Search Test Lab Report

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**1. Linear Search**

We know from class that the theoretical time complexity of linear search over *unordered lists* is:

|  |  |  |
| --- | --- | --- |
| **Best Case** | **Worst Case** | **Average Case** |
| *1* | *N* | *N/2* |

**Q1:** Increasing the number of trials and the value of N

1. Run experiments with an increasing value of N (from 1000 to 10,000). Does increasing N affect how many trials you have to run to get accurate results? Explain.

**It dependents. For best cases, it doesn’t influence. But for worst cases and average case, it influences. The deviations or errors increases with the increase of the N.**

1. Write down the number of trials that seem to have worked well for N=10,000.

|  |
| --- |
| **Number of Trials** |
| 100 |

**Q2:** Linear Search Time Complexity Plot (Unordered List)

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| --- |
|  |

**Q3:** Does the order of the data in the list affect the number of comparisons? In the table below, guess the time complexity of Linear Search on an *Ordered List.*

|  |  |  |
| --- | --- | --- |
| **Best Case** | **Worst Case** | **Average Case** |
| 1 | N | N/2 |

Linear Search Time Complexity Plot (Ordered List)

|  |
| --- |
|  |

**Conclusion:**

**The order of data does not affect the complexity.**

**2. Binary Search**

We know from class that the theoretical time complexity of binary search over *ordered lists* are:

|  |  |  |
| --- | --- | --- |
| **Best Case** | **Worst Case** | **Average Case** |
| *1* | *log\_2(N)* | *???* |

**Q4:** Binary Search Time Complexity Plot

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| --- |
|  |

**Conclusion:** What do your results tell you about the average-case complexity of Binary Search?

**O( logn) which is the same as the worst case.**

**3. Median**

Q5: We hypothesize that the time complexity of find\_median is:

|  |  |  |
| --- | --- | --- |
| **Best Case** | **Worst Case** | **Average Case** |
| N | N² | N² |

**Justification:**

1. Best case scenario:

*Happens when* ***the median is the first element in the list.***

1. Worst case scenario:

*Happens when* ***the median is the last element in the list.***

1. Average case scenario:

***(1 + 2 + 3 + 4… + N)\*N / N ~ O(N*²)**

Find\_median Time Complexity Plot

|  |
| --- |
|  |

**Conclusion:** Did your results support your hypothesis? If not, why not, and how does it change your original hypothesis?

**Yes**