

Software Engineering

Quiz #5 (100 points)

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Answer the following questions and make a pdf file that includes the **source code, sample inputs, and outputs**. You must submit the **pdf file and all of the .c files** on Canvas for full credit. Do not forget to add your group partner name on the pdf file and the source codes.

1. (50 points) Being able to write code concisely can sometimes shorten runtime and therefore make it more efficient. Modify the following code so that it uses loops to scan the user inputs and calculate the averages. Your program must also use an array(s) to store the user inputs and a separate array to store the homework average, exam average, and weighted average. **Your program output must be same as if you run the given code.**

```
#include<stdio.h>

int main() {
    double hw1, hw2, hw3, hw4, hw5, exam1, exam2, exam3;    double
hw_avg, exam_avg, weighted_avg;

    printf("Enter your grade (%%) for HW #01: ");
scanf("%lf" , &hw1);    printf("Enter your grade (%%)
for HW #02: ");    scanf("%lf" , &hw2);
printf("Enter your grade (%%) for HW #03: ");
scanf("%lf" , &hw3);    printf("Enter your grade (%%)
for HW #04: ");    scanf("%lf" , &hw4);
printf("Enter your grade (%%) for HW #05: ");
scanf("%lf" , &hw5);    printf("Enter your grade (%%)
for Exam #01: ");    scanf("%lf" , &exam1);
printf("Enter your grade (%%) for Exam #02: ");
scanf("%lf" , &exam2);    printf("Enter your grade
(%%) for Exam #03: ");    scanf("%lf" , &exam3);
```

One submission per group (2 students)

```
hw_avg = (hw1 + hw2 + hw3 + hw4 + hw5) / 5.0; exam_avg
= (exam1 + exam2 + exam3) / 3.0; weighted_avg = (0.40 *
hw_avg) + (0.60 * exam_avg);

printf("\nFinal grade = %.2lf%%\n", weighted_avg); return
0;
}
```

Inputs and outputs format:

```
Enter your grade (%) for HW #01: 89
Enter your grade (%) for HW #02: 99
Enter your grade (%) for HW #03: 87
Enter your grade (%) for HW #04: 96
Enter your grade (%) for HW #05: 94
Enter your grade (%) for Exam #01: 89
Enter your grade (%) for Exam #02: 97
Enter your grade (%) for Exam #03: 93

Final grade = 93.00%
```

2. (50 points) Write a complete C program that uses a 2D array to store the assignment grades of two students (user input) and calculates each student's final grade by averaging the values. There should be four assignment grades per student and there should be two functions: one to calculate the average, another to determine the letter grade. Please use the following scale for the letter grade:

```
A: 100-85
B: 84-75
C: 74-60 F: 59-0
```

The program must output the average grade and final letter grade in the following format:

Sample Inputs and outputs format:

```
Please Enter assignment grades for student 1 and student 2
Student-1 Assignment-1 grade: 99
Student-1 Assignment-2 grade: 100
Student-1 Assignment-3 grade: 78
Student-1 Assignment-4 grade: 67
Student-2 Assignment-1 grade: 100
Student-2 Assignment-2 grade: 89
Student-2 Assignment-3 grade: 78
Student-2 Assignment-4 grade: 88

Student 1 Avg = 86.00
Student 1 Grade = A
Student 2 Avg = 88.75
Student 2 Grade = A
```

```
C:\Users\kenns\OneDrive\Desktop\Desktop\SE185\Homework\Quizzes\Quiz05\Q1.c - Notepad++
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
Q1.c
1  #include<stdio.h>
2
3  int main(void) {
4      const int AMNT_HW = 5;
5      const int AMNT_EX = 3;
6      double hw[AMNT_HW];
7      double exam[AMNT_EX];
8      double hwB = 0;
9      double exB = 0;
10     double hwAvg, examAvg, weightedAvg;
11
12     for (int i = 0; i < AMNT_HW; ++i) {
13         printf("Enter your grade (%%) for HW #0%d:", i + 1);
14         scanf("%lf", &(hw[i]));
15     }
16     for (int i = 0; i < AMNT_EX; ++i) {
17         printf("Enter your grade (%%) for Exam #0%d:", i + 1);
18         scanf("%lf", &(exam[i]));
19     }
20     printf("\n");
21
22     for (int i = 0; i < AMNT_HW; ++i) {
23         hwB = hwB + hw[i];
24     }
25
26     for (int i = 0; i < AMNT_EX; ++i) {
27         exB = exB + exam[i];
28     }
29
30     hwAvg = hwB / 5.0; //Adverage
31     examAvg = exB / 3.0; //Adverage
32
33     weightedAvg = (0.40 * hwAvg) + (0.60 * examAvg); //Total adverage
34
35     printf("\nFinal grade = %.2lf%%\n" , weightedAvg);
36
37     return 0;
38 }
```

C source file length: 831 lines: 38 Ln: 31 Col: 36 Pos: 683 Windows (CR LF) UTF-8 INS

```

/cygdrive/C/Users/kenns/OneDrive/Desktop/Desktop/SE185/Homework/Quizzes/Quiz05
kenns@LAPTOP-L53JNR5E /cygdrive/C/Users/kenns/OneDrive/Desktop/Desktop/SE185/Homework/Quizzes/Quiz05
$ gcc Q1.c -o Q1
kenns@LAPTOP-L53JNR5E /cygdrive/C/Users/kenns/OneDrive/Desktop/Desktop/SE185/Homework/Quizzes/Quiz05
$ ./Q1
Enter your grade (%) for HW #01:89
Enter your grade (%) for HW #02:99
Enter your grade (%) for HW #03:87
Enter your grade (%) for HW #04:96
Enter your grade (%) for HW #05:94
Enter your grade (%) for Exam #01:89
Enter your grade (%) for Exam #02:97
Enter your grade (%) for Exam #03:93

Final grade = 93.00%
kenns@LAPTOP-L53JNR5E /cygdrive/C/Users/kenns/OneDrive/Desktop/Desktop/SE185/Homework/Quizzes/Quiz05
$ |
```

```
C:\Users\kenns\OneDrive\Desktop\Desktop\SE185\Homework\Quizzes\Quiz05\Q2.c - Notepad++
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
Q1.c Q2.c new 1
7
8 int main(void) {
9     const int STU_AMNT = 2;
10    const int STU_ASNT = 4;
11    int stu[STU_AMNT][STU_ASNT];
12    double counter1 = 0;
13    double counter2 = 0;
14
15    for (int i = 0; i < STU_AMNT; ++i) {
16        for (int j = 0; j < STU_ASNT; ++j) {
17            printf("Student-%d Assignment-%d grade: ", i + 1, j + 1);
18            scanf("%d", &(stu[i][j]));
19        }
20    }
21
22    printf("\n");
23
24    for (int j = 0; j <= STU_ASNT - 1; ++j) {
25        counter1 = counter1 + (stu[0][j]);
26    }
27
28    for (int j = 0; j <= STU_ASNT - 1; ++j) {
29        counter2 = counter2 + (stu[1][j]);
30    }
31
32    printf("Student 1 Avg = %.2f\n", adverageGrade(counter1)); //add variables
33
34    printf("Student 1 Grade = %c\n", gradeLtrr(adverageGrade(counter1))); //add variables
35
36    printf("Student 2 Avg = %.2f\n", adverageGrade(counter2)); //add variables
37
38    printf("Student 2 Grade = %c\n", gradeLtrr(adverageGrade(counter2))); //add variables
39
40    return 0;
41 }
42
43 double adverageGrade(double number){
44     number = number / 4.0;
45     return number;
46 }
47
48 char gradeLtrr(double number){
49     if (number >= 0 && number < 100) {
50         if (number >= 85) {
51             number = 'A';
52         }
53         else if (number >= 75 && number < 85) {
54             number = 'B';
55         }
56         else if (number >= 60 && number < 75) {
57             number = 'C';
58         }
59         else if (number >= 74 && number < 60) {
60             number = 'D';
61         }
62         else if (number >= 0 && number < 60) {
63             number = 'F';
64         }
65     }
66     return number;
67 }
```

C source file length: 1,508 lines: 67 Ln: 50 Col: 28 Pos: 1,199 Windows (CR LF) UTF-8 INS

```
/cygdrive/c/Users/kenns/OneDrive/Desktop/Desktop/SE185/Homework/Quizzes/Quiz05
kenns@LAPTOP-L53JNR5E /cygdrive/c/Users/kenns/OneDrive/Desktop/Desktop/SE185/Homework/Quizzes/Quiz05
$ gcc Q2.c -o Q2 -Wall

kenns@LAPTOP-L53JNR5E /cygdrive/c/Users/kenns/OneDrive/Desktop/Desktop/SE185/Homework/Quizzes/Quiz05
$ ./Q2
Student-1 Assignment-1 grade: 99
Student-1 Assignment-2 grade: 100
Student-1 Assignment-3 grade: 78
Student-1 Assignment-4 grade: 67
Student-2 Assignment-1 grade: 100
Student-2 Assignment-2 grade: 89
Student-2 Assignment-3 grade: 78
Student-2 Assignment-4 grade: 88

Student 1 Avg = 86.00
Student 1 Grade = A
Student 2 Avg = 88.75
Student 2 Grade = A

kenns@LAPTOP-L53JNR5E /cygdrive/c/Users/kenns/OneDrive/Desktop/Desktop/SE185/Homework/Quizzes/Quiz05
$ ./Q2
Student-1 Assignment-1 grade: 89
Student-1 Assignment-2 grade: 57
Student-1 Assignment-3 grade: 85
Student-1 Assignment-4 grade: 68
Student-2 Assignment-1 grade: 95
Student-2 Assignment-2 grade: 25
Student-2 Assignment-3 grade: 48
Student-2 Assignment-4 grade: 99

Student 1 Avg = 74.75
Student 1 Grade = C
Student 2 Avg = 66.75
Student 2 Grade = C

kenns@LAPTOP-L53JNR5E /cygdrive/c/Users/kenns/OneDrive/Desktop/Desktop/SE185/Homework/Quizzes/Quiz05
$ ./Q2
Student-1 Assignment-1 grade: 85
Student-1 Assignment-2 grade: 14
Student-1 Assignment-3 grade: 28
Student-1 Assignment-4 grade: 98
Student-2 Assignment-1 grade: 74
Student-2 Assignment-2 grade: 94
Student-2 Assignment-3 grade: 46
Student-2 Assignment-4 grade: 95

Student 1 Avg = 56.25
Student 1 Grade = F
Student 2 Avg = 77.25
Student 2 Grade = B

kenns@LAPTOP-L53JNR5E /cygdrive/c/Users/kenns/OneDrive/Desktop/Desktop/SE185/Homework/Quizzes/Quiz05
$ !
```