This programming project is due on Monday, December 2, 2019.

Inventory Application Program

This project involves designing and creating a C++ program that will utilize the **InventoryItem** class, which is described in Section 13.10 (pages 771-775) and Section 13.12 (pages 777-780) of the Gaddis textbook. (The **`InventoryItem.h`** source code for this class is provided on Moodle.)

The program should create an array of 100 **InventoryItem** objects and support the following interactive commands:

- a **A**dd parts: increase the **units** value for an existing inventory item.
- h print **H**elp text.
- i **I**nput inventory data from a file.
- p **Print** inventory list.
- n create a **N**ew inventory Item.
- o **O**utput inventory data to a file.
- q **q**uit (end the program).
- r **R**emove parts: reduce the **units** value for an existing inventory item.

Data File Format

The "input" / "output" commands read / write data which is in a "pipe-delimited" text file.

The format of each line of text, in the data file, is described below:

File Format
inventory item number | *description* | *cost* | *units*

Explanation of Data Fields	
Field name	**Explanation**
inventory item number	For the *output* file, this number can be the same as the array index. For the *input* file, the contents of this field will be ignored, because the input data will be appended to the end of the "populated" portion of the *InventoryItem* array.
description	Description of the inventory item
cost	Cost per unit for the inventory item
units	Number of units present for the inventory item (must be greater than or equal to zero and less than or equal to 30).

Important Design Requirement

The **output** file format must be the same as the **input** file format. That is, any file that your program creates with the "**o**" command must be readable with the "**i**" command.

Sample Test Data

Four sample input files are provided: **electrical.txt**, **fasteners.txt**, **miscellaneous.txt** and **plumbing.txt**. The data files that your program creates must obey the same file format as these sample files. The program should work correctly with these files, as well as general files of similar format.

electrical.txt

```
0|Cable|5.00|18
1|Extension Cord (14/3, 25 ft)|27.95|6
2|Light switch (15 amp)|2.79|10
3|Ceiling Fan (52 inch)|79.95|3
4|Vinyl Electrical Tape (20 ft roll)|0.79|30
5|GFI Tester|9.35|5
```

fasteners.txt

```
0|Turnbuckle|3.80|25
1|Siding nails (box of 100)|4.00|20
2|Flat washer (box of 100)|2.80|30
3|Machine screw (box of 100)|3.20|10
4|Hex bolt (box of 100)|6.50|23
5|Hex nut (box of 100)|3.80|15
6|Sheet Metal Screw (qty 100)|1.50|28
```

miscellaneous.txt

```
0|Door Hinges (3-pack)|6.30|10
1|Rubber work boots (1 pair)|28.00|5
2|Leather Work Gloves (1 pair)|12.00|8
3|Long Handle Grass Shear|30.00|5
```

plumbing.txt

```
0|Pump|39.00|20
1|Gasket|1.50|29
2|Water Level Guage|12.99|30
3|Faucet Repair Kit|4.89|8
4|Teflon Thread Seal Tape (50 ft roll)|3.30|12
5|shutoff valve|6.50|10
```

Sample Interactive Session

In the sample data on the next several pages, what the user types is shown in **bold**. In actuality, what the user types would appear as the same text format as the rest of the output.

Sample Interactive Session

```
Command: h
Supported commands:
                a               Add parts.
                h               print Help text.
                i               Input inventory data from a file.
                p               Print inventory list.
                n               New inventory Item.
                o               Output inventory data to a file.
                q               quit (end the program).
                r               Remove parts.

Command: i
Enter name of input file: plumbing.txt
6 records loaded to array.
Command: p

Item Num    Description                                  Cost    Quantity
________    ___________                                  ____    ________
   0        Pump                                        39.00          20
   1        Gasket                                       1.50          29
   2        Water Level Guage                           12.99          30
   3        Faucet Repair Kit                            4.89           8
   4        Teflon Thread Seal Tape (50 ft roll)         3.30          12
   5        shutoff valve                                6.50          10
6 records.
Command: i
Enter name of input file: electrical.txt
6 records loaded to array.
Command: p

Item Num    Description                                  Cost    Quantity
________    ___________                                  ____    ________
   0        Pump                                        39.00          20
   1        Gasket                                       1.50          29
   2        Water Level Guage                           12.99          30
   3        Faucet Repair Kit                            4.89           8
   4        Teflon Thread Seal Tape (50 ft roll)         3.30          12
   5        shutoff valve                                6.50          10
   6        Cable                                        5.00          18
   7        Extension Cord (14/3, 25 ft)                27.95           6
   8        Light switch (15 amp)                        2.79          10
   9        Ceiling Fan (52 inch)                       79.95           3
   10       Vinyl Electrical Tape (20 ft roll)           0.79          30
   11       GFI Tester                                   9.35           5
12 records.
```

Sample Interactive Session

```
Command: a

Choose a Item Number: 7
How many parts to add? 5
Command: p

Item Num    Description                                  Cost    Quantity
_______     ___________                                  ____    ________
   0        Pump                                        39.00          20
   1        Gasket                                       1.50          29
   2        Water Level Guage                           12.99          30
   3        Faucet Repair Kit                            4.89           8
   4        Teflon Thread Seal Tape (50 ft roll)         3.30          12
   5        shutoff valve                                6.50          10
   6        Cable                                        5.00          18
   7        Extension Cord (14/3, 25 ft)                27.95          11
   8        Light switch (15 amp)                        2.79          10
   9        Ceiling Fan (52 inch)                       79.95           3
   10       Vinyl Electrical Tape (20 ft roll)           0.79          30
   11       GFI Tester                                   9.35           5
12 records.
Command: r

Choose a Item Number: 9
How many parts to remove? 5

Error:  You are attempting to remove more parts than the Item currently holds.
Command: r

Choose a Item Number: 9
How many parts to remove? 3
Command: p

Item Num    Description                                  Cost    Quantity
_______     ___________                                  ____    ________
   0        Pump                                        39.00          20
   1        Gasket                                       1.50          29
   2        Water Level Guage                           12.99          30
   3        Faucet Repair Kit                            4.89           8
   4        Teflon Thread Seal Tape (50 ft roll)         3.30          12
   5        shutoff valve                                6.50          10
   6        Cable                                        5.00          18
   7        Extension Cord (14/3, 25 ft)                27.95          11
   8        Light switch (15 amp)                        2.79          10
   9        Ceiling Fan (52 inch)                       79.95           0
   10       Vinyl Electrical Tape (20 ft roll)           0.79          30
   11       GFI Tester                                   9.35           5
12 records.
```

Sample Interactive Session

```
Command: o
Enter name of output file: testData01.txt
12 records written to file.
Command: i
Enter name of input file: testData01.txt
12 records loaded to array.
Command: p

Item Num    Description                                Cost    Quantity
________    ___________                                ____    ________
   0        Pump                                      39.00          20
   1        Gasket                                     1.50          29
   2        Water Level Guage                         12.99          30
   3        Faucet Repair Kit                          4.89           8
   4        Teflon Thread Seal Tape (50 ft roll)       3.30          12
   5        shutoff valve                              6.50          10
   6        Cable                                      5.00          18
   7        Extension Cord (14/3, 25 ft)              27.95          11
   8        Light switch (15 amp)                      2.79          10
   9        Ceiling Fan (52 inch)                     79.95           0
   10       Vinyl Electrical Tape (20 ft roll)         0.79          30
   11       GFI Tester                                 9.35           5
   12       Pump                                      39.00          20
   13       Gasket                                     1.50          29
   14       Water Level Guage                         12.99          30
   15       Faucet Repair Kit                          4.89           8
   16       Teflon Thread Seal Tape (50 ft roll)       3.30          12
   17       shutoff valve                              6.50          10
   18       Cable                                      5.00          18
   19       Extension Cord (14/3, 25 ft)              27.95          11
   20       Light switch (15 amp)                      2.79          10
   21       Ceiling Fan (52 inch)                     79.95           0
   22       Vinyl Electrical Tape (20 ft roll)         0.79          30
   23       GFI Tester                                 9.35           5
24 records.
Command: n
Enter description for new Item: Broom
Enter unit cost for new Item: 9.99
Enter initial quantity for the new Item: 12
Announcing a new inventory Item: Broom
We now have 25 different inventory Items in stock!
Command: p

Item Num    Description                                Cost    Quantity
________    ___________                                ____    ________
   0        Pump                                      39.00          20
   1        Gasket                                     1.50          29
   2        Water Level Guage                         12.99          30
   3        Faucet Repair Kit                          4.89           8
```

Sample Interactive Session

```
   4        Teflon Thread Seal Tape (50 ft roll)      3.30          12
   5        shutoff valve                             6.50          10
   6        Cable                                     5.00          18
   7        Extension Cord (14/3, 25 ft)             27.95          11
   8        Light switch (15 amp)                     2.79          10
   9        Ceiling Fan (52 inch)                    79.95           0
   10       Vinyl Electrical Tape (20 ft roll)        0.79          30
   11       GFI Tester                                9.35           5
   12       Pump                                     39.00          20
   13       Gasket                                    1.50          29
   14       Water Level Guage                        12.99          30
   15       Faucet Repair Kit                         4.89           8
   16       Teflon Thread Seal Tape (50 ft roll)      3.30          12
   17       shutoff valve                             6.50          10
   18       Cable                                     5.00          18
   19       Extension Cord (14/3, 25 ft)             27.95          11
   20       Light switch (15 amp)                     2.79          10
   21       Ceiling Fan (52 inch)                    79.95           0
   22       Vinyl Electrical Tape (20 ft roll)        0.79          30
   23       GFI Tester                                9.35           5
   24       Broom                                     9.99          12
25 records.
Command: n
Enter description for new Item: Dust Pan
Enter unit cost for new Item: 5.99
Enter initial quantity for the new Item: 5
Announcing a new inventory Item: Dust Pan
We now have 26 different inventory Items in stock!
Command: p

Item Num    Description                                Cost    Quantity
_______     ___________                                ____    ________
   0        Pump                                     39.00          20
   1        Gasket                                    1.50          29
   2        Water Level Guage                        12.99          30
   3        Faucet Repair Kit                         4.89           8
   4        Teflon Thread Seal Tape (50 ft roll)      3.30          12
   5        shutoff valve                             6.50          10
   6        Cable                                     5.00          18
   7        Extension Cord (14/3, 25 ft)             27.95          11
   8        Light switch (15 amp)                     2.79          10
   9        Ceiling Fan (52 inch)                    79.95           0
   10       Vinyl Electrical Tape (20 ft roll)        0.79          30
   11       GFI Tester                                9.35           5
   12       Pump                                     39.00          20
   13       Gasket                                    1.50          29
   14       Water Level Guage                        12.99          30
   15       Faucet Repair Kit                         4.89           8
   16       Teflon Thread Seal Tape (50 ft roll)      3.30          12
   17       shutoff valve                             6.50          10
   18       Cable                                     5.00          18
```

Sample Interactive Session

```
   19       Extension Cord (14/3, 25 ft)                27.95          11
   20       Light switch (15 amp)                        2.79          10
   21       Ceiling Fan (52 inch)                       79.95           0
   22       Vinyl Electrical Tape (20 ft roll)           0.79          30
   23       GFI Tester                                   9.35           5
   24       Broom                                        9.99          12
   25       Dust Pan                                     5.99           5
26 records.
Command: o
Enter name of output file: testData02.txt
26 records written to file.
Command: n
Enter description for new Item: Gasoline Can
Enter unit cost for new Item: 8.99
Enter initial quantity for the new Item: 34
ERROR: initial quantity must be >= zero and <= 30.
Enter initial quantity for the new Item: 29
Announcing a new inventory Item: Gasoline Can
We now have 27 different inventory Items in stock!
Command: p

Item Num    Description                                  Cost    Quantity
________    ___________                                  ____    ________
   0        Pump                                        39.00          20
   1        Gasket                                       1.50          29
   2        Water Level Guage                           12.99          30
   3        Faucet Repair Kit                            4.89           8
   4        Teflon Thread Seal Tape (50 ft roll)         3.30          12
   5        shutoff valve                                6.50          10
   6        Cable                                        5.00          18
   7        Extension Cord (14/3, 25 ft)                27.95          11
   8        Light switch (15 amp)                        2.79          10
   9        Ceiling Fan (52 inch)                       79.95           0
   10       Vinyl Electrical Tape (20 ft roll)           0.79          30
   11       GFI Tester                                   9.35           5
   12       Pump                                        39.00          20
   13       Gasket                                       1.50          29
   14       Water Level Guage                           12.99          30
   15       Faucet Repair Kit                            4.89           8
   16       Teflon Thread Seal Tape (50 ft roll)         3.30          12
   17       shutoff valve                                6.50          10
   18       Cable                                        5.00          18
   19       Extension Cord (14/3, 25 ft)                27.95          11
   20       Light switch (15 amp)                        2.79          10
   21       Ceiling Fan (52 inch)                       79.95           0
   22       Vinyl Electrical Tape (20 ft roll)           0.79          30
   23       GFI Tester                                   9.35           5
   24       Broom                                        9.99          12
   25       Dust Pan                                     5.99           5
   26       Gasoline Can                                 8.99          29
```

Sample Interactive Session

```
27 records.
Command: i
Enter name of input file: fasteners.txt
7 records loaded to array.
Command: i
Enter name of input file: miscellaneous.txt
4 records loaded to array.
Command: p

Item Num    Description                          Cost    Quantity
________    ___________                          ____    ________
   0        Pump                                39.00          20
   1        Gasket                               1.50          29
   2        Water Level Guage                   12.99          30
   3        Faucet Repair Kit                    4.89           8
   4        Teflon Thread Seal Tape (50 ft roll) 3.30          12
   5        shutoff valve                        6.50          10
   6        Cable                                5.00          18
   7        Extension Cord (14/3, 25 ft)        27.95          11
   8        Light switch (15 amp)                2.79          10
   9        Ceiling Fan (52 inch)               79.95           0
   10       Vinyl Electrical Tape (20 ft roll)   0.79          30
   11       GFI Tester                           9.35           5
   12       Pump                                39.00          20
   13       Gasket                               1.50          29
   14       Water Level Guage                   12.99          30
   15       Faucet Repair Kit                    4.89           8
   16       Teflon Thread Seal Tape (50 ft roll) 3.30          12
   17       shutoff valve                        6.50          10
   18       Cable                                5.00          18
   19       Extension Cord (14/3, 25 ft)        27.95          11
   20       Light switch (15 amp)                2.79          10
   21       Ceiling Fan (52 inch)               79.95           0
   22       Vinyl Electrical Tape (20 ft roll)   0.79          30
   23       GFI Tester                           9.35           5
   24       Broom                                9.99          12
   25       Dust Pan                             5.99           5
   26       Gasoline Can                         8.99          29
   27       Turnbuckle                           3.80          25
   28       Siding nails (box of 100)            4.00          20
   29       Flat washer (box of 100)             2.80          30
   30       Machine screw (box of 100)           3.20          10
   31       Hex bolt (box of 100)                6.50          23
   32       Hex nut (box of 100)                 3.80          15
   33       Sheet Metal Screw (qty 100)          1.50          28
   34       Door Hinges (3-pack)                 6.30          10
   35       Rubber work boots (1 pair)          28.00           5
   36       Leather Work Gloves (1 pair)        12.00           8
   37       Long Handle Grass Shear             30.00           5
38 records.
```

Sample Interactive Session

```
Command: o
Enter name of output file: testData03.txt
38 records written to file.
Command: q
Exit.
```

Project Deliverables:

The project source file(s) should be submitted by Moodle, using the Moodle Activity:

CIT237_Project3

Submit your **.cpp** file(s) and any **.h** file(s) that you create. I will need to compile your code on my home computer in order to grade it. If you are submitting more than one file (**.cpp** and/or **.h**), do **not** enclose the files in a ZIP file. Moodle will allow you to submit multiple source files.
Do ***not*** submit the entire *Visual Studio* project.
Do ***not*** include the *Visual Studio* project folders, or any binary files.

If you have developed your program using some compiler *other* than *Visual C++*, be sure to compile and test your final version on one of the Windows 10 computers in our classroom before you submit it.

Grading Criteria

The project will be graded according to the following grading criteria:

Feature	Portion of grade
1. The program functions correctly.	65%

2. In the **main** function of the program, there is a loop which contains code to support the following input commands:
`a Add parts.`
`h print Help text.`
`i Input inventory data from a file.`
`p Print inventory list.`
`n New inventory Item.`
`o Output inventory data to a file.`
`q quit (end the program).`
`r Remove parts.`
	3%

3. The "command loop" in the **main** function should continue until the user enters a '**q**' command.	3%
4. Each of the commands (except the '**q**' command) should call a separate function. That is, the "**main**" function should not be excessively long.	3%
5. The '**i**' and '**o**' commands must each call another function that asks the user to specify the name of the input or output file. That is, the project must work for files with any name.	3%

Feature	Portion of grade
6. The program is clearly organized and **commented** so that it is easy to read and understand. At a minimum, there should be a comment at the beginning of each function that explains what that function does. Use your judgement regarding any additional comments that may be needed to make the program easy to understand, without over-commenting the program. (As you get more experience, your judgement about this will improve.) Do **NOT** put all of your code in the **main** function or any other function.	10%
7. Use good variable names and function names: • A variable name or function name should indicate something about what that variable or function does in the program. • Variable names and function names should be not too short and not too long.	5%
8. Cleanup any unused portions of code, such as "failed attempts" that you later replaced.	3%
9. Place a brief summary of the program in comments at the beginning of the source file(s). Also be sure these comments have your name and the due-date for the project.	3%
10. Cleanup any irrelevant comments	2%
Total:	100%