**Homework #9**

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Table 1 shows the total execution times for both a linear and binary search to find a number of interest. As shown below, the linear search takes the longest to run. This is expected as the linear search is searching one by one starting from the first element while the binary continually cuts its search region in half until it finds the number its looking for. Since we are looking for the second to last number, the binary search will be much quicker to reach the end as the linear search essentially has to look through the entire array while the binary search only looks through a portion. However, the binary search only works for an array that is sorted in ascending order while a linear search works on both sorted and unsorted arrays. If we were looking for the second element instead of the second to last element, the linear search would outperform the binary search. In our current case, the binary search is 7845 times faster than the linear search.

**Table 1. HW9 Results**

|  |  |
| --- | --- |
| Method | Execution Time (s) |
| Linear Search | 3.193800000000001E-002 |
| Binary Search | 4.000000000004000E-006 |

A computer screen shot of a black and white screen

Description automatically generated

**Figure 1. Output Linear and Binary Search**