Time Complexity Report

COMP605 Assignment 2

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REPRESENTATIVE

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Introduction

This Time Complexity Report shows the time it takes for the program to find and insert a new word into the dictionary, both by inserting at the end of the list, and inserting after a chosen node.

In this Study, the following Standardised factors were used to make a fair time complexity report:

- The common word used for all tests was "Tools"
- For the "Insert After" tests, the word Tools was input after node 400

As inserting words using Doubly Linked Lists is generally a O(1) Big O, it should have a constant time no matter which file we are inserting into.

Statistics and Graphs of Time Complexity Findings

1.

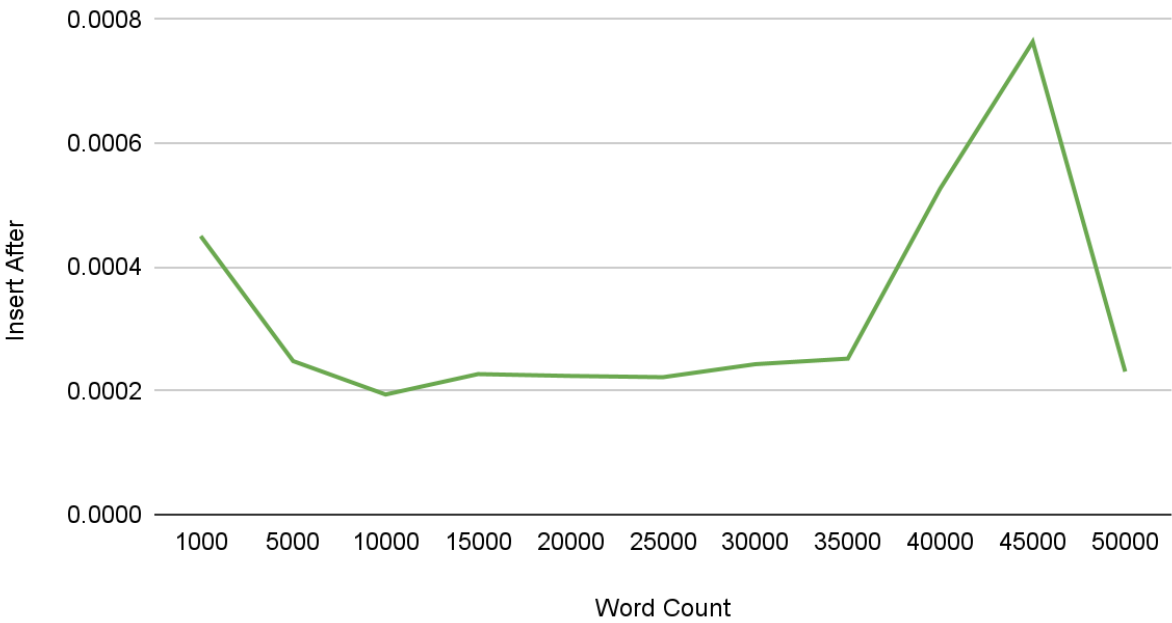| Word Count	Insert End	Insert After
5000	0.0002280	0.000248
1000	0.0004870	0.00045
10000	0.0002550	0.000194
15000	0.0002360	0.000227
20000	0.0002330	0.000224
25000	0.0002330	0.000222
30000	0.0003890	0.000243
35000	0.0002480	0.000252
40000	0.0002740	0.000527
45000	0.0002730	0.000764
50000	0.0002920	0.000231

2.

Insert End vs. Word Count
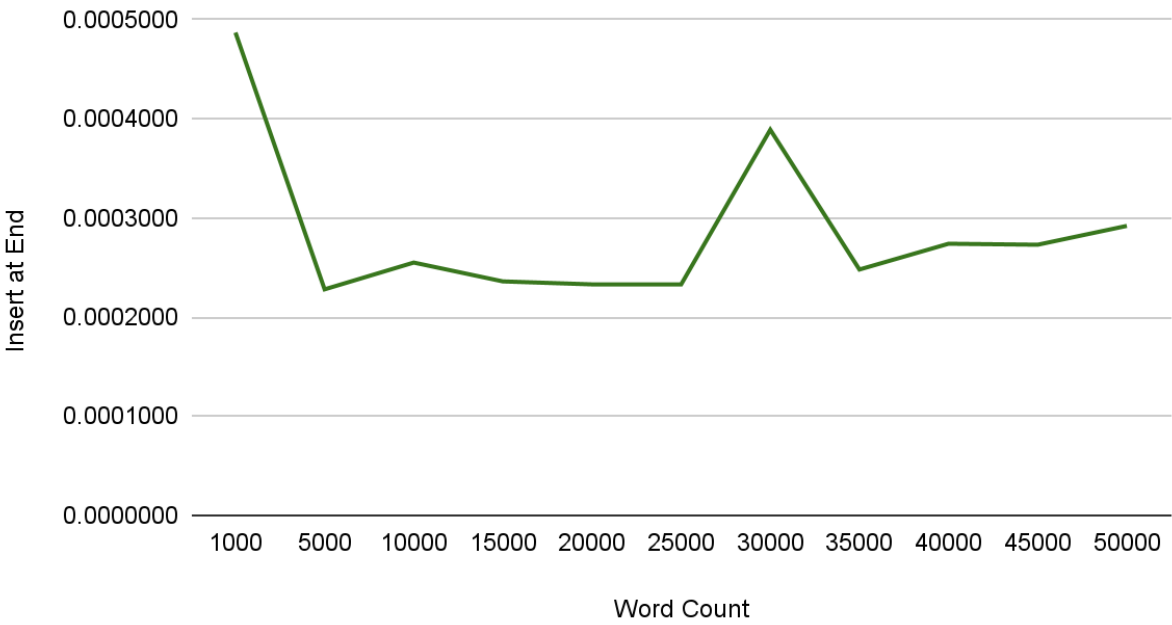
Insert After vs. Word Count

Time Complexity Finding Analysis

Time to Insert Word at End of Dictionary:
Aside from two deviations to the predicted outcome, those being 1000 and 30000 words, the findings have generally shown a constant if not fluctuating constant efficiency. This is because inserting a word at the end of the list does not depend on the number of words that are there initially.

Time to Insert Word After a node:
Again aside from two outliers, we are still seeing only a gradual minimal increase in time. The findings should have been linear, however there may be a fault in either how the code was supposed to be implemented or the stopwatch may have been placed in an incorrect space. That being said the Word was successfully inserted after a chosen node so ultimately these findings are consistent.