

## **ICS4U - Summative Assignment**

To complete this assignment, select and complete the level that is appropriate to your abilities.

### **Level 1**

Write a fully commented and functional program that will calculate tax and produce an invoice. It will do this by first prompting for a **province code** and the **shipping code**. The shipping code may be one of:

- |                          |           |
|--------------------------|-----------|
| a. PC - Priority Courier | -\$35.00  |
| b. XP - Express Post     | - \$20.00 |
| c. RP - Regular Post     | - \$10.00 |

Once this preliminary information has been input, the program will then repeatedly prompt the user for :

1. Item Description
2. Quantity Sold
3. Unit Price

This will continue until the user decides to stop. (You determine how this will be achieved.)

Once all the input is complete, the program will display a formatted invoice on the screen. A sample invoice is provided for you at the end of the assignment. If you are completing a Level 1 submission, you will only need to display the middle portion of the invoice. (The heading portion will not be required)

Tax on the invoice must be calculated according to the province of the purchaser. The tax calculation will differ from province to province. See the end of the assignment for the details on this calculation.

**NOTE: Full marks given only if program is checking for user entry error in all fields.**

## **Level 2**

Write a fully commented and functional program that will create an invoice. **This program must make use of methods.** It will do this by first prompting the user for the following:

1. Invoice Date
2. Company or Individual Name
3. Street Address
4. City
5. Province
6. Postal Code

Once this preliminary information been input, the program will repeatedly prompt the user for :

1. Item Description
2. Quantity Sold
3. Unit Price

This will continue until the user decides to stop. (You determine how this will be achieved.)

Lastly, the program will prompt the user for the **shipping code**. The shipping code may be one of:

- |                          |           |
|--------------------------|-----------|
| a. PC - Priority Courier | -\$35.00  |
| b. XP - Express Post     | - \$20.00 |
| c. RP - Regular Post     | - \$10.00 |

Your program will then generate a unique Invoice Number. The invoice number will be the digits of the date, followed by a 4 digit unique ID, starting at 001. For example, the first invoice generated on January 7, 2022 would be 010720220001.

Once all input is complete, the program will display a formatted invoice to the screen. A sample invoice layout is provided at the end of the assignment.

Tax on the invoice must be calculated according to the province of the purchaser. The tax calculation will differ from province to province. See the end of the assignment for the details on this calculation.

**NOTE: Full marks given only if program is checking for user entry error in all fields.**

**\*\* 5 % Bonus if you output the invoice to a uniquely named text file. \*\***

### **Level 3**

Write a fully commented and functional program to create invoices. **This program must use Object Oriented Programming and you must create and make use of at least one user defined class.** All invoice information is contained in a text file called **Level3InvoiceInformation.txt**. It can be found in the google classroom with this assignment.

The file contains 'Header' records and "Detail" records. Header records contain customer information for each order. Detail records contain information about each item ordered by a particular customer.

It is possible to have multiple 'detail' records, following a single 'header' record (when one customer orders multiple items)

A 'Header' contains the following:

1. Account Number
2. Customer Name
3. Customer Street Address
4. Customer City
5. Customer Province
6. Customer Postal Code
7. Invoice Date
8. Shipping Method
  - a. PC - Priority Courier -\$35.00
  - b. XP- Express Post - \$20.00
  - c. RP - Regular Post - \$10.00

A 'Detail' record contains the following:

1. Item Number
2. Item Description
3. Quantity Sold
4. Unit Price

Your program must read the information from the text file and output the invoice to the screen. Note that there is information for three invoices in the file. Your program must process all three invoices. As well, during assessment, a test file will be used to test your program for accuracy. The number of invoices on the text file is unknown.

Your program will then generate a unique Invoice Number. The invoice number will be the digits of the date, followed by a 4 digit unique ID, starting at 001. For example, the first invoice generated on January 7, 2022 would be 010720220001.

Tax on the invoice must be calculated according to the province of the purchaser. The tax calculation will differ from province to province. See the end of the assignment for the details on this calculation.

Your program will display a formatted invoice to the screen. A sample invoice is provided at the end of the assignment.

**\*\* There is a 5% bonus if you output the invoice to a text file\***

## **Level 4**

Write a fully commented and functional program to create invoices. **This program must use Object Oriented Programming and you must create and make use of at least two user defined classes.** This will be done by reading the necessary information from text files. There are four data files. They are located in the google classroom with the assignment.

- Level4ProductList.txt
- Level4ShippingRates.txt
- Level4Accounts.txt
- Level4InvoiceInformation.txt

Your program must read in the information from the first three files. The product list file contains all the items the company sells and their unit prices.

The shipping rates file contains the prices charged to the customers for shipping orders across the country. The order can be shipped Priority Courier (PC), Express Post (XP) or Regular Post (RP). The cost of shipping is charged to the customer and varies according to their shipping preference and province of destination.

The shipping preference of the customer is stored in the Level4Accounts file. It contains information on the customer (name, address, and shipping preference).

The invoice information file contains details for each invoice. Each record in this file contains the following invoice details:

- Invoice Number
- Invoice date
- Account Number
- Product Number
- Quantity Sold

Your program must read through the program and print the invoice(see end of assignment for sample invoice) to a uniquely named text file. Every time an invoice number changes, a new invoice is printed. An invoice may appear over one or more lines in the file.

Your program must use the Account Number to retrieve the Customer name and address and shipping code. It must use the Product Number to find the name of the product and its unit price in the Product List file. The Shipping Code must be used to determine the cost of shipping to the province.

Tax on the invoice must be calculated according to the province of the purchaser. The tax calculation will differ from province to province. See the end of the assignment for details on this calculation.

### Calculating Provincial Sales Tax

For the purposes of the assignment, your program should ONLY consider the ten provinces. That is, you do not need to calculate taxes for any of the three territories.

In theory, the Goods and Services Tax (GST) is charged in every province. It is charged at a rate of 5%.

Provincial Sales Tax (PST) is charged in most provinces, but not all.

In some provinces, the GST and PST are combined into a single tax called the Harmonized Sales Tax. (HST). GST is not charged separately in these provinces. The taxes and rates are as follows:

| Province  | Tax | Rate |
|-----------|-----|------|
| <b>BC</b> | PST | 7%   |
| <b>AB</b> | PST | 0%   |
| <b>SK</b> | PST | 5%   |
| <b>MB</b> | PST | 7%   |
| <b>ON</b> | PST | 8%   |
| <b>QC</b> | QST | 7.5% |
| <b>NB</b> | HST | 13%  |
| <b>NS</b> | HST | 13%  |
| <b>PE</b> | PST | 10%  |
| <b>NL</b> | HST | 13%  |

For most provinces, the PST and HST is charged on the total purchase amount only. If the total purchase price was \$100, the PST would be charged on \$100.

NOTE: In Quebec and Prince Edward Island, the QST and PST are charged on the purchase amount PLUS the GST amount. For example:

| Amounts         | Quebec          | P.E.I.          |
|-----------------|-----------------|-----------------|
| Purchase Amount | \$100.00        | \$100.00        |
| G.S.T.          | \$5.00          | \$5.00          |
| Subtotal        | \$105.00        | \$105.00        |
| QST / PST       | \$7.88          | \$10.50         |
| <b>Total</b>    | <b>\$112.88</b> | <b>\$115.50</b> |

### Sample Invoice

Your invoice should look something like this:

S A F E T Y   F I R S T   S U P P L I E S   L T D .  
2346 Industrial Ave, Burlington, ON L7S 2W1  
(905)-SAFETY1

Invoice Number

-----

1234

Invoice Date

-----

Jun 11, 2007

SOLD TO:   JKL Company Ltd.  
             321 Picton Ave  
             Cambridge, ON  
             N2R 4K8

| Item Description | Quantity | Unit Price | Total  |
|------------------|----------|------------|--------|
| -----            | -----    | -----      | -----  |
| Work Gloves      | 12       | 5.95       | 71.40  |
| Safety Harness   | 4        | 7.30       | 29.20  |
|                  |          | Shipping:  | 10.00  |
|                  |          |            | -----  |
|                  |          | Subtotal:  | 110.60 |
|                  |          | GST:       | 5.53   |
|                  |          | PST:       | 8.85   |
|                  |          |            | =====  |
|                  |          | Total:     | 124.98 |

(Your safety & your business are important to us!)