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.

Bigger N needs more trials in order to get accurate results because it is more likely to cover all the numbers and get an expected result.

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

|  |
| --- |
| **Number of Trials** |
| 1000 |

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

|  |
| --- |
| *Linear SearchInsert plot here* |

**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)

|  |
| --- |
| *Linear Search(sorted)Insert plot here* |

**Conclusion:**

There is no obvious differences in time complexity between ordered list and unordered list if we use linear search

**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)* | *log\_2(N)* |

**Q4:** Binary Search Time Complexity Plot

|  |
| --- |
| *Insert plot here* |

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

Same as the worst case time complexity

**3. Median**

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

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

**Justification:**

1. Best case scenario:

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

1. Worst case scenario:

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

1. Average case scenario: the element in the middle of the list is the median

Find\_median Time Complexity Plot

|  |
| --- |
| *Insert plot here* |

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

Yes