

## **Assignment # 1**

### **Point of Sale Terminal**

**Date Assigned:** 17/03/2021  
**Due Date:** 23/03/2021 11:59 pm

In this assignment you will be tested on the concepts related to multi tier architecture, file I/O, collections and other utilities in .Net.

### **Problem Statement**

The problem statement is pretty simple. We need a software implementation of a Point of Sale terminal at a typical store. The users of the system are the cashiers sitting at the sales terminals of the store. The users can use the system to manage sales items in the store, customer details and of course the sales. The system should be capable of presenting some reports related to the sales, items and customers.

All data should be stored in flat file system. You'll come to know about the details later in this handout.

### **User Interface**

You are not put in the trouble of creating some fancy GUIs at the moment. What you are supposed to do is to develop a simple console based system. When the system starts the user is presented with the main menu as follows:

#### **Main Menu**

- 1- Manage Items
- 2- Manage Customers
- 3- Make New Sale
- 4- Make Payment
- 5- Print Reports
- 6- Exit

Press 1 to 5 to select an option:

The user selects his/her desired option by pressing one of the numbers from 1 to 5.

Upon selecting an option from the main menu the system presents user with a corresponding sub menu. The details are as follows:

### **Items Menu**

- 1- Add new Item
- 2- Update Item details
- 3- Find Items
- 4- Remove Existing Item
- 5- Back to Main Menu

Press 1 to 5 to select an option:

### **Customers Menu**

- 1- Add new Customer
- 2- Update Customer details
- 3- Find Customer
- 4- Remove Existing Customer
- 5- Back to Main Menu

Press 1 to 5 to select an option:

### **Reports Menu**

- 1- Stock in Hand
- 2- Customer Balance
- 3- Sales Report (by date)
- 4- Outstanding Sales (by Date)
- 5- Back to Main Menu

Press 1 to 5 to select an option:

## Items Menu

When the user selects the “Manage Items” option from the main menu he/she is presented with the “Items Menu”.

The user is allowed to add new Item, update Item information and to search for Items and also remove an existing Item.

### **Add New Item**

When the user selects add new Item option, he is presented with the system generated (new) Item Id and then prompts the user to enter the following information of the Item:

Description, Price, Quantity

Upon getting all info the system confirms from the user to save the info and then if the user confirms the system saves the info to file shows confirmation message (e.g. Item Information successfully saved) and again the Item Menu.

Note that when a new Item is added the creation date will be the current date to be stored in the file.

### **Modify Item Details**

The system asks user to enter Item Id and then if found displays the item data. Then the system asks user to enter the item details which he wants to modify and to leave blank otherwise.

Upon getting all info the system confirms from the user to save the info and then if the user confirms the system saves the info to file shows confirmation message (e.g. Item Information successfully saved) and again the Item Menu.

### **Find Item**

The system asks the user to enter any of the item info and then finds the item from the file according to the given information. The user can leave blank the fields he/she does not want in the search criteria.

e.g. the screen presented should look like this:

Please specify atleast one of the following to find the item. Leave all fields blank to return to Customers Menu:

Item ID:

Description:

Price:

Quantity:

Creation Date:

If the item is found then its details are displayed or an appropriate message is displayed on the screen. Following output is shown to the user:

Item ID	Description	Price	Quantity
1	HP Printer	10,000	150
2	Focus Keyboard	500	200

### **Remove Existing Item**

User enters the “Item ID“ and if a valid item id exist then a confirmation from the user is asked. After confirmation the specified “Item ID” is removed from the file.

Note that an item should only be allowed to remove if there is no recorded sale for the item at the moment and appropriate message should be displayed to the user for those items.

## Customers Menu

When the user selects the “Manage Customers” option from the main menu he/she is presented with the “Customers Menu”.

The user is allowed to add new customers, update their information and to search for customers and also remove an existing customer.

### **Add New Customer**

When the user selects add new customer option, he is presented with the system generated (new) Customer Id and then prompts the user to enter the following information of the customer:

Name, Address, Phone and Email, Sales Limit

Upon getting all info the system confirms from the user to save the info and then if the user confirms the system saves the info to file shows confirmation message (e.g. Customer Information successfully saved) and again the Customers Menu.

Note that when a new customer is added his payable amount will be zero.

### **Modify Customer Details**

The system asks user to enter Customer Id and then if found displays the customer data. Then the system asks user to enter the customer details which he wants to modify and to leave blank otherwise.

Upon getting all info the system confirms from the user to save the info and then if the user confirms the system saves the info to file shows confirmation message (e.g. Customer Information successfully saved) and again the Customers Menu.

### **Find Customer**

The system asks the user to enter any of the customer info and then finds the customer from the file according to the given information. The user can leave blank the fields he/she does not want in the search criteria.

e.g. the screen presented should look like this:

Please specify atleast one of the following to find the customer. Leave all fields blank to return to Customers Menu:

Customer ID:

Name:

Email:

Phone:

Sales Limit:

If the customer is found then his details are displayed or an appropriate message is displayed on the screen. Following output is shown to the customer:

Customer ID	Name	Email	Phone	Sales Limit
1	Javed Ahmed	<a href="mailto:javed@pucit.edu.pk">javed@pucit.edu.pk</a>	03004433333	650.00
2	Omer Khan	<a href="mailto:omer@pucit.edu.pk">omer@pucit.edu.pk</a>	03334444433	790.00

### **Remove Existing Customer**

User enters the “Customer ID” and if a valid customer id exist then a confirmation from the user is asked. After confirmation the specified “Customer ID” is removed from the file.

Note that a “Customer ID” which is associated with any sales cannot be removed from the system and appropriate message should be displayed to the user.

### **Make New Sale**

When the user selects the “Make New Sale” option from the Main Menu, the screen appears with the sale date/time and Sales ID of the new sale. The cashier is prompted to enter the “CustomerID” and system waits for input from the cashier.

Example screen:

Sales ID: 1

Sales Date: 05/06/2006

Enter Customer ID: 2

The cashier is then asked to add items for this sales. He is prompted to enter "ItemID" and system waits for input from the cashier. As soon as the cashier enters ItemID, system displays item "Description" and "Price" if a correct ItemID is found and prompts cashier to enter "Quantity".

Example screen:

```

Item Id: 123
Description: C#: The Complete Reference
Price: Rs. 650.00
Quantity: 1
Sub-Total: Rs. 650.00

Press 1 to Enter New Item
Press 2 to End Sale
Press 3 to Remove an existing Item from the current sale
Press 4 to Cancel Sale

```

Choose from option 1 – 4:

Note: Text in red represents user input and in green represent system generated output.

### Enter New Item

When the user types "1", the system responds by prompting user once again for new Item Id as before and upon entry of each new item the system displays the "Total amount payable".

The process of entering new items will continue until all items have been processed at which point the cashier selects the "End Sale" option by typing "2".

### End Sale

This system operation will involve computing the total for the sale and communicating it to the user by displaying on the console. Following output should be displayed after ending the sale:

Sales ID: 1

Customer ID: 2

Sales Date: 06/05/2006

Name: Javed Ahmed

Item Id	Description	Quantity	Amount
1	C#: Complete Reference	1	650.00

2	Bioinformatics Algorithms	1	790.00
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Total Sales:      Rs. 1440.00

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Press any key to continue....

The user will be taken to the Main Menu after ending the sale. **Note that the total sales for a single day for a single customer should not exceed the sale limit of the customer.**

Note that every new sale created against a customer will increase the customer balance by the sales amount.

### Make Payment

The system prompts the user to enter the “Sales ID” and if a valid “Sales ID” is given then following output is shown:

Sale ID: **3**  
 Customer Name: **Javed Ahmed**  
 Total Sales Amount: **30,000**  
 Amount Paid: **17,550**  
 Remaining Amount: **12,450**  
 Amount to be Paid: **10,000**

In the above output the user will enter the amount to be paid for making the payments against the sale. Following action will be taken after a payment is entered:

- A new payment will be recorded
- Customer balance will be decreased for the associated customer

Note that the amount paid is calculated using the sum of all amounts of receipts of given “Sales ID”.

### View Reports

If the user selects view reports then he/she should be asked to specify one of the following reports:

- 6- Stock in Hand
- 7- Customer Balance
- 8- Sales Report (by date)
- 9- Outstanding Sales (by Date)

**Stock in hand**

The user is asked for an “Item ID” range as an input. Then, he is presented with a summary of stock in hand as follows:

Date: 10/10/2006 11:59AM

ItemId	Description	Price	Quantity in Hand
123	C#: The Complete Reference	650.00	150
124	Bioinformatics Algorithms	790.00	65
...			

**Customer Balance**

The user is prompted for Customer Id and if the customer is found then his personal information and the balance is presented to the user:

Please enter Customer Id: 123

Customer Name: Mr. Bilal Afzal

Address: 145A, Garden Town, Lahore

Phone: 04258858858

Email: bilal@hotmail.com

Balance: Rs. 1000.00

**Sales Report**

The user is prompted for two dates to specify the period for which the report is to be generated. If the user leaves blank one of the dates then the report is printed for a single day.

The report format is as follows:

Sales Report

From: 10/09/2006      To: 15/09/2006

Item Id	Description	Quantity Sold	Amount
123	C#: The Complete Reference	20	1300.00
124	Bioinformatics Algorithms	15	11850.00



... ..  
 ... ..

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Total Sale:      Rs. 50000.00

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### **Outstanding Sales**

The user is prompted for two dates to specify the period for which the report is to be generated. If the user leaves blank one of the dates then the report is printed for a single day.

The report format is as follows:

#### Outstanding Orders

From: 10/09/2006      To: 15/09/2006

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Sales ID	Customer Name	Total Amount	Remaining Amount
123	Mohammad Atif	25,000	15,000
124	Imran Shafi	1,500	750
...	....	....	
...	....		

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Total Remaining Amount:      Rs. 50000.00

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## Design Information and Requirements

- Use flat file systems to store all data the format of the files is given below but broadly you should have one file for customer information, second for items information, third for sales and fourth for receipts.
- You should also have different classes for: Customer, Item and Sale. Make sure you separate the implementation from the interface completely using N-Tier architecture because we are going to ask you to give the same assignment with GUI features later on.
- All data entry points should have proper error checks and error messages.
- **All data entry is through command line interface.**
- There must be proper commenting through out your code.
- The code should be well indented and easy to read as your marking depends a lot on this.

### File System

The data to be preserved in files is given below:

**Item** (ItemId, Description, Price, Quantity, CreationDate)

**Customer** (CustomerId, Name, Address, Phone, Email, AmountPayable, Sales Limit)

**Sale** (OrderId, CustomerId, Date, Status)

**SaleLineItem** (LineNo, OrderId, ItemId, Quantity, Amount)

**Receipt** (ReceiptNo, ReceiptDate, OrderId, Amount)

The underlined attributes are unique (key attributes) and your system autogenerates these numbers. You need to store all data in plain text files.

**Example:** Format of the Item file should be as given below:

```
<ItemId>;<Description>;<Price>;<Quantity>;<CreationDate>;
123;C#-The Complete Reference;65.00;1;10/10/2006;
```

GOOD LUCK ☺