CS 271
Lab Assignment # 4

Due Tuesday, March 1 before 2:00 pm

Submit **lab4.c, arrayfunctions.c, arrayfunctions.h, and makefile** on Canvas Lab 4 Assignment.

Chapter 6 – Arrays
Chapter 8 – C characters and strings

Comments: At the top of each program include header comments. Use inline comments throughout the code to document what your program is doing.

Pseudocode is given for the main function in lab4.c. All of the problems go in the same main.

Problem 1:

- Print the message "Problem 1".
- Create an array of 20 integers.
- Call the function fillInteger to fill the array with random numbers between -20 and 20.
- Print the array, 10 numbers per line.
- Call function findConsecutive.

Problem 2:

- Print the message "Problem 2".
- Create an array of 50 characters.
- Call the function fillCharacter to fill the array with random, lowercase letters.
- Print the array, all 50 elements on one line, with 1 space between elements.
- Call the function findTriples.

Problem 3:

- Print the message "Problem 3".
- Create an array of 10 float values.
- Call function fillFloat to initialize the elements of the array to random float values between 1.0 and 50.0
- Print the array, all elements on one line, with two spaces between elements.
- Call function floatMean to get the mean of the values. Print the mean.
- Call function floatMin to find the minimum value in the array.
- Call function floatMax to find the maximum value in the array.

In the file arrayfunctions.h, write the prototypes for these functions. In the file arrayfunctions.c, write the definitions for these functions. In the makefile, write commands to compile your programs and produce an executable named lab4.

void fillInteger(int a[ ], int length, int min, int max)

- Fill the array with random integers between min and max (inclusive). You may assume that min is less than max. Use the srand function with the time to seed the generator. Then use the rand function to generate the random numbers.

void fillCharacter(char c[ ], int length, char start, char end)

- Fill the array with random characters between start and end (inclusive). You may assume that start is alphabetically before end. Use the srand function with the time to seed the generator. Then use the rand function to generate the random characters.

void findConsecutive(int array[ ] , int length)

- Examine the array. If any two elements are consecutive integers, print a message giving the array subscripts of the two elements. (Remember, subscripts start with 0.)

  For example, here's an array with 10 elements. Assume that this is the array passed to the function and the length passed is 10.

  9 11 12 10 18 20 -10 12 -3 -2

  For this array, there are two places where two consecutive integers occur, so the function should print

  Elements 1 and 2 are consecutive.
  Elements 8 and 9 are consecutive.

void findTriples (char c[ ], int length)

- Examine the array. If any 3 sequential elements form an alphabetic sequence, print a message with the 3 characters.

  For example, this array is passed to the function along with the length of 10.
  a b c i k j l m n x

  For this array, there are two places where there are 3 characters in alphabetic sequence, so the function should print

  abc
  lmn

void fillFloat(float a[ ], int length, float min, float max)

- Fill the array with random float values between min and max (inclusive). You may assume that min is less than max.

float floatMean(float array[ ], int length)

- Calculate and return the arithmetic mean of all of the elements in the array

float floatMin(float array[ ], int length)

- Calculate and return the minimum value in the array

float floatMax(float array[ ], int length)

- Calculate and return the maximum value in the array