EE3980 Algorithms

Homework 5. Trading Stock

Due: Apr. 12, 2020

It was shown that both Algorithms (3.1.12) and (3.1.13) can be used to find the maximum earning for one-buy-one-sell stock trading. In this homework please implement both algorithms to compare their performance.

The history of Google stock (GOOGL) closing price is given in 9 files, `s1.dat` - `s9.dat`. Again the first line of each file contains the number of data entries in that file. Followed by the date and the closing price of that day. Assuming only one buy and one sell is performed, using the maximum subarray algorithms, please find the buying day and the price, the selling day and the price, and the earning made per share. A typical program output is as following.

```
$ a.out < s1.dat
N = 16
Brute-force approach: time 1.19209e-06 s
  Buy: 2004/8/19 at 100.335
  Sell: 2004/8/23 at 109.4
  Earning: 9.065 per share.
Divide and Conquer: time 2.41041e-07 s
  Buy: 2004/8/19 at 100.335
  Sell: 2004/8/23 at 109.4
  Earning: 9.065 per share.
```

Note that the CPU time is also measured for both algorithms. However, Algorithm (3.1.12) is executed only once, but Algorithm (3.1.13) is executed 1000 times to get the average CPU time.

Notes.

1. One executable and error-free `C` source file should be turned in. This source file should be named as `hw05.c`.

2. A `pdf` file is also needed. This report file should be named as `hw05a.pdf`.

3. Submit your `hw05.c` and `hw05a.pdf` on EE workstations using the following command:

   `$ ~ee3980/bin/submit hw05 hw05.c hw05a.pdf`

   where `hw05` indicates homework 5.

4. Your report should be clearly written such that I can understand it. The writing, including English grammar, is part of the grading criteria.

5. Since the date (year, month, day) and price information should be kept for the program, it is recommended to use the structure as following.

```
typedef struct sSTKprice {
    int year, month, day;
    double price, change;
} STKprice;
```