610 microsecond
-----Text -----

The quick, brown fox jumps over a lazy dog.
DJs flock by when MTV ax quiz prog.
Junk MTV quiz graced by fox whelps.
Bawds jog, flick quartz, vex nymphs.
Waltz, bad nymph, for quick jigs vex!
Fox nymph


TEST05 - addStringToText(test.size()+5, *TEST*) method called with invalid index
java.lang.IndexOutOfBoundsException: Index: 205, Size: 200


The quick, brown fox jumps over a lazy dog.
DJs flock by when MTV ax quiz prog.
Junk MTV quiz graced by fox whelps.
Bawds jog, flick quartz, vex nymphs.
Waltz, bad nymph, for quick jigs vex!
Fox nymph

TEST06 - addStringToText(test.size()-5, *TEST*) method called and executed in 10 microseconds

-----Text -----

The quick, brown fox jumps over a lazy dog.
DJs flock by when MTV ax quiz prog.
Junk MTV quiz graced by fox whelps.
Bawds jog, flick quartz, vex nymphs.
Waltz, bad nymph, for quick jigs vex!
Fox *TEST*nymph


TEST07 - addStringToTextItr(test.size()+5, *TEST*) method called with invalid index
java.lang.IndexOutOfBoundsException: Index: 205, Size: 200
```

```
-----Text -----

The quick, brown fox jumps over a lazy dog.
DJs flock by when MTV ax quiz prog.
Junk MTV quiz graced by fox whelps.
Bawds jog, flick quartz, vex nymphs.
Waltz, bad nymph, for quick jigs vex!
Fox nymph

TEST08 - addStringToTextItr(test.size()-5, *TEST*) method called and executed in 10 microseconds
-----Text -----

 The quick, brown fox jumps over a lazy dog.
DJs flock by when MTV ax quiz prog.
Junk MTV quiz graced by fox whelps.
Bawds jog, flick quartz, vex nymphs.
Waltz, bad nymph, for quick jigs vex!
Fox *TEST*nymph

-----Text -----

The quick, brown fox jumps over a lazy dog.
DJs flock by when MTV ax quiz prog.
Junk MTV quiz graced by fox whelps.
Bawds jog, flick quartz, vex nymphs.
Waltz, bad nymph, for quick jigs vex!
Fox *TEST*nymph


 TEST09 - findStringInText(sasdsadsa) method called with invalid word returnedIndex : -1

 Given word (sasdsadsa) is not find in text

-----Text -----

The quick, brown fox jumps over a lazy dog.
DJs flock by when MTV ax quiz prog.
Junk MTV quiz graced by fox whelps.
Bawds jog, flick quartz, vex nymphs.
Waltz, bad nymph, for quick jigs vex!
Fox *TEST*nymph


 TEST10 - findStringInText(quick) method called and executed in 4 microseconds returnedIndex: 4
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-----Text -----

The quick, brown fox jumps over a lazy dog.
DJs flock by when MTV ax quiz prog.
Junk MTV quiz graced by fox whelps.
Bawds jog, flick quartz, vex nymphs.
Waltz, bad nymph, for quick jigs vex!
Fox *TEST*nymph

 TEST11 - findStringInTextItr(sasdsadsa) method called with invalid word returnedIndex : -1

 Given word (sasdsadsa) is not find in text

-----Text -----

The quick, brown fox jumps over a lazy dog.
DJs flock by when MTV ax quiz prog.
Junk MTV quiz graced by fox whelps.
Bawds jog, flick quartz, vex nymphs.
Waltz, bad nymph, for quick jigs vex!
Fox *TEST*nymph


 TEST12 - findStringInText(quick) method called and executed in 3 microseconds returnedIndex: 4


-----Text -----

The quick, brown fox jumps over a lazy dog.
DJs flock by when MTV ax quiz prog.
Junk MTV quiz graced by fox whelps.
Bawds jog, flick quartz, vex nymphs.
Waltz, bad nymph, for quick jigs vex!
Fox *TEST*nymph

TEST13 - replaceAll(a,-) method called and executed in 249 microseconds
-----Text -----

The quick, brown fox jumps over - l-zy dog.
DJs flock by when MTV -x quiz prog.
Junk MTV quiz gr-ced by fox whelps.
B-wds jog, flick qu-rtz, vex nymphs.
W-ltz, b-d nymph, for quick jigs vex!
Fox *TEST*nymph
```

```
-----Text -----

The quick, brown fox jumps over a lazy dog.
DJs flock by when MTV ax quiz prog.
Junk MTV quiz graced by fox whelps.
Bawds jog, flick quartz, vex nymphs.
Waltz, bad nymph, for quick jigs vex!
Fox *TEST*nymph

TEST14 - replaceAllItr(a,-) method called and executed in 33 microseconds

-----Text -----

The quick, brown fox jumps over - l-zy dog.
DJs flock by when MTV -x quiz prog.
Junk MTV quiz gr-ced by fox whelps.
B-wds jog, flick qu-rtz, vex nymphs.
W-ltz, b-d nymph, for quick jigs vex!
Fox *TEST*nymph
```