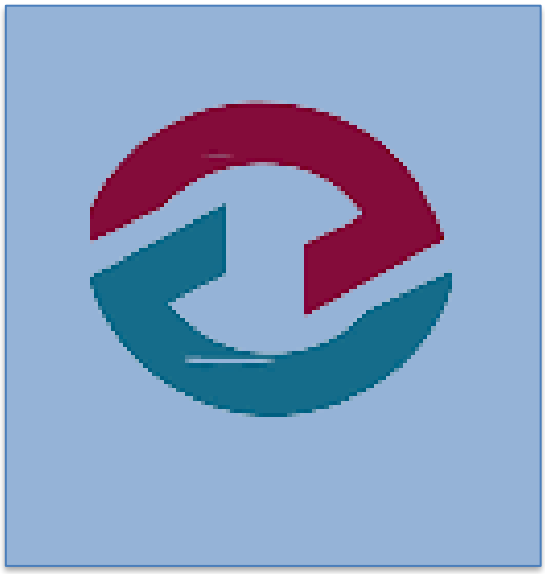

ZM - Corporation

Production Management System

Team Members:
- Syed Muneeb Hoda
- Usman Ghani Bawany
- Naseer Ahmed Aziz

Naveen Zehra Quzailbish

DECLARATION

We hereby declare that this software, neither whole nor as a part has been copied out from any source. It is further declared that we have developed this software and accompanied report entirely on the basis of our personal efforts. If any part of this project is proved to be copied out from any source or found to be reproduction of some other, we will stand by the consequences. No Portion of the work presented has been submitted of any application for any other degree or qualification of this or any other university or institute of learning.

Syed Muneeb Hoda	Usman Ghani Bawany	Naseer Ahmed Aziz

Certificate of Approval

This is to certify that

Syed Muneeb Hoda, Usman Ghani and Naseer Ahmed from IBA has been approved to design and develop, a management system for ZM – Corporation.

Access to database has been given. Any unlawful use of the database will lead to strict actions against the party.

For and on behalf of

ZM – Corporation

CEO of ZM Corporation

Abdul Ghani Bawany

CERTIFICATE OF APPROVAL

It is to certify that the Software Engineering project of BS (CS) "Production Management System" was developed by **Syed Muneeb Hoda 22809, Usman Ghani 22850** and **Naseer Ahmed 22743** under the supervision of and that in their opinion; it is fully adequate, in scope and quality for the degree of "**NAVEEN QUAZILBASH ZEHRA**" and co supervisor "**Samra – TA** " Bachelor of Science in Computer Sciences.

Supervisor

Assistant Supervisor

Head of Department

(Department of Computer Science)

Acknowledgement

All praise is to Almighty Allah who bestowed upon us a minute portion of His boundless knowledge by virtue of which we were able to accomplish this challenging task.

We are greatly indebted to our project supervisor "**NAVEEN QUAZILBASH ZEHRA**" and co supervisor "**Samra – TA**". Without their personal supervision, advice and valuable guidance, completion of this project would have been doubtful. We are grateful to them for their encouragement and continual help during this work.

Syed Muneeb Hoda

Usman Ghani Bawany

Naseer Ahmed Aziz

Abstract

The purpose of the project is to streamline the production management system of an existing business, (ZM Corporation). This project proposes a technical solution to improve ZM Corporation's production management to make it easier for them to go through the information and make informed decisions based on the information provided.

Additionally, the project would assess whether the current system should be moved to a different architecture, such as a web-based system, an ERP-based system, a native desktop app, etc. At its conclusion, the project would select an architecture and show how to execute it to meet the needs of ZM Corporation. A native desktop production management tool was determined to be the best course of action during the project's discovery and analysis phase. Multiple users would be able to access the system from various locations using the web-based solution and conduct commercial operations. This system would make it simple for the corporate office to access the most recent store information and carry out system maintenance tasks.

Managers would benefit greatly from the Production management system since it would make it easier for them to identify things that need to be ordered first. As a result, managers would spend significantly less time on production management tasks and considerably more time managing the day-to-day operations of the store. The store managers could also ask for the transfer of goods from nearby retailers to meet an urgent need. As a result, the company would experience improved customer service and customer happiness, which would raise its income.

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Chapter 1: Introduction

1.1: Introduction

In the manufacturing industry, the ability to maintain constant access to information can determine whether the company would survive the competition or not. A Production Management System is needed to provide accurate information to all levels of the organization, from top management located at the corporate headquarters to the individual managers.

The current process is a very outdated system that consists of a the production report that is filled by the store manager. Then the report is given to the supervisor. Then all the reports for one specific item are arranged in a file. Each store provides the corporate headquarters with weekly reports on inventory use and ordering. As a result, the corporate office does not regularly receive up-to-date data on the inventory level in the stores. Additionally, there is no clear procedure for moving products between stores. This project seeks to examine the current production management processes and identify potential areas for improvement in order to enhance the production management process.

1.2: Aim of the project:

The primary objective of the project is to manage a production facility according to the requirements analyzed and refined through understanding and fixing loopholes in the existing business activities of ZM Corporation.

It gives us information on how to implement the various components of our web application as well as descriptions of each individual aspect that is a part of it. It outlines all the user's expected functional and non-functional requirements. The project's major goal is to give the user a responsive and intuitive experience.

The idea is to move manufacturers from the traditional way of storing data on notebooks and excel files to a more convenient and efficient way to enter and view their data. So that they can analyze their business effectively and focus on making the right decisions to grow their business rather than understanding the data.

This software's primary goal is to eliminate double data entry and to ensure production transparency so that the user is fully aware of the production reports for each job. In order to save time and money, the software should also be simple to implement and maintain.

1.3: Methodology:

The project development started after conducting interviews at ZM Corporation to identify their pain points. After this, we decided to use the Waterfall model for our proposed system development Life Cycle (SDLC) because the proponents really believe that using this model.

- Node-JS for Backend
- IDE – Net Beans
- XAAMP app for connection of Backend and Frontend
- Frontend on GUI
- Database Connection on MySQL

1.4 Significance of The Work:

The systems used in most businesses are outdated and time-consuming to understand and transfer. Reports are being transferred from one person to another which requires a lot of back and forth between colleagues. All of this leads to bad decision-making in business causing a loss of time and money that could have been used more effectively.

Our systems will avoid the problems existing in the current system and it will be integrated into the existing system without causing any problems for the business. All the production reports that are made by the machine man will directly be entered from each department in the system so this will save traveling costs and time as well. Secondly when each department will have entered the report of their respective process then a summary will be automatically generated by the system so this will save a lot of manpower as well as unnecessary documentation and storage space. This will then be available to all company management for viewing.

1.5 Conclusion

This chapter has covered a brief description about what exactly a Production management system is, and where it can be used in the real world. The next chapter would discuss how our system is unique in solving the problem.

Chapter 2:

2.1 Introduction

We compared our software with existing systems to understand where the system can be improved and take things forward from there.

2.2 Literature Review

Our goal is to create a company management system that enables the user to view important metrics for their business in an efficient manner in order to help them focus more on developing new products rather than worrying about the performance.

The audience for our factory management system would primarily be business owners who are interested in getting their business more efficient in terms of production management and help them analyze the potential recoveries they can make to make their business more efficient and reduce wastages.

2.3 Presentation of the problem

Currently, the staff at ZM Corportation is using excel to store the data. We are providing a more convenient and efficient way to enter and view the data with the help of graphs and charts so that the user makes an informed decision to generate profits and avoid any miscalculations. Along with that our application would also be able to keep track of pending tasks, raise flags, and jobs that have been completed. In short, it would cover each and every aspect from finance to management to production to delivery.

2.4 Methodology

This product aims to ease the process of entering and storing data for

This product aims to ease the process of evaluating teachers and obtaining teacher reviews nationwide. The goal of this project is to develop an application that will enable students to quickly access all the information about a teacher, including student reviews, grading policies, and workload ratings, by simply typing the instructor's name.

We need to undertake this project to help the students by providing them one place to answer all their questions regarding a teacher. Currently a lot of time is wasted in finding a review which covers the key aspects of a teacher such as grading, learning, workload etc.

2.5 Solution to the Problem

Our goal is to provide a production management system that enables users to swiftly monitor crucial business data so they can focus more on developing new products rather than stressing about performance.
Building an aesthetically pleasing user interface and creating a simple onboarding process are the responsibilities at hand to make everything simple for users switching from a normal notebook management system.

2.5 Conclusion

Our primary challenge would be to get people from regular notebooks to digital solution which is more convenient to use and helps take better business decision. The primary reason why we took this business idea was because there isn’t a good managing solution yet to help business owners focus on the development and research rather than worrying and understanding the stats and metrics.

Chapter 3:

3.1 Introduction

In this chapter, we will discuss the algorithms, UMLS and their code snippets alongside contribution of every team member.

3.2 Team Contributions

Muneeb Hoda

Main Implementation of Database integration and Modifying the GUI and some related conditions and code skeleton as well as designing and helping in code implementation.

Usman Ghani

Implementing the code design and making the classes and pages as well as integrating the excel sheets and helping with the frontend of the application.

Naseer Ahmed Aziz

Providing the idea of our essence of the software as well as doing all the authentication work regarding login and registrations as well as making new profiles.

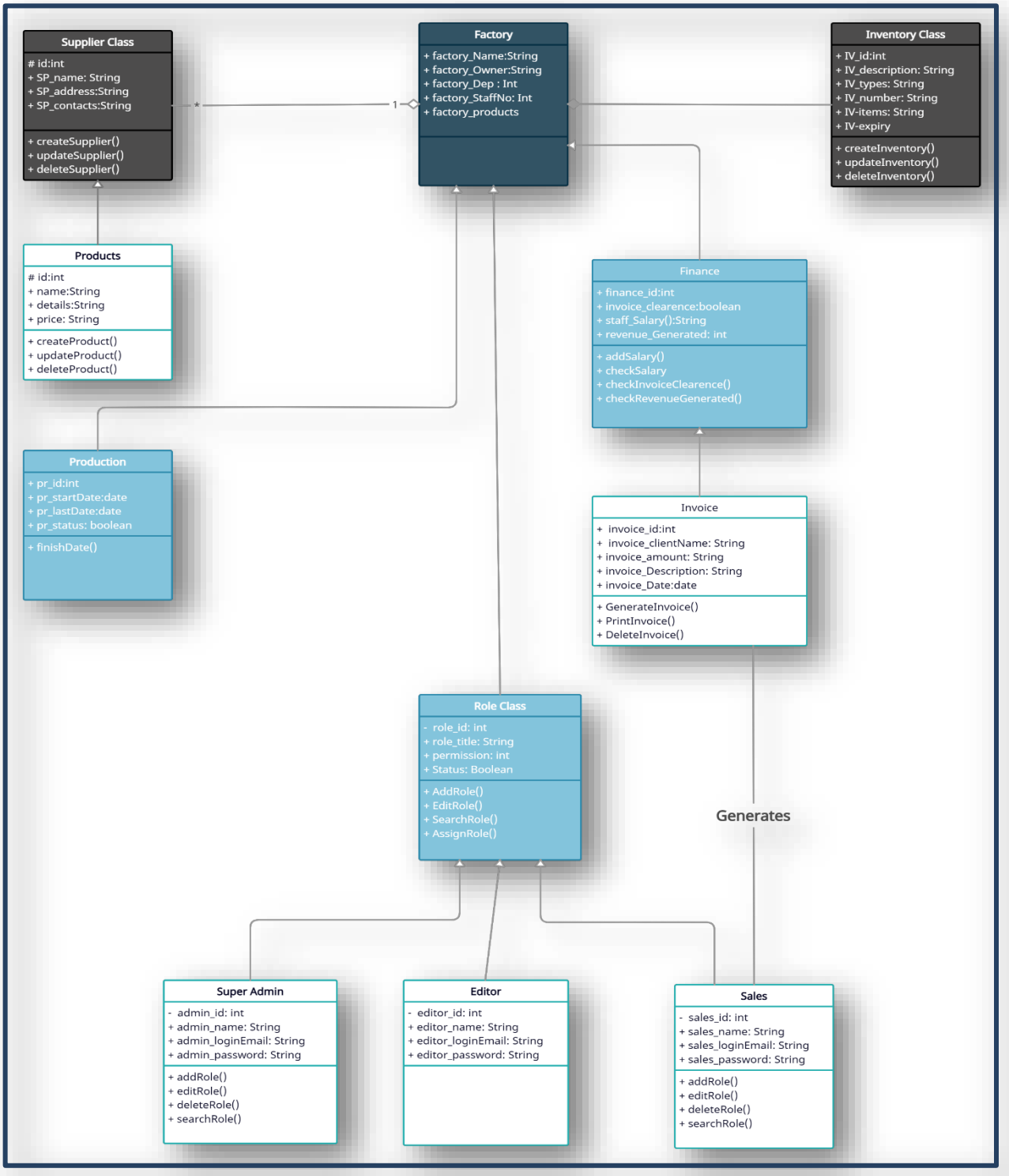
3.3Algorithm Used

- The user(admin) logins into the system given that provided with the correct credentials.
- Next if the credentials are correct then he will be directed to the dashboard of the application.
- Now he can firstly see the summary of all important data analytics on the dashboard.
- The is also a side bar which shows all the possible routes which are;
    - Inventory
    - Orders

    - Production report
    - Users
    - Suppliers
    - Products
    - New users
    - Etc.
- Now for each page there is a excel sheet linked through the database which shows the data in tabular form for each page
- Secondly there is also an import to excel feature integrated for ease of use
- Also there opens another frame when we add or make a new product.
- You can add drop and remove all data and search for data as well.
- In addition, a lot of other features were also added which made the design and execution smooth.

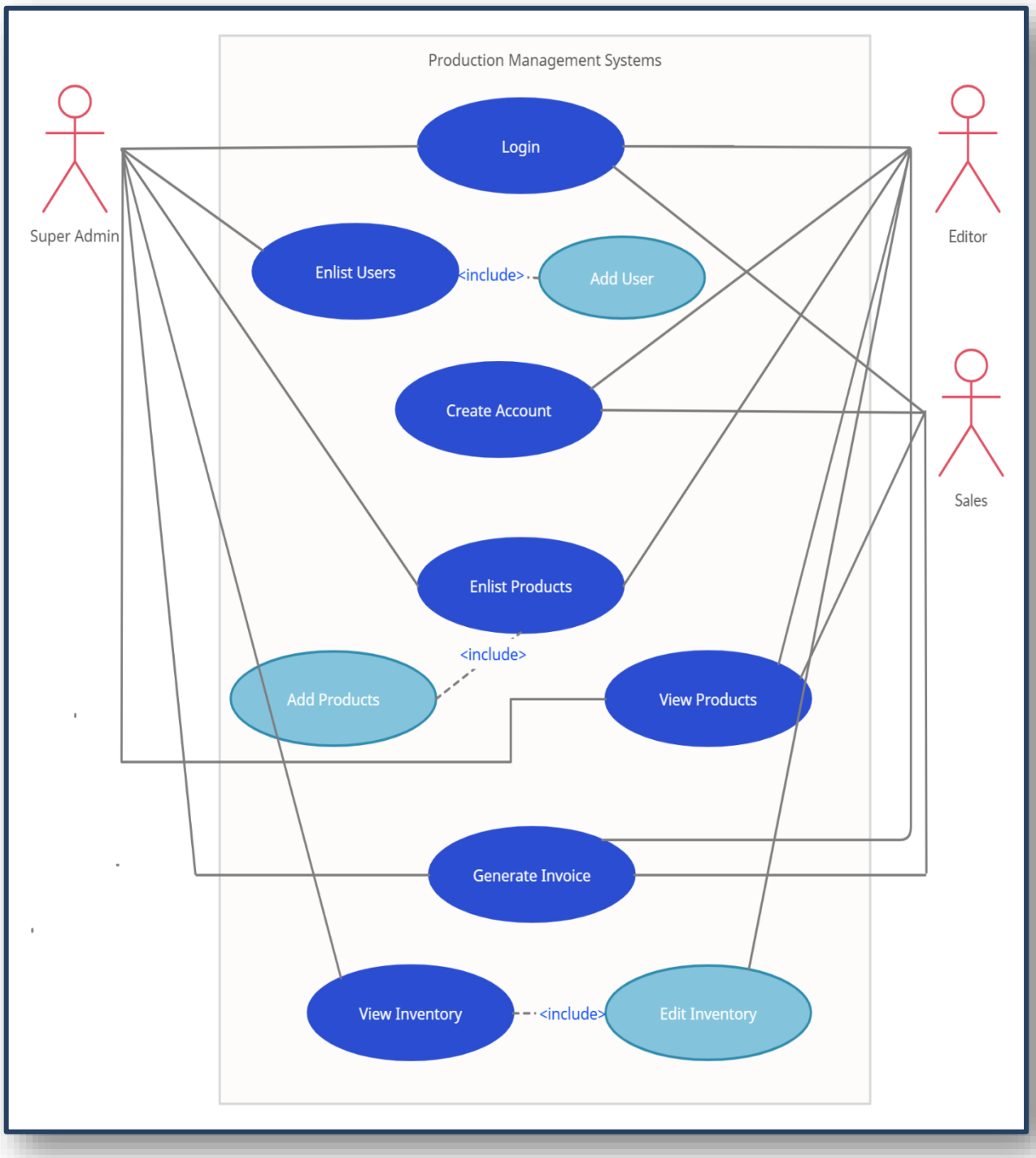
3.4 Diagrams

3.4.1: UML Diagram



3.4.1: UML Diagram

3.4.2: User Case Diagram



3.4.2: User Case Diagram

3.4.3: Sequential Diagram

Login Page:

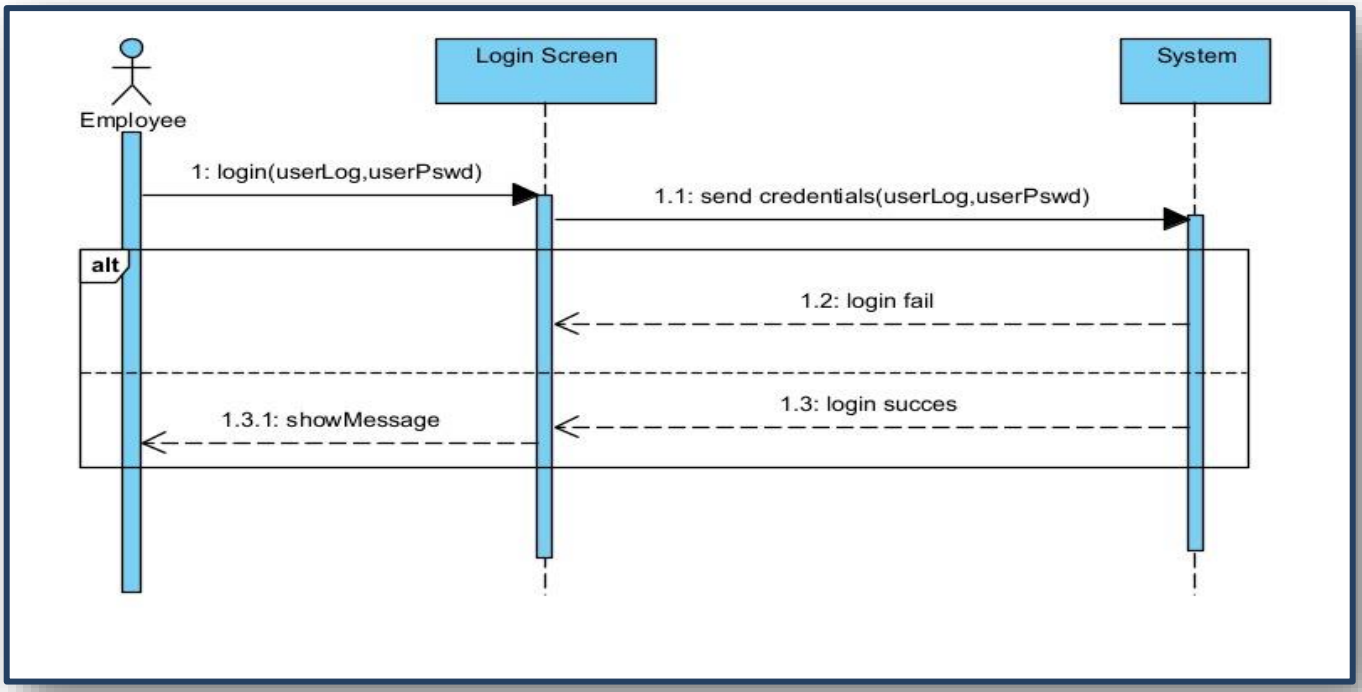


Figure 3.4.3: Login Page Sequence

3.5 Conclusion

In this chapter we collaborated collectively to build the algorithms and process to get provide the users with a good looking and functional system to ease understanding of the data.

Chapter 4:

4.1 Introduction

In this chapter we carried out testing on our application. In case when the app did not perform as desired, we troubleshooted the algorithms implemented to improve the app and avoid bugs we came across.

4.2 User Interface

4.2.1 Login Page

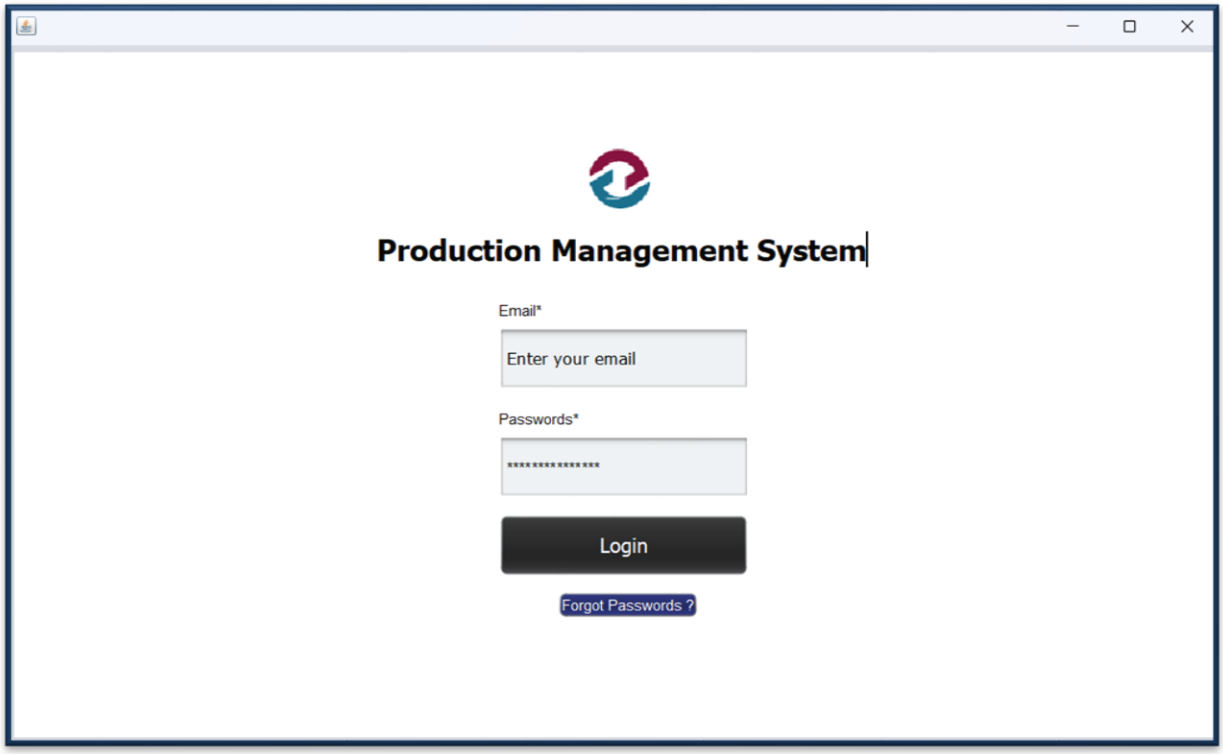


Figure 4.2.1: Login Page

- ⇨ Login Page:
  - Working
    - Database is connected behind the scenes for the login page.
    - When a user enters his/her credentials, they are checked in the database for verification
    - If the Email and Password matches correctly, a pop-up is displayed saying “Username and Password Matched”
    - If Email and Passwords were incorrect, a pop-up is displayed saying “Incorrect Username and Password”
  - How to Use It:
    - To, type in your Email and Password, first clear the text on the dialog box
    - After credentials are added, click the login button.

- A pop-up menu will open.
- On Pressing okay, the dashboard will become visible

4.2.2 Dashboard

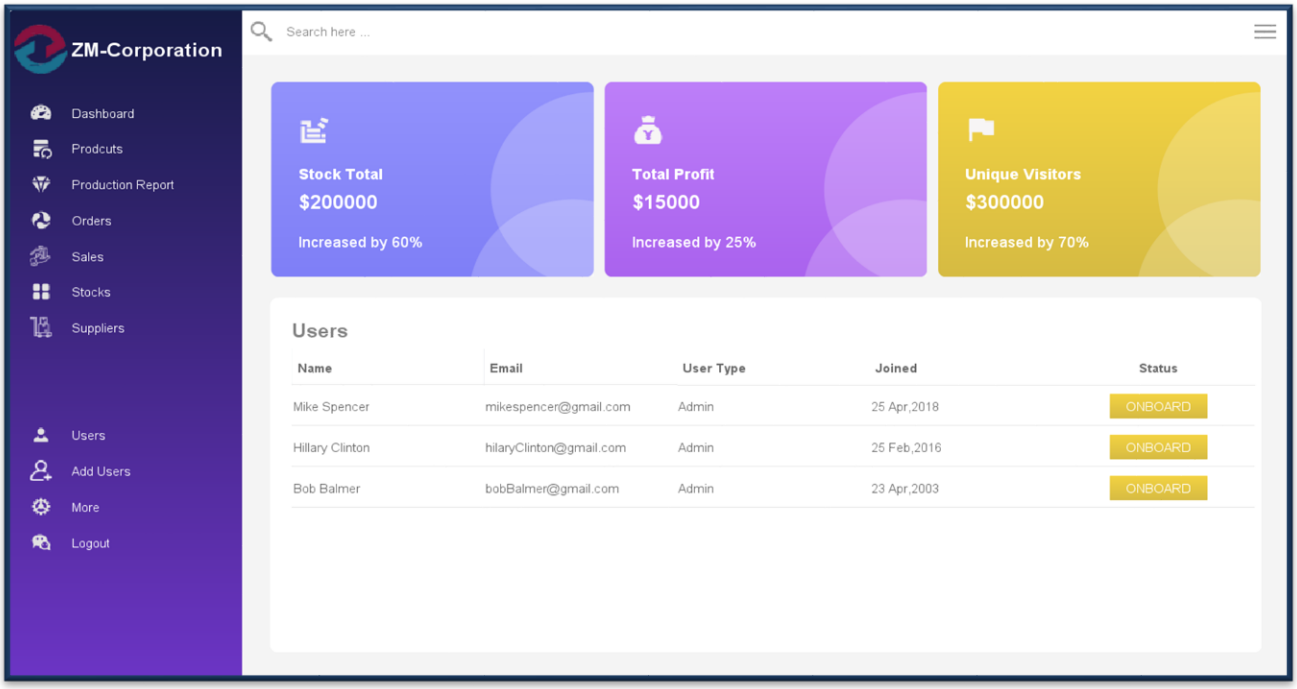


Figure 4.2.2: Dashboard

⇨ Dashboard:

- Working
  - Clicking on any side menu option, will redirect you to it's page.
  - Clicking on add user, will direct to a new page, asking to enter information to create a new user
  - Clicking on logout, will close the dashboard and will move you out of the system and back to the login page
  - **NOTE:** Option More, is right not in this version.
- How To Use It:
  - Different Tabs could be accessed by just clicking on the icon with the cursor of the mouse.
  - Click on the search bar to type, what you want to search

4.2.3 Products

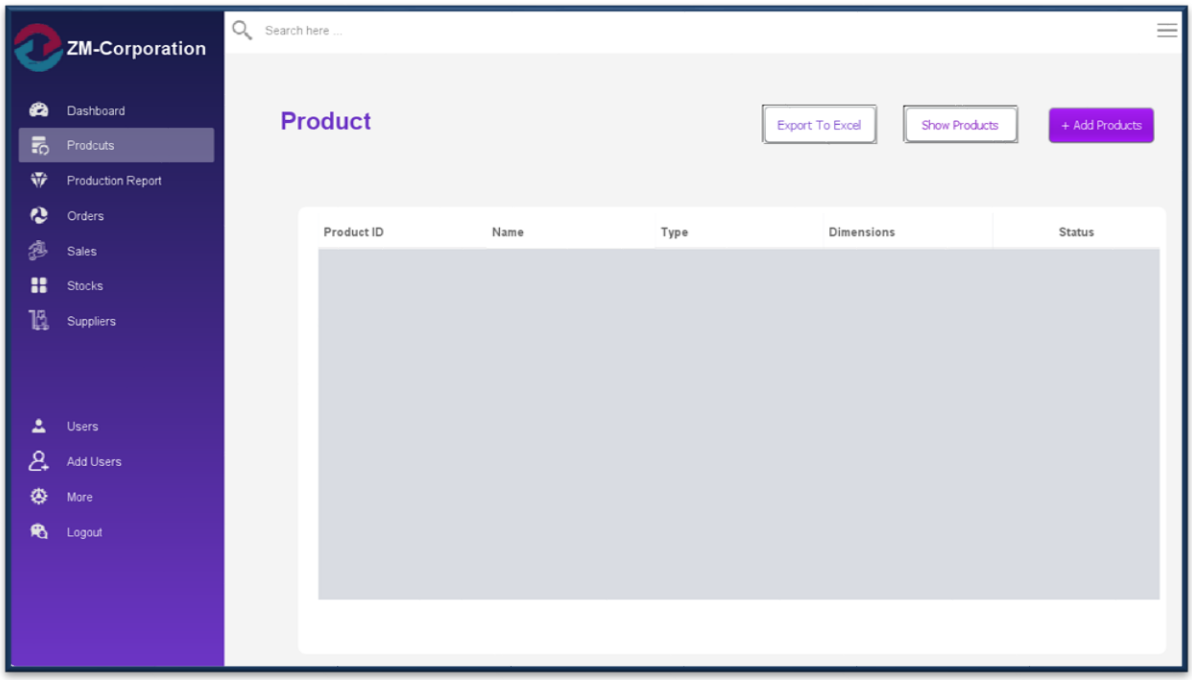


Figure 4.2.3: Products Table

- ⇨ Products
  - Working
    - Clicking on any side menu, option will redirect you to that page.
    - Pressing, of Add Product option, will open a new window asking to enter product details
    - Pressing “Show Database”, executes a “SELECT * FROM *database”* query. All the data is then show
    - Pressing, “Export To Excel”, executes a “SELECT” query first and then each and every row in the database is printed using a loop in excel file.

  - How To Use It:
    - Click on the “Add Product” button, to add a product first before pressing the “Show Product” option
    - After adding data, Press “Show Product” button to see that entry in the table
    - Clicking “Export to Excel”, will transfer all the table data to an excel file.

4.2.4 Add Products

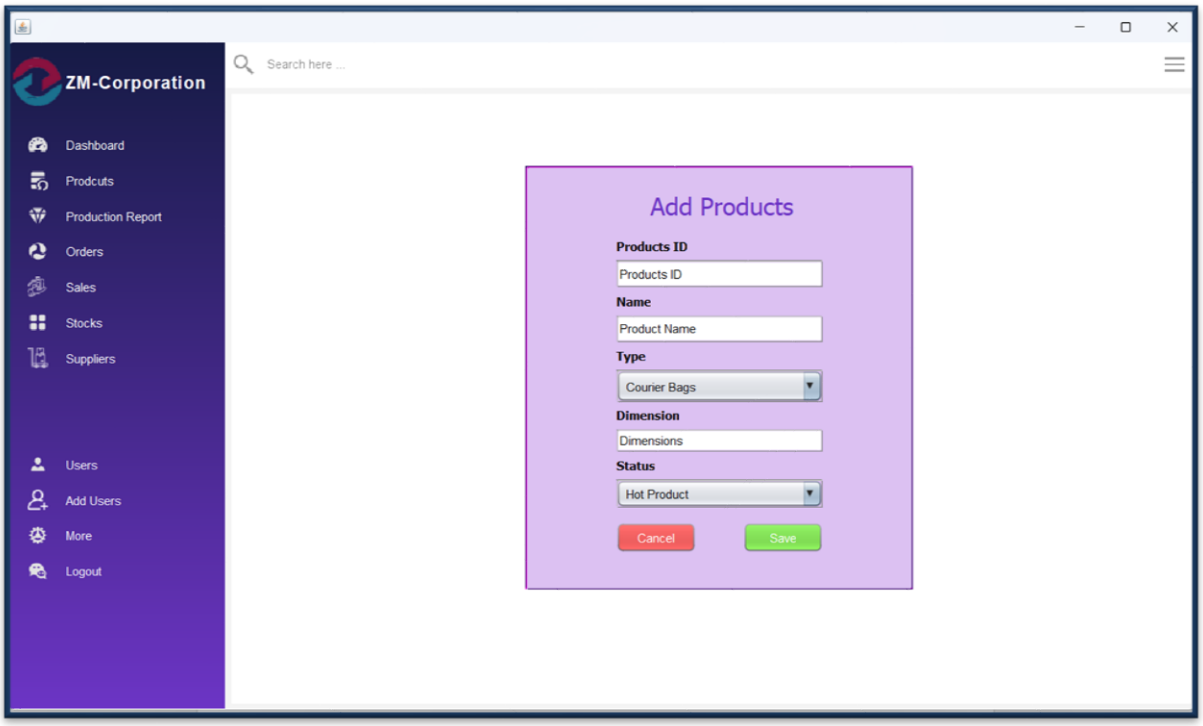


Figure 4.2.4: Add Products

⇨ Add Products

- Working
  - Once the data is entered, and “Save” button is pressed.
  - All the entries that are made in the field box are read.
  - They are passed to a function which then access the data base and executes an “INSERT” query to insert the data in the table
  - Once data is entered successfully, a confirmation dialog box is show

- How To Use It:
  - Leave no field empty, as that would generate an error.
  - Use the arrow besides the combo button to view more options and select
  - Pressing “Cancel” or “Back – Arrow” Button will re-direct back to Dashboard

4.2.4 Orders

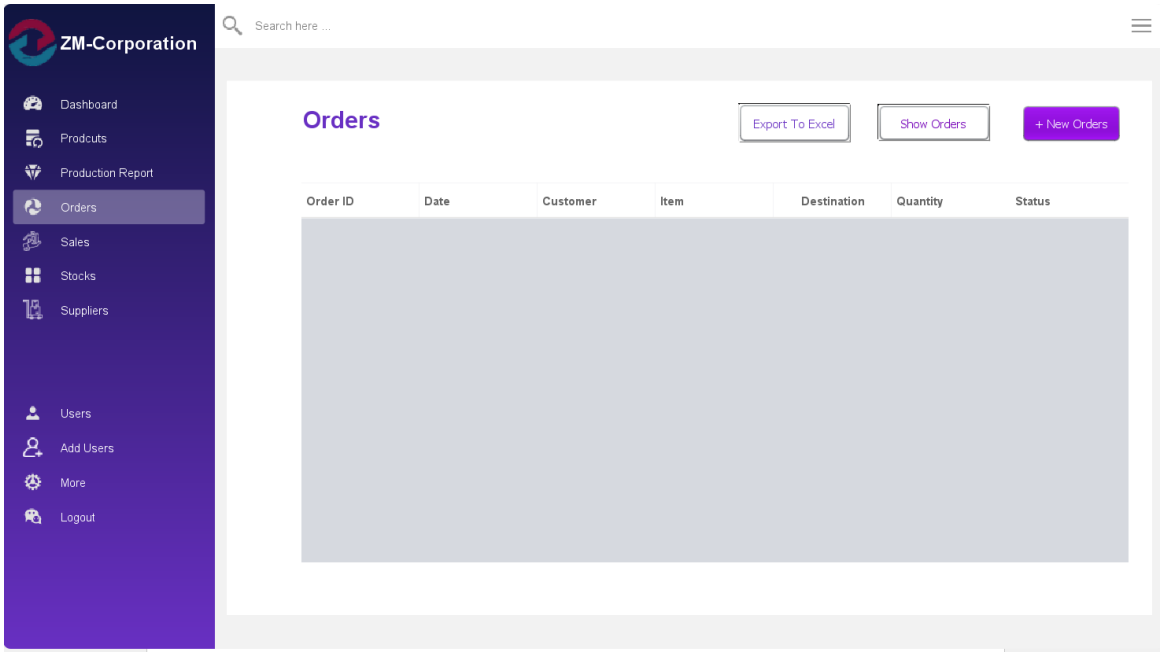


Figure 4.2.4: Orders

- ⇨ Orders
  - Working
    - Clicking on any side menu, option will redirect you to that page.
    - Pressing, of New Order option, will open a new window asking to enter product details
    - Pressing “Show Order”, executes a “SELECT * FROM *database”* query. All the data is then show
    - Pressing, “Export to Excel”, executes a “SELECT” query first and then each and every row in the database is printed using a loop in excel file.

  - How To Use It:
    - Click on the “New Order” button, to create order first before pressing the “Show Order” option
    - After adding data, Press “Show Order” button to see that entry in the table
    - Clicking “Export to Excel”, will transfer all the table data to an excel file.

4.2.5 Add Orders

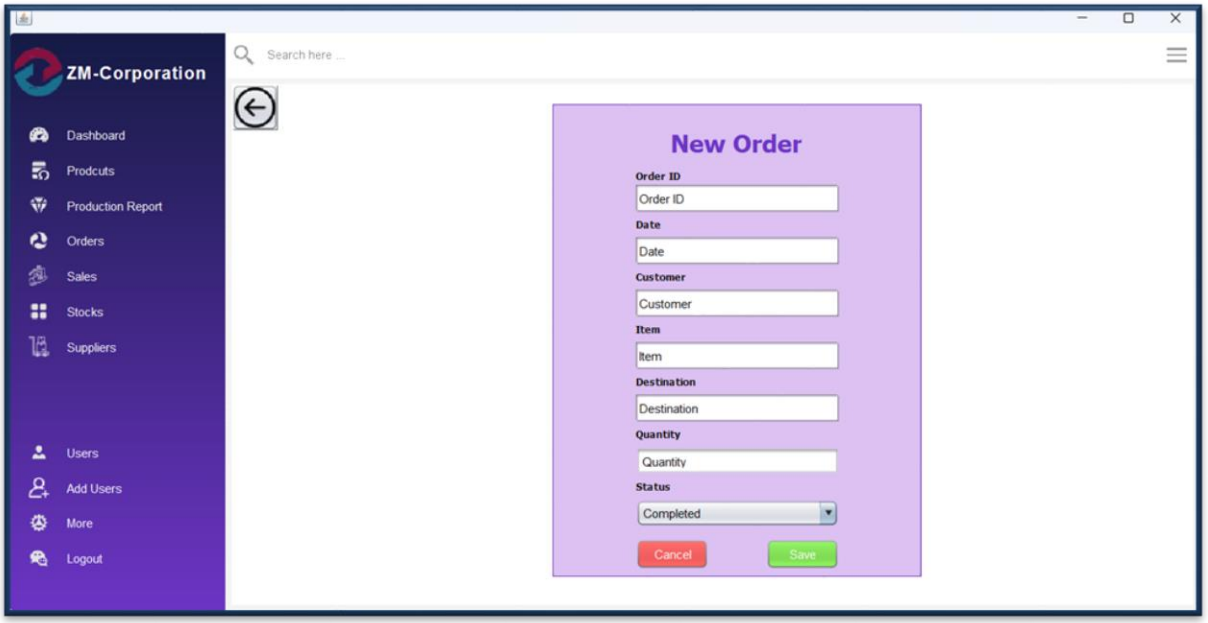


Figure 4.2.5

⇨ Add Orders

- Working
  - Once the data is entered, and “Save” button is pressed.
  - All the entries that are made in the field box are read.
  - They are passed to a function which then access the data base and executes an “INSERT” query to insert the data in the table
  - Once data is entered successfully, a confirmation dialog box is show

- How To Use It:
  - Leave no field empty, as that would generate an error.
  - Use the arrow besides the combo button to view more options and select to fill the table.
  - Quantity should be of numeric type, otherwise an error would be thrown
  - Pressing “Cancel” or “Back – Arrow” Button will re-direct back to Dashboard

4.2.6 Stocks

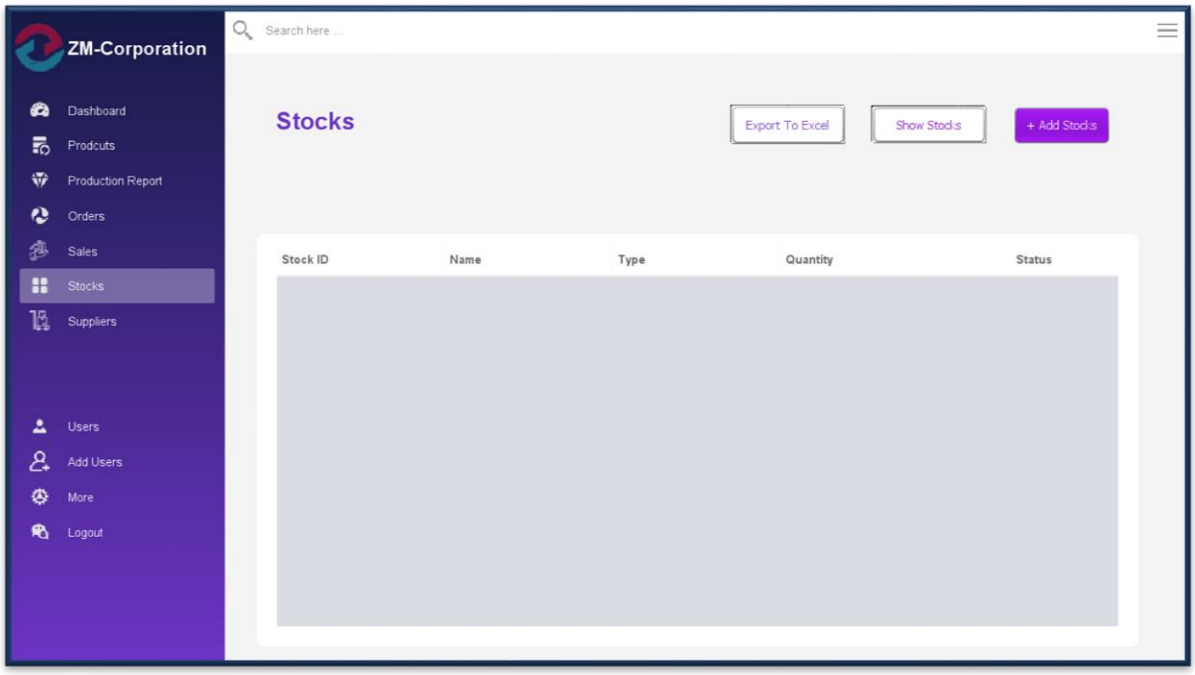


Figure 4.2.6: Stocks

⇨ Stocks

- Working
  - Clicking on any side menu, option will redirect you to that page.
  - Pressing, of Add stock option, will open a new window asking to enter stocks details
  - Pressing “Show Stocks”, executes a “SELECT * FROM *database”* query. All the data is then show
  - Pressing, “Export to Excel”, executes a “SELECT” query first and then each and every row in the database is printed using a loop in excel file.

- How To Use It:
  - Click on the “Add Stock” button, to create order first before pressing the “Show Stocks” option
  - After adding data, Press “Show Stocks” button to see that entry in the table
  - Clicking “Export to Excel”, will transfer all the table data to an excel file.

4.2.7 Add Stocks

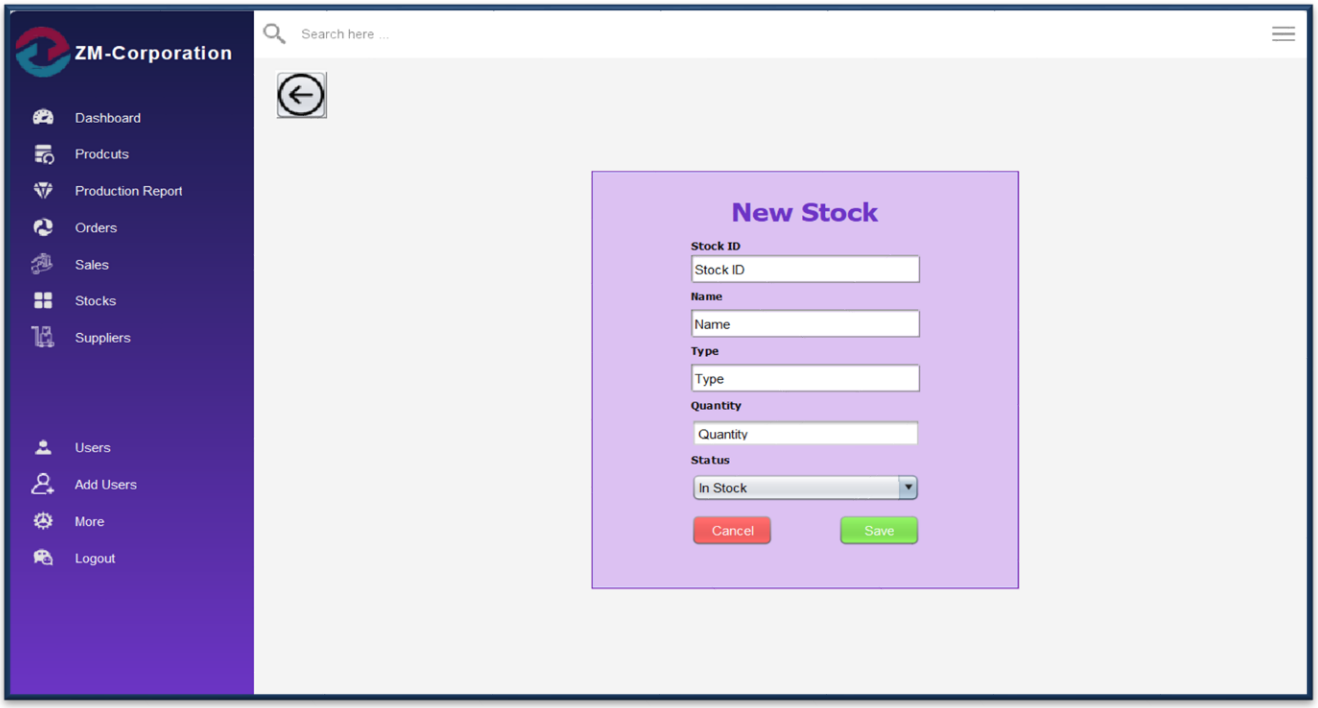


Figure 4.2.7: Add Stocks

⇨ Add Stocks

- Working
  - Once the data is entered, and "Save" button is pressed.
  - All the entries that are made in the field box are read.
  - They are passed to a function which then access the data base and executes an "INSERT" query to insert the data in the table
  - Once data is entered successfully, a confirmation dialog box is show

- How To Use It:
  - Leave no field empty, as that would generate an error.
  - Use the arrow besides the combo button to view more options and select to fill the table.
  - Quantity should be of numeric type, otherwise an error would be thrown
  - Pressing "Cancel" or "Back – Arrow" Button will re-direct back to Dashboard

4.2.8 Supplier

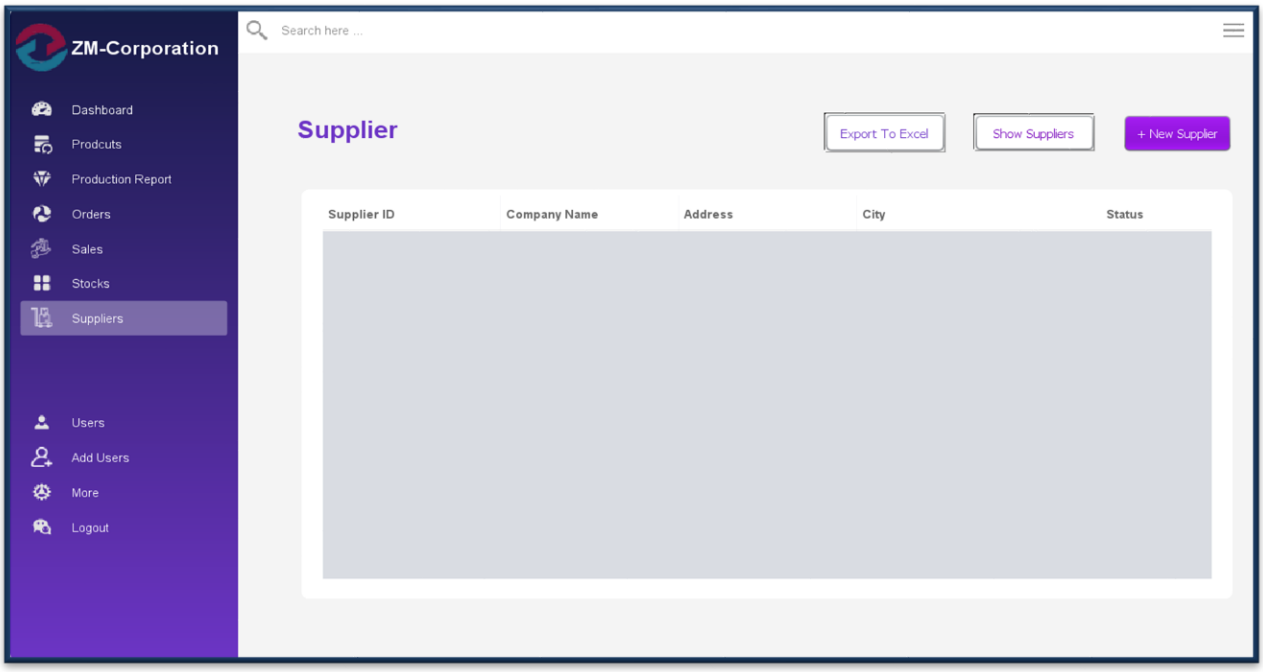


Figure 4.2.8: Supplier

⇨ Supplier

- Working
  - Clicking on any side menu, option will redirect you to that page.
  - Pressing, of "New Supplier" option, will open a new window asking to enter stocks details
  - Pressing "Show Suppliers", executes a "SELECT * FROM *database"* query. All the data is then show
  - Pressing, "Export to Excel", executes a "SELECT" query first and then each and every row in the database is printed using a loop in excel file.

- How To Use It:
  - Click on the "New Suppliers" button, to create order first before pressing the "Show Suppliers" option
  - After adding data, Press "Show Stocks" button to see that entry in the table
  - Clicking "Export to Excel", will transfer all the table data to an excel file

4.2.9 Add Supplier

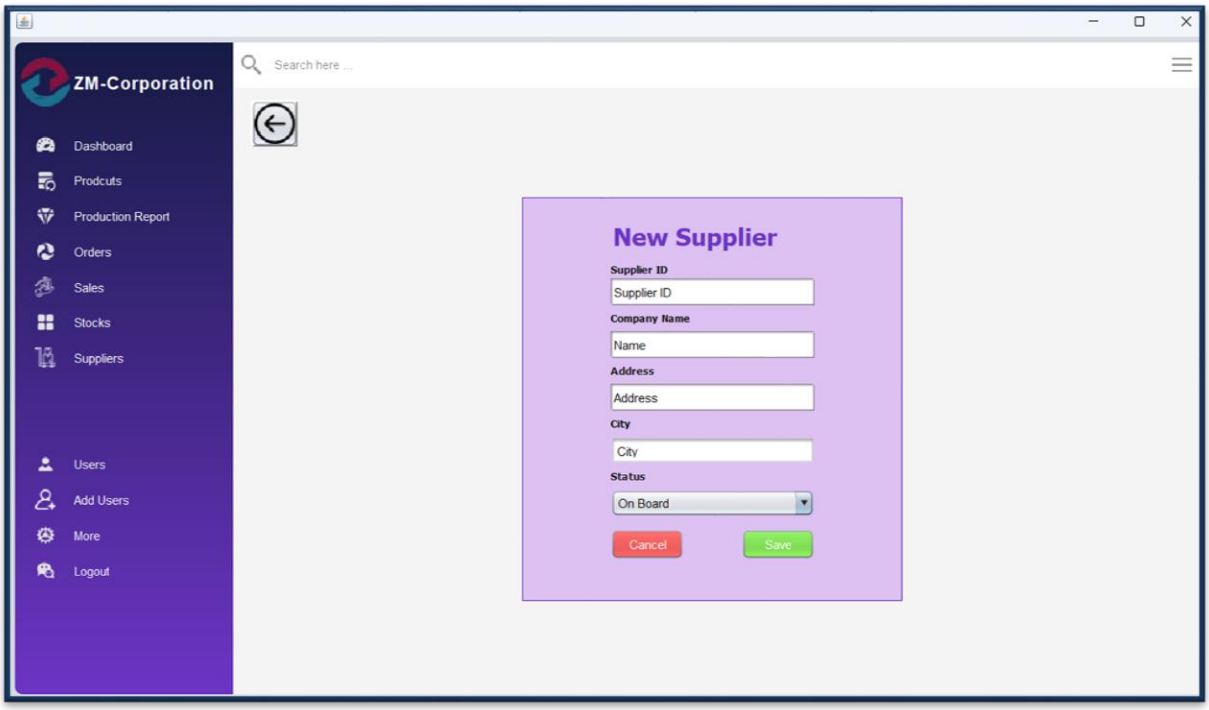


Figure 4.2.9: Add Supplier

⇨ Add Supplier

- Working
  - Once the data is entered, and “Save” button is pressed.
  - All the entries that are made in the field box are read.
  - They are passed to a function which then access the data base and executes an “INSERT” query to insert the data in the table
  - Once data is entered successfully, a confirmation dialog box is show

- How To Use It:
  - Leave no field empty, as that would generate an error.
  - Use the arrow besides the combo button to view more options and select to fill the table.
  - Pressing “Cancel” or “Back – Arrow” Button will re-direct back to Dashboard

4.2.10 Add Users

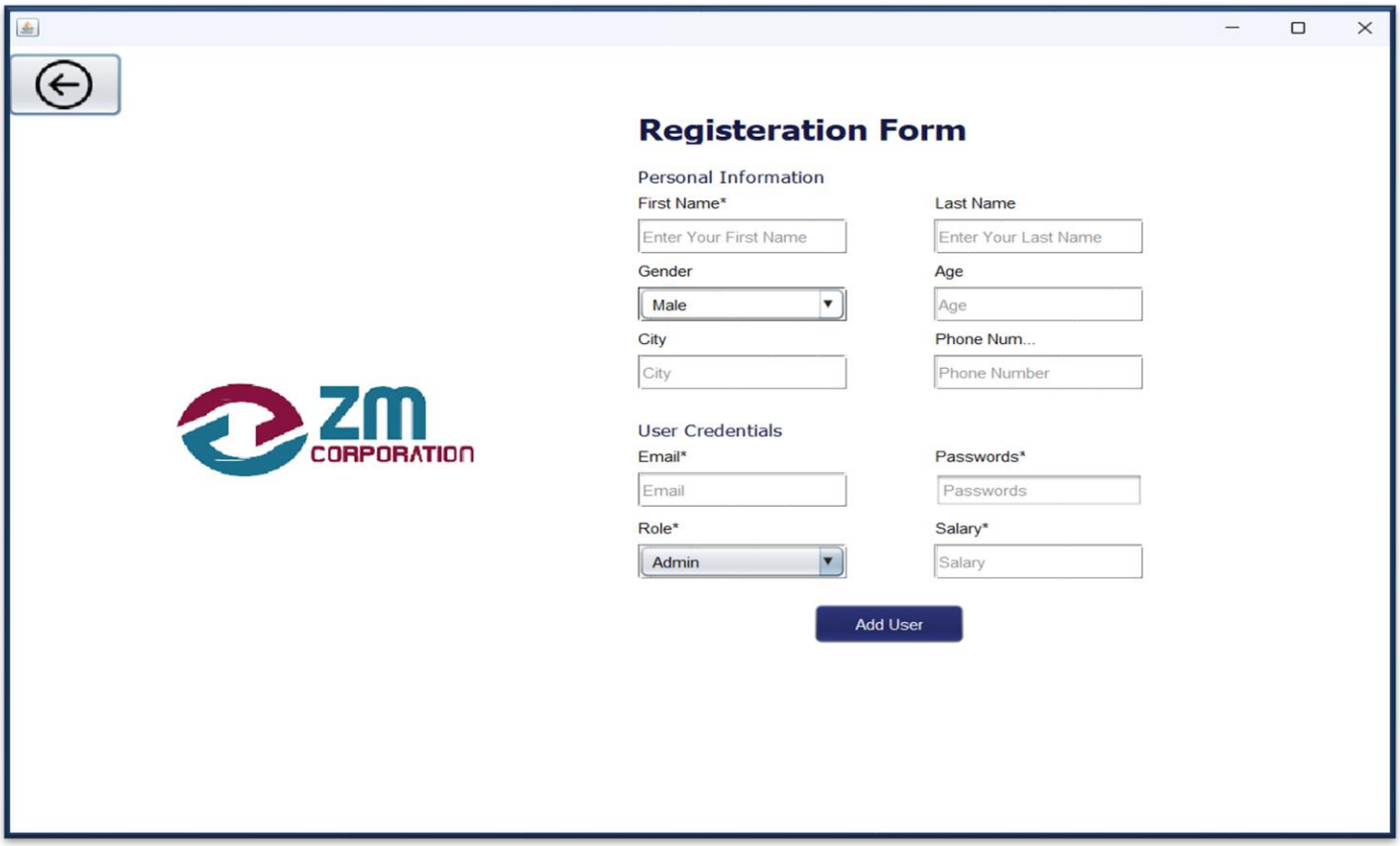


Figure 4.2.10: Add Users

⇨ Add Users

- Working
  - Data is collected from all the fields and stored in an array.
  - Pressing “Add User” button, Array block is passed to a function, which executes an “INSERT” query to enter all the data into the table.
  - Email, Password and Role are extracted separately and are passed to the ‘*logincredentials’* table to create Email and Password for login.

- How To Use It:
  - Fill all the details in the text fields and select option through the drop-down menu.
  - Don’t leave any field marked with (*) in the heading.
  - Press “Add User”, to create user credential and store all the entries in the database.

4.3 Test Case

4.3.1 Login Test Case

Test Case ID	T-ID_001	**Test Case Description**	Test the Login Functionality		
Created By	Muneeb	**Reviewed By**	Usman	**Version**	1.0
Tester's Name	Muneeb	**Date Tested**	27-Nov-2022	**Test Case (Pass/Fail/Not Executed)**	Pass

S #	**Prerequisites:**	**S #**	**Test Data**
1	Access to Dashboard	1	Email = muneebHoda
2		2	Password = Admin
3		3	
4		4	

Test Scenario	Verify on entering valid userid and password, the customer can login

Step #	**Step Details**	**Expected Results**	**Actual Results**	**Pass / Fail / Not executed / Suspended**
1	Run Login Page	Site should open	As Expected	Pass
2	Enter Userid & Password	Credential can be entered	As Expected	Pass
3	Validate Credentials	Validated from database	As Expected	Pass
4	Open Dashboard Page	Dashboard Opens	As Expected	Pass

4.3.1: Login Test

- ⇨ Login Page Test
  - Test Designing
    - It was designed to check whether the data base has been integrated with the application successfully.
    - Designed to check whether credentials entered could be read and searched in the databas

4.3.2 Dashboard Menu Functionality

Test Case ID	T-ID_002	**Test Case Description**	Test Side-Bar Functionality of Dashboard		
Created By	Usman	**Reviewed By**	Muneeb	**Version**	1.0
Tester's Name	Usman	**Date Tested**	1-Dec-2022	**Test Case (Pass/Fail/Not Executed)**	Pass

S #	**Prerequisites:**	**S #**	**Test Data**
1	Access Page clicked	1	
2		2	
3		3	
4		4	

Test Scenario	Check customer can navigate between various pages

Step #	**Step Details**	**Expected Results**	**Actual Results**	**Pass / Fail / Not executed / Suspended**
1	Navigate and Click Products	Open Product Page	As Expected	Pass
2	Navigate and Click Orders	Open Orders Page	As Expected	Pass
3	Navigate and Click Stock	Open Stock Page	As Expected	Pass
4	Navigate and Click Suppliers	Open Supplier Page	As Expected	Pass
5	Navigate and Click Sales	Open Sales Page	Error	Fail
6	Click Add Users	Open Add Users	As Expected	Pass

Table 4.3.2: Dashboard Functionality Test

- ⇨ Dashboard Menu Functionality Test
  - Test Designing
    - All the button are clickable, and could be re-directed to page

4.3.3 Adding of Data in Database

Test Case ID	TID_003	**Test Case Description**	Test whether data is getting entered in database		
Created By	Muneeb	**Reviewed By**	Usman	**Version**	1.0
Tester's Name	Muneeb	**Date Tested**	25-Nov -2022	**Test Case (Pass/Fail/Not Executed)**	Pass

S #	**Prerequisites:**	**S #**	**Test Data**
1	Add Data in Product's Table	1	Product Form Data
2	Add Data in Order's Table	2	Order Form Data
3	Add Data in Stock's Table	3	Stock Form Data
4	Add Data in Supplier's Table	4	Supplier

Test Scenario	Data entered in add products, orders, stock and suppliers form

Step #	**Step Details**	**Expected Results**	**Actual Results**	**Pass / Fail / Not executed / Suspended**
1	Enter details in the add form	Details Entered	As Expected	Pass
2	Check database to see entry of data	Values Entered in the Database Table	As Expected	Pass
3	Press Show Database to see entries	Entries Shown	As Expected	Pass
4	Repeat task with product, stock, suppliers, and orders	Successfully Accomplished	As Expected	Pass

Table 4.3.3: Insert Data Test

- ⇨ Adding of Data in Database
  - Test Designing
    - Tables Exists in the database
    - Query is correct
    - Query is working properly
    - Data gets inserted in Tables

4.3.4 Show Database Entries in Table

Test Case ID	TID_004	**Test Case Description**	Check if data could be shown in tables		
Created By	Muneeb	**Reviewed By**	Naseer	**Version**	2.1
Tester's Name	Mark	**Date Tested**	1-Jan-2017	**Test Case (Pass/Fail/Not Executed)**	Pass

S #	**Prerequisites:**	**S #**	**Test Data**
1	Data exists in Table	1	
2		2	
3		3	
4		4	

Test Scenario	Show data present in database on tables.

Step #	**Step Details**	**Expected Results**	**Actual Results**	**Pass / Fail / Not executed / Suspended**
1	Check Table in Database	Table Exists	As Expected	Pass
2	Press Show Database	Gets Pressed	As Expected	Pass
3	Present Table Values	Show data in tables	As Expected	Pass
4	Repeat Same Process with Products, Orders, Stock & Supplier	Data shown for every table	As Expected	Pass

4.3.4: Show Data Test

- ⇨ Showing Database Entries on Tables
  - Test Designing
    - Tables Exists in the database
    - Query is correct
    - Query is working properly
    - Shows data present in table

4.3.5 Export Data in Tables to Excel Files

Test Case ID	TID_005	**Test Case Description**	Can data be exported to excel		
Created By	Muneeb	**Reviewed By**	Usman	**Version**	1.0
Tester's Name	Muneeb	**Date Tested**	25-Nov-2022	**Test Case (Pass/Fail/Not Executed)**	Pass

S #	**Prerequisites:**	**S #**	**Test Data**
1	Data to be present in tables	1	
2		2	
3		3	
4		4	

Test Scenario	Verify on entering valid userid and password, the customer can login

Step #	**Step Details**	**Expected Results**	**Actual Results**	**Pass / Fail / Not executed / Suspended**
1	Press “Export to Excel” Button	Button gets pressed	As Expected	Pass
2	Specify File Location	Window opens to specify space	As Expected	Pass
3	Generate Excel File	Excel File Generated	As Expected	Pass
4	Correct Data in Excel	Same data as in table	As Expected	Pass

4.3.5: Export Data Test Case

- ⇨ Export Data in table to Excel File:
  - Test Designing
    - Tables Exists in the database
    - Query is correct
    - Query is working properly
    - Data gets exported in excel file

4.3.6 Adding User

Test Case ID	TID_006	Test Case Description	User Added and Credentials Generated		
Created By	Muneeb	Reviewed By	Usman	Version	2.1
Tester's Name	Usman	Date Tested	24-Nov-2022	Test Case (Pass/Fail/Not Executed)	Pass

S #	Prerequisites:	S #	Test Data
1	Dashboard Opened	1	
2		2	
3		3	
4		4	
Test Scenario	Add user to the database and verify login		

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	Navigate to Add User	Add User window should open	As Expected	Pass
2	Fill The Form	Form gets filled	As Expected	Pass
3	Save form data in database	Values entered gets in table	As Expected	Pass
4	Create Credentials Based on Data entered	Credentials generated	As Expected	Pass
5	Login with new credentials	Login to be successful	As Expected	Pass

4.3.6: Adding User

- ⇨ Adding User:
  - Test Designing
    - Tables Exists in the database
    - Query is correct
    - Query is working properly
    - Data gets inserted in Tables

Chapter 5: Software Requirement Software

5.1 Introduction

5. 1.1 Purpose

The purpose of this document is to explain the process by which we will manage a production facility according to the requirements analyzed and refined through understanding and fixing loopholes of existing businesses.

It includes description of every individual part included in our web-application and also gives us answers on how we are going to implement the various parts of our web-application. It lists down all the functional and non-functional requirements the user can expect. The main purpose of the project is to provide the user an intuitive and responsive experience.

5.1.2 Document Conventions

We have used the standard font size of 12, Times New Roman which is the standard for professional reports. In order to emphasize a topic importance, we have used a bold font so that it is easier for the reader of the SRS to be prepared on what to expect in the body of the SRS. When it comes to priority, the more important the requirement the more in depth look we will have on it that’s not to undermine other requirements, but there definitely is some precedence at play here.

5.1.3 Intended Audience and Reading Suggestions

The Intended Audience is:

- End Users
- Developers
- IT Teams

Using this software

The document must be read from end to beginning for a complete understanding of the project; However, it is written in sections and hence can be read as such.
For an overview of the document and the project itself, see Overall Description (Section 2).
For a detailed description of our web application, functional requirements see System Featur

5.1.4 Product Scope

Our goal is to create a responsive manufacturer/production management application system. moving the manufacturers from the traditional way of storing data on excel files to a more convenient and efficient way to enter and view their data. This application will allow users to enter data through forms, view their statistics in terms of graphs, and easily generate various reports from different departments. This website would also be able to keep track of pending tasks, raise flags, and jobs that have been completed. In short, it would cover each and every aspect from finance to management to production to delivery.
Apart from the ease of use, it will also serve as a guide by providing useful data-analytics to help companies maintain their stocks or control their wastages. With the help of business and artificial intelligence, we aim to achieve this

5.1.5 References

Notes: Our web-application is heavily inspired by SAP System.

5.5.1 SAP SUPPORT DOCUMENTATION
https://help.sap.com/docs/SAP_INTEGRATED_BUSINESS_PLANNIG

5.5.2 FIREBASE
https://firebase.google.com/dos

5 Overall Description

5.2.1 Product Perspective

The perspective of our production management system is to encourage production facility to use a system that would take them less time to manage the stats and focus more on improving product quality and research o gain a competitive advantage in their niche.

5.2.2 Product Functions

The function which we will include in our application are the following:

1. Data Entry features
2. Login and Sign in functionality
3. Multiuse access

5.2.3 User Classes and Characteristics

Our typical users would be business owners and managers who are looking to get technology integrated in their businesses to make the overall experience more user-friendly and easier to use while increasing the efficiency of the business**.**

5.2.4 Operating Environment

Operating Systems:

- *iOS*
- Linux
- Mac OS
- Windows 7
- Windows 8
- Windows 10

Web Application:

Our web application will operate on browsers such as Microsoft Internet Explorer, Google Chrome, Mozilla Firefox, etc. In terms of hardware, a regular desktop would do as our application will not be too graphically demanding

5.2.5 Design and Implementation Constraints

Minimum Hardware Requirements:

- Microsoft Windows 7 or higher
- X86 Processor
- 2gb ram for Windows

Software Requirements:

- The information of all users, must be stored in a database that is accessible only by web-application
- Every user related information will remain confidential.
- The web application user interface must be responsive
- React native will be used for frontend.
- The server will remain functional all the time.
- Users must login with their correct username and password to perform any action.

5.2.6 User Documentation

We will provide a manual for our web-application

5.2.7 Assumptions and Dependencies

Assumptions:

- User PC will have Windows 7 or any Microsoft Windows of version greater than or equal to Windows 7 installed.
- The user must have a decent and consistent internet connection
- The mobile operating system will be Android.
- Both the mobile and PC must be of decent specification
- There will be no power outage.
- The user must have basic knowledge on how to operate a Windows or Mobile device.
- The server will not crash or malfunction.

Dependencies:

(*Further dependency will be noted down once we move into the later stages)*

- Bootstrap
  - Grid system based on HTML and CSS to make our application responsive
- Font-awesome
  - Contain large collection of icons and symbol to use whenever necessary
- Material UI
- react user interface library
- *React-router-Dom*
  - *react router library to access everything related to routes link, history, router params.*
- *React use-state, use-effect:*
  - *To handle and manage state across the website, states are your variables which are subject to change, since react works on the principle of one page applications, this allows us to update our variable (states) without reloading or affecting the dom element.*

Note: (all dependencies written in italic may change depending on implementation)

5.3 External Interface Requirements

5.3.1 User Interfaces

We shall make a web application as per the standard conventions with user friendly and easy to use interfaces with using contrasting colors and using headings and borders to make the web application more appealing to the eye.

Error messages and prompts will be displayed where necessary.

- GUI along with meaningful Frames and buttons
- Reports are generated as per the requirement
- Interfaces will be user friendly
- A summary will also be shown of the reports
- Refer Appendices 2.

5.3.2 Hardware Interfaces

Hardware Environment	Dual Core 2nd generation/
System Configuration	System Configuration RAM-4 GB HDD-80GB
Operating system	Windows 7/8/8.1/10/11

5.3.3 Software Interfaces

When invalid inputs are given to the modules then the error messages will be popped up in order to inform the user that the input provided is not taken by the database. When incomplete information is provided by the user and the user tries to submit the form to store the details in the database the system will pop up a message box asking the user to enter all the details required.

Front End	Bootstrap (Subject to change)
Back End	Java Script
Database	Firebase

5.3.4 Communications Interfaces

The production management system will run on a web browser so an internet connection will be always required.

The system will run on the premises of a factory to manage the production reports and the data base will be based on cloud.

5.4.4 System Features

The Functional Requirements mentioned below in this section are given priority number according to the below mentioned criteria.

Priority 1: All requirements of this priority level must be implemented and verified. The system can't work without these requirements.
Priority 2: Requirements of this priority are expected to be implemented but the system can work without these requirements. Unless and until their omission does not affect higher priority components.

5.4.1 Creating A User Account

Description and Priority

In our web application we need a way to identify which users are using our web- application. We will need profiles to be maintained that represent each user. Having these profiles will also help us keep a log of all the users that has logged into our application and track their activities.

Stimulus/Response Sequences

Step 1: User requests to create a new account

Step 2: The user enters the details

Step 3: A new account is created

Functional Requirements

REQ-1. A: When the application is launched for the first time, the user must be prompted to create a new profile. The user will be asked to enter a nickname and select an avatar from a list of predefined avatars.
Priority 1

REQ-1. B: The user shall be allowed to create a profile or switch to an existing profile.
Priority 1

REQ-1. C: A user must create a profile if they want to access our application.
Priority 1

REQ-1. D: A user must enter a unique username, valid email, and password to create an account.
Priority 1

REQ-1. E: A user must have unique credentials. The data is then validated to make sure there is not an existing user with those credentials.
Priority 1

5.4.2 Signing a User

Description and Priority

The user must be signed in to get hands-on functionality of the application.

Stimulus/Response Sequences Step 1:

The sign in screen prompts.

Step 1: The sign in screen prompts.
Step 2: The user enters the credentials

Step 3: The user gets access to the web-application based on his/her access level.

Functional Requirements

REQ-2. A: The user signs in through username and password.

Priority 1

REQ-2. B: The user credentials are validated from the Database. If correct, the user is logged in.

Priority 1

REQ-2. C: An error message will be prompted if the user enters wrong user credentials.

Priority 1

REQ-2. D: If the user has forgotten their password, the user clicks on the “Forget Password” and a dialog box is prompted which asks for the user's email through which the password is recovered.

Priority 1

REQ-2. E: The user shall be allowed to edit their profile when signed into the web-application.

Priority 2

REQ-2. F: The user shall be allowed to change their password, username and avatar when editing their profile.

Priority 2

REQ-2. G: A signed in user shall be allowed to sign out from the application.

Priority 1

REQ-2. H: A blocked user shall not be allowed to sign-in to the application.

Priority 1

5.4.3 Admin System Features

Description and Priority

The admin is responsible for deleting or blocking users in case there is a suspicion for malicious act.

Stimulus/Response Sequences

Deleting/Blocking User:

Step 1: The admin wants to delete a user.

Step 2: The admin deletes or blocks the specific user from the database.

Functional Requirements

REQ-3. A: The admin should be able to delete or block/unblock a user.

Priority 1

REQ-3. B: When the user that is deleted, all his information that is stored in the database, should be deleted alongside.

Priority 2.

5.5 Other Nonfunctional Requirements

5.5.1 Performance Requirements

The system must be interactive, and the delay must be as less as possible. To avoid overloading of the server and keep its performance at optimal level the server should be spam proof and should have the functionality to ban the IP Address for a duration of 5 minutes from which it receives spam requests.

The Database should use optimize sorting, evaluation queries to minimize the loading time to preferably less than 2 second. The code should use try catch blocks to return optimal error response whenever it receives a bad request and to stop it from crashing whenever some app breaking bug occurs.

5.5.2 Safety Requirements

The following safety requirements need to be paid attention to:

1. Any ads displayed on our application do not redirect the user to a malicious link and are skippable.
2. The users' phone's temperature must not exceed too much while using the application.
3. While the application is running, it should not cause disruption to system processes.
4. The application asks the users to take a short break after every few hours to prevent eye strain.

5.5.3 Security Requirements

- Database:

  The database will be hosted on a private server. The only way to gain access to the server will be to use SSH (Secure Shell). the server will only allow SSH requests from specific IP's that will be configured into it, for authentication of SSH we will use public key authentications. The database will be protected using username and password, password will be generated using a keyboard mash. The user profile password will be stored in encrypted format. The password will be encrypted using Salted SHA-2.
  The Database itself will be protected against SQL injection attacks by using parameterized queries.
  The server itself will be protected against DDOS attack by limiting broadcast and validation against spoofing

- Authentication and Authorization:

  For authentication and authorization purposes we will be using JWT tokens. Each request will contain an authorization header with a proper token. If the app received any request without the token or if the token is invalid the server will return the error status code 401 or if the request contains the proper token but the user doesn't have the permission to access that service, the server will return the error status code 403.

- Front-End Security:

  To protect the app from spam and abuse, the app will be integrated with google reCAPTCHA service.

5.5.4 Software Quality Attributes

Attributes are defined in order of their importance.

1. Usability:
    - The site should be easy to use.
    - The layout should be simple and self-explanatory.
    - The buttons should have appropriate data-toggle attributes to explain their purposes and the images should also have appropriate alt tags.
2. Audit Log:
    - The app will Log every relevant information in an external text file which will be stored for a specific amount of time in the server.
    - User created logs will be store in file call userlog.txt in a format of "User id" "function perform" "date time"
    - All exception occurs during app lifetime will be store in a file call appException.txt in a format of "Exception" "date time created"
3. Testability:
    - The unit test should cover at least 90+% of the app. For both backend and frontend. The app should be tested for every scenario and cover user stories.
    - Every third-party library should be tested for security flaws or vulnerabilities.
4. Upgradability:
    - The app should be written using up-to-date OOP concepts. So, the code is maintainable and easy to change.
    - Upgrade to all third-party libraries use in the app must be performed in 30 days of their release.

5.5.5 Business Rules

1. User Id and email must be unique.
2. Users must log in to make any sort of entries.
3. User must be logged in to view any sort of entries.
4. Records must be updated regularly

5.6 Other Requirements

To Be Added Later

Appendix A: Glossary

Chapter 6: BUSINESS REQUIREMENTS DOCUMENT TEMPLATE

PROJECT DETAILS

PROJECT NAME
PRODUCTION MANAGEMENT SYSTEM
CREATOR: Muneeb Hoda – 22809, Usman Ghani – 22850, Naseer Ahmed Aziz - 22743

DOCUMENT NO.	DATE	VERSION NO.
1	3rd October 2022	1.0

6.1 EXECUTIVE SUMMARY SNAPSHOT

Provide an executive summary (overview of your business requirements) here. Your executive summary should be a "snapshot" of the purpose of your business requirements, including a brief description of any analysis, findings, project details, scope, business drivers, proposed process, current process, and functional requirements. An executive summary provides an overview of a larger document or of research and is usually the first thing your reader will see. Here are the questions you should answer when writing your business requirements executive summary:
- What is the goal (purpose) of this business requirements document (BRD)?
- Who is the audience for this business requirements document?

Our goal is to create a company management system that enables the user to view important metrics for their business in an efficient manner in order to help them focus more on developing new products rather than worrying about the performance.

The audience for our factory management system would primarily be business owners who are interested in getting their business more efficient in terms of production management and help them analyze the potential recoveries they can make to make their business more efficient and reduce wastage

6.2 PROJECT DESCRIPTION

In this section, describe the project for which you are writing this business requirements document. Describe the project's purpose, what the current process/solution is for the project, what the challenges are, and why you need to undertake the project.

Our production management system would encourage production facility to use a system that would take them less time to manage the stats and focus more on improving product quality and research to gain a competitive advantage in their niche.

Currently most of the businesses are being managed through an excel file, while our solution would be easier on the user's eyes and help them be more effective while managing their business.

Our primary challenge would be to get people from regular notebooks to digital solution as most of the people are not willing to relearn a new method of managing their business.

The primary reason why we took this business idea was because there isn't a good managing solution yet to help business owners focus on the development and research rather than worrying and understanding the stats and metrics.

6.3 PROJECT SCOPE

Provide a high-level description of the project's scope, including a list of project-specific goals, tasks, deliverables, costs, deadlines -- everything that is "in" and "out" of scope for the project. This information provides team members with guidelines for the scope of the project, so they can plan and resource accordingly.

Our objective is to establish a production management system that enables the user to quickly monitor key business data so they can concentrate more on creating new goods than worrying about performance.

The tasks on hand are to build a good-looking user interface and having an easy learning procedure to make it all easy for users coming from regular notebook managements system.

Deliverables would primarily be the system itself.

We might need the premium plan for firebase to manage the database over cloud.

IN-SCOPE ITEMS	OUT-OF-SCOPE ITEMS
Item 1: Login Authorization	Item 1: IT Support Functions *Any tool to make any sort of changes in web application*
Item 2: Data Entries	Item 2: Phone Number Integration / Login *Phone Number login will not be supported*
Item 3: User Interface	Item 3: Notifications *No notification or alert messages*
Item 4: Report Generation	Item 4: Changes or Addition of features in later stages
Etc.	

6.4 BUSINESS DRIVERS

Enter the reasons (i.e., business drivers) why your business is initiating the project. In short, Why are you undertaking the project? Examples might include the following: legal requirements, cost savings with a more efficient practice, updated import/export laws, improved efficiency, improved sales, etc.

Business Driver 1: Cost Savings	Cost savings are an integral part of any business. So this system gives a lot of cost savings by making the system documentation free hence saving paper cost. The labor cost is also saved who had to manage all the documentation now will be done on cloud.
Business Driver 2: improved efficiency	As all the data will be gathered at one place and all the entries will be done on one master app so this saves the data corruption as well as all the data summaries are available at one click rather than manual calculation.
Business Driver 3: ISO Certification	The requirement for certification is that all data should be documented on a centralized database so this product will serve that purpose
Business Driver 4: improved accountability	A transparent system will show wherever the production wastage or cost increases so relevant department can take quick notice and rectify the issue as well as penalize those accountable.

6.5: Project Process

Provide details of your current, prevailing process for addressing the primary issue your project attempts to solve. Feel free to include diagrams, flowcharts, or other visuals to illustrate the current process.

The current process is a very outdated system that consists of a the production report that is filled for process 1 by its machine man. Then the report is given to the supervisor. Similar process is followed for rest of the processes. Then all the reports for one specific item are arranged in a file. There are a lot of issue in this SOP. The main issue is that it lacks coherency between processes are the input for one process should be the output of the previous process but wastage is hidden and this is not always the case and it is also not easy to account for. Then another important issue is that to make a summary of all the processes for one job requires the operator to manually calculate for each job which requires complex and lengthy as well as error prone calculations which are then made into a summary document. Similarly, a lot of travelling is done in reporting as productions reports have to be sent to the office which increase time wastage.

6.6 PROPOSED PROCESS

Provide details of the proposed process for addressing the primary issue your project attempts to solve. Feel free to include diagrams, flowcharts, or other visuals to illustrate the proposed process. For this process, we recommend that you use the same illustrative tool/style that you used for your present/current process (above).

The proposed process is such that a production management system will be integrated into the existing system. All the production reports that are made by the machine man will directly be entered from each department in the system so this will save travelling cost and time as well. Secondly when each department will have entered the report of their respective process then a summary will be automatically generated by the system so this will save a lot of manpower as well as unnecessary documentation and storage space. This will then be available to all company management for viewing.

6.7 FUNCTIONAL REQUIREMENTS

Detail the project's functional requirements by enumerating the ways in which the current process addresses the issue and by describing the functional requirements necessary to make the project successful.

- Production Management System.
  From a traditional way of entering data in registers or excel file to a more organized and a well-maintained data system.

- Keep track of the data entered

  Prevents from entering wrong data by raising flags.

- Give detailed information analytics.
  Providing graphs and useful business insights from the data collected.

- Login Authentication
  Give only the desired user the access and access depends on the level of authorization.

– PRIORITY

Use the following priority table. It allows you to apply a ratings system to your requirements, so you have the visibility (into the value, status, and description of each requirement) that is necessary for determining whether a particular requirement is essential to project success.

VALUE	STATUS	DESCRIPTION
1	Immediate	The requirement is critical to the project's success. Without fulfilling this requirement, the project is not possible.
2	High	The requirement is high priority re the project's success, but the project could still be implemented in a minimum viable product (MVP) scenario.
3	Moderate	The requirement is important to the project's success, as it provides value, but the project could still be implemented in an MVP scenario.
4	Low	The requirement is of low priority, but the project's success is not dependent upon it.
5	Prospective	The requirement is out of the project's scope and is included as a possible component of a prospective release and/or feature.

– CATEGORIES (RC1)

In this section, detail the project's functional use; break down your project's requirements into categories so that they're easy to understand. You can duplicate this section for any successive project categories as needed. The following table includes a unique ID for each requirement, the details of each requirement, the priority of each requirement, and the name of the person who is driving or is responsible for the requirement. Include descriptions of how the current process addresses the issue. Also include the functional requirements necessary to achieve success.

ID	REQUIREMENT	PRIORITY	RAISED BY
1	Enter, Read and Delete Data.	Immediate	Developers
2	Login Authorization	High	Factory Owner
3	Separate Individual View for each use based on authorization	Medium	Factory Owner
4	An Interactive User Interface	Low	Developer
5	Business Intelligence – Provide Useful Insight	Perspective	Developer

6.8 NON-FUNCTIONAL REQUIREMENTS

Detail all non-functional requirements (NFRs) of the project, including such things as features, system behavior, and project characteristics that relate to user experience.

ID	REQUIREMENT
NFR - 001	(Functionality) Production Management System: - Login Authorization - Entering, Viewing and Reading the Data
NFR - 002	(Usability) - Beautiful and an aesthetically pleasing interface
NFR – 003	(Reliability): - All data will be stored on the cloud on daily basis so could be easily recovered. - Critical data to be stored in physical hardware
NFR – 004	(Performance): - No Memory or RAM would suffer much - Performance solely depends on the speed of internet
NFR - 005	(Supportability): - User Documentation - Software Requirement Support

9. GLOSSARY

For easy reference, enter any terms, abbreviations, and/or acronyms that you include in this document.

TERM/ABBREVIATION	EXPLANATION

10. REFERENCES

Provide links to all referenced resources (websites, documents, etc.) throughout this document.

NAME	LOCATION
ReactJS	
NodeJS	
Firebase	

11. APPENDIX

Include any additional information

References:

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