

In this assignment you will implement a program called "*nursery\_inv2.cpp*" to process the customer purchase orders for a nursery. There are ten values associated with each order, which are as follows: 1) a plant name (string, no spaces), 2) a county name (string, no space), 3) the cost of the plant (double), 4) the quantity of plants in the purchase (integer), 5) the tax on the purchase (double), 6) the net cost of the purchase (double), 7) the discount rate (double), 8) discount on the purchase (double), 9) the purchase tax (double), and 10) the total cost of the purchase (double). Your program will have 3 functions: input, process, and output. Your main program will call (invoke) each function until the end of the data file has been reached. Following are the descriptions of the functionality of each function:

1. The void function "**input**" will have five parameters: an input file stream called "**in**", the plant name (**pname**), the name of the county the plant was purchase in (**cname**), the cost of the plant (**plant\_cost**), and the quantity of the plant purchase (**quantity**). The function will read plant name, county name, plant cost and quantity record from the data file, "*nursery\_stock.txt*".
2. The void function "**process**" will calculate the **tax rate** (**tax\_rate**), the **net cost** of the purchase (**net\_cost**), the **discount rate** (**discount\_rate**), the **discount** on the purchase (**discount**), the **tax** on the purchase (**purchase\_tax**), and the **total cost** of the purchase (**total\_cost**). The function will have nine parameters which should appear in the following order: **cname**, **plant\_cost**, **quantity**, **tax\_rate**, **net\_cost**, **discount\_rate**, **discount**, **purchase\_tax**, and **total\_cost**. Please consider the following information to help you implement the necessary calculations:
  - a. The **tax rate (in percent) on a purchase** is based on the **county** where the purchase was made. If the county was **dade**, the tax rate is 5.5%; if the county is **broward**, the tax rate is 5%; if the county was **palm**, the tax rate is 6%.
  - b. The **net cost of a purchase** is calculated by the following formula:
    - $net\_cost = (quantity \times plant\_cost)$
  - c. The **discount** is based on the **quantity of plants** in the purchase. **The discount is determined is follows:**
    - If **quantity** equals 0, then the **discount** is 0% of the net cost;
    - If  $1 \leq quantity \leq 6$  then **discount** = 2% of the net cost;  $7 \leq quantity \leq 13$  then **discount** = 4% of the net cost ; if  $14 \leq quantity \leq 25$  then **discount** = 7% of the net cost;  $26 \leq quantity \leq 60$  then **discount** = 9% of the net cost; **quantity** >60 then **discount** =14% of the net cost) . **Apply discount after the net cost has been calculated.**
  - d. The **tax on a purchase** is calculated by the following formula:
    - $purchase\_tax = (net\_cost * tax\_rate / 100)$  **(drop /100 if you converted the rate from a percentage)**
  - e. The **total cost of a purchase (rounded to the nearest hundredth)** is calculated by the following formula:
    - $total\_cost = net\_cost + purchase\_tax - discount$  .

**Note :** **All tax and cost calculations should be rounded to the nearest**

*hundredths.*

3. The void function “**output**” will print ten values to the screen in the following order: plant name, county name, plant cost, quantity of plants, tax rate, net cost of purchase, discount rate, discount on purchase, purchase tax, and total cost. See the section below called “**Input Stream**” and “**Format of Output**” for more information. See “**Format of Input data file, “nursery\_stock.txt”**”.

*Use the following format information to print the variables:*

Field	Format
=====	
<b>Plant Name</b>	<b>string</b>
<b>County Name</b>	<b>string</b>
<b>Plant Cost</b>	<b>XXXX.XX</b>
<b>Quantity of Plants</b>	<b>XXXX</b>
<b>Tax Rate</b>	<b>XX.XX</b>
<b>Net Cost of Purchase</b>	<b>XXXXX.XX</b>
<b>Discount Rate</b>	<b>XX.XX</b>
<b>Discount on Purchase</b>	<b>XXXX.XX</b>
<b>Purchase Tax</b>	<b>XXXX.XX</b>
<b>Total Purchase</b>	<b>XXXXXXXX.XX</b>

You may implement more functions if you find it necessary. Please start the assignment ASAP, and ask questions to make sure you understand what you must do. **It is always good to start with the skeleton program I provide.** Remember to follow all style rules and to include all necessary documentation (consistent, indentation, proper variable names, pre/post conditions, program header, function headers, and so forth.) .

Finally, your input data file (*nursery\_stock.txt*) should be in the same directory as your program source file (nursery\_inv2.cpp) for your program to produce the correct output.

## Output Format for the Function “output”:

Consider the following sample output table when designing and implementing the function “output”:

(The output is in the following order: plant name, county name, plant cost, quantity, tax rate, net cost, discount rate, discount, purchase tax, total cost).

owl	dade	10.55	100	5.50	1055.00	14.00	147.70	58.02	965.33
hibiscus	broward	15.82	15	5.00	237.30	7.00	16.61	11.87	232.55
rose	dade	9.99	45	5.50	449.55	9.00	40.46	24.73	433.82
carnation	palm	7.99	32	6.00	255.68	9.00	23.01	15.34	248.01
rose	palm	7.99	60	6.00	479.40	9.00	43.15	28.76	465.02
widow	palm	25.75	5	6.00	128.75	2.00	2.58	7.72	133.90
carnation	dade	12.55	10	5.50	125.50	4.00	5.02	6.90	127.38
carnation	dade	12.55	8	5.50	100.40	4.00	4.02	5.52	101.91
lilly	broward	6.92	150	5.00	1038.00	14.00	145.32	51.90	944.58
xerabtgum	palm	13.63	50	6.00	681.50	9.00	61.34	40.89	661.05
yarrow	dade	22.85	20	5.50	457.00	7.00	31.99	25.14	450.14
zenobia	palm	37.19	32	6.00	1190.08	9.00	107.11	71.40	1154.38
zephyranthes	broward	62.82	40	5.00	2512.80	9.00	226.15	125.64	2412.29
daisy	broward	15.99	80	5.00	1279.20	14.00	179.09	63.96	1164.07
aconitum	dade	30.02	72	5.50	2161.44	14.00	302.60	118.88	1977.72
amaryllis	dade	16.14	65	5.50	1049.10	14.00	146.87	57.70	959.93
bogonia	broward	18.45	3	5.00	55.35	2.00	1.11	2.77	57.01
bellflow	broward	2.96	200	5.00	592.00	14.00	82.88	29.60	538.72
bergenia	palm	85.92	10	6.00	859.20	4.00	34.37	51.55	876.38

## Input Stream:

In the assignment you will declare one ifstream to bind your input to the file “*nursery\_stock.txt*” to an input file stream. Whenever a program performs file i/o you must include the “*fstream*” library. **Add the following statements to your program:**

For source file, “*nursery\_inv2.cpp*”

- Add “#include <iostream>” to your #include statements in your source file.
- Add “#include <fstream>” to your # include statements in your source file.
- Add “#include <string>” to your # include statement in your source file.
- Add “#include <iomanip>” all formatting of output

**Format of the input data file (input filename is “nursery\_stock.txt”):**

Do not include column titles in your data file. Field as order as follows: plant name, county name, plant cost, quantity.

Owl	dade	10.55	100
Hibiscus	broward	15.82	15
Rose	dade	9.99	45
carnation	palm	7.99	32
Rose	palm	7.99	60
Widow	palm	25.75	5
carnation	dade	12.55	10
carnation	dade	12.55	8
Lilly	broward	6.92	150
xerabtgemum	palm	13.63	50
Yarrow	dade	22.85	20
Zenobia	palm	37.19	32
zephyranthes	broward	62.82	40
Daisy	broward	15.99	80
aconitum	dade	30.02	72
amaryllis	dade	16.14	65
Begonia	broward	18.45	3
Bellflow	broward	2.96	200
bergenia	palm	85.92	10

**Use the following skeleton to help you start this program which is included as a cpp file in the module: nursery\_inv2.cpp**

```
//THIS IS ONLY AN EXAMPLE TO HELP YOU GET STARTED WITH THIS ASSIGNMENT
```

```
//EXAMPLE OF PROGRAM HEADER
```

```

*****
*****

```

Name: \_\_\_\_\_ Z#: \_\_\_\_\_  
 Course: Foundations of Computer Science (COP3014)  
 Professor: Dr. Lofton Bullard  
 Due Date: \_\_\_\_\_ Total Points: 20  
 Assignment#: Assignment#2 (nursery\_inv2.cpp)

Description:

```

*****
***** /

```

```
//Include the following
```

```
#include <iostream>
#include <string>
#include <fstream> //you must include this library if you wish to do file i/o
#include <iomanip>
using namespace std;
```

```

/*****
//Following is the declaration of a order record
*****/

```

```
//Prototypes for your functions: input, output, and process will go here
void input(ifstream &, string &, string &, double &, int &);
void process(const string, const double, const int, double &, double &, double &, double &, double &);
void output(const string, const string, const double, const int, const double&, const double &, const double &, const double &, const double&, const double&, const double&);
```

```
//Function Implementations will go here
```

```

//*****
//Name:  input
//Precondition: State what is true before the function is called.
// Example: the variables (formal parameters) have not been initialized
//Postcondition: State what is true after the function has executed.
// Example: the variables (formal parameters) have been initialized
//Description:
// Example:Get input (values of plant name, county name, plant cost, quantity )
//from data file.

```

```
//PURPOSE: SHOW ME THAT YOU KNOW HOW TO READ INPUT AND USE INPUT (CALL BY VALUE) & OUTPUT (CALL BY VALUE) PARAMETERS
```

```

//*****

```

```

void input(ifstream & in,string & pname,string & cname, double & plant_cost,int & quantity) //
example using the call by reference mechanism in C++ -- call record is passed by reference --note &
operator
{
    //put your code here...
}

//*****
//Name: process
//Precondition: The state what is true before the function is called.
//Postcondition: State what is true after the function has executed.
//Description: Describe what the function does (purpose).
//*****

void process(const string cname, const double plant_cost, const int quantity, double& tax_rate,
double& net_cost, double& discount_rate, double& discount, double& purchase_tax, double&
total_cost)
{
    //put the code for your calculations here...
}

//*****
//Name: output
//Precondition: State what is true before the function is called.
//Postcondition: State what is true after the function has executed.
//Description: Describe what the function does (purpose).
//*****

void output(const string pname, const string cname, const double plant_cost, const int quantity,
double& tax_rate,
double& net_cost, double& discount_rate, double& discount, double& purchase_tax, double&
total_cost)
{
    //Use thee following statement to help you format you our output. These statements are called
the magic formula.
    /*out.setf(ios::showpoint);
    out.precision(2);
    out.setf(ios::fixed);*/
    cout.setf(ios::showpoint);
    cout.precision(2);
    cout.setf(ios::fixed);

    //cout << left << setw(15) << pname << left << setw(8) << cname
    //      << right << setw(8) << plant_cost << right << setw(8) << quantity
    //complete the statement

}

//Here is your driver to test the program
int main()
{
    string pname = "";
    string cname = "";
    double plant_cost = 0;
    int quantity = 0;
    double tax_rate = 0;
    double net_cost = 0;
    double discount_rate = 0;
    double discount = 0;
    double purchase_tax = 0;
    double total_cost = 0;

```

```

ifstream in;    //declaring an input file stream
in.open("nursery_stock.txt"); //opening the input file stream

if (in.fail())
{
    cout << "Input file did not open correctly" << endl;
}
else
{
    //the following while loop processes one order record at a time
    //while (!in.eof())
    //{
        //    input(in, pname,cname, plant_cost, quantity);
        //    process(cname,plant_cost,quantity,...add other actual arguments);
        //    output(pname,cname, ... add other actual arguments);
    //}
}

in.close(); //always close opened files.
return 0;
}

```

### Handing in your program:

Electronically submit "*nursery\_inv2.cpp*" in the Assignments area of Canvas before the due date and time. **Remember, complete the assignment no matter if it is late. It is very important that you do all assignments to master the C++ programming language and get a passing grade.**



