**CSCI 1470 Final Programming Project (225 points)**

**Fall 2015: An Exam Grading and Reporting System**

**Executive Summary:**

In this project, you are asked to design, develop, implement, and test a prototype (a model) for an exam software system. This exam is administered to students graduating with a degree in Social Science who would like to enter the Graduate Program. The students’ must pass this exam to be admitted into the Graduate Program. The basic requirements for such a system include the following:

1. **Student Registration**: Students taking the exam are entered into the grading system via an input file. The file contains the students’ names, ID numbers, and answers to a multiple choice exam.
2. **Grading:** The user enters an “Answer Key” and then the system grades the students’ answers and calculates the students’ total points, average, and letter grade earned;
3. **Grade Reporting:** The system generates a report ***(in ascending order)*** of each student’s name, ID number, exam answers, total points, average and letter grade earned;
4. **Analysis Reporting**: The system produces reports (in ascending order) that include the names and graded results of the students who made an A, B, or C (***full admission into the program***), the names and graded results of the students who made a D (***conditional admission into the program***), and the names and graded results of the students who failed (F – ***not admitted to the program***);
5. **Searching**: The system is able to find and report a specific student’s results based on the student’s ID entered by the user.

**Due Dates and Honor:**

This project will be due by ***3:00 pm*** on ***Friday, December 4, 2015***. This is a *Programming Project*, and it is very important that you understand and abide by the policy concerning programming projects. You are required to complete this assignment ***independently***. If you need help, you should consult with the lab assistants or your instructor only. Remember, your personal honor and integrity are far more important than your grade on a project.

**Detailed Specification:**

1. **Student Registration:**

The system will read the students’ ID number (***an integer***), full name (***name will be the format: last name, first name)***, and the students’ 5 multiple choice answers from an input file provided.

1. **Grading:**

The exam consists of 5 multiple-choice questions. The answer key is entered by the user. Valid choices for each of the exam question are A, B, C, or D.

The grading rules are specified as follows: Each correct answer counts 10 points in raw score. The percentile score is the quotient between the total raw score received and the maximum possible. The percentile score is converted to a letter grade: A (90% above), B (80-89%), C (70-79%), D (60-69%), and F (59% and below).

1. **Grade Reporting:**

A report will be produced, ***sorted by name***, displaying all the students’ information. (See the report in the ***Sample Input/Output*** section.)

1. **Analysis Reporting:**

Three separate reports will be produced, ***sorted by name***, and grouped in the following categories:

1. ***Admitted into the Graduate Program***;
2. ***Conditional Admission***;
3. ***Admission Denied***.

(See the report in the ***Sample Input/Output*** section.)

1. **Searching:**

Allow the user to search for a particular student ID and display the name, total points, average, and letter grade earned by that student. If the ID of the student entered does not exist, then inform the user that the student did not take the exam.

**Solution Design:**

**Function decomposition**: accomplish each specified task with well designed modular functions.

**Solution integration**:integrate the modules into a prototype (a working model) for an exam software system.

**Validation:** Perform data validation where necessary. All coding standards should be followed.

**What to submit and how it will be graded:**

* ***Detailed Design Phase (25 points):*** A design using pseudocode, flowchart, or hierarchy chart. Due Monday, November 30, 2015
* ***Develop, Implement, and Test (200 points):*** You will only submit the tested integral prototype with full functionality if you completed them successfully. Otherwise, you may submit a solution with partial functionalities. ***This means you will submit your solution for the highest numbered step that actually works.*** For example, if you had a working solution to Step 3, but only a partially complete solution to Step 4, you would submit your Step 3 solution. Each of the five required functionalities is worth 40 points for a total of 200 combined points.

***Sample Input/Output***

Enter the answer key.

 Answer 1: ? A

 Answer 2: ? C

 Answer 3: ? D

 Answer 4: ? C

 Answer 5: ? A

 Grading Report

 Student ID Student Name Answers Total Pts Average Letter Grade

878 Adams, Jerry A C D C A 50.0 100.0 A

 44 Ball, Lee A B D C A 40.0 80.0 B

 666 Dunn, Roberta A B D C A 40.0 80.0 B

 88 Hall, Bill A C D A B 30.0 60.0 D

 55 Hill, Nathan A C B A B 20.0 40.0 F

111 Jones, Paula A C D C A 50.0 100.0 A

 333 Land, Chris C D B C A 20.0 40.0 F

998 Miles, Sue A C D B B 30.0 60.0 D

66 Rowe, Steve A C D C A 50.0 100.0 A

22 Smith, Mary A C D B A 40.0 80.0 B

Students Admitted to the Graduate Program:

Student ID Student Name Total Pts Average Letter Grade

878 Adams, Jerry 50.0 100.0 A

44 Ball, Lee 40.0 80.0 B

666 Dunn, Roberta 40.0 80.0 B

111 Jones, Paula 50.0 100.0 A

66 Rowe, Steve 50.0 100.0 A

22 Smith, Mary 40.0 80.0 B

Students with Conditional Admission to the Graduate Program:

Student ID Student Name Total Pts Average Letter Grade

88 Hall, Bill 30.0 60.0 D

998 Miles, Sue 30.0 60.0 D

Students Not Allowed Admission:

Student ID Student Name Total Pts Average Letter Grade

55 Hill, Nathan 20.0 40.0 F

333 Land, Chris 20.0 40.0 F

Would you like to search for a particular student to display their grade (1 for yes or 0 for no)? 1

Enter the ID of the student to search for: 44

Student ID Student Name Total Pts Average Letter Grade

44 Ball, Lee 40.0 80.0 B

Would you like to search for another student to display their grade (1 for yes or 0 for no)? 1

Enter the ID of the student to search for: 777

\*\*\* This student did not take the exam. \*\*\*

Would you like to search for another student to display their grade (1 for yes or 0 for no)? 0

Would you like to process another group of students (1 for Yes or 0 for No)? 0

Programming Ending!

contents of student.txt file

878 Adams, Jerry

 A C D C A

44 Ball, Lee

 A B D C A

666 Dunn, Roberta

A B D C A

88 Hall, Bill

 A C D A B

55 Hill, Nathan

A C B A B

111 Jones, Paula

 A C D C A

333 Land, Chris

 C D B C A

998 Miles, Sue

 A C D B B

66 Rowe, Steve

 A C D C A

22 Smith, Mary

 A C D B A