



AMERICAN INTERNATIONAL UNIVERSITY–BANGLADESH (AIUB)

Dept. of Computer Science
Faculty of Science and Technology

CSC2210: OBJECT ORIENTED PROGRAMMING 2

Spring 2024-2025

Section: [w]

Group No: 05

Project Report On

INVENTORY MANAGEMENT SYSTEM

Supervised By

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Submitted By:

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CO2: Display and verify the mean of a real-life Project using the concepts of C# Graphical User Interface based environment with database integration to depict a desktop-based application.

Assessment Criteria	Not Attended/ Incorrect (0)	Inadequate (1-2)	Average (3)	Good (4)	Excellent (5)
Evaluation Criteria	Evaluation Definition				Total =
Requirement fulfillment	Properly demonstrate a real-life scenario-based project with proper functional requirement identification for the Object-Oriented Programming project development activities.				
Validation	Ensuring the ability of students' proper demonstration on validation forms in their system in terms of dealing with the data.				
Verification	Identifying if the students can verify the system data along with proper functional requirements in terms of data flow.				

Chapter :01 (Introduction)

The **Inventory Management System** is designed to streamline the management and tracking of products within a business through a digital platform. It serves as an interactive system for administrators, cashiers, and customers, enabling them to manage inventory, process sales, and place orders efficiently. The system ensures secure user authentication, organized product and category handling, and smooth transaction processing to enhance operational efficiency and accuracy.

Chapter :02(User Story)

1. Admin Features

Module	Functionality
1. Dashboard	View overall system status and statistics.
2. User Management	Add, update, or deactivate users.
3. Category Management	Add, update, or delete product categories.
4. Product Management	Add new products and manage existing product details.
5. Customer Management	View customer records and transaction summaries.
6. Donation Records	View and manage all donation entries.

2. Cashier Features

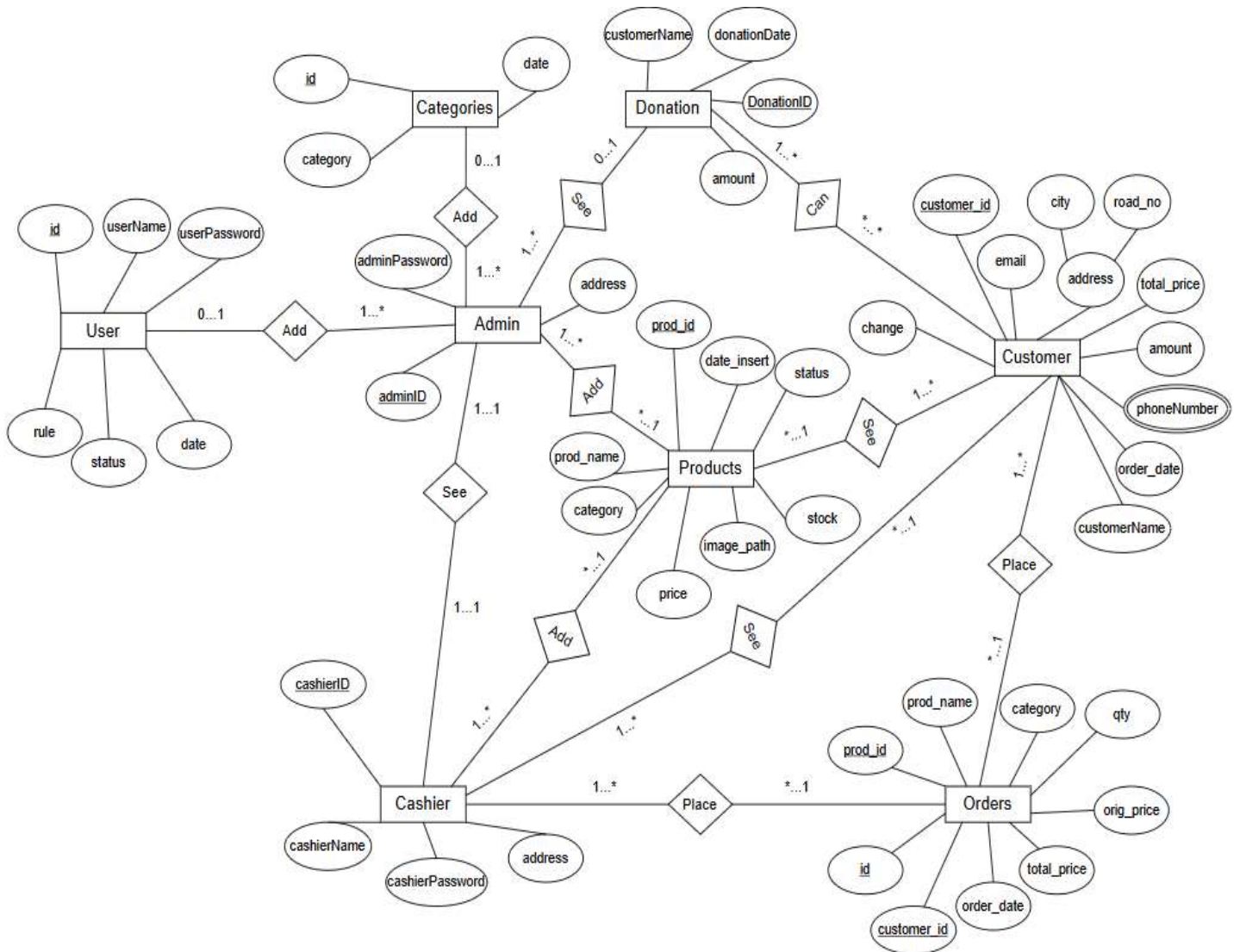
Module	Functionality
1. Dashboard	View sales summary and stock alerts.
2. Product Management	Add or update product information and stock.
3. Order Management	Place and manage customer orders.
4. Customer Overview	View customer transactions and balances.

3. Customer Features

Module	Functionality
1. Product View	Browse available products.
2. Order Placement	Select and order products.
3. Profile Management	Edit personal account information.
4. Donation	Make and view donations.

By integrating these features, the INVENTORY MANAGEMENT SYSTEM enhances efficiency, sustainability, and collaboration in this project.

Chapter :03 (ER Diagram)



NORMALIZATION

Add relation

UNF : adminID, adminPassword, address, id, username, userPassword, role, status, date

1NF : adminID, adminPassword, address, userID, username, userPassword, role, status, date

2NF :

- 1) adminID(PK), adminPassword, address
- 2) id(PK), username, userPassword, role, status, date
- 3) adminID(PK), id(FK)

3NF :

- 1) adminID(PK), adminPassword, address
- 2) id(PK), username, userPassword, role, status, date
- 3) adminID(PK), id(FK)

Add relation

UNF : adminID, adminPassword, address, id, category, date

1NF : adminID, adminPassword, address, id, category, date

2NF :

- 1) adminID(PK), adminPassword, address
- 2) id(PK), category, date
- 3) adminID(PK), id(FK)

3NF :

- 1) adminID(PK), adminPassword, address
- 2) id(PK), category, date
- 3) adminID(PK), id(FK)

See relation

UNF : adminID, adminPassword, address, DonationID, customerName, amount, donationDate

1NF : adminID, adminPassword, address, DonationID, customerName, amount, donationDate

2NF :

- 1) adminID(PK), adminPassword, address
- 2) DonationID(PK), customerName, amount, donationDate
- 3) adminID(PK), donationID(FK)

3NF :

- 1) adminID(PK), adminPassword, address
- 2) DonationID(PK), customerName, amount , donationDate
- 3) adminID(PK), DonationID(FK)

Add relation

UNF : adminID, adminPassword, address, prod_id, prod_name, category, price, stock, image_path, status, date_insert

1NF : adminID, adminPassword, address, prod_id, prod_name, category, price, stock, image_path, status, date_insert

2NF :

- 1) adminID(PK), adminPassword, address
- 2) prod_id(PK), prod_name, category, price, stock, image_path, status, date_insert
- 3) adminID(PK), productID(FK)

3NF :

- 1) adminID(PK), adminPassword, address
- 2) prod_id(PK), prod_name, category, price, stock, image_insert, status, date_insert
- 3) adminID(PK), prod_id(FK)

See relation : (admin,cashier)**UNF :**

adminID, adminPassword, address, cashierID, cashierName, cashierPassword , address

1NF :

adminID, adminPassword, address, cashierID, cashierName, cashierPassword , address

2NF :

- 1) adminID(PK), adminPassword, address
- 2) cashierID(PK), cashierName, cashierPassword , address
- 3) adminID(PK), cashierID(FK)

3NF :

- 1) adminID(PK), adminPassword, address
- 2) cashierID(PK), cashierName, cashierPassword , address
- 3) adminID(PK), cashierID(FK)

Add relation

UNF : cashierID, cashierName, cashierPassword , address, prod_id, prod_name, category, price, stock, image_path, status, date_insert

1NF : cashierID, cashierName, cashierPassword , address, prod_id, prod_name, category, price, stock, image_path, status, date_insert

2NF :

- 1) cashierID(PK), cashierName, cashierPassword , address
- 2) prod_id(PK), prod_name, category, price, stock, image_path, status, date_insert
- 3) cashierID(PK), prod_id(FK)

3NF :

- 1) cashierID(PK), cashierName, cashierPassword , address
- 2) productID(PK), prod_name, category, price, stock, image_path, status, date_insert
- 3) cashierID(PK), prod_id(FK)

Place relation

UNF : cashierID, cashierName, cashierPassword , address, id , prod_id, prod_name, category, qty, orig_price, total_price, order_date, customer_id

1NF : cashierID, cashierName, cashierPassword , address, id , prod_id, prod_name, category, qty, orig_price, total_price, order_date, customer_id

2NF :

- 1) cashierID(PK), cashierName, cashierPassword , address
- 2) id(PK) , prod_id(PK), prod_name, category, qty, orig_price, total_price, order_date, customer_id(PK)
- 3) cashierID(PK), id(FK), prod_id(FK), customer_id(FK)

3NF :

- 1) cashierID(PK), cashierName, cashierPassword , address
- 2) id(PK) , prod_id(PK), prod_name, category, qty, orig_price, total_price, order_date, customer_id(PK)
- 3) cashierID(PK), id(FK), prod_id(FK), customer_id(Fk)

Place relation

UNF : customer_id, customerName, address ,city , road_no, email , total_price, amount, change, phoneNumber, id , prod_id, prod_name, category, qty, orig_price, total_price, order_date, customer_id

1NF : customer_id, customerName, address , city , road_no, email , total_price, amount, change, phoneNumber, id , prod_id, prod_name, category, qty, orig_price, total_price, order_date, customer_id

2NF :

- 1) customer_id(PK), customerName, city , road_no, email , total_price, amount,change, phoneNumber
- 2) id(PK) , prod_id(PK), prod_name, category, qty, orig_price, total_price, order_date, customer_id(PK)
- 3) customer_id(PK), id(FK), prod_id(FK), customer_id(FK)

3NF :

- 1) customer_id(PK), customerName, city , road_no, email , total_price, amount, change, phoneNumber
- 2) id(PK) , prod_id(PK), prod_name, category, qty, orig_price, total_price,order_date, customer_id(PK)
- 3) customer_id(PK), id(FK), prod_id(FK), customer_id(FK)

See relation

UNF :cashierID, cashierName, cashierPassword , address, customer_id, customerName, address, city , road_no, email , total_price, amount, change, phoneNumber

1NF : cashierID, cashierName, cashierPassword , address, customer_id, customerName, address, city , road_no, email , total_price, amount, change, phoneNumber

2NF :

- 1) cashierID(PK), cashierName, cashierPassword , address
- 2) customer_id(PK), customerName, city , road_no, email , total_price, amount, change, phoneNumber
- 3) cashierID(PK), customer_id(FK)

3NF :

- 1) cashierID(PK), cashierName, cashierPassword , address
- 2) customer_id(PK), customerName, city , road_no, email , total_price, amount, change, phoneNumber
- 3) cashierID(PK), customer_id(FK)

See relation

UNF : customer_id, customerName, address, city , road_no, email , total_price, amount, change, phoneNumber, prod_id, prod_name, category, price, stock, image_path, status, date_insert

1NF : customer_id, customerName, address, city , road_no, email , total_price, amount, change, phoneNumber, prod_id, prod_name, category, price, stock, image_path, status, date_insert

2NF :

- 1) customer_id(PK), customerName, city , road_no, email , total_price, amount, change, phoneNumber
- 2) prod_id(PK), prod_name, category, price, stock, image_path, status, date_insert
- 3) customer_id(PK), prod_id(FK)

3NF :

- 1) customer_id(PK), customerName, city , road_no, email , total_price, amount, change, phoneNumber
- 2) prod_id(PK), prod_name, category, price, stock, image_path, status, date_insert
- 3) customer_id(PK), prod_id(FK)

Can relation

UNF : customer_id, customerName, address, city , road_no, email , total_price, amount, change, phoneNumber, DonationID, amount , donationDate

1NF : customer_id, customerName, address, city , road_no, email , total_price, amount, change, phoneNumber, DonationID, amount , donationDate

2NF :

- 1) customer_id(PK), customerName, city , road_no, email , total_price, amount, change, phoneNumber
- 2) DonationID, amount , donationDate
- 3) customer_id(PK), DonationID(FK)

3NF :

- 1) customer_id(PK), customerName, city , road_no, email , total_price, amount, change, phoneNumber
- 2) DonationID, amount , donationDate
- 3) customer_id(PK), DonationID(FK)

Finalization :

- 1) adminID(PK), adminPassword, address
- 2) id(PK), username, userPassword, role, status, date
- 3) adminID(PK), id(FK)
- 4) id(PK), category, date
- 5) DonationID(PK), customerName, amount, donationDate
- 6) adminID(PK), DonationID(FK)
- 7) prod_id(PK), prod_name, category, price, stock, image_insert, status, date_insert
- 8) adminID(PK), prod_id(FK)
- 9) cashierID(PK), cashierName, cashierPassword, address
- 10) adminID(PK), cashierID(FK)
- 11) cashierID(PK), prod_id(FK)
- 12) id(PK), prod_id(PK), prod_name, category, qty, orig_price, total_price, order_date, customer_id(PK)
- 13) cashierID(PK), id(FK), prod_id(FK), customer_id(FK)
- 14) customer_id(PK), customerName, city, road_no, email, total_price, amount, change, phoneNumber
- 15) cashierID(PK), customer_id(FK)
- 16) customer_id(PK), prod_id(FK)
- 17) DonationID, amount, donationDate
- 18) customer_id(PK), DonationID(FK)

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Chapter :03 (SQL Queries)

User table

```
CREATE TABLE users
(
    id INT PRIMARY KEY IDENTITY(1,1),
    username VARCHAR(MAX) NULL,
    password VARCHAR(MAX) NULL,
    role VARCHAR(MAX) NULL,
    status VARCHAR(MAX) NULL,
    date DATE NULL
);
```

Customer table

```
CREATE TABLE customer
(
    id INT PRIMARY KEY IDENTITY(1,1),
    customer_id INT NULL,
    total_price FLOAT NULL,
    amount FLOAT NULL,
    change FLOAT NULL,
    order_date DATE NULL,
    PaymentMethod NVARCHAR(50) NOT NULL,
);
```

Donations table

```
CREATE TABLE Donations (
    DonationID INT PRIMARY KEY IDENTITY(1,1),
    CustomerName NVARCHAR(100),
    PhoneNumber NVARCHAR(15),
    Amount DECIMAL(10, 2),
    DonationDate DATETIME DEFAULT GETDATE()
);
```

Categories table

```
CREATE TABLE categories
(
    id INT PRIMARY KEY IDENTITY(1,1),
    category VARCHAR(MAX) NULL,
    date DATE NULL
);
```

Products table

```
CREATE TABLE products (  
    id INT PRIMARY KEY IDENTITY(1,1),  
    prod_id VARCHAR(MAX) NULL,  
    prod_name VARCHAR(MAX) NULL,  
    category VARCHAR(MAX) NULL,  
    price FLOAT NULL,  
    stock INT NULL,  
    image_path VARCHAR(MAX) NULL,  
    status VARCHAR(MAX) NULL,  
    date_insert DATE NOT NULL  
);
```

Orders table

```
CREATE TABLE orders  
(  
    id INT PRIMARY KEY IDENTITY(1,1),  
    prod_id VARCHAR(MAX) NULL,  
    prod_name VARCHAR(MAX) NULL,  
    category VARCHAR(MAX) NULL,  
    qty INT NULL,  
    orig_price FLOAT NULL,  
    total_price FLOAT NULL,  
    order_date DATE NULL,  
    customer_id INT NOT NULL  
);
```


TABLES

	Column Name	Data Type	Allow Nulls
🔑	id	int	<input type="checkbox"/>
	username	varchar(MAX)	<input checked="" type="checkbox"/>
	password	varchar(MAX)	<input checked="" type="checkbox"/>
	role	varchar(MAX)	<input checked="" type="checkbox"/>
	status	varchar(MAX)	<input checked="" type="checkbox"/>
	date	date	<input checked="" type="checkbox"/>
			<input type="checkbox"/>


User Table

	Column Name	Data Type	Allow Nulls
🔑	id	int	<input type="checkbox"/>
	prod_id	varchar(MAX)	<input checked="" type="checkbox"/>
	prod_name	varchar(MAX)	<input checked="" type="checkbox"/>
	category	varchar(MAX)	<input checked="" type="checkbox"/>
	price	float	<input checked="" type="checkbox"/>
	stock	int	<input checked="" type="checkbox"/>
	image_path	varchar(MAX)	<input checked="" type="checkbox"/>
	status	varchar(MAX)	<input checked="" type="checkbox"/>
	date_insert	date	<input checked="" type="checkbox"/>
			<input type="checkbox"/>


Products Table

	Column Name	Data Type	Allow Nulls
	id	int	<input type="checkbox"/>
	customer_id	int	<input checked="" type="checkbox"/>
	total_price	float	<input checked="" type="checkbox"/>
	amount	float	<input checked="" type="checkbox"/>
	change	float	<input checked="" type="checkbox"/>
	order_date	date	<input checked="" type="checkbox"/>
	PaymentMethod	nvarchar(50)	<input checked="" type="checkbox"/>
			<input type="checkbox"/>

Customer Table

	Column Name	Data Type	Allow Nulls
	DonationID	int	<input type="checkbox"/>
	CustomerName	nvarchar(100)	<input checked="" type="checkbox"/>
	PhoneNumber	nvarchar(15)	<input checked="" type="checkbox"/>
	Amount	decimal(10, 2)	<input checked="" type="checkbox"/>
	DonationDate	datetime	<input checked="" type="checkbox"/>
			<input type="checkbox"/>

Donations Table

	Column Name	Data Type	Allow Nulls
	id	int	<input type="checkbox"/>
	category	varchar(MAX)	<input checked="" type="checkbox"/>
	date	date	<input checked="" type="checkbox"/>
			<input type="checkbox"/>

Categories Table

Chapter:04 (Screenshots)

Inventory management system | Admin's portal

Welcome, Admin

- Dashboard
- Add users
- Add categories
- Add products
- Customers
- Donations
- Log out

4 All users

7 All Customers

BDT2072000.000 Today's Income

BDT2072000.000 Total Income

All Today's Customer

CustomerID	TotalPrice	Amount	Change	Date
1	462000	4800000	4338000	6/24/2025 12:00:00 AM
2	98000	98000	0	6/24/2025 12:00:00 AM
3	490000	490000	0	6/24/2025 12:00:00 AM
4	95000	97000	2000	6/24/2025 12:00:00 AM
5	135000	135000	0	6/24/2025 12:00:00 AM
6	522000	523000	1000	6/24/2025 12:00:00 AM
7	270000	270000	0	6/24/2025 12:00:00 AM

Fig.1: Features for ADMIN

Inventory management system | Cashier's portal

Welcome, Cashier

- Dashboard
- Add products
- Customers
- Order
- Log out

4 All users

7 All Customers

BDT2072000.000 Today's Income

BDT2072000.000 Total Income

All Today's Customer

CustomerID	TotalPrice	Amount	Change	Date
1	462000	4800000	4338000	6/24/2025 12:00:00 AM
2	98000	98000	0	6/24/2025 12:00:00 AM
3	490000	490000	0	6/24/2025 12:00:00 AM
4	95000	97000	2000	6/24/2025 12:00:00 AM
5	135000	135000	0	6/24/2025 12:00:00 AM
6	522000	523000	1000	6/24/2025 12:00:00 AM
7	270000	270000	0	6/24/2025 12:00:00 AM

Fig.2: Features for CASHIER

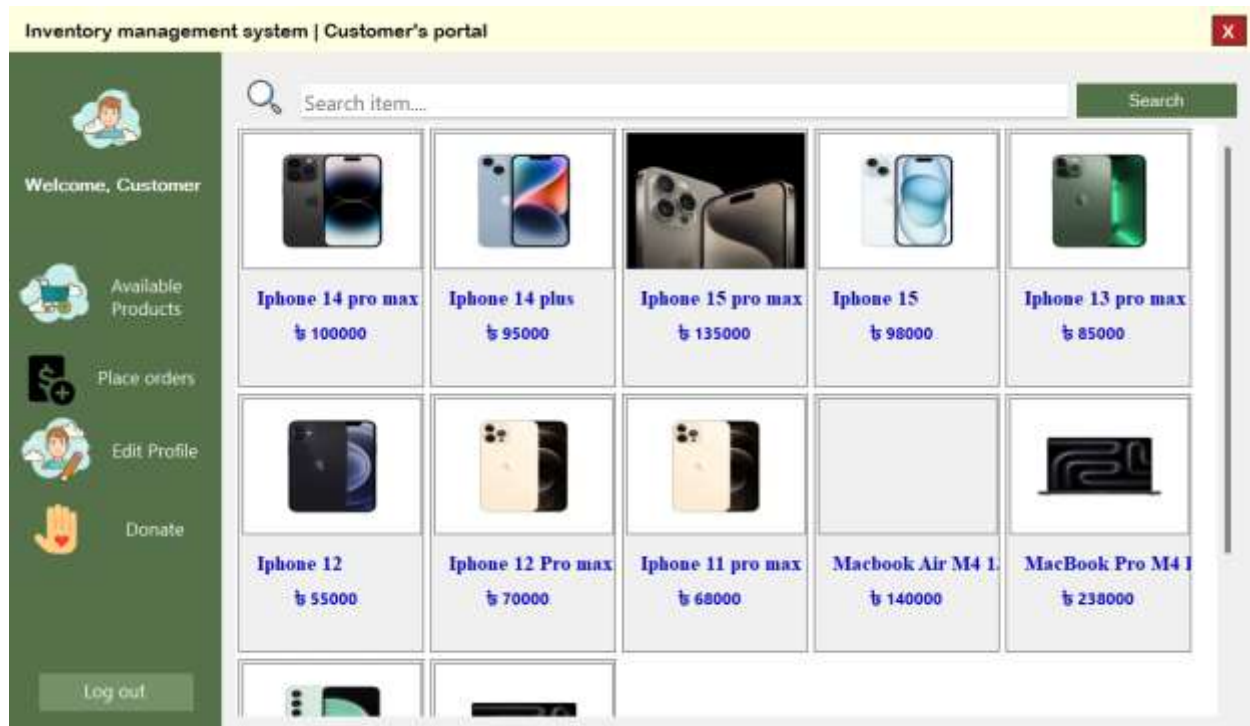
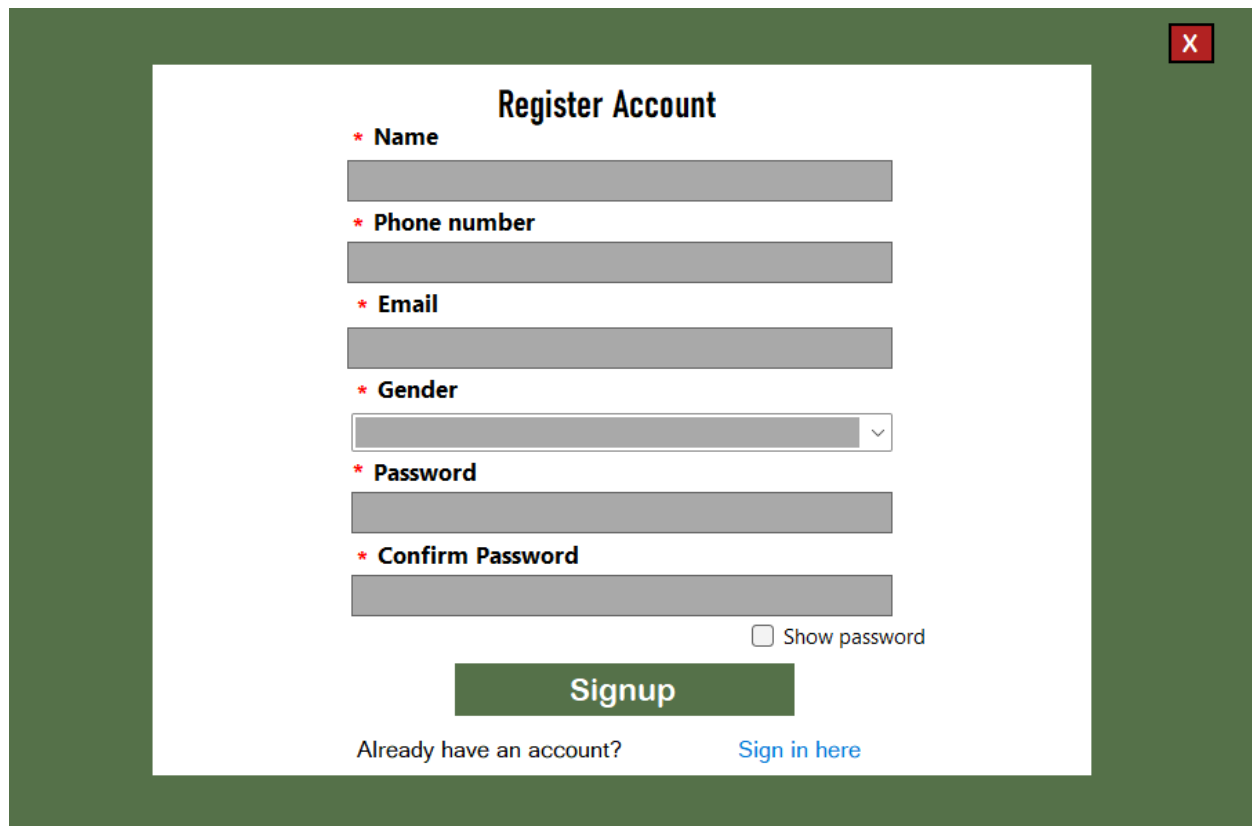


Fig.3: Features for CUSTOMER.

All FORMS

Fig.4: Login form



Register Account

* Name

* Phone number

* Email

* Gender

* Password

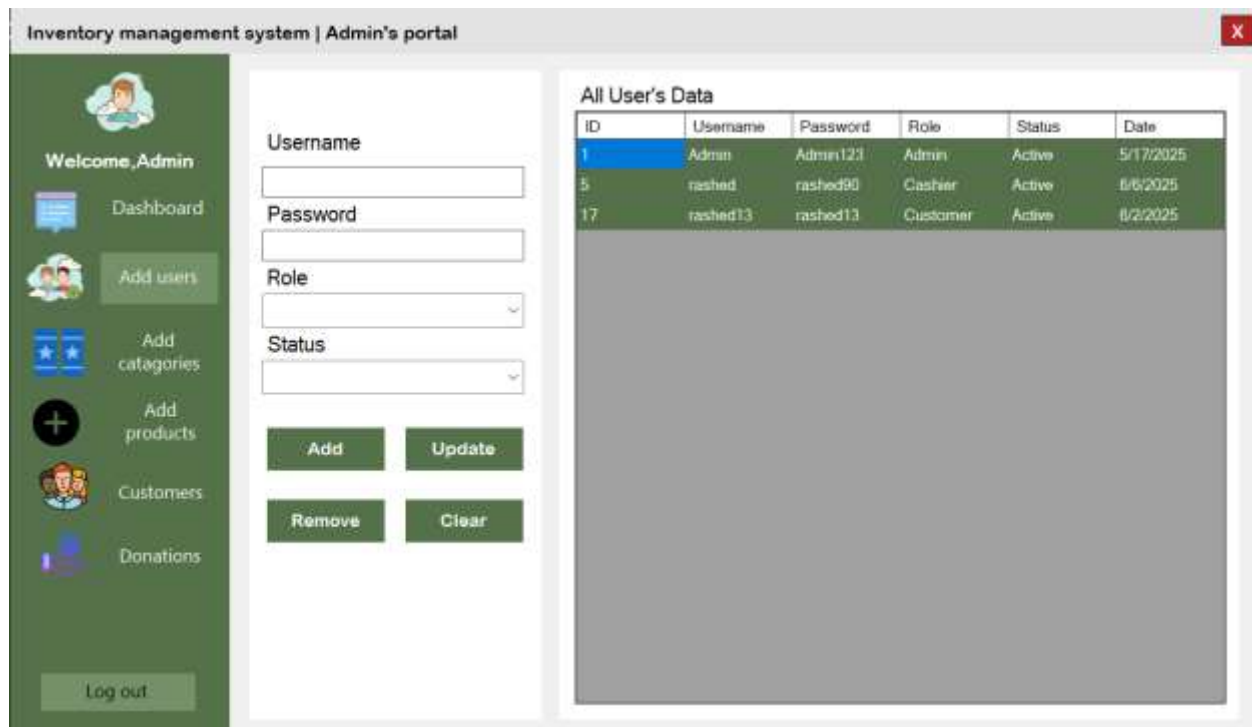
* Confirm Password

☐ Show password

Signup

Already have an account? [Sign in here](#)

Fig.4: Register form



Inventory management system | Admin's portal

Welcome, Admin

Dashboard

Add users

Add categories

Add products

Customers

Donations

Log out

Username

Password

Role

Status

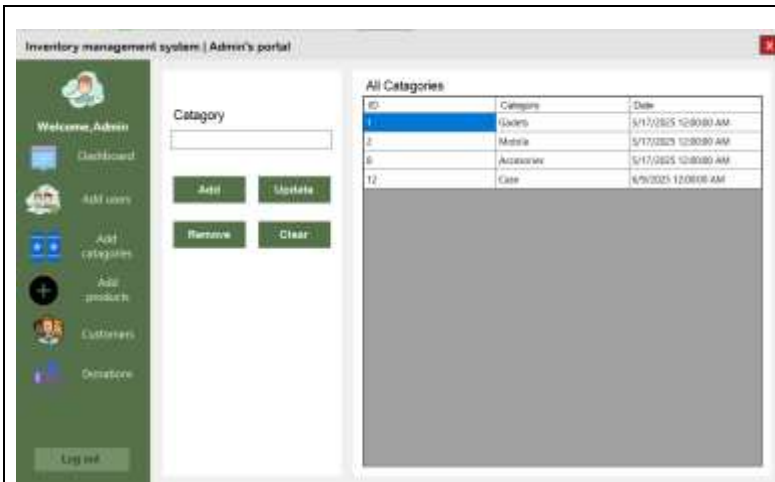
Add **Update**

Remove **Clear**

All User's Data

ID	Username	Password	Role	Status	Date
1	Admin	Admin123	Admin	Active	5/17/2025
5	rashed	rashed99	Cashier	Active	6/6/2025
17	rashed13	rashed13	Customer	Active	6/2/2025

Fig.5: Admin add user form



Inventory management system | Admin's portal

Welcome, Admin

Dashboard

Add users

Add categories

Add products

Customers

Donations

Log out

Category

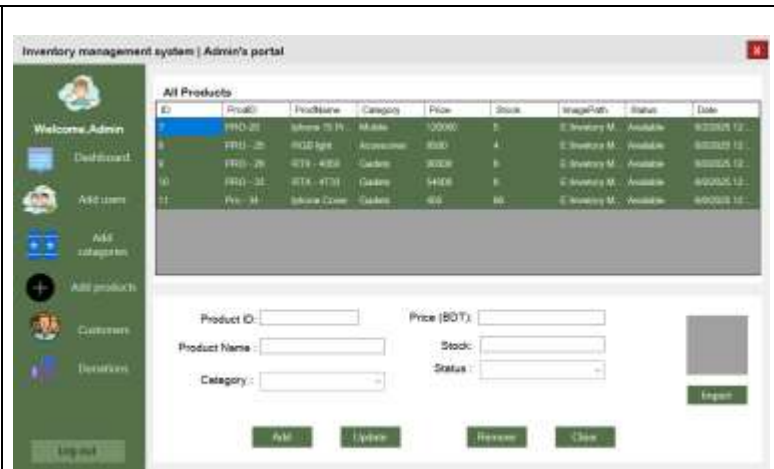
Add Update

Remove Clear

All Categories

ID	Category	Date
1	Others	5/17/2025 12:00:00 AM
2	Mobile	5/17/2025 12:00:00 AM
3	Accessory	5/17/2025 12:00:00 AM
12	Case	5/17/2025 12:00:00 AM

Fig.6 : Admin add categories Form



Inventory management system | Admin's portal

Welcome, Admin

Dashboard

Add users

Add categories

Add products

Customers

Donations

Log out

All Products

ID	ProdID	ProdName	Category	Price	Stock	ImagePath	Status	Date
1	PRD-20	iPhone 15 Pro	Mobile	10000	5	C:\Inventory M	Available	5/17/2025 12:00:00 AM
2	PRD-20	iPhone 15 Pro	Accessory	5000	4	C:\Inventory M	Available	5/17/2025 12:00:00 AM
3	PRD-20	iPhone 15 Pro	Accessory	3000	5	C:\Inventory M	Available	5/17/2025 12:00:00 AM
4	PRD-32	iPhone 15 Pro	Accessory	5000	5	C:\Inventory M	Available	5/17/2025 12:00:00 AM
5	PRD-34	iPhone Case	Accessory	400	10	C:\Inventory M	Available	5/17/2025 12:00:00 AM

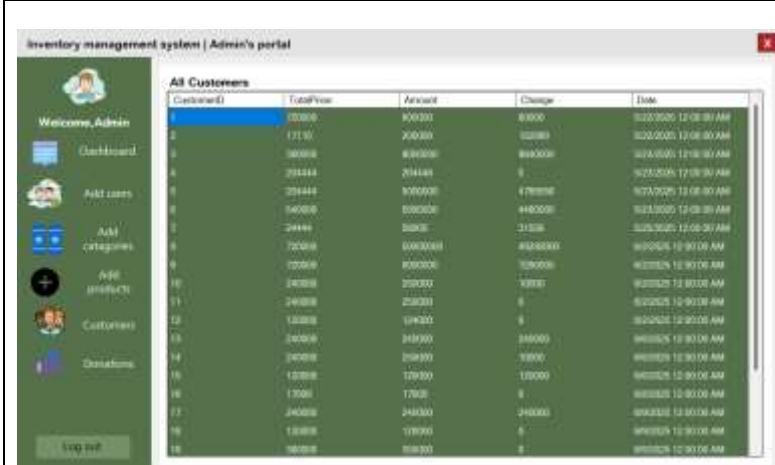
Product ID: Price (BOT):

Product Name: Stock:

Category: Status:

Add Update Remove Clear

Fig.7 : Admin add Products Form



Inventory management system | Admin's portal

Welcome, Admin

Dashboard

Add users

Add categories

Add products

Customers

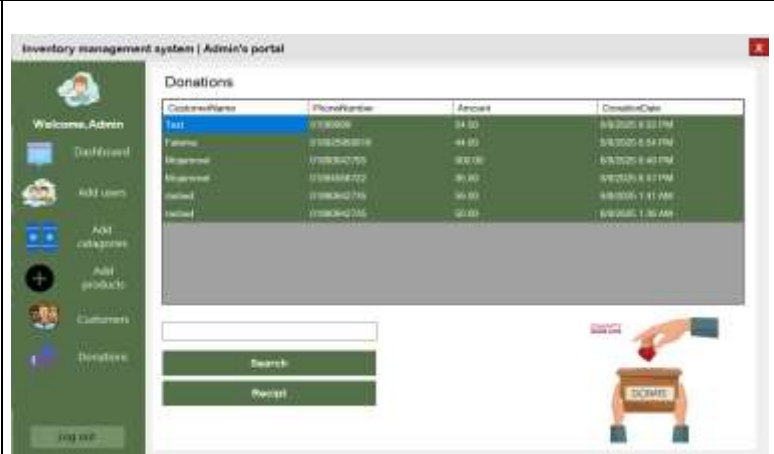
Donations

Log out

All Customers

CustomerID	TotalPrice	Amount	Change	Date
1	10000	10000	0	5/17/2025 12:00:00 AM
2	10000	10000	0	5/17/2025 12:00:00 AM
3	10000	10000	0	5/17/2025 12:00:00 AM
4	10000	10000	0	5/17/2025 12:00:00 AM
5	10000	10000	0	5/17/2025 12:00:00 AM
6	10000	10000	0	5/17/2025 12:00:00 AM
7	10000	10000	0	5/17/2025 12:00:00 AM
8	10000	10000	0	5/17/2025 12:00:00 AM
9	10000	10000	0	5/17/2025 12:00:00 AM
10	10000	10000	0	5/17/2025 12:00:00 AM
11	10000	10000	0	5/17/2025 12:00:00 AM
12	10000	10000	0	5/17/2025 12:00:00 AM
13	10000	10000	0	5/17/2025 12:00:00 AM
14	10000	10000	0	5/17/2025 12:00:00 AM
15	10000	10000	0	5/17/2025 12:00:00 AM
16	10000	10000	0	5/17/2025 12:00:00 AM
17	10000	10000	0	5/17/2025 12:00:00 AM
18	10000	10000	0	5/17/2025 12:00:00 AM

Fig.8 : All Customer Form



Inventory management system | Admin's portal

Welcome, Admin

Dashboard

Add users

Add categories

Add products

Customers

Donations

Log out

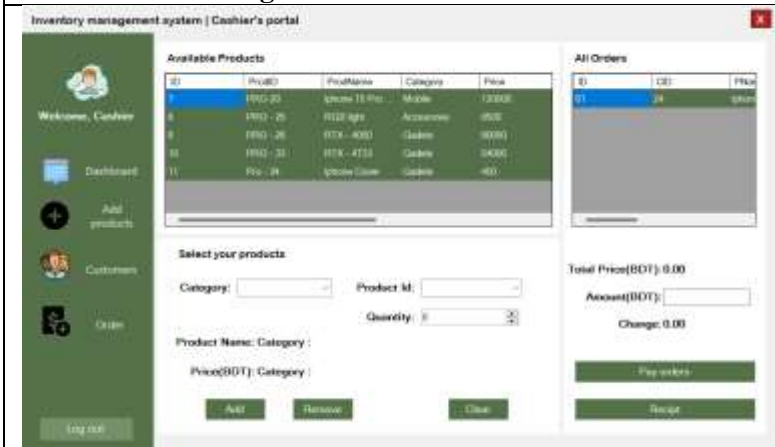
Donations

CustomerName	PhoneNumber	Amount	DonationDate
Test	0123456789	10000	5/17/2025 12:00:00 AM
Test	0123456789	10000	5/17/2025 12:00:00 AM
Test	0123456789	10000	5/17/2025 12:00:00 AM
Test	0123456789	10000	5/17/2025 12:00:00 AM
Test	0123456789	10000	5/17/2025 12:00:00 AM
Test	0123456789	10000	5/17/2025 12:00:00 AM
Test	0123456789	10000	5/17/2025 12:00:00 AM
Test	0123456789	10000	5/17/2025 12:00:00 AM
Test	0123456789	10000	5/17/2025 12:00:00 AM
Test	0123456789	10000	5/17/2025 12:00:00 AM

Search

Receipt

Fig.9 : All Donations Form



Inventory management system | Cashier's portal

Welcome, Cashier

Dashboard

Add products

Customers

Orders

Log out

Available Products

ID	ProdID	ProdName	Category	Price
1	PRD-20	iPhone 15 Pro	Mobile	10000
2	PRD-20	iPhone 15 Pro	Accessory	5000
3	PRD-20	iPhone 15 Pro	Accessory	3000
4	PRD-32	iPhone 15 Pro	Accessory	5000
5	PRD-34	iPhone Case	Accessory	400

Select your products

Category: Product ID:

Product Name: Category:

Price(BOT): Category:

Add Remove Clear

All Orders

ID	Order	Price
1	24	10000

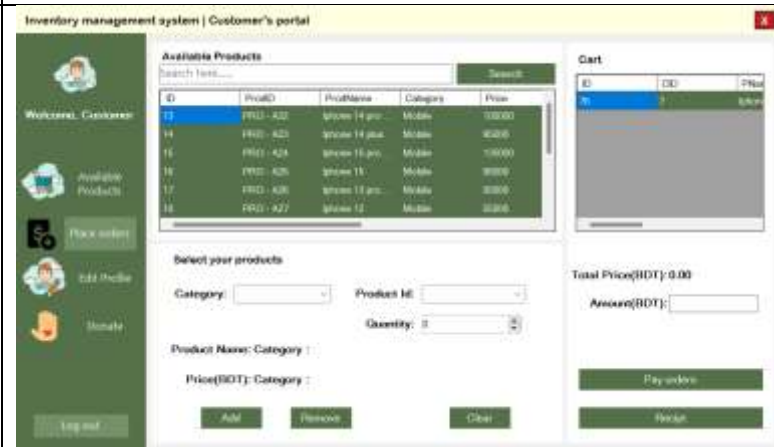
Total Price(BOT): 0.00

Amount(BOT):

Change: 0.00

Pay online Receipt

Fig.8 : Orders Form



Inventory management system | Customer's portal

Welcome, Customer

Available Products

ID	ProdID	ProdName	Category	Price
1	PRD-20	iPhone 15 Pro	Mobile	10000
2	PRD-20	iPhone 15 Pro	Accessory	5000
3	PRD-20	iPhone 15 Pro	Accessory	3000
4	PRD-32	iPhone 15 Pro	Accessory	5000
5	PRD-34	iPhone Case	Accessory	400

Select your products

Category: Product ID:

Product Name: Category:

Price(BOT): Category:

Add Remove Clear

Cart

ID	Order	Price
1	24	10000

Total Price(BOT): 0.00

Amount(BOT):

Pay online Receipt

Fig.10 : Customer Orders Form

Inventory management system | Customer's portal

Welcome, Customer

Available Products

Place orders

Edit Profile

Donate

Log out

Search item...

Search










				
Iphone 14 pro max ₹ 100000	Iphone 14 plus ₹ 95000	Iphone 15 pro max ₹ 135000	Iphone 15 ₹ 98000	Iphone 13 pro max ₹ 85000
				
Iphone 12 ₹ 55000	Iphone 12 Pro max ₹ 70000	Iphone 11 pro max ₹ 68000	Macbook Air M4 1 ₹ 140000	MacBook Pro M4 ₹ 238000

Fig.11 : Available products Form

Inventory management system | Customer's portal

Welcome, Customer

Available Products

Place orders

Edit Profile

Donate

Log out

Current username

Username

Password

Update

Fig.12 : Customer Edit profile Form

Inventory management system | Customer's portal

Every donation—big or small—helps us bring hope and support to those who need it most.

Welcome, Customer

Available Products

Place orders

Edit Profile

Donate

Log out

Name

Phone Number

Amount

Donate Clear


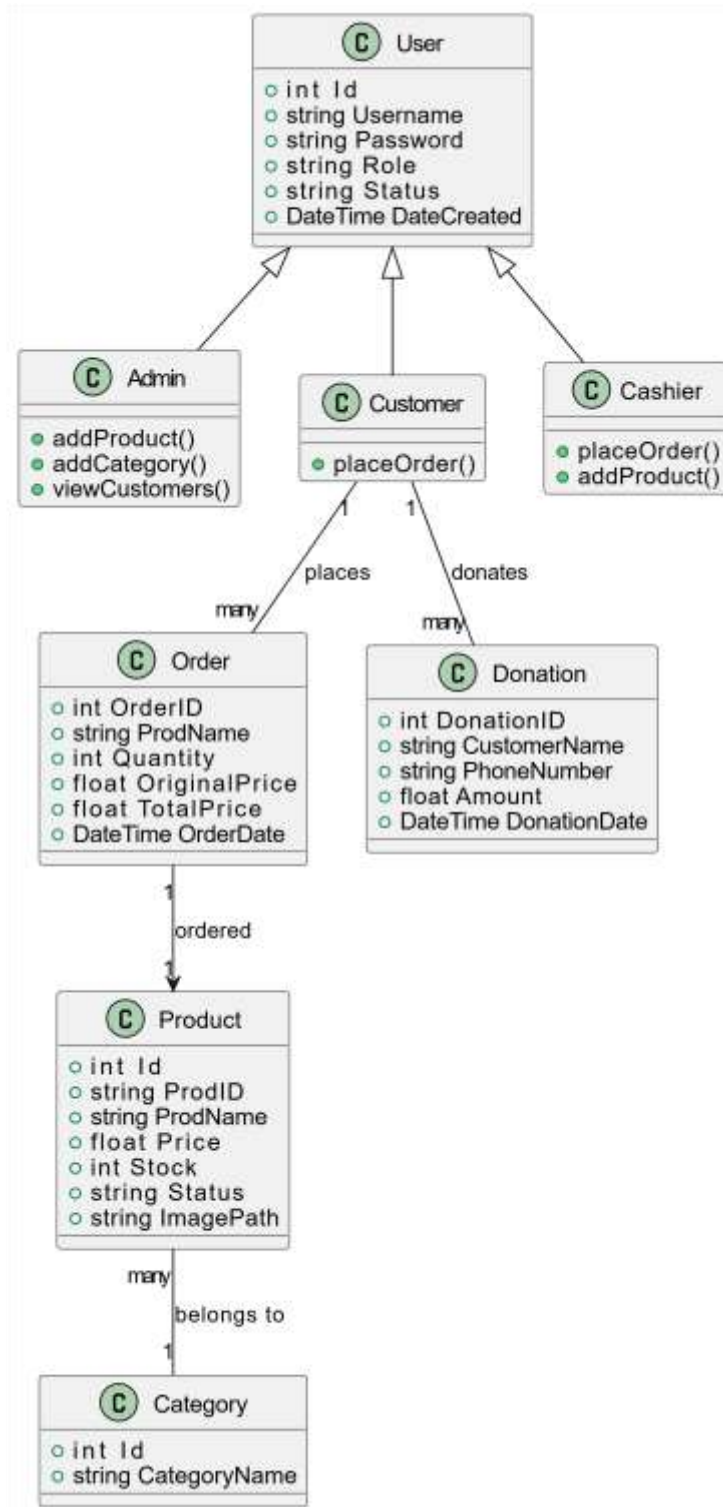
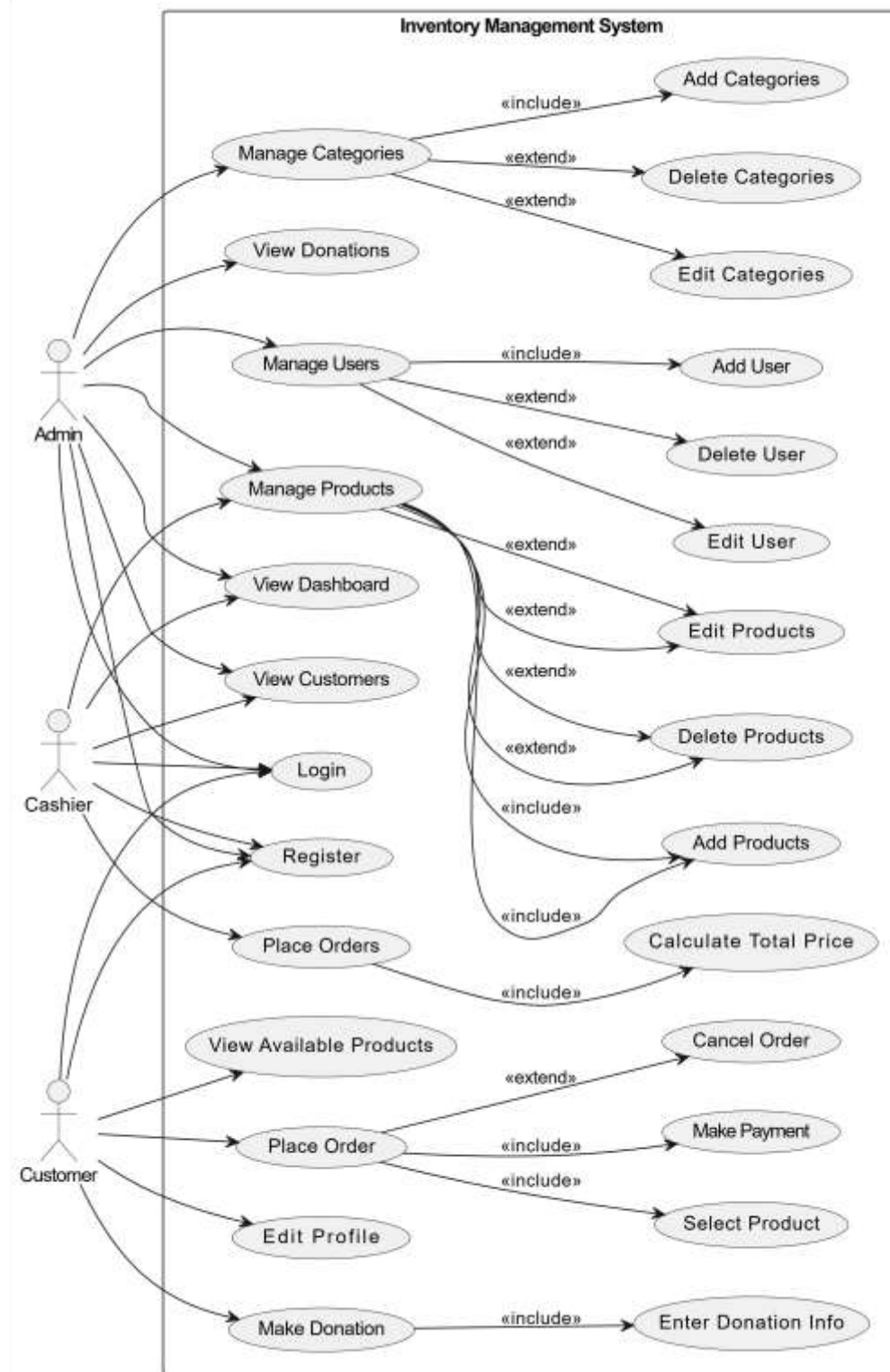


Fig.13 : Customer Donation Form.

CLASS DIAGRAM



USE CASE DIAGRAM



ACTIVITY DIAGRAM

