\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Projects with Three Tier Model**



Session: 2021 – 2025

**Submitted by:**

M Faraz Ali 2021-CS-122

**Supervised by:**

Prof. Awais Hassan

Department of Computer Science

**University of Engineering and Technology Lahore Pakistan**

**Table of Contents**

*Business Application*

1. Case Study 3
2. Class Diagram 3
3. Wireframes 3

*Code*

1. BL 11

* Order.cs 11
* Product.cs 11
* User.cs 12

1. DL

* GlobalVariables 18
* OrderCRUD 18
* ProductCRUD 15
* UserCRUD 15

1. Vs 18

* Validations.cs 18

1. SFs (Secondary Forms) 20

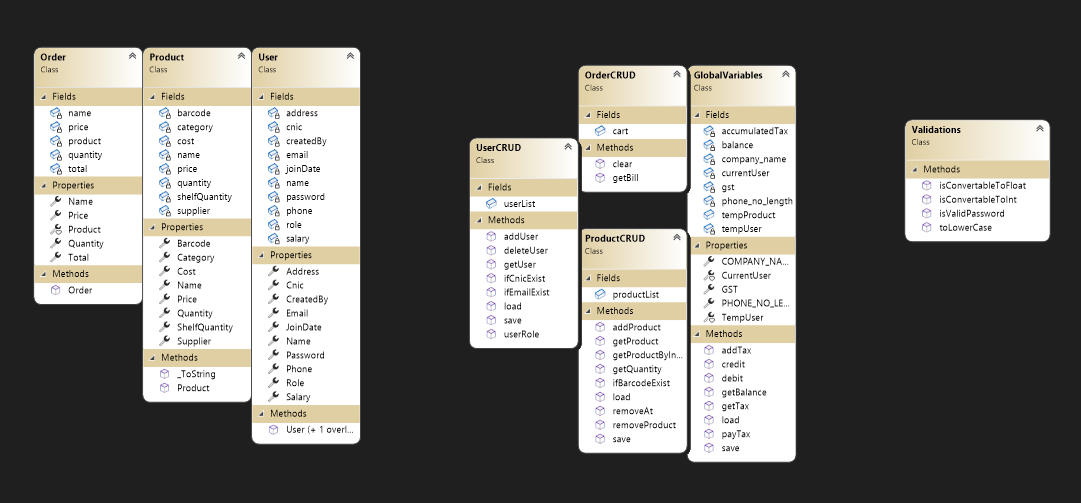
* SF\_AddProduct 20
* SF\_AddUser 21
* SF\_ForProduct 24
* SF\_ForUser 25
* SF\_SetGST 27
* SF\_TransferProduct 27

1. Form\_Admin 29
2. Form\_InventoryController 32
3. Form\_Cashier 35
4. Login\_Form 37
5. Program.cs 39
6. Sequence Diagram 39

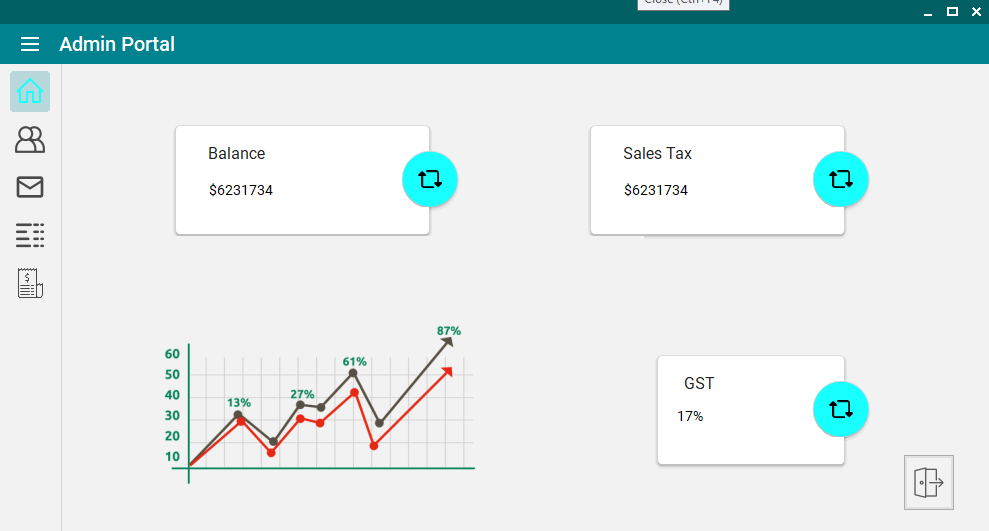
**Case Study**

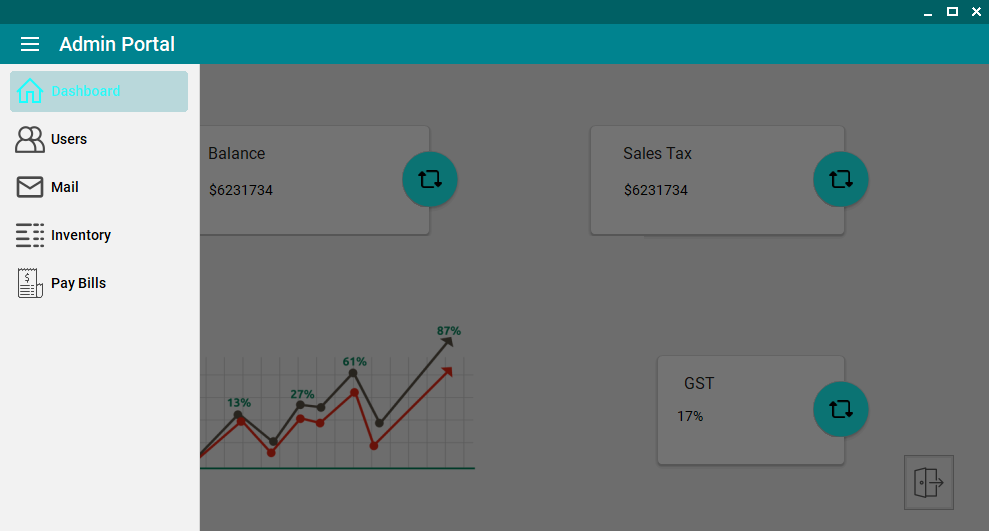
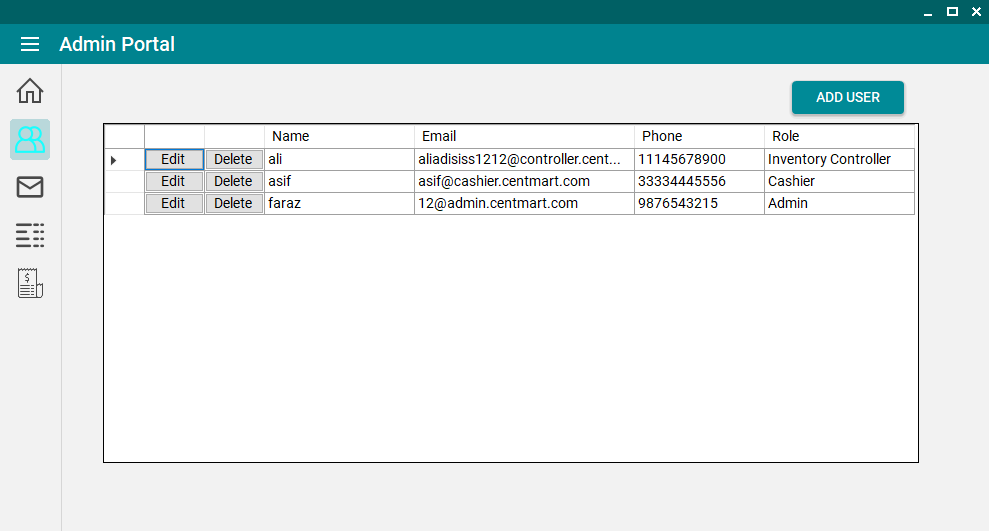
Every shop ranging from a local store to supermarkets need some kind of software to digitize their stock, payments, sales and other stuff. This application assists the store in the scalability of the business. And since computers don’t do mistakes, they are better than human options. Almost every shop in the world uses such kind of application to get track of their operations. Such an application is usually termed as Point-of-Sale application. CentMart is a Point-of-Sale application dedicated to digitize, mobilize and ultimately scale the shopping business. So, the different aspects of this application are given below.

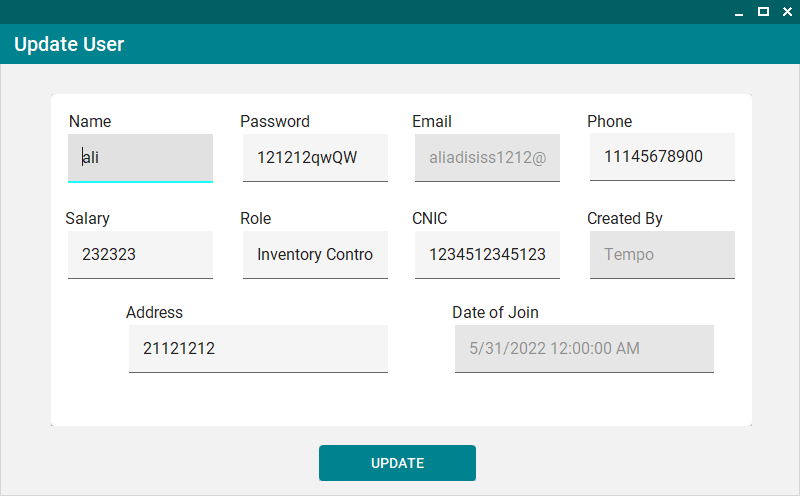
**Class Diagrams**

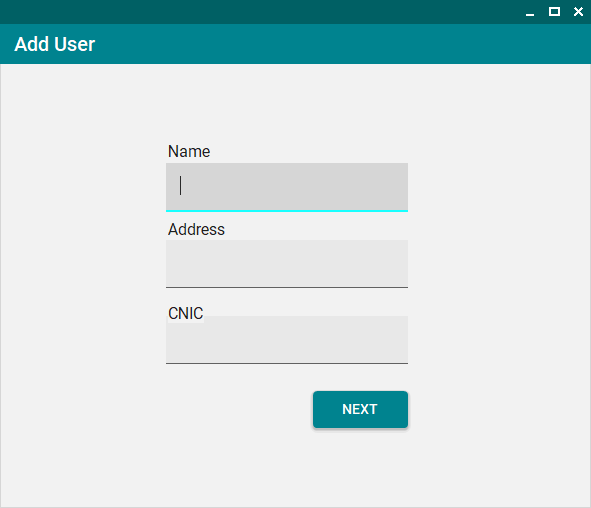
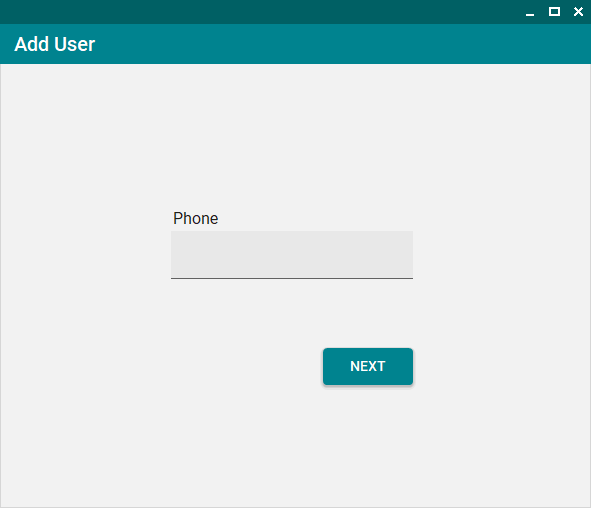
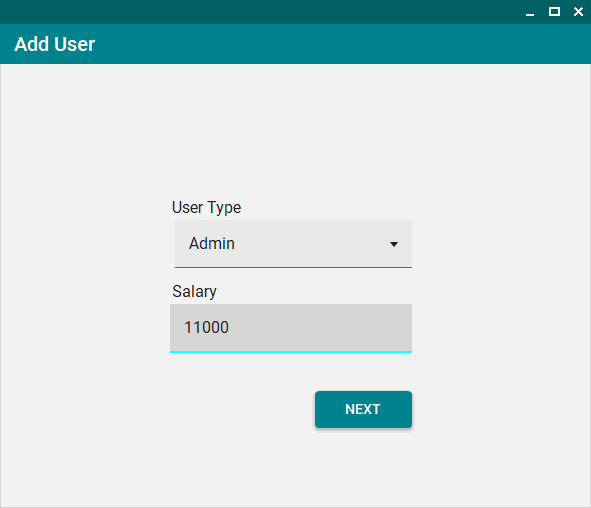


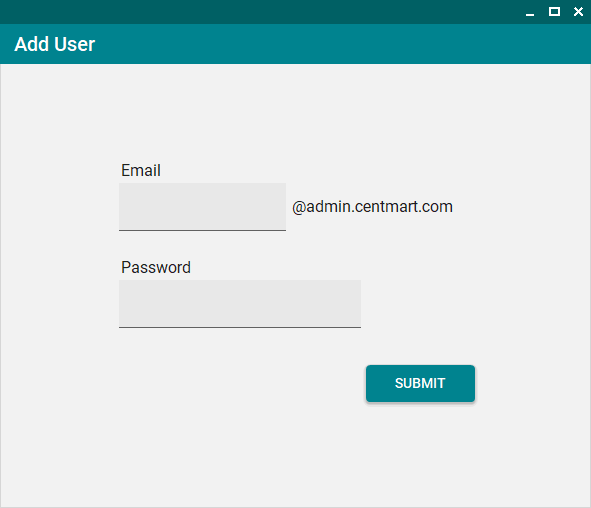
**Wireframes**

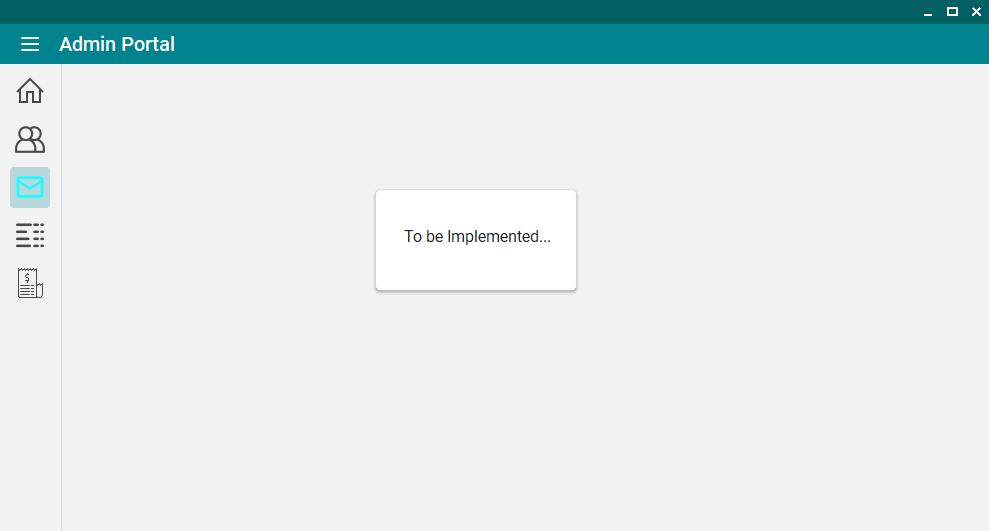


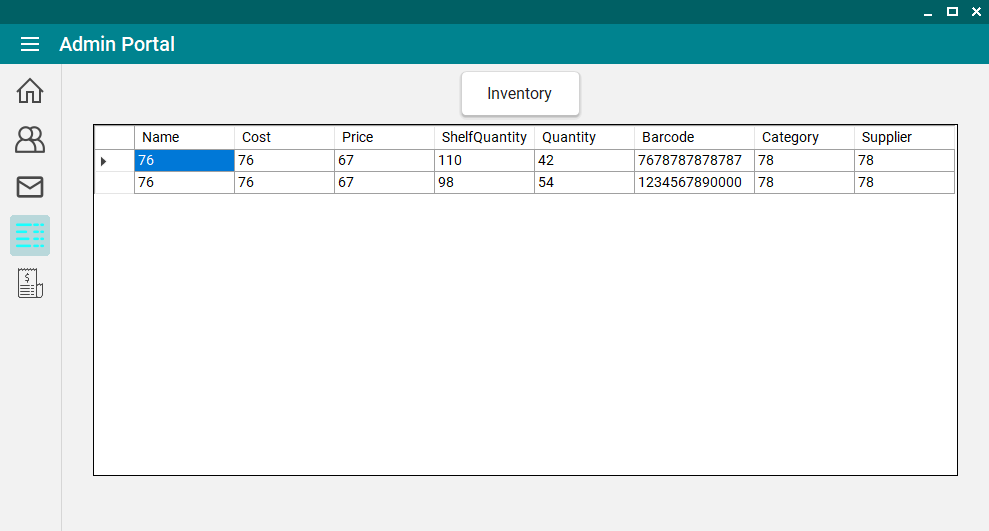
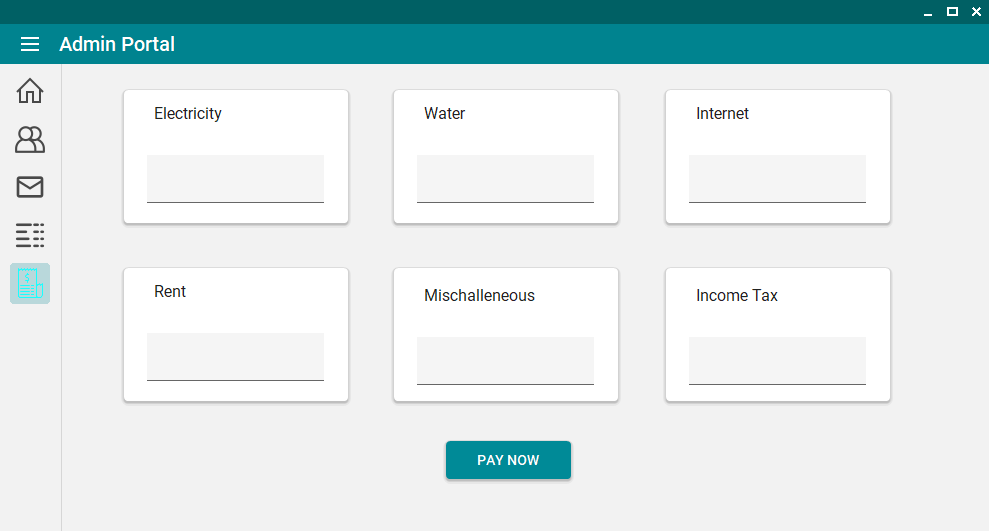


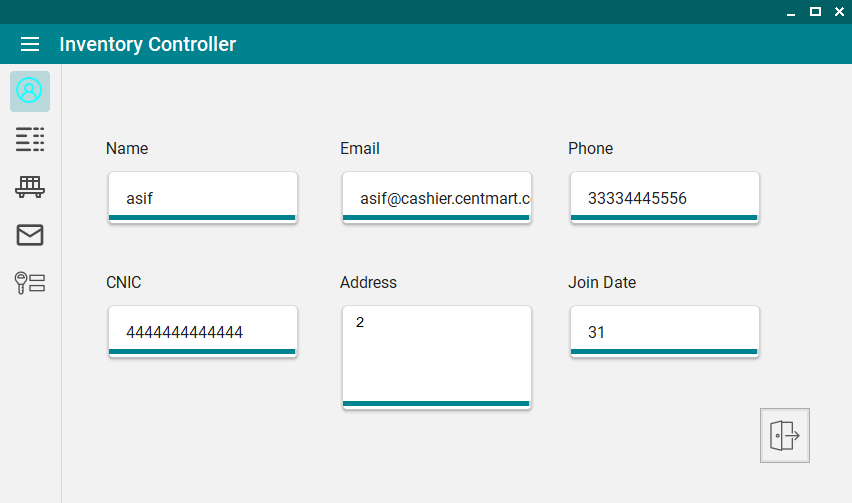


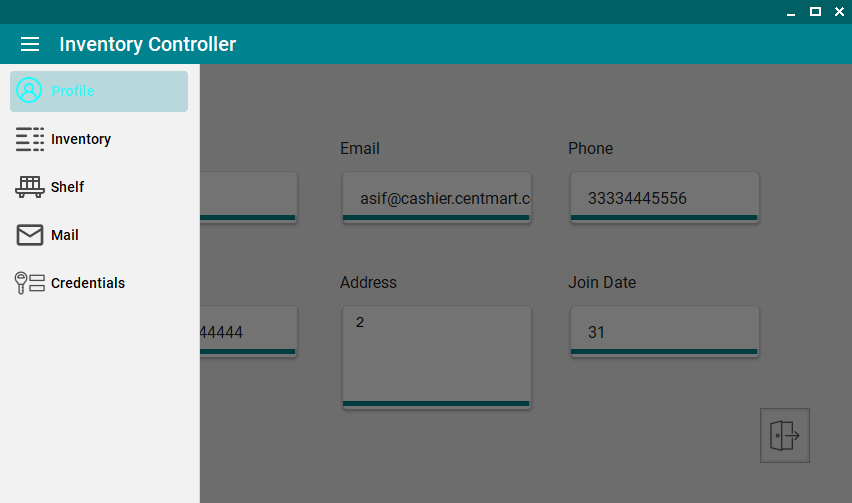
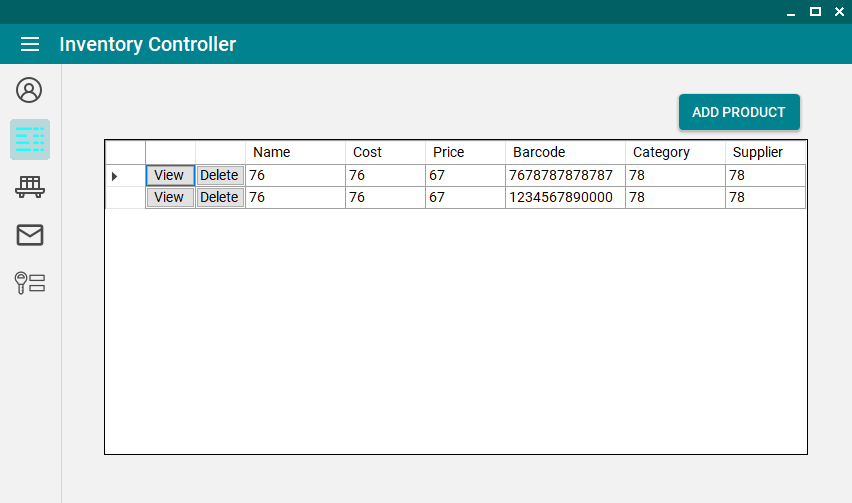
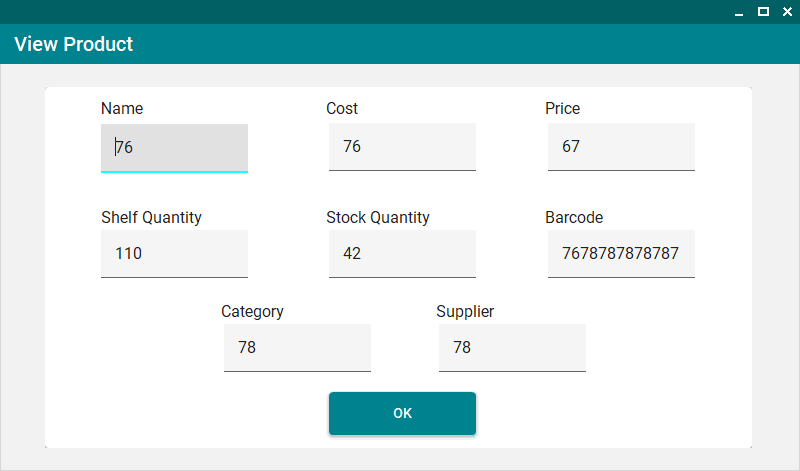
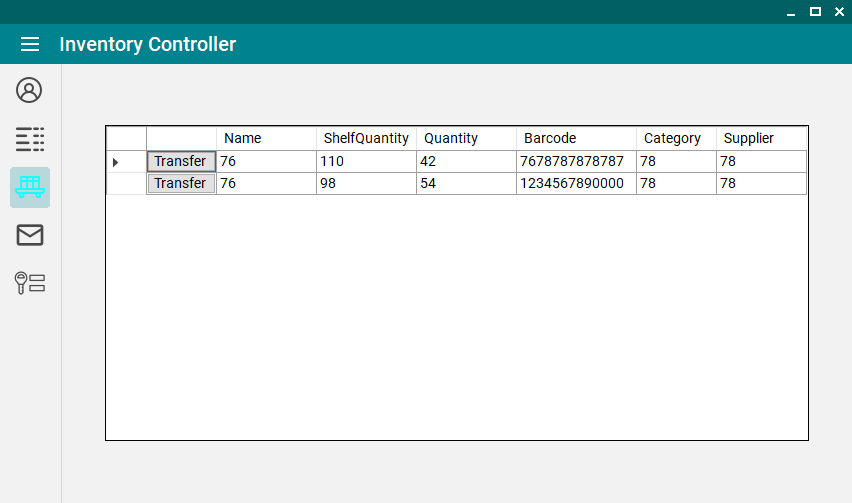
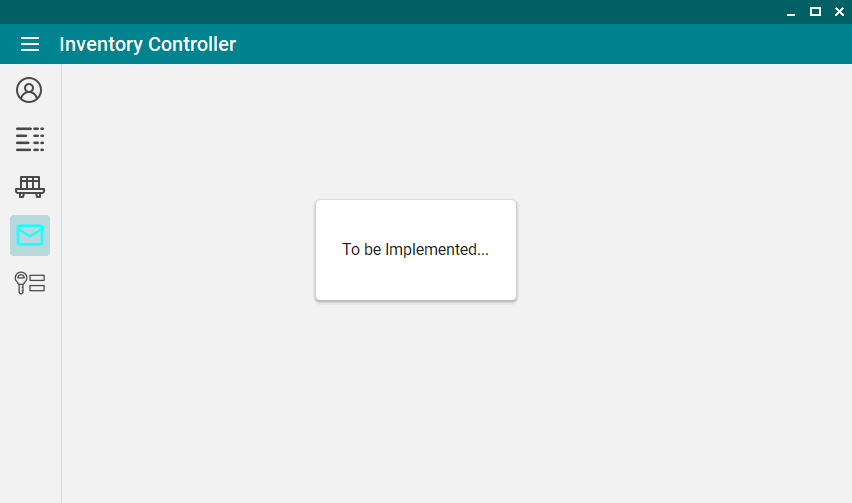
  

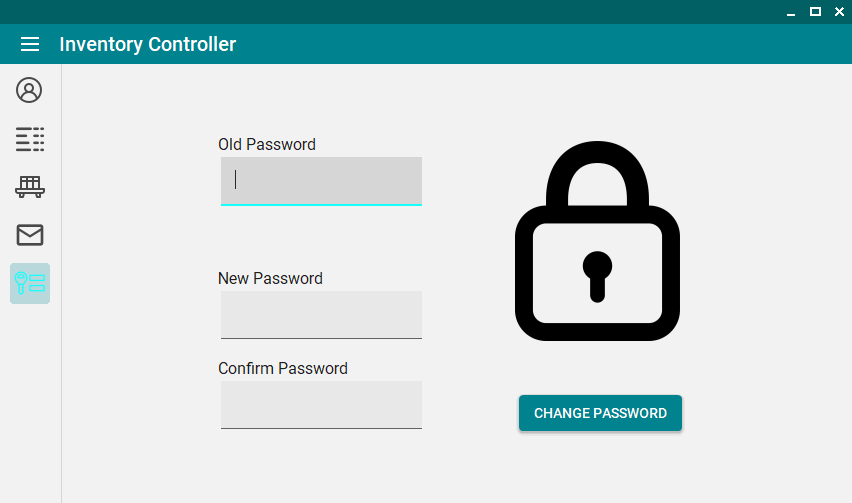




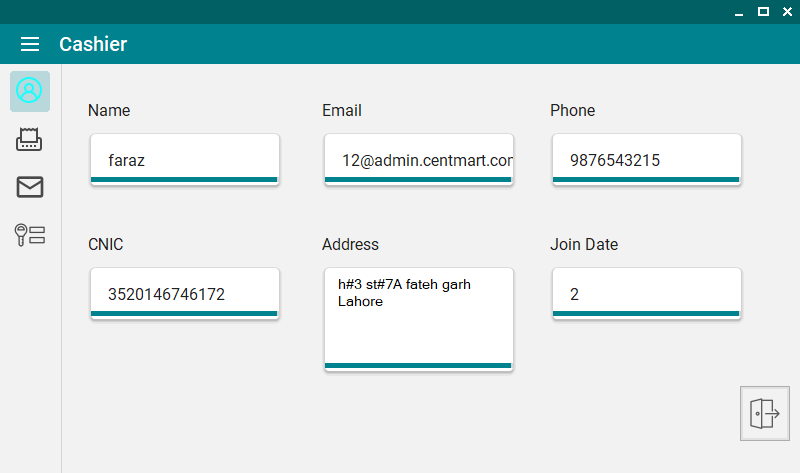
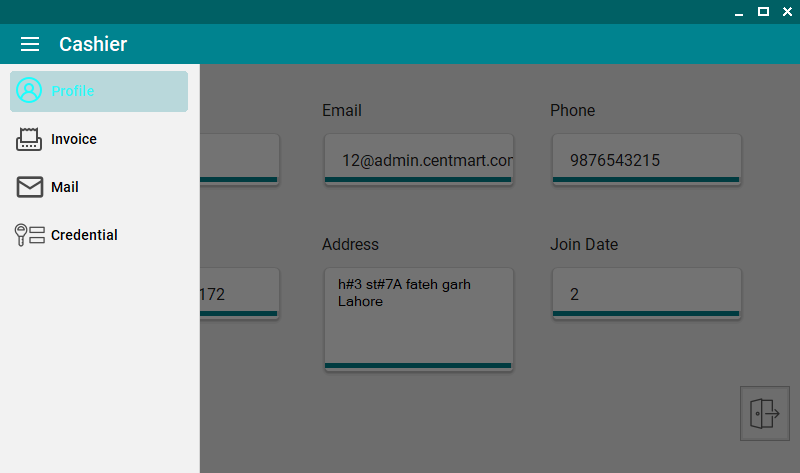
 

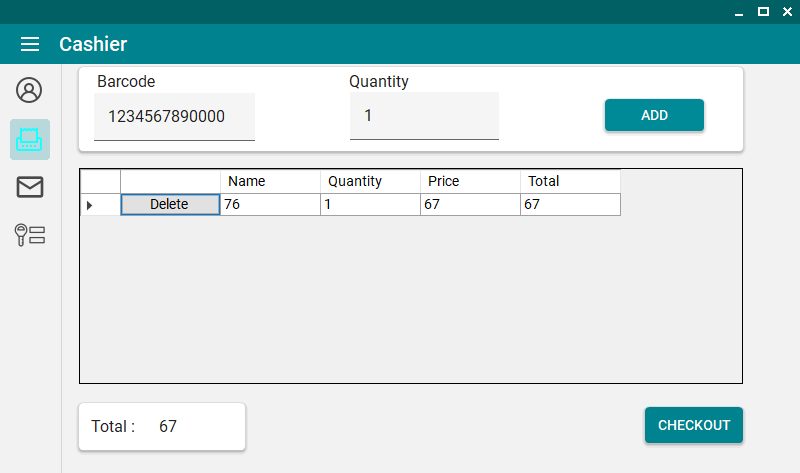
Inventory Controller

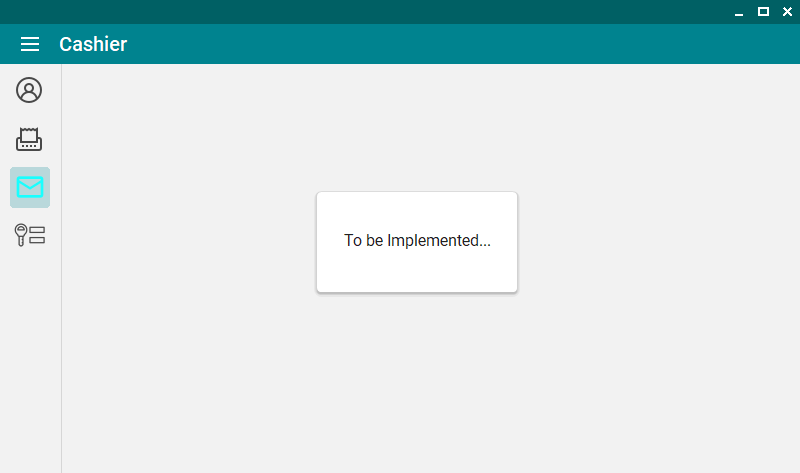
    

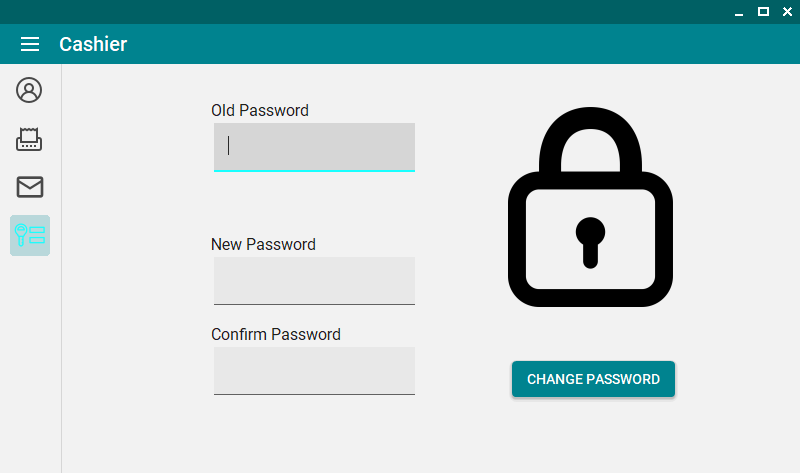


Cashier









**Code**

BL

Order.cs

using System;

using System.Collections.Generic;

using System.Linq;

using System.Text;

using System.Threading.Tasks;

namespace BusinessApplication.BL

{

internal class Order

{

private Product product;

private string name;

private int price;

private int quantity;

private int total;

internal Product Product { get => product; set => product = value; }

public string Name { get => name; set => name = value; }

public int Quantity { get => quantity; set => quantity = value; }

public int Price { get => price; set => price = value; }

public int Total { get => total; set => total = value; }

public Order(Product product, int quantity)

{

this.product = product;

this.quantity = quantity;

this.Price = product.Price;

this.Name = product.Name;

this.total = Price \* Quantity;

}

}

}

Product.cs

using System;

using System.Collections.Generic;

using System.Linq;

using System.Text;

using System.Threading.Tasks;

namespace BusinessApplication.BL

{

internal class Product

{

private string name;

private int cost;

private int price;

private int shelfQuantity;

private int quantity;

private Int64 barcode;

private string category;

private string supplier;

//parametrized constructor

public Product(string name, int cost, int price, int shelfQuantity, int quantity, Int64 barcode, string category, string supplier)

{

this.name = name;

this.cost = cost;

this.price = price;

this.shelfQuantity = shelfQuantity;

this.quantity = quantity;

this.barcode = barcode;

this.category = category;

this.supplier = supplier;

}

public string Name { get => name; set => name = value; }

public int Cost { get => cost; set => cost = value; }

public int Price { get => price; set => price = value; }

public int ShelfQuantity { get => shelfQuantity; set => shelfQuantity = value; }

public int Quantity { get => quantity; set => quantity = value; }

public Int64 Barcode { get => barcode; set => barcode = value; }

public string Category { get => category; set => category = value; }

public string Supplier { get => supplier; set => supplier = value; }

public string \_ToString()

{

return name + ',' + cost + ',' + price + ',' + shelfQuantity + ',' + quantity + ',' + barcode + ',' + category + ',' + supplier;

}

}

}

User.cs

using System;

using System.Collections.Generic;

using System.Linq;

using System.Text;

using System.Threading.Tasks;

namespace BusinessApplication.BL

{

internal class User

{

private string name;

private string password;

private string email;

private Int64 phone;

private int salary;

private string address;

private string role;

private string createdBy;

private Int64 cnic;

private DateTime joinDate;

public string Name { get => name; set => name = value; }

public string Password { get => password; set => password = value; }

public string Email { get => email; set => email = value; }

public Int64 Phone { get => phone; set => phone = value; }

public int Salary { get => salary; set => salary = value; }

public string Address { get => address; set => address = value; }

public string Role { get => role; set => role = value; }

public string CreatedBy { get => createdBy; set => createdBy = value; }

public Int64 Cnic { get => cnic; set => cnic = value; }

public DateTime JoinDate { get => joinDate; set => joinDate = value; }

public User(string name, string password, string email, Int64 phone, int salary, string address, string role, string createdBy, Int64 cnic, DateTime joinDate)

{

this.Name = name;

this.Password = password;

this.Email = email;

this.Phone = phone;

this.Salary = salary;

this.Address = address;

this.Role = role;

this.CreatedBy = createdBy;

this.Cnic = cnic;

this.JoinDate = joinDate;

}

//for file handlind

public User(string name, string password, string email, Int64 phone, int salary, string address, string role, string createdBy, Int64 cnic, int date, int month, int year)

{

this.Name = name;

this.Password = password;

this.Email = email;

this.Phone = phone;

this.Salary = salary;

this.Address = address;

this.Role = role;

this.CreatedBy = createdBy;

this.Cnic = cnic;

this.JoinDate = new DateTime(year, month, date);

}

}

}

DL

GlobalVariables.cs

using BusinessApplication.BL;

using System;

using System.Collections.Generic;

using System.Linq;

using System.Text;

using System.Threading.Tasks;

namespace BusinessApplication.DL

{

internal class GlobalVariables

{

private static Int64 balance = 134000;

private static Int64 accumulatedTax = 1200;

private static float gst = 17;

private static string company\_name = "CentMart";

private static int phone\_no\_length = 11;

private static BL.User currentUser;

private static User tempUser;

public static Product tempProduct;

public static double getBalance()

{

return balance;

}

public static void credit(int amount)

{

balance += amount;

}

public static void debit(int amount)

{

balance -= amount;

}

public static double getTax()

{

return accumulatedTax;

}

public static void addTax(int amount)

{

accumulatedTax += amount;

}

public static void payTax()

{

balance -= accumulatedTax;

accumulatedTax = 0;

}

public static float GST { get => gst; set => gst = value; }

public static int PHONE\_NO\_LENGTH { get => phone\_no\_length;}

public static string COMPANY\_NAME { get => company\_name; set => company\_name = value; }

internal static User CurrentUser { get => currentUser; set => currentUser = value; }

internal static User TempUser { get => tempUser; set => tempUser = value; }

public static void save()

{

System.IO.StreamWriter file = new System.IO.StreamWriter("balance.txt");

file.WriteLine($"{balance},{accumulatedTax},{gst},{company\_name}");

file.Flush();

file.Close();

}

public static void load()

{

System.IO.StreamReader file = new System.IO.StreamReader("balance.txt");

string[] data = file.ReadLine().Split(',');

balance = Int64.Parse(data[0]);

accumulatedTax = Int64.Parse(data[1]);

gst = float.Parse(data[2]);

company\_name = data[3];

file.Close();

}

}

}

OrderCRUD.cs

using System;

using System.Collections.Generic;

using System.Linq;

using System.Text;

using System.Threading.Tasks;

using BusinessApplication.BL;

namespace BusinessApplication.DL

{

internal class OrderCRUD

{

public static List<Order> cart = new List<Order>();

public static int getBill()

{

int bill = 0;

foreach(Order o in cart)

{

bill += o.Total;

}

return bill;

}

public static void clear()

{

cart = null;

}

}

}

ProductCRUD.cs

using System;

using System.Collections.Generic;

using System.Linq;

using System.Text;

using System.Threading.Tasks;

using System.IO;

using BusinessApplication;

using BusinessApplication.BL;

namespace BusinessApplication.DL

{

internal class ProductCRUD

{

public static List<Product> productList = new List<Product>();

public static int getQuantity(Int64 id)

{

foreach(Product p in productList)

{

if(p.Barcode == id)

{

return p.ShelfQuantity;

}

}

return -1;

}

public static bool ifBarcodeExist(Int64 id)

{

foreach(Product p in productList)

{

if(p.Barcode == id)

{

return true;

}

}

return false;

}

public static Product getProduct(Int64 id)

{

foreach(Product p in productList)

{

if(p.Barcode == id )

{

return p;

}

}

return null;

}

public static Product getProductByIndex(int idx)

{

return productList[idx];

}

public static void addProduct(Product product)

{

productList.Add(product);

}

public static void removeProduct(Product product)

{

productList.Remove(product);

}

public static void save()

{

StreamWriter sw = new StreamWriter("products.txt");

foreach (Product product in productList)

{

sw.WriteLine(product.\_ToString());

}

sw.Flush();

sw.Close();

}

public static void load()

{

StreamReader sr = new StreamReader("products.txt");

string s = sr.ReadLine();

while(s!=null)

{

string[] arr = s.Split(',');

Product p = new Product(arr[0], int.Parse(arr[1]), int.Parse(arr[2]), int.Parse(arr[3]), int.Parse(arr[4]), Int64.Parse(arr[5]), arr[6], arr[7]);

DL.ProductCRUD.addProduct(p);

s = sr.ReadLine();

}

sr.Close();

}

public static void removeAt(int idx)

{

productList.RemoveAt(idx);

}

}

}

UserCRUD.cs

using System;

using System.Collections.Generic;

using System.Linq;

using System.Text;

using System.IO;

using System.Threading.Tasks;

using BusinessApplication.BL;

namespace BusinessApplication.DL

{

internal class UserCRUD

{

public static List<User> userList = new List<User>();

public static User getUser(int idx)

{

return userList[idx];

}

public static void addUser(User user)

{

userList.Add(user);

}

public static void deleteUser(int idx)

{

userList.RemoveAt(idx);

}

public static bool ifCnicExist(Int64 cnic)

{

foreach (User user in userList)

{

if (user.Cnic == cnic)

{

return true;

}

}

return false;

}

public static bool ifEmailExist(string email)

{

foreach (User user in userList)

{

if (user.Email == email)

{

return true;

}

}

return false;

}

//save to file

public static void save()

{

StreamWriter sw = new StreamWriter("users.txt");

foreach (User u in userList)

{

sw.WriteLine($"{u.Name},{u.Password},{u.Email},{u.Phone},{u.Salary},{u.Address},{u.Role},{u.CreatedBy},{u.Cnic},{u.JoinDate.Date.Day},{u.JoinDate.Month},{u.JoinDate.Year}");

}

sw.Flush();

sw.Close();

}

public static void load()

{

StreamReader sr = new StreamReader("users.txt");

string line = sr.ReadLine();

while (line != null)

{

string[] data = line.Split(',');

User user = new User(data[0], data[1], data[2], Int64.Parse(data[3]), int.Parse(data[4]), data[5], data[6], data[7], Int64.Parse(data[8]), int.Parse(data[9]), int.Parse(data[10]), int.Parse(data[11]));

userList.Add(user);

line = sr.ReadLine();

}

sr.Close();

}

public static string userRole(string email, string pass)

{

foreach(User u in userList)

{

if (u.Email == email && u.Password == pass)

{

GlobalVariables.CurrentUser = u;

return u.Role;

}

}

return "";

}

}

}

Vs

Validations

using System.Linq;

namespace BusinessApplication.Vs

{

internal class Validations

{

public static bool isConvertableToInt(string s)

{

foreach (char c in s)

{

if ((int)c < 48 || (int)c > 57)

{

return false;

}

}

return true;

}

public static string toLowerCase(string s)

{

string result = "";

foreach (char c in s)

{

if ((int)c >= 65 && (int)c <= 90)

{

result += (char)((int)c + 32);

}

else

{

result += c;

}

}

return result;

}

public static bool isValidPassword(string s)

{

if (s.Length < 8)

{

return false;

}

else

{

if (s.Any(char.IsDigit))

{

return true;

}

else

{

return false;

}

return true;

}

}

public static bool isConvertableToFloat(string s)

{

foreach (char c in s)

{

if (((int)c < 48 || (int)c > 57) && c != '.')

{

return false;

}

}

return true;

}

}

}

**SFs (Secondary Forms)**

SF\_AddProduct

using System;

using System.Collections.Generic;

using System.ComponentModel;

using System.Data;

using System.Drawing;

using System.Linq;

using System.Text;

using System.Threading.Tasks;

using static BusinessApplication.Vs.Validations;

using System.Windows.Forms;

using MaterialSkin;

namespace BusinessApplication.SFs

{

public partial class SF\_AddProduct : MaterialSkin.Controls.MaterialForm

{

public SF\_AddProduct()

{

InitializeComponent(); ;

MaterialSkinManager materialSkinManager = MaterialSkinManager.Instance;

materialSkinManager.AddFormToManage(this);

materialSkinManager.Theme = MaterialSkinManager.Themes.LIGHT;

materialSkinManager.ColorScheme = new ColorScheme(Primary.Cyan800, Primary.Cyan900, Primary.Cyan500, Accent.Cyan200, TextShade.WHITE);

}

private void materialButton1\_Click(object sender, EventArgs e)

{

if (txt\_name == null || txt\_barcode == null || txt\_cost == null || txt\_price == null || txt\_stock == null || txt\_shelf == null || txt\_supplier == null || txt\_category == null)

{

MessageBox.Show("Please fill all the fields");

}

else

{

if (txt\_barcode.Text.Length != 13)

{

MessageBox.Show("Barcode must be 13 digits");

}

else

{

if (txt\_cost.Text.Length > 8 || txt\_price.Text.Length > 8 || txt\_stock.Text.Length > 8 || txt\_shelf.Text.Length > 8)

{

MessageBox.Show("Cost, Price and Stock must be less than 8 digits");

}

else if(DL.ProductCRUD.ifBarcodeExist(Int64.Parse(txt\_barcode.Text)))

{

MessageBox.Show("Barcode already exist");

}

else

{

if(isConvertableToInt(txt\_cost.Text)&& isConvertableToInt(txt\_price.Text) && isConvertableToInt(txt\_shelf.Text) && isConvertableToInt(txt\_stock.Text) && isConvertableToInt(txt\_barcode.Text))

{

BL.Product p = new BL.Product(txt\_name.Text, int.Parse(txt\_cost.Text), int.Parse(txt\_price.Text), int.Parse(txt\_shelf.Text), int.Parse(txt\_stock.Text), Int64.Parse(txt\_barcode.Text), txt\_supplier.Text, txt\_category.Text);

DL.ProductCRUD.addProduct(p);

DL.ProductCRUD.save();

MessageBox.Show("Product added successfully");

this.Close();

}

}

}

}

}

}

}

**SF\_AddUser**

using System;

using System.Collections.Generic;

using System.ComponentModel;

using System.Data;

using System.Drawing;

using System.Linq;

using System.Text;

using System.Threading.Tasks;

using MaterialSkin;

using System.Windows.Forms;

namespace BusinessApplication.SFs

{

public partial class SF\_AddUser : MaterialSkin.Controls.MaterialForm

{

private string \_name;

private string \_password;

private string \_email;

private Int64 \_phone;

private int \_salary;

private string \_address;

private string \_role;

private string \_createdBy;

private Int64 \_cnic;

public SF\_AddUser()

{

InitializeComponent(); ;

MaterialSkinManager materialSkinManager = MaterialSkinManager.Instance;

materialSkinManager.AddFormToManage(this);

materialSkinManager.Theme = MaterialSkinManager.Themes.LIGHT;

materialSkinManager.ColorScheme = new ColorScheme(Primary.Cyan800, Primary.Cyan900, Primary.Cyan500, Accent.Cyan200, TextShade.WHITE);

}

private void materialButton1\_Click(object sender, EventArgs e)

{

if(materialTextBox1.Text!=""&& materialTextBox2.Text != "" && materialTextBox3.Text != "" )

{

this.\_name = materialTextBox1.Text;

this.\_address = materialTextBox2.Text;

if(materialTextBox3.Text.Length==13)

{

if (Vs.Validations.isConvertableToInt(materialTextBox3.Text))

{

this.\_cnic = Int64.Parse(materialTextBox3.Text);

if (DL.UserCRUD.ifCnicExist(this.\_cnic))

{

MessageBox.Show("Cnic already exist");

}

else

{

this.panel1.Visible = false;

this.panel2.Visible = true;

}

}

else

{

MessageBox.Show("Please enter a valid CNIC number");

}

}

else

{

MessageBox.Show("CNIC must be 13 digits");

}

}

else

{

MessageBox.Show("Please fill all the fields");

}

}

private void materialButton2\_Click(object sender, EventArgs e)

{

if(materialTextBox4.Text!="")

{

if (Vs.Validations.isConvertableToInt(materialTextBox4.Text))

{

if (materialTextBox4.Text.Length == DL.GlobalVariables.PHONE\_NO\_LENGTH)

{

this.\_phone = Int64.Parse(materialTextBox4.Text);

this.panel2.Visible = false;

this.panel3.Visible = true;

}

else

{

MessageBox.Show("Please enter a valid phone number!");

}

}

else

{

MessageBox.Show("Please enter a valid phone number");

}

}

else

{

MessageBox.Show("Please enter a phone number");

}

}

private void materialButton3\_Click(object sender, EventArgs e)

{

if(materialTextBox5.Text==""||materialComboBox1.Text=="")

{

MessageBox.Show("Kindly fulfill all requirements!");

}

else

{

if (materialComboBox1.Text == "Admin")

{

this.materialLabel9.Text = ("@admin." + Vs.Validations.toLowerCase(DL.GlobalVariables.COMPANY\_NAME) +".com");

}

else if (materialComboBox1.Text == "Inventory Controller")

{

this.materialLabel9.Text = "@controller." + Vs.Validations.toLowerCase(DL.GlobalVariables.COMPANY\_NAME) + ".com";

}

else if (materialComboBox1.Text == "Cashier")

{

this.materialLabel9.Text = "@cashier." + Vs.Validations.toLowerCase(DL.GlobalVariables.COMPANY\_NAME) + ".com";

}

if (Vs.Validations.isConvertableToInt(materialTextBox5.Text))

{

if(int.Parse(materialTextBox5.Text)>0)

{

this.\_salary = int.Parse(materialTextBox5.Text);

this.\_role = materialComboBox1.Text;

this.panel3.Visible = false;

this.panel4.Visible = true;

}

else

{

MessageBox.Show("Salary must be greater than 0");

}

}

else

{

MessageBox.Show("Please enter a valid salary");

}

}

}

private void materialButton4\_Click(object sender, EventArgs e)

{

if(materialTextBox6.Text==""||materialTextBox7.Text=="")

{

MessageBox.Show("Please fill the required fields!");

}

else

{

if(!Vs.Validations.isValidPassword(materialTextBox7.Text))

{

MessageBox.Show("Password must be at least 8 characters long and contain at least one number and one uppercase letter");

}

else if (DL.UserCRUD.ifEmailExist(materialTextBox6.Text+ materialLabel9.Text))

{

MessageBox.Show("Email already exist");

}

else

{

this.\_email = materialTextBox6.Text + materialLabel9.Text;

this.\_password = materialTextBox7.Text;

this.\_createdBy = DL.GlobalVariables.CurrentUser.Name;

BL.User user = new BL.User(this.\_name, \_password, \_email, \_phone, \_salary, \_address, \_role, \_createdBy, \_cnic, DateTime.Now);

DL.UserCRUD.addUser(user);

DL.UserCRUD.save();

MessageBox.Show("User added successfully!");

//

this.Close();

}

}

}

}

}

**SF\_ForProduct**

using System;

using System.Collections.Generic;

using System.ComponentModel;

using System.Data;

using System.Drawing;

using System.Linq;

using System.Text;

using System.Threading.Tasks;

using System.Windows.Forms;

using MaterialSkin;

namespace BusinessApplication.SFs

{

public partial class SF\_ForProduct : MaterialSkin.Controls.MaterialForm

{

public SF\_ForProduct()

{

InitializeComponent(); ;

MaterialSkinManager materialSkinManager = MaterialSkinManager.Instance;

materialSkinManager.AddFormToManage(this);

materialSkinManager.Theme = MaterialSkinManager.Themes.LIGHT;

materialSkinManager.ColorScheme = new ColorScheme(Primary.Cyan800, Primary.Cyan900, Primary.Cyan500, Accent.Cyan200, TextShade.WHITE);

}

private void SF\_ForProduct\_Load(object sender, EventArgs e)

{

txt\_name.Text = DL.GlobalVariables.tempProduct.Name;

txt\_cost.Text = DL.GlobalVariables.tempProduct.Cost.ToString();

txt\_price.Text = DL.GlobalVariables.tempProduct.Price.ToString();

txt\_shelf.Text = DL.GlobalVariables.tempProduct.ShelfQuantity.ToString();

txt\_stock.Text = DL.GlobalVariables.tempProduct.Quantity.ToString();

txt\_barcode.Text = DL.GlobalVariables.tempProduct.Barcode.ToString();

txt\_category.Text = DL.GlobalVariables.tempProduct.Category;

txt\_supplier.Text = DL.GlobalVariables.tempProduct.Supplier;

}

private void materialButton1\_Click(object sender, EventArgs e)

{

this.Close();

}

}

}

**SF\_ForUsers**

using System;

using System.Collections.Generic;

using System.ComponentModel;

using System.Data;

using System.Drawing;

using System.Linq;

using System.Text;

using System.Threading.Tasks;

using System.Windows.Forms;

using MaterialSkin;

namespace BusinessApplication.SFs

{

public partial class SF\_ForUsers : MaterialSkin.Controls.MaterialForm

{

public SF\_ForUsers()

{

InitializeComponent(); ;

MaterialSkinManager materialSkinManager = MaterialSkinManager.Instance;

materialSkinManager.AddFormToManage(this);

materialSkinManager.Theme = MaterialSkinManager.Themes.LIGHT;

materialSkinManager.ColorScheme = new ColorScheme(Primary.Cyan800, Primary.Cyan900, Primary.Cyan500, Accent.Cyan200, TextShade.WHITE);

}

private void SF\_ForUsers\_Load(object sender, EventArgs e)

{

txt\_name.Text = DL.GlobalVariables.TempUser.Name;

txt\_password.Text = DL.GlobalVariables.TempUser.Password;

txt\_email.Text = DL.GlobalVariables.TempUser.Email;

txt\_phone.Text = DL.GlobalVariables.TempUser.Phone.ToString();

txt\_salary.Text = DL.GlobalVariables.TempUser.Salary.ToString();

txt\_role.Text = DL.GlobalVariables.TempUser.Role;

txt\_cnic.Text = DL.GlobalVariables.TempUser.Cnic.ToString();

txt\_createdBy.Text = DL.GlobalVariables.TempUser.CreatedBy;

txt\_address.Text = DL.GlobalVariables.TempUser.Address;

txt\_date.Text = DL.GlobalVariables.TempUser.JoinDate.Date.ToString();

}

private void materialButton1\_Click(object sender, EventArgs e)

{

if(txt\_name.Text=="" || txt\_password.Text == "" || txt\_phone.Text == "" || txt\_salary.Text == "" || txt\_cnic.Text == "" || txt\_address.Text == "" || txt\_role.Text == "")

{

MessageBox.Show("Enter all the Fields!");

}

else if(!(Vs.Validations.isConvertableToInt(txt\_phone.Text)&& Vs.Validations.isConvertableToInt(txt\_salary.Text)&& Vs.Validations.isConvertableToInt(txt\_cnic.Text)))

{

MessageBox.Show("Enter Valid Inputs!");

}

else if(!Vs.Validations.isValidPassword(txt\_password.Text))

{

MessageBox.Show("Enter Strong Password!");

}

else if(txt\_phone.Text.Length!=11)

{

MessageBox.Show("Enter Valid Password! ");

}

else if(txt\_cnic.Text.Length != 13)

{

MessageBox.Show("Enter Valid CNIC!");

}

else if(!(txt\_role.Text == "Admin"||txt\_role.Text == "Inventory Controller"||txt\_role.Text == "Cashier"))

{

MessageBox.Show("Enter Valid Role!");

}

else

{

DL.GlobalVariables.TempUser.Name = txt\_name.Text;

DL.GlobalVariables.TempUser.Password = txt\_password.Text;

DL.GlobalVariables.TempUser.Phone = Int64.Parse(txt\_phone.Text);

DL.GlobalVariables.TempUser.Salary = int.Parse(txt\_salary.Text);

DL.GlobalVariables.TempUser.Role = txt\_role.Text;

DL.GlobalVariables.TempUser.Cnic = Int64.Parse(txt\_cnic.Text);

DL.GlobalVariables.TempUser.Address = txt\_address.Text;

MessageBox.Show("Success!");

DL.UserCRUD.save();

this.Close();

}

}

}

}

SF\_SetGST

using System;

using System.Collections.Generic;

using System.ComponentModel;

using System.Data;

using System.Drawing;

using System.Linq;

using System.Text;

using MaterialSkin;

using System.Threading.Tasks;

using System.Windows.Forms;

namespace BusinessApplication.SFs

{

public partial class SF\_SetGST : MaterialSkin.Controls.MaterialForm

{

public SF\_SetGST()

{

InitializeComponent();

MaterialSkinManager materialSkinManager = MaterialSkinManager.Instance;

materialSkinManager.AddFormToManage(this);

materialSkinManager.Theme = MaterialSkinManager.Themes.LIGHT;

materialSkinManager.ColorScheme = new ColorScheme(Primary.Cyan800, Primary.Cyan900, Primary.Cyan500, Accent.Cyan200, TextShade.WHITE);

}

private void SF\_setGST\_Load(object sender, EventArgs e)

{

txt\_gst.Text = $"{DL.GlobalVariables.GST}";

}

private void materialButton1\_Click(object sender, EventArgs e)

{

if (Vs.Validations.isConvertableToFloat(txt\_gst.Text))

{

DL.GlobalVariables.GST = float.Parse(txt\_gst.Text);

DL.GlobalVariables.save();

this.Close();

}

else

{

MessageBox.Show("Please enter a valid GST value");

}

}

}

}

SF\_TransferProducts

using System;

using System.Collections.Generic;

using System.ComponentModel;

using System.Data;

using System.Drawing;

using System.Linq;

using System.Text;

using System.Threading.Tasks;

using System.Windows.Forms;

using MaterialSkin;

namespace BusinessApplication.SFs

{

public partial class SF\_TransferProduct : MaterialSkin.Controls.MaterialForm

{

public SF\_TransferProduct()

{

InitializeComponent();

MaterialSkinManager materialSkinManager = MaterialSkinManager.Instance;

materialSkinManager.AddFormToManage(this);

materialSkinManager.Theme = MaterialSkinManager.Themes.LIGHT;

materialSkinManager.ColorScheme = new ColorScheme(Primary.Cyan800, Primary.Cyan900, Primary.Cyan500, Accent.Cyan200, TextShade.WHITE);

}

private void btn\_transfer\_Click(object sender, EventArgs e)

{

string qty = txt\_quantity.Text;

if (!Vs.Validations.isConvertableToInt(qty))

{

MessageBox.Show("Quantity must be a number");

}

else

{

int qtyInt = Convert.ToInt32(qty);

if (qtyInt <= 0)

{

MessageBox.Show("Quantity must be greater than 0");

}

else

{

if (qtyInt > DL.GlobalVariables.tempProduct.Quantity)

{

MessageBox.Show("Stock not Available!");

}

else

{

DL.GlobalVariables.tempProduct.Quantity -= qtyInt;

DL.GlobalVariables.tempProduct.ShelfQuantity += qtyInt;

DL.ProductCRUD.save();

MessageBox.Show("Transfer Successful!");

this.Close();

}

}

}

}

}

}

**Form\_Admin**

using System;

using System.Collections.Generic;

using System.ComponentModel;

using System.Data;

using System.Drawing;

using System.Linq;

using System.Text;

using System.Threading.Tasks;

using System.Windows.Forms;

using MaterialSkin.Controls;

using BusinessApplication;

using MaterialSkin;

namespace BusinessApplication

{

public partial class Form\_Admin : MaterialSkin.Controls.MaterialForm

{

// 2021-CS-122

public Form\_Admin()

{

InitializeComponent();

MaterialSkinManager materialSkinManager = MaterialSkinManager.Instance;

materialSkinManager.AddFormToManage(this);

materialSkinManager.Theme = MaterialSkinManager.Themes.LIGHT;

materialSkinManager.ColorScheme = new ColorScheme(Primary.Cyan800, Primary.Cyan900, Primary.Cyan500, Accent.Cyan200, TextShade.WHITE);

}

private void button1\_Click(object sender, EventArgs e)

{

this.Hide();

LoginForm f = new LoginForm();

f.Show();

f.Closed += (s, args) => this.Close();

}

private void materialButton1\_Click(object sender, EventArgs e)

{

//override new form

SFs.SF\_AddUser f = new SFs.SF\_AddUser();

f.ShowDialog();

gv\_users.DataSource = null;

this.gv\_users.DataSource = DL.UserCRUD.userList;

this.gv\_users.Columns["Password"].Visible = false;

this.gv\_users.Columns["Salary"].Visible = false;

this.gv\_users.Columns["Address"].Visible = false;

this.gv\_users.Columns["CreatedBy"].Visible = false;

this.gv\_users.Columns["Cnic"].Visible = false;

this.gv\_users.Columns["JoinDate"].Visible = false;

//

this.gv\_users.Columns[0].Width = 60;

this.gv\_users.Columns[1].Width = 60;

this.gv\_users.Columns["Name"].Width = 150;

this.gv\_users.Columns["Email"].Width = 220;

this.gv\_users.Columns["Phone"].Width = 130;

this.gv\_users.Columns["ROle"].Width = 150;

this.gv\_users.ForeColor = Color.Black;

}

private void dataGridView1\_CellContentClick\_1(object sender, DataGridViewCellEventArgs e)

{

int row = e.RowIndex;

int column = e.ColumnIndex;

if (column == 0)

{

DL.GlobalVariables.TempUser = DL.UserCRUD.getUser(row);

SFs.SF\_ForUsers form = new SFs.SF\_ForUsers();

form.ShowDialog();

gv\_users.DataSource = null;

this.gv\_users.DataSource = DL.UserCRUD.userList;

this.gv\_users.Columns["Password"].Visible = false;

this.gv\_users.Columns["Salary"].Visible = false;

this.gv\_users.Columns["Address"].Visible = false;

this.gv\_users.Columns["CreatedBy"].Visible = false;

this.gv\_users.Columns["Cnic"].Visible = false;

this.gv\_users.Columns["JoinDate"].Visible = false;

//

this.gv\_users.Columns[0].Width = 60;

this.gv\_users.Columns[1].Width = 60;

this.gv\_users.Columns["Name"].Width = 150;

this.gv\_users.Columns["Email"].Width = 220;

this.gv\_users.Columns["Phone"].Width = 130;

this.gv\_users.Columns["ROle"].Width = 150;

this.gv\_users.ForeColor = Color.Black;

//

}

if (column == 1)

{

MessageBox.Show("leftest+1");

DL.UserCRUD.deleteUser(row);

DL.UserCRUD.save();

gv\_users.DataSource = null;

this.gv\_users.DataSource = DL.UserCRUD.userList;

this.gv\_users.Columns["Password"].Visible = false;

this.gv\_users.Columns["Salary"].Visible = false;

this.gv\_users.Columns["Address"].Visible = false;

this.gv\_users.Columns["CreatedBy"].Visible = false;

this.gv\_users.Columns["Cnic"].Visible = false;

this.gv\_users.Columns["JoinDate"].Visible = false;

//

this.gv\_users.Columns[0].Width = 60;

this.gv\_users.Columns[1].Width = 60;

this.gv\_users.Columns["Name"].Width = 150;

this.gv\_users.Columns["Email"].Width = 220;

this.gv\_users.Columns["Phone"].Width = 130;

this.gv\_users.Columns["ROle"].Width = 150;

this.gv\_users.ForeColor = Color.Black;

}

}

private void materialFloatingActionButton3\_Click(object sender, EventArgs e)

{

lbl\_balance.Text = null;

lbl\_balance.Text = $"${DL.GlobalVariables.getBalance()}";

DL.GlobalVariables.save();

}

private void materialFloatingActionButton1\_Click(object sender, EventArgs e)

{

lbl\_tax.Text = null;

lbl\_tax.Text = $"${DL.GlobalVariables.getTax()}";

DL.GlobalVariables.save();

}

private void materialFloatingActionButton2\_Click(object sender, EventArgs e)

{

SFs.SF\_SetGST form = new SFs.SF\_SetGST();

form.ShowDialog();

lbl\_gst.Text = null;

lbl\_gst.Text = $"{DL.GlobalVariables.GST} %";

DL.GlobalVariables.save();

}

private void materialButton2\_Click(object sender, EventArgs e)

{

string x1 = materialTextBox1.Text;

string x2 = materialTextBox2.Text;

string x3 = materialTextBox3.Text;

string x4 = materialTextBox4.Text;

string x5 = materialTextBox5.Text;

string x6 = materialTextBox6.Text;

if (x1==""|| x2 == "" || x3 == "" || x4 == "" || x5 == "" ||x6 == "")

{

MessageBox.Show("Please fill all the fields");

}

else if(Vs.Validations.isConvertableToFloat(x1)&& Vs.Validations.isConvertableToFloat(x2) && Vs.Validations.isConvertableToFloat(x3) && Vs.Validations.isConvertableToFloat(x4) && Vs.Validations.isConvertableToFloat(x5) && Vs.Validations.isConvertableToFloat(x6))

{

DL.GlobalVariables.debit(int.Parse(x1));

DL.GlobalVariables.debit(int.Parse(x2));

DL.GlobalVariables.debit(int.Parse(x3));

DL.GlobalVariables.debit(int.Parse(x4));

DL.GlobalVariables.debit(int.Parse(x5));

DL.GlobalVariables.debit(int.Parse(x6));

DL.GlobalVariables.save();

MessageBox.Show("Debit Successful");

}

else

{

MessageBox.Show("Please enter valid numbers");

}

}

private void Form\_Admin\_Load\_1(object sender, EventArgs e)

{

//home tab

this.lbl\_balance.Text = $"${DL.GlobalVariables.getBalance()}";

this.lbl\_tax.Text = $"${DL.GlobalVariables.getTax()}";

this.lbl\_gst.Text = $"{DL.GlobalVariables.GST} %";

//users tab

this.gv\_users.DataSource = null;

this.gv\_users.DataSource = DL.UserCRUD.userList;

this.gv\_users.Columns["Password"].Visible = false;

this.gv\_users.Columns["Salary"].Visible = false;

this.gv\_users.Columns["Address"].Visible = false;

this.gv\_users.Columns["CreatedBy"].Visible = false;

this.gv\_users.Columns["Cnic"].Visible = false;

this.gv\_users.Columns["JoinDate"].Visible = false;

//

this.gv\_users.Columns[0].Width = 60;

this.gv\_users.Columns[1].Width = 60;

this.gv\_users.Columns["Name"].Width = 150;

this.gv\_users.Columns["Email"].Width = 220;

this.gv\_users.Columns["Phone"].Width = 130;

this.gv\_users.Columns["ROle"].Width = 150;

this.gv\_users.ForeColor = Color.Black;

//invenntory tab

this.gv\_inventory.DataSource = null;

this.gv\_inventory.DataSource = DL.ProductCRUD.productList;

this.gv\_inventory.Columns["Barcode"].Width = 120;

}

}

}

**Form\_InventoryController**

using System;

using System.Collections.Generic;

using System.ComponentModel;

using System.Data;

using System.Drawing;

using System.Linq;

using System.Text;

using System.Threading.Tasks;

using System.Windows.Forms;

using MaterialSkin;

using BusinessApplication;

using MaterialSkin.Controls;

namespace BusinessApplication

{

public partial class Form\_InventoryController : MaterialSkin.Controls.MaterialForm

{

public Form\_InventoryController()

{

InitializeComponent();

MaterialSkinManager materialSkinManager = MaterialSkinManager.Instance;

materialSkinManager.AddFormToManage(this);

materialSkinManager.Theme = MaterialSkinManager.Themes.LIGHT;

materialSkinManager.ColorScheme = new ColorScheme(Primary.Cyan800, Primary.Cyan900, Primary.Cyan500, Accent.Cyan200, TextShade.WHITE);

}

private void Form\_InventoryController\_Load(object sender, EventArgs e)

{

//home tab

lbl\_name.Text = DL.GlobalVariables.CurrentUser.Name;

lbl\_email.Text = DL.GlobalVariables.CurrentUser.Email;

lbl\_phone.Text = DL.GlobalVariables.CurrentUser.Phone.ToString();

lbl\_cnic.Text = DL.GlobalVariables.CurrentUser.Cnic.ToString();

lbl\_address.Text = DL.GlobalVariables.CurrentUser.Address;

lbl\_date.Text = DL.GlobalVariables.CurrentUser.JoinDate.Day.ToString();

//inventory tab

gv\_inventory.DataSource = DL.ProductCRUD.productList;

gv\_inventory.ForeColor = Color.Black;

gv\_inventory.Columns[0].Width = 50;

gv\_inventory.Columns[1].Width = 50;

gv\_inventory.Columns[3].Width = 80;

gv\_inventory.Columns[4].Width = 80;

gv\_inventory.Columns[5].Visible = false;

gv\_inventory.Columns[6].Visible = false;

this.gv\_inventory.Columns["Barcode"].Width = 120;

this.gv\_inventory.Columns["Supplier"].Width = 80;

//shelf tab

gv\_shelf.DataSource = DL.ProductCRUD.productList;

gv\_shelf.ForeColor = Color.Black;

gv\_shelf.Columns["Cost"].Visible = false;

gv\_shelf.Columns["Price"].Visible = false;

gv\_shelf.Columns["Category"].Width = 80;

gv\_shelf.Columns["Supplier"].Width = 90;

gv\_shelf.Columns["Barcode"].Width = 120;

gv\_shelf.Columns[0].Width = 70;

}

private void button1\_Click(object sender, EventArgs e)

{

this.Hide();

LoginForm f = new LoginForm();

f.Show();

f.Closed += (s, args) => this.Close();

}

private void dataGridView1\_CellContentClick(object sender, DataGridViewCellEventArgs e)

{

int row = e.RowIndex;

int column = e.ColumnIndex;

if (column == 0)

{

DL.GlobalVariables.tempProduct = DL.ProductCRUD.getProductByIndex(row);

SFs.SF\_ForProduct form = new SFs.SF\_ForProduct();

form.ShowDialog();

}

if (column == 1)

{

DL.ProductCRUD.removeAt(row);

DL.ProductCRUD.save();

gv\_inventory.DataSource = null;

gv\_inventory.DataSource = DL.ProductCRUD.productList;

gv\_inventory.ForeColor = Color.Black;

gv\_inventory.Columns[0].Width = 50;

gv\_inventory.Columns[1].Width = 50;

gv\_inventory.Columns[3].Width = 80;

gv\_inventory.Columns[4].Width = 80;

gv\_inventory.Columns[5].Visible = false;

gv\_inventory.Columns[6].Visible = false;

MessageBox.Show("Product Deleted!");

}

}

private void materialButton2\_Click(object sender, EventArgs e)

{

SFs.SF\_AddProduct form = new SFs.SF\_AddProduct();

form.ShowDialog();

this.gv\_inventory.DataSource = null;

BindingSource s = new BindingSource();

s.DataSource = DL.ProductCRUD.productList;

this.gv\_inventory.DataSource = s;

this.gv\_inventory.Columns["Name"].Visible = false;

//dataGridView1.Refresh();

}

private void btn\_changePassword\_Click(object sender, EventArgs e)

{

string pass = txt\_oldPassword.Text;

string cpass1 = txt\_newPassword1.Text;

string cpass2 = txt\_newPassword2.Text;

if (pass == DL.GlobalVariables.CurrentUser.Password)

{

if (cpass1 == cpass2)

{

if (Vs.Validations.isValidPassword(cpass1))

{

DL.GlobalVariables.CurrentUser.Password = cpass1;

MessageBox.Show("Password Changed!");

}

else

{

MessageBox.Show("Enter Strong Password!");

}

}

else

{

MessageBox.Show("Passwords don't match!");

}

}

else

{

MessageBox.Show("Wrong Password!");

}

}

private void gv\_shelf\_CellContentClick(object sender, DataGridViewCellEventArgs e)

{

int row = e.RowIndex;

int column = e.ColumnIndex;

if (column == 0)

{

DL.GlobalVariables.tempProduct = DL.ProductCRUD.getProductByIndex(row);

SFs.SF\_TransferProduct form = new SFs.SF\_TransferProduct();

form.ShowDialog();

gv\_shelf.DataSource = null;

gv\_shelf.DataSource = DL.ProductCRUD.productList;

gv\_shelf.ForeColor = Color.Black;

gv\_shelf.Columns["Cost"].Visible = false;

gv\_shelf.Columns["Price"].Visible = false;

gv\_shelf.Columns["Category"].Width = 80;

gv\_shelf.Columns["Supplier"].Width = 90;

gv\_shelf.Columns["Barcode"].Width = 120;

gv\_shelf.Columns[0].Width = 70;

}

}

}

}

**Form\_Cashier**

using System;

using System.Collections.Generic;

using System.ComponentModel;

using System.Data;

using System.Drawing;

using System.Linq;

using System.Text;

using System.Threading.Tasks;

using System.Windows.Forms;

using MaterialSkin;

using BusinessApplication.BL;

using static BusinessApplication.Vs.Validations;

namespace BusinessApplication

{

public partial class Form\_Cashier : MaterialSkin.Controls.MaterialForm

{

public Form\_Cashier()

{

InitializeComponent();

MaterialSkinManager materialSkinManager = MaterialSkinManager.Instance;

materialSkinManager.AddFormToManage(this);

materialSkinManager.Theme = MaterialSkinManager.Themes.LIGHT;

materialSkinManager.ColorScheme = new ColorScheme(Primary.Cyan800, Primary.Cyan900, Primary.Cyan500, Accent.Cyan200, TextShade.WHITE);

}

private void Form\_Cashier\_Load(object sender, EventArgs e)

{

lbl\_name.Text = DL.GlobalVariables.CurrentUser.Name;

lbl\_email.Text = DL.GlobalVariables.CurrentUser.Email;

lbl\_phone.Text = DL.GlobalVariables.CurrentUser.Phone.ToString();

lbl\_cnic.Text = DL.GlobalVariables.CurrentUser.Cnic.ToString();

lbl\_address.Text = DL.GlobalVariables.CurrentUser.Address;

lbl\_date.Text = DL.GlobalVariables.CurrentUser.JoinDate.Day.ToString();

}

private void button1\_Click(object sender, EventArgs e)

{

this.Hide();

LoginForm f = new LoginForm();

f.Show();

f.Closed += (s, args) => this.Close();

}

private void materialButton2\_Click(object sender, EventArgs e)

{

string barcode = txt\_barcode.Text;

string quantity = txt\_quantity.Text;

if (barcode == null || quantity == null)

{

MessageBox.Show("Please enter all the fields");

}

else if(!(isConvertableToInt(barcode)&&isConvertableToInt(quantity)))

{

MessageBox.Show("Please enter valid values");

}

else if (!DL.ProductCRUD.ifBarcodeExist(Int64.Parse(barcode)))

{

MessageBox.Show("Barcode don't Exist!");

}

else if(DL.ProductCRUD.getQuantity(Int64.Parse(barcode))<int.Parse(quantity))

{

MessageBox.Show("Not Available on Shelf!");

}

else

{

Int64 barcode\_int = Convert.ToInt64(barcode);

int quantity\_int = Convert.ToInt32(quantity);

Order o = new Order(DL.ProductCRUD.getProduct(barcode\_int), quantity\_int);

DL.OrderCRUD.cart.Add(o);

this.gv\_cart.DataSource = null;

this.gv\_cart.DataSource = DL.OrderCRUD.cart;

txt\_finalBill.Text = DL.OrderCRUD.getBill().ToString();

/\*

if (DL.GlobalVariables.CurrentUser.Cart.ContainsKey(barcode\_int))

{

MessageBox.Show("Item already in cart");

}

else

{

DL.GlobalVariables.CurrentUser.Cart.Add(barcode\_int, quantity\_int);

MessageBox.Show("Item added to cart");

}

\*/

}

}

private void materialButton3\_Click(object sender, EventArgs e)

{

DL.GlobalVariables.credit(DL.OrderCRUD.getBill());

foreach(Order o in DL.OrderCRUD.cart)

{

o.Product.ShelfQuantity -= o.Quantity;

}

MessageBox.Show("Success!");

DL.OrderCRUD.clear();

}

private void btn\_changePass\_Click(object sender, EventArgs e)

{

string pass = txt\_password.Text;

string cpass1 = txt\_newPass1.Text;

string cpass2 = txt\_newPass2.Text;

if (pass == DL.GlobalVariables.CurrentUser.Password)

{

if (cpass1 == cpass2)

{

if (Vs.Validations.isValidPassword(cpass1))

{

DL.GlobalVariables.CurrentUser.Password = cpass1;

MessageBox.Show("Password Changed!");

}

else

{

MessageBox.Show("Enter Strong Password!");

}

}

else

{

MessageBox.Show("Passwords don't match!");

}

}

else

{

MessageBox.Show("Wrong Password!");

}

}

}

}

**LoginForm.cs**

using System;

using System.Collections.Generic;

using System.ComponentModel;

using System.Data;

using System.Drawing;

using System.Linq;

using System.Text;

using System.Threading.Tasks;

using System.Windows.Forms;

using MaterialSkin.Controls;

using MaterialSkin;

namespace BusinessApplication

{

public partial class LoginForm : MaterialSkin.Controls.MaterialForm

{

public LoginForm()

{

InitializeComponent();

MaterialSkinManager materialSkinManager = MaterialSkinManager.Instance;

materialSkinManager.AddFormToManage(this);

materialSkinManager.Theme = MaterialSkinManager.Themes.LIGHT;

materialSkinManager.ColorScheme = new ColorScheme(Primary.Cyan800, Primary.Cyan900, Primary.Cyan500, Accent.Cyan200, TextShade.WHITE);

}

private void materialButton1\_Click(object sender, EventArgs e)

{

string email = materialTextBox1.Text;

string password = materialTextBox2.Text;

if (DL.UserCRUD.userRole(email, password) == "Admin")

{

this.Hide();

Form\_Admin admin = new Form\_Admin();

admin.Closed += (s, args) => this.Close();

admin.Show();

}

else if (DL.UserCRUD.userRole(email, password) == "Inventory Controller")

{

this.Hide();

Form\_InventoryController iv = new Form\_InventoryController();

iv.Closed += (s, args) => this.Close();

iv.Show();

}

else if (DL.UserCRUD.userRole(email, password) == "Cashier")

{

this.Hide();

Form\_Cashier cashier = new Form\_Cashier();

cashier.Closed += (s, args) => this.Close();

cashier.Show();

}

else

{

MessageBox.Show("Wrong Credentials");

}

}

private void materialButton2\_Click\_1(object sender, EventArgs e)

{

this.Hide();

Form\_Admin admin = new Form\_Admin();

DL.GlobalVariables.CurrentUser = DL.UserCRUD.userList[0];

admin.Closed += (s, args) => this.Close();

admin.Show();

}

private void materialButton3\_Click(object sender, EventArgs e)

{

this.Hide();

DL.GlobalVariables.CurrentUser = DL.UserCRUD.userList[1];

Form\_InventoryController iv = new Form\_InventoryController();

iv.Closed += (s, args) => this.Close();

iv.Show();

}

private void materialButton4\_Click(object sender, EventArgs e)

{

this.Hide();

DL.GlobalVariables.CurrentUser = DL.UserCRUD.userList[2];

Form\_Cashier cashier = new Form\_Cashier();

cashier.Closed += (s, args) => this.Close();

cashier.Show();

}

}

}

Program.cs

using System;

using System.Collections.Generic;

using System.Linq;

using System.Threading.Tasks;

using System.Windows.Forms;

namespace BusinessApplication

{

internal static class Program

{

/// <summary>

/// The main entry point for the application.

/// </summary>

[STAThread]

static void Main()

{

DL.GlobalVariables.load();

DL.UserCRUD.load();

DL.ProductCRUD.load();

Application.EnableVisualStyles();

Application.SetCompatibleTextRenderingDefault(false);

var v = new LoginForm();

Application.Run(v);

}

}

}

**Sequence Diagram**

