

CS 215 - Programming Assignment 1

Insertion Sort Analysis

Winter 2015 due January 1, 2015

Be sure to read the Programming Requirements and Grading document when turning in your assignment. This is an individual assignment; you must work alone.

In this lab we will use the actual machine to validate our run-time complexity analysis and asymptotic run-time complexity analysis by comparing worst case, best case, and average case run times for Insertion Sort. You should implement the algorithm within a sorting class and then plot its time behavior as a function of n and compare this with plots of the expected behavior.

Some questions to think about and address:

- What size n_0 is required to begin to exhibit asymptotic complexity?
- What inputs are required to generate “average” complexity? How about “best” and “worst” case?
- How does measured run time correspond to operation counts that we use in abstract complexity analysis? Are you counting the same thing?
- How do you create your test driver so that it exercises your programs?
- How to create the sorting class so that it will be extensible and re-usable for future projects. (You will be adding more sorts and sorting different types of data.)

To be effective in this assignment you should read and understand Chapter 2, sections 2.1 and 2.2 thoroughly.

Grading:

- Motivation and Background writeup - 15%
- Procedures writeup
 - 5% Pseudocode with Invariants, pre-conditions, and post conditions
 - 5% Correct Program Headers and documentation
 - 5% Implemented Pre/Post conditions in program
 - 15% Implemented Invariants in program
- Testing Plan and Test Results - 10%
- Correctness of program - Does it meet its post condition and does the program produce the required results? - 25%
- Problems Encountered - 5% (List of problems and how they were solved.)
- Experimental Analysis and Conclusion

NOTE: If you do not attach your actual code as an Appendix, I cannot effectively grade your work. If you attach your code in a poor format, it will lower your grade. I suggest using a text editor to print part of your code (a small section) to insure that the format is readable before you print the entire program. Any files, such as class files, needed to understand and run your program should be included in the Appendix.