

## **Lab 2 Report**

Matthew Sabo

CISC Program, Harrisburg University

CISC 233: Essential Algorithms

Professor Rohrbaugh

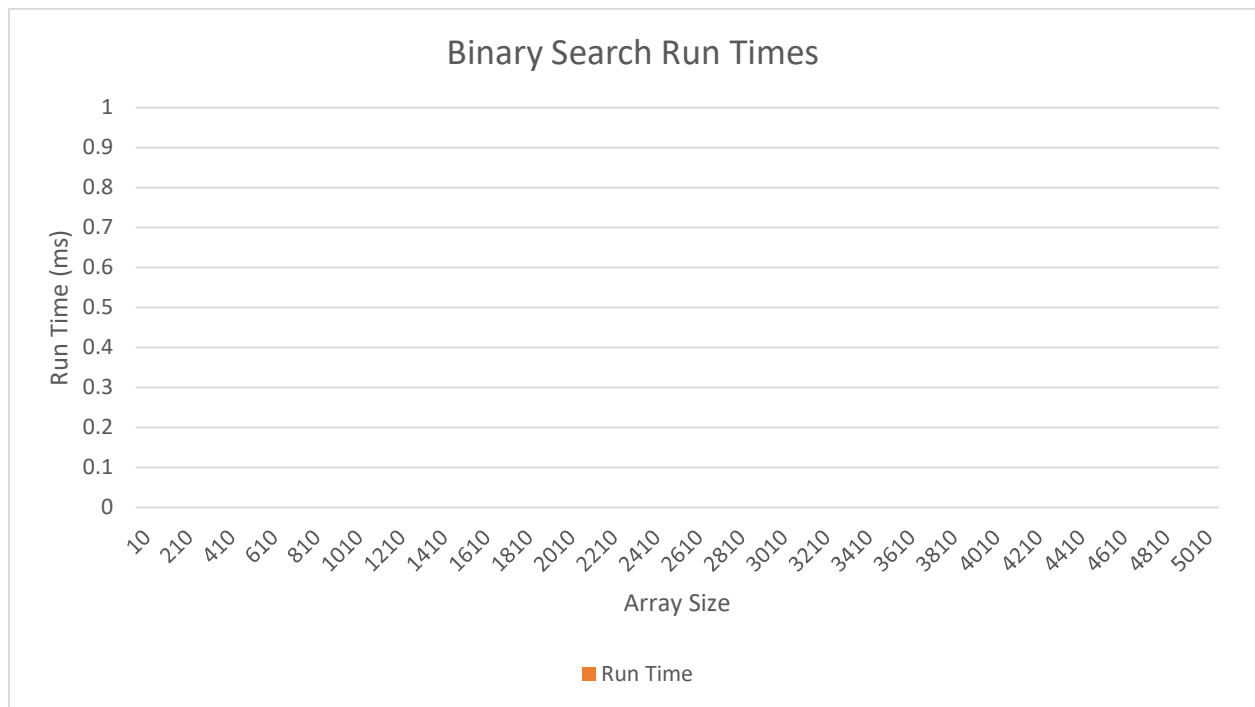
February 14, 2023

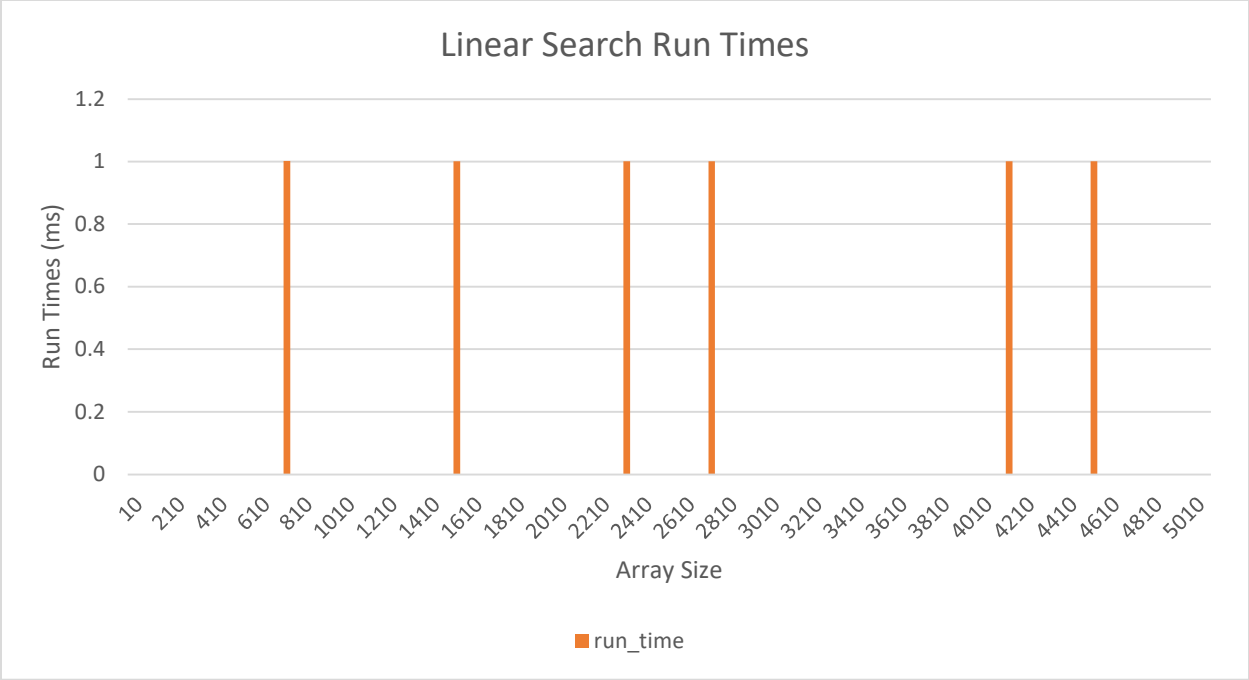
## Overview

The lab task was to create 2 separate sorting algorithms. One would use a linear search algorithm while the other would use a binary search algorithm. The list that would be used would be an array that is filled with random data from 1 to the maximum size of the array. Then after choosing a target, we were to track the efficiency of each algorithm by outputting both how long the search took in milliseconds and the length of the array into a .csv file that can be read in Excel.

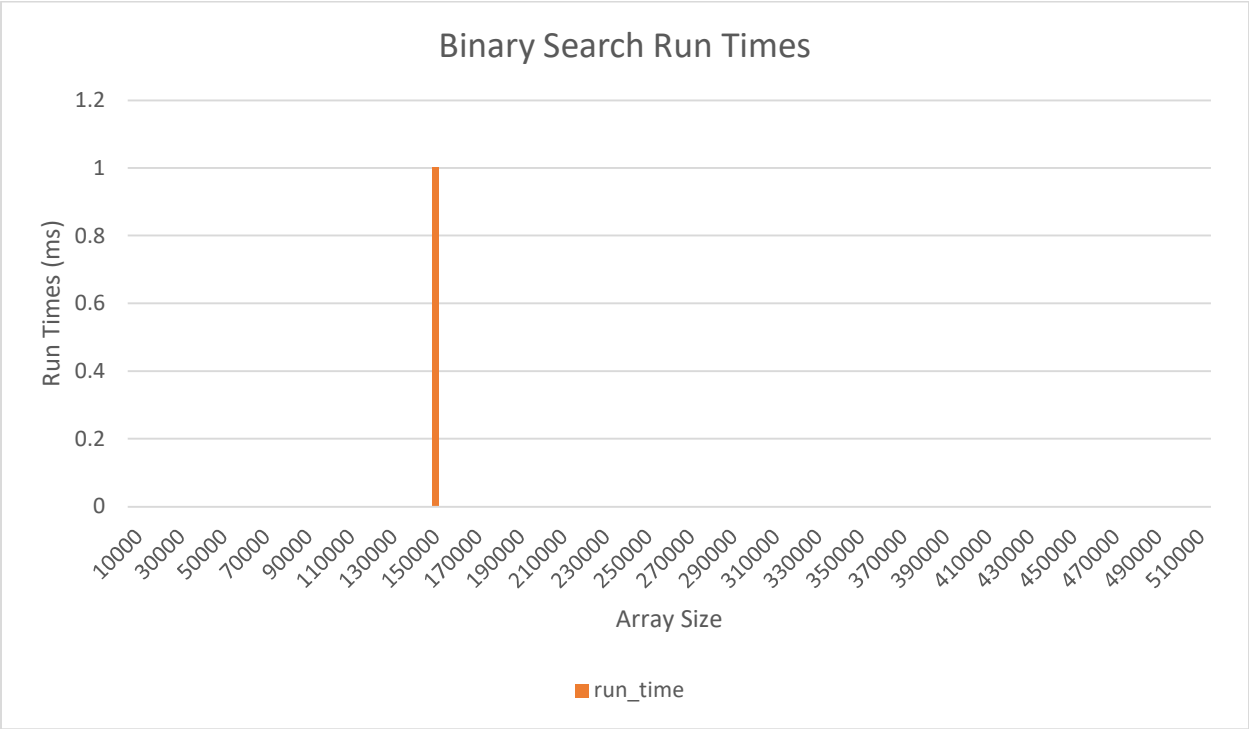
## Results

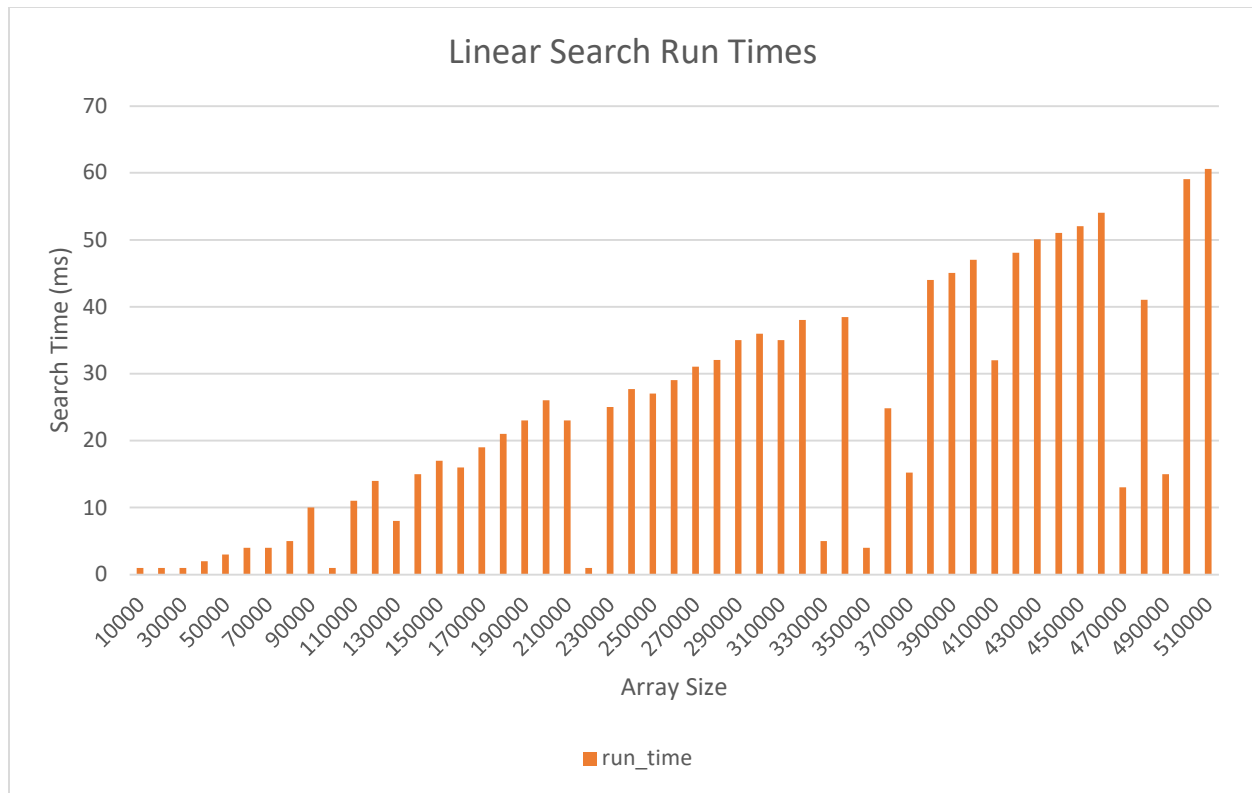
*Minimum Size = 10, Maximum Size = 10000, Step Size = 100, Number of Trials = 50*





*Minimum Size = 10000, Maximum Size = 1000000, Step Size = 10000, Number of Trials = 50*





## Discussion

The Big-O efficiency of the binary search algorithm is  $O(\log n)$  which is a lot more efficient than the linear search algorithm that has an efficiency of  $O(n)$ . This can be seen in the results of the tests where the binary search algorithm is so efficient that most of the test cases has a run time less than a millisecond which shows up as 0 milliseconds. Meanwhile in the linear search algorithm tests you can see that the run time is significantly higher than the binary searches. This shows the difference in the efficiency between each of the two algorithms.