SE185: Problem Solving in 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.**

Inputs and outputs format:

SS #1

C:\fall2022\se185\quiz05\question1.c - Notepad++

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question1.c question2.c

```c
#include <stdio.h>

int main()
{
    double homework[5], exams[3];   //This arrays will store % inputs of Homework and Exams
    double average[3];   //Array to store average calculations

    for(int i = 0; i < 5; i++)
    {
        printf("Enter your grade (%%) for HW #0%d: ", i+1);   //Aks user to enter Homework grade
        scanf(" %lf", &homework[i]);   //Stores inputs into hw[i]
    }
    for(int i = 0; i < 3; i++)
    {
        printf("Enter your grade (%%) for Exm #0%d: ", i+1);  //Ask user to enter the Exam grade
        scanf(" %lf", &exams[i]); //Stores inputs into exm[i]
    }
    //The Homework average is calculated and stored in avg[0]
    average[0] = (homework[0] + homework[1] + homework[2] + homework[3] + homework[4])/5.0;

    //The Exam average is calculated and stored in avg[1]
    average[1] = (exams[0] + exams[1] + exams[2])/3.0;

    //The weighted average is calculated and stored in avg[2]
    average[2] = (0.40 * average[0]) + (0.6 * average[1]);

    printf("\nFinal grade = %.2lf%%\n", average[2]);   //This displays the weighted average
    return 0;
}
```

SS #2

```
jesus@ASUS_GA503 /cygdrive/c/fall2022/se185/quiz0
$ gcc question1.c -o question1

jesus@ASUS_GA503 /cygdrive/c/fall2022/se185/quiz0
$ ./question1
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 Exm #01: 89
Enter your grade (%) for Exm #02: 97
Enter your grade (%) for Exm #03: 93

Final grade = 93.00%
```

SS #3

```
jesus@ASUS_GA503 /cygdrive/c/fall2022/se185/quiz05
$ ./question1
Enter your grade (%) for HW #01: 87
Enter your grade (%) for HW #02: 73
Enter your grade (%) for HW #03: 91
Enter your grade (%) for HW #04: 100
Enter your grade (%) for HW #05: 56
Enter your grade (%) for Exm #01: 79
Enter your grade (%) for Exm #02: 99
Enter your grade (%) for Exm #03: 81

Final grade = 84.36%
```

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:

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

Sample Inputs and outputs format:

SS #1

C:\fall2022\se185\quiz05\question2.c - Notepad++

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question1.c question2.c

```c
#include <stdio.h>

double calculateAverage(double average[4]) //Function to calculate the averages
{
    return (average[0] + average[1] + average[2] + average[3])/4.0; //Returns the average of all grades
}

char letterGrade(double average)   //Function to find the letter grade
{
    if(average >= 85 && average <= 100)
        return 'A';
    else if(average >= 75 && average <= 84)
        return 'B';
    else if(average >= 60 && average <= 74)
        return 'C';
    else
        return 'F';
}

int main()
{
   double grades[2][4];   //2d array

   printf("Please Enter assignment grades for student 1 and student 2\n");
   for(int i = 0; i < 2; i++) // 2 students
   {
      for(int j = 0; j < 4; j++)  // 4 assignment grades
      {
         printf("Student-%d Assignment-%d grade: ", i+1, j+1);   //Ask user to enter grades
         scanf(" %lf", &grades[i][j]);    //stores user inputs into grades[i][j]
      }
   }

    //Uses calculateAverage for student 1 grades array and stores in avg1
   double avg1 = calculateAverage(grades[0]);

    //Uses calculateAverage for student 2 grades array and stores in avg2
   double avg2 = calculateAverage(grades[1]);

   printf("\nStudent 1 Avg = %.2lf\n", avg1);
   printf("Student 1 Grade = %c\n", letterGrade(avg1));
   printf("Student 2 Avg = %.2lf\n", avg2);
   printf("Student 2 Grade = %c\n", letterGrade(avg2));
   return 0;
}
```

SS #2

```
jesus@ASUS_GA503 /cygdrive/c/fall2022/se185/quiz05
$ gcc question2.c -o question2

jesus@ASUS_GA503 /cygdrive/c/fall2022/se185/quiz05
$ ./question2
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
```

SS #3

```
jesus@ASUS_GA503 /cygdrive/c/fall2022/se185/quiz05
$ ./question2
Please Enter assignment grades for student 1 and student 2
Student-1 Assignment-1 grade: 65
Student-1 Assignment-2 grade: 82
Student-1 Assignment-3 grade: 39
Student-1 Assignment-4 grade: 99
Student-2 Assignment-1 grade: 12
Student-2 Assignment-2 grade: 43
Student-2 Assignment-3 grade: 28
Student-2 Assignment-4 grade: 100

Student 1 Avg = 71.25
Student 1 Grade = C
Student 2 Avg = 45.75
Student 2 Grade = F
```