

**OKAN
YILDIRIM
150160537**

ITU FACULTY OF COMPUTER AND
INFORMATICS ENGINEERING,
AYAZAĞA-ISTANBUL/TURKEY
MOBILE NUMBER: +90 544 207 2762
E-MAIL: oknyldrm95@gmail.com

Doctor Damien Jade DUFF
Istanbul Technical University
Maslak, Istanbul, 34469
Sunday, 21 May, 2017

Subject: Final Report of Experimental Analysis of Searching Algorithms
To whom it may concern:

The following letter informs you about results of our project for BLG 374E course. As you remember, we have been researching and analyzing searching algorithms that are vital subject of today's digital world. We have focused on three fundamental searching algorithms: Linear Search, Binary Search and Hash Table. Our aim is to find which algorithms is better than the others in terms of time. We completed our task and achieved a result on date as planned.

As our method, we do researches related to these three searching algorithms and analyze their performance asymptotically in order to foresee the result scientifically. Then, each team member implement a searching algorithm by using C++ programming languages, which is familiar to us. We do experiment on 1K, 10K, 100K, 1M string sample data and measure time for best, average and worst cases. Each team member is responsible for an operating system to test performance of algorithms on variety environment. Our aim is not to test which operating system is better than the others yet, just we want to show that result is the same for each various environment. In other words, performance of the algorithms do not depend on environment. Used operating system are Linux, Windows and OS-X. After the experiments, we create tables and graphics for all cases and algorithms. We compare them based on their average case performance and see that result is consistent with our asymptotic analysis. Summary of a result is given below:

Result

1. Theoretical Analysis

Asymptotical analysis result is given below:

	Linear Search	Binary Search	Hash Table
Time complexity	$Q(n)$	$Q(\lg n)$	$Q(1)$

Table1 Asymptotical Analyze Result

Asymptotically,

$$Q(n) > Q(\lg n) > Q(1)$$

So that Linear Search takes more time the others and Hash Table has best performance on searching.

2. Experimental Analysis

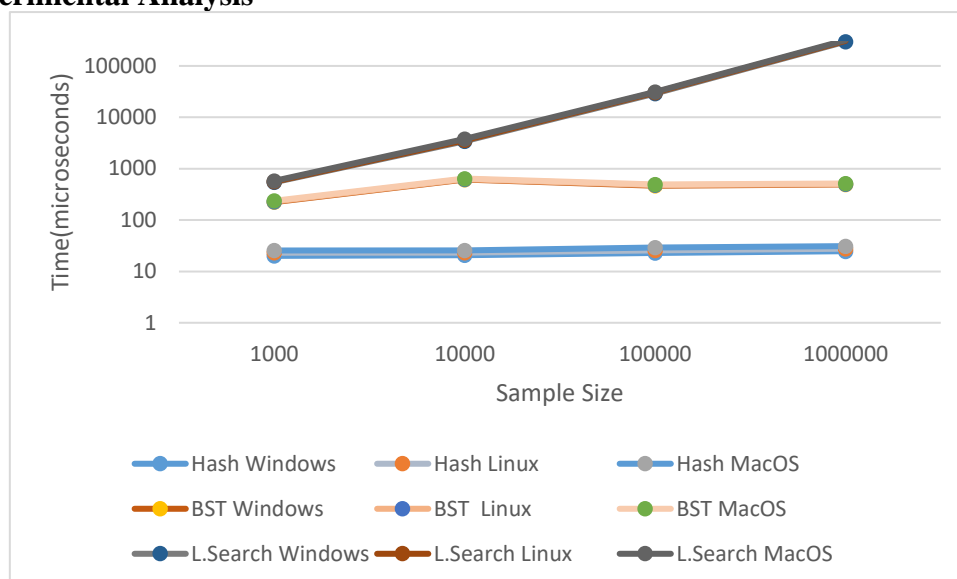


Figure 1 Comparison chart of Average Cases these three searching algorithms overall.

As seen in the Figure 1 performance of Hash Searching best and Linear Search is slowest on all environment and experimental analysis is consistent with the theoretical analysis.

Thank you for taking the time to consider our project. I am excited to get your feedbacks. My enclosed project report will provide you with attachment. I am sure you will be pleased with our study.

Yours sincerely,

Okan YILDIRIM

Attachment:

- ✓ Project Report
- ✓ Codes of three searching algorithms (source files as with extension cpp)
- ✓ Screenshots of results on computer for all three operating system
- ✓ Study of Tables and Graphics as a spreadsheet program
- ✓ Sample Data Set