

ESE 224 – Advanced Programming and Data Structures

Fall 20, Xin Wang

Laboratory 05: Review.

This laboratory is to be performed the week starting Oct. 5th.

Prerequisite Reading

Lecture Slides for Chapter 1 - 6

Purpose

The purpose of this laboratory is to practice what we have learned so far.

Review Content

- I. Programmer-Defined Function*
 - A. Function Prototype and Definition
- II. Parameter Passing*
 - A. Pass by value
 - B. Pass by reference
- III. Scope*
 - A. Global and local variable
- IV. Control Structures: Selection and Repetition*
 - A. Switch, while, if/else, etc.
- V. File operation*
 - A. Reading and generating data files
- VI. Standard Input & Output*
 - A. cin and cout
- VII. C++ Class*
 - A. Class Declaration & Class implementation

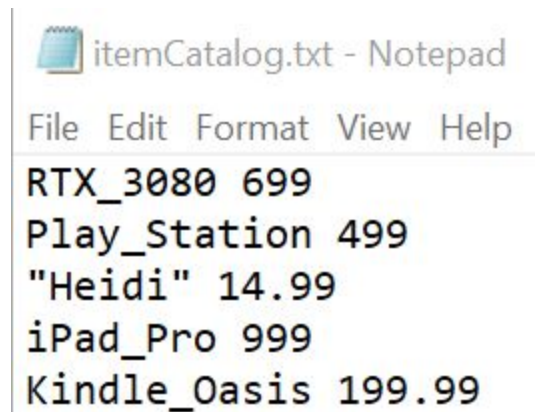
Laboratory Tasks Overview

In this laboratory, you will write a class that manages a shopping list called **shoppingList.cpp** that runs on **ShoppingListManager.cpp** (the main program). A shopping list is simply a list of items and prices, here is an overview of our member functions in **shoppingList.h**:

```
class ShoppingList
{
private:
    string file_name;
    fstream myFile;
    string most_expensive_item;
    double max_price;
    string name;
    double price;
public:
    ShoppingList();
    bool fileExists(istream& in);
    void addItem(istream& in);
    bool itemExist(istream& in);
    void printMostExpensiveItem();
    void printAll();
};
```

You may have different member variables and constructors, **but you must include the member functions shown above.**

Also, this is the sample input file:



```
RTX_3080 699
Play_Station 499
"Heidi" 14.99
iPad_Pro 999
Kindle_Oasis 199.99
```

Task 1: Write a member function called **bool fileExists(istream& in)** and **printAll()** in your ShoppingList.cpp class. The former asks the user to input the name of the input file, and **return true if it exists (quit the program immediately if otherwise)**, the latter simply asks the user to read the file and **print everything**.

Sample output:

```
Opening Shopping_List_Manager . . .
Please enter the file name: itemCatalog.txt
Successfully opens the target file!

(a) - add an item and its price
(i) - check to see if this item exists
(e) - print the most expensive item in the list
(p) - print all items and its price
(q) - quit the program

Please select an option: p

1. RTX_3080           $699
2. Play_Station       $499
3. "Heidi"            $14.99
4. iPad_Pro           $999
5. Kindle_Oasis       $199.99
```

PS. You might want to use the **fstream**, because it has the capabilities of both ofstream and ifstream which means you can read and write at the same time.

Task 2: Write a member function called `bool itemExists(istream& in)` in your `ShoppingList.cpp` class. This function checks if the user input item exists in the `input.txt`. **If it exists, display its price.**

Sample Output:

```
(a) - add an item and its price
(i) - check to see if this item exists
(e) - print the most expensive item in the list
(p) - print all items and its price
(q) - quit the program

Please select an option: i

Enter the item name: iPad_Pro

The item exists and it costs $999

(a) - add an item and its price
(i) - check to see if this item exists
(e) - print the most expensive item in the list
(p) - print all items and its price
(q) - quit the program

Please select an option: i

Enter the item name: iPhone_11

The item does not exist
```

P.S. You may want to use the following functions after `myFile.eof()`:

```
myFile.seekg(0,ios::end); //this moves the cursor to the end of the file.
myFile.seekg(0, ios::beg); //this moves the cursor to the start of the file.
```

P.P.S. By finishing task 1, you already open the file, so **you don't need to open it again** in this or other task; **you don't need to close it either**, because you can't read a closed file.

Task 3: Write a member function called **void printMostExpensiveItem()** in your `ShoppingList.cpp` class.

Sample Output:

```
(a) - add an item and its price
(i) - check to see if this item exists
(e) - print the most expensive item in the list
(p) - print all items and its price
(q) - quit the program

Please select an option: e

The most expensive item is iPad_Pro and it costs $999
```

Task 4: Write a member function called **void addItem()** in your ShoppingList.cpp class, and verify its functionality by using functions you created from task 2 and 3.

Sample Output:

```
Please select an option: a

Enter item name and its price: iPhone_11 699.99

(a) - add an item and its price
(i) - check to see if this item exists
(e) - print the most expensive item in the list
(p) - print all items and its price
(q) - quit the program

Please select an option: p

1. RTX_3080           $699
2. Play_Station       $499
3. "Heidi"            $14.99
4. iPad_Pro           $999
5. Kindle_Oasis       $199.99
6. iPhone_11          $699.99
```

```
(a) - add an item and its price
(i) - check to see if this item exists
(e) - print the most expensive item in the list
(p) - print all items and its price
(q) - quit the program

Please select an option: e

The most expensive item is iPad_Pro and it costs $999

(a) - add an item and its price
(i) - check to see if this item exists
(e) - print the most expensive item in the list
(p) - print all items and its price
(q) - quit the program

Please select an option: i

Enter the item name: iPhone_11

The item exists and it costs $699.99
```