



AMERICAN INTERNATIONAL UNIVERSITY–BANGLADESH (AIUB)

Dept. of Computer Science
Faculty of Science and Technology

CSC 2210: OBJECT ORIENTED PROGRAMMING 2

Fall 2025-2026

Section: II

Group No:

Project Report On Inventory Management System

Supervised 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.				

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1. INTRODUCTION

Welcome to the Inventory Management System

The Inventory Management System is a user-friendly platform designed to simplify and enhance the management of inventory, purchases, and sales for businesses. This system provides a centralized database that keeps track of administrators, managers, staff, products, purchases, and sales, ensuring seamless coordination and smooth business operations.

- The Admin oversees the entire system, managing users, monitoring products, purchases, and sales, and ensuring system security.
- The Manager is responsible for managing products, updating stock, monitoring inventory levels, and performing auto restock when necessary.
- The Staff can view products, create sales, update stock automatically, and generate sales receipts for customers.

2. FEATURE LIST

2.1.1 Admin Features

- Admin can log in using secure credentials.
- Access dashboard to view overall system status, inventory levels.
- Manage users.
- Ensure secure access to the system.

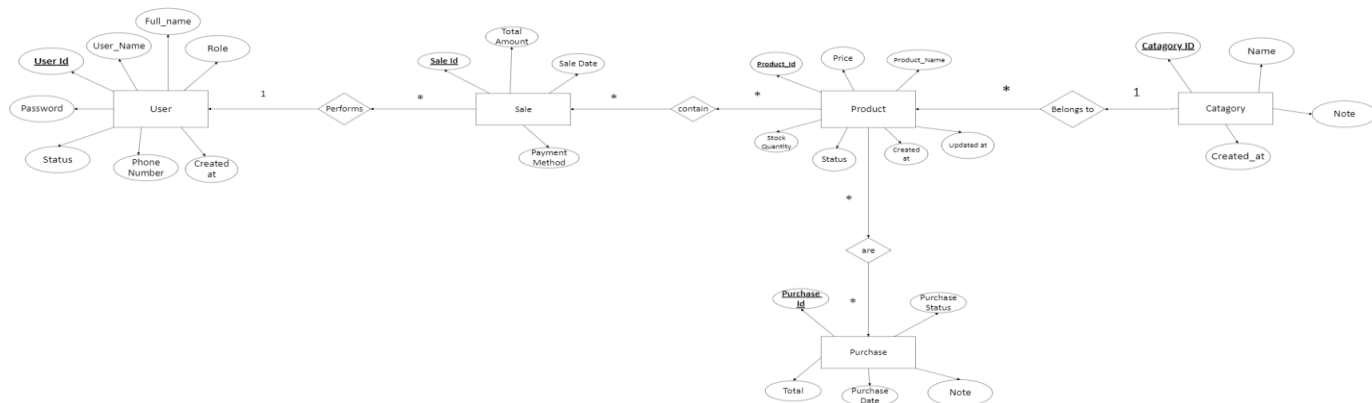
2.1.2 Manager Features

- Manager can log in securely.
- Add new products with details: product name, category, price, and stock quantity.
- Update existing product information.
- Delete products when necessary.
- View and search products in inventory.
- Monitor current stock levels.
- Auto-purchase products if stock is low.
- Delete restock requests as needed.
- Automatically update stock quantities after restock.

2.1.3 Staff Features

- Staff can log in securely.
- View available products with name, price, and stock quantity.
- Create sales by selecting multiple products.
- Record quantity sold for each product.
- Automatically reduce stock quantity after sales.
- View all sales they have performed.
- Print sales receipts for customers.

3. ER DIAGRAM



3.1 Normalization

3.1.1 User-Performs-Sale

UNF:

User~~Id~~(PK), User~~Na~~me, User~~Ph~~one, User~~Pa~~ssword, Role, Full_~~na~~me, Created_~~at~~, Status, Sale~~Id~~(PK), Sale_~~da~~te, Payment_~~me~~thod, Total

1NF:

User~~Id~~(PK), User~~Na~~me, User~~Ph~~one, User~~Pa~~ssword, Role, Full_~~na~~me, Created_~~at~~, Status, Sale~~Id~~(FK), Sale_~~da~~te, Payment_~~me~~thod, Total

2NF:

User~~Id~~(PK), User~~Na~~me, User~~Ph~~one, User~~Pa~~ssword, Role, Full_~~na~~me, Created_~~at~~, Status, Sale~~Id~~(PK), Sale_~~da~~te, Payment_~~me~~thod, Total
 Sale~~Id~~(PK), User~~Id~~(FK)

3.1.2 Sale –Contains-Product

UNF:

Product~~Id~~(PK), Sale~~Id~~(PK), Quantity, Unit~~P~~rice, Total~~P~~rice

1NF:

Product~~Id~~(PK), Sale~~Id~~(PK), Quantity, Unit~~P~~rice, Total~~P~~rice

2NF:

Product~~Id~~(PK), Sale~~Id~~(PK), Quantity, Unit~~P~~rice, Total~~P~~rice

3.1.3 Category-Belongs to-Product

UNF:

Catagory~~Id~~(PK), Catagory~~Na~~me, Created_~~at~~, Note, Product~~Id~~(PK), Product~~Na~~me, Price, Stock~~Qu~~antity, Restock_~~at~~, Created_~~at~~, Updated_~~at~~, Status

1NF:

Catagory~~Id~~(PK), Catagory~~Na~~me, Created_~~at~~, Note

ProductId(PK), ProductName, Price, StockQuantity, Restock_at, Created_at, Updated_at, Status

2NF:

CatagoryId(PK), CatagoryName, Created_at, Note

ProductId(PK), ProductName, Price, StockQuantity, Restock_at, Created_at, Updated_at, Status

ProductId(PK), CatagoryId(FK),

3.1.4 Product-Are-Purchase

UNF: ProductPurchaseId(PK), ProductId(PK), PurchaseId(PK), Quantity, UnitPrice

1NF: ProductPurchaseId(PK), ProductId(PK), PurchaseId(PK), Quantity, UnitPrice

2NF: ProductPurchaseId(PK), ProductId(FK), PurchaseId(FK), Quantity, UnitPrice,

3.2 Finalization

Users:

UserId(PK), UserName, UserPhone, UserPassword, Role, Full_name, Created_at, Status

Category:

CatagoryId(PK), CatagoryName, Created_at, Note

Product:

ProductId(PK), ProductName, Price, StockQuantity, Restock_at, Created_at, Updated_at, Status, CatagoryId(FK)

Purchase:

PurchaseId(PK), PurchaseDate, UserId(FK), TotalAmount, Status, Notes

Product_Purchase:

ProductPurchaseId(PK), ProductId(FK), PurchaseId(FK), Quantity, UnitPrice,

Sale:

SaleId(PK), UserId(FK), Sale_date, Payment_method, Total

Sale_Product:

ProductId(PK), SaleId(PK), Quantity, UnitPrice, TotalPrice

3.3 Sql Query:

Users Table

create table Users(

UserId int primary key identity(1,1) not null,

UserName varchar(50) not null,

UserPhone varchar(20) not null,

UserPassword varchar(30) not null,

Role varchar(20) not null,

```
Full_name varchar(50) not null,  
Created_at datetime not null default getdate(),  
Status varchar(30) not null default 'Active'  
);
```

Category Table

```
create table Catagory(  
CatagoryId int primary key identity(1,1) not null,  
CatagoryName varchar(100) not null,  
Created_at datetime not null default getdate(),  
Note varchar(200) null  
);
```

Product Table

```
create table Product(  
ProductId int primary key identity(1,1) not null,  
ProductName varchar(100) not null,  
Price decimal(10,2) not null,  
StockQuantity int not null,  
CatagoryId int not null,  
Restock_at int not null,  
Created_at datetime not null default getdate(),  
Updated_at datetime null,  
Status varchar(100) not null default 'Available',  
constraint Unq_Product_Catagory unique (ProductName, CatagoryId),  
constraint FK_Catagory foreign key (CatagoryId) references Catagory(CatagoryId)  
);
```

Purchase Table

```
create table Purchase(  
PurchaseId int primary key identity(1,1) not null,  
PurchaseDate datetime not null default getdate(),  
UserId int not null,  
TotalAmount decimal(10,2) null,  
Status varchar(50) null,  
Notes varchar(255) null,  
constraint FK_User foreign key (UserId) references Users(UserId)  
);
```

Product_Purchase Table

```
create table Product_Purchase(  
ProductPurchaseId int primary key identity(1,1) not null,  
ProductId int not null,  
PurchaseId int not null,  
Quantity int not null,  
UnitPrice decimal(10,2) not null,
```

```
constraint FK_Product foreign key (ProductId) references Product(ProductId),  
constraint FK_Purchase foreign key (PurchaseId) references Purchase(PurchaseId)  
);
```

Sale Table

```
create table Sale(  
SaleId int primary key identity(1,1) not null,  
UserId int not null,
```

```
sale_date datetime not null default getdate(),  
Payment_method varchar(50) not null,  
Total decimal(10,2) not null,
```

```
constraint FK_Saletb_User foreign key (UserId) references Users(UserId)  
);
```

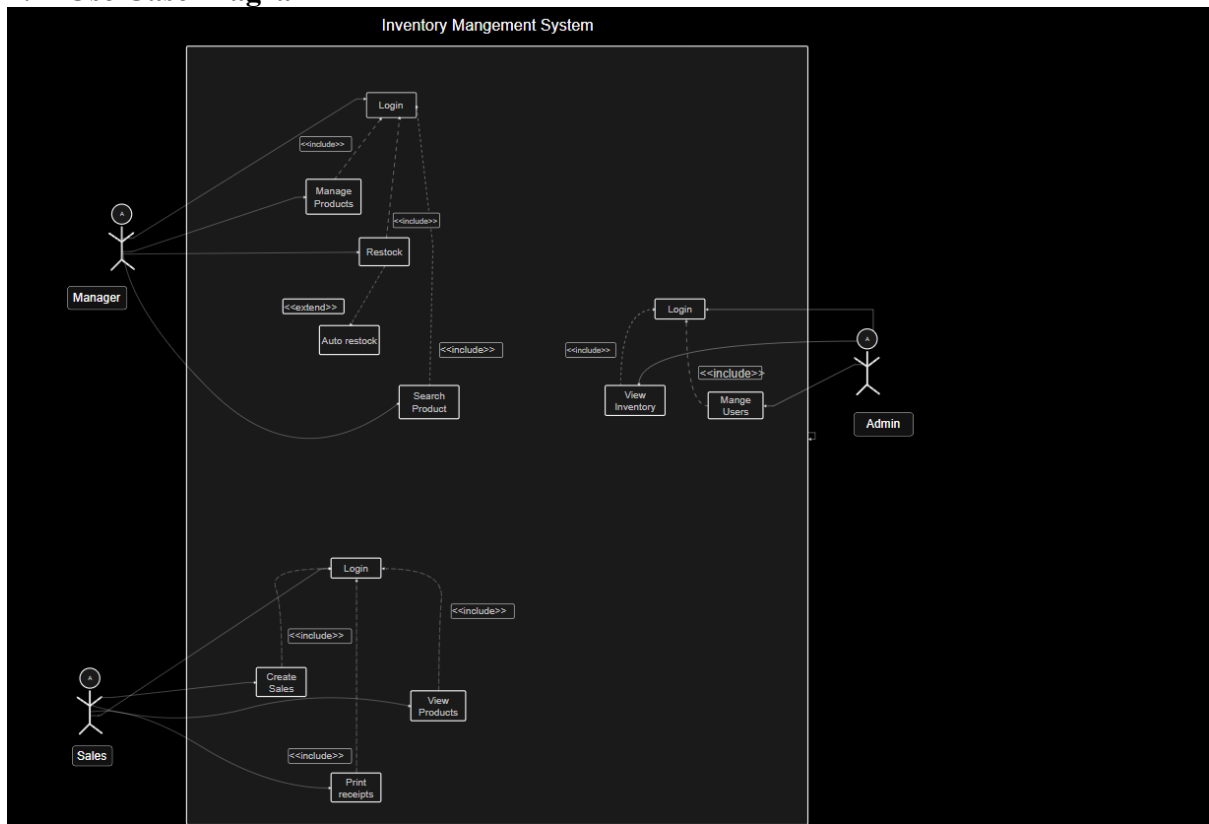
Sale_Product Table

```
create table Sale_Product(  
ProductId int not null,  
SaleId int not null,  
Quantity int not null,  
Unitprice decimal(18,0) not null,  
TotalPrice decimal(10,2) null,
```

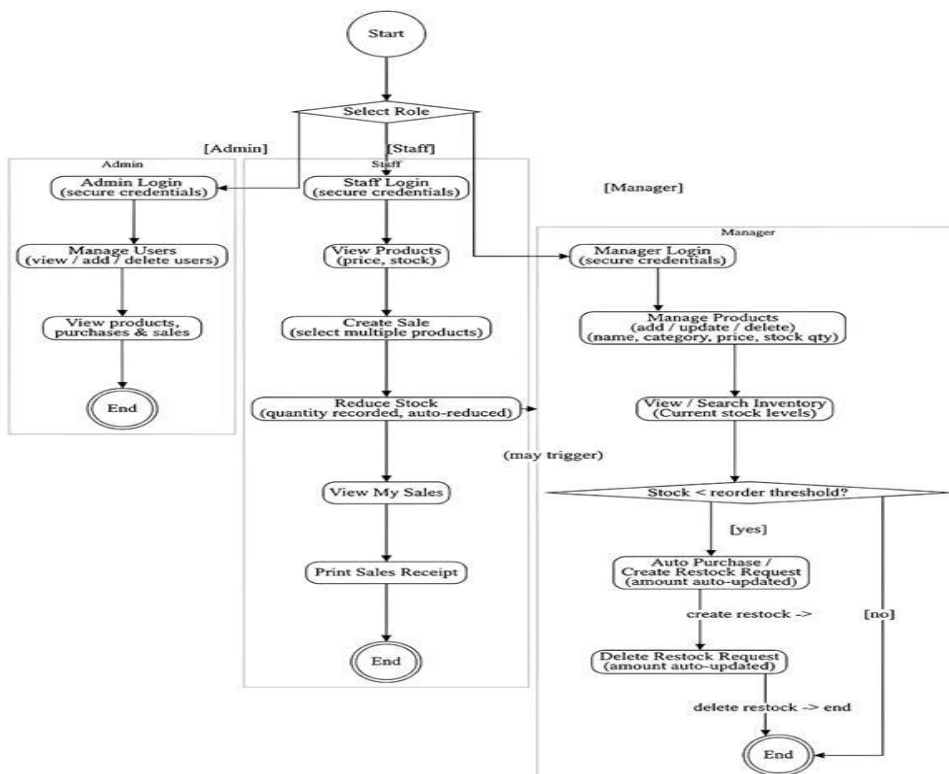
```
constraint PK_Sale_Product primary key (ProductId, SaleId),  
constraint FK_Sale_Product foreign key (ProductId) references Product(ProductId),  
constraint FK_Sale foreign key (SaleId) references Sale(SaleId)  
);
```

4. UML DIAGRAM

4.1 Use Case Diagram



4.2 Activity Diagram.

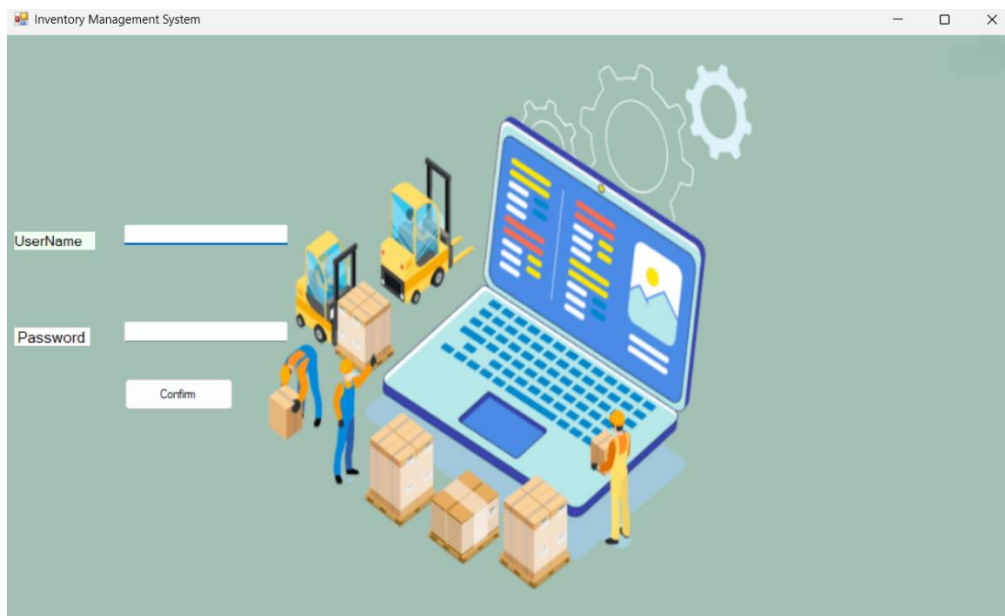


5. CONCLUSION

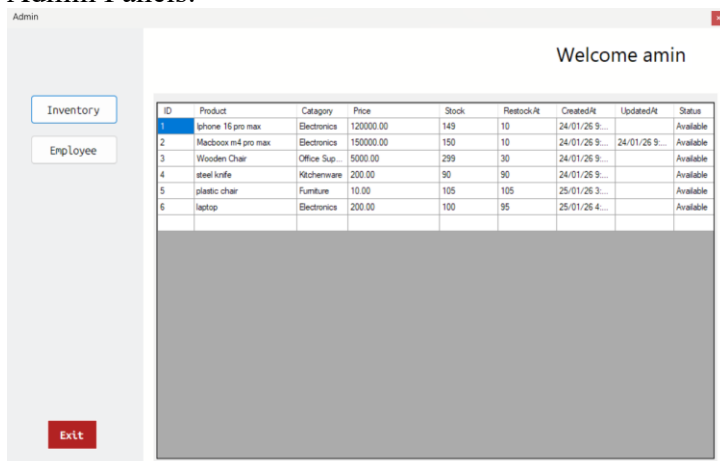
Overall, the Inventory Management System significantly enhances the efficiency and accuracy of inventory operations by automating daily processes and maintaining well-organized records. It reduces manual effort, minimizes data entry errors, and ensures smooth coordination between administrators, managers, and staff. Through role-based access control and a centralized database, the system improves security, transparency, and effective monitoring of products, purchases, and sales. Ultimately, this system supports informed decision-making, improves operational performance, and contributes to the long-term stability and growth of the organization.

6. Screen Shots:

Welcome Screen:



Admin Panels:



Admin

Welcome amin

Inventory

Employee

Exit

Userid	Username	Full_name	Role	UserPhone
1	sakib	Sakib Ahmed	manager	01717171111
2	naifs	Nafis Ahmed	manager	017008891
6	system	System User	system	000
8	amin	Amin Ashraf	admin	018008891


Employee ID
Employee Name

Role
Phone Number

User Name


Password

Manager Panels:



Welcome, sakib

Add Product
Update Details
Delete Product
Restock Product
Restock History
Check Inventory
Logout



Welcome: Sakib Ahmed


Move to Main Menu

	Productid	ProductName	Price	StockQuantity	Restock_at	Created_at	Updated_at	Status	CategoryName
▶	1	iphone 15 pr...	120000.00	149	10	24/01/26 9:...		Available	Electronics
	2	Macbook m4...	150000.00	150	10	24/01/26 9:...	24/01/26 9:...	Available	Electronics
	3	Wooden Chair	5000.00	299	30	24/01/26 9:...		Available	Office Supplies
	4	steel knife	200.00	90	90	24/01/26 9:...		Available	Kitchenware
	5	plastic chair	10.00	105	105	25/01/26 3:...		Available	Furniture
	6	laptop	200.00	100	95	25/01/26 4:...		Available	Electronics

Product Name
Product Price

Product Quantity
Product Category
Restock At

Inventory Management System, Update Menu



Welcome: Sakib Ahmed

Move to Main Menu

ProductId	ProductName	Price	StockQuantity	Restock_at	Created_at	Updated_at	Status	CategoryName
1	iphone 16 pro ...	120000.00	149	10	24/01/26 9:0...		Available	Electronics
2	Macbook m4 ...	150000.00	150	10	24/01/26 9:0...	24/01/26 9:0...	Available	Electronics
3	Wooden Chair	5000.00	299	30	24/01/26 9:0...		Available	Office Supplies
4	steel knife	200.00	90	90	24/01/26 9:0...		Available	Kitchenware
5	plastic chair	10.00	105	105	25/01/26 3:5...		Available	Furniture
6	laptop	200.00	100	95	25/01/26 4:5...		Available	Electronics

Product Name

Product Quantity

Product Price

Category


Restock Level

Availability

Update

Clear

Inventory Management System, Delete Product




Welcome: Sakib Ahmed

Move to Main Menu

ProductId	ProductName	Price	StockQuantity	Restock_at	Created_at	Updated_at	Status	CategoryName
1	iphone 16 p...	120000.00	149	10	24/01/26 9...		Available	Electronics
2	Macbook m...	150000.00	150	10	24/01/26 9...	24/01/26 9...	Available	Electronics
3	Wooden Ch...	5000.00	299	30	24/01/26 9...		Available	Office Supp...
4	steel knife	200.00	90	90	24/01/26 9...		Available	Kitchenware
5	plastic chair	10.00	105	105	25/01/26 3...		Available	Furniture
6	laptop	200.00	100	95	25/01/26 4...		Available	Electronics

Delete

Inventory Management System, Search Product




Welcome: Sakib Ahmed

Move to Main Menu

ProductId	ProductName	Price	StockQuantity	Restock_at	Created_at	Updated_at	Status	CategoryName
1	iphone 16 pro ...	120000.00	149	10	24/01/26 9:03...		Available	Electronics
2	Macbook m4 p...	150000.00	150	10	24/01/26 9:04...	24/01/26 9:06...	Available	Electronics
3	Wooden Chair	5000.00	299	30	24/01/26 9:06...		Available	Office Supplies
4	steel knife	200.00	90	90	24/01/26 9:09...		Available	Kitchenware
5	plastic chair	10.00	105	105	25/01/26 3:57...		Available	Furniture
6	laptop	200.00	100	95	25/01/26 4:59...		Available	Electronics

Search



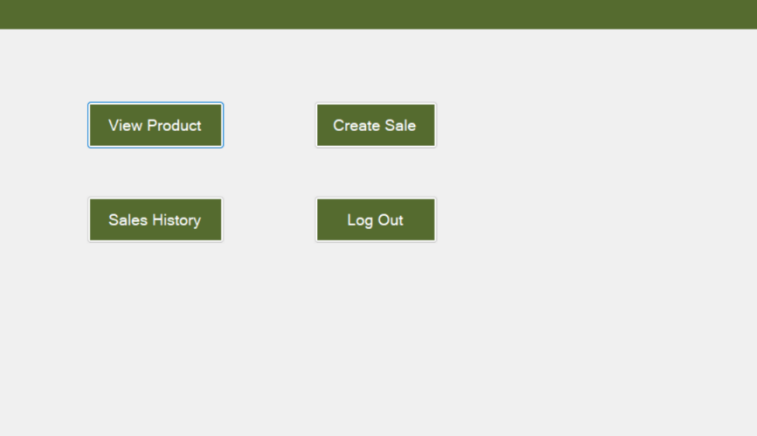
Welcome: Sakib Ahmed

Move to Main Menu

Inventory Mangement System, Restock History

UserName	ProductName	Quantity	UnitPrice	Sub Total	TotalAmount	PurchaseDate	Notes
system	plastic chair	5	10.00	60.00	60.00	25/01/26 3:58 PM	Created by system
sakib	Wooden Chair	100	5000.00	500000.00	502000.00	24/01/26 9:34 PM	restock performed
system	steel knife	11	200.00	2200.00	2200.00	24/01/26 9:10 PM	Created by system

Sales Panel:



Inventory Management System, Sales Dashboard

Welcome,

View Product

Create Sale

Sales History

Log Out

Inventory Management System, Sale Product

Create Sales

Product
Price
Quantity

Sale Cart

	ProductId	ProductName	Price	Quantity	Subtotal
*					

Payment Method
Total Price

ViewProduct

View Products

	Product Name	Category	Price	Stock	Status
▶	iphone 16 pro max	Electronics	120000.00	149	Available
	Macbook m4 pro max	Electronics	150000.00	150	Available
	Wooden Chair	Office Supplies	5000.00	299	Available
	steel knife	Kitchenware	200.00	90	Available
	plastic chair	Furniture	10.00	105	Available
	laptop	Electronics	200.00	100	Available
*					

Back

SalesHistory

Sales History

	SaleId	Date	Total Amount	Payment
▶	5	25/01/26 5:10 PM	5200.00	Cash
	4	25/01/26 4:19 PM	10.00	Nagad
	3	25/01/26 4:02 PM	120000.00	Bkash
	2	24/01/26 9:10 PM	2000.00	Card
	1	24/01/26 9:09 PM	2000.00	Bkash
*				

Dashboard

7. Github link:

<https://github.com/averagedude05/Inventory-Management-System>