

TITLE OF PROJECT

WEB APP ON INVENTORY MANAGEMENT

SYSTEM

A Project Report

Submitted by:

ARITRA PAUL (Univ Roll No : 10500116054)

MANISH KUMAR PATHAK (Univ Roll No : 10500116041)

TATHAGATA SINGHA (Univ Roll No : 10500216001)

PRITAM SINGH (Univ Roll No : 10500116037)

In partial fulfillment for the award of the degree

Of

BACHELOR OF TECHNOLOGY

IN

COMPUTER SCIENCE AND ENGINEERING



at

Bankura Unnayani Institute of Engineering

Subhankar Nagar, Pohabagan, Bankura I, West Bengal 722146

(Affiliated to Maulana Abul Kalam Azad University of Technology, INDIA) December, 2019

Dedicated to my parents

*"We are what our thoughts have made us; so take care about what you think.
Words are secondary. Thoughts live; they travel far."*

- Swami Vivekananda

"Take up one idea. Make that one idea your life – think of it, dream of it, live on that idea. Let the brain, muscles, nerves, every part of your body, be full of that idea, and just leave every other idea alone. This is the way to success."

- Swami Vivekananda

"When an idea exclusively occupies the mind, it is transformed into an actual physical or mental state."

- Swami Vivekananda

"You have to dream before your dreams can come true."

-Dr. A. P. J. Abdul Kalam

"Dream is not that which you see while sleeping it is something that does not let you sleep."

-Dr. A. P. J. Abdul Kalam

Certificate of Approval

The forgoing project report is hereby approved as a creditable study of Technological subject carried out and presented in a manner satisfactory to warrant its acceptance as a prerequisite with degree for which it has been submitted. It is to be understood that by this approval, the undersigned do not necessarily endorse or approve any statement made, opinion expressed or conclusion drawn there in but approve the thesis only for the purpose for which it has been submitted.

Board of Examiners:

•

•

•

•

Declaration

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which has been accepted for the award of any other degrees or diplomas of the university or other institutes of higher learning, except which due acknowledgment has been made in this text.

.....

Signature

Certificate

This is certified that the work contained in this report entitled, WEB APP ON INVENTORY MANAGEMENT SYSTEM, by Aritra Paul, Manish Kumar Pathak, Pritam Singh, Tathagatha Singha have been carried out under the supervision of the undersign and this work has not been submitted elsewhere for any other degree.

(Signature of the Supervisor)

Dr. Aniruddha Dey

Assistant Professor, Department of CSE
Bankura Unnayani Institute of Engineering
Bankura, West Bengal

(Signature of the Co-supervisor)

Mr. Subrata pan,

Assistant Professor, Department of IT
Bankura Unnayani Institute of Engineering
Bankura, West Bengal

(Signature of the HoD)

Prof. Alok Roy,

Associate Professor, Department of CSE
Bankura Unnayani Institute of Engineering
Bankura, West Bengal

Acknowledgments

I hereby wish to express my sincere gratitude and respect to Assistant Professor *Dr. Aniruddha Dey*, Dept. of CSE, Bankura Unnayani Institute Of Engineering, Bankura under whom I had proud privilege to work. His valuable guidance and encouragement have really led me to the path of completion of this project. Any amount of thanks would not be enough for the valuable guidance of my supervisor. I would also like to thank all the faculty member of CSE dept. for their devoted help. I also cordially thank all laboratory assistants for their cooperation. Finally, I would like to pen down my gratitude towards my family members for their continuous support and encouragement. It would have not been possible to complete my work without their support.

Table of Contents

Title Page	i
Certificate of Approval	
Declaration of the Student	ii
Certificate of the Guide	iii
Abstract	iv
Acknowledgement	v
List of Figures	vi
List of Tables (optional)	vii
Timeline / Gantt Chart	viii
1. INTRODUCTION*	1
1.1 Problem Definition	1
1.2 Project Overview/Specifications* (page-1 and 3)	1
1.3 Hardware Specification	2
1.4 Software Specification	2
2. LITERATURE SURVEY	3
2.1 Existing System	3
2.2 Proposed System	3
2.3 Feasibility Study	4
3. SYSTEM ANALYSIS & DESIGN	
3.1 Requirement Specification	7
3.2 Flowcharts, DFDs, ERDs, Database Diagram, Use Case Diagram	7
3.3 Design and Test Steps / Criteria	10
3.3 Algorithms and Pseudo Code	16
3.4 Testing Process	18
...	
4. RESULTS / OUTPUTS	21
5. CONCLUSIONS / RECOMMENDATIONS	23
6. REFERENCES	24
7. APPENDICES	24

INTRODUCTION

Problem Definition

Inventory management refers to the process of ordering, storing, and using a company's inventory. These include the management of raw materials, components, and finished products, as well as warehousing and processing such items.

For companies with complex supply chains and manufacturing processes, balancing the risks of inventory gluts and shortages is especially difficult. To achieve these balances, firms have developed two major methods for inventory management: just-in-time and materials requirement planning: just-in-time (JIT) and materials requirement planning (MRP).

Project Overview/Specifications

The **Inventory Management System** is a real-time **inventory** database capable of connecting multiple stores. However, the **system** merely records sales and restocking data and provides warning of low stock at any location through email at a specified interval.

- **Login Page:** Basically, for any software security is major concern. So, we have developed a secure application. Without being authenticated no user is allow to view any other interfaces. For login page we have User ID, Password, Profile. After being authenticated user is authorize to perform certain work according to his/her profile.
- **Profile Page:** Every user has his own profile. From here they can change their information like correction in name, email id, address etc.
- **Storage Page:** In this page users can add items to be stored using this page and barcode reader. After scanning barcode information that stored in barcode are fetch from database and desired data are stored in storage table.
- **Inventory Page:** Inventory page provides flexibility to change quality if any inventory get damaged. Managing inventory is our main goal so this page is only visible to admin or manager profiles.

- **Items Page:** User can add new items using this page. While adding the items to database user provide item description. This description help to understand the quality of product, uses, manufacture date, expiry date etc.
- **Order Page:** Using order page one can place order and database would add the item to order list and quantity has been decrease from Inventory table. Admin/Manager has special privilege to edit order details if customer requested to edit them. Order is attached to shipment table which help the user to get the address of customer and make order to dispatch.
- **Shipment page:** Using this page user can update address, if it changes and track the shipped items. Tracking is required to increase the client experience more satisfactory.

HARDWARE SPECIFICATION

System

Processor:	Intel(R) Core(TM) i3-7020U CPU @ 2.30GHz 2.30 GHz
Installed memory (RAM):	4.00 GB (3.89 GB usable)
System type:	64-bit Operating System, x64-based processor
Pen and Touch:	No Pen or Touch Input is available for this Display

SOFTWARE SPECIFICATION

- Windows 10
- Visual studio
- XAMP
- MySql 2.17
- Chrome Browser

LITERATURE SURVEY

Existing System

There are number of Inventory Management System available in the market. After doing my research, I have come to know that most of them are limited to few products. Some others are lacking in good UI.

Marketing points are not much focus to increasing sales. Customer management system and Inventory Management system can't be linked due to different organization which leads to compromising the client satisfaction level.

Most of them are not using cloud computer concept but we are trying to develop such a system which is for everyone rather than for only big companies or for small organisation. Most of them are expensive to use and their maintenance is generally not cheap. Our system is Pay-as-per-Use. Current system is a manual one in which users are maintaining ledgers, books etc to store the information like suppliers details, inwards, deliveries and returns of items in all godowns, customer details as well as employee details. It is very difficult to maintain historical data.

- **Inventory Management Software**

sagar International, Balkhu

- **Swatik Accounting and Inventory Software**

High-tech Software, Kalimati

Proposed System

The proposed system will be designed to support the following features:-

- The proposed system has a user friendly Interface for porting of data to server.
- The proposed system provides the facility to pull the data from the server of the specified Supply order number and get the respective report.
- The proposed system provides the no replication of data.

User can get the desired output according to their queries .This is an added advantage.

Feasibility Study

All projects are feasible given unlimited resources and infinite time. Unfortunately the development of computer-based system in many cases is more likely to be plagued by scarcity of resources and delivery date. Hence, we have made use the concept of reusability that is what Object Oriented Programming (OOPS) is all about.

The feasibility report of the ptoject holds the advantages and flexibility of the project. This is divided into three sections:

- Economical Feasibility
- Technical Feasibility
- Behavioral Feasibility

Economic Feasibility:

Economic analysis is the most frequently used method for evaluating the effectiveness of the candidate system. More commonly known as cost/benefit analysis, the procedure is to be determining the benefits and savings that are expected from a candidate and compare them with

costs. If benefits outweigh costs, then the decision is made to design and implement the system. A system's financial benefit must exceed the cost of developing that system. i.e. a new system being developed should be a good investment for the organization. Economic feasibility considers the following

- i. The cost to conduct a full system investigation.
- ii. The cost of hardware and software for the class of application.
- iii. The benefits in the form of reduced cost or fewer costly errors.
- iv. The cost if nothing changes (i.e. The proposed system is not developed).

The proposed "INVENTORY MANAGEMENT" is economically feasible because

- i. The system requires very less time factors.
- ii. The system will provide fast and efficient automated environment instead of slow and error prone manual system, thus reducing both time and manpower spent in running the system.
- iii. The system will have GUI interface and very less user-training is required to learn it.
- iv. The system will provide service to view various information for proper managerial decision making.

Technical Feasibility:

Technical feasibility centers around the existing computer system (Hardware and

Software etc) and to what extent it support the proposed addition. For example, if the current computer is operating at 80 percent capacity - an arbitrary ceiling - then running another application could overload the system or require additional Hardware. This involves financial considerations to accommodate technical enhancements. If the budgets is a serious constraint ,then the project is judged not feasible. In this project, all the necessary cautions have been taken care to make it technically feasible. Using a key the display of text/object is very fast. Also, the tools, operating system and programming language used in this localization process is compatible with the existing one.

Behavioral Feasibility:

People are inherently resistant to change, and computers have been known to facilitate change. An estimate should be made of how strong a reaction the user staff is likely to have toward the development of a computerized system. Therefore it is understandable that the introduction of a candidate system requires special efforts to educate and train the staff. The software that is being developed is user friendly and easy to learn. In this way, the developed software is truly efficient and can work on any circumstances ,tradition ,locales.

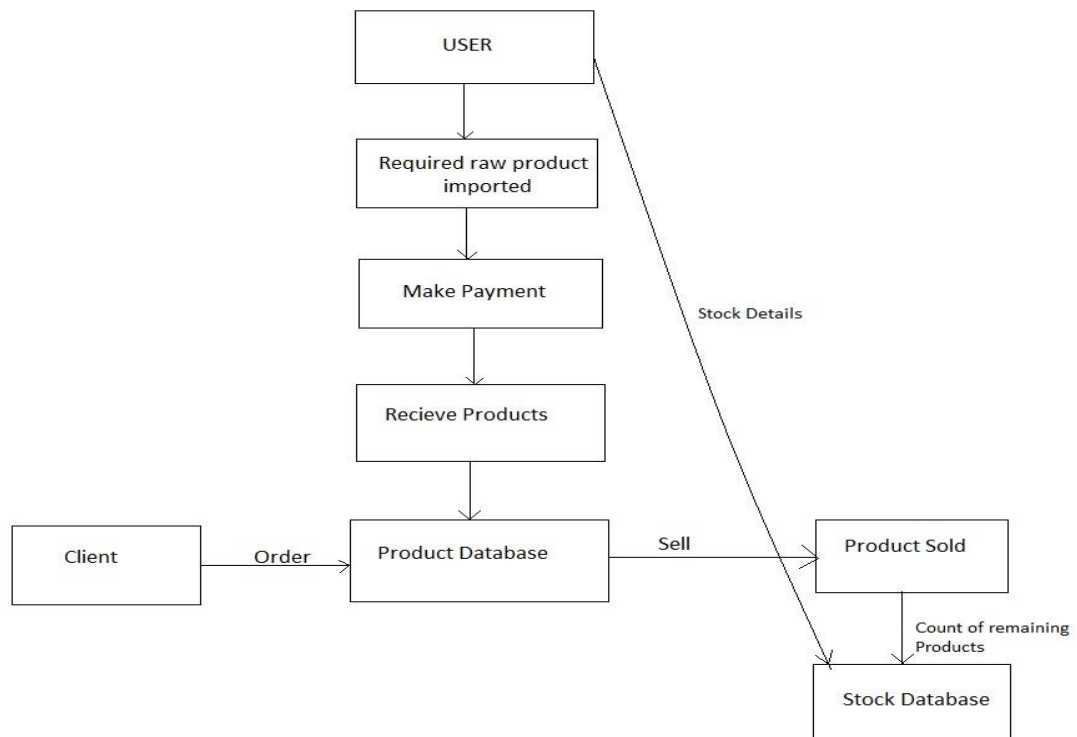
Behavioral study strives on ensuring that the equilibrium of the organization and status quo in the organization are not disturbed and changes are readily accepted by the users.

SYSTEM ANALYSIS & DESIGN

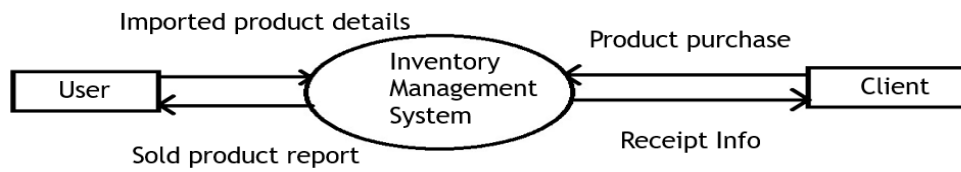
Requirement Tools and Specifications

- JSX
- React Js
- Node Js
- Express
- Mysql

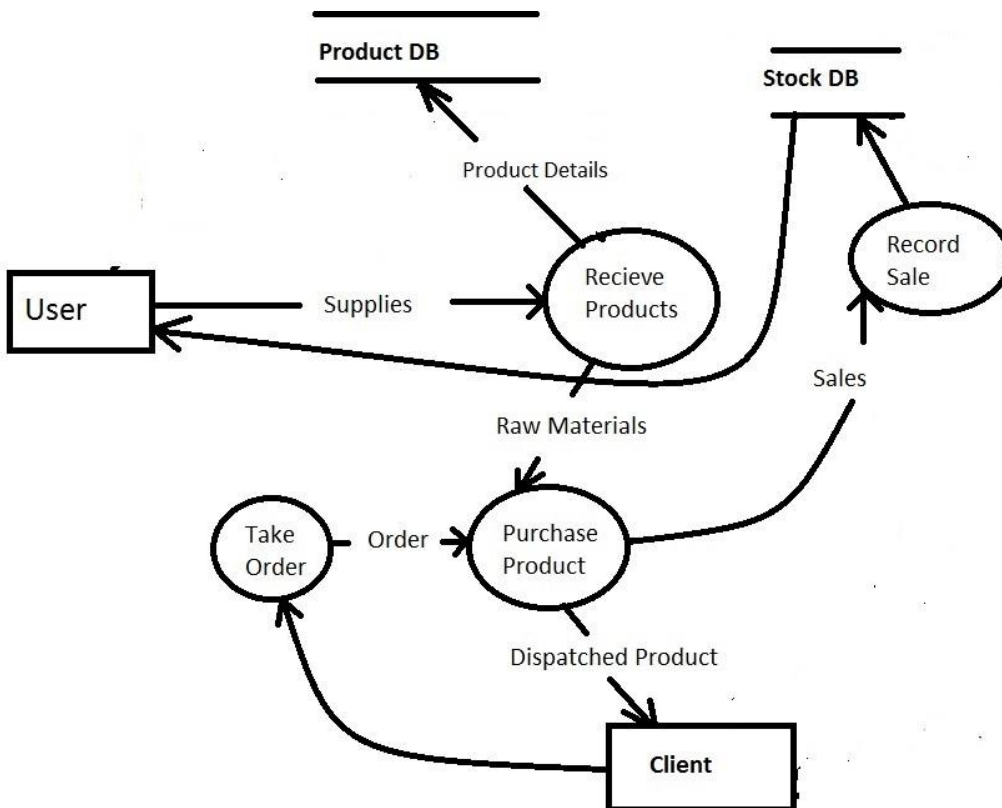
Flow Chart



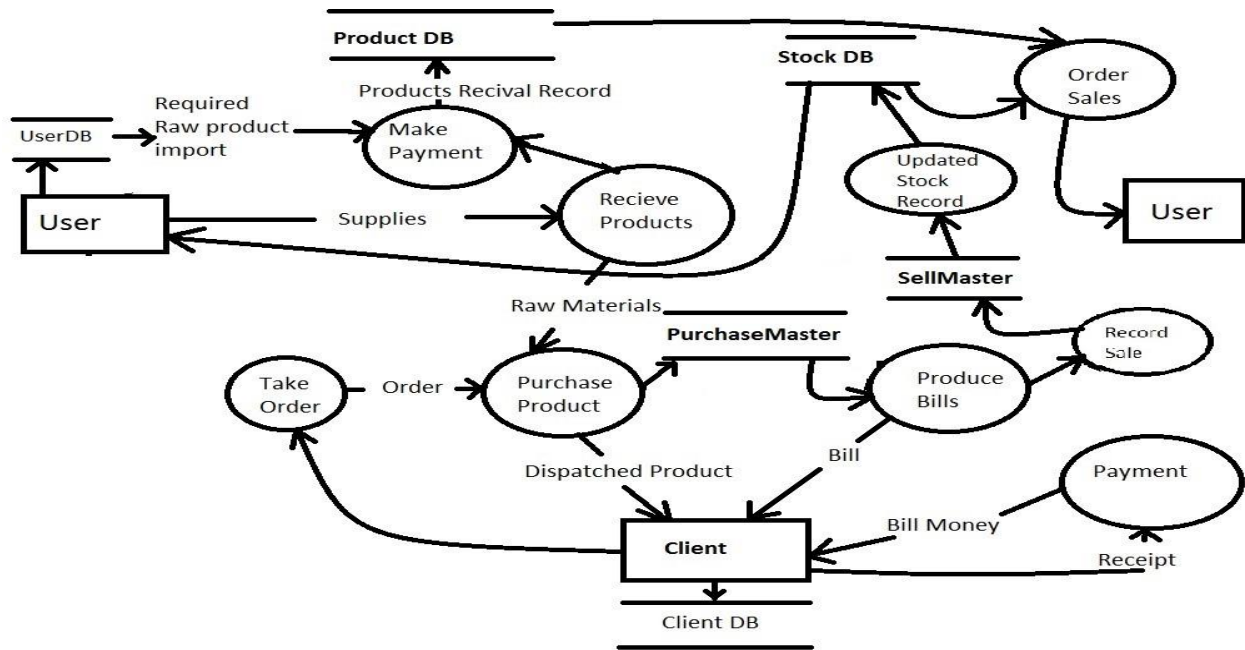
DFDs



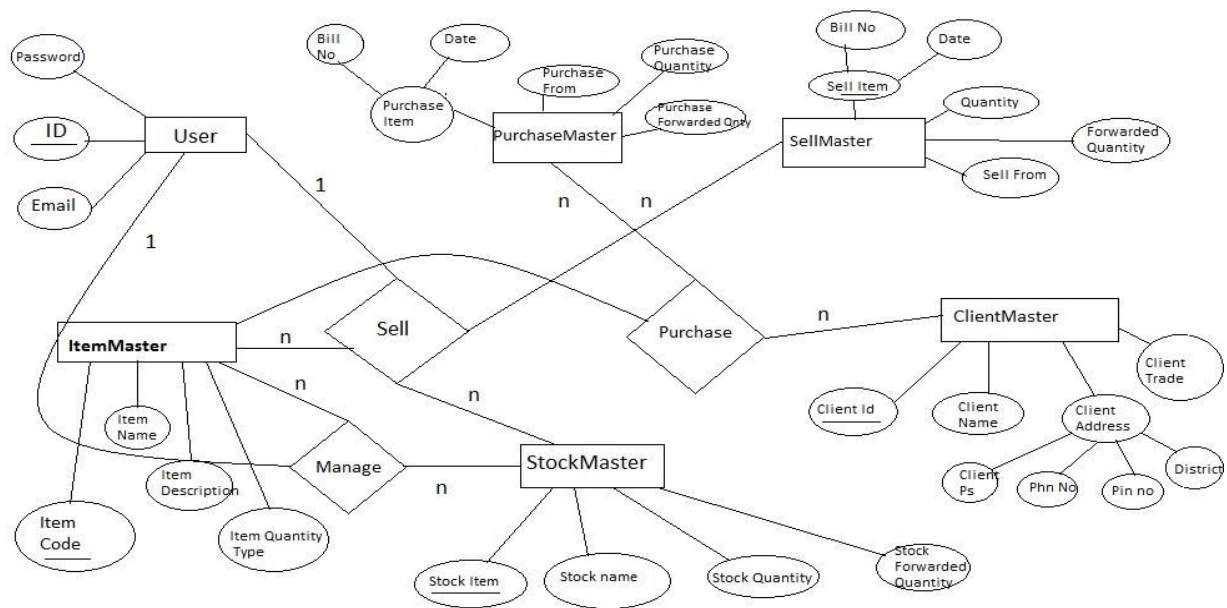
Level 0 DFD Diagram



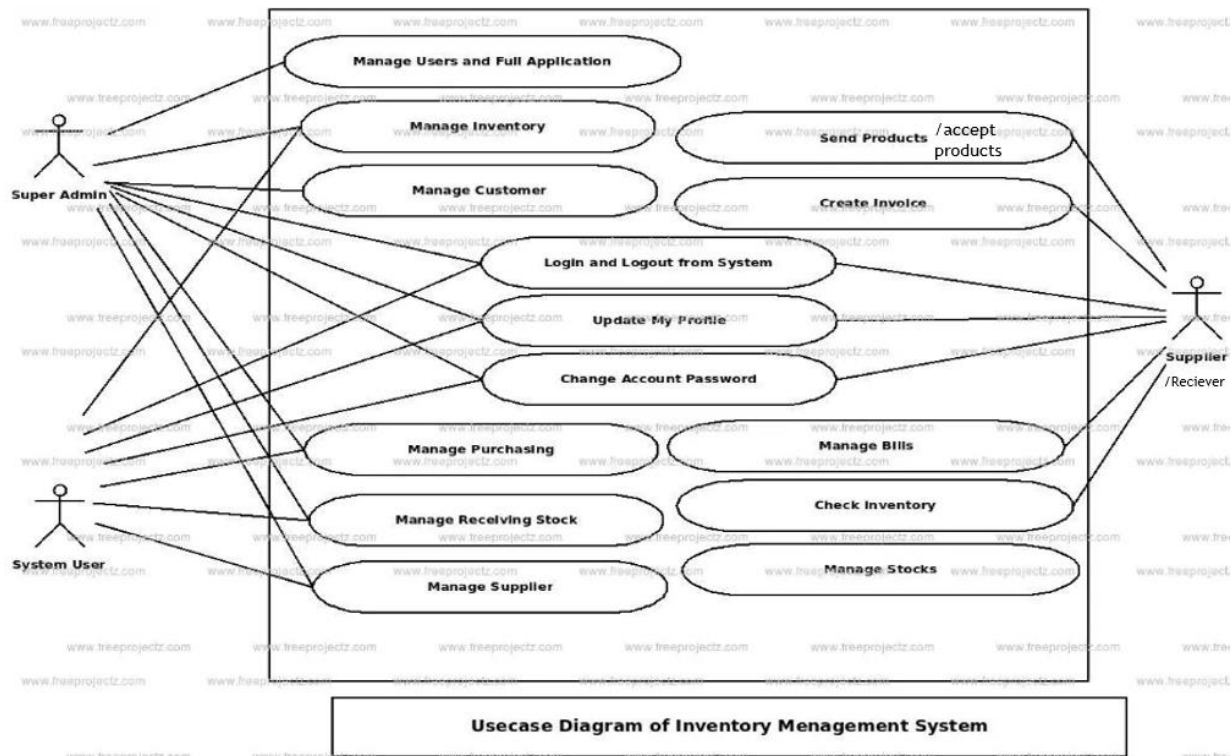
Level 1 DFD



Level 2 DFD



ER DIAGRAM



DESIGN

1. DETERMINE CUSTOMER NEEDS & FORECAST DEMAND

This can be a difficult first step, but it's absolutely necessary to a solid inventory management process. Take a look at your past sales, inventory records, and seasonal selling patterns, and be sure to forecast future demand. If you're a new business who doesn't have this kind of data, concentrate on market research and overall revenue predictions. This will allow you to make sure that you have the optimal amount of inventory on hand at any one time—while avoiding both stock-outs and excess carrying costs.

2. CATEGORIZE YOUR INVENTORY

Categorizing your inventory can help you run your warehouse more smoothly and

optimize the use of your warehouse space. Organize your inventory by which items experience the highest sell-through, those items that sell at a more moderate pace, and items that are slower to move.

3. DECIDE ON A METHOD

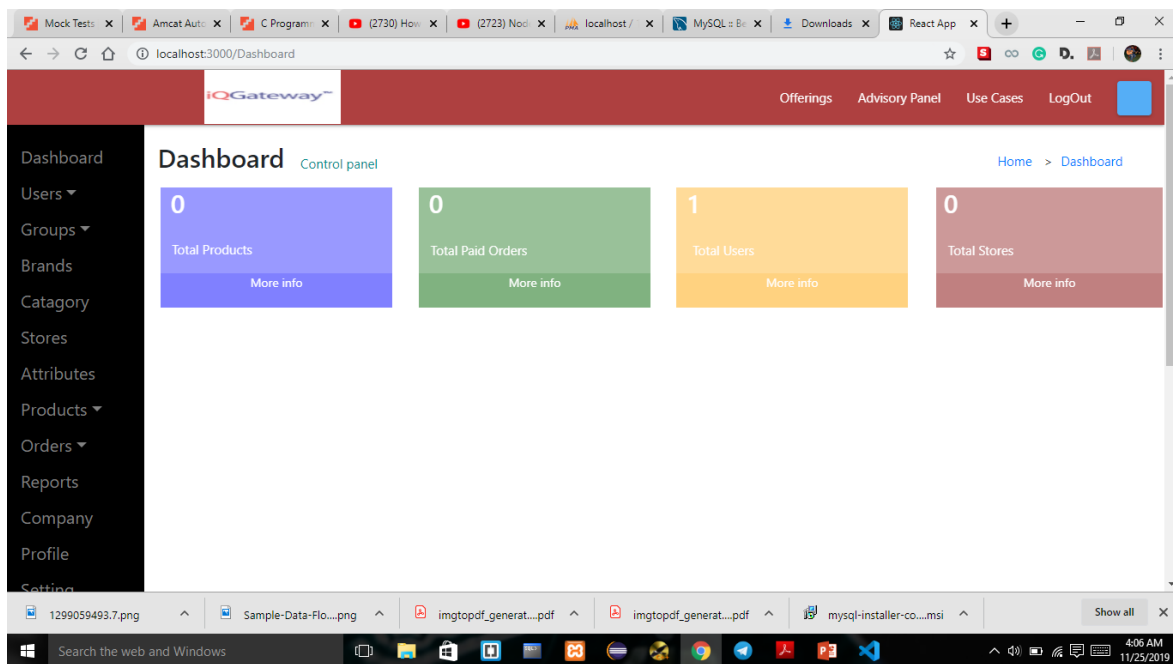
Take a look at which inventory management techniques work best for your business. For instance, you may choose to maintain minimum stock levels in your warehouse and replace inventory only when it reaches that minimum threshold. If you're worried about demand uncertainty, on the other hand, you may choose to keep safety stock. Or if you need to concentrate on reducing carrying costs, a "just-in-time" inventory strategy may be the best method. For more detail on these inventory management techniques, check out [this post](#).

4. FIGURE OUT HOW YOU'LL TRACK INCOMING/OUTGOING INVENTORY

It's important to know the exact number and cost of all the items you have in your warehouse, as well as how inventory is moving in and out of that warehouse. Some smaller businesses often start by doing this manually on paper or Excel spreadsheets, but there are also many software options out there for both SMBs and large businesses to help automate the process. These solutions help businesses develop forecasts, track inventory across multiple warehouses, and generate reports.

5. CONDUCT INVENTORY COUNTS TO ENSURE ACCURACY

Even if you have inventory management software in place, it is important to also figure out how (and how often) you're going to check the accuracy of your system. This can be done by conducting physical inventory counts, and one of the most common methods is cycle counting. This involves specifying a certain set of inventory to physically count each day, and comparing those numbers with the records in your inventory management system. This allows you to catch potential problems and inaccuracies without having to do the overwhelming job of conducting a complete physical count. Questions about how to design an effective inventory management process? Let us know in the comments below.



CRITERIA

1. Automatic calculation of the required stock level for each SKU / location

- Automated orders for movement, supplier and cross-docking orders;
- Algorithms for store orders, RC orders (taking into account the needs of the network) and RC sales, orders of non-everyday demand goods and perishable goods.

2. Performance Indicators and Deviation Notifications

- Indicators of the general situation: out-of-stock, overstock, turnover;
- Indication of priority tasks, e.g., late orders, missing data.

3. Maintaining promotions and seasonality

- Automatic recalculation of stock levels to prepare for and exit a promotion / season.

4. Additional functionality for order placement

- Optimization of orders by amount, weight, pallets;
- Division of the order according to capacity / volume of vehicles;
- Accounting for analog products when placing orders.

5. Control and data transparency

- The ability to quickly form a list of goods with a shortage or excess stock and check the history of orders and movements of any goods in the warehouse for a quick analysis;
- Logging system changes made by its users.

6. Analytics

- Flexible reports for the lost sales, surplus and turnover analysis in the context of warehouses, managers, and groups of goods;
- Assortment reports (ABCD, XYZ);
- Reports on timeliness and quality of order fulfillment by suppliers.

7. Cross-platform

- The ability to log into the system from any device.

Test Cases

Before the project is released, it has to pass through a test cases suit, so that the required functionality is met and previous functionality of the system is also not broken to do this, there is an existing test cases which checks for the previous functionality. New test cases are prepared and added to this existing test suit to check for the added functionality.

Test case describes an input description and compare the observed output with expected output to know the outcome of the test case. If it is different, then, there is a failure and it must be identified.

Test Cases for different field used.

V/E/P Type: should be a character value till length 50

Test Cases	INPUT (a)	Expected Output
1	123	Invalid Input
2	cumins	Valid Company Name
3	Asdfghjklqwertyuiop zxcvbnmasdfghjpoiuyttqwert hello	Invalid Input(out of range)
4	-12	Invalid input

Algorithms

Step1: User Signed in.

Step2: Import products as requirement from different organizations.

Step3: Make Payment.

Step4: Products are received and will be stored as a current asset.

Step5: Client signed in.

Step6: Make Payment.

Step7: Products are sold.

Step8: Reports will be generated.

Step9: All updates of product will go to Stock Database.

Step10: User will manage whole the system.

Pseudo Code

Front End:

App.js : All components are merged in here.

```
import React from "react";
import "./App.css";
import { BrowserRouter, Route } from "react-router-dom";
import Dashboard from "./Dashboard";
import Startpage from "./Startpage";
import Addgrp from "./Addgrp";
import Managegrp from "./Managegrp";
class App extends React.Component {
  render() {
    return (
      <BrowserRouter>
        <div className="App">
          <Route path="/" exact component={Startpage} />
          <Route path="/dashboard" exact component={Dashboard} />
          <Route path="/addgrp" exact component={Addgrp} />
          <Route path="/managegrp" exact component={Managegrp} />
        </div>
      </BrowserRouter>
    );
  }
}
export default App;
```

Other components are Dashboard.js, index.js, index.css, App.test.js, Managegrp.js, Server.js, Startpage.js, ServiceWorker.js , App.css, Addgrp.js, Navbar.js, Sidebar.js, Signin.js, Signout.js.

Back end & Database connection for login page:

```
var express = require("express");
var mysql = require("mysql");
var connection = mysql.createConnection({
  host: "localhost",
  user: "root",
  password: "",
  database: "signin"
});
var app = express();

connection.connect(function(err) {
  if (!err) {
    console.log("Database is connected ... nn");
  } else {
    console.log("Error connecting database ... nn");
  }
});

var app = express();
app.use(
  session({
    secret: "secret",
    resave: true,
    saveUninitialized: true
  })
);
app.use(bodyParser.urlencoded({ extended: true }));
app.use(bodyParser.json());

app.get("/", function(request, response) {
  response.sendFile(path.join(__dirname + "/Startpage.js"));
});

app.post("/auth", function(request, response) {
  var username = request.body.username;
  var password = request.body.password;
  if (username && password) {
    connection.query(
      "SELECT * FROM accounts WHERE username = ? AND password = ?",
      [username, password],
      function(error, results, fields) {
        if (results.length > 0) {
          request.session.loggedin = true;
        }
      }
    );
  }
});
```

```

        request.session.username = username;
        response.redirect("/home");
    } else {
        response.send("Incorrect Username and/or Password!");
    }
    response.end();
}
);
} else {
    response.send("Please enter Username and Password!");
    response.end();
}
});

app.get("/home", function(request, response) {
    if (request.session.loggedin) {
        response.send("Welcome back, " + request.session.username + "!");
    } else {
        response.send("Please login to view this page!");
    }
    response.end();
});

app.listen(3000);

```

TESTING PROCESS

Following types of testing are done on the System.

a) Unit Testing

The module interface is tested to ensure that information properly flows into and out of the program unit under test. The unit testing is normally considered as an adjunct step to coding step. Because modules are not a standalone program, drivers and/or stubs software must be developed for each unit. A driver is nothing more than a “main program” that accepts test cases data and passes it to the module. A stub serves to replace the modules that are subordinate to the modules to be tested. A stub may do minimal data manipulation, prints verification of entry and returns.

Approaches used for Unit Testing were:

Functional Test: Each part of the code was tested individually and the panels were tested individually on all platforms to see if they are working properly.

Performance Test: These determined the amount of execution time spent on various parts of units and the resulting throughput, response time given by the module.

Stress Test: A lot of test files were made to work at the same time in order to check how much workloads can the unit bear.

Structure Test: These tests were made to check the internal logic of the program and traversing particular execution paths.

b) Integration Testing

“If they all work individually, they should work when we put them together.” The problem of course is “putting them together “. This can be done in two ways:

Top down integration: Modules are integrated by moving downwards through the control hierarchy, beginning with main control module are incorporated into the structure in either a depth first or breadth first manner.

Bottom up integration: It begins with construction and testing with atomic modules i.e. modules at the lowest level of the program structure. Because modules are integrated from the bottom up, processing required for the modules subordinate to a given level is always available and the need of stubs is eliminated.

- **Testing includes**

- **Verification and Validation**

- **Verification:-** is a process of confirming that software meets its specification.

- **Validation:-** is the process of confirming that software meets the customer's requirements.

c) Validation Testing

Validation succeeds when software functions in a manner that can be reasonably expected by the customer. It covers the following :-

Validation test criteria: Performance, functional characteristics and uncovered deviation from specification

Configuration review: Ensures that all the elements of software configuration have been properly developed cataloged and have support for the maintenance phase of software life cycle

Alpha Beta testing: Alpha test is conducted by developer's site by customer. Beta test is conducted at one or more customer site by software end user

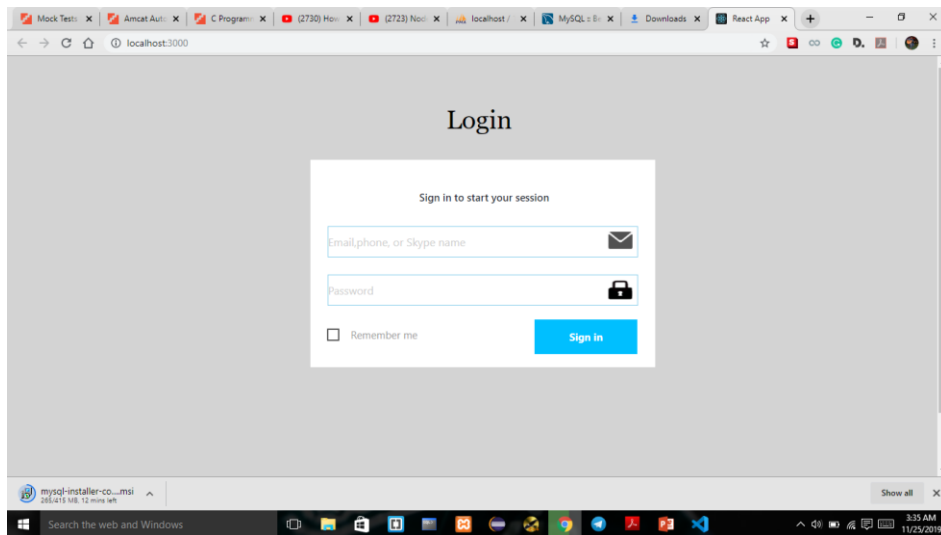
Modular integration testing:

Modular integration testing is done to ensure that the module is working independently. The inputs

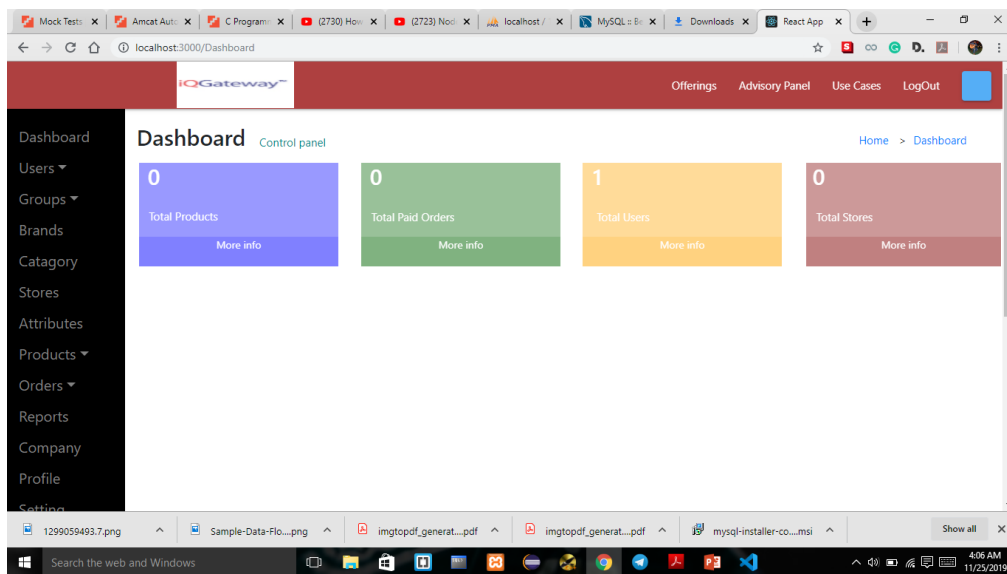
as required by the module are given as required and the output is tested as per the specifications.

RESULTS & OUTPUTS

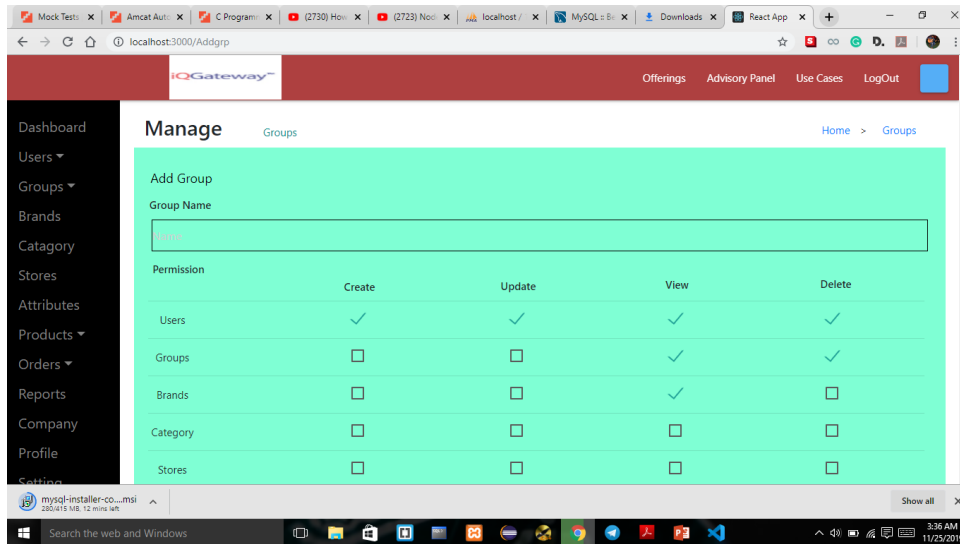
Sign In page:



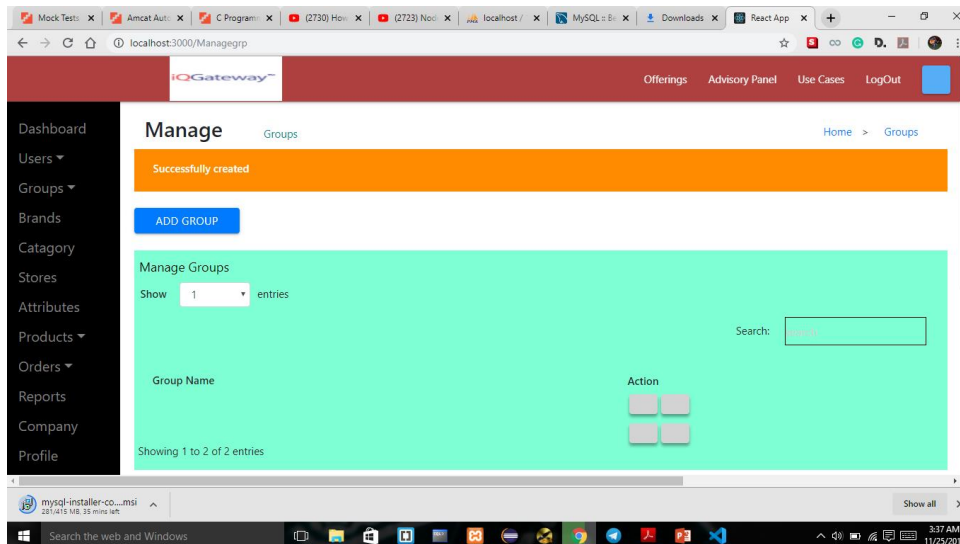
Dashboard Page:



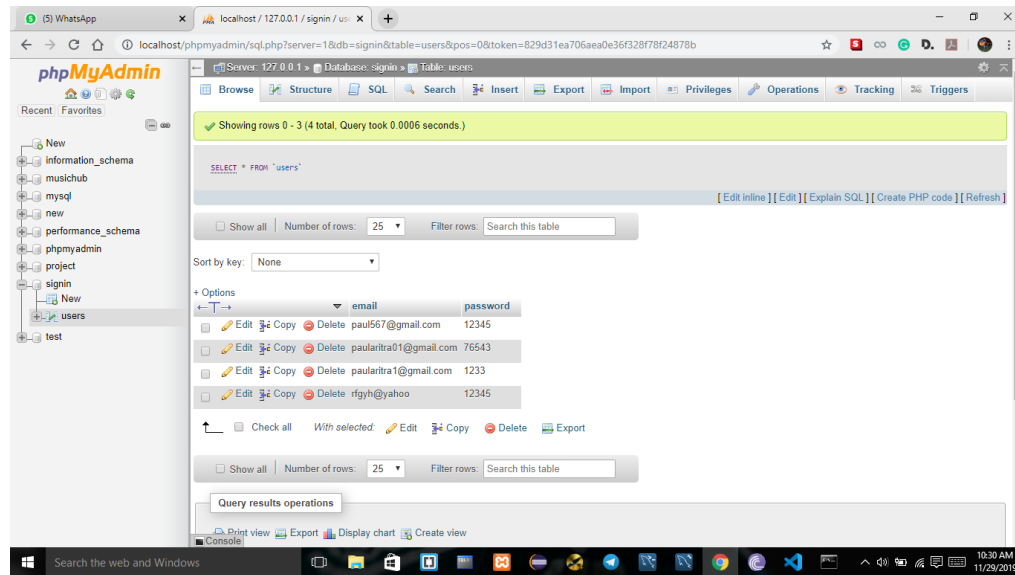
Add Group as per products:



Manage Groups:



User Sign in Database:



Conclusion

The objective of this project was to build a program for maintaining the details of all Supply Order .The system developed is able to meet all the basic requirements. It will provide the facility to the user so that they can keep tracks of all the equipments being supplied. The management of the Inventory will be also benefited by the proposed system, as it will automate the whole supply procedure, which will reduce the workload. The security of the system is also one of the prime concerns.

There is always a room for improvement in any software, however efficient the system may be. The important thing is that the system should be flexible enough for future modifications. The system has been factored into different modules to make system adapt to the further changes. Every effort has been made to cover all user requirements and make it user friendly.

- ❑ **Goal achieved:** The System is able provide the interface to the user so that he can replicate his desired data. .

- ❑ **User friendliness:** Though the most part of the system is supposed to act in the background, efforts have been made to make the foreground interaction with user as smooth as possible. Also the integration of the system with Inventory Management project has been kept in mind throughout the development phase.

REFERENCES

Sites Referred

- www.w3schools.com
- Udemy courses for React, Node, MySql
- <http://bro.gov.in>
- www.aspalliance.com
- www.vbforums.com/showthread.php?p=2686697
- www.final-yearprojects.co.cc

APPENDICES

Books Referred

- “Software Engineering” [K.K. Aggarwal & Yogesh Sighn]
- “Learning React: Functional Web Development with React and Redux” [Book by Alex Banks and Eve Porcello]
- “Node.js in Action” [Marc Harter, Nathan Rajlich, T. J. Holowaychuk, Mike Cantelon]