

COMP2710: Homework 4

Due 11:59 Apr.12th

Points Possible: 100

Note: You do not need to submit hard copies.

Goals:

- To learn streams and file I/O
- To learn how to use tools for stream I/O
- To use arrays to group data elements
- To design and implement functions (Note: this topic was covered in Homework 3)
- To perform unit testing
- To design a simple algorithm

Write a program that merges the numbers in two files and writes all the numbers into a third file. Your program takes input from two different files and writes its output to a third file. Each input file contains a list of numbers of type int in sorted order from the smallest to the largest. After the program is run, the output file will contain all the numbers in the two input files in one longer list in sorted order from smallest to largest.

```
*** Welcome to Zijie Zhang's sorting program ***
Enter the first input file name: input1.txt
The list of 4 numbers in file input1.txt is:
3
7
9
12

Enter the second input file name: input2.txt
The list of 6 numbers in file input2.txt is:
4
6
8
11
16
23

The sorted list of 10 numbers is: 3 4 6 7 8 9 11 12 16 23
```

Your program must follow the above user interface

The filename of the output file should be `output.txt`

Design Issues:

Please do NOT intend to implement this project using a single main() function.

You need at least three functions to implement this project. The suggested functions are:

```
1. array_size <- readfile(inputArray[], instream)
2. outputArray_size <- sort(inputArray1[], inputArray1_size,
    inputArray2[], inputArray2_size, outputArray[])
3. void <- writefile(outputArray[], outputArray_size)
```

Integration Testing:

Integration testing (a.k.a., Integration and Testing) is the phase in software testing in which individual software modules are combined and tested as a group. You may use the attached two input files to test the correctness of your program as an entire system.

Requirements:

1. (5 points) Use comments to provide a heading at the top of your code containing your name, Auburn Userid, filename, and how to compile your code. Also describe any help or sources that you used (as per the syllabus).
2. (5 points) Your source code file should be named as "hw4_AUID.cpp" i.e. hw4_zzz0092.cpp
3. (10 points) The name of your output file should be **output.txt**
4. (5 points) Your program must test if files have been correctly opened.
5. (5 points) You must close files after using them.
6. (10 points) Your program should read and display numbers stored in the two input files.
7. (20 points) Your program should sort and display the numbers.
8. (20 points) Your program should correctly write the sorted list to the third file.
9. (10 points) You must define at least three functions.
10. (5 points) Usability of your program (e.g., user interface)
11. (5 points) Readability of your source code.

Note: You will lose **at least 40 points** if there are compilation errors or warning messages when the TA compiles your source code. You will lose points if you: do not use the specific program file name, or do not have a comment on each function in your program you hand in.

Programming Environment:

It is your responsibility to ensure that your code **compiles and runs as intended on AU servers**

Sample Code 1:

The following code shows you how to use arrays and their sizes as input parameters of functions.

```
//Sample code for Homework 4
#include <fstream>
#include <iostream>
using namespace std;

const int MAX_SIZE = 100;

//Input: (1) Array storing data retrieved from the file (i.e.,
//        instream)
//        (2) input file stream object
//Output: Size of array. Note: you need to use this parameter to
//        control the array size.
int readfile(int inputArray[], ifstream& instream);

int main( )
{
    ifstream inStream1;

    int iArray1[MAX_SIZE];
    int iArray1_size;
    int iArray2[MAX_SIZE];
    int iArray2_size;

    inStream1.open("input1.txt");

    iArray1_size = readfile(inputAry, inStreamFirst);

    inStreamFirst.close( );

    return 0;
}

int readfile(int inputArray[], ifstream& inStream){
    int index;

    inStream >> inputArray[index];
    while (! inStream.eof()) {
        cout << inputArray[index] << endl;
        index++;
        inStream >> inputArray[index];
    }

    return index;
}
```

Sample Code 2:

The following code shows you (1) how to retrieve a file name from your keyboard, (2) how to open a file, and (3) how to read data from the file.

```
#include <fstream>
#include <iostream>
#include <cstdlib> //for exit()
using namespace std;
```

```
int main( )
{
    ifstream inStream;
    int data;

    cout << "file name:";
    cin >> filename;
    cout << "entered filename is:" << filename << endl;

    //Pass the file name as an array of chars to open()
    //    inStream.open(filename);
    inStream.open((char*)filename.c_str());

    if (inStream.fail()) {
        cout << "Input file opening failed." << endl;
        exit(1);
    }

    inStream >> data;
    while (!inStream.eof()) {
        cout << data << endl;
        inStream >> data;
    }
    inStream.close( );

    return 0;
}
```

Deliverables:

- Submit your source code file named as “hw4.cpp” through the Canvas system.

Late Submission Penalty:

- Late submissions are not accepted and will result in a **ZERO** without valid excuses.
- GTA/Instructor will not accept any late submission caused by internet latency

Rebuttal period:

- You will be given a period of 3 business days to argue for your grade.