Homework 1

100 Points

One Dimensional Arrays

22B_H_1A.cpp – Binary Search: Find and fix errors
22B_H_1B.cpp – Insertion Sort: Find and fix errors
Pr8-3_BinS.cpp – Binary Search: Code Review
22B_H_1C.cpp – Search a Sorted List of Strings

Project: Searching a Sorted List of Strings using Binary Search

The input file students.txt contains up to 5000 lines. On each line there is a student identification code (a unique identifier) followed by the student's gpa and major. You may assume that the data in the input file are sorted by the student ID as shown below:

```
12AB1 3.2 Communications
2ABCD 2.5 Marketing
333XY 3.9 Computer Science
516BC 2.8 Biology
```

Create the input file using data on the next page. Read data from file into three parallel arrays. Use arrays of maximum size 5000. In case the input file contains more than 5000 lines, print an error message such as "The file contains more than 5000 lines!" and terminate the program.

Change the Binary Search function to search the parallel arrays, then test it in a loop as it is shown in **Program 8-3**. Prompt the user to enter a student ID, such as **2ABCD** then call the Binary Search function to search for **2ABCD**. If found, display the gpa and major, otherwise display an error message. Keep track of the number of searches for each student in another array. When done searching, write the arrays to an output file named out.txt, as shown below.

```
2 12AB1 Communications (3.2)
0 2ABCD Marketing (2.5)
5 333XY Computer Science (3.9)
0 516BC Biology (2.8)
```

The first number on the first line, 2, shows that there were 2 searches for **12AB1**, the first number on the second line, 0, shows that there were 0 searches for **2ABCD**, and so on.

Grading

Program 1A	– 15Points
Program 1B	– 20
Program Pr8-3_BinS	– 10
Program 1C	– 50
Self Assessment Report	– 5

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Grading Program 1C – 50

Read data from file into arrays	– 10Points
Binary Search	– 10
Test Binary Search (loop)	– 10
Create the new array (frequency array)	– 10
Write arrays to a file	– 10

Run each program once and save the output at the end of the source file as a comment. Compress the source files, input and output files (if any), and the report, and upload the compressed file: 22B_LastName_FirstName_H1.zip

Self Assessment Report: Write a short report, (see 22B_H_1Report.doc form) briefly explaining your code and containing an assessment of your implementation based on the above grading criteria.

Create the input file students.txt using the following data:

```
111AB 4.0 Business Administration
12AB1 3.2 Communications
134EK 3.7 Political Science
2ABCD 2.5 Marketing
333XY 3.9 Computer Science
516BC 2.8 Biology
516BC 3.1 Nursing
9QWE9 3.4 Psychology
AC234 3.9 Marketing
AJ222 3.2 Computer Science
AK323 3.1 Political Science
DH232 4.0 Elementary Education
DR123 2.7 Criminal Justice
JP200 3.8 Nursing
SW111 4.0 Criminal Justice
TY4XZ 2.3 Business Administration
```