

## Programming Assignment 4

Write a program to practice reading data from files and working with functions that take arrays as parameter.

A data set recording daily stock price of a company is given (downloaded from Yahoo Finance). You are asked to write a program that

- \* Read the data from the file, and store the date and opening price into two arrays separately.

- \* Report the highest open price, the lowest open price. (For extra credits, also reports the dates when the highest/lowest price occurred.)

- \* Report the average open price (over all dates as listed in the data set)

- \* Report the largest increase in opening price in two consecutive days (For extra credits, also report which two dates yielded this largest jump in opening price).

### Requirement:

1. Write a function that returns the index of the smallest value in an array of doubles.

```
// return the index of the smallest value in array numbers[s...e]
// i.e., we are looking at the subarray that starts at index s, end ends at index e
// precondition: s<=e, numbers[s ...e] has been initialized
// postcondition: the index of smallest value in the above subarray is returned
// if there is a tie, we return the smaller index
int IndexOfSmallest (double numbers[ ], int s, int e)
```

2. Write a function that returns the index of the largest value in an array of doubles

3. Write a function that calculates and returns the average of numbers stores in a double array, allow the caller to specify the part of array to calculate (i.e., by passing the starting and ending indices of the sub-array).

4. Write a function that returns the indices of two consecutive numbers in a array of doubles, such that they represents the largest jump in two days in the data.

5. Test your program using the given data set. You can use the following command to copy the file:

```
cp ~zhang/public_html/cs2000/Data/GOOG.txt .
cp ~zhang/public_html/cs2000/Data/MSFT.txt .
cp ~zhang/public_html/cs2000/Data/TSLA.txt .
```

**(Note the last dot in the commands above).**

### Codebase:

You can copy the following code base that reads the file and saves the price into an array. The codebase was discussed during lab section.

```
#include <iostream>
#include <ifstream>
using namespace std;

//Todo: declare your functions here.
int main()
{
    ifstream input;
    char fileName[256];

    cout <<"Enter the name of the file to be analyzed:";
    cin >> fileName;

    input.open (fileName);
    if (input.fail()){
        cout <<"File "<< fileName << " cannot be opened.";
        exit(1);
    }

    const int MAX_SIZE=100;
    double p[MAX_SIZE];
    string date, junk;

    int i=0;
    do {
        input>>date>>p[i]>>junk;
        cout <<date<<" " << p[i]<<endl;

        i++;

        if (input.eof()) //ignore the last attempt to read which set eof to true
```

```
        i--;  
    } while (!input.eof());  
    int len=i; ## of elements in array p  
}
```

### Extra Credit:

1. In your main function, writes the output of the report (i.e., highest, lowest price, and average, and consecutive dates with largest jump) into a file named "output.txt".

2. Read this tutorial about command line arguments

<https://ece.uwaterloo.ca/~dwharder/icsrts/C/05/>

I suggest that you copy the code example and play with it first. Note that `printf()` is just the library function for writing to standard output. You can replace them with `cout<<` statement.

Then, you can modify your main function, so that if the user passes any argument (i.e., if `argc>=1`), it uses `argv[1]` as the input file name; otherwise, prompt the user to enter the file name (as shown in the codebase above).

If your executable file is named `a.out`, you can run the program as follows to specify the file to analyze.

```
./a.out GOOG.txt
```

or

```
./a.out MSFT.txt
```

or

```
./a.out TSLA.txt
```