CS 2400 – Fall 2022

Project 4 – Structures

Due: 11:59 PM Friday, November 18th

Purpose: This project is a continuation of the last. Now that you are an expert in generating barcodes, you need to be able to store more data for a letter. To do this, you will need to create two structures. You will also need a few functions that will be able to manipulate those structures.

Requirements:

1. YOU MUST USE STRUCTURES FOR THIS ASSIGNMENT, NOT CLASSES. The functions listed below also may NOT be implemented as members of the structures, you must pass the structure objects into the functions as parameters.
2. The first structure should be called Address.
    a. An Address consists of 6 strings: a person's name, a house number, a street name, a city, a state, and a zip code.
    b. Write a `load_address` function that takes an Address and an input stream as parameters. You will need to pass the Address by reference.
    c. Write a `print_address` function that takes an Address as a parameter.
3. The second structure should be called Letter.
    a. A Letter consists of 2 Addresses (who the letter is from and who the letter is to), and a string for the barcode.
    b. Write a `load_letter` function that takes a Letter and an input stream as parameters. You will need to pass the Letter by reference. You can use your `load_address` function to load the "to" and "from" Addresses.
    c. Write a `print_letter` function that takes a Letter as a parameter. You can use your `print_address` function to print the "to" and "from" Addresses. Also remember to print the barcode.
4. Write a `create_barcode` function that takes a Letter as a parameter. The function should create a barcode for the "to" Address's zip code. To make this work correctly, you will need to pass the Letter by reference so that you are allowed to change the barcode member.
5. I have provided a starter data file with two Addresses worth of data listed. You should add at least enough data to that file to populate 5 letters total (you will need to add 8 addresses). The data for each Address should be in this order:

    name
    house number
    street name
    city
    state
    zip code

6. Write a main program that does the following:
    a. Create an array or vector of Letters.
    b. Open the data file and make a loop to process it. Each iteration of the loop should
        i. Use your `load_letter` function to initialize a Letter object's Address fields.
        ii. Create and assign the barcode that goes with this letter using your `create_barcode` function.
    c. At this point, you should have a list of at least 5 Letters. Write another loop that outputs the data for each letter using your `print_letter` function.

You are encouraged to add other functions as you find them useful.

Submit your source code and data file on Blackboard.

Grading:

Programs that contain syntax errors will earn zero points.

Programs that do not include functions other than main will earn zero points.

Programs that do not include any structures will earn zero points.

Programs that use global variables other than constants will earn zero points.

Programs that use libraries NOT discussed in class will earn zero points.

Your grade will be determined using the following criteria:

- Correctness: the program works as requested above (65 points).
    - (10 points) Address structure contains all the correct data
    - (10 Points) Letter structure contains all the correct data
    - (10 points) Data is input from a correctly formatted file
    - (50 points) All 5 required functions are implemented correctly
    - (10 points) Output is correct for each Letter (including the barcode)
- Documentation and Style (10 points)
    - Include Doxygen style comments for each function with meaningful comments for the purpose of the function and the parameters
    - Include comments in your functions explaining what you are doing