Barthelemy Peter

bapeter

CS1300 <AB>

Program 4

Gradebook

Due Date: 4/21/17

**Design Document**

Design and implement a program that takes user input from a text file that inputs student identification and course scores. Scores should then be manipulated to calculate the weighted final score and the final score should be used to find the course grade.

**Calculations**

Weighted score per category

* (Sum of all grades in category) \*(weight of category)

Score to grade conversion

* If… if else statements which set domains per grade category
* String value-returning function

Best of Three exam grades

* Find the lowest score percentage of all the exams
* Subtract the lowest score percentage from total score percentage
* Divide the new total score percentage by 200

Final Course Score

* **\*NOTE\*** Do not treat course weight as a percentage
* (Course score\*course weight+.…repeat)/ (100)

**Pre-conditions:**

* User input comes from a text file
* Program restricts user input
* Information for 5 students are provided
* Data input is accurate
* A program structure is used to store user data
* Best 2 of 3 exams can be found

**Post-conditions:**

* Final course score and course grade are displayed and labeled
* Output is easy to follow
* Output accurately grades student’s work
* Students’ information is displayed separately and legibly

**Source Code**

//Barthelemy Peter

// 4-27-17

// Gradebook

// Info read in from a text file

//Output student first and lastname (include ID #) grades and the percentage of the grade in each category and final grade

#include <iostream>

#include <fstream>

#include <string>

#include <iomanip>

using namespace std;

const string space= " ";

struct crsInfo

{

double SID;

string lName;

string fName;

string email;

double quizzes[7];

double exams[3];

double progs[5];

double final;

};

string grade\_check(double grade);

void capture(int num, string& fn, string& ln, double& ID, string& em, double qz[], double prog[], double ex[], double& fin);

void info(string& fn, string& ln, double& ID, string& em);

void results(double qz[],const int qztot[],double prog[],const int progtot[], double ex[],const int extot[], double& fin,const int fintot);

double pecentage(int num, double category[],const int total);

double Best\_of\_Three(double ex[],const int extot[]);

int main()

{

crsInfo student;

double course\_grade;

double qz\_percent;

double prog\_percent;

double exam\_percent;

double final\_percent;

double qz\_ans = 0;

double ex\_ans = 0;

int prog\_ans = 0;

int fin\_ans = 0;

const int quiz\_total[7]= {5, 50, 5, 18, 20, 16, 10};

for(int i = 0; i < 7; i++)

qz\_ans += quiz\_total[i];

const int exam\_total[3]={100, 100, 20};

for(int j = 0; j < 3; j++)

ex\_ans += exam\_total[j];

const int prog\_total[5]= {20, 20, 20, 20, 20} ;

for(int k = 0; k < 5; k++)

prog\_ans += prog\_total[k];

const int final\_total = 200;

fin\_ans = final\_total;

char border = ' ';

const string space = " ";

cout << setfill(' ');

cout << endl << setw(30)<< "WELCOME TO THE GRADEBOOK"<< endl << endl;

cout << setw(11) << "Programs " << setw(24) << "30% of grade"<<endl;

cout << setw(19) << "Homework/Quizzes " << setw(16) << "25% of grade"<< endl;

cout << setw(18) << "Exams(best 2/3) "<< setw(17) << "25% of grade"<< endl;

cout << setw(8) << "Final "<< setw(27) << "20% of grade"<<endl;

cout << setfill('=');

cout << setw(37) << border << endl;

cout << setfill(' ');

cout << setw(7) << "Total" << setfill(' ') << setw(20) << "100%" << endl << endl;

cout << setfill('-');

cout << setw(65)<< border<< endl ;

cout << "Letter grades will be assigned according to the following scale"<< endl << endl;

cout << space << "A >= 93%, A- >= 89%, B+ >=86%, B >= 83%, B- >= 79%,"<< endl;

cout << space << "C+ >= 76%, C >= 73%, C- >= 69%, D >= 60%, F < 60%" << endl;

cout << setw(65)<< border<< endl << endl;

capture(1, student.fName, student.lName, student.SID,student.email, student.quizzes, student.progs, student.exams, student.final);

info(student.fName, student.lName, student.SID, student.email);

results(student.quizzes, quiz\_total,student.progs, prog\_total, student.exams , exam\_total, student.final, final\_total);

cout << endl;

qz\_percent = pecentage(7, student.quizzes,qz\_ans);

prog\_percent = pecentage(5, student.progs,prog\_ans);

exam\_percent = Best\_of\_Three(student.exams,exam\_total);

final\_percent = student.final/fin\_ans\*100;

course\_grade = (qz\_percent\*25+prog\_percent\*30+exam\_percent\*25+final\_percent\*20)/100;

cout << "Quiz Total = "<<qz\_percent <<"%" <<endl;

cout << "Program Total = " <<prog\_percent <<"%"<<endl;

cout << "Exam Total = " <<exam\_percent <<"%"<<endl;

cout << "Final Total = "<< final\_percent <<"%"<<endl<<endl;

cout <<space << space << "FINAL COURSE SCORE = "<<course\_grade<<"%";

cout <<space << space << "FINAL COURSE GRADE = "<<grade\_check(course\_grade)<< endl<<endl<<endl;

capture(2, student.fName, student.lName, student.SID,student.email, student.quizzes, student.progs, student.exams, student.final);

info(student.fName, student.lName, student.SID, student.email);

results(student.quizzes, quiz\_total,student.progs, prog\_total, student.exams , exam\_total, student.final, final\_total);

cout << endl;

qz\_percent = pecentage(7, student.quizzes,qz\_ans);

prog\_percent = pecentage(5, student.progs,prog\_ans);

exam\_percent = Best\_of\_Three(student.exams,exam\_total);

final\_percent = student.final/fin\_ans\*100;

course\_grade = (qz\_percent\*25+prog\_percent\*30+exam\_percent\*25+final\_percent\*20)/100;

cout << "Quiz Total = "<<qz\_percent <<"%" <<endl;

cout << "Program Total = " <<prog\_percent <<"%"<<endl;

cout << "Exam Total = " <<exam\_percent <<"%"<<endl;

cout << "Final Total = "<< final\_percent <<"%"<<endl<<endl;

cout <<space << space << "FINAL COURSE SCORE = "<<course\_grade<<"%";

cout <<space << space << "FINAL COURSE GRADE = "<<grade\_check(course\_grade)<< endl<<endl<<endl;

capture(3, student.fName, student.lName, student.SID,student.email, student.quizzes, student.progs, student.exams, student.final);

info(student.fName, student.lName, student.SID, student.email);

results(student.quizzes, quiz\_total,student.progs, prog\_total, student.exams , exam\_total, student.final, final\_total);

cout << endl;

qz\_percent = pecentage(7, student.quizzes,qz\_ans);

prog\_percent = pecentage(5, student.progs,prog\_ans);

exam\_percent = Best\_of\_Three(student.exams,exam\_total);

final\_percent = student.final/fin\_ans\*100;

course\_grade = (qz\_percent\*25+prog\_percent\*30+exam\_percent\*25+final\_percent\*20)/100;

cout << "Quiz Total = "<<qz\_percent <<"%" <<endl;

cout << "Program Total = " <<prog\_percent <<"%"<<endl;

cout << "Exam Total = " <<exam\_percent <<"%"<<endl;

cout << "Final Total = "<< final\_percent <<"%"<<endl<<endl;

cout <<space << space << "FINAL COURSE SCORE = "<<course\_grade<<"%";

cout <<space << space << "FINAL COURSE GRADE = "<<grade\_check(course\_grade)<< endl<<endl<<endl;

capture(4, student.fName, student.lName, student.SID,student.email, student.quizzes, student.progs, student.exams, student.final);

info(student.fName, student.lName, student.SID, student.email);

results(student.quizzes, quiz\_total,student.progs, prog\_total, student.exams , exam\_total, student.final, final\_total);

cout << endl;

qz\_percent = pecentage(7, student.quizzes,qz\_ans);

prog\_percent = pecentage(5, student.progs,prog\_ans);

exam\_percent = Best\_of\_Three(student.exams,exam\_total);

final\_percent = student.final/fin\_ans\*100;

course\_grade = (qz\_percent\*25+prog\_percent\*30+exam\_percent\*25+final\_percent\*20)/100;

cout << "Quiz Total = "<<qz\_percent <<"%" <<endl;

cout << "Program Total = " <<prog\_percent <<"%"<<endl;

cout << "Exam Total = " <<exam\_percent <<"%"<<endl;

cout << "Final Total = "<< final\_percent <<"%"<<endl<<endl;

cout <<space << space << "FINAL COURSE SCORE = "<<course\_grade<<"%";

cout <<space << space << "FINAL COURSE GRADE = "<<grade\_check(course\_grade)<< endl<<endl<<endl;

capture(5, student.fName, student.lName, student.SID,student.email, student.quizzes, student.progs, student.exams, student.final);

info(student.fName, student.lName, student.SID, student.email);

results(student.quizzes, quiz\_total,student.progs, prog\_total, student.exams , exam\_total, student.final, final\_total);

cout <<endl;

qz\_percent = pecentage(7, student.quizzes,qz\_ans);

prog\_percent = pecentage(5, student.progs,prog\_ans);

exam\_percent = Best\_of\_Three(student.exams,exam\_total);

final\_percent = student.final/fin\_ans\*100;

course\_grade = (qz\_percent\*25+prog\_percent\*30+exam\_percent\*25+final\_percent\*20)/100;

cout << "Quiz Total = "<<qz\_percent <<"%" <<endl;

cout << "Program Total = " <<prog\_percent <<"%"<<endl;

cout << "Exam Total = " <<exam\_percent <<"%"<<endl;

cout << "Final Total = "<< final\_percent <<"%"<<endl<<endl;

cout <<space << space << "FINAL COURSE SCORE = "<<course\_grade<<"%";

cout <<space << space << "FINAL COURSE GRADE = "<<grade\_check(course\_grade)<< endl<<endl<<endl;

return 0;

}

string grade\_check(double grade)

{

string alpha\_Val;

if(grade >= 93)

alpha\_Val = "A";

else if(grade >= 89)

alpha\_Val = "A-";

else if(grade >= 86)

alpha\_Val = "B+";

else if(grade >= 83)

alpha\_Val = "B";

else if (grade >= 79)

alpha\_Val = "B-";

else if (grade >= 76)

alpha\_Val = "C+";

else if (grade >= 73)

alpha\_Val = "C";

else if (grade >= 69)

alpha\_Val = "C-";

else if (grade >= 60)

alpha\_Val = "D";

else if (grade <= 60)

alpha\_Val = "F";

return alpha\_Val;

}

void capture(int num, string& fn, string& ln, double& ID, string& em , double qz[], double prog[], double ex[], double& fin)

{

ifstream inFile;

inFile.open("Grades.txt");

for(int r = 0; r < num; r++)

{

inFile >> fn >> ln >> ID >> em;

for(int i = 0; i < 7; i++)

inFile>> qz[i];

for(int j = 0; j < 5; j++)

inFile >> prog[j];

for(int k = 0; k < 3; k++)

inFile >> ex[k];

inFile >> fin;

}

inFile.close();

}

void info(string& fn, string& ln, double& ID, string& em)

{

cout << "Student's current information"<< endl << endl;

cout << "Student name: " << fn << " "<< ln << endl;

cout << "Student ID#: " << ID << endl;

cout << "Email address: " << em << endl << endl;

}

void results(double qz[], const int qztot[],double prog[],const int progtot[], double ex[],const int extot[], double& fin,const int fintot)

{

cout << "Quiz Scores"<< endl;

for (int i = 0; i < 7; i++)

cout << qz[i]/qztot[i]\*100 << space;

cout << endl;

cout << "Program Scores"<< endl;

for (int j = 0; j < 5; j++)

cout << prog[j]/progtot[j]\*100 << space;

cout << endl;

cout << "Exam Scores" << endl;

for (int k = 0; k < 3; k++)

cout << ex[k]/extot[k]\*100 << space;

cout << endl;

cout << "Final Exam Score" << endl;

cout << fin/fintot\*100 << space;

cout << endl;

}

double pecentage(int num, double category[],const int total)

{

double ans = 0;

for(int i = 0; i < num; i++)

ans += category[i];

return ans/total\*100;

}

double Best\_of\_Three(double ex[],const int extot[])

{

double ans[3];

double solution = 0;

double capture = 0;

for(int i = 0; i < 3; i++)

{

ans[i] = ex[i]/extot[i]\*100;

capture += ans[i];

}

for(int j = 0; j < 3; j++)

{

if (ans[j] < ans[2-j])

solution = ans[j];

}

if(solution != 0)

solution = (capture - solution)/200\*100;

else if(solution == 0)

solution = (ans[0]+ans[1])/200\*100;

return solution;

}

**Output Listing**

WELCOME TO THE GRADEBOOK

Programs 30% of grade

Homework/Quizzes 25% of grade

Exams(best 2/3) 25% of grade

Final 20% of grade

====================================

Total 100%

----------------------------------------------------------------

Letter grades will be assigned according to the following scale

A >= 93%, A- >= 89%, B+ >=86%, B >= 83%, B- >= 79%,

C+ >= 76%, C >= 73%, C- >= 69%, D >= 60%, F < 60%

----------------------------------------------------------------

Student's current information

Student name: All Available

Student ID#: 99999

Email address: aaa@indianatech.net

Quiz Scores

100 100 100 100 100 100 100

Program Scores

100 100 100 100 100

Exam Scores

100 100 100

Final Exam Score

100

Quiz Total = 100%

Program Total = 100%

Exam Total = 100%

Final Total = 100%

FINAL COURSE SCORE = 100% FINAL COURSE GRADE = A

Student's current information

Student name: Dear John

Student ID#: 51928

Email address: Dnj@indianatech.net

Quiz Scores

100 60 100 88.8889 70 75 100

Program Scores

100 100 100 100 65

Exam Scores

80 90 100

Final Exam Score

90

Quiz Total = 74.1935%

Program Total = 93%

Exam Total = 95%

Final Total = 90%

FINAL COURSE SCORE = 88.1984% FINAL COURSE GRADE = B+

Student's current information

Student name: Chris Taylor

Student ID#: 34029

Email address: CsT@indianatech.net

Quiz Scores

100 90 40 66.6667 65 62.5 50

Program Scores

50 65 80 90 100

Exam Scores

70 80 75

Final Exam Score

75

Quiz Total = 74.1935%

Program Total = 77%

Exam Total = 77.5%

Final Total = 75%

FINAL COURSE SCORE = 76.0234% FINAL COURSE GRADE = C+

Student's current information

Student name: Ruby Dunsfield

Student ID#: 23980

Email address: RlM@indianatech.net

Quiz Scores

0 0 0 0 0 0 0

Program Scores

100 100 100 100 100

Exam Scores

50 90 90

Final Exam Score

100

Quiz Total = 0%

Program Total = 100%

Exam Total = 90%

Final Total = 100%

FINAL COURSE SCORE = 72.5% FINAL COURSE GRADE = C-

Student's current information

Student name: Hatt Manson

Student ID#: 45980

Email address: HtM@indianatech.net

Quiz Scores

80 90 80 55.5556 60 100 80

Program Scores

75 80 90 85 100

Exam Scores

85 90 75

Final Exam Score

80

Quiz Total = 79.8387%

Program Total = 86%

Exam Total = 87.5%

Final Total = 80%

FINAL COURSE SCORE = 83.6347% FINAL COURSE GRADE = B

**Reflection**

**Overview:**

The purpose of this program was to utilize and manipulate structs within a program. Structs were used to store data which in turn needed to be manipulated to complete various tasks. User input was necessary to run this program but restricted strictly to input from a text file.

**Challenges and solution:**

The biggest challenge I faced with this program was finding the best 2 of three exam scores. Finding the smallest grade was easy if I had one value that was less that the other two values, but when all values we the same I encountered an issue where I could not find the lowest score because technically there was not any to be found. I resolved this problem by using an if statement which would use any two of the three values to find the best 2 of 3 exam percentage since the problem only occurred when all three values were the same.

**Lesson Learned:**

By completing this program, I have learned of some instances in which program structures would be used.