INVENTORY MANAGEMENT CONTROL

by

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Computer Systems Engineering
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APPROVED BY:

[Primary Advisor/Internal Examiner] [Official Title & Department]	[External Examiner] [Official Title & Department]
[Chairman of the Department]	[Dean of Faculty]

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ABSTRACT

This is a web-based application. An Inventory Management Control that is aimed to manage the process of any manufacturing industry. There are many inventory systems, as we know, much of the business is only growing due to inventory management. The uniqueness of this project is that this Inventory Management Control uses the formulae that makes an inventory more manageable, accurate and easy to use. It can be used by large as well as small companies. This Inventory Management Control System is used to store the details of the products, maintenance of the stock, and it updates the inventory based on the sales details. It also generates sales reports weekly or daily as needed. This is an automated system that helps to minimize the errors while recording the stock.

The Inventory Management Control will help a certain business or shop to manage their stock or inventory online. This project allows the business management to easily store, record, monitor their product stocks. It was developed in Python using the Django Framework. It has a simple and pleasant user interface using Bootstrap version 5. The project also has user-friendly features and functionalities.

ACKNOWLEDGMENTS

With the blessings of Almighty Allah and prayers of our parents we have made this attempt to achieve the goal that was set for us to complete the BS degree.Without the guidance, patience, and assistance of our supervisor, Engr. Bushra Samreen the project would not have been possible. Although the project was complex and complicated, her kind and encouraging nature helped us to achieve our goal. We owe our deepest gratitude to Kiyani&Co. for providing us with the required data. We are also thankful to Muhammad Bux Alvi for guiding us. Finally, we extend our gratitude and blessings to everyone who assisted us in any way during the completion of our project.

STATEMENT OF ORIGINALITY

It is stated that the research work presented in this thesis consists of our own ideas and research work. The contributions and ideas from others have been duly acknowledged and cited in the dissertation. This complete thesis is written by us.

[Mubashra Munir][Asif Fiaz]

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NOMENCLATURE

Symbol	Description
IMS	Inventory Management System
MVC	Model View Controller
WEB	World Wide Web
B/S	Browser Server Architecture
LIMS	Laboratory Information Management System
CMD	Command Prompt

1. INTRODUCTION

1.1 Overview

This thesis focuses on Inventory Management Control, which means managing company's data by keeping a record of each product. This is a web-based application that helps a certain business or shop to manage their stock or inventory online. This project allows the business management to easily store, record, monitor their product stocks. It was developed in Python using the Django Framework. It has a simple and pleasant user interface using Bootstrap version 5. The project also has user-friendly features and functionalities.

1.2 Motivation

Our motivation behind this project is to develop an inventory that is accurate and easy to use in spite of all the inventories that have been made before. Even larger companies face difficulties in managing their data. It has been made by keeping in mind the issues and problems faced by companies while operating an inventory. It will be a step in the right direction for developing future technology for our manufacturing companies especially in Pakistan.

1.3 Organization of Thesis

The first chapter is titled "Introduction," and it gives a summary of the thesis and discusses the rationale. The second chapter, "Literature Survey," discusses the prior research that has been done in this field. The problem statement, the project's scope, and the "Proposed Solution," which outlines the entire system architecture, the software

organisation of the system, and the activity flow, are covered in Chapter 3. The intricacies of the software implementation are covered in detail in Chapter 4, "Implementation." The test techniques and findings are detailed in Chapter 5 of "Results and Discussions." References used in our work are supplied at the conclusion. Additionally, we have "Source Code" in Appendix A of our thesis.

2. LITERATURE SURVEY

2.1 Inventory Management Control

There are three basic components in Inventory Management Control that play an important role in the manufacturing process as shown in Figure 1.

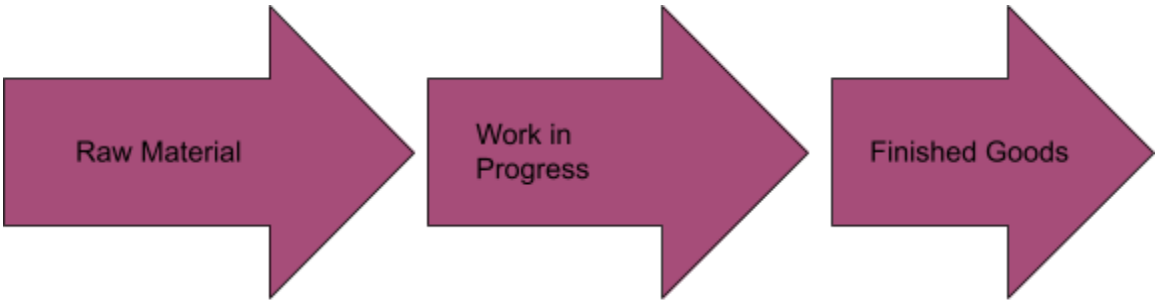

Figure 1. Manufacturing Process

- Raw Material: It is the basic material that is in its core form and it needs to go through a process to become a finished product.
- Work in Progress: It is a process through which a raw material changes to be like a proper-furnished material. Also known as semi-finished goods.
- Finished Goods: It is the proper furnished product after the whole process.

2.2 Brief History

The earliest form of inventory management dates back over 50,000 years in which people used “tally sticks” to count. Archaeologists have also discovered the use of clay tokens dating back approximately 4,000 years ago.

In 2019, Sandro Alfeno and Danang Rifai made a raw material inventory and also designed a dashboard system that could help achieve company goals. The research method used is the method of analysis of stash, software design methods, and methods of software testing[1].

By using django, Cloud computing can be used to improve Inventory Management and put an end to quite a number of issues faced in the sector. Besides stress-free updates, cloud computing providers work in the background to ensure that things go smoothly and typically are available to answer questions or support if requested[2].

In November 2019, Using the advantages of Django technology and QR code technology, and Django MVC open source framework, the special lightweight material WEB system for low-value consumables information management system was designed to realize the network of online and offline inventory information synchronization network and resource sharing[3].

In September 2017, a management system of automated high-rise warehouses and one specific design of the communication mechanism was made. The B/S architecture system based on Django can complete in/out stock, inventory taking, inventory transfer operations etc[4].

In 2020, a laboratory information management system (LIMS), software was made that makes it possible to collect, store and retrieve laboratory and sample data. To date there are no open-source options that can manage the entire analytical flow of a genetic laboratory. appMAGI seeks to include all the management aspects of a clinical diagnostic laboratory[5].

A Web Based Inventory Management System In LotteMart Solo baru has been made in the year 2019, In this project, the researcher used the newest type of store, the retail one, because that the article of goods that is not as much as the wholesale, so it is possible to sustain a prototype model of the wanted system. In this case, the researcher found that there is a possible development towards the non-embedded system, especially in the inventory management. The researcher is concerned about the inventory management post-procedure where the employee needs to find the missing goods that came from the difference between embedded system data and the result of the manual checked routine[6].

3. PROBLEM STATEMENT AND PROPOSED SOLUTION

Our purpose is to design an automated system which manages all the stock of a warehouse and an easy to use inventory for different industries. Our focus group is manufacturing industries whether small or large.

Block diagram of the system is shown in Figure 2 which depicts that the system will input the stock data and then process it and record the in stock and out of stock products.

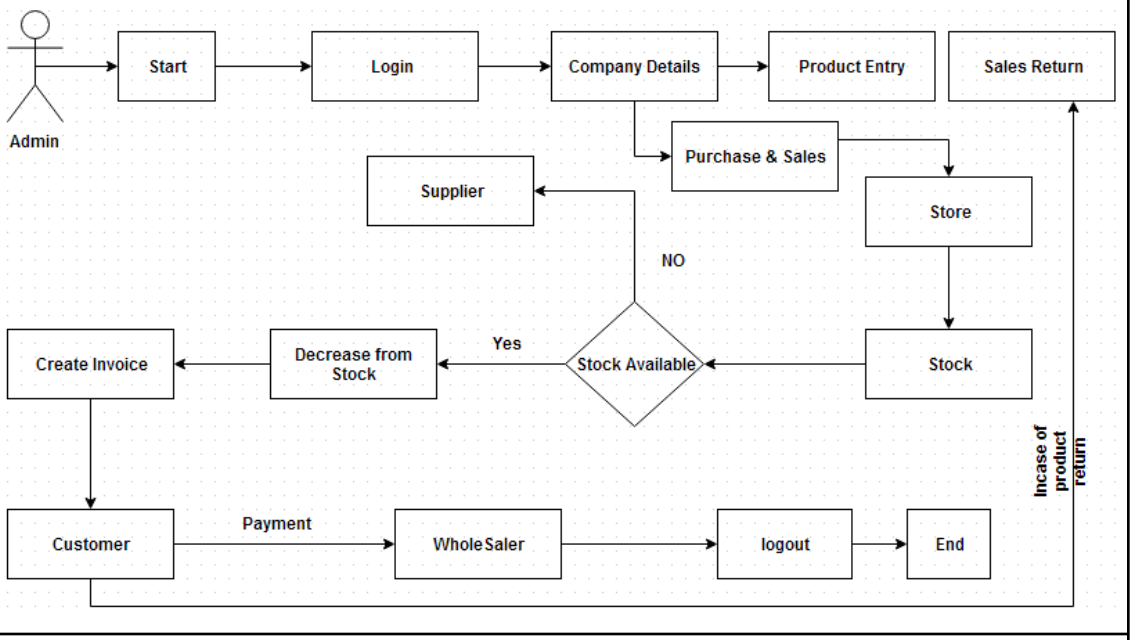

Figure 2. IMS flow diagram

3.1 Scope of Project in Terms of Applications

- Manage Inventory: An inventory manages the products of the company by providing proper details to the purchasing department.
- Less Storage: Less storage is required when accurate information is provided by the management. Extra unnecessary production has been stopped.
- Improve Productivity: People are aware of the quantity of products that are needed. No extra products are made which helps in the improvement of machines and manpower
- Increase Profits: Proper information about stocks helps increasing profit when unnecessary buying of products is reduced.

3.2 Scope of Project in Terms of Market Need and Usage

- Determination of economic order
- Formulation of Policy
- Determination of Lead Time
- Effectiveness Towards running a store
- Organization Structure

3.3 Assumptions and Dependencies

- Python
- Django
- HTML/CSS/JavaScript/jQuery
- Ajax
- Bootstrap v5
- Material Design Bootstrap Template
- Font-Awesome

3.4 General Constraints

- Python (version 3.9.1)
- Django (version 4.0.3)
- PIP (for python modules installation)

3.5 System Architecture

Figure 3 shows Project Architecture Diagram. This diagram shows the flow of the system which is briefly described here.

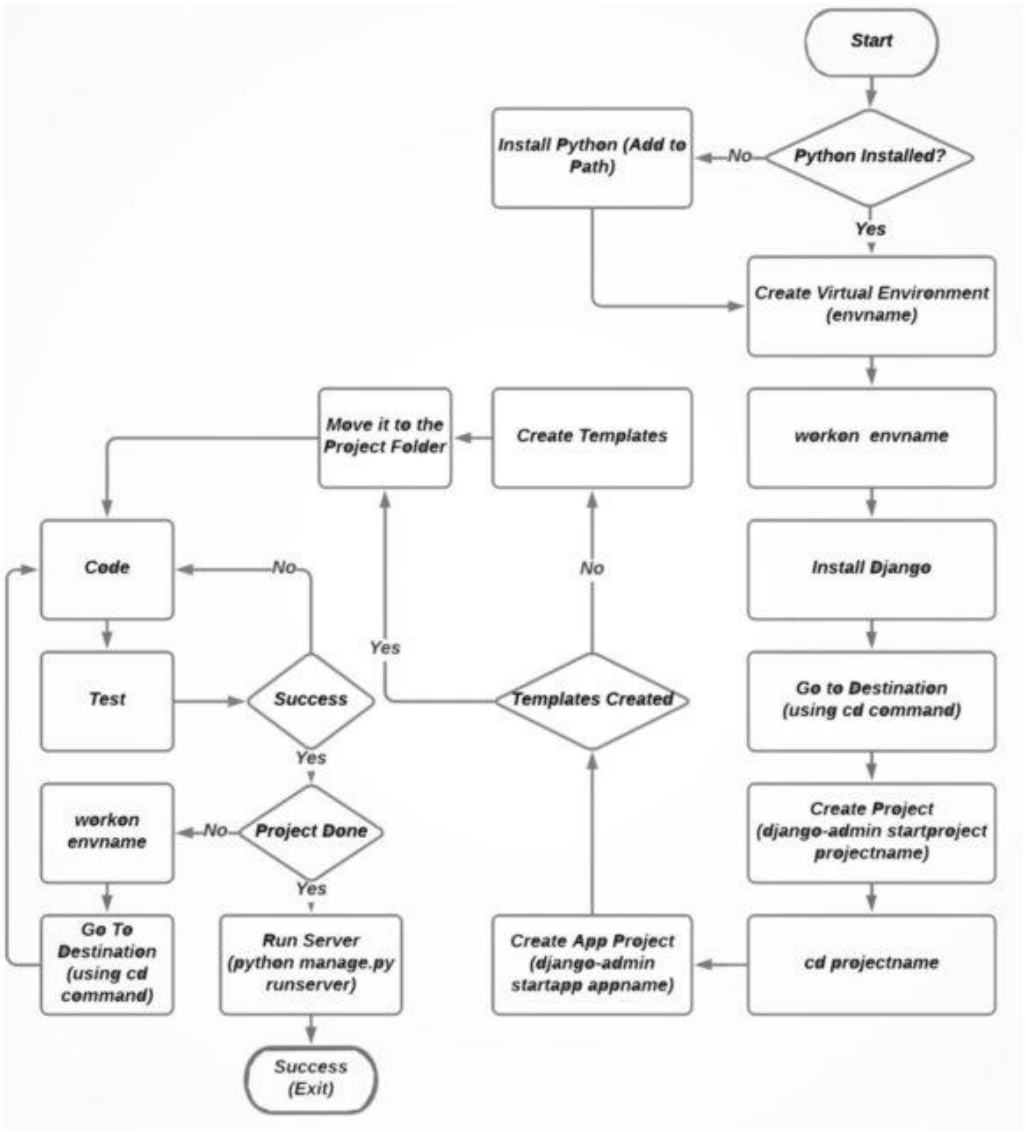

Figure 3. Project Architecture Diagram

It is a web-based application.The system can be accessed by 2 users which are the admin and staff. The admin has the privilege to access Django's admin panel/site and manage the list of users. The staff users are only allowed to manage the site. In this project, the users can store or list the product categories and list the product. The users can add stocks to each product and the system automatically calculates the available stocks per product. The application also contains a sale transaction feature where the user will encode all the transactions of the customers. Each item in a sale transaction will be deducted from the available stock automatically. The user can also track the history of the product stocks. The architecture has the following features:

Login and Registration Page

Home/Dashboard Page

- ➢ Displays the summary

Categories

- ➢ Add New Category
- ➢ List All Categories
- ➢ Update Category Details
- ➢ Delete Category Details

Product

- ➢ Add New Product
- ➢ List All Products
- ➢ Update Product Details
- ➢ Delete Product Details

Inventory

- ➢ List All Products
- ➢ View Products Stock History
- ➢ Add New Product Stock
- ➢ Update Product Stock
- ➢ Delete Product Stock

Sales Transaction

Invoices

- ➢ List All Invoices
- ➢ Delete Invoice Details

Profile

- ➢ Update Profile Details
- ➢ Update Account Password

Logout

4. PROJECT IMPLEMENTATION

The Django Inventory Management System Project was built using Python, Django, and the SQLITE3 database. This project is perfect for assessing your company's performance, and it can be used for any type of business that sells goods rather than services. This method creates a complete list of all of the administrator's reviews.

4.1 Development Tools & Technology Used

- **Django Framework:** Django is a free and open-source, Python-based web framework that follows the model template views architectural pattern. It encourages rapid development and clean, pragmatic design.
- **SQLite3:** It is used for the database.
- **Front-end development:** It focuses on the visual elements. We are using HTML, CSS and JavaScript as front-end languages.
- **Back-end development:** Python is used as a back-end programming language. The Python version recommended is 3.10.

4.2 Project Details

The project information and technology used in this system are listed in the table below. SQLite3 is used for the database, and Python Django is used for the programming language. The Python version recommended is 3.10 and the author or developer of this project is M&A and the project name of this system is inventory management control.

Project Name:	Inventory Management Control
Language/s Used:	Python Django
Python Version:	3.10
Database:	SQLITE3
Type:	Web-Based Application
Developer:	M&A

Table 1 Project Details

4.3 GUI for Application

Following are the screenshot for GUI of the System.

Login Page: Where user will enter Username and Password. Users can also login through facebook and twitter.

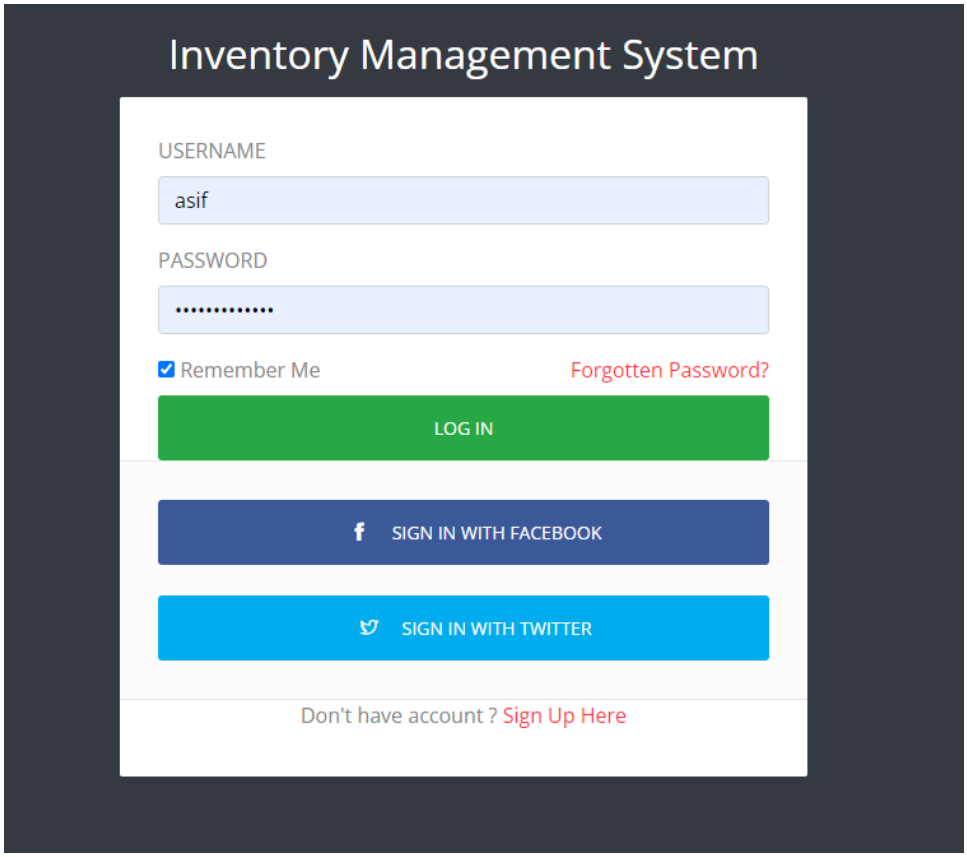

Figure 4. Login Page

Dashboard: Where users can select the options Supplier, Buyer, Season, Drop, Product, Order and Delivery. Users can manage the data accordingly.

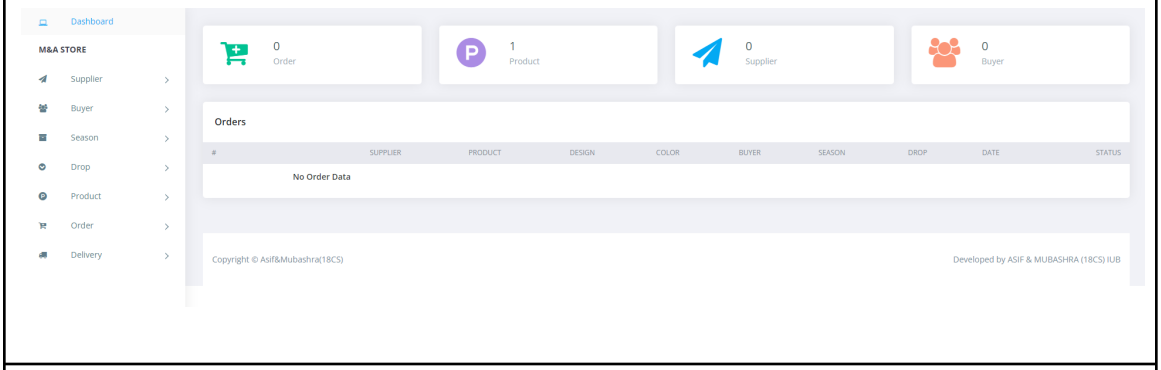

Figure 5. Dashboard

Supplier: Supplier Details are written.

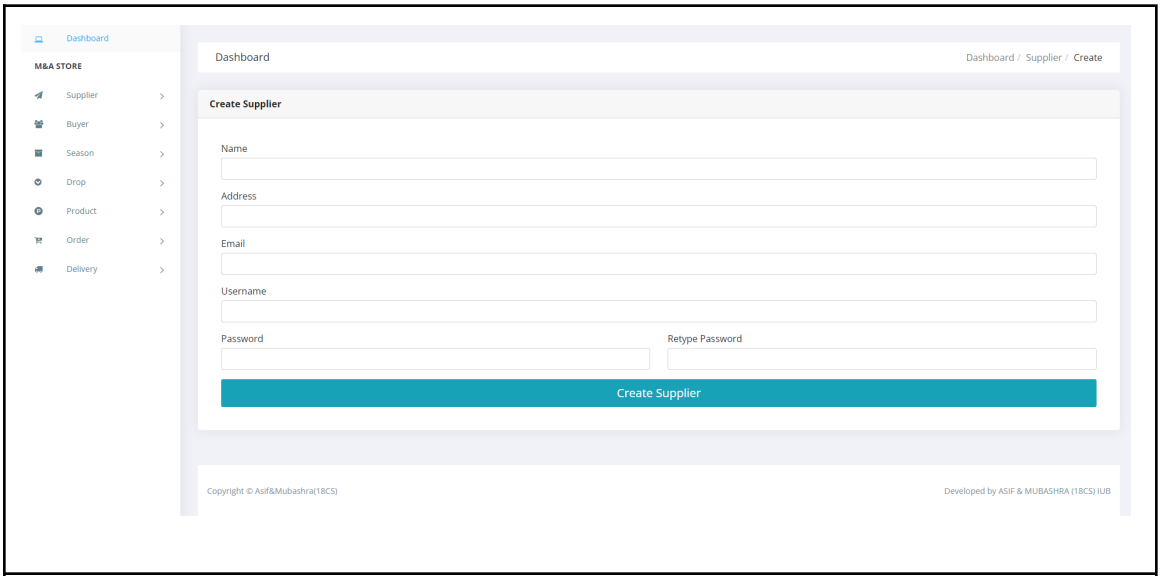

Figure 6. Supplier

Buyer: Buyer Details can be added.

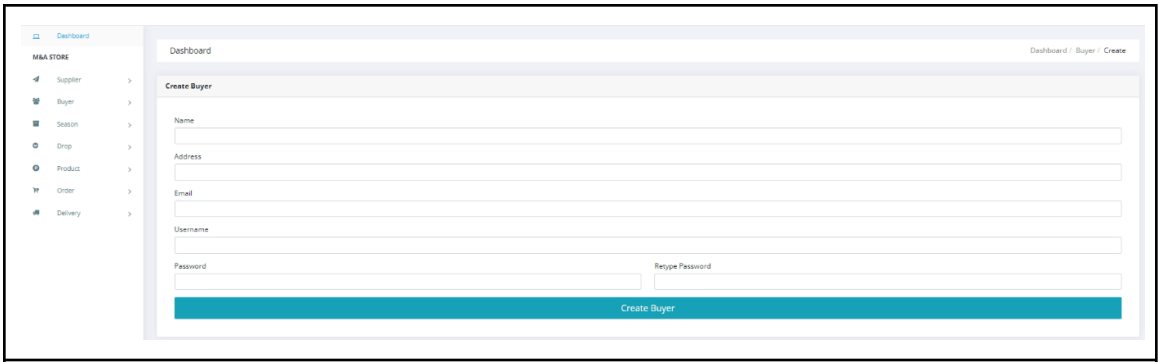

Figure 7. Buyer

Create Season: Season Name and Description can be added.

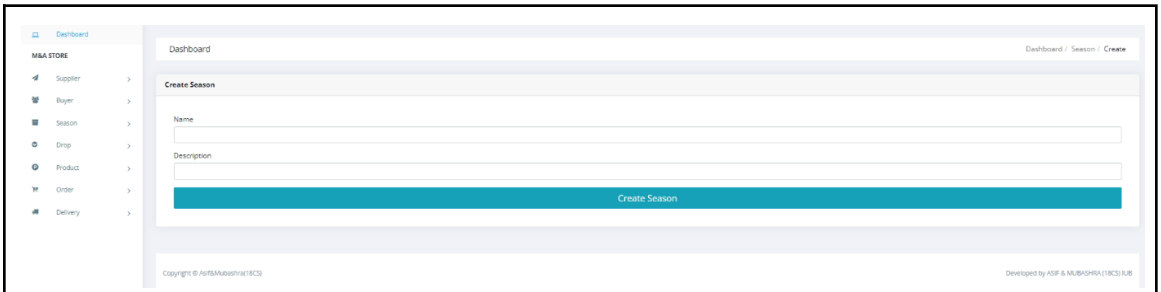

Figure 8. Season

Create Drop: Drop can be added or viewed.

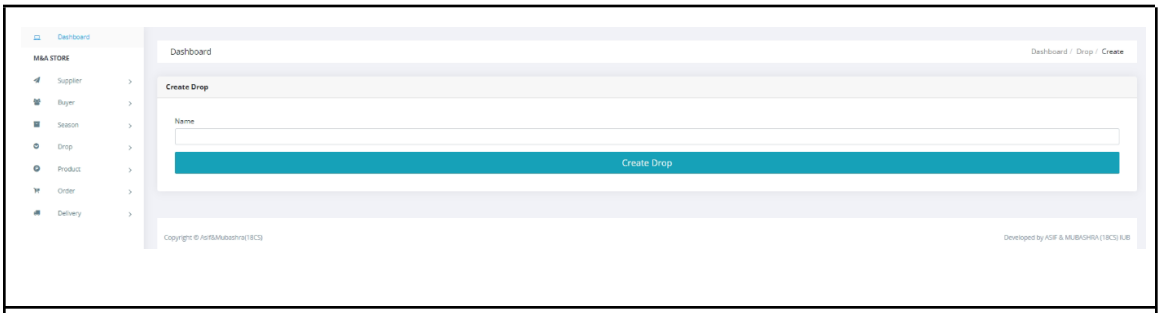

Figure 9. Drop

Create Product: Products can be organized. We can add or subtract a product according to the quantity. Products can be sorted and named.

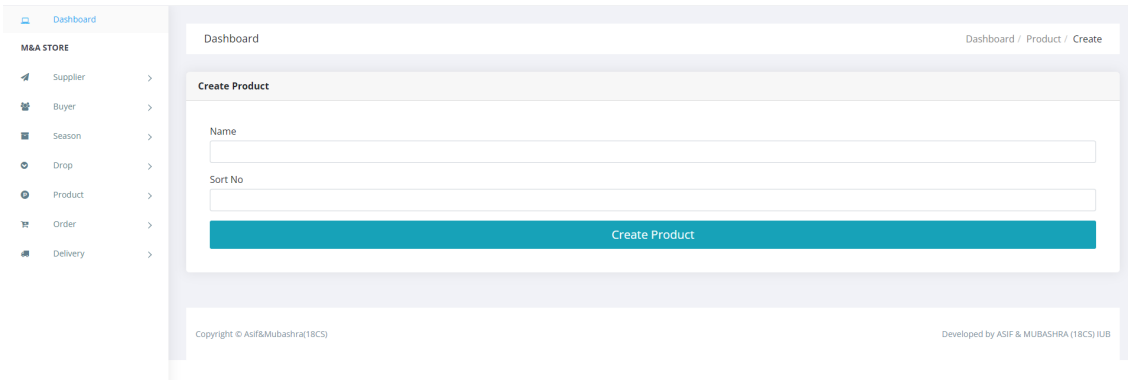

Figure 10. Product

Create Order: Order can be placed. It can also be added or viewed

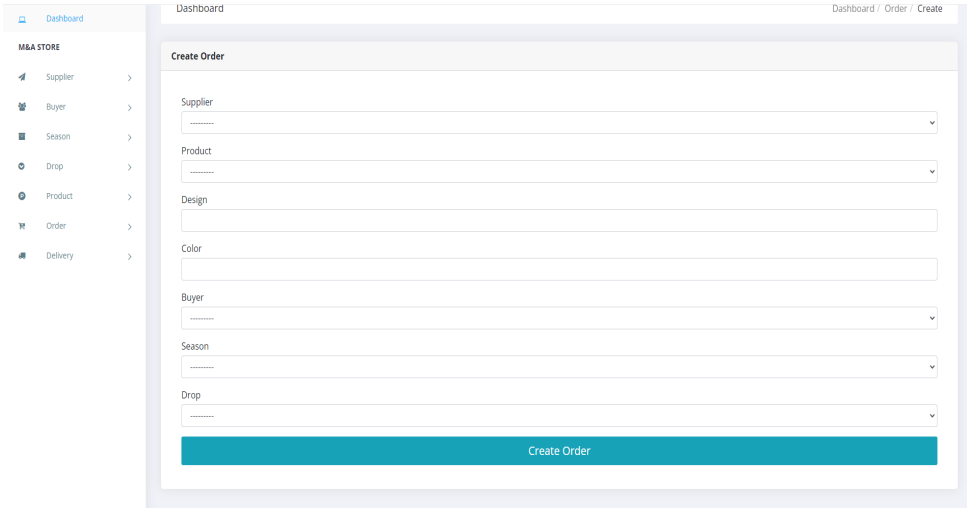

Figure 11. Order

Delivery: Delivery details can be added or viewed.

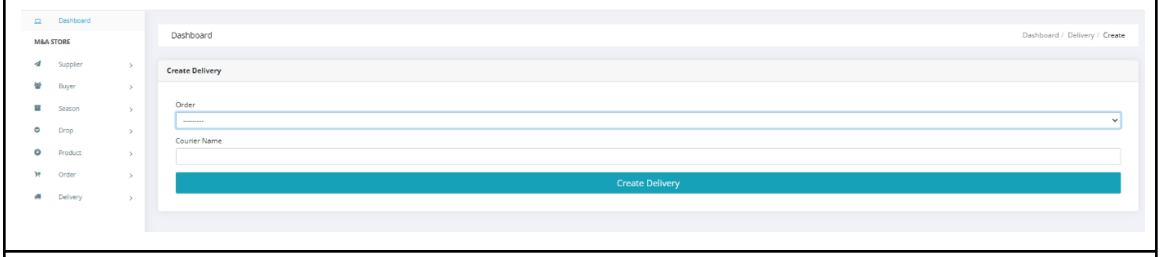

Figure 12. Delivery

5. RESULTS AND DISCUSSIONS

This project is a successful Inventory Management Control System that can help large or small warehouses to manage their stock data. The scope is narrow. The system can add or subtract Suppliers, Products, Orders accordingly. Season , Drop and Delivery can also be managed. Django Framework provides an easy to use inventory with full clarifications.

5.1 Project Limitation

One can expect a limitation to anything. This project has its limitations. The aims and objectives that were thought by the authors are not yet fully implemented. Some things went missing during the whole project making process.

Some of them are:

- This Inventory Management Control System may not be helpful in industries where there are different levels of warehouses.
- It can only generate simple reports. One may not expect complicated reports out of it.
- Only a single admin can operate it. It's not good for multiple users.

5.2 Conclusion

We successfully made an Inventory Management Control System that can manage the inventories of different businesses. It has basic elements that are needed in stock management which are generally used for an organization. Our team is successful in making the application where we can update, insert and delete the item as per the

requirement. Though it has some limitations, our team strongly believes that the implementation of this system will surely benefit the organization.

5.3 Objectives Obtained

Good lessons are learnt by making innovations in already existing projects. Some of the objectives learned by this project are:

- Basically we learnt to work in a team.
- Understood the significance of the Django Framework.
- Detail study about web engineering, its components and ways to implement them
- Learned to work under pressure and to be patient.
- Came to know how to manage the database under SQLITE3 .

5.4 Future Enhancements

We came to know about enhancement techniques since this project has been made with little knowledge about IMS. Some of the scope we can increase for the betterment and effectiveness are listed below:

- Interactive graphical user interface design.
- Manage Stock as in warehouse
- Use of SQLITE3 as its database.
- Online banking can be added.
- Making the system easy to use and flexible in any type.
- Products could be return by sales and purchase system
- Lost and breakage

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APPENDICES

A: How to Run

Download/Install the following

- Python (v3.9.1)
- Django (v4.0.3)
- PIP (for python modules installation)

Setup/Installation

1. **Download** and **Extract** the provided source code zip file.
2. The static files upload separately because the folder exceeds the maximum file size of the website. **Extract the static files** at the root path of the downloaded source code folder.
3. **Open** your **Command Prompt** window. (make sure to add "python" and "pip" in your environment variables)
4. **Change** the **working directory** to the extracted source code folder. i.e. cd C:\Users\Personal\Desktop\django_ims
5. **Run** the following **commands**:

- pip install Django
- pip install -r requirements.txt
- python manage.py migrate

- python manage.py runserver

6. **Open** a **web browser** and **browse** http://localhost:8000/ or http://127.0.0.1:8000/

Access Information

SuperUser

Username: Asif

Password: ****

VITA

Mubashra Munir born in Bahawalpur, Pakistan, on February 4, 2001. I attended elementary school and did my matriculation, in 2016, from Army Public School & College Bahawalpur. Then I went to Moon Girls College for 2 years where I did my Fsc. My Bachelor's degree started in 2018 in The Islamia University of Bahawalpur. My graduation is due in 2022. After that I will receive a Bachelor's Degree in Computer System Engineering.

Asif Fiaz born in Bahawalpur, Pakistan, on May 5, 1998. Attended school