**ECE 15200: Programming for Engineers**

**Purdue University Northwest, ECE Department**

Laboratory 7: Arrays and Pointers

**Instructions**:

* Submit only C++ source files (\*.cpp) for all the problems through Brightspace.
* Name each file following the format ***Lastname\_*Lab*X*\_p*Y*.cpp**, replace *Lastname, X,* and *Y* with your last name, lab #, and problem #, respectively.
* Put your name, assignment number, and date on the top of each source file (\*.cpp) as multi-line comment given below:

/\*

Class: ECE15200

Author: [Your Name]

Assignment: Lab [No.]

Date: [MM]/[DD]/[YY]

\*/

Remove the brackets after updating the information in them.

* PLEASE WORK ALONE. If any plagiarism is found, you will get ZERO. Never hesitate to discuss with the instructor/TA if stuck in any assignment problem.

**Problem 1. (**Lastname\_Lab7\_p1.cpp**)** Write a C++ program to input eight integer numbers into a 2-by-4 array named grade. After all numbers are input, display the numbers and the averages for each row [**20 points**].

**Problem 2.** (Lastname\_Lab7\_p2.cpp) [**20 points**]

1. Write a function named findmax()that finds and displays the maximum values in a two dimensional array of integers passed into it from main(). The array should be declared as a 10 row by 15 column array of integers in main(), populated with random numbers between 0 and 100, and displayed following that.
2. Modify the function written above so that it also displays the row and column numbers of the element with the maximum value.

**Problem 3.** (Lastname\_Lab7\_p3.cpp) A professor constructed a 3-by-4 two-dimensional array of float numbers. The array contains lab grades, quiz and exam grades of three students in the class. Write a C++ program that calculates the final grade for each student and save it to the last column. You program should display the following output:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Lab | Quiz | Exam | Final |
| Student 1 | ## | ## | ## | ## |
| Student 2 | ## | ## | ## | ## |
| Student 3 | ## | ## | ## | ## |

The final grade consists of 30% lab grade, 30% quiz grade and 40% exam. For example, if lab grade is 95, quiz grade is 82 and exam grade is 87, the final grade is equal to

. Use random numbers between 40 and 100 for lab, quiz and exam grades [**20 points**].

**Problem 4.** (Lastname\_Lab7\_p4.cpp) Write a declaration to store the following values into an array named prices: 12.25, 12.75, 19.50, 16.75, 8.30, 13.50, 19.2. Include the declaration in a program then display the values in the array using **pointer** notation [**20 points**].

**Problem 5.** (Lastname\_Lab7\_p5.cpp)[**20 points**]

1. Write a program that has a declaration in main()to store the following numbers into an array named rates: 6.5, 7.2, 7.5, 8.7, 8.6, 9.4, 9.6, 9.8, 10.6. Write a function show()that accepts rates in a parameter argument named rates and then displays the numbers using the pointer notation: \*(rates+i)
2. Modify the show()function written above so that it can display the numbers in rates by alter the address in rates. Hint: Use the expression \*rates than \*(rates+i) to retrieve the correct element.