Thomas Buteau
CS162-400
2-5-17
Project 2

Program Overview
This project is a simple shopping list program designed to maintain and display a list of items, their individual costs, and the total cost for all items. The program will allow for new items to be added to the list, items to be removed, and increasing quantities of items already in the list.

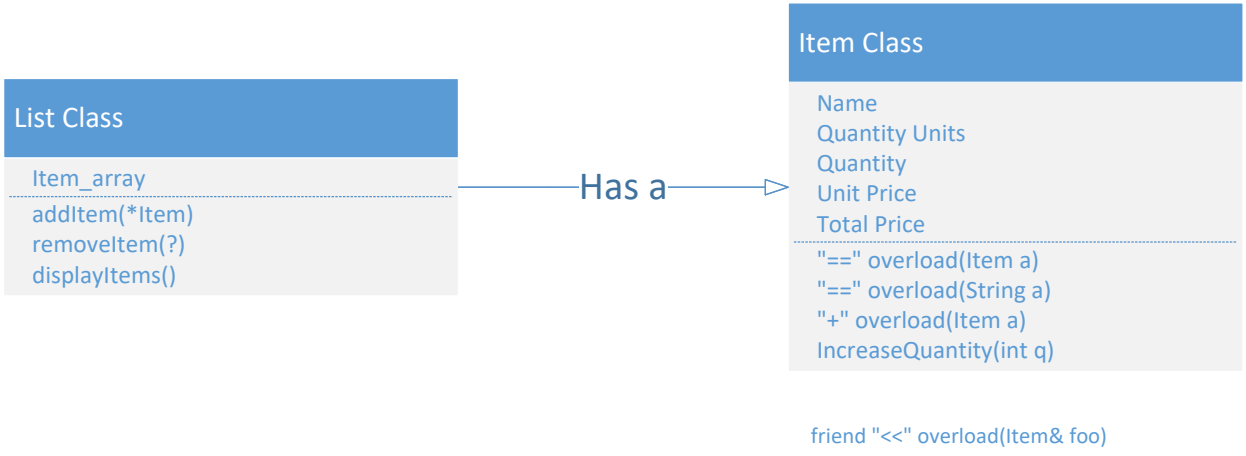
Program Design
The program will consist of 2 classes, an Item class and a List class.

The Item class will have variables for name, quantity units, quantity, unit price, and total price. There will be a method to overload the comparison operator "==" to compare the name variable of an Item object to another item object. There will also be a method that increases the quantity of an Item object as well as update the total price.

The List class will contain a dynamic array of Item objects. There will be a method to add Items to the array which first checks to see if the Item is already in the array. If so, the quantity of the existing Item as well as the total price will be updated. If not, the Item will be added to the array. There will be a method to remove Items from the array. Note that both the add and remove methods will also resize the array as appropriate. There will also be a method to display the Items in the List array.

There will also be an input validation function used to ensure user inputs are correct and appropriate as well as a menu function to give the user access to the List methods and allow the user to terminate the program.

Class Hierarchy Diagram



*This page was written before writing any code and is subject to change in the final deliverable design.

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Tests (User inputs)

Test description	Test Inputs	Method Tested	Expected Outcome	Observed Outcome
User enters non-integer	a	List.menu()	Error Message	"User input invalid, please try again."
User enters integer smaller than accepted range	0	List.menu()	Error Message	"User input invalid, please try again."
User enters integer larger than accepted range	5	List.menu()	Error Message	"User input invalid, please try again."
User selects Display list before items are in list	1	List.menu()	Message saying list is empty	"No items currently in the list."
User selects Add items option	2	List.menu()	Series of messages asking for inputs necessary to generate an Item object.	Series of messages asking for inputs necessary to generate an Item object.
User selects Remove items option	3	List.menu()	Asks user for the name of the item to remove	"What is the name of the item to remove?"
User selects Exit program	4	List.menu()	Program closes	Program closes
User adds an item to the list then chooses Display list option.	2, potatoes, bag, 2, 5.50, 1	List.menu()	Displays a list of all the items entered.	"potatoes: 2 bag at 5.5 each for a total cost of 11 The total price for all items is 11"
User adds the same item to the list then chooses Display list option.	2, potatoes, bag, 3, 5.50, 1	List.menu()	Displays the item with an updated quantity.	"potatoes: 5 bag at 5.5 each for a total cost of 27.5 The total price for all items is 27.5"
User choses to remove an item not in the list.	3, cheese	List.menu()	Error Message	"cheese was not found in the list"
User choses to remove an item on the list then chooses Display list option.	3, potato	List.menu()	Item is removed from list	"No items currently in the list."

Reflections

This program, similar to the previous ones for this course, has shown me that during initial design I underestimate the number of functions I will need to complete the assignment. In this case I added extra functions to reduce the number of tasks each function had to do. For example, the List method addItem was originally going to generate a new Item object and then add it to the array as appropriate. In the end, I wrote two extra methods, generateItem and arrayIncrease, to reduce the workload of each function to more manageable levels.

The process of writing a dynamic array of pointers with the ability to resize as needed has really reinforced the idea that the vector class is an amazing thing. I am glad that I had the experience of learning how to do this but I really hope that in the future we will be allowed to use established libraries that streamline the process. Getting the array to function correctly was the bulk of the time I spend writing code for this assignment.