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BLG 335E: Analysis of Algorithms I Project 1 Report

Compiling & running:

- To compile:
    - g++ csvRow.cpp csvRow.h main.cpp -std=c++11
- To run:
    - ./a.out –algo A –feature F –size N
        - A = 'm' for merge sort, 'i' for insertion sort
        - F = 'p' for last_price, 't' for time_stamp;
        - N = number of lines.
        - (without single quotation marks);

a. Asymptotic upper bounds:

- i. Merge Sort:
    - O(n*logn)
    -
        1. It takes log2(n) steps to divide the input,
        2. log2(n) + 1 quotients.
        3. It takes n steps to merge,
        4. So c*n*(log2(n) + 1)
        5. = cnlog(n) + cn
        6. Then it is O(nlogn).
- ii. Insertion Sort:
    - O(n^2)

b. Running each algorithm 10 times for each N:

N	1 000	10 000	100 000	916 721
Merge Sort	0.006559	0.035153	0.706477	10.272594
Insertion Sort	0.014024	0.941159	303.464996	

c. Plot lines:

Merge Sort and Insertion Sort