

COMP 314: Algorithms and Complexity

Lab work 1: Searching

1 Purpose

Implementation, testing and performance measurement of linear search and binary search algorithms.

2 Tasks

Students are required to accomplish the following tasks preferably in Python.

1. Implement linear and binary search algorithms.
2. Write some test cases to test your program.
3. Generate some random inputs for your program and apply both linear and binary search algorithms to find a particular element on the generated input. Record the execution times of both algorithms for best and worst cases on inputs of different size (e.g. from 10000 to 100000 with step size as 10000). Plot an input-size vs execution-time graph.
4. Explain your observations.

3 Readings

1. For search algorithms: Chapter 5 of Necaise, R. D. (2010). Data Structures and Algorithms Using Python.
2. For algorithm analysis and performance measurement: Chapter 1 of Horowitz et al. (2013). Fundamentals of Computer Algorithms.
3. For unit testings: <https://docs.python.org/3.12/library/unittest.html>