Graduate CFD-I: Project Report #1

Dina Soltani Tehrani
dina.soltani@ae.sharif.edu

Sharif University of Technology — November 23, 2021

Introduction

Production of technology is a necessary component of life in a changing environment. As a result, computer programming is critical to our global society's future success. Graduates with a computer programming degree may contribute to the creation of this future by automating procedures, collecting data, analyzing data, and sharing knowledge in order to continually innovate and enhance current processes.
As a result, while computer programming is critical now, it may become much more so in the future. The field of computer programming will continue to expand as computer programmers throughout the world develop new ways to communicate with machines and computers. By earning your computer programming degree today, one will be able to participate in the research and testing that will lead to the development of features that will benefit society.
Because so much of our environment is automated, computer programming is essential nowadays. Humans need to be able to govern how humans and technology interact. We use computer programming to harness the processing power of computers and machines since they are so efficient and accurate.

1 Problem Description

After presenting an algorithm, write a computer program (in one of the Fortran, C, C++ languages), calculate the final grades of the lesson and present it in a table. Therefore, the final results will include the algorithm and a table containing the inputs and outputs.

2 Problem Assumptions

There are 10 students with hypothetical names. Hypothetical scores for rehearsals, projects 1-4, midterm and final. There are a number of absences and delays for each student. Percentage of impact is considered as follows: exercises 10%, project 6%, other projects 24%, midterm 20% and final 40%. Absence formula: The final score based on one hundred is increased or decreased as follows. Final score + (4n-1) So the number of absences is n and all three delays are equal to one absence.

3 Algorithm Description

This program is written in two languages, C and MATLAB. The algorithm written for the C program is written in two methods. At the beginning of the program, the user reads the description of each method before execution, and as a result, selects the desired method. At the beginning of the program, the user is asked to enter the number 1 if he wants to follow method number 1 and the number 2 if he wants to follow method number 2. After selecting the method, the user is asked to enter the desired percentages for exercises, projects, intermediate and final, and the default value is stated for each case. If method number 1 is selected, for every ten students in the class, which can be changed, the user will be asked to enter first name, last name, and then the grades of each student in the order they are asked, from 100. If method number 2 is selected, the user needs to change the scores in the file itself. Each student's grade is then calculated and stored in an array. At the end of the calculations, the grades of all the students are printed next to their names. After the calculation, the user is asked to enter the phrase y if he wants to receive the

output as a text file and if he does not want to enter n to end the program. For this program, a test mode is provided, which is executed by entering any value except 1 and 2 when selecting the method, and it works in such a way that all the items needed to execute the code, including scores and names Students are considered by default to measure only the performance of the algorithm. The algorithm written in MATLAB language is similar to the previous algorithm, except that the data entered in an Excel file is edited by the user and then read by the program. After calculating the scores, the result is recorded in another Excel file.

4 Code in C Language

```c
#include <stdio.h>
#include <stdlib.h>
#include <string.h>

int main(void)
{
    /*
    Dear user,
    you can take your data by asking the user in method 1
    or you can simply edit the following lines using method2.
    Each time that you run the code, you will be asked these
    general questions:
    1. Please specify the method you want to work with.
    2. Please indicate the percentage of the grades' contribution.
    All the best
    First, you need to choose your method.
    Enter 1 if you want method 1, and 2 if you want method 2.
    Method 1:
    Enter 1 if you want to choose this method.
    In this method, you'll go through a loop. In each loop,
    you are asked to insert the name of the student, following
    with the grades from each of the sections.
    Method 2:
    Enter 2 if you want to choose this method. In this method,
    you need to simply modify the data below, based on your own
    data.
    */
    int Method = 2;
    char ans = 'n';
    FILE *fptr;
    float percents[7] = {0.1, 0.06, 0.08, 0.08, 0.08, 0.2, 0.4};
    //char input[50];
    char M1_name[10][2][20];
    float M1_HW[10];
    float M1_P1[10];
    float M1_P2[10];
    float M1_P3[10];
    float M1_P4[10];
    float M1_mid[10];
    float M1_fin[10];
    int M1_Absences[10];
    int M1_Delays[10];
    float M1_Grade[10];

    char M2_name[10][20] = {"Mina Seyfan    ", "Ali Hosseini   ", "Setared Iraji  ", "Parsa
    Seyedi   ", "Fateme Keshtkar", "Mostafa Kia    ", "Maryam Seif    ", "Bardia Naji    ", "
    Soheila Sarlak ", "Majid Hadi     "};
    float M2_HW[10] = {91, 91.5, 92, 92.5, 93, 93.5, 94, 94, 94, 94};
    float M2_P1[10] = {91, 91.5, 92, 92.5, 93, 93.5, 94, 94, 94, 94};
    float M2_P2[10] = {91, 91.5, 92, 92.5, 93, 93.5, 94, 94, 94, 94};
    float M2_P3[10] = {91, 91.5, 92, 92.5, 93, 93.5, 94, 94, 94, 94};
    float M2_P4[10] = {91, 91.5, 92, 92.5, 93, 93.5, 94, 94, 94, 94};
    float M2_mid[10] = {91, 91.5, 92, 92.5, 93, 93.5, 94, 94, 94, 94};
    float M2_fin[10] = {91, 91.5, 92, 92.5, 93, 93.5, 94, 94, 94, 94};
    int M2_Absences[10] = {1, 2, 3, 5, 4, 0, 1, 2, 3, 4};
    int M2_Delays[10] = {1, 2, 3, 5, 4, 0, 1, 2, 3, 4};
    float M2_Grade[10];
    int i, j, k;
```

```
57
58      printf("Please enter 1 to choose method1, and 2 to choose method2: ");
59      scanf("%d", &Method);
60      printf("You entered %d.\n", Method);
61
62      switch (Method)
63      {
64      case 1:
65          /* ****************************Case 1******************************** */
66          printf("Enter the percent for the homeworks; the default is 0.1: ");
67          scanf("%f", &percents[0]);
68          printf("You entered %f.\n", percents[0]);
69          printf("Enter the percent for the project number 1; the default is 0.06: ");
70          scanf("%f", &percents[1]);
71          printf("Enter the percent for the project number 2; the default is 0.08: ");
72          scanf("%f", &percents[2]);
73          printf("Enter the percent for the project number 3; the default is 0.08: ");
74          scanf("%f", &percents[3]);
75          printf("Enter the percent for the project number 4; the default is 0.08: ");
76          scanf("%f", &percents[4]);
77          printf("Enter the percent for the midterm exam; the default is 0.2: ");
78          scanf("%f", &percents[5]);
79          printf("Enter the percent for the final exam; the default is 0.4: ");
80          scanf("%f", &percents[6]);
81          for (i = 0; i < 10; i++)
82          {
83              printf("You are in loop number %d.\n", i);
84
85              printf("Enter the given name of the student number %d: ", i);
86              scanf("%s", &M1_name[i][0][20]);
87              printf("Enter the last name of the student number %d: ", i);
88              scanf("%s", &M1_name[i][1][20]);
89
90              /*gets(input);
91              char *token = strtok(input, " ");
92              strcpy(M1_name[i][1][20], token);
93              //printf("%s\n",command);
94              token = strtok(NULL, " ");
95              strcpy(M1_name[i][2][20], token);
96              //printf("%s\n",num);*/
97
98              printf("\nEnter the HW's mark out of 100: ");
99              scanf("%f", &M1_HW[i]);
100             printf("\nEnter the 1st Project's mark out of 100: ");
101             scanf("%f", &M1_P1[i]);
102             printf("\nEnter the 2nd Project's mark out of 100: ");
103             scanf("%f", &M1_P2[i]);
104             printf("\nEnter the 3rd Project's mark out of 100: ");
105             scanf("%f", &M1_P3[i]);
106             printf("\nEnter the 4th Project's mark out of 100: ");
107             scanf("%f", &M1_P4[i]);
108             printf("\nEnter the Midterm Exam's mark out of 100: ");
109             scanf("%f", &M1_mid[i]);
110             printf("\nEnter the Final Exam's mark out of 100: ");
111             scanf("%f", &M1_fin[i]);
112             printf("\nEnter the number of absences: ");
113             scanf("%d", &M1_Absences[i]);
114             printf("\nEnter the number of delays: ");
115             scanf("%d", &M1_Delays[i]);
116             M1_Grade[i] = M1_HW[i] * percents[0] + M1_P1[i] * percents[1] + M1_P2[i] *
    percents[2] + M1_P3[i] * percents[3] + M1_P4[i] * percents[4] + M1_mid[i] * percents[5] +
    M1_fin[i] * percents[6] + (4 - M1_Absences[i] - (M1_Delays[i] / 3));
117             //printf("grade = ");
118             //printf("grade = %f\n", M1_Grade[i]);
119         }
120         printf("Name    Grade\n");
121         for (j = 0; j < 10; j++)
122         {
123             printf("%s %s   %f \n", M1_name[j][0], M1_name[j][1], M1_Grade[j]);
124         }
125         break;
126     case 2:
```

```
127         /* ****************************Case 2********************************** */
128         printf("Enter the percent for the homeworks; the default is 0.1: ");
129         scanf("%f", &percents[0]);
130         printf("You entered %f.\n", percents[0]);
131         printf("Enter the percent for the project number 1; the default is 0.06: ");
132         scanf("%f", &percents[1]);
133         printf("Enter the percent for the project number 2; the default is 0.08: ");
134         scanf("%f", &percents[2]);
135         printf("Enter the percent for the project number 3; the default is 0.08: ");
136         scanf("%f", &percents[3]);
137         printf("Enter the percent for the project number 4; the default is 0.08: ");
138         scanf("%f", &percents[4]);
139         printf("Enter the percent for the midterm exam; the default is 0.2: ");
140         scanf("%f", &percents[5]);
141         printf("Enter the percent for the final exam; the default is 0.4: ");
142         scanf("%f", &percents[6]);
143 
144         printf("You are using method 2.\n");
145         printf("Name    Grade\n");
146         for (k = 0; k < 10; ++k)
147         {
148             M2_Grade[k] = M2_HW[k] * percents[0] + M2_P1[k] * percents[1] + M2_P2[k] *
    percents[2] + M2_P3[k] * percents[3] + M2_P4[k] * percents[4] + M2_mid[k] * percents[5] +
    M2_fin[k] * percents[6] + (4 - M2_Absences[k] - (M2_Delays[k] / 3));
149             printf("%s    %f \n", M2_name[k], M2_Grade[k]);
150         }
151         break;
152     default:
153         printf("You are using the default setting.\n");
154         printf("Name            Grade\n\n");
155         for (k = 0; k < 10; k++)
156         {
157             M2_Grade[k] = M2_HW[k] * percents[0] + M2_P1[k] * percents[1] + M2_P2[k] *
    percents[2] + M2_P3[k] * percents[3] + M2_P4[k] * percents[4] + M2_mid[k] * percents[5] +
    M2_fin[k] * percents[6] + (4 - M2_Absences[k] - (M2_Delays[k] / 3));
158             printf("%s    %f \n", M2_name[k], M2_Grade[k]);
159         }
160         break;
161     }
162     printf("Do you want to print the results in a text file? (y/n)\n");
163     scanf("%c", &ans);
164     scanf("%c", &ans);
165     printf("You entered %c.\n", ans);
166     if (ans == 'y')
167     {
168         fptr = fopen("D:\\EDocuments\\Grades.txt", "a");
169         if (Method == 1)
170         {
171             fprintf(fptr, "You have used method 1.\n");
172             fprintf(fptr, "Name    Grade\n");
173             for (j = 0; j < 10; j++)
174             {
175                 fprintf(fptr, "%s %s   %f \n", M1_name[j][0], M1_name[j][1], M1_Grade[j]);
176             }
177         }
178         else if (Method == 2)
179         {
180             fprintf(fptr, "You have used method 2.\n");
181             fprintf(fptr, "Name    Grade\n");
182             for (k = 0; k < 10; ++k)
183             {
184                 M2_Grade[k] = M2_HW[k] * percents[0] + M2_P1[k] * percents[1] + M2_P2[k] *
    percents[2] + M2_P3[k] * percents[3] + M2_P4[k] * percents[4] + M2_mid[k] * percents[5] +
    M2_fin[k] * percents[6] + (4 - M2_Absences[k] - (M2_Delays[k] / 3));
185                 fprintf(fptr, "%s    %f \n", M2_name[k], M2_Grade[k]);
186             }
187         }
188         else
189         {
190             fprintf(fptr, "You have used the default settings.\n");
191             fprintf(fptr, "Name            Grade\n\n");
192             for (k = 0; k < 10; k++)
```

```
            {
                M2_Grade[k] = M2_HW[k] * percents[0] + M2_P1[k] * percents[1] + M2_P2[k] *
    percents[2] + M2_P3[k] * percents[3] + M2_P4[k] * percents[4] + M2_mid[k] * percents[5] +
    M2_fin[k] * percents[6] + (4 - M2_Absences[k] - (M2_Delays[k] / 3));
                fprintf(fptr, "%s    %f \n", M2_name[k], M2_Grade[k]);
            }
        }
        fclose(fptr);
    }
    return 0;
}
```

5 Code in MATLAB Language

```
clc; clear; close all;
% ---------------- Input Parameters ------------------------------...
   -------
% Dear user,
% you can read your data from an excel file.
% All the best

% % Method: provide the inputs from an excel file
% Your excel file should be something like this
% Row|Name|HW1 |HW2 |HW3 |HW4 |HW5 |Prj1 |Prj2 |Prj3 |Prj4 |Mid ...
   |Final|Delays|Absents
% 1  |XXXX|18.0|19.0|19.5|20  |20  |18   |19   |19.5 |20   |20  ...
   |20   |5     |2
% 2  |YYYY|...
% read the input data
[numbers, strings, raw] = xlsread('CFD1_grades.xlsx');
HW1 = 0.02*(numbers(1:10,3));
HW2 = 0.02*(numbers(1:10,4));
HW3 = 0.02*(numbers(1:10,5));
HW4 = 0.02*(numbers(1:10,6));
HW5 = 0.02*(numbers(1:10,7));
Prj1 = 0.06*(numbers(1:10,8));
Prj2 = 0.08*(numbers(1:10,9));
Prj3 = 0.08*(numbers(1:10,10));
Prj4 = 0.08*(numbers(1:10,11));
Mid = 0.2*(numbers(1:10,12));
Final = 0.4*(numbers(1:10,13));
Delays = floor((numbers(1:10,14))./3)
Absents = (numbers(1:10,15));
% compute the grade
HW_Grades = HW1 + HW2 + HW3 + HW4 + HW5;
Prj_Grades = Prj1 + Prj2 + Prj3 + Prj4;
Grades = HW_Grades + Prj_Grades + Mid + Final + (4- Delays - ...
   Absents)*0.25;
% write the output data
filename = 'CFD1_FinalGrades.xlsx';
names = strings(2:11,2);
A = string(names);
sheet1 = 1;
xlRange1 = 'A1';
xlswrite(filename,A,sheet1,xlRange1)

B = Grades;
```

```
sheet1 = 1;
xlRange2 = 'B1';
xlswrite(filename,B,sheet1,xlRange2)
```