**Lab 3 Report**

Big-O Analysis**:**

for LinkedList using the removeDotsIndex() method the asymptotic analysis equation was found to be n2 + 19n + 5 , so the Big-O analysis is O(n2), where n is the number of Dots considering that there is only one while loop, one for loop, and two if statements, which are things that would be done a number of times .

|  |  |
| --- | --- |
| Asymptotic Analysis | |
| number of dots | run-time |
| 125 | 18005 |
| 250 | 67255 |
| 500 | 259505 |
| 1000 | 1019005 |
| 2500 | 6297505 |
| 5000 | 25095005 |
| 7500 | 56392505 |
| 10000 | 100190005 |

Benchmarking**:**

|  |  |  |
| --- | --- | --- |
| Linked list benchmark | | |
| number of dots | dots remaining | timetaken(ns) |
| 125 | 25 | 900 |
| 250 | 150 | 5000 |
| 500 | 400 | 8200 |
| 1000 | 900 | 12900 |
| 2500 | 2400 | 14300 |
| 5000 | 4900 | 19800 |
| 7500 | 7400 | 281000 |
| 10000 | 9900 | 3450000 |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
| ArrayList benchmark | | |
| number of dots | dots remaining | timetaken(ns) |
| 125 | 25 | 800 |
| 250 | 150 | 3900 |
| 500 | 400 | 4800 |
| 1000 | 900 | 9800 |
| 2500 | 2400 | 12400 |
| 5000 | 4900 | 11500 |
| 7500 | 7400 | 8100 |
| 10000 | 9900 | 12800 |
|  |  |  |
|  |  |  |

Questions**:**

1. From your benchmarks, the run time of which scenario grows more slowly as n is increased? The run time of which scenario grows more quickly as n is increased?

The Linked list grows more quickly as the number of dots increases and the opposite is true for the ArrayList.

1. From your big-O analysis, the run time of which scenario grows more slowly as n is increased? The run time of which scenario grows more quickly as n is increased?

They had the same Big-O analysis because the used the same piece of code.

1. Are the results from your benchmarks and big-O analysis consistent?

I think so but only for the first ones, the last two were off and less consistent.