THAR INSTITUTE OF ENGINEERING, SCIENCES AND TECHNOLOGY
A Constituent College of NED University of Engineering & Technology

Department of

Computer Science and Information Technology

(CT-365: Software Engineering)

Project: Inventory Management System

Submitted To

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THAR INSTITUTE
Engineering Sciences & Technology Tharparkar
A constituent College of NED University Karachi

CERTIFICATE

This is to certify that we, Hasnain Nisar, Azhan Bhayo, and Sarafarz Essa, batchmates and students of Computer Science & Information Technology (TIEST), Semester V, have successfully completed our Industrial Project entitled ***Inventory Management System*** *as a partial requirement for the degree of* ***Bachelor of Computer Application*** *during the academic year 2023-2024.*

Coordinator: Engr. Govarishankar
Department of Computer Science & Information Technology (TIEST)

Acknowledgement

- The success of this project is thanks to the guidance and support of several individuals. We are grateful for the foundational knowledge from courses like **System Analysis and Design** and **Database Management** with Sir Anees, and especially to our Coordinator, **Engr. Govarishankar**, for his invaluable support.

- I am especially grateful to our Coordinator, Engr. Govarishankar, at the Thar Institute of Engineering, Science, and Technology, for granting us the opportunity to undertake this project. His constant motivation and dedication to creating an exceptional learning environment have inspired us to strive for excellence.

Finally, I am thankful to everyone who provided the necessary resources and information that contributed to the successful development of this Inventory Management System

Project Abstract

- In this project, I have developed a project on an **Inventory Management System** to simplify inventory control tasks.

- By using this project, any user can efficiently manage products, customers, categories, users, and orders, making it a valuable tool for individuals and businesses.

- I have incorporated multiple forms and functionalities, ensuring the project is user-friendly and easy to navigate.

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Introduction

Project Summary

The **Inventory Management System** prioritizes user-friendliness, enabling easy navigation and efficient management of products, customers, categories, users, and orders. With intuitive forms, users can effortlessly input and update details without confusion.

The straightforward interface ensures that anyone, regardless of technical expertise, can manage their inventory effectively. Overall, this project simplifies the inventory management process, making it accessible to all users

Purpose

- Goals & Objectives

  ✓ The primary purpose of this project is to allow users to manage their inventory with ease. Users can effortlessly view and track the details of products, customers, categories, users, and orders.

  ✓ The main goal of the **Inventory Management System** is to facilitate faster and more efficient inventory management.

  "To Our aim is to create software that processes information quickly, features an intuitive user interface, and remains reliable for long-term use with minimal errors and maintenance requirements."

Scope

- Inventory Control is a totally Desktop application made in C#.Net. With the help of this project a user are manage inventory. This process is a very fast process and accurate also.

- As we know that Inventory Control is a Desktop application. So user which is operating this software little knowledge of computer they can understand easily.

Technology and Literature Review

- Technology
  - Front End : C#.NET
  - Back End : SQL Server 2020

- Client side scripting

  C#.NET combines unique developer productivity with performance and reliability.

  - Developer Productivity

    1. **Flexible Language Options**

       C#.NET lets you control your current programming language skills. Unlike classic ASP, which supports only interpreted VBScript and JScript, .NET now supports more than 25 .NET languages giving you unprecedented flexibility in your choice of language.

2. Rich Class Framework

Application features that used to be hard to implement, or required a 3rd-party component, can now be added in just a few lines of code using the .NET Framework. The .NET Framework offers over 4500 classes that encapsulate rich functionality like XML, data access, file upload, regular expressions, image generation, performance monitoring and logging, transactions, message queuing, SMTP mail, and much more…

- Increased Reliability

  Memory Leak, Deadlock and Crash Protection: .NET automatically detects and recovers from errors like deadlocks and memory leaks to ensure your application is always available to your users.

Disadvantages of old system

As we know the manual process is quite tedious, time consuming, less accurate in comparison to computerized processing. Obviously the present system is not is exception consultant encountering all the above problems.

- Time Consuming.
- It is very tedious.
- All information is not placed separately.
- Lot of paper work.
- Slow data processing
- Not user-friendly environment.

It is difficult to found records due file management system.

Advantages of new system

In new computerized system I tried to give these facilities.

- Manually system changes into computerized system.
- Friendly user interface.
- Time saving.
- Save paper.
- Connecting to database so we use different type of queries, data report.
- Give facility of different type of inquiry.
- Formatted data.
- Data's are easily approachable.

Project Management

Project Planning and Scheduling

Project Development Approach

To solve actual problems in an industry setting, a software development strategy must be incorporated that encompasses the process, methods and tools for software engineering. This strategy is often referred to as Software Process Model or Software Engineering Paradigm. A software process model for software engineering is chosen based on the nature of project and application, the methods and tools to be used and the controls and deliverables that are required.

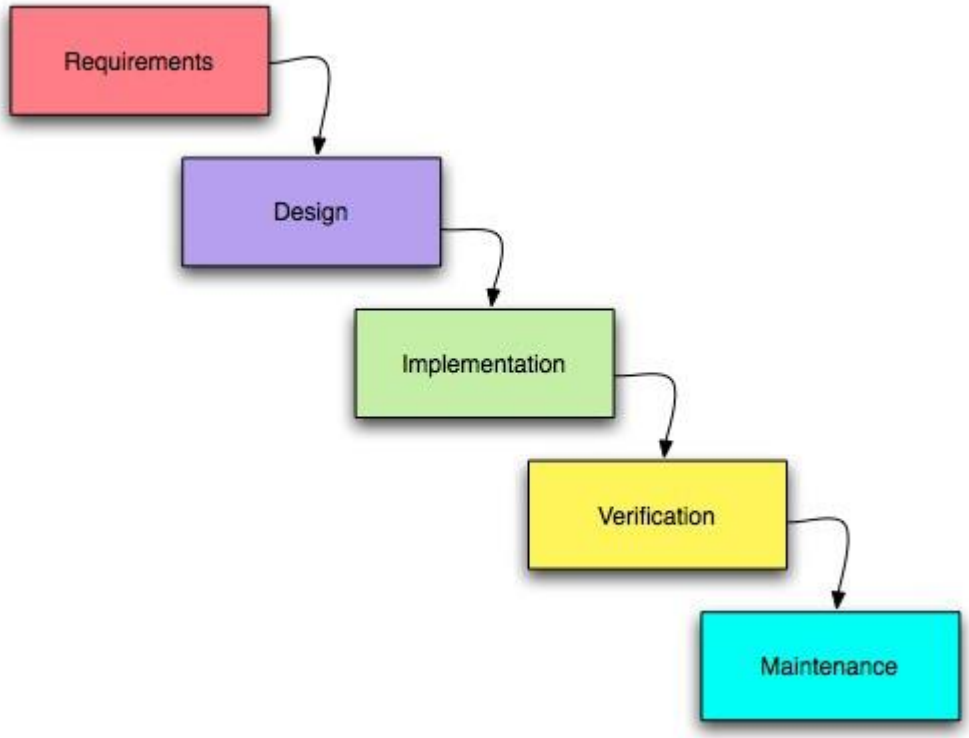
Among them, we have chosen a very popular one, The Classical System Development Life Cycle Model or the Waterfall Model. This approach is classically thought of as a set of six interrelated activities that make up the entire system development life cycle.

Water Fall Model:

This is also called Classic Life Cycle Model or Linear Sequential Model or Software Development Life Cycle Model (SDLC). This model has the following activities

- ✓ System Information Engineering and Modeling
- ✓ Software Requirement Analysis
- ✓ System Analysis and Design
- ✓ Code Generation

- ✓ Testing
- ✓ Maintenance



1) System/Information Engineering and Modeling

As software development is large process so work begins by establishing requirements for all system elements and then allocating some subset of these requirements to software. The view of this system is necessary when software must interface with other elements such as hardware, people and other resources. System is the very essential requirement for the existence of software in any entity. In some cases for maximum output, the system should be reengineered and spruced up. Once the ideal system is designed according to requirement, the development team studies the software requirement for the system.

2) Software Requirement Analysis

Software Requirement Analysis is also known as feasibility study. In this requirement analysis phase, the development team visits the customer and studies their system requirement. They examine the need for possible software automation in the given software system. After feasibility study, the development team provides a document that holds the different specific recommendations for the candidate system. It also consists of personnel assignments, costs of the system, project schedule and target dates.

3) System Analysis and Design

In this phase, the whole software development process, the overall software structure and its outlay are defined. In case of the clients/server processing technology, the number of tiers required for the package architecture, the database design, the data structure design etc are all defined. After designing part a software development model is created. Analysis and Design are very important in the whole development cycle process. Any fault in the design phase could be very expensive to solve in the software development process. In this phase, the logical system of the system product is developed.

4) Code Generation

In Code Generation phase, the design must be decoded into a machine-readable form. If the design of software product is done in

a detailed manner, code generation can be achieved without much complication.

5) Testing

After code generation phase the software program testing begins. Different testing methods are available to detect the bugs that were committed during the previous phases. A number of testing tools and methods are already available for testing purpose.

6) Maintenance

Software will definitely go through change once when it is delivered to the customer. There are large numbers of reasons for the change. Change could happen due to some unpredicted input values into the system. In addition to this the changes in the system directly have an effect on the software operations. The software should be implemented to accommodate changes that could be happen during the post development period.

- Project Plan

Project planning includes description of project tasks, activities and functions, dependencies, resource requirements and a detailed schedule. This activity results in the software project management plan for the Matrimonial Project.

- Risk Management

✓ Risk Identification

- Technical Risks

Technical risks threaten the quality and timeliness of the software to be produced. If a technical risk becomes a reality, implementation may become difficult or impossible. Technical risks identify potential design, implementation, interface, verification, and maintenance problems.

- Business Risks

Business risks threaten the visibility of the software to be built. Business risks often jeopardize the project or the product. Candidates for the top five business risks are

1. Building an excellent product or system that no one really wants.
2. Building a product that no longer fits into the overall business strategy for the company
3. Building a product that the sales force doesn't understand how to sell
4. Losing the support of senior management due to a change in focus or a change in people and
5. Losing budgetary or personnel commitment.

- Product Size

Risks associated with the overall size of the software to be built or modified

- Project Definition

Risks associated with the degree to which the software process has been defined and is followed by the development organization.

In any software the analysis part is the most important part. In risk management the programmer or software developer can think seriously about the risk like what kind of risks are there in the project if the risks are solvable or not or what is the solution or which way he or she can solve the risk this the main things comes into the analysis part . if this part is good means developer can analyze the risk so there is a no chance of risk and if possibly risk is come so it is easily solve

So if developer or programmer can analyze about the risks related to their project there is a no or less chance of errors and make a nice project. So risk analysis is the good part to remove the risk or prevent your project to future risks.

Project Requirement Study

User Characteristics

The user must have basic knowledge of the Computer. User must be familiar with all the application whose documents are used in the system. The user must be familiar with these computer based system and their operations done in the system.

Hardware Requirement

Hardware	**Minimum Requirement**
Processor	Core i3 Duo or above
RAM	4 GB
Hard-disk Space	128 GB

Software Requirement

Software	**Requirement**
Operating System	Window XP or more
Tools	MS Visual Studio 2022 SQL Server 2020 MS.NET Framework 4.0
Technology	C#.Net

C#	Scripting Language
Documentation Tools	Microsoft office 2016/21

Constraints

Every project has to follow some constrain throughout its lifecycle. Following are the constraints identified that must be followed during the development of my system.

- **Time Constraints:** The project should be developed and implemented within the time limit.

- **Personal Constraints:** The constraints imposed by the skills possessed by the member for the development. I had to learn C#.NET and then implement the system.

- **Reliability Requirements**

  - ✓ The system should be reliable enough in the following areas:

  - ✓ Integrity of data should be maintained, requiring the atomicity of transactions

  - ✓ Loss of data should be minimized

  - ✓ Integrity of the system should be maintained, requiring a tight login security so that only the authorized used is allowed to perform a transaction.

- **Safety and Security Consideration**

  ✓ Without log into Login Form user cannot access the application.

  ✓ The database is on centralized server so only authorized user can use this database.

System Analysis

Requirements of New Systemss

- The system must be authorized.
- The system must be accessible to account branch of company.
- The system must be able to store inventory.
- Advanced Searching facilities must be included.
- The system should be convenient and work according to the Company Requirements.

Requirement Analysis

In Requirement analysis, we met to the company head and project guide. We discussed about their requirements and the problems they are facing with existing system.

Fact Finding Technique

During requirement determination phase, the system analyst has to find out how the current system works and what is expected from a new system. For that it is required to spend considerable time in talking with users and gathering all relevant information on the project.

Information Sources

Main sources of information are:

- ✓ User of the system.
- ✓ Documents used in the organization.
- ✓ Procedure manuals and rulebooks, which specify how various activities, are carried out in the organization.
- ✓ Various reports used in the organization.

Analysis of actual data

The data collected during the fact finding study and included in data flow and decision analysis documentation are examined to determine how well the system is performing and whether it will. Meet the organization's demand.

Reliability

Reliability could be defined as an extent to which application can be perform its intended function with required precision. It is evaluated by measuring the frequency and severity of failure and

the ability to recover from failure. Thus the application should be as reliable as possible to overcome the failure and recover from it.

Maintainability

The application to be developed should be easily maintained and should locate undiscovered error and fix them as soon as possible. For maintenance of the application the contact number of the application provider would be given to the end user to resolve the queries.

Portability

Portability means an effort to transfer the application from one hard ware and/or software system environment to another. Our application is to be developed in C#.Net, so the application can be install on various Windows Platform but the .Net framework needs to be installed.

Efficiency

The application should make optimal use of system resources. Also the runtime performance of the system should be considered.

Maintenance

Software maintenance applies to following phases in the existing program

- ✓ Change in software due to errors.
- ✓ Change in software because the software must be adapted to accommodate changes in its external environment.
- ✓ Change in software when the customer requires functional or performance enhancements.

Feasibility Study:

"Feasibility Study" is a test of the system according to its workability, impact of the organization, ability to meet user needs and effective use of the resources.

We can test our system by different types of the feasibilities. There are 5 types of the feasibilities which are discussed here. These are as follows:

❖ Technical Feasibility:

A study of resources availability that may affect the ability to achieve an acceptable system. This evaluation determines whether the technology needed for the proposed system is available or not. This system can be made in any language that support good user interface and easy database handling.

❖ Front-End Selection:

Front End means a language that is used for user interface designing and coding.

Front-End should have following qualities:

- ✓ Platform independent.
- ✓ Easy to deploy & maintain. ✓ Event driven programming
- ✓ Front-End must support some popular Back-End like MS Access, SQL Server and Oracle.
- ✓ According to the organization requirements and culture.

❖ Back-End Selection:

Back-End means a language that is used for database management. Back-End should have following qualities.

- ✓ Multiple user support.
- ✓ Provide inherent feature for security.
- ✓ Efficient data retrieval and maintenance.
- ✓ Stored procedures.
- ✓ Popularity.
- ✓ Easy to install.
- ✓ Various drivers must available.
- ✓ Easy to implement with Front-End.

❖ Economical Feasibility:

- ✓ The cost to conduct a full system investigation.
- ✓ The cost of hardware and software for class of application being considered.
- ✓ The benefit in the form of the reduced cost.

Our system has a lot of features at a minimum cost so it is feasible to implement and it will be very much beneficial to the sellers in the reduced cost.

The software and hardware cost is also low then the existing system.

❖ Operational Feasibility:

- ✓ What changes will be brought with the system?
- ✓ What new skills will be required?
- ✓ Do the existing staff members have these skills? If not, can they be trained in due course of time?

Above points we consider in this feasibility study.

Requirement Validation

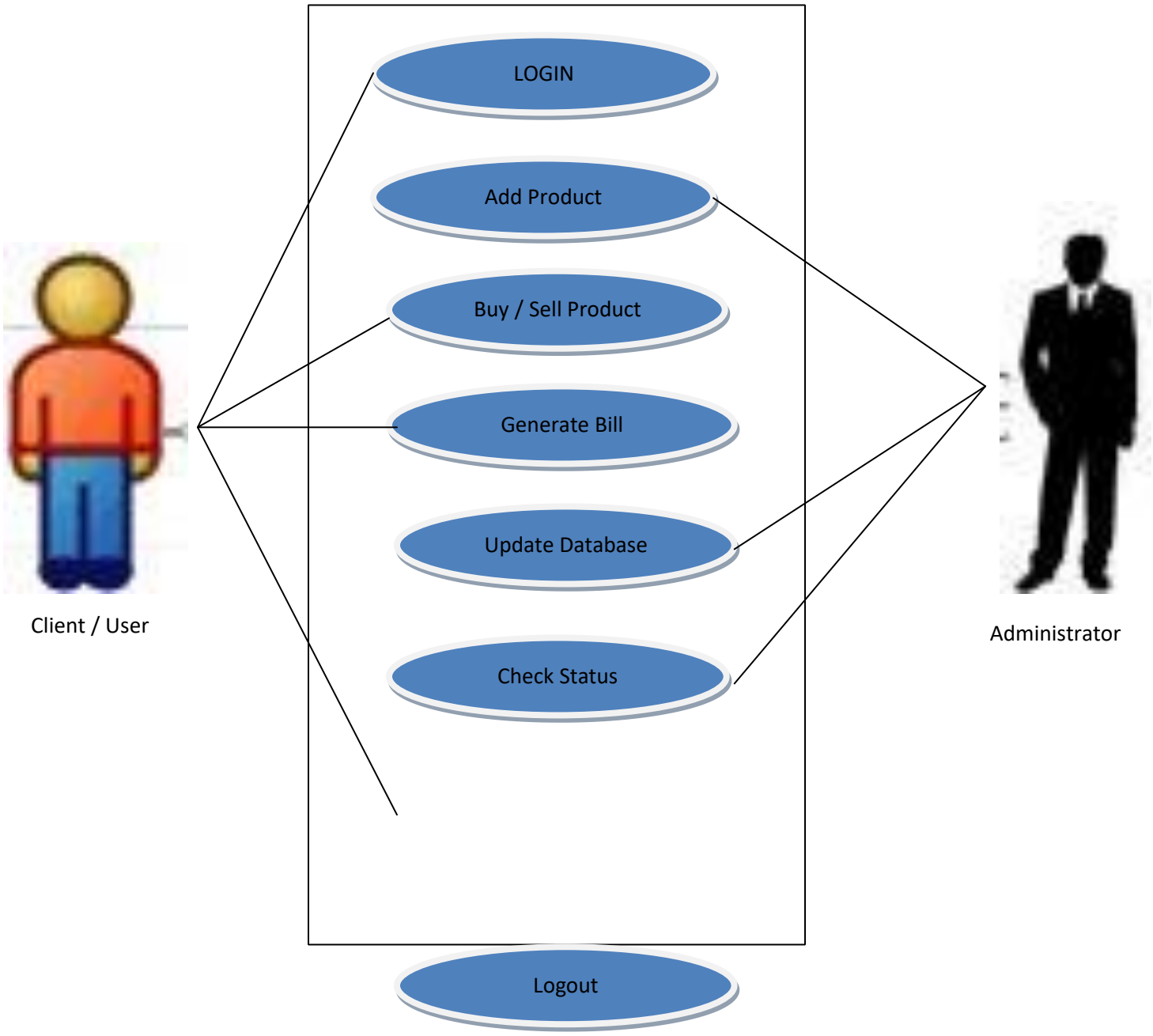
- ✓ It means that the developed software is as per requirement or not? Simply stating whatever we are doing is right or wrong as per requirements?
- ✓ Here we check each and every requirement and compare with our product and that it satisfies the user need.

UML Diagrams

Unified Modeling Language (UML) is a standardized generalpurpose modeling language in the field of object-oriented software engineering. UML includes a set of graphic notation techniques to create Visual Models of object-oriented software-intensive systems. Behavior Diagrams

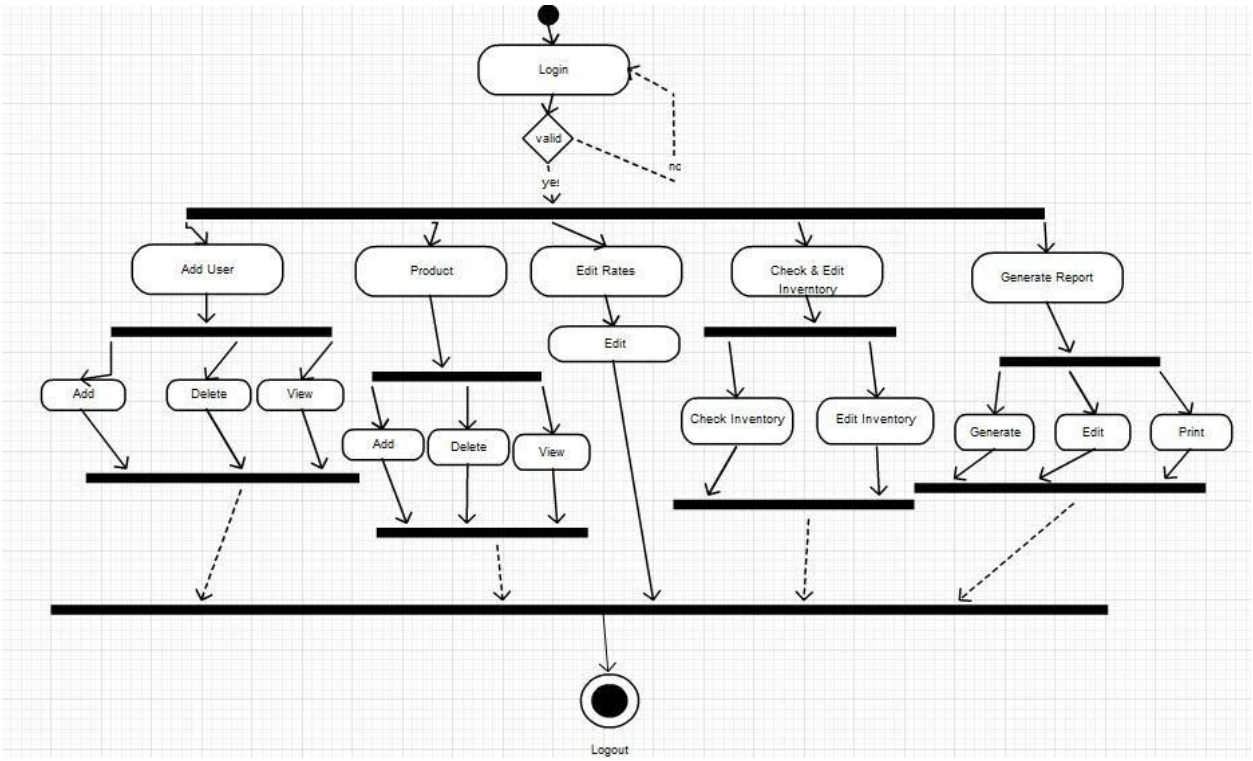
- Use Case Diagram: Describes the functionally provided by a system in terms of actors, their goals represented as use cases, and any dependencies among those use cases.
- Activity Diagrams: Describes the business and operational step-by-step workflows of components in a system. An activity diagram shows the overall flow of control.
- Sequence Diagram: Describes the sequence of processes.

Use Case Diagram

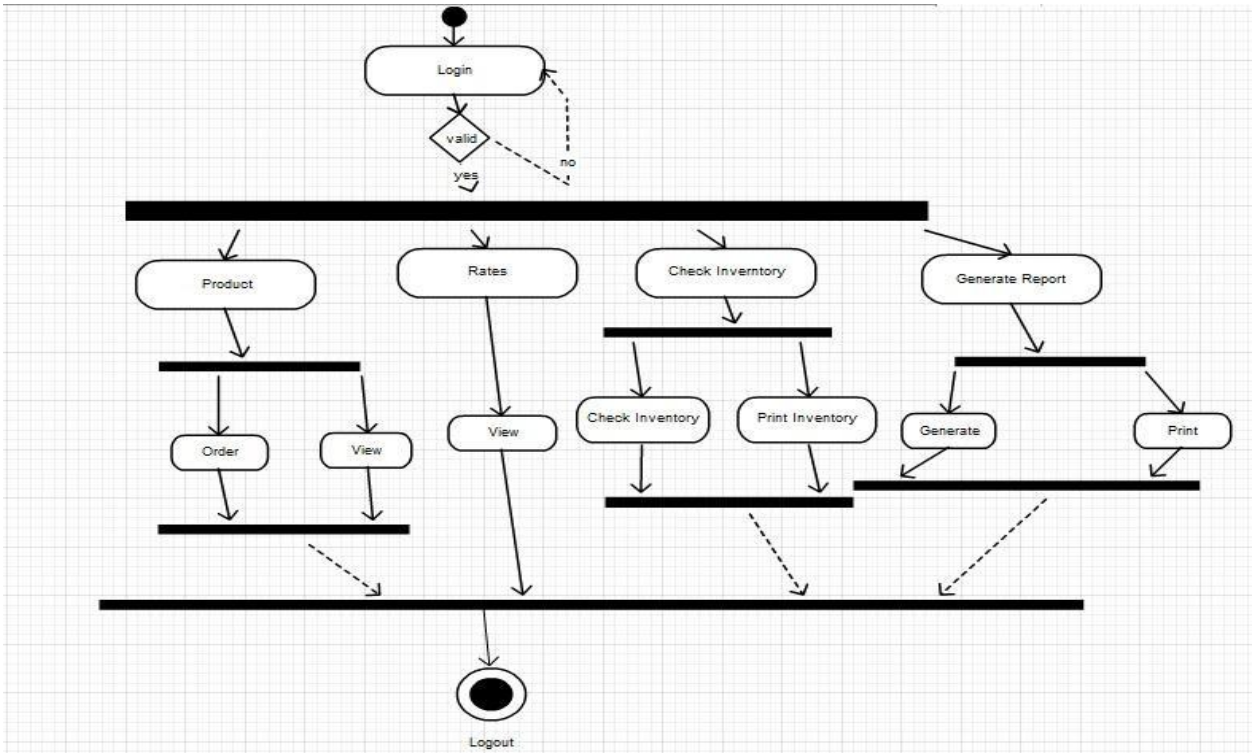


Activity Diagram:

Admin Side:

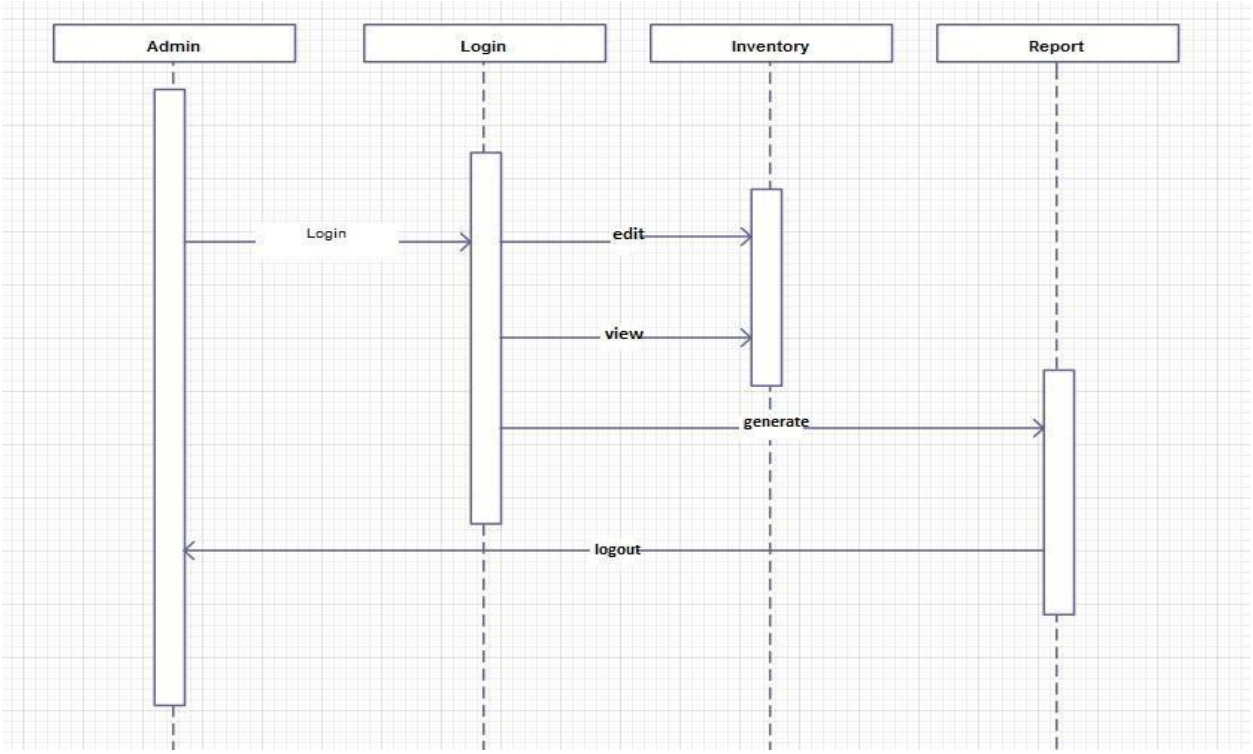


Client Side:

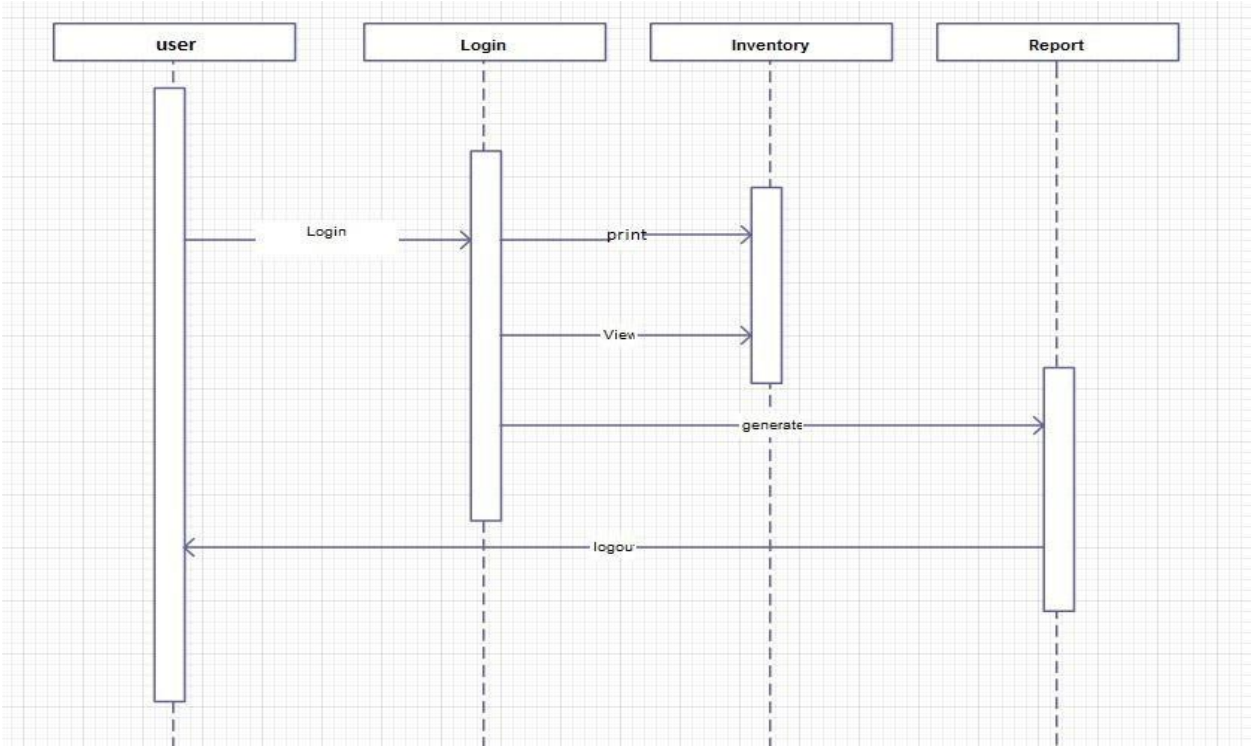

Login
valid
yes
no
Product
Rates
Check Inverntory
Generate Report
Order
View
View
Check Inventory
Print Inventory
Generate
Print
Logout

Sequence Diagram:

Admin Side:

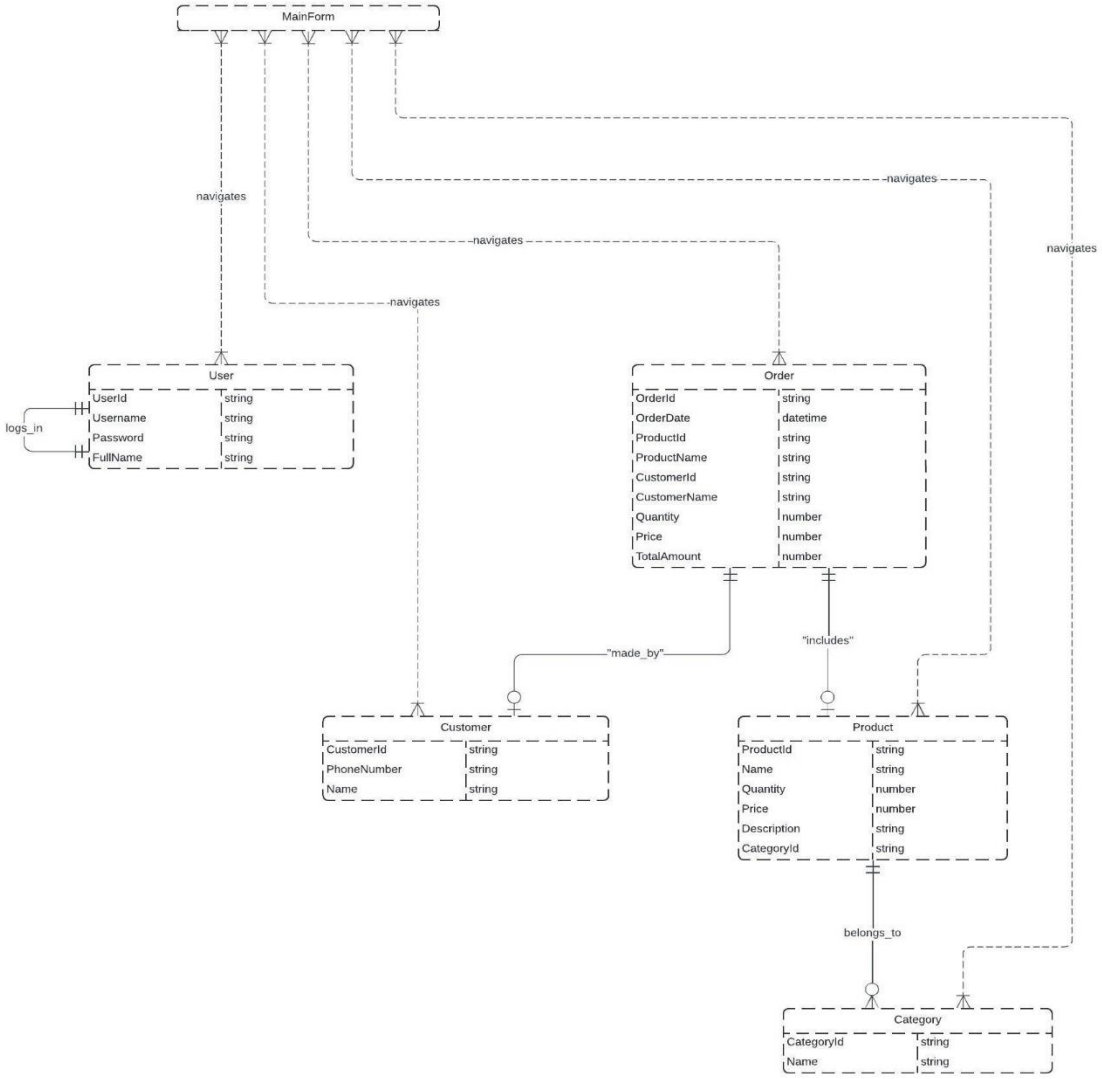


Client Side:


user
Login
Inventory
Report
Login
print
View
generate
logou

Entity Relationship Diagram

It is an abstract and conceptual representation of data. Entityrelationship modeling is a database modeling method, used to produce a type of conceptual schema or semantic data model of a system, often a relational database.



Data Dictionary

tbUser

Field Name	Data Type	Range
Password	Varchar	20
User name	Varchar	20

product_master

Field Name	Data Type	Range
product_id (p_key)	Int	5
product_type_id	Int	5
product_name	Varchar	20
product_purchase_date	Date/time	
product_stock	int	5

- Tb Order

Field Name	Data Type	Range
buyer_id (p_key)	Int	5
buyer_name	Varchar	50
buyer_address	Varchar	200
contect_person	Varchar	50
contect_no	Int	15
e-mail	Varchar	50
product_sell_date	Date/time	
invoice_no	Int	5

transection_id	Int	5
transection_type	varchar	10
no_of_products_transection	Int	5
product_stock	Int	5

tbCustomer

Field Name	Data Type	Range
Customer I'd	Varchar	20
Customer name	Varchar	20

tbCategory

Field Name	Data Type	Range
Cat_I'd	int	10
Cat_name	Varchar	20

Implementation

Implementation Environment

By applying the implementations and above analysis we have created Web Applications in Asp.net and SQL database. That is very to operate.

The interrelated database of SQL server 2020 is connected to Asp.net.

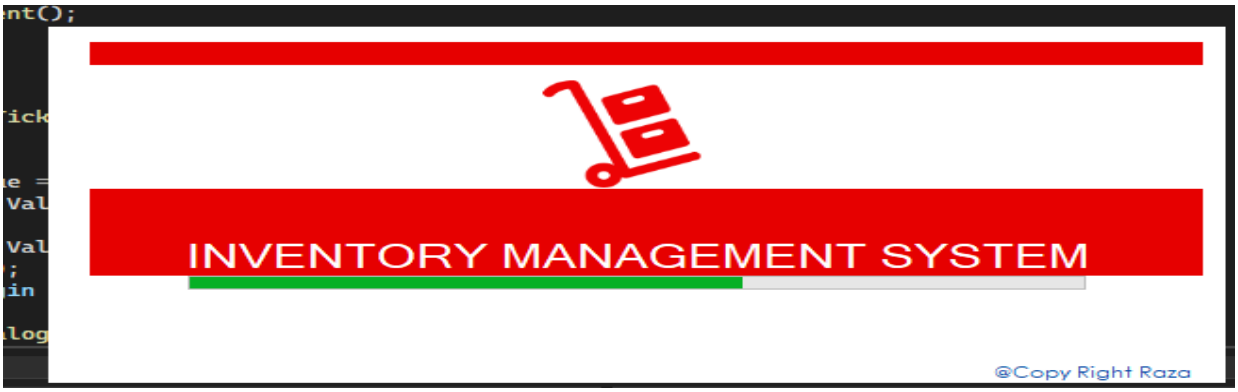
Security Feature

- ✓ Inventory Control is developed in C#.NET and the backend is SQL Server 2008 database which provides maximum security. Security is a key feature of SQL Server 2020, which provides confidentiality, integrity, and availability of missioncritical data.
- ✓ User authentication feature in Inventory Control provides authentication so that any unauthorized user cannot use this application.

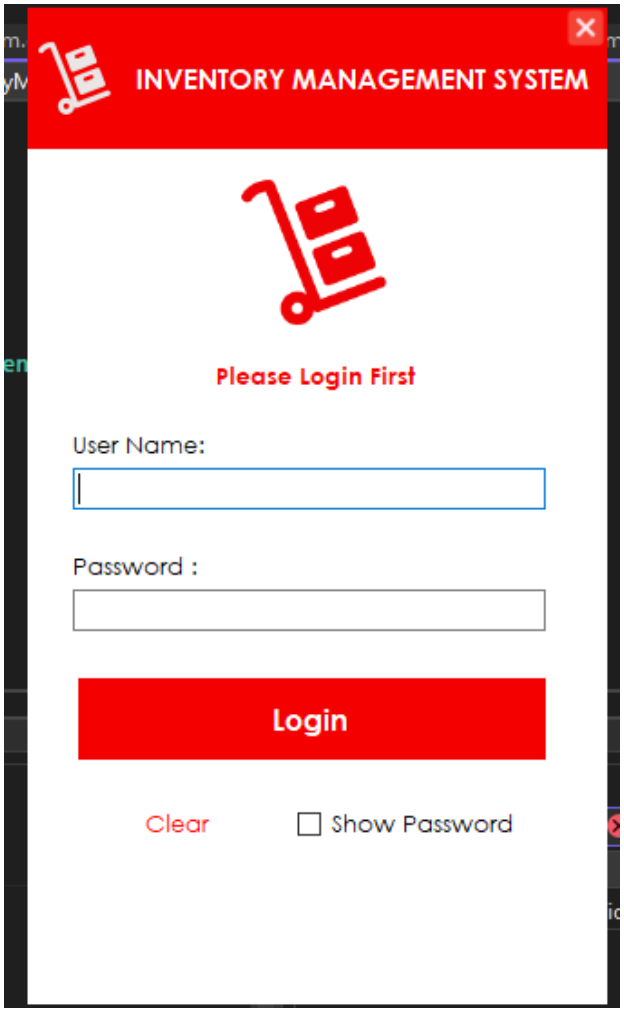
Coding Standards

- ✓ Code conventions are important to programmers for a number of reasons.
- ✓ 60% of the lifetime cost of a piece of software goes to maintenance.
- ✓ Hardly any software is maintained for its whole life cycle by original author.
- ✓ Code convention improves the readability of the software, allowing engineers to understand new code more quickly and thoroughly.
- ✓ If you ship your source code as product, you need to make sure it is as well packaged and clean as any other product you create.

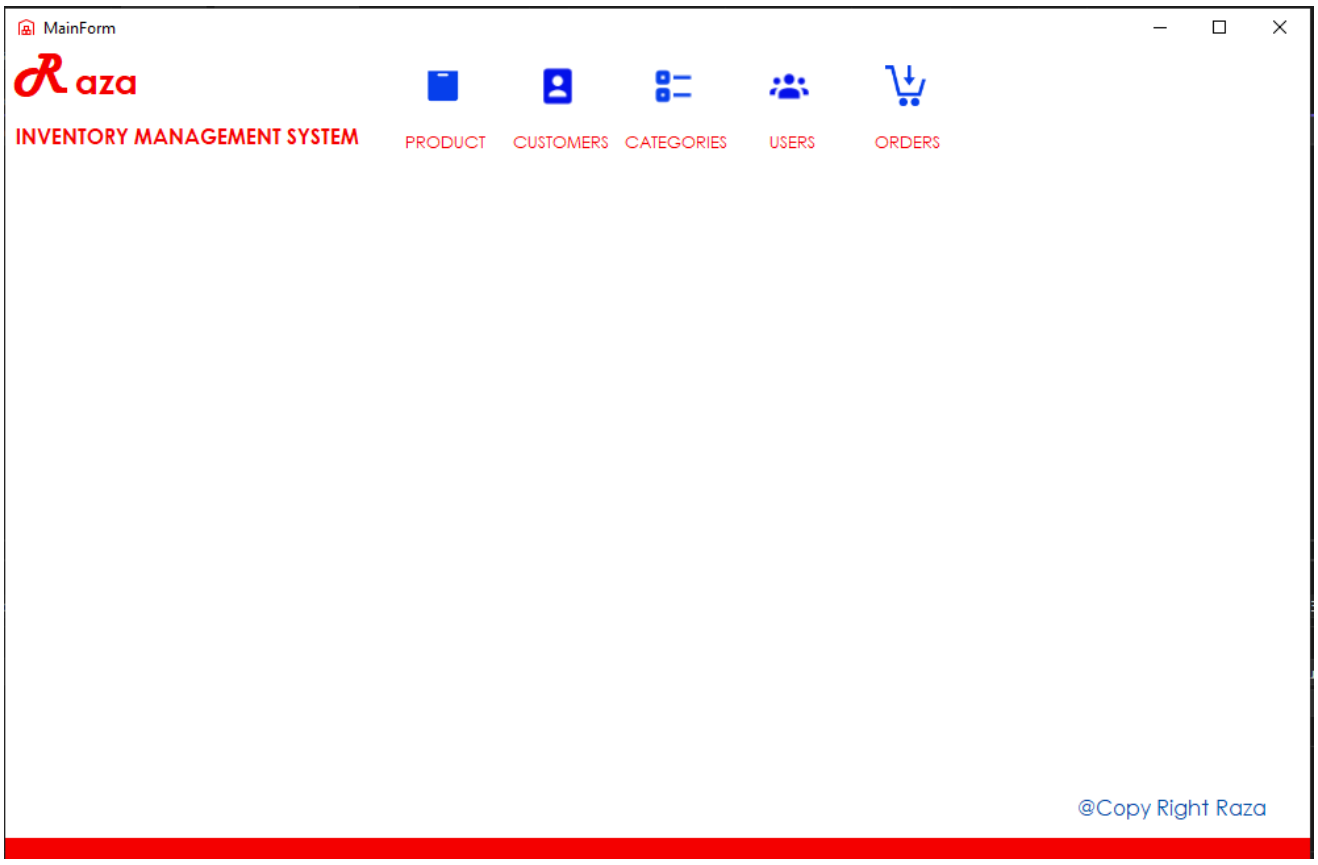
Screenshots



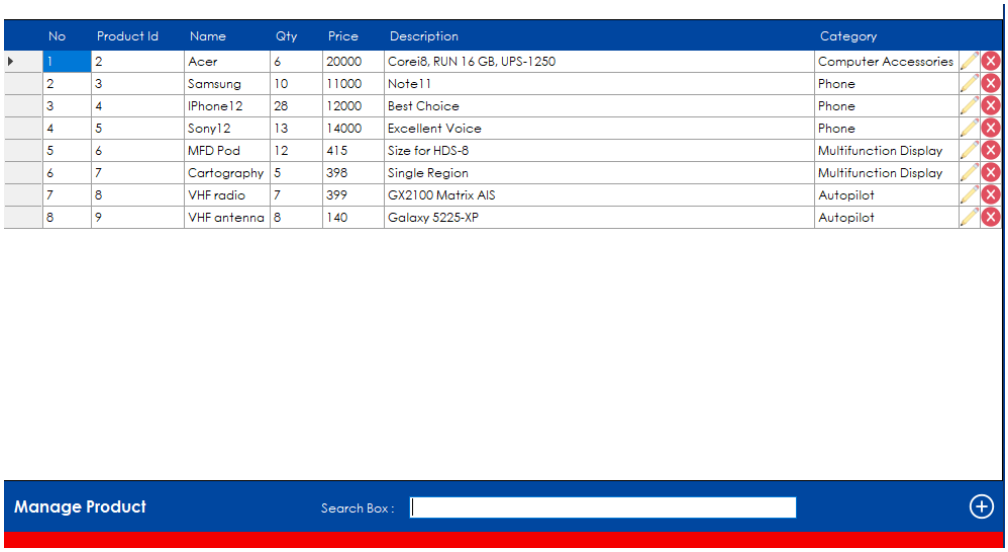
LoginPage



MainForm

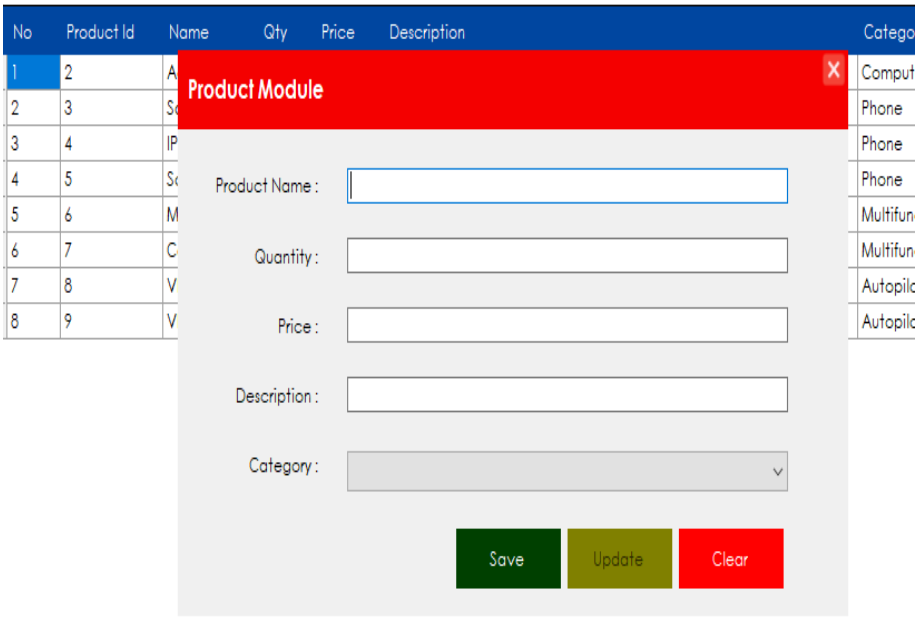

MainForm
Raza
INVENTORY MANAGEMENT SYSTEM
PRODUCT
CUSTOMERS
CATEGORIES
USERS
ORDERS
@Copy Right Raza

ProductForm:

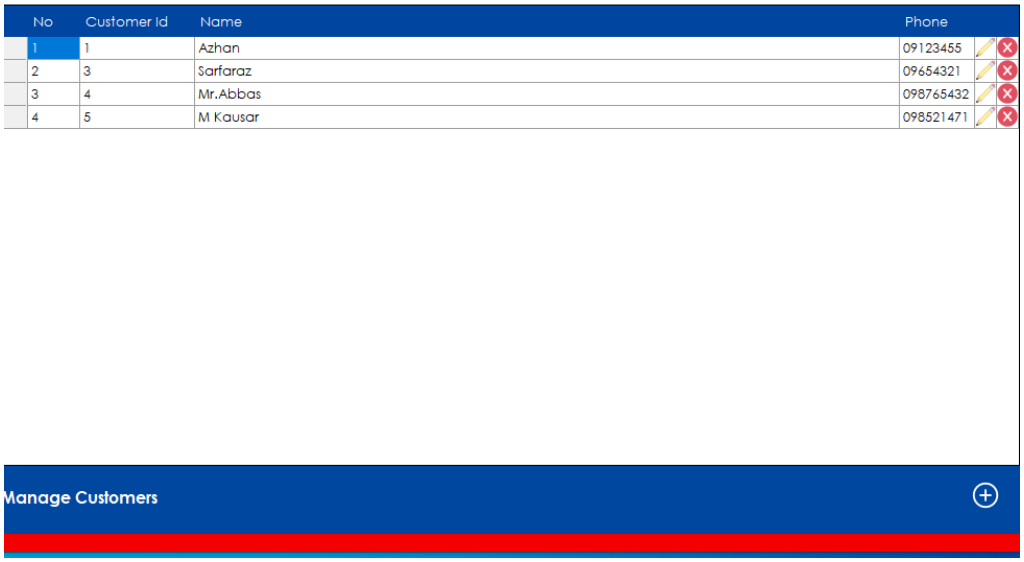


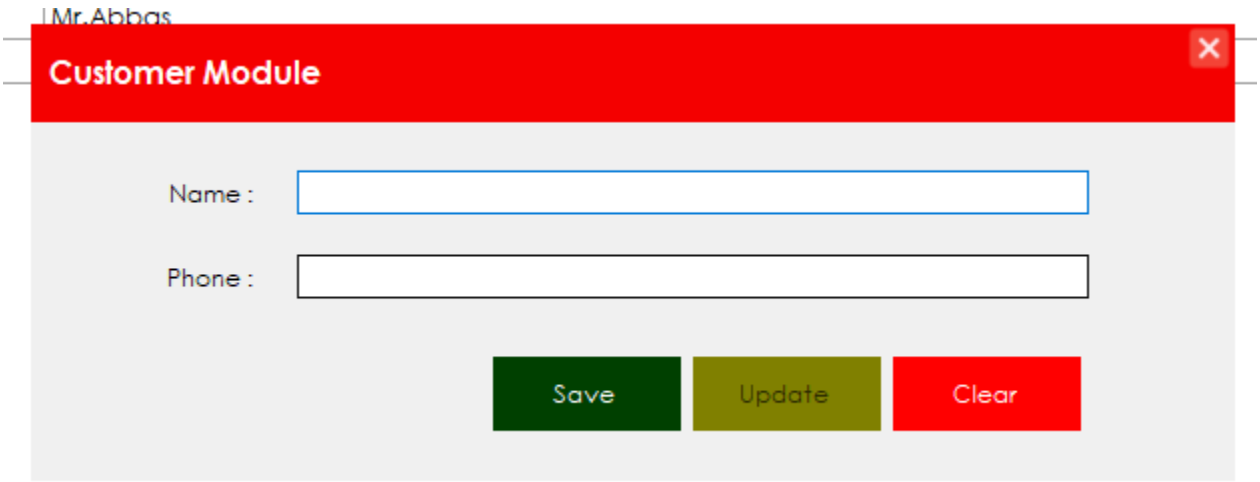
No	Product Id	Name	Qty	Price	Description	Category
1	2	Acer	6	20000	Corei8, RUN 16 GB, UPS-1250	Computer Accessories
2	3	Samsung	10	11000	Note11	Phone
3	4	IPhone12	28	12000	Best Choice	Phone
4	5	Sony12	13	14000	Excellent Voice	Phone
5	6	MFD Pod	12	415	Size for HDS-8	Multifunction Display
6	7	Cartography	5	398	Single Region	Multifunction Display
7	8	VHF radio	7	399	GX2100 Matrix AIS	Autopilot
8	9	VHF antenna	8	140	Galaxy 5225-XP	Autopilot

Manage Product Search Box :

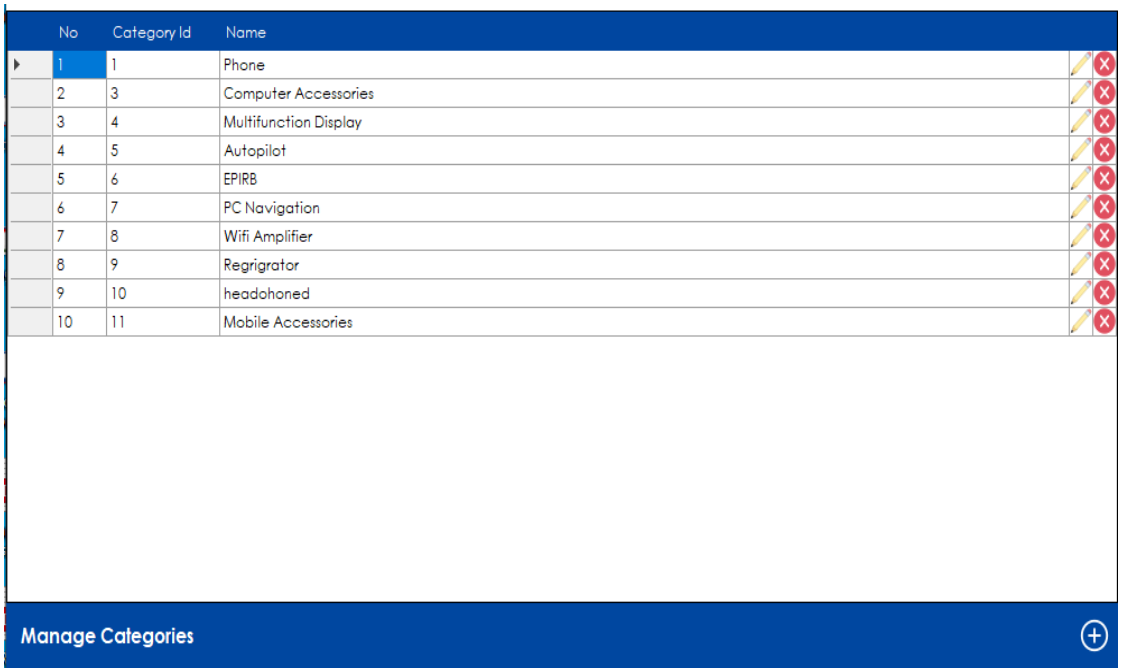


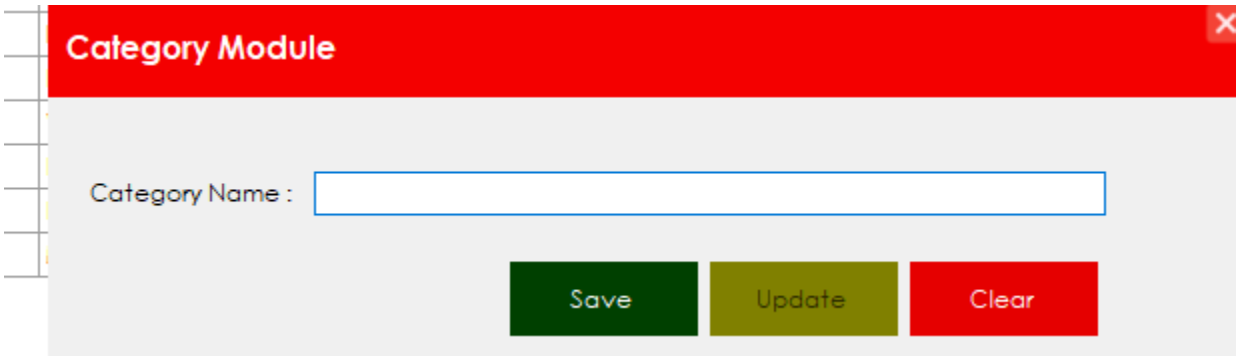
CustomerForm:





CategoryForm

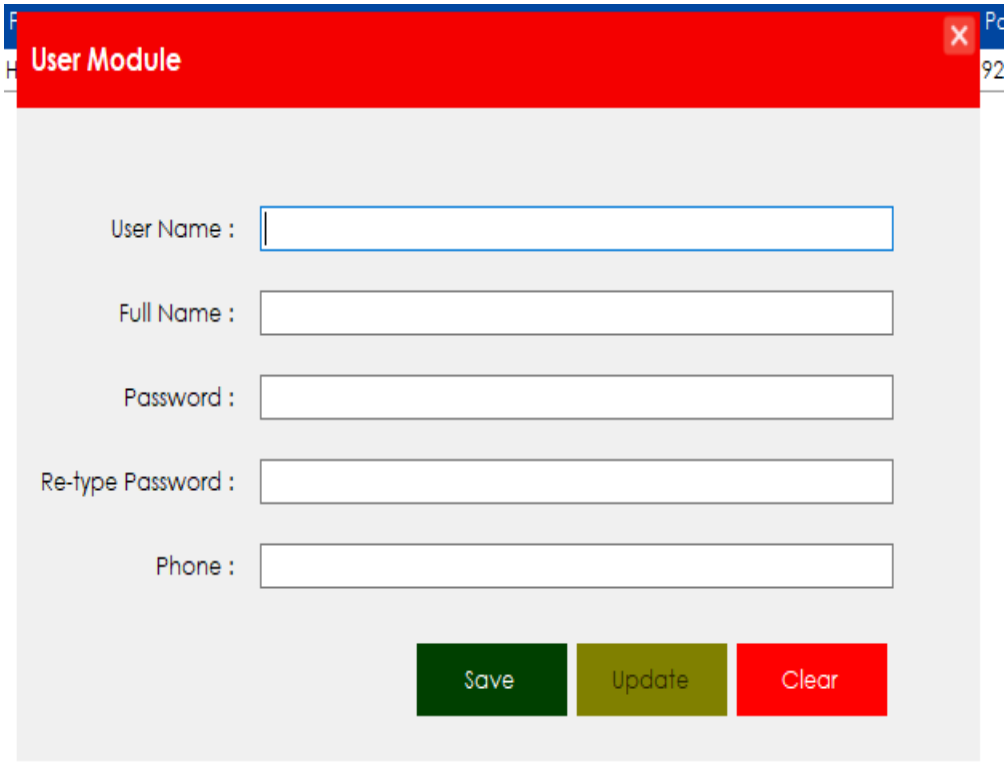




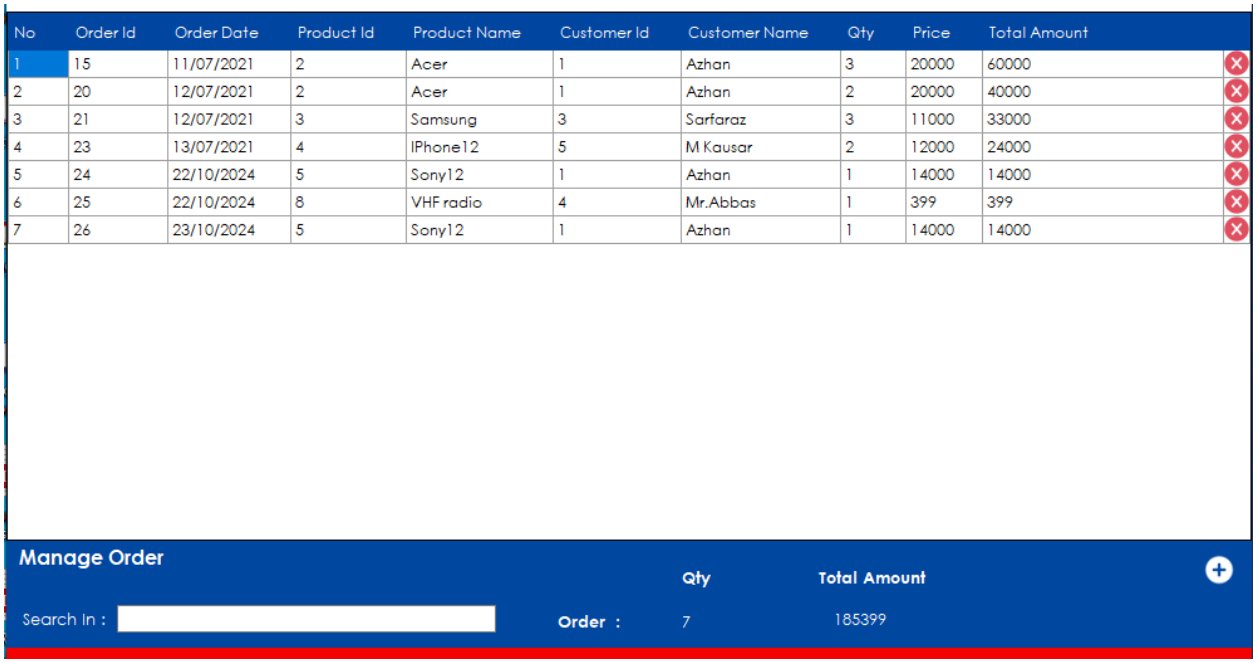
UserForm


No
User Name
Full Name
Password
Phone
1
hasnain
Hasnain Nisar
92727


Manage Users


User Module
User Name :
Full Name :
Password :
Re-type Password :
Phone :
Save
Update
Clear

OrderForm



No	Order Id	Order Date	Product Id	Product Name	Customer Id	Customer Name	Qty	Price	Total Amount
1	15	11/07/2021	2	Acer	1	Azhan	3	20000	60000
2	20	12/07/2021	2	Acer	1	Azhan	2	20000	40000
3	21	12/07/2021	3	Samsung	3	Sarfaraz	3	11000	33000
4	23	13/07/2021	4	IPhone12	5	M Kausar	2	12000	24000
5	24	22/10/2024	5	Sony12	1	Azhan	1	14000	14000
6	25	22/10/2024	8	VHF radio	4	Mr.Abbas	1	399	399
7	26	23/10/2024	5	Sony12	1	Azhan	1	14000	14000

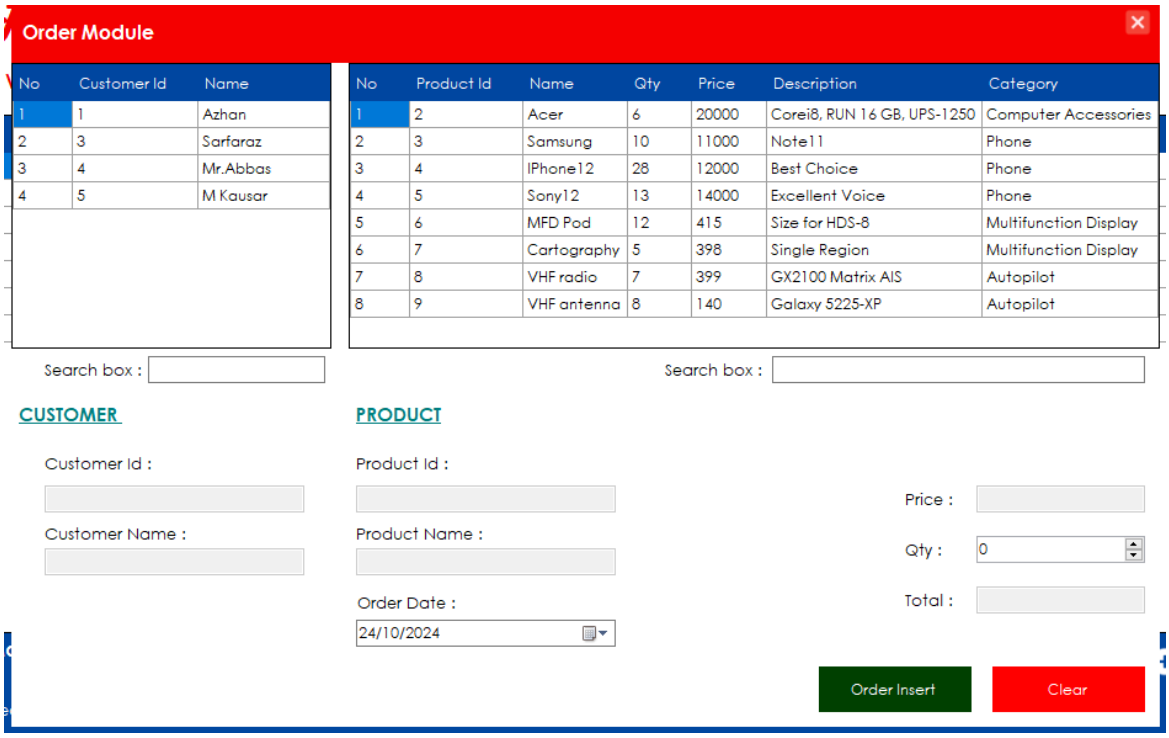
Manage Order

Search In :

Order : 7 185399

Qty Total Amount

OrderModule



Conclusion and Discussion

This Desktop application provides easy way to manage Inventory. This application developed is designed in such a way that any further enhancements can be done with ease.

This application is going to be used for our company to easily manage document. So, we are very happy to develop this desktop application as it provides all the requirements of our company.

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