



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

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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.

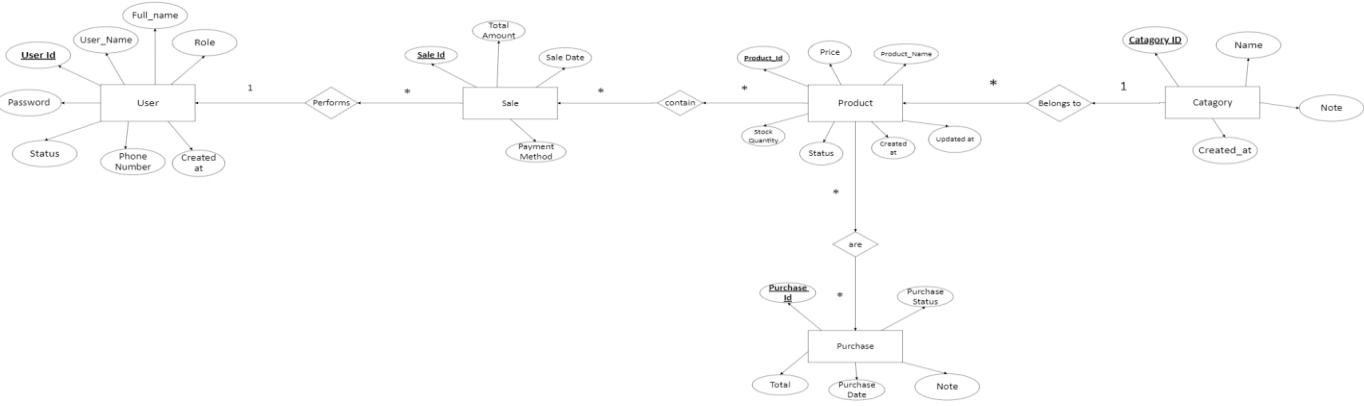
### **2.1.2 Manager Features**

- 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\_Name, UserPhone, UserPassword, Role, Full\_name, Created\_at, Status, Sale\_Id(PK), Sale\_date, Payment\_method, Total

**1NF:**

User\_Id(PK), User\_Name, UserPhone, UserPassword, Role, Full\_name, Created\_at, Status, Sale\_Id(FK), Sale\_date, Payment\_method, Total

**2NF:**

User\_Id(PK), User\_Name, UserPhone, UserPassword, Role, Full\_name, Created\_at, Status  
Sale\_Id(PK), Sale\_date, Payment\_method, Total  
Sale\_Id(PK), User\_Id(FK)

##### 3.1.2 Sale -Contains-Product

**UNF:**

Product\_Id(PK), Sale\_Id(PK), Quantity, UnitPrice, TotalPrice

**1NF:**

Product\_Id(PK), Sale\_Id(PK), Quantity, UnitPrice, TotalPrice

**2NF:**

Product\_Id(PK), Sale\_Id(PK), Quantity, UnitPrice, TotalPrice

##### 3.1.3 Category-Belongs to-Product

**UNF:**

CatagoryId(PK), CatagoryName, Created\_at, Note, ProductId(PK), ProductName, Price, StockQuantity, Restock\_at, Created\_at, Updated\_at, Status

**1NF:**

CatagoryId(PK), CatagoryName, 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)
);
```

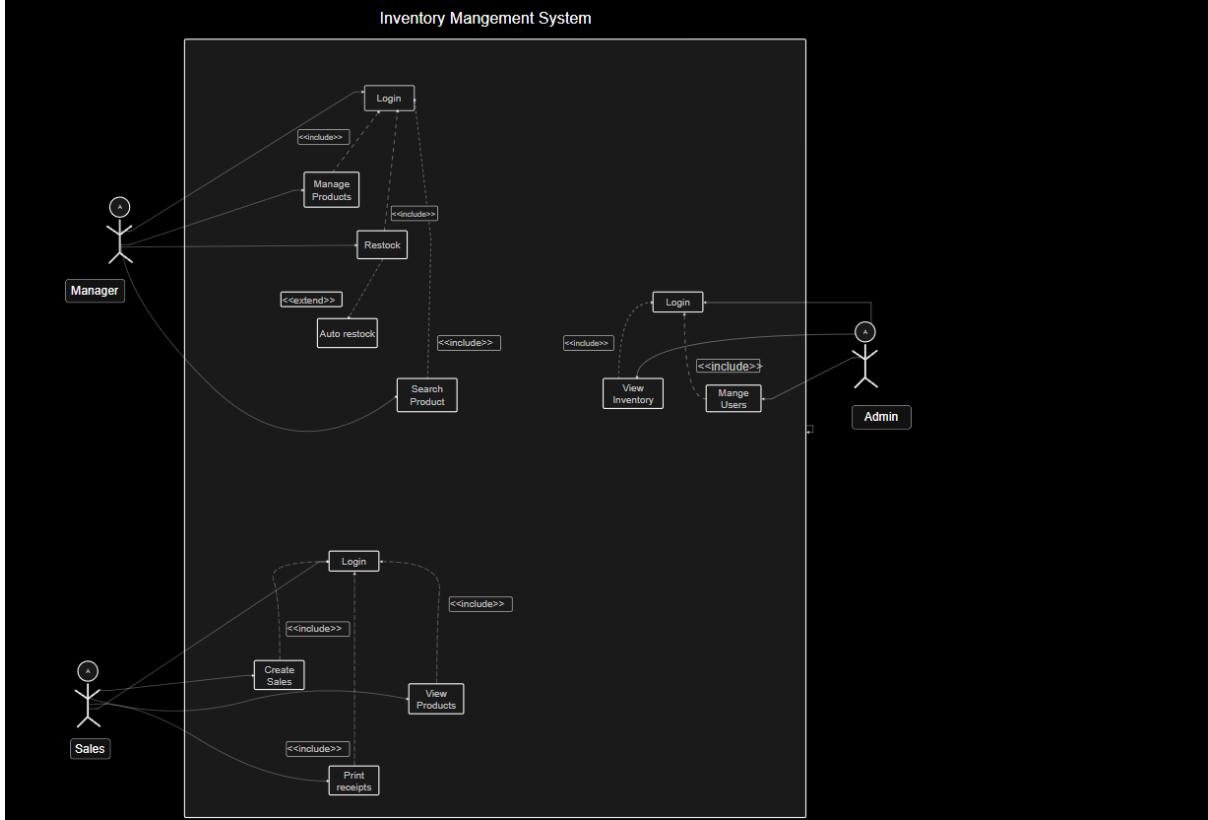
### **Sale\_Product Table**

```
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,
```

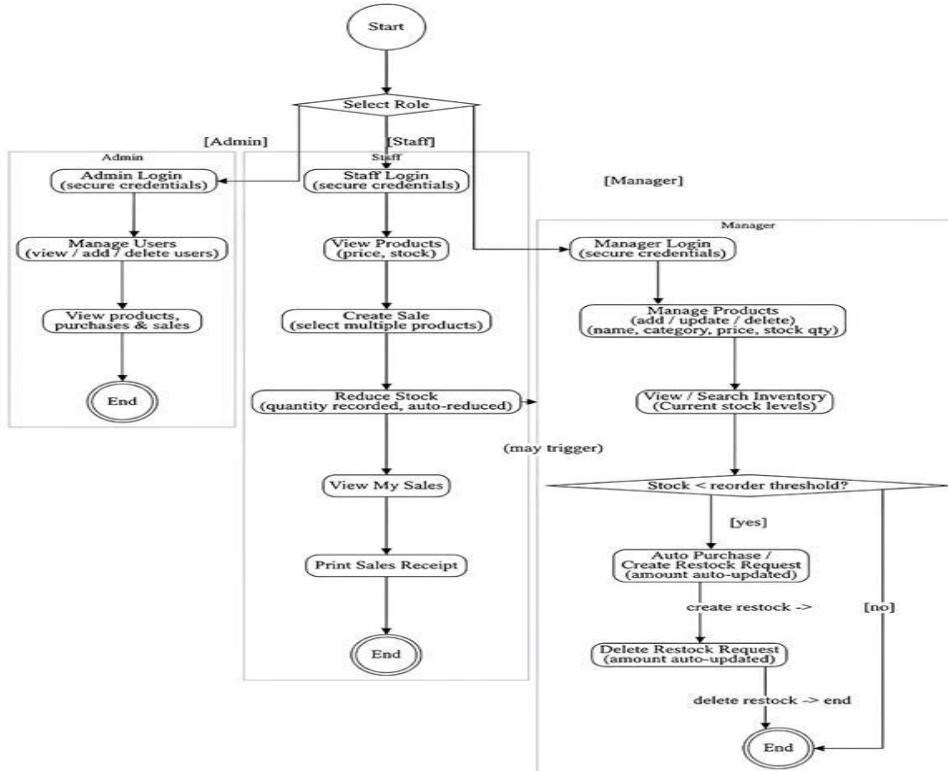
```
constraint PK_Sale_Product primary key (ProductId, SaleId),
constraint FK_Sale_Product foreign key (ProductId) references Product(ProductId),
constraint FK_Sale foreign key (SaleId) references Sale(SaleId)
);
```

## 4. UML DIAGRAM

### 4.1 Use Case Diagram



### 4.2 Activity Diagram.

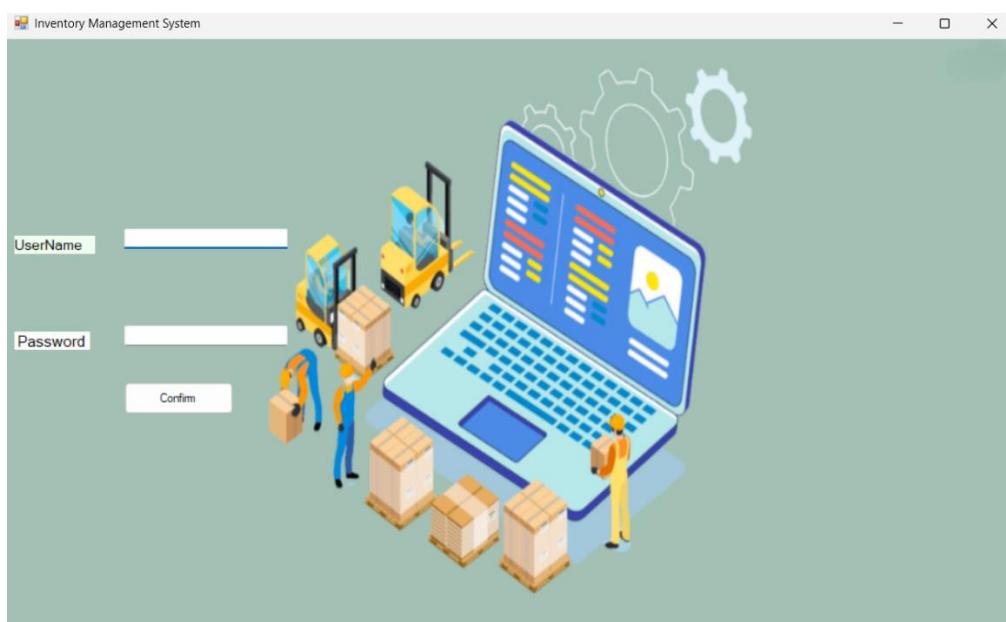


## 5. CONCLUSION

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:

The image shows the Admin Panel interface. On the left, a sidebar has 'Admin' at the top, followed by 'Inventory' (which is highlighted with a blue border) and 'Employee'. At the bottom is a red 'Exit' button. The main area has a title 'Welcome amin'. Below it is a table with the following data:

ID	Product	Category	Price	Stock	RestockAt	CreatedAt	UpdatedAt	Status
1	Iphone 16 pro max	Electronics	120000.00	149	10	24/01/26 9:...	24/01/26 9:...	Available
2	Macbox m4 pro max	Electronics	150000.00	150	10	24/01/26 9:...	24/01/26 9:...	Available
3	Wooden Chair	Office Sup.	5000.00	299	30	24/01/26 9:...	24/01/26 9:...	Available
4	steel knife	Kitchenware	200.00	90	90	24/01/26 9:...	24/01/26 9:...	Available
5	plastic chair	Furniture	10.00	105	105	25/01/26 9:...	25/01/26 9:...	Available
6	laptop	Electronics	200.00	100	95	25/01/26 4:...	25/01/26 4:...	Available

Admin

Welcome amin

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

Employee ID: 15 Employee Name:   
 Role:  Phone Number:   
 User Name:   
 Password:

[Exit](#) [Clear All](#) [Add](#) [Save and Update](#) [Delete](#)

### Manager Panels:



Welcome, sakib

[Add Product](#)

[Update Details](#)

[Delete Product](#)

[Restock Product](#)

[Restock History](#)

[Check Inventory](#)

[Logout](#)



Welcome: Sakib Ahmed

ProductId	ProductName	Price	StockQuantity	Restock_at	Created_at	Updated_at	Status	CatagoryName
1	iPhone 16 pro	120000.00	149	10	24/01/26 9:00:00	24/01/26 9:00:00	Available	Electronics
2	Macbook m4	150000.00	150	10	24/01/26 9:00:00	24/01/26 9:00:00	Available	Electronics
3	Wooden Chair	5000.00	299	30	24/01/26 9:00:00	24/01/26 9:00:00	Available	Office Supplies
4	steel knife	200.00	90	90	24/01/26 9:00:00	24/01/26 9:00:00	Available	Kitchenware
5	plastic char	10.00	105	105	25/01/26 3:00:00	25/01/26 3:00:00	Available	Furniture
6	laptop	200.00	100	95	25/01/26 4:00:00	25/01/26 4:00:00	Available	Electronics

Product Name:  Product Price:   
 Product Quantity:  Product Catagory:  Restock At:   
[Save](#) [Clear](#)

[Move to Main Menu](#)

Inventory Management System, Update Menu



Welcome: Sekib Ahmed

ProductId	ProductName	Price	StockQuantity	Restock_at	Created_at	Updated_at	Status	CatagoryName
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  Catagory

Restock Level  Availability

Inventory Mangement System, Delete Product



Welcome: Sekib Ahmed

ProductId	ProductName	Price	StockQuantity	Restock_at	Created_at	Updated_at	Status	CatagoryName
1	Iphone 16 p...	120000.00	149	10	24/01/26 9...		Available	Electronics
2	Macboxx 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

Inventory Mangement System, Search Product



Welcome: Sekib Ahmed

ProductId	ProductName	Price	StockQuantity	Restock_at	Created_at	Updated_at	Status	CatagoryName
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

Inventory Management System, Restock Form

Welcome: Sakib Ahmed

ProductId	ProductName	Price	StockQuantity	Restock_at
1	Iphone 16 pro max	120000.00	149	10
2	Macbook m4 pro	150000.00	150	10
3	Wooden Chair	5000.00	299	30
4	steel knife	200.00	90	90
5	plastic chair	10.00	105	105
6	laptop	200.00	100	95

Catagory: Electronics

Product Name: Iphone 16 pro max

Product Quantity: 0

Unit Price: 0

Sub total: 0

Note:

Add Remove Confirm

Move to Main

Inventory Management System, Restock History

Welcome: Sakib Ahmed

UserName	ProductName	Quantity	UnitPrice	SubTotal	TotalAmount	PurchaseDate	Notes
system	plastic chair	6	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

Delete

Move to Main Menu

### Sales Panel:

Inventory Management System, Sales Dashboard

Welcome,

[View Product](#) [Create Sale](#)

[Sales History](#) [Log Out](#)

Inventory Management System, Sale Product

### Create Sales

Product	iPhone 16 pro max	Price	120000.00	Quantity	0	Add To Cart
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### 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
*				

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
*			

**7. Github link:**

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