Project 2: CSC 24400
Student Records
Due: Tuesday, February 6, 2018 at 11:59 p.m.

Description:

For your second programming assignment, you are to write a program to open and read input files which contain an unknown number of records and process the student data in accordance with the instructions given below. Your program is to be modularized with functions to sort, print, and read. It is also to include any other functions you deem necessary.

INPUT:

The input file for this program consists of an unknown number of records (You may assume a <u>maximum</u> of 100 records in the data file). Each record will consist of two lines of data. The first line will contain a Student's ID Number which will be an integer. The second line will contain **four (4)** test scores of type float. A negative value for the Student's ID Number will act as the sentinel, indicating the end of input. If there are entries after the sentinel, they should be ignored by your program. The input file name will be **data2.txt**.

PROCESSING:

You will need to create 4 parallel arrays as follows:
1. An integer array of size 100 to hold the student IDs.
2. An 2 dimensional double array of size [100][4] (that's 100 rows with 4 columns in each row).
3. An double array of size 100 to hold the student's average score.
4. An character array of size 100 to hold the student's letter grade (a single char each).

You should initialize all numeric array entries to -1. You should initialize the character array to hold a space character.

The processing steps are:
1) Read all the data from the input file into the appropriate array elements.
2) **After** reading in **all** the data, the program is to print the list of student IDs and all their test scores (in other words, print out the contents of the first 2 arrays).
3) After this information is printed, the program is to **sort** the listing of students (and their test scores), by student ID number from high to low, and print the list again.
4) The program is then to calculate the student's test average and the associated letter grade for each student, and store the average and letter grade into the appropriate array. The letter grade is to be one of the five standard letter grades of A, B, C, D, or F. The letter grade should be calculated using the grading scheme found in the course syllabus.
5) The program should then print the student information (ID, test scores, average score, and letter grade) for each student.
6) Using the test score average as the "key", the program is then to sort the student information in the order of highest test average to lowest test average.
7) The program is then to print a final list of the student IDs, their test scores, averages, and course grade.

Note: You should have two print functions. The first will print the student IDs and the test scores. The second print function will print the contents of all four arrays.

OUTPUT:

For this project, all output should be generated to the screen. The output for this program is to consist of a listing of the student information according to the sample output. Output may begin in any column. All output must be properly labeled and be in an easy to read format. All test scores are to have 1 decimal point accuracy, while the <u>average of the test scores</u> is to have 2 decimal place accuracy. Course grades are to be uppercase letters. A message such as **END OF PROGRAM OUTPUT** must appear after all information has been printed.

SAMPLE Input: Suppose **data4.txt** looked like this:

```
5601
66.7 83.4 88.8 72.1
8202
44.0 90.5 83.2 79.2
3303
93.5 72.6 80.9 96.5
4104
99.6 88.6 94.6 92.7
9905
62.3 70.2 55.5 50.3
1206
80.9 90.7 85.1 87.4
7307
70.2 70.4 75.7 78.3
-999
```

Then your output should look something like this:

```
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Fall 2017 Assignment #1
---------------------------------------------------------------------


The original student data is:
Student ID     Test 1  Test 2  Test 3  Test 4
------------   ------  ------  ------  ------
   5601         66.7    83.4    88.8    72.1
   8202         44.0    90.5    83.2    79.2
   3303         93.5    72.6    80.9    96.5
   4101         99.6    88.6    94.6    92.7
   9905         62.3    70.2    55.5    50.3
   1206         80.9    90.7    85.1    87.4
   7307         70.2    70.4    75.5    78.3
```

```
The list of students sorted by ID Number high to low is:
Student ID      Test 1   Test 2   Test 3   Test 4
------------    ------   ------   ------   ------
    9905         62.3     70.2     55.5     50.3
    8202         44.0     90.5     83.2     79.2
    7307         70.2     70.4     75.5     78.3
    5601         66.7     83.4     88.8     72.1
    4101         99.6     88.6     94.6     92.7
    3303         93.5     72.6     80.9     96.5
    1206         80.9     90.7     85.1     87.4


The list of students with their test average and course grade is:
                                                    Test      Course
Student ID      Test 1   Test 2   Test 3   Test 4   Average   Grade
------------    ------   ------   ------   ------   -------   ------
    9905         62.3     70.2     55.5     50.3     59.58      F
    8202         44.0     90.5     83.2     79.2     74.23      C
    7307         70.2     70.4     75.5     78.3     73.60      C
    5601         66.7     83.4     88.8     72.1     77.75      C
    4101         99.6     88.6     94.6     92.7     93.88      A
    3303         93.5     72.6     80.9     96.5     85.88      B
    1206         80.9     90.7     85.1     87.4     86.03      B


The list of students sorted by test average high to low is:
                                                    Test      Course
Student ID      Test 1   Test 2   Test 3   Test 4   Average   Grade
------------    ------   ------   ------   ------   -------   ------
    4101         99.6     88.6     94.6     92.7     93.88      A
    1206         80.9     90.7     85.1     87.4     86.03      B
    3303         93.5     72.6     80.9     96.5     85.88      B
    5601         66.7     83.4     88.8     72.1     77.75      C
    8202         44.0     90.5     83.2     79.2     74.23      C
    7307         70.2     70.4     75.5     78.3     73.60      C
    9905         62.3     70.2     55.5     50.3     59.58      F



      ----------------------------------
     |       END OF OUTPUT              |
      ----------------------------------
```

Project Submission:
      Create a .zip file containing your .cpp and .h files ONLY (do not include executables or object files please – these take large amounts of disk space). Submit your .zip file to the project submission tool on the Canvas course web page for this assignment. **All submissions must be received by 11:59 p.m. the day they are due in order to receive full credit.**