Assignment 1 –Design and Testing with Classes

Goals-

Develop a class from given requirements

Implement that class using object-oriented programming techniques

You will design, implement, and test a grocery list program. The program should display a list of items. The user must be able to enter the items.

You must create a design document. It can be submitted as part of the reflections but should provide some explanation of your choices. You need to consider the structure of your data. How are you ultimately going to represent them in your program? Figure that out, **before** you start coding. Then design the functions you will need. If you do the design properly the coding should be simple.

You will use a class for the Items. The class should have data elements for the following information: item name, unit (i.e. can, or pounds, or ounces), number to buy, and unit price. Add other member variables you find necessary. What functions do you need? How do you validate the input on numeric fields? That is, are number to buy and unit price numbers and not strings or characters?

You will also need a List class. You will need an array to store Item objects in your List object. As each item is entered an Item object must be created with that information and added to the List object. Each class should be in a separate file.

You perform incremental development and start with a static array in the List class. Once everything is working correctly with that small array convert it to a dynamic array. The initial size should be 4. When a fifth item is added the array should double in size. Whenever it is full and an item is added it should double in size.

You will need to perform the following activities: create a list, add items, remove items, display the shopping list. To add an item you should prompt the user to enter the name, unit of sale, the number needed, and the unit price. Debug and test your program.

You will also need to provide a simple test plan. Since this is a program with input and output you should not need any driver functions. The test plan should provide coverage, i.e. several different items. You do NOT need to test for every possible item in a grocery store, just a reasonable number or varying lengths. How to do you handle spaces in names? Do you validate that numeric entry is a number? Can you restrict monetary amounts to 2 decimal places?

You will submit- design document, test plan and results (these can be in your reflections but mark them clearly), and the program files- List, Item, main, and your makefile. Submit all in a zip file.

Grading:

- programming style and documentation (10%)
- create your design document; outline classes, specify data and function members (15%)
- create the list class and object, did it follow your design? (20%)
- correctly use the dynamic array (10%)
- add and remove item objects to the list, did it follow your design? (20%)
- display the list to include the following: item name, unit or purchase, price per unit, number to buy, subtotal for that item. (5%)
- display the list to the screen but add: at the bottom of the display indicate the total cost for that trip to the store. (5%)
- reflections document to include the design description, test plan, test results, and comments about how you resolved problems during the assignment (15%)