

# COMP 314: Algorithms and Complexity

## Lab work 2: Sorting

### 1 Purpose

Implementation, testing and performance measurement of sorting algorithms.

### 2 Tasks

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

1. Implement the following sorting algorithms:
  - (a) Insertion sort
  - (b) Merge sort
2. Write some test cases to test your program.
3. Generate some random inputs for your program and apply both insertion sort and merge sort algorithms to sort the generated sequence of data. Record the execution times of both algorithms for best and worst cases on inputs of different size. Plot an input-size vs execution-time graph.
4. Explain your observations.

Students are suggested to use GitLab to keep their programs. Naming convention for GitLab project: CE.III.(Roll\_No).Lab2

### 3 Readings

1. For sorting algorithms: Chapter 5 and 12 of Nease, 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/2/library/unittest.html>
4. For Git: <http://www.vogella.com/tutorials/Git/article.html>