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COSC 120

Project 2

1. We want to take in data from the .dat file for each student and calculate the grades. It needs to account for quiz scores, labs projects midterms and attendance. After taking these all in it needs to find the averages and calculate the letter grade. It then needs to output to a separate .dat file with the first and last name and final grade.
2. Student Array student student\_array holds list of student objects which holds the quiz,lab,project, and midterm grades

Quiz array int quiz\_array holds student’s quizzes

Project array int project\_array holds student’s projects

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1. Function get\_averages (student John) uses the student object as input then goes through it and calulates the grades of all the quizzes tests exams and projects saves the averages in variables also within the student object.
2. Function final \_scores (student John) Once again uses the student object for input and manipulates data within it) uses the info in the variables and calulates the final score
3. ­­Function debug\_output (Student Object) takes in data from the student object and outputs it to the console for easy debugging

Source Code:

**#include** <iostream>

**#include** <iomanip>

**#include** <string>

**#include** <fstream>

**using** **namespace** std;

**const** **int** QUIZ\_SIZE = 10;

**const** **int** LAB\_SIZE = 10;

**const** **int** PROJECT\_SIZE = 3;

**const** **int** MIDTERM\_SIZE = 3;

**const** **int** SECTION\_SIZE = 19;

//define constants

**class** Student {

//student object to hold their info

**public**:

string name\_first = "";

string name\_last = "";

//name

**int** quiz\_array[QUIZ\_SIZE];

**int** lab\_array[LAB\_SIZE];

**int** project\_array[PROJECT\_SIZE];

**int** midterm\_array[MIDTERM\_SIZE];

//arrays for assignments

**double** quiz\_avg = 0;

**double** lab\_avg = 0;

**double** project\_avg = 0;

**double** midterm\_avg = 0;

//averages for assignments

**int** final\_exam = 0;

**double** attendance = 0;

**char** letter\_grade;

**double** total\_grade = 0;

};

**void** get\_average(Student &John) {

**double** quiz\_total = 0;

**double** lab\_total = 0;

**double** project\_total = 0;

**double** midterm\_total = 0;

//total scores for temporary

**for** (**int** i = 0; i < QUIZ\_SIZE; i++) {

quiz\_total += John.quiz\_array[i];

}

**for** (**int** i = 0; i < PROJECT\_SIZE; i++) {

project\_total += John.project\_array[i];

}

**for** (**int** i = 0; i < LAB\_SIZE; i++) {

lab\_total += John.lab\_array[i];

}

**for** (**int** i = 0; i < MIDTERM\_SIZE; i++) {

midterm\_total += John.midterm\_array[i];

}

//populate totals from arrays

John.quiz\_avg = quiz\_total / QUIZ\_SIZE;

John.lab\_avg = lab\_total / LAB\_SIZE;

John.project\_avg = project\_total / PROJECT\_SIZE;

John.midterm\_avg = midterm\_total / MIDTERM\_SIZE;

//find averages

}

**void** final\_score(Student &John) {

**const** **int** grade\_90 = 90;

**const** **int** grade\_80 = 80;

**const** **int** grade\_70 = 70;

**const** **int** grade\_60 = 60;

**const** **int** grade\_0 = 0;

//declare constants

**double** quiz\_scaled = John.quiz\_avg \* .1;

**double** lab\_scaled = John.lab\_avg \* .1;

**double** midterm\_scaled = John.midterm\_avg \* .3;

**double** project\_scaled = John.project\_avg \* .2;

**double** final\_scaled = John.final\_exam \* .3;

//scale points

**double** particp\_points = John.attendance \* 100;

John.total\_grade = quiz\_scaled + lab\_scaled + project\_scaled + final\_scaled

+ midterm\_scaled - particp\_points;

//calculate total points

**if** (John.total\_grade >= grade\_90) {

**if** (John.project\_avg >= 90) {

John.letter\_grade = 'A';

} **else** {

John.letter\_grade = 'B';

}

} **else** **if** ((John.total\_grade >= grade\_80)

&& (John.total\_grade < grade\_90)) {

**if** (John.project\_avg >= 80) {

John.letter\_grade = 'B';

} **else** {

John.letter\_grade = 'C';

}

} **else** **if** ((John.total\_grade >= grade\_70)

&& (John.total\_grade < grade\_80)) {

**if** (John.project\_avg >= 70) {

John.letter\_grade = 'C';

} **else** {

John.letter\_grade = 'D';

}

} **else** **if** ((John.total\_grade >= grade\_60)

&& (John.total\_grade < grade\_70)) {

John.letter\_grade = 'D';

} **else** **if** ((John.total\_grade >= grade\_0) && (John.total\_grade < grade\_60)) {

John.letter\_grade = 'F';

} **else** {

John.letter\_grade = 'P';

//if the grade cannot be calulated it gets P for pending

}

//calculates the letter grade

}

**void** debug\_output(Student &John) {

//a short debug function to assist me in making the program

cout << endl << "check";

cout << endl << "Quiz " << John.quiz\_avg;

cout << endl << "exams " << John.midterm\_avg;

cout << endl << "projects " << John.project\_avg;

cout << endl << "labs " << John.lab\_avg;

cout << endl << "Final Exam " << John.final\_exam;

cout << endl << "total " << John.total\_grade;

}

**int** main() {

string line;

Student student\_list[SECTION\_SIZE];

ifstream dataIn;

ofstream dataOut;

//define file stream

dataIn.open("grade120.dat");

dataOut.open("letter120.dat");

**if** (dataIn.fail()) {

cout << "Opening the file failed";

}

getline(dataIn, line);

getline(dataIn, line);

//skip first 2 lines

**for** (**int** i = 0; i < SECTION\_SIZE; i++) {

dataIn >> student\_list[i].name\_first;

dataIn >> student\_list[i].name\_last;

**for** (**int** j = 0; j < 10; j++) {

dataIn >> student\_list[i].quiz\_array[j];

}

**for** (**int** j = 0; j < 10; j++) {

dataIn >> student\_list[i].lab\_array[j];

}

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

dataIn >> student\_list[i].project\_array[j];

}

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

dataIn >> student\_list[i].midterm\_array[j];

}

dataIn >> student\_list[i].final\_exam;

dataIn >> student\_list[i].attendance;

get\_average(student\_list[i]);

final\_score(student\_list[i]);

//do calculations

}

dataOut << "First Name Last Name Final Grade" << endl;

**for** (**int** i = 0; i < SECTION\_SIZE; i++) {

dataOut << left << student\_list[i].name\_first << " " << left

<< setw(21) << student\_list[i].name\_last << left

<< student\_list[i].letter\_grade << endl;

//print out for each student

}

cout << "The grades have been calculated and sent to letter120.dat";

**return** 0;

}