Assignment 1 Reflections

Student: Joaquin Saldana

Program Design

For the program I created two classes, an Items class and a List class. The item's class has four member variables which are the following:

1. Item name
2. Item unit type
3. Total number of items
4. Item price

The only class function that is unique is the calculation of the total cost of the item

The List class has four member variables which are the following:

1. Pointer to a Items object, which will be used to create a dynamic array of object type Items
2. Number of items on the list
3. Total size of the array
4. Total cost of the list

Unique class functions are:

- Add items to the list
- Remove items from the list
- Is the list empty
- Print the grocery list
- Total cost of the list

The definitions to these functions can be found in the respective .hpp and .cpp files

Main is designed to have a menu option in which the user decides whether they wish to enter an item on the list, remove an item on the list, print the list, or exit the program.

The directions are clearly displayed to the user. Main is constructed with a do while loop and will continue until the user enters the option to exit the program.

Input is validated to ensure the user is entering a number when necessary. Especially when choosing from the menu.

Test 1

First test was to see if main produced any memory leaks or if the program crashed when attempting to enter more than four items in the list. Also tested the validation code to ensure it's accepting numberical inputs when required. Below was the results of my test:

```
flip2 ~/Prog2Summer/Assignment1 157% ls
```

```
Assignment1Main.cpp  Items.cpp  Items.hpp  List.cpp  List.hpp
Makefile
flip2 ~/Prog2Summer/Assignment1 158% make
g++ -c Items.cpp
g++ -c List.cpp
g++ Items.o List.o Assignment1Main.cpp -o Assignment1
valgrind --tool=memcheck --leak-check=yes Assignment1
==2654== Memcheck, a memory error detector
==2654== Copyright (C) 2002-2013, and GNU GPL'd, by Julian Seward et
al.
==2654== Using Valgrind-3.10.0 and LibVEX; rerun with -h for copyright
info
==2654== Command: Assignment1
==2654==
Welcome, this program allows you to create a grocery list.  Below are
the options provided to you.
1. Add item to list
2. Remove Item from List
3. Print the list
4. Exit the program.

Which option do you elect?  Enter 1, 2, 3, or 4: 1
What is the name of the item you wish to add to the list: Soda
What is the unit type: Liters
How many do you wish to add: 8
Finally what's its price: 5.95

Which option do you elect?  Enter 1, 2, 3, or 4: 1
What is the name of the item you wish to add to the list: Oranges
What is the unit type: Pounds
How many do you wish to add: 9
Finally what's its price: 4.45

Which option do you elect?  Enter 1, 2, 3, or 4: 1
What is the name of the item you wish to add to the list: Fish
What is the unit type: Pounds
How many do you wish to add: 1
Finally what's its price: 9.23

Which option do you elect?  Enter 1, 2, 3, or 4: asdf
You did not enter a number.  Please enter a number: 9
Your selection was invalid.  Please try again:
Which option do you elect?  Enter 1, 2, 3, or 4: 1
What is the name of the item you wish to add to the list: Steak
What is the unit type: Pounds
How many do you wish to add: 3
Finally what's its price: 8.89

Which option do you elect?  Enter 1, 2, 3, or 4: 1
What is the name of the item you wish to add to the list: Onions
```

```
What is the unit type: Pounds
How many do you wish to add: 4
Finally what's its price: 6.70

Which option do you elect?  Enter 1, 2, 3, or 4: 1
What is the name of the item you wish to add to the list: Deodorant
What is the unit type: ML
How many do you wish to add: 1
Finally what's its price: 12.98

Which option do you elect?  Enter 1, 2, 3, or 4: 4

Thank you running the program.  Goodbye.
==2654==
==2654== HEAP SUMMARY:
==2654==     in use at exit: 0 bytes in 0 blocks
==2654==   total heap usage: 54 allocs, 54 frees, 2,299 bytes
allocated
==2654==
==2654== All heap blocks were freed -- no leaks are possible
==2654==
==2654== For counts of detected and suppressed errors, rerun with: -v
==2654== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 1 from
1)
```

I added six items to the list with no trouble involving memory leaks or lost data.

Test 2

My intentions were to test my formatting code for the printList() function to ensure the alignments were correct and the data entered was correct. I added two items to the list and printed the items to ensure it was printing correctly

```
Welcome, this program allows you to create a grocery list.  Below are
the options provided to you.
1. Add item to list
2. Remove Item from List
3. Print the list
4. Exit the program.

Which option do you elect?  Enter 1, 2, 3, or 4: 1
What is the name of the item you wish to add to the list: Steak
What is the unit type: Pounds
How many Steak's do you wish to add to the list: 4
Finally what's its price: 12.90

Which option do you elect?  Enter 1, 2, 3, or 4: 1
What is the name of the item you wish to add to the list: Fruits
What is the unit type: LBS
```

How many Fruits's do you wish to add to the list: 15
Finally what's its price: 9.87

Which option do you elect? Enter 1, 2, 3, or 4: 3

Item Name	Unit	No. Units	Price
Steak	Pounds	4	$12.90
Fruits	LBS	15	$9.87

Total Cost of the Grocery List: $0.00

Which option do you elect? Enter 1, 2, 3, or 4: 4

Thank you running the program. Goodbye.
Program ended with exit code: 0

I immediately noticed by totalListCost function was not correctly printing so I addressed it in my next round of testing

```
flip2 ~/Prog2Summer/Assignment1 169% make
g++ -c Items.cpp
g++ -c List.cpp
g++ Items.o List.o Assignment1Main.cpp -o Assignment1
valgrind --tool=memcheck --leak-check=yes Assignment1
==26603== Memcheck, a memory error detector
==26603== Copyright (C) 2002-2013, and GNU GPL'd, by Julian Seward et
al.
==26603== Using Valgrind-3.10.0 and LibVEX; rerun with -h for
copyright info
==26603== Command: Assignment1
==26603==
Welcome, this program allows you to create a grocery list.  Below are
the options provided to you.
1. Add item to list
2. Remove Item from List
3. Print the list
4. Exit the program.

Which option do you elect?  Enter 1, 2, 3, or 4: 1
What is the name of the item you wish to add to the list: Coca Cola
What is the unit type: Liters
How many Coca Cola 's do you wish to add to the list: 5
Finally what's its price: 1.99

Which option do you elect?  Enter 1, 2, 3, or 4: 1
What is the name of the item you wish to add to the list: Boars Head
Turkey
What is the unit type: LBS
How many Boars Head Turkey's do you wish to add to the list: 1
Finally what's its price: 11.99
```

```
Which option do you elect?  Enter 1, 2, 3, or 4: 1
What is the name of the item you wish to add to the list: Deodorant
What is the unit type: Ounces
How many Deodorant 's do you wish to add to the list: 1
Finally what's its price: 5.99

Which option do you elect?  Enter 1, 2, 3, or 4: 1
What is the name of the item you wish to add to the list: Fruits
What is the unit type: LBS
How many Fruits 's do you wish to add to the list: 15
Finally what's its price: .65

Which option do you elect?  Enter 1, 2, 3, or 4: 1
What is the name of the item you wish to add to the list: Frozen Pizza
What is the unit type: LBS
How many Frozen Pizza's do you wish to add to the list: 8
Finally what's its price: 16.99

Which option do you elect?  Enter 1, 2, 3, or 4: 1
What is the name of the item you wish to add to the list: Veggies
What is the unit type: LBS
How many Veggies's do you wish to add to the list: 6
Finally what's its price: 2.56

Which option do you elect?  Enter 1, 2, 3, or 4: 3

Item Name            Unit      No. Units   Price
------------------   -------   ---------   -----
Coca Cola            Liters    5           $1.99
Boars Head Turkey    LBS       1           $11.99
Deodorant            Ounces    1           $5.99
Fruits               LBS       15          $0.65
Frozen Pizza         LBS       8           $16.99
Veggies              LBS       6           $2.56
-------------------------------------
Total Cost of the Grocery List: $188.96

Which option do you elect?  Enter 1, 2, 3, or 4: 4

Thank you running the program.  Goodbye.
==26603==
==26603== HEAP SUMMARY:
==26603==     in use at exit: 0 bytes in 0 blocks
==26603==   total heap usage: 58 allocs, 58 frees, 2,475 bytes
allocated
==26603==
==26603== All heap blocks were freed -- no leaks are possible
==26603==
==26603== For counts of detected and suppressed errors, rerun with: -v
```

```
==26603== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 1 from
1)
```

In the code above I also changed the code from cin >> name to getline(cin, name) in order to accept items with blank spaces in between characters. The total cost function is working correctly

Test 3

Assuming correct input from the user, in regards to capitalization and white spaces, the program should detect if an item already exits. Based on the test below it appears it does detect such requests.

```
Welcome, this program allows you to create a grocery list.  Below are
the options provided to you.
1. Add item to list
2. Remove Item from List
3. Print the list
4. Exit the program.

Which option do you elect?  Enter 1, 2, 3, or 4: 1
What is the name of the item you wish to add to the list: Coca Cola
What is the unit type: Liters
How many Coca Cola's do you wish to add to the list: 5
Finally what's its price: 1.99

Which option do you elect?  Enter 1, 2, 3, or 4: Coca Cola
You did not enter a number.  Please enter a number: Liters
You did not enter a number.  Please enter a number: 17
Your selection was invalid.  Please try again:
Which option do you elect?  Enter 1, 2, 3, or 4: 1
What is the name of the item you wish to add to the list: Coca Cola
What is the unit type: Liters
How many Coca Cola's do you wish to add to the list: 17
Finally what's its price: 1.99
The item is already in the list.

Which option do you elect?  Enter 1, 2, 3, or 4: 3

Item Name            Unit      No. Units   Price
-----------------    -------   ---------   -----
Coca Cola            Liters    5           $1.99
-------------------------------------
Total Cost of the Grocery List: $9.95
```

Test 4

The final test is the my testing of the remove function and all of the functions combined.

In particular I'm interested in ensuring the remove functions does the following:

1. Not remove anything when the list is empty
2. When the list is only of size 1, simply create a new dynamic array of type item and reassign the pointer to the new array and destroy the old array
3. Ensure the function does not go out of bounds, especially when it's the last item being removed
4. If the item being removed is NOT the first or last item in the array, that the function correctly copy/shift the items that follow AFTER the item we are removing

Below are my test results

```
Welcome, this program allows you to create a grocery list.  Below are
the options provided to you.
1. Add item to list
2. Remove Item from List
3. Print the list
4. Exit the program.

Which option do you elect?  Enter 1, 2, 3, or 4: 1
What is the name of the item you wish to add to the list: Coca Cola
What is the unit type: Liters
How many Coca Cola 's do you wish to add to the list: 4
Finally what's its price: 5.99

Which option do you elect?  Enter 1, 2, 3, or 4: Oranges
You did not enter a number.  Please enter a number: LBS
You did not enter a number.  Please enter a number: 2
Please type the name of the item you wish to remove from the list:
15.00
The item your requesting to remove is not in the list.  Please make
sure you typed it in correctly.

Which option do you elect?  Enter 1, 2, 3, or 4: 1
What is the name of the item you wish to add to the list: Oranges
What is the unit type: LBS
How many Oranges's do you wish to add to the list: 3
Finally what's its price: 15.00

Which option do you elect?  Enter 1, 2, 3, or 4: 1
What is the name of the item you wish to add to the list: Highliters
What is the unit type: Ounces
How many Highliters's do you wish to add to the list: 3
Finally what's its price: .79

Which option do you elect?  Enter 1, 2, 3, or 4: 3

Item Name            Unit      No. Units   Price
-----------------    -------   ---------   -----
Coca Cola            Liters    4           $5.99
```

```
Oranges              LBS       3           $15.00
Highliters           Ounces    3           $0.79
-------------------------------------------------
Total Cost of the Grocery List: $71.33

Which option do you elect?  Enter 1, 2, 3, or 4: 2
Please type the name of the item you wish to remove from the list:
Highliters

// removing an item in the middle of the list

Which option do you elect?  Enter 1, 2, 3, or 4: 3

Item Name            Unit      No. Units   Price
------------------   -------   ---------   -----
Coca Cola            Liters    4           $5.99
Oranges              LBS       3           $15.00
-------------------------------------------------
Total Cost of the Grocery List: $68.96

Which option do you elect?  Enter 1, 2, 3, or 4: 2
Please type the name of the item you wish to remove from the list:
Coca Cola
The item your requesting to remove is not in the list.  Please make
sure you typed it in correctly.

Which option do you elect?  Enter 1, 2, 3, or 4: Coca Cola
You did not enter a number.  Please enter a number: 2
Please type the name of the item you wish to remove from the list:
Coca Cola

// removed the first item on the list

Which option do you elect?  Enter 1, 2, 3, or 4: 3

Item Name            Unit      No. Units   Price
------------------   -------   ---------   -----
Oranges              LBS       3           $15.00
-------------------------------------------------
Total Cost of the Grocery List: $45.00

Which option do you elect?  Enter 1, 2, 3, or 4: 2
Please type the name of the item you wish to remove from the list:
Oranges

Which option do you elect?  Enter 1, 2, 3, or 4: 3

The list is empty

Which option do you elect?  Enter 1, 2, 3, or 4: 1
```

What is the name of the item you wish to add to the list: Water
What is the unit type: Ounces
How many Water's do you wish to add to the list: 10
Finally what's its price: 8.90

Which option do you elect? Enter 1, 2, 3, or 4: 1
What is the name of the item you wish to add to the list: Soda
What is the unit type: Liters
How many Soda's do you wish to add to the list: 1.99
Finally what's its price: 1.99

Which option do you elect? Enter 1, 2, 3, or 4: 1
What is the name of the item you wish to add to the list: Bananas
What is the unit type: LBS
How many Bananas's do you wish to add to the list: 1
Finally what's its price: .65

Which option do you elect? Enter 1, 2, 3, or 4: 1
What is the name of the item you wish to add to the list: Candy
What is the unit type: LBS
How many Candy's do you wish to add to the list: 2
Finally what's its price: .98

Which option do you elect? Enter 1, 2, 3, or 4: 3

Item Name	Unit	No. Units	Price
Water	Ounces	10	$8.90
Soda	Liters	1	$1.99
Bananas	LBS	1	$0.65
Candy	LBS	2	$0.98

Total Cost of the Grocery List: $93.60

Which option do you elect? Enter 1, 2, 3, or 4: 2
Please type the name of the item you wish to remove from the list:
Candy

// removed the last item on the list

Which option do you elect? Enter 1, 2, 3, or 4: 3

Item Name	Unit	No. Units	Price
Water	Ounces	10	$8.90
Soda	Liters	1	$1.99
Bananas	LBS	1	$0.65

Total Cost of the Grocery List: $91.64

```
Which option do you elect?  Enter 1, 2, 3, or 4: 2
Please type the name of the item you wish to remove from the list:
Soda

Which option do you elect?  Enter 1, 2, 3, or 4: 3

Item Name            Unit      No. Units   Price
------------------   -------   ---------   -----
Water                Ounces    10          $8.90
Bananas              LBS       1           $0.65
-------------------------------------------------
Total Cost of the Grocery List: $89.65

Which option do you elect?  Enter 1, 2, 3, or 4: 4

Thank you running the program.  Goodbye.
Program ended with exit code: 0
```

Test 5

One final test on flip to ensure there is no memory leaks or errors

```
flip3 ~/Prog2Summer 153% ls
Assignment1  LabA  modA
flip3 ~/Prog2Summer 154% cd Assignment1
flip3 ~/Prog2Summer/Assignment1 155% make
g++ -c Items.cpp
g++ -c List.cpp
g++ Items.o List.o Assignment1Main.cpp -o Assignment1
valgrind --tool=memcheck --leak-check=yes Assignment1
==29526== Memcheck, a memory error detector
==29526== Copyright (C) 2002-2013, and GNU GPL'd, by Julian Seward et
al.
==29526== Using Valgrind-3.10.0 and LibVEX; rerun with -h for
copyright info
==29526== Command: Assignment1
==29526==
Welcome, this program allows you to create a grocery list.  Below are
the options provided to you.
1. Add item to list
2. Remove Item from List
3. Print the list
4. Exit the program.

Which option do you elect?  Enter 1, 2, 3, or 4: 1
What is the name of the item you wish to add to the list: Soda
What is the unit type: Liters
How many Soda's do you wish to add to the list: 3
Finally what's its price: 4.79
```

```
Which option do you elect?  Enter 1, 2, 3, or 4: 1
What is the name of the item you wish to add to the list: Cake
What is the unit type: LBS
How many Cake's do you wish to add to the list: 2
Finally what's its price: 15.87

Which option do you elect?  Enter 1, 2, 3, or 4: 1
What is the name of the item you wish to add to the list: Water
What is the unit type: Liters
How many Water's do you wish to add to the list: 5
Finally what's its price: 3.39

Which option do you elect?  Enter 1, 2, 3, or 4: 2
Please type the name of the item you wish to remove from the list:
Soda

We successfully removed the item from the list.

Which option do you elect?  Enter 1, 2, 3, or 4: 3

Item Name            Unit      No. Units   Price
------------------   -------   ---------   -----
Cake                 LBS       2           $15.87
Water                Liters    5           $3.39
-----------------------------------------------
Total Cost of the Grocery List: $48.69

Which option do you elect?  Enter 1, 2, 3, or 4: 2
Please type the name of the item you wish to remove from the list:
Water

We successfully removed the item from the list.

Which option do you elect?  Enter 1, 2, 3, or 4: 3

Item Name            Unit      No. Units   Price
------------------   -------   ---------   -----
Cake                 LBS       2           $15.87
-----------------------------------------------
Total Cost of the Grocery List: $31.74

Which option do you elect?  Enter 1, 2, 3, or 4: 2
Please type the name of the item you wish to remove from the list:
Cake

We successfully removed the item from the list.

Which option do you elect?  Enter 1, 2, 3, or 4: 3
```

```
The list is empty

Which option do you elect?  Enter 1, 2, 3, or 4: 1
What is the name of the item you wish to add to the list: Bananas
What is the unit type: LBS
How many Bananas's do you wish to add to the list: 15
Finally what's its price: .79

Which option do you elect?  Enter 1, 2, 3, or 4: 4

Thank you running the program.  Below is the final version of your
list.  Goodbye.

Item Name            Unit      No. Units   Price
-----------------    -------   ---------   -----
Bananas              LBS       15          $0.79
-------------------------------------------------
Total Cost of the Grocery List: $11.85
==29526==
==29526== HEAP SUMMARY:
==29526==     in use at exit: 0 bytes in 0 blocks
==29526==   total heap usage: 46 allocs, 46 frees, 1,839 bytes
allocated
==29526==
==29526== All heap blocks were freed -- no leaks are possible
==29526==
==29526== For counts of detected and suppressed errors, rerun with: -v
==29526== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 1 from
1)
flip3 ~/Prog2Summer/Assignment1 156%
```