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Student Name: Atal Gyawali

London Met ID: 22067674

College ID: NP01NP4A220090

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Introduction

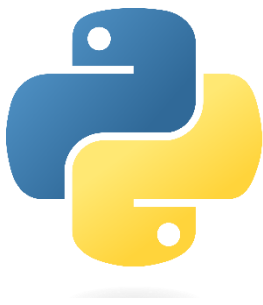
This is an individual course work of Fundamental of Computing module which is about creating a system for a laptop shop. A laptop shop that buys laptops/computers from manufacturers and sell it to different customers which may be individuals or companies.

I have created a system for the shop that reads the text file provided by the laptop shop and displays all the laptops available and makes changes to the text file according to the nature of the transaction. The system also generates a receipt with the details of the transaction with each order or sale and it also updates the stock of the product in the main text file. When a laptop is sold to a customer it creates a .txt file that contains the details of the transaction like the name of the laptop, brand, name of the customer, date and time of purchase, total amount without the shipping cost, the shipping cost itself and the total amount to be paid for the laptop including the shipping cost. And when laptops are ordered by the shop it creates another .txt file that has the details like the name of the distributor, laptop brand, laptop model, date and time of purchase, total amount without VAT, VAT amount only and the gross amount.

I used the following tools to build my system:


Python

Python is a high-level, interpreted, object-oriented programming language. Python is simple, easy to learn and its syntax is easy to read which helps us to maintain the program easily. It supports modules and packages which helps us to reuse our code to save time. Python programs are also easy to debug. Debugging is also faster in Python because there is no compilation step (What is Python? Executive Summary, n.d.).



Personally, I like python programming language more than other languages because its much easier to learn and very effective too. I realized you don't have to declare the data type like Java so it was much faster and the chance of making an error was lower than other languages.

PyCharm



PyCharm is one of the most popular Python IDEs (Integrated development environment Software) developed by JetBrains. It is a cross-platform application which means it's available in all Linux, macOS and Windows. It supports both Python 2 (2.7) and Python 3 (3.5 and above) versions. PyCharm has code analysis tools, debugger, testing tools, and also version control options. It also comes with a user interface that can be customized according to the needs using plugins (What is PyCharm? Features, Advantages & Disadvantages, n.d.).

Every code in my system was written using PyCharm . I chose PyCharm as my primary IDEs because it's interface is much more user friendly than others . It has word suggestion features which I really like, that feature also made thing a lot easier and it also helped me code faster.

Microsoft Word



Microsoft word is a word processor software developed by Microsoft. It is one of the most popular word processor software in the world. It is used to create professional quality documents, letters, reports, resumes, etc. and allows you to edit or modify your new or existing document (Introduction to Microsoft Word, n.d.).

This exact document file is created using Microsoft Word. I don't think I need to explain why I used Microsoft Word as my word processor software. It's easy to use, easy to learn, the most popular word processor.

Algorithm

Step1: Start.

Step 2: Display the option one to buy two to sell and 3 to exit the system and ask the user for input.

Step 3: if the user inputs 1 step 3.1, else go to Step 4.

Step 3.1: Display the table of available laptops with their specifications, price and quantity and ask the user to input the laptop ID and quantity.

Step 3.2: If the ID matches with the ID in the table, then go to step 3.4 else go to step 3.3

Step 3.3: Display a message saying that the ID does not exist on the table please read the table carefully and enter again then go to step 3.1.

Step 3.4: After the ID matches Loop through the laptop dictionary and determine the laptop the user wants to buy and store the details of that laptop in variables and calculate the total price by multiplying the quantity and price of laptop and adding 13% Vat and go to step 3.5.

step 3.5: Ask the user if he wants to buy again and go to step 3.6.

Step 3.6: If the input is yes go to step 2 again, else go to step 3.7

step 3.7: Display the bill by using the variables that we created before and go to step 6

Step 4: If the user inputs to go to step 4.1 else go to step 5.

Step 4.1: Display the table of available laptops with the specification price and quantity and ask the user to input the laptop ID quantity the name of customer and phone number of the customer.

Step 4.2: If the entered ID matches and quantity is available go to step 4.4, else go to step 4.3.

Step 4.3: display a message saying that either your ID doesn't match, or the quantity is not available and enter again and go to step 4.1.

Step 4.4: look through the dictionary and use the user input to determine the laptop they want to sell and store the details of the laptop all variables and calculate the total price by multiplying the quantity and price of the laptop.

Step 4.5: ask the user yes, they want to add shipping charge and go to step 4.6.

Step 4.6: If the user wants to add shipping charge go to step 4.7, else go to step 4.8.

Step 4.7: Add the total amount and shipping amount define grand total and go to step 4.8

Step 4.8: ask the user if they want to buy or sell again, I'll go to step 4.9.

Step 4.9: if the user wants to buy again go to Step 2, else go to step 4.10.

Step 4.10: display the sales detail that has the specifications of the laptop its price, quantity sold, shipping charge and total amount also create a TXT file by the name of the customer's name and phone number that also has the same sales detail and go to step 6.

Step 5: If the user inputs 3 to exit go to step 6 else go to Step 2.

Step 6: End

Flow chart

Flow chart is the graphical representation of the data or the algorithm which is used for understanding the code visually it is a step-by-step process that shows how a program works it is a very easy way of explaining the algorithm. Complex programs can be drawn in a simple way using flow chart. Flow charts are used to separate useful logic from unwanted parts of a program. Flow charts can be created using different shapes. An oval shape represents a start or end point. The line is a connector that shows relationship between the representative shapes. A parallelogram represents input or output. A rectangle represents a process. A diamond indicates a decision (pradiptamukherjee, n.d.).

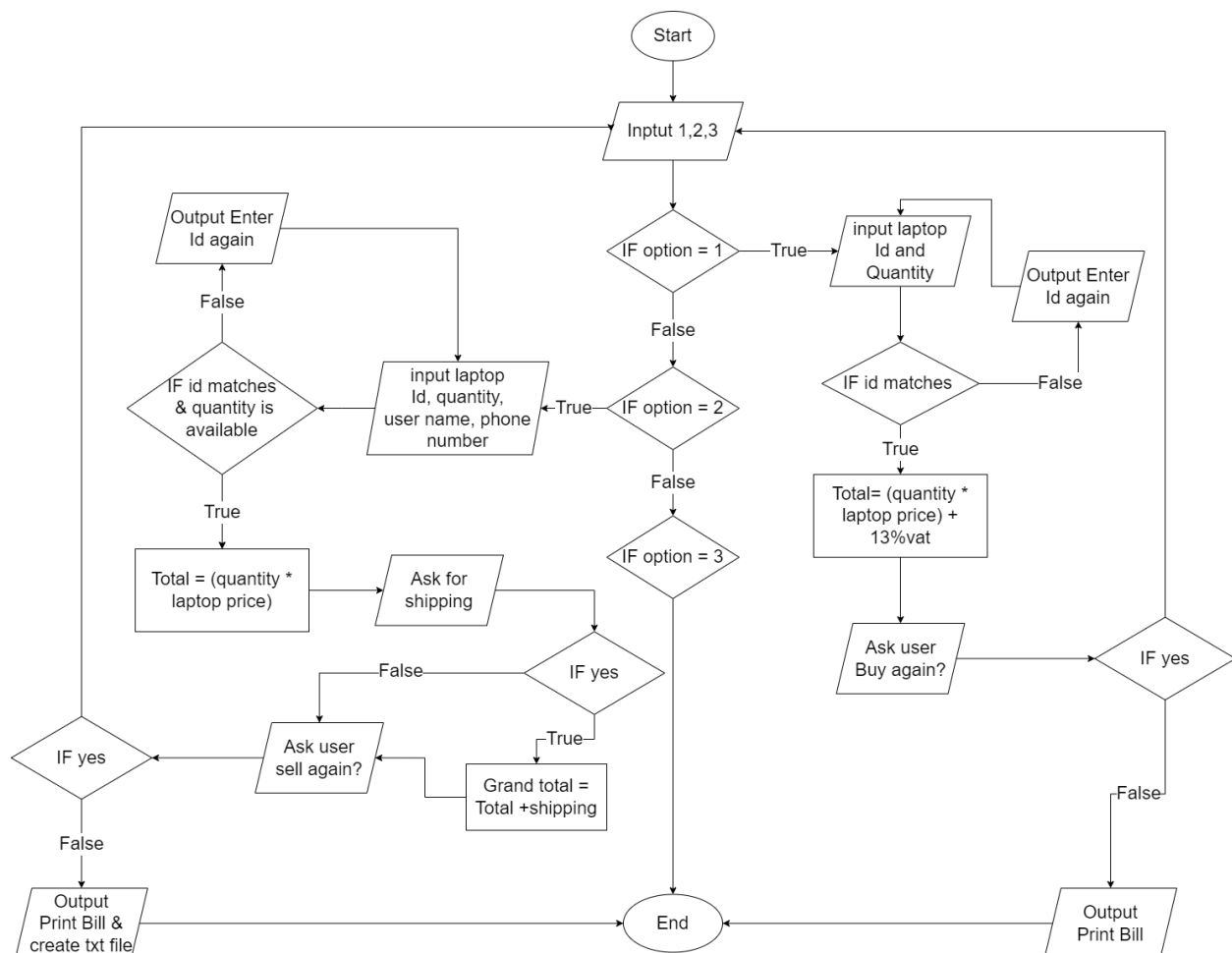


Figure 1: Flow chart of the program

PseudoCode

Pseudocode means fake code. It's an informal way of designing program where we don't have to obey any sets of rules. It is like a rough image of the actual program where we don't have to use semi-colons, curly braces, exact keywords, etc. We just must explain what we are doing in our own words (Anon., n.d.).

a)PseudoCode of main.py

Display the welcome message

While true

Define main function

Ask the users what they want to do buy, sell or exit

While true

Try

Read user input

If user wants to buy

Import operation function from Operation file

Send user input in operation function

Break

End if

Else if user wants to sell

Import operation function from Operation file

Send user input in operation function

Break

```
        End else if
        Else if user wants to exit
            Display thank you message
        End else if
        Else
            Display enter buy, sell or exit option only
        End else
    Except
        Display invalid input

    Call main function

    Ask user to buy, sell or exit again

    If user says no
        Display thanks for using system message
        Break
    End if

Main file ends here
```

b)PseudoCode of Reading.py

```
Define Reading_file function
    Reading the laptop txt file
    Displaying a table to the user
    Displaying all the laptops and their details with unique Id
```

Calling the Reading_file function

c)PseudoCode of Operations.py

Import date and time

Make a laptop dictionary from the txt file and give unique Id to each laptop

Define operation function that takes user input as parameter from main.py

If user input is buy

While True

Import Reading_file function from Reading.py

Try

Ask user to input laptop id

Ask user to input quantity of the laptop

If the laptop id exists in the laptop dictionary

Import update_when_buying function from
Writing.py file

Send entered Id and quantity of laptop as
parameters to the imported function

Break

End if

Else

Show available laptop list again

Display Id not present in the list message

Display enter again message

End else

Except

Display enter in number only message

End if

```
If user input is sell
    While True
        Import Reading_file function from Reading.py
        Try
            Ask user to input laptop id
            Ask user to input selling quantity of the laptop
            Ask user to input the customer name
            Ask user to input the customer phone number
            If the laptop id exists in the laptop dictionary
                IF selling quantity is smaller than or equals to
                    the quantity in the list
                    Import update_when_selling function
                    from Writing.py file
                    Send entered Id, quantity, customer
                    name and phone number as
                    parameters to the imported function
                    Break
            End if
        Else
            Show available laptop list again
            Display quantity not available message
        End else
    End if
Else
    Show available laptop list again
    Display Id not present in the list message
```

Display enter again message

End else

Except

Display enter in number only message

End if

Else

Show invalid input message

End else

Function operation ends here

End of Operation.py file

d) PseudoCode of Writing.py

Import datetime package

Make a laptop dictionary from the txt file and give unique Id to each laptop

Define update_when_buying function that takes buying laptop id and quantity as perimeter

Take the user input from parameter and store the details of the laptop that the user wants to buy in variables to use later

Update the laptop dictionary by adding the quantity entered by the user

Open the laptop txt file in write mode and update the quantity

Close the laptop txt file

Calculate the net amount by multiplying the laptop price and quantity

Calculate the total amount by adding net amount and 13% Vat

Display the purchase details of the user by using the variables that we created

Function update_when_buying ends here

Define update_when_selling function that take selling laptop id, quantity, buyer name and phone number as perimeter

Update laptop dictionary by subtracting the available quantity with the quantity entered by the user

Open the laptop txt file in write mode and update the quantity

Close the laptop txt file

Ask the user if they want to add shipping charges input in Yes or No

If input is yes

Add shipping charge = 5

End if

Elif input is no

Add shipping charge = 0

End elif

Else

Display invalid input message

End else

Take the user input and determine which laptop they want to sell and store the details of the laptop in variables to use later

Calculate the total shipping by multiplying shipping charge and selling laptop quantity

Calculate the total price by multiplying price of the laptop and quantity of laptop and adding total shipping

Create a txt file that's named after the customer's name and phone number

Write the sale details in the txt file including laptop details and shipping cost

Display the sale details

Function update_when_selling ends here

Data Structures

Data structures are collection of data values and the relationship between them. They allow programs to store and process data effectively. Facet of algorithms that can be used in many programming languages to organize the data. There are two types of data structure primitive and non-primitive data structure (R, 2023).

Primitive Data Structure

It is a type of data structures that directly operate according to the machine instruction. String, float, char, double and pointer are some of the examples of primitive data structure.

a) String

String is a data type used in programming which is used to represent text. Here `buyer_name` is a string data type.

```
selling_laptop_qty = int(input("Please Enter the number
buyer_name = input("Please Enter the name of the Custom
buyer_number = int(input("Please Enter the phone number
```

Figure 2: String datatype

b) Integer

Integer is a data type in programming which represents only whole number like 6,200, -8 etc. Here `buying_laptop_id` and `buying_laptop_qty` both are integer data type.

```
buying_laptop_id = int(input("Enter the ID of the Laptop you want to p
buying_laptop_qty = int(input("Enter the quantity of the Laptop you wa
```

Figure 3: Integer datatype

c) Float

Float data type represents a floating-point or decimal number. For example, 0.1234 and 15.465. Here vat is a variable that stores float data type.

```
pur_datetime = datetime.now()
vat = (13 / 100) * net_amount
total_amount = net_amount + vat
```

Figure 4:Float datatype

In-built non-primitive data structures

Non primitive data structures are the complex data structures that are derived from primitive data structure. It is just a complex form of primitive data structure.

a) Dictionary

Dictionaries are those data structures that are used to store data values in the form of keys and values. Dictionary in python is very versatile, we can easily, add, remove, or change the data stored inside the dictionary. Dictionaries do not allow two items with the same key.

```
# Making A dictionary to store +
file = open("Laptop.txt", "r")
laptop_dictionary = {}
laptop_id = 1
for line in file:
    line = line.replace("\n", " ")
```

Figure 5:Dictionary datatype

Program

I have created a program for a laptop shop to help them sell laptops to their customers and buy from manufacturers. The program first welcomes the user and asks him/her what they would like to do Buy, Sell or Exit.

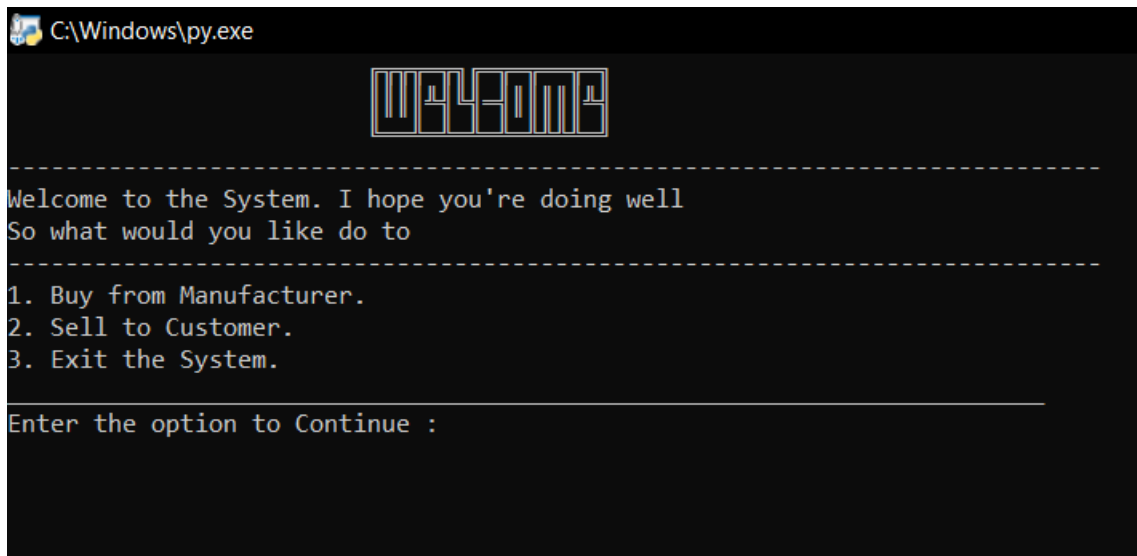


Figure 6:What would you like to do.

a) Purchasing

After entering '1' which for purchasing. The program shows the list of laptops available for purchase with their specifications, price, and available quantity in the store. The user can select to purchase any of the mentioned laptops in the table. The program asks the user to enter the Id and quantity of laptop they want to purchase after showing the table.

```

C:\Windows\py.exe

WELCOME

-----
Welcome to the System. I hope you're doing well
So what would you like do to
-----
1. Buy from Manufacturer.
2. Sell to Customer.
3. Exit the System.

Enter the option to Continue : 1
-----
S.N.    Laptop Name    Company Name    Price    Quantity    Processor    Graphics
-----
1      Razer Blade      Razer          $2000    20          i7 7th Gen   GTX 3060
2      XPS              Dell           $1976    15          i5 9th Gen   GTX 3070
3      Alienware        Alienware      $1978    24          i5 9th Gen   GTX 3070
4      Swift 7          Acer           $900     12          i5 9th Gen   GTX 3070
5      Macbook Pro 16   Apple          $3500    10          i5 9th Gen   GTX 3070
Enter the ID of the Laptop you want to purchase :

```

Figure 7: Displaying available laptops before buying from manufacturer.

After after the user inputs the ID and quantity of the laptop the program prints the bill and shows the purchase detail of the laptops including the specifications of the laptop its price quantity purchased and it also adds 13% VAT to the total amount. The user if they want to buy or sell again and if they enter no the program stops and if they enter yes the program loops again.

```

2      XPS              Dell           $1976    15          i5 9th Gen   GTX 3070
3      Alienware        Alienware      $1978    24          i5 9th Gen   GTX 3070
4      Swift 7          Acer           $900     12          i5 9th Gen   GTX 3070
5      Macbook Pro 16   Apple          $3500    10          i5 9th Gen   GTX 3070
Enter the ID of the Laptop you want to purchase : 3
Enter the quantity of the Laptop you want to purchase : 5
-----
OK here is the details of your purchase from the manufacturer Alienware
-----
Purchase time   : 2023-05-10 21:50:08.975470
Laptop Brand    : Alienware
Laptop Model    : Alienware
Processor       : i5 9th Gen
Graphics        : GTX 3070
Price           : $1978
Purchased units : 5
Net Amount      : $9890
Vat amount      : $1285.7
Total Amount    : $11175.7
None
Do yo want to Buy or Sell again (Y/N) : _

```

Figure 8: Printing a bill that has the purchase details.

We can see here that this program is asking the user again to buy or sell after he enters yes.

```

Price      : $1978
Purchased units : 5
Net Amount : $9890
Vat amount : $1285.7
Total Amount : $11175.7
None
Do yo want to Buy or Sell again (Y/N) : y
1. Buy from Manufacturer.
2. Sell to Customer.
3. Exit the System.

Enter the option to Continue : _

```

Figure 9: Asking the user again, to buy or sell?

The program has also updated the text file previously the quantity of laptop Alienware was 24 but after buying 5 additional laptops the quantity of the laptop Alienware available in the shop has increased by 5.

```

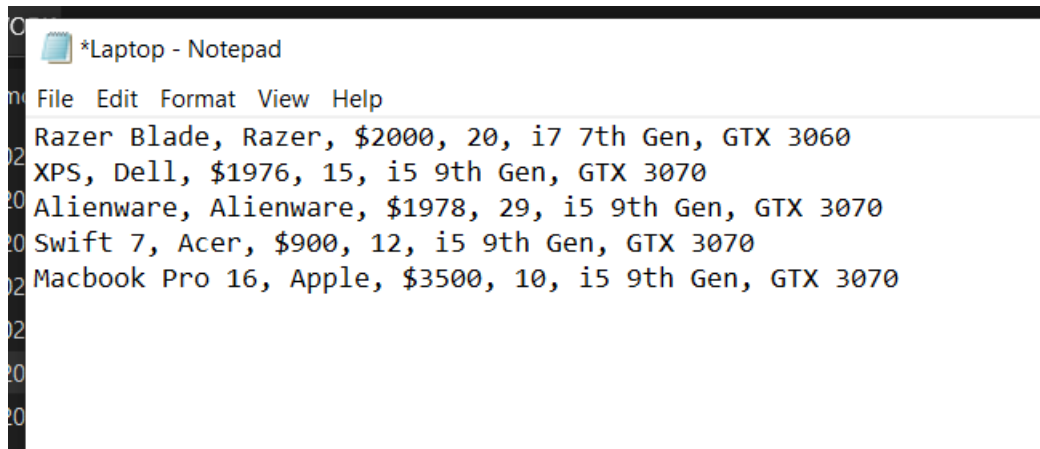
1. Buy from Manufacturer.
2. Sell to Customer.
3. Exit the System.

Enter the option to Continue : 1
-----
S.N.   Laptop Name      Company Name   Price   Quantity   Processor      Graphics
-----
1      Razer Blade        Razer         $2000   20         i7 7th Gen     GTX 3060
2      XPS                 Dell          $1976   15         i5 9th Gen     GTX 3070
3      Alienware          Alienware     $1978   29         i5 9th Gen     GTX 3070
4      Swift 7             Acer          $900    12         i5 9th Gen     GTX 3070
5      Macbook Pro 16      Apple         $3500   10         i5 9th Gen     GTX 3070
Enter the ID of the Laptop you want to purchase : _

```

Figure 10: Updating the available laptop table after buying.

The laptop txt file has also been updated.



```

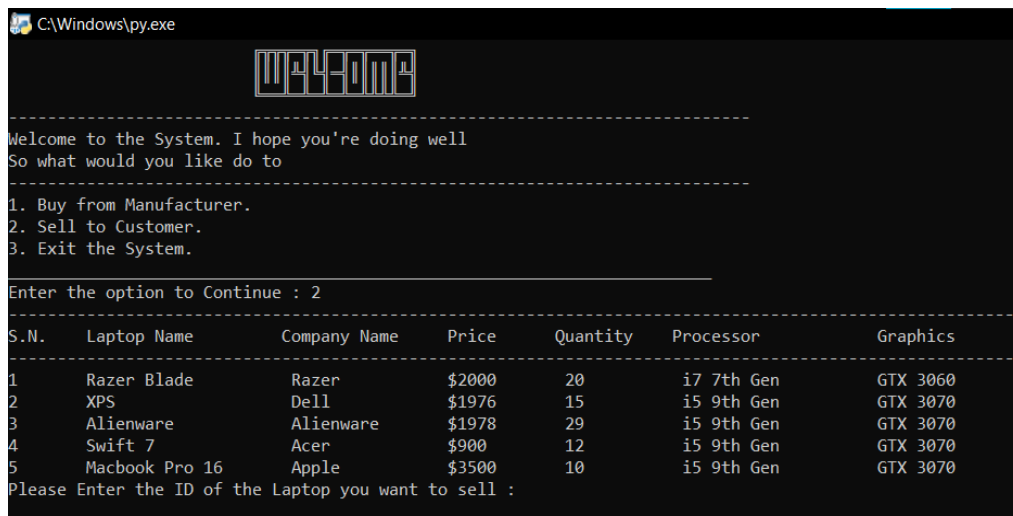
File Edit Format View Help
Razer Blade, Razer, $2000, 20, i7 7th Gen, GTX 3060
XPS, Dell, $1976, 15, i5 9th Gen, GTX 3070
Alienware, Alienware, $1978, 29, i5 9th Gen, GTX 3070
Swift 7, Acer, $900, 12, i5 9th Gen, GTX 3070
Macbook Pro 16, Apple, $3500, 10, i5 9th Gen, GTX 3070

```

Figure 11: Updating the laptop txt file after buying.

b) Selling

After two is for selling to the customer our table is it's shown that has all the details of the laptops available in the shop with their quantities and specifications.



```

C:\Windows\py.exe
Welcome to the System. I hope you're doing well
So what would you like do to
1. Buy from Manufacturer.
2. Sell to Customer.
3. Exit the System.
Enter the option to Continue : 2

```

S.N.	Laptop Name	Company Name	Price	Quantity	Processor	Graphics
1	Razer Blade	Razer	\$2000	20	i7 7th Gen	GTX 3060
2	XPS	Dell	\$1976	15	i5 9th Gen	GTX 3070
3	Alienware	Alienware	\$1978	29	i5 9th Gen	GTX 3070
4	Swift 7	Acer	\$900	12	i5 9th Gen	GTX 3070
5	Macbook Pro 16	Apple	\$3500	10	i5 9th Gen	GTX 3070

```

Please Enter the ID of the Laptop you want to sell :

```

Figure 12: Showing the available laptop to sell.

After the user puts the Id and quantity of the laptop, customer name and their phone number the program Asks the user if they want to add shipping charge or

not. After deciding the shipping charge the program displays the sales detail that has the specification of the laptop its price shipping cost and total amount. Then the program asks the user if they want to buy or sell again and if they say yes the program loops again and if they say no the program stops.

```

C:\Windows\py.exe

WELCOME

-----
Welcome to the System. I hope you're doing well
So what would you like do to
-----
1. Buy from Manufacturer.
2. Sell to Customer.
3. Exit the System.

Enter the option to Continue : 2

-----
S.N.    Laptop Name    Company Name    Price    Quantity    Processor    Graphics
-----
1       Razer Blade    Razer          $2000    20          i7 7th Gen   GTX 3060
2       XPS           Dell           $1976    15          i5 9th Gen   GTX 3070
3       Alienware     Alienware      $1978    29          i5 9th Gen   GTX 3070
4       Swift 7       Acer           $900     12          i5 9th Gen   GTX 3070
5       Macbook Pro 16 Apple          $3500    10          i5 9th Gen   GTX 3070

Please Enter the ID of the Laptop you want to sell : 1
Please Enter the number of Laptops you want to sell : 5
Please Enter the name of the Customer : Atal
Please Enter the phone number of the buyer : 12345
Do you want to add ship your laptop (Y/N) : y

-----
OK here is the bill for  Atal | phone number: 12345
-----
Purchase time   : 2023-05-10 22:07:27.544894
Laptop Brand    : Razer
Laptop Model    : Razer Blade
Processor       : i7 7th Gen
Graphics        : GTX 3060
Price           : $2000
Purchased units : 5
Shipping cost   : $25
Total Amount    : $10025
None
Do yo want to Buy or Sell again (Y/N) :

```

Figure 13:Printing the bill that stores sales details.

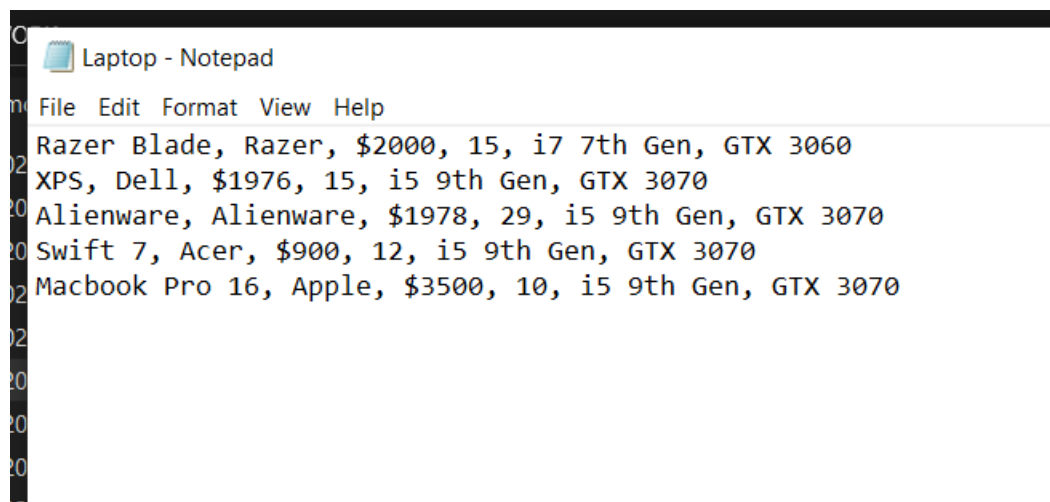
Here we can see that the quantity of the laptops has been updated in the table. Previously the quantity of laptop razor blade was 20 but now after selling five laptops the quantity has been decreased to 15.

Enter the option to Continue : 2

S.N.	Laptop Name	Company Name	Price	Quantity	Processor	Graphics
1	Razer Blade	Razer	\$2000	15	i7 7th Gen	GTX 3060
2	XPS	Dell	\$1976	15	i5 9th Gen	GTX 3070
3	Alienware	Alienware	\$1978	29	i5 9th Gen	GTX 3070
4	Swift 7	Acer	\$900	12	i5 9th Gen	GTX 3070
5	Macbook Pro 16	Apple	\$3500	10	i5 9th Gen	GTX 3070

Figure 14: Updating the quantity of laptops in the available laptop table.

The laptop txt file has also been updated.



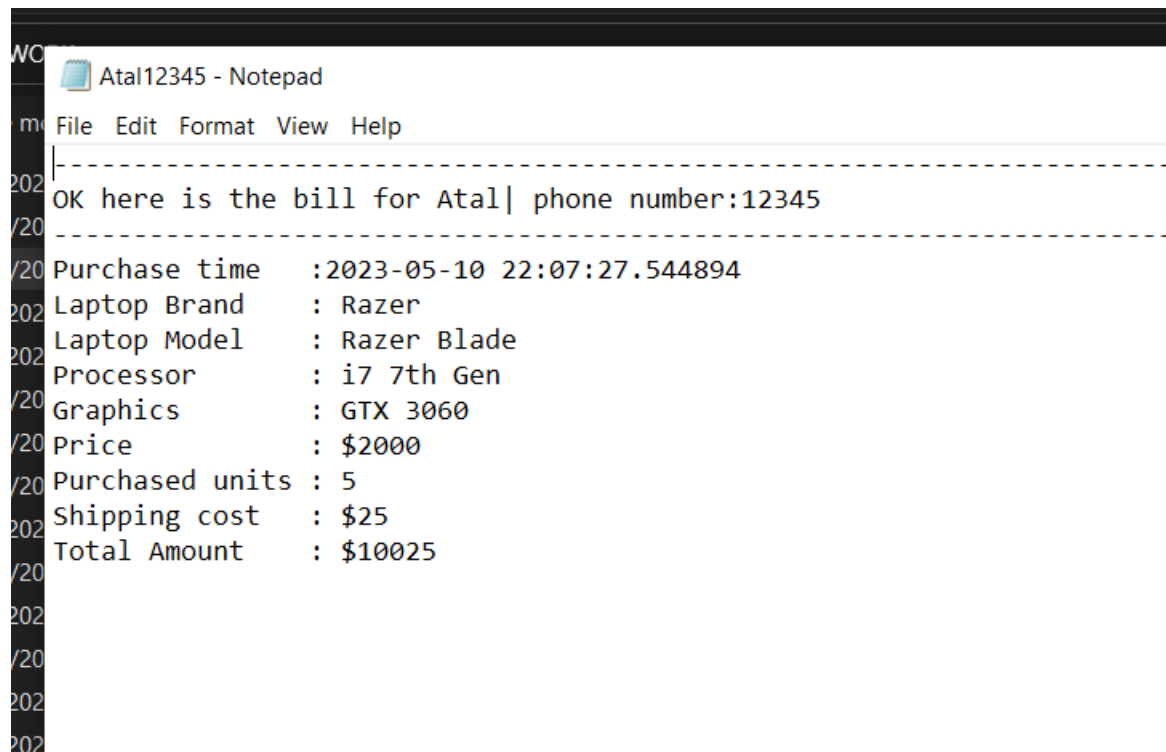
```

Laptop - Notepad
File Edit Format View Help
Razer Blade, Razer, $2000, 15, i7 7th Gen, GTX 3060
XPS, Dell, $1976, 15, i5 9th Gen, GTX 3070
Alienware, Alienware, $1978, 29, i5 9th Gen, GTX 3070
Swift 7, Acer, $900, 12, i5 9th Gen, GTX 3070
Macbook Pro 16, Apple, $3500, 10, i5 9th Gen, GTX 3070

```

Figure 15: Updating the laptop txt file after selling.

A txt file by the customer's name and phone number has been created that has the bill that shows the detail of the laptop sold including their price quantity purchased shipping cost and total amount.



```

WC
m Atal12345 - Notepad
File Edit Format View Help
-----
OK here is the bill for Atal| phone number:12345
-----
Purchase time      :2023-05-10 22:07:27.544894
Laptop Brand      : Razer
Laptop Model      : Razer Blade
Processor         : i7 7th Gen
Graphics          : GTX 3060
Price             : $2000
Purchased units   : 5
Shipping cost     : $25
Total Amount      : $10025
  
```

Figure 16: A txt file that stores the sales detail.

c) **Exit**

if the user process three with is for exit the program thanks the user for using the system but also asks the user if he wants to buy or sell again. If the user inputs no the program well exit and if he presses yes the options will are shown again.

```

C:\Windows\py.exe

WELCOME

-----
Welcome to the System. I hope you're doing well
So what would you like do to
-----
1. Buy from Manufacturer.
2. Sell to Customer.
3. Exit the System.

Enter the option to Continue : 3
Thank you fore using the System , Have a good day
None
Do yo want to Buy or Sell again (Y/N) : _

```

Figure 17:Exiting the system.

Testing

a) Test no 1.

Table 1:Test 1 table

Test no:	1
Objective:	To show the implementation of try and catch
Action:	<ul style="list-style-type: none"> - Open the program. - After the program asks for input enter the option that is not present. - After the program shows a message to input again, enter any string
Expected Result:	The program should show a message that says the input is wrong enter right input.
Actual Result:	The program showed the message both times while entering wrong number and wrong format.
Conclusion:	The test is successful.

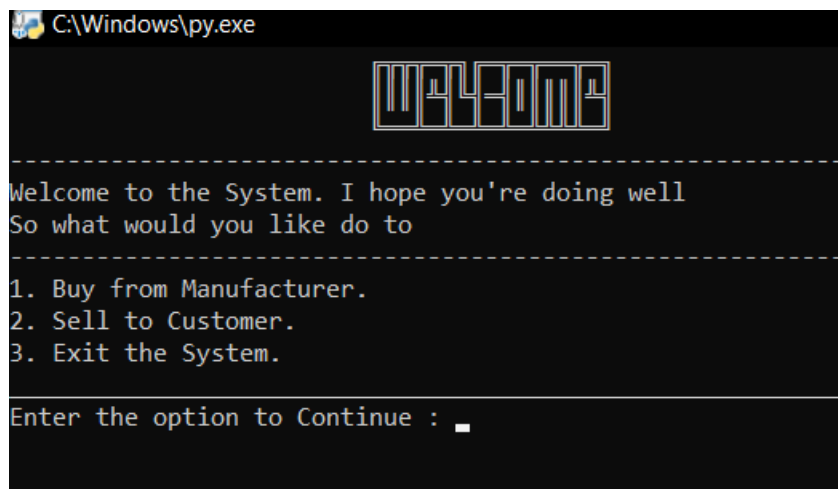


Figure 18: Screenshot of program asking for input.

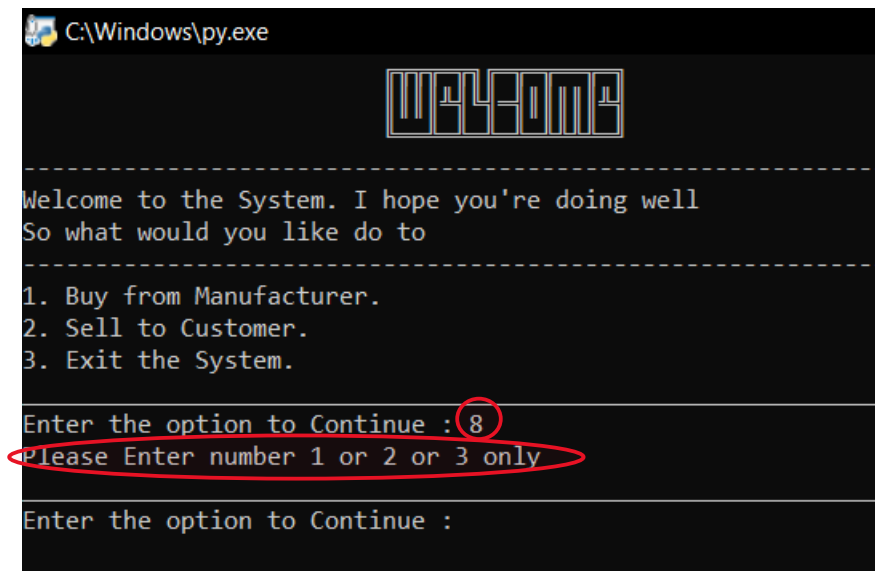


Figure 19: Screenshot of program showing invalid message after entering wrong number.

```

Welcome to the system. I hope you're doing well.
So what would you like to do to
-----
1. Buy from Manufacturer.
2. Sell to Customer.
3. Exit the System.

Enter the option to Continue : 8
Please Enter number 1 or 2 or 3 only

Enter the option to Continue : hello
(Invalid Input) Please Enter number 1 or 2 or 3 only

Enter the option to Continue :

```

Figure 20: Screenshot of program showing invalid message after entering in word.

b) Test no 2.

Table 2: Test 2 table

Test no:	2
Objective:	To show the selection of purchase and sale of laptops
Action:	<ul style="list-style-type: none"> - Open the program. - After selecting to buy or sell laptops enter a negative value. - After the program shows a message that the input is invalid and asks to input again enter a non-existing value.
Expected Result:	The program should show a message that says the input is wrong enter right input in both cases.
Actual Result:	The program showed the message both times while entering negative value and non-existing value.
Conclusion:	The test is successful.

```

-----
Welcome to the System. I hope you're doing well
So what would you like do to
-----
1. Buy from Manufacturer.
2. Sell to Customer.
3. Exit the System.
-----
Enter the option to Continue : 1
-----
S.N.    Laptop Name    Company Name    Price    Quantity    Processor    Graphics
-----
1       Razer Blade    Razer          $2000    16          i7 7th Gen   GTX 3060
2       XPS            Dell           $1976    20          i5 9th Gen   GTX 3070
3       Alienware     Alienware     $1978    29          i5 9th Gen   GTX 3070
4       Swift 7       Acer          $900     12          i5 9th Gen   GTX 3070
5       Macbook Pro 16 Apple         $3500    10          i5 9th Gen   GTX 3070
Enter the ID of the Laptop you want to purchase :

```

Figure 21: Screenshot of the program asking to input the ID to buy.

```

2       XPS            Dell           $1976    20          i5 9th Gen   GTX 3070
3       Alienware     Alienware     $1978    29          i5 9th Gen   GTX 3070
4       Swift 7       Acer          $900     12          i5 9th Gen   GTX 3070
5       Macbook Pro 16 Apple         $3500    10          i5 9th Gen   GTX 3070
Enter the ID of the Laptop you want to purchase : -1
Enter the quantity of the Laptop you want to purchase : 3
-----
S.N.    Laptop Name    Company Name    Price    Quantity    Processor    Graphics
-----
1       Razer Blade    Razer          $2000    16          i7 7th Gen   GTX 3060
2       XPS            Dell           $1976    20          i5 9th Gen   GTX 3070
3       Alienware     Alienware     $1978    29          i5 9th Gen   GTX 3070
4       Swift 7       Acer          $900     12          i5 9th Gen   GTX 3070
5       Macbook Pro 16 Apple         $3500    10          i5 9th Gen   GTX 3070
-----
Sorry the ID you entered is not present
Please read the list of laptops properly and enter again
-----
Enter the ID of the Laptop you want to purchase :

```

Figure 22: Screenshot of the program showing message that the input is invalid after entering a negative number to buy.

```

-----
Sorry the ID you entered is not present
Please read the list of laptops properly and enter again
-----
Enter the ID of the Laptop you want to purchase : 88
Enter the quantity of the Laptop you want to purchase : 2
-----
S.N.    Laptop Name    Company Name    Price    Quantity    Processor    Graphics
-----
1       Razer Blade      Razer          $2000    16          i7 7th Gen   GTX 3060
2       XPS              Dell           $1976    20          i5 9th Gen   GTX 3070
3       Alienware        Alienware      $1978    29          i5 9th Gen   GTX 3070
4       Swift 7          Acer           $900     12          i5 9th Gen   GTX 3070
5       Macbook Pro 16   Apple          $3500    10          i5 9th Gen   GTX 3070
-----
Sorry the ID you entered is not present
Please read the list of laptops properly and enter again
-----
Enter the ID of the Laptop you want to purchase : 

```

Figure 23: Screenshot of the program showing an invalid input after entering a non-existing Id to buy.

```

-----
1. Buy from Manufacturer.
2. Sell to Customer.
3. Exit the System.
-----
Enter the option to Continue : 2
-----
S.N.    Laptop Name    Company Name    Price    Quantity    Processor    Graphics
-----
1       Razer Blade      Razer          $2000    16          i7 7th Gen   GTX 3060
2       XPS              Dell           $1976    20          i5 9th Gen   GTX 3070
3       Alienware        Alienware      $1978    29          i5 9th Gen   GTX 3070
4       Swift 7          Acer           $900     12          i5 9th Gen   GTX 3070
5       Macbook Pro 16   Apple          $3500    10          i5 9th Gen   GTX 3070
-----
Please Enter the ID of the Laptop you want to sell : -1
Please Enter the number of Laptops you want to sell : 3
Please Enter the name of the Customer : Atal
Please Enter the phone number of the buyer : 12345
-----
Sorry, ID you entered is wrong
-----
S.N.    Laptop Name    Company Name    Price    Quantity    Processor    Graphics
-----
1       Razer Blade      Razer          $2000    16          i7 7th Gen   GTX 3060
2       XPS              Dell           $1976    20          i5 9th Gen   GTX 3070
3       Alienware        Alienware      $1978    29          i5 9th Gen   GTX 3070
4       Swift 7          Acer           $900     12          i5 9th Gen   GTX 3070
5       Macbook Pro 16   Apple          $3500    10          i5 9th Gen   GTX 3070
-----
Please read the list properly and enter the Available ID and Quantity only
Please Enter the ID of the Laptop you want to sell : 

```

Figure 24: Screenshot of the program showing message that the input is invalid after entering a negative number to sell.

```

-----
Sorry,ID you entered is wrong
-----

S.N.    Laptop Name    Company Name    Price    Quantity    Processor    Graphics
-----
1      Razer Blade      Razer          $2000    16          i7 7th Gen   GTX 3060
2      XPS               Dell            $1976    20          i5 9th Gen   GTX 3070
3      Alienware         Alienware       $1978    29          i5 9th Gen   GTX 3070
4      Swift 7           Acer            $900     12          i5 9th Gen   GTX 3070
5      Macbook Pro 16    Apple           $3500    10          i5 9th Gen   GTX 3070
Please read the list properly and enter the Available ID and Quantity only
Please Enter the ID of the Laptop you want to sell : 88
Please Enter the number of Laptops you want to sell : 3
Please Enter the name of the Customer : Atal
Please Enter the phone number of the buyer : 12345
-----
Sorry,ID you entered is wrong
-----

S.N.    Laptop Name    Company Name    Price    Quantity    Processor    Graphics
-----
1      Razer Blade      Razer          $2000    16          i7 7th Gen   GTX 3060
2      XPS               Dell            $1976    20          i5 9th Gen   GTX 3070
3      Alienware         Alienware       $1978    29          i5 9th Gen   GTX 3070
4      Swift 7           Acer            $900     12          i5 9th Gen   GTX 3070
5      Macbook Pro 16    Apple           $3500    10          i5 9th Gen   GTX 3070
Please read the list properly and enter the Available ID and Quantity only
Please Enter the ID of the Laptop you want to sell : _

```

Figure 25: Screenshot of the program showing an invalid input after entering a non-existing Id to sell.

c) Test no 3.

Table 3:Test 3 table

Test no:	3
Objective:	To show the file generation of purchase of laptop.
Action:	<ul style="list-style-type: none"> - Open the program. - Enter a valid input to select the option to buy. - Enter the valid Id of the laptop to buy. - Enter the quantity of the laptop to buy.
Expected Result:	The program should display the details of the purchase, should ask if the user wants to buy again and a txt file that has the purchase details should be created.
Actual Result:	The program displays the details of the purchase, asks if the user want to buy again and creates a txt file that has the details.
Conclusion:	The test is successful.

```

C:\Windows\py.exe

Welcome to the System. I hope you're doing well
So what would you like do to

1. Buy from Manufacturer.
2. Sell to Customer.
3. Exit the System.

Enter the option to Continue : 

```

Figure 26: Screenshot of program asking the user for input to choose the option.

```

Welcome to the System. I hope you're doing well
So what would you like do to

1. Buy from Manufacturer.
2. Sell to Customer.
3. Exit the System.

Enter the option to Continue : 1

S.N.    Laptop Name    Company Name    Price    Quantity    Processor    Graphics
-----
1       Razer Blade    Razer          $2000    16          i7 7th Gen   GTX 3060
2       XPS            Dell           $1976    20          i5 9th Gen   GTX 3070
3       Alienware     Alienware      $1978    29          i5 9th Gen   GTX 3070
4       Swift 7        Acer           $900     12          i5 9th Gen   GTX 3070
5       Macbook Pro 16 Apple          $3500    10          i5 9th Gen   GTX 3070

Enter the ID of the Laptop you want to purchase : 

```

Figure 27: Screenshot of program showing available laptop and asking to input laptop Id after selecting to buy.


```

-----
S.N.      Laptop Name      Company Name      Price      Quantity      Processor      Graphics
-----
1         Razer Blade      Razer            $2000      16            i7 7th Gen     GTX 3060
2         XPS              Dell             $1976      20            i5 9th Gen     GTX 3070
3         Alienware        Alienware        $1978      29            i5 9th Gen     GTX 3070
4         Swift 7           Acer             $900       12            i5 9th Gen     GTX 3070
5         Macbook Pro 16      Apple            $3500      10            i5 9th Gen     GTX 3070
Enter the ID of the Laptop you want to purchase : 2
Enter the quantity of the Laptop you want to purchase : 3
-----
OK here is the details of your purchase from the manufacturer Dell
-----
Purchase time   : 2023-05-11 16:48:12.841831
Laptop Brand    : Dell
Laptop Model    : XPS
Processor       : i5 9th Gen
Graphics        : GTX 3070
Price           : $1976
Purchased units : 3
Net Amount      : $5928
Vat amount      : $770.64
Total Amount    : $6698.64
None
Do yo want to Buy or Sell again (Y/N) : _

```

Figure 28: Screenshot of program printing the purchase bill and asking if the user wants to buy again.

```

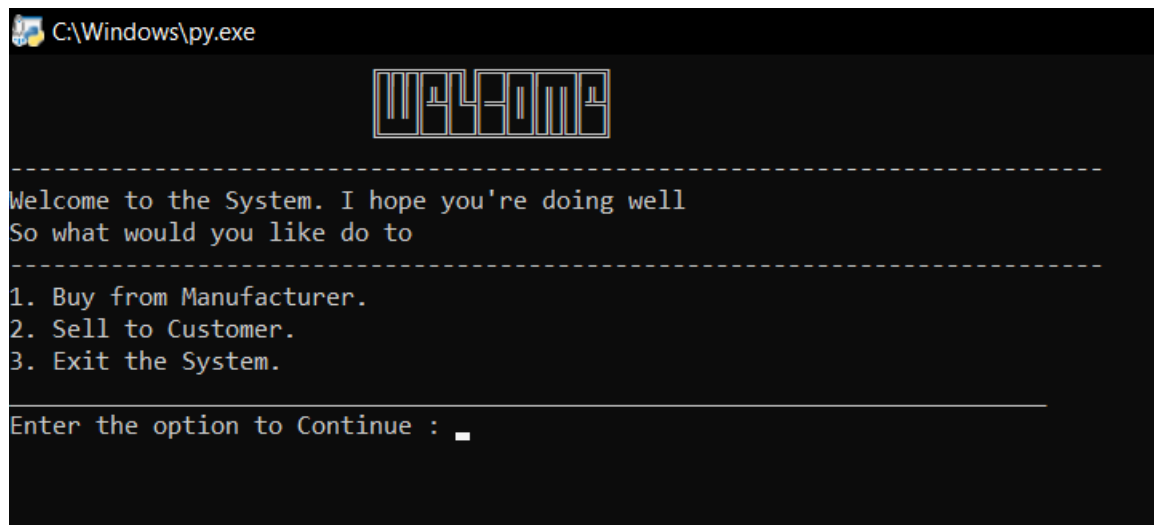
buying - Notepad
File Edit Format View Help
-----
OK here is the details of your purchase from the manufacturer Dell
-----
Purchase time   :2023-05-11 19:58:41.925989
Laptop Brand    : Dell
Laptop Model    : XPS
Processor       : i5 9th Gen
Graphics        : GTX 3070
Price           : $1976
Purchased units : 3
Net Amount      : $5928
Vat amount      : $770.64
Total Amount    : $6698.64

```

Figure 29: Txt file that stores the purchase details.

d) Test no 4.*Table 4:Test 4 table*

Test no:	4
Objective:	To show the file generation of sales process of laptop
Action:	<ul style="list-style-type: none"> - Open the program. - Enter a valid input to select the option to sell. - Enter the valid Id of the laptop to sell. - Enter the quantity of the laptop to sell. - Enter the name of the customer. - Enter the phone number of the customer.
Expected Result:	The program should display the details of the sale, should ask if the user wants to sell again and a txt file that has the sales details should be created.
Actual Result:	The program displays the details of the sale, asks if the user want to sell again and creates a txt file that has the details.
Conclusion:	The test is successful.

*Figure 30:Screenshot of program asking the user to buy, sell or exit.*

```

-----
Welcome to the System. I hope you're doing well
So what would you like do to
-----
1. Buy from Manufacturer.
2. Sell to Customer.
3. Exit the System.
-----
Enter the option to Continue : 2
-----
S.N.    Laptop Name      Company Name    Price    Quantity    Processor      Graphics
-----
1       Razer Blade        Razer          $2000    16          i7 7th Gen     GTX 3060
2       XPS                 Dell           $1976    20          i5 9th Gen     GTX 3070
3       Alienware          Alienware      $1978    29          i5 9th Gen     GTX 3070
4       Swift 7            Acer           $900     12          i5 9th Gen     GTX 3070
5       Macbook Pro 16     Apple          $3500    10          i5 9th Gen     GTX 3070
Please Enter the ID of the Laptop you want to sell : 

```

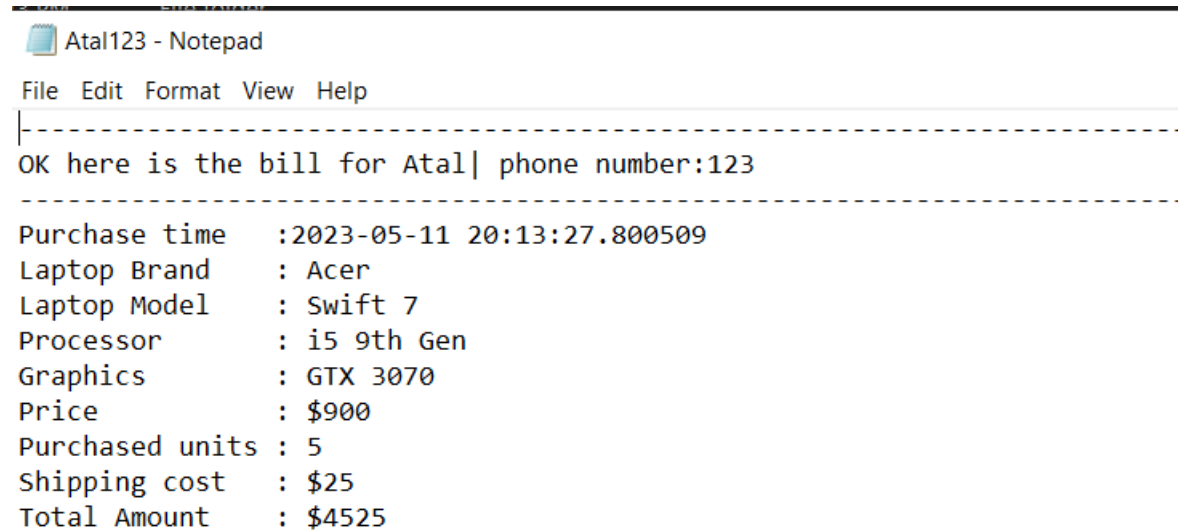
Figure 31: Screen shot of program showing the available laptops for sale and asking laptop Id as input.

```

-----
S.N.    Laptop Name      Company Name    Price    Quantity    Processor      Graphics
-----
1       Razer Blade        Razer          $2000    16          i7 7th Gen     GTX 3060
2       XPS                 Dell           $1976    20          i5 9th Gen     GTX 3070
3       Alienware          Alienware      $1978    29          i5 9th Gen     GTX 3070
4       Swift 7            Acer           $900     12          i5 9th Gen     GTX 3070
5       Macbook Pro 16     Apple          $3500    10          i5 9th Gen     GTX 3070
Please Enter the ID of the Laptop you want to sell : 4
Please Enter the number of Laptops you want to sell : 5
Please Enter the name of the Customer : Atal
Please Enter the phone number of the buyer : 123
Do you want to add shipping charge your laptop (Y/N) : y
-----
OK here is the bill for  Atal | phone number: 123
-----
Purchase time   : 2023-05-11 20:13:27.800509
Laptop Brand    : Acer
Laptop Model    : Swift 7
Processor       : i5 9th Gen
Graphics        : GTX 3070
Price           : $900
Purchased units : 5
Shipping cost   : $25
Total Amount    : $4525
None
Do yo want to Buy or Sell again (Y/N) : 

```

Figure 32: Screen shot of program displaying sales bill after entering all the required inputs.



```

Atal123 - Notepad
File Edit Format View Help
-----
OK here is the bill for Atal| phone number:123
-----
Purchase time      :2023-05-11 20:13:27.800509
Laptop Brand       : Acer
Laptop Model       : Swift 7
Processor          : i5 9th Gen
Graphics           : GTX 3070
Price              : $900
Purchased units    : 5
Shipping cost      : $25
Total Amount       : $4525
  
```

Figure 33:Screen shot of txt file created by the program that has the sales details.

e) Test no 5.

Table 5:Test 5 table

Test no:	5
Objective:	To show the update in stock of laptop.
Action:	<ul style="list-style-type: none"> - Open the program. - Use valid inputs and buy laptops. - Use valid inputs and sell laptops. - Open the Laptop.txt file and observe the stock of laptops.
Expected Result:	The program should update the existing Laptop.txt file according to the purchase and sale.
Actual Result:	The program updates the existing Laptop.txt file according to the purchase and sale.
Conclusion:	The test is successful.

3. Exit the System.

Enter the option to Continue : 1

S.N.	Laptop Name	Company Name	Price	Quantity	Processor	Graphics
1	Razer Blade	Razer	\$2000	16	i7 7th Gen	GTX 3060
2	XPS	Dell	\$1976	20	i5 9th Gen	GTX 3070
3	Alienware	Alienware	\$1978	29	i5 9th Gen	GTX 3070
4	Swift 7	Acer	\$900	7	i5 9th Gen	GTX 3070
5	Macbook Pro 16	Apple	\$3500	10	i5 9th Gen	GTX 3070

Enter the ID of the Laptop you want to purchase : 2

Enter the quantity of the Laptop you want to purchase : 6

Figure 34: Screen shot of the available laptop table before purchasing.

WELCOME

Welcome to the System. I hope you're doing well

So what would you like do to

1. Buy from Manufacturer.
2. Sell to Customer.
3. Exit the System.

Enter the option to Continue : 1

S.N.	Laptop Name	Company Name	Price	Quantity	Processor	Graphics
1	Razer Blade	Razer	\$2000	16	i7 7th Gen	GTX 3060
2	XPS	Dell	\$1976	26	i5 9th Gen	GTX 3070
3	Alienware	Alienware	\$1978	29	i5 9th Gen	GTX 3070
4	Swift 7	Acer	\$900	7	i5 9th Gen	GTX 3070
5	Macbook Pro 16	Apple	\$3500	10	i5 9th Gen	GTX 3070

Enter the ID of the Laptop you want to purchase :

Figure 35: Screen shot of the available laptop table after purchasing.

*Laptop - Notepad

File Edit Format View Help

Razer Blade, Razer, \$2000, 16, i7 7th Gen, GTX 3060
XPS, Dell, \$1976, 20, i5 9th Gen, GTX 3070
Alienware, Alienware, \$1978, 29, i5 9th Gen, GTX 3070
Swift 7, Acer, \$900, 7, i5 9th Gen, GTX 3070
Macbook Pro 16, Apple, \$3500, 10, i5 9th Gen, GTX 3070

Figure 36: Screen shot of the available laptop in txt file before purchasing.

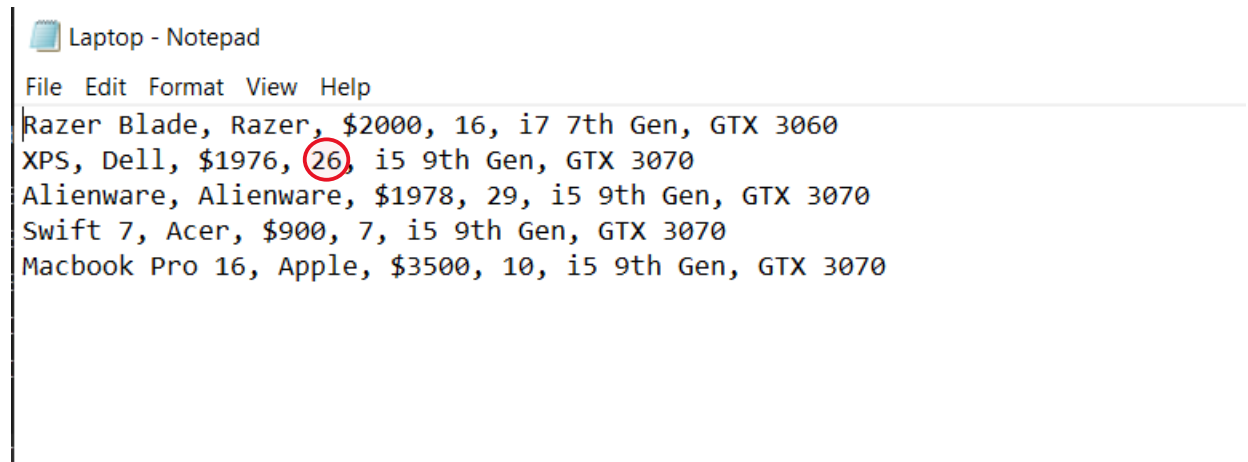


Figure 37: Screen shot of the available laptop in txt file after purchasing.

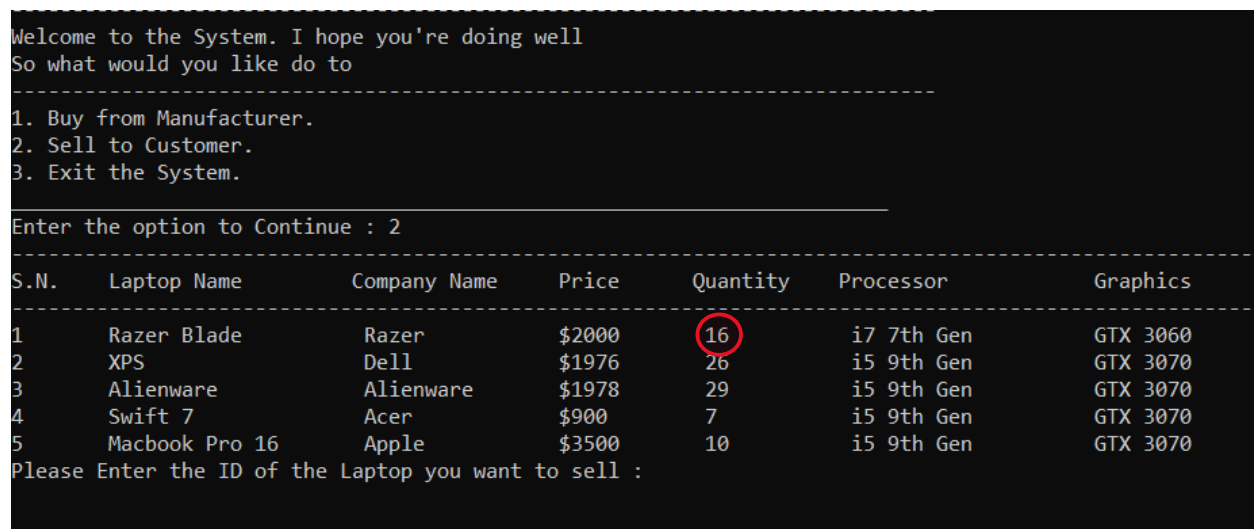


Figure 38: Screen shot of the available laptop table before selling.

S.N.	Laptop Name	Company Name	Price	Quantity	Processor	Graphics
1	Razer Blade	Razer	\$2000	11	i7 7th Gen	GTX 3060
2	XPS	Dell	\$1976	26	i5 9th Gen	GTX 3070
3	Alienware	Alienware	\$1978	29	i5 9th Gen	GTX 3070
4	Swift 7	Acer	\$900	7	i5 9th Gen	GTX 3070
5	Macbook Pro 16	Apple	\$3500	10	i5 9th Gen	GTX 3070

Figure 39: Screen shot of the available laptop table after selling.

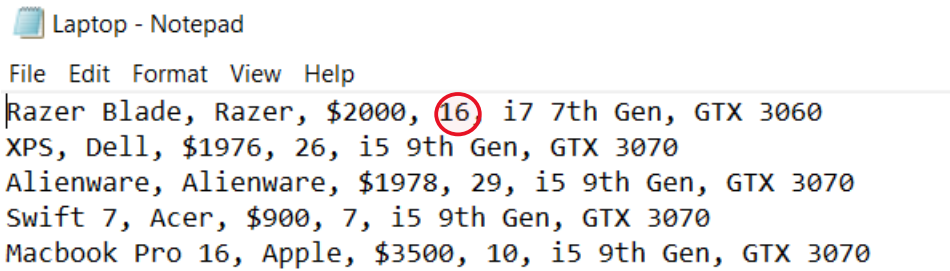


Figure 40: Screen shot of the available laptop in txt file before selling.

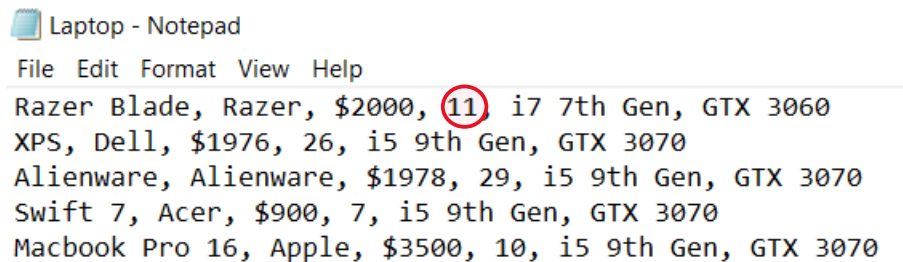


Figure 41: Screen shot of the available laptop in txt file after selling.

Conclusion

This coursework was about creating a system for a laptop shop using python programming. A laptop shop that buys laptops/computers from manufacturers and sell it to different customers which may be individuals or companies. To complete this course work, I had to learn a lot of things about python programming. I learned about data types, loops, function, list, dictionary, control statements, etc. It was hard and confusing in the begging, but I learned new things from my teachers, friends and seniors which made things a lot easier. This documentation part was a lot more time consuming than the whole coding part.

I learned a lot of things from this course work. I now know a lot more about python programming, I understood the concept of functions, dictionary, 2-D lists, etc. I'm a more skilled programmer now than before. I also learned a lot by making this documentation part, I learned about algorithm and flow chart.

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```
    if user_input == 1:
        from Operations import operation
        operation(user_input)
        break

    elif user_input == 2:
        from Operations import operation
        operation(user_input)
        break

    elif user_input == 3:
        print("Thank you fore using the System , Have a good day")
        break

    else:
        print("Please Enter number 1 or 2 or 3 only")

print("_____")
print("_____")

    except:

print("_____")
print("_____")
    print("(Invalid Input) Please Enter number 1 or 2 or 3 only")

print("_____")
print("_____")
```

```
print(main())
```

```
again = input("Do yo want to Buy or Sell again (Y/N) : ")
```

```
if again.lower() == 'n':
```

```
    print("Thank you for using our system. Good Bye")
```

```
    break
```

b) Reading.py

```
def Reading_file():
```

```
    ID = 1
```

```
    file = open("Laptop.txt", "r")
```

```
    print("-----")
    print("-----")
```

```
    print("S.N. \tLaptop Name      Company Name   Price   Quantity   Processor\nGraphics")
```

```
    print("-----")
    print("-----")
```

```
    for line in file:
```

```
        data = line.strip().split(",")
```

```
print(f"{ID}\t{data[0]:<20}{data[1]:<16}{data[2]:<12}{data[3]:<12}{data[4]:<20}{data[5]}")
```

```
    ID += 1
```

```
    file.close()
```

```
Reading_file()
```

c) Operations.py

```

from datetime import datetime

# Making A dictionary to store the data of txt file
file = open("Laptop.txt","r")
laptop_dictionary = {}
laptop_id = 1
for line in file:
    line = line.replace("\n","")
    laptop_dictionary.update({laptop_id: line.split(" ")})
    laptop_id = laptop_id + 1
file.close()

def operation(user_input):
    # If the user wants to Buy from Manufacturer
    if user_input == 1:

        while True:
            from Reading import Reading_file
            try:
                buying_laptop_id = int(input("Enter the ID of the Laptop you want
to purchase : "))
                buying_laptop_qty = int(input("Enter the quantity of the Laptop
you want to purchase : "))

                if buying_laptop_id in laptop_dictionary:

                    from Writing import update_when_buying
                    update_when_buying(buying_laptop_id,buying_laptop_qty)
                    break

                else:
                    Reading_file()
                    print("-----")
                    print("Sorry the ID you entered is not present")
                    print("Please read the list of laptops properly and enter again")
                    print("-----")

            except ValueError:

```

```

print("-----")
-----")
print("(Invalid Input) Please Enter in int format only")
print("-----")
-----")

# If the user wants to sell to the Customer
elif user_input == 2:
    # Showing User the list of available laptops to sell

    while True:
        from Reading import Reading_file

        try:
            # Asking the user for inputs to Determine what and how many
            # laptops he wants to sell to his customers and the details of the customer

            selling_laptop_id = int(input("Please Enter the ID of the Laptop
            you want to sell : "))
            selling_laptop_qty = int(input("Please Enter the number of
            Laptops you want to sell : "))
            buyer_name = input("Please Enter the name of the Customer : ")
            buyer_number = int(input("Please Enter the phone number of the
            buyer : "))

            if selling_laptop_id in laptop_dictionary:

                if selling_laptop_qty <=
                int(laptop_dictionary[selling_laptop_id][3]) and selling_laptop_qty > 0 :

                    from Writing import update_when_selling

                    update_when_selling(selling_laptop_id,selling_laptop_qty,buyer_name,buyer
                    _number)

                    break

                else:
                    Reading_file()
                    print("Quantity not available")
                    print("Please read the list properly and enter the Available
                    ID and Quantity only")

```

```

        else:
            print("-----")
            print("Sorry,ID you entered is wrong ")
            print("-----")
            Reading_file()
            print("Please read the list properly and enter the Available ID
and Quantity only")

    except:

        print("_____")
        print("Invalid Input) Please Enter in int format only")

        print("_____")

    else:
        print("Invalid Input")

```

d) Writing.py

```

from datetime import datetime

# Making A dictionary to store the data of txt file
file = open("Laptop.txt", "r")
laptop_dictionary = {}
laptop_id = 1
for line in file:
    line = line.replace("\n", "")
    laptop_dictionary.update({laptop_id: line.split(", ")})
    laptop_id = laptop_id + 1
file.close()

```

```

# Updating the Laptop txt file's quantity when Buying
def update_when_buying(buying_laptop_id, buying_laptop_qty):
    # ----- Taking users input and storing the details in variables -----
    -----
    laptop_name = laptop_dictionary[buying_laptop_id][0]
    laptop_brand = laptop_dictionary[buying_laptop_id][1]
    price = laptop_dictionary[buying_laptop_id][2].replace("$", "")
    processor = laptop_dictionary[buying_laptop_id][4]
    gpu = laptop_dictionary[buying_laptop_id][5]
    net_amount = int(price) * buying_laptop_qty
    pur_datetime = datetime.now()
    vat = (13 / 100) * net_amount
    total_amount = net_amount + vat

    laptop_dictionary[buying_laptop_id][3] =
int(laptop_dictionary[buying_laptop_id][3]) + int(buying_laptop_qty)
    file = open("Laptop.txt", "w")
    for values in laptop_dictionary.values():
        file.write(str(values[0]) + ", " + str(values[1]) + ", " + str(values[2]) + ", " +
str(values[3]) + ", " + str(
            values[4]) + ", " + str(values[5]))
        file.write("\n")
    file.close()

# Printing the purchase details of the shop from manufacturer
print("-----")
--")
print("OK here is the details of your purchase from the manufacturer " +
str(laptop_brand))
print("-----")
--")
print("Purchase time   :", pur_datetime)
print("Laptop Brand    :", laptop_brand)
print("Laptop Model     :", laptop_name)
print("Processor       :", processor)
print("Graphics        :", gpu)
print("Price           : $" + price)
print("Purchased units  :", buying_laptop_qty)
print("Net Amount      : $" + str(net_amount))
print("Vat amount       : $" + str(vat))
print("Total Amount    : $" + str(total_amount))

```



```

    buy_bill = open( "buying" + ".txt", "w")
    buy_bill.write("-----")
    buy_bill.write("\n")
    buy_bill.write("OK here is the details of your purchase from the
manufacturer " + str(laptop_brand))
    buy_bill.write("\n")
    buy_bill.write("-----")
    buy_bill.write("\n")
    buy_bill.write("Purchase time  :"+ str(pur_datetime))
    buy_bill.write("\n")
    buy_bill.write("Laptop Brand   :"+ str(laptop_brand))
    buy_bill.write("\n")
    buy_bill.write("Laptop Model  :"+ str(laptop_name))
    buy_bill.write("\n")
    buy_bill.write("Processor    :"+ str(processor))
    buy_bill.write("\n")
    buy_bill.write("Graphics     :"+ str(gpu))
    buy_bill.write("\n")
    buy_bill.write("Price        : $" + str(price))
    buy_bill.write("\n")
    buy_bill.write("Purchased units : "+ str(buying_laptop_qty))
    buy_bill.write("\n")
    buy_bill.write("Net Amount     : $" + str(net_amount))
    buy_bill.write("\n")
    buy_bill.write("Vat amount     : $" + str(vat))
    buy_bill.write("\n")
    buy_bill.write("Total Amount   : $" + str(total_amount))

    buy_bill.close()

```

Updating the Laptop txt file when selling to customer and creating a txt file that stores the bill

```
def update_when_selling(selling_laptop_id, selling_laptop_qty, buyer_name,
buyer_number):
```

```
    # Updating the Laptop dictionary
```

```
    laptop_dictionary[selling_laptop_id][3] =
int(laptop_dictionary[selling_laptop_id][3]) - int(selling_laptop_qty)
```

```
    # Updating txt file
```

```

file = open("Laptop.txt", "w")
for values in laptop_dictionary.values():
    file.write(str(values[0]) + ", " + str(values[1]) + ", " + str(values[2]) + ", " +
str(values[3]) + ", " + str(
        values[4]) + ", " + str(values[5]))
    file.write("\n")
file.close()

```

```

# For shipping
shipping_input = input("Do you want to add shipping charge your laptop
(Y/N) : ")
if shipping_input.lower() == 'y':
    shipping_charge = 5

```

```

elif shipping_input.lower() == 'n':
    shipping_charge = 0

```

```

else:
    print("Invalid Input")

```

```

# Taking users input and storing the details in variables

```

```

laptop_name = laptop_dictionary[selling_laptop_id][0]
laptop_brand = laptop_dictionary[selling_laptop_id][1]
price = laptop_dictionary[selling_laptop_id][2].replace("$", "")
processor = laptop_dictionary[selling_laptop_id][4]
gpu = laptop_dictionary[selling_laptop_id][5]
total_shipping = shipping_charge * selling_laptop_qty
total_price = (int(price) * selling_laptop_qty) + total_shipping
purchase_datetime = datetime.now()

```

```

# Creating a new txt file that stores the bill

```

```

bill_txt = open(str(buyer_name) + str(buyer_number) + ".txt", "w")

```

```

bill_txt.write("-----")
bill_txt.write("\n")
bill_txt.write("OK here is the bill for " + str(buyer_name) + "| phone
number:" + str(buyer_number))
bill_txt.write("\n")
bill_txt.write("-----")

```

```

bill_txt.write("\n")
bill_txt.write("Purchase time  :" + str(purchase_datetime))
bill_txt.write("\n")
bill_txt.write("Laptop Brand   :" + str(laptop_brand))
bill_txt.write("\n")
bill_txt.write("Laptop Model  :" + str(laptop_name))
bill_txt.write("\n")
bill_txt.write("Processor    :" + str(processor))
bill_txt.write("\n")
bill_txt.write("Graphics     :" + str(gpu))
bill_txt.write("\n")
bill_txt.write("Price        :" + str(price))
bill_txt.write("\n")
bill_txt.write("Purchased units : " + str(selling_laptop_qty))
bill_txt.write("\n")
bill_txt.write("Shipping cost  :" + str(total_shipping))
bill_txt.write("\n")
bill_txt.write("Total Amount   :" + str(total_price))
bill_txt.write("\n")

bill_txt.close()

# Printing the bill that has details of the sale made to the customer
print("-----")
print("--")
print("OK here is the bill for ", buyer_name, "| phone number:",
buyer_number)
print("-----")
print("--")

print("Purchase time  :", purchase_datetime)
print("Laptop Brand   :", laptop_brand)
print("Laptop Model  :", laptop_name)
print("Processor    :", processor)
print("Graphics     :", gpu)
print("Price        :", price)
print("Purchased units :", selling_laptop_qty)
print("Shipping cost  :", total_shipping)
print("Total Amount   :", total_price)

```