CS1428 Lab 10: Fall 2020

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Lab Section: LAB 17

Type your name at the top of this sheet. Answer the following questions and turn in this sheet before the due date. You may use the pre-lab, your book, or internet resources to assist you.

Your instructor will be available on Zoom during the usual lab hours to answer questions or in the Discussion section of Canvas outside of those hours.

Visit https://userweb.cs.txstate.edu/~js236/cs1428/c-ides-for-cs1428.html for instruction on setting up a Development Environment (like CodeBlocks) to be able to complete the coding portion.

1. (15 pts) What is the output of the following code? Pay attention to which variables are passed by reference.

```
#include <iostream>

using namespace std;

void math(int&, int, int&);
void print(int, int, int);

int main() {
  int a = 6, b = 4, c = 3;
  math(a, b, c);
  print(a, b, c);
  return 0;
}

void math(int &num1, int num2, int &num3) {
  num1 = num2 + num3;
  num2 = num1 - num3;
  num3 = num1 + num2;
  return;
}

void print(int a, int b, int c) {
  cout << "a: " << a << ", b: " << b << ", c: " << c << endl;
  return;
}
```

Output:

a: 7, b: 4, c: 11

2. (5pts) What’s the difference between pass by reference and pass by value?

Pass by reference accesses the variable's memory and will change the variable outside the function paramaters.

Pass by value is just creating a copy of the value of a certain variable, and will not change the variable being referenced.

3. (50 pts) Modify the provided code to create program which will take 5 numerical grades from the user and find the lowest grade, and then compute the average grade after dropping the lowest grade entered to the console.

The program should include the following functions:

- **void getGrades(double grades[], const int SIZE)** Prompts the user for 5 grades and populates the grades array.
- **double getAverage(double grades[], const int SIZE)** Calculates and returns the average of the array.
- **void findDropInfo(double grades[], const int SIZE, int &lowest, double &average)** Finds the index of the lowest grade and populates the lowest variable. Next, the function calculates the average of the array with the lowest grade dropped and populates the average variable.
- **void printData(int lowest, double average, double avg_before)** Prints all of the data to the screen.

NOTE: Each function needs to be called once from main.

Sample Output (to console):

Please enter 5 grades:

66.66

90

85.5

98

77

The 5 grades entered by the user are:

66.66

90

85.5

98

77

Grade dropped: 66.66

Final Average: 87.62

Average Before Dropped Grade: 83.00

WRITE your name in the authorship comments at the top of your program.
UPLOAD this pdf with your answers filled in and your source code as lab10.cpp to Canvas.