

Web Based Printing Job Management System

**K. M. G. Senarathne
2020**

Declaration

The thesis is my original work and has not been submitted previously for a degree at this or any other university/institute.

To the best of my knowledge it does not contain any material published or written by another person, except as acknowledged in the text.

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Certified by:
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Date:



Web Based Printing Job Management System

**A dissertation submitted for the Degree of Master of
Information Technology**

**K. M. G. Senarathne
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Acknowledgement

This dissertation is an important milestone in my career. I have been learnt how to use the concepts and the theories that we have learnt in Master of Information Technology in order to build a software product.

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Chapter1. Introduction

Nihal Printers is a popular printing press in Kurunegala city among tuition masters, restaurants, bakeries, and ordinary people. They provide a range of services including paper printing, production of documents, box printing, book binding and laminating. They have number of regular customers and one time customers who are willing to have the service of Nihal Printers. But they don't have a proper way to manage their customers.

When observing their printing process there are several steps usually they follow. Starting from the customer printing order to the delivery of the print happens manually. Therefore usually process getting delayed and they need to repeat the same thing again and again.

Customers always should visit their place to take the service of them. Customers used to visit Nihal Printers and submit the documents that they want to print, whether it is a hard copy or soft copy. Then they produce the documents, if it is a hand written document and print number of copies of the document. Customers need to take phone calls in time to time to make sure that they have completed the task. Therefore they have to face inconvenience situations regularly. Although for requesting a quotation also need to visit the Nihal Printers and get the quotation.

They use a receipt book to provide bills for their customers. Then it is difficult them to store and analyse the past sales records. Although they don't know the proper details of their customers, how long the customer has been with them or how many sales have they made?

Nihal Printers has number of raw materials used in their printing process. But they don't have any proper procedure for stroke management. They don't have exact idea about their available stroke and re-order level of raw materials. They are unable to maintain the record of their suppliers as well. Therefore they have to wait number of days to deliver the raw materials. Then the printing process is also getting delayed due to their poor management.

Finally they don't know the exact amount of the revenue they earn and the expenses that they spent for last month or last year due to their poor arrangement in valuable records and lack of use in technology to maintain the past records.

This Printing Job Management system aims to increase the efficiency of the printing process of Nihal Printers and it will help to manage the internal works such as supplier and customer records maintenance, recoding order details, generate purchase order and revenue calculation etc. Although this system will enhance the customer base and facilitates customer to engage with the printing process distantly.

This chapter describes the problem definition, project objectives, scope, motivation and the limitations of the project. Chapter 2 will describe about the background study of this system, that

the existing press management software products and the similar systems available. Design and the methodology of this system will be described in Chapter 3. Chapter 4 will discuss about a critical evaluation of the system, such as objectives achieved, failures and lesson learnt. Conclusion of the dissertation will be in Chapter 5 and it will describe the about summary of the result of the project and the future work.

1.1 Project Objectives

- Produce a web application for the Nihal Printers to remotely interact with their customers.
- Automate invoice generation and bill printing.
- Effectively manage the supplier details and purchases.
- Properly manage stock and re-order levels.
- Real time updating of the printing progress to the customer.
- Facilitates to generate reports for decision making and analyzing the revenue.
- Secure confidential data in the organization from avoiding to access the unauthorized people.

1.2 Motivation

There are number of people who are looking for finding printing services either small or large scale. Sometimes they may need to get the quotations for printing. Rather than visiting a printing press it'll be more convenient for them to request for a quotation or a place an order for printing through a web based system. It will be an efficient and appropriate method to share the printing document, (image or a text document) with the press using an application. This strategy will course to gather new customers and expand the business for Nihal Printers.

Although for the printer's perception, this system notify customer requirements and no need to put an additional effort to gather documents or any other requirements manually. Once customer placed the order system will provide all the details required for printing by itself. Without providing mandatory fields the customer will not be able the place the order.

There are no proper way of maintaining supplier details, raw material details and the stock control in Nihal Printers. Through this system it'll be easy for the Nihal Printers to maintain all those details and calculate profit and expenses. Although it will be visible the customer printing patterns, material usage and expenses for the suppliers.

1.3 Limitations

Suppliers don't have access to the system, since Nihal Printers does not need to purchase raw materials through the system. Although it is not practical for the suppliers to login to the system always and view the purchase orders from Nihal Printers. Some suppliers are used to visit the nearby presses around the Kurunegala city and do the sale. Therefore Supplier login is counted as an unnecessary feature for Nihal Printers and the suppliers will not be able to login to this Printing Job Management System.

Online payments are not handling by this system, since the Nihal Printers does not allow to make the online payment at the movement. But as the final step of the printing process customer needs to visit the shop and collect the printed materials. Therefore they can make the payment once they visit the shop. The system generates the total amount to pay for the service and the discount if any. When the customer making the payment staff member can search the order and record the payment details.

Chapter 2: Background

2.1 Analysis

For the requirement gathering I visited the Nihal Printers and observed their working environment. Once a customer visit to the Nihal Printers they used to get the printing details in to a printed form. They manually write the details such as type of item, number of pages, laminating cover page, typesetting etc. Then until the end of the printing process they use that form and also based on the details they calculate the payment. Therefore a main function of this system is to computerized this data gathering and allow to access, update details in digital format. Another main functionality that I have identified is to place an order for the regular customers remotely. I have notify that they have not properly maintain the income and expenses. Therefore I wanted to build a proper mechanism to make visible all the income, expenses and revenue.

This chapter will describe the requirement that I have gathered and also the aspects that I have refuse to implement due to some reasons.

2.1.1 Functional Requirements

Basically there are four types of users in the system, Administrator, Staff Member, Registered Customer and Guest.

Administrator is the main user of the system and owner of the Nihal Printers will act role of Administrator. Following functionalities can be done by the Administrator;

- Login to the system.
- Mange user profile.
- Add Staff members to the system.
- Accept the customer registration.
- View Customer request and contact customers.
- Accept the customer request for printing.
- View customer history.
- View available tasks.
- Update the status of the tasks.
- View the responsible staff member with respect to the status of a task.
- Generate quotation and send to the customers.
- Add sales records to the system.
- Generate invoices, bills and print.
- View customer details.
- View completed tasks.
- Add items to stoke.
- Add and update supplier details.
- View re-order items.
- Generate purchase orders and calculate the expenses.
- Add and update Suppliers.
- Add new stroke to the system.
- Add and update products.
- Add and update materials.
- Add daily usage of materials.
- Generate expense, order and material reports.

Staff Member plays a main role of the system and other staff members working in the press, except the owner will be given the privileges as Staff Member in this system. Following functionalities can be done by a Staff Member;

- Login to the system.
- Mange user profile.
- View Customer request and contact customers.
- Accept the customer request for printing.
- View available tasks.
- Update the status of the tasks.
- Add sales records to the system.
- Generate invoices, bills and print.
- View customer details.
- View completed tasks.
- Add items to stoke.
- Add and update supplier details.
- View re-order items.
- Add and update products.
- Add and update materials.
- Add daily usage of materials.

Registered Customer is a regular customer, who used to engage with the service from Nihal Printers frequently. Following privileges are available for the Registered Customer;

- View the available services.
- View the contact details.
- Login.
- Manage user profile.
- Contact with Nihal Printers.
- Send documents or images.
- Provide details of printing and request to print.
- Request for quotations.
- View the status of the printing.
- Receive the invoice.

Guest is a person who is willing to be a customer or interested of Nihal Printers. Guest is eligible to do the following functionalities;

- View the available services.
- View the contact details.
- Self-registration to the system.
- Request for quotations.

Out of Scope:

- Online Payment Handling.
- Supplier interaction with the system.

2.1.2 Nonfunctional requirements of the project

Nonfunctional requirements are the requirement that specifies criteria that can be used to judge the operation of a system, rather than specific behaviors. They are contrasted with functional requirements that define specific behavior or functions.

- **Availability**

As this is a web based system this available in 24 hours of the day. If the internet service gets disrupted while sending information to the server, the information can be send again for verification. System will be temporary down when there is an update or maintenance going on.

- **Reliability**

It should be make sure that the system is reliable in its operations and for securing the sensitive details and that it may not crash while the processes are happening. Confidential details such as the NIC number, contact number and address in the user account will be only visible for the admin, staff and the customer himself of the system. Also that these details will only be used for the official purposes.

- **Maintainability**

The system has ability to be retain in its original form and to be restore to that form in case of failure. Code is easily maintainable, since I have used PHP, HTML and CSS. Use of comments can make maintenance easier, assuming they aid code comprehension. Comments can be helpful to understand what the code in question solves, and why it solves it the given way.

- **Security**

One or more requirements about protection of system and its data. Information transmission should be securely transmitted to server without any changes in information. System has all the details of customers, suppliers and staff, so it should be more secure. User name and password is the things that confirm about security mainly. Passwords are encrypted in the database.

- **Usability**

As the system is easy to handle and navigates in the most expected way with no delays. In that case the system program reacts accordingly and transverses quickly between its states. Easy and quickly understandable icons and navigations used in this Printing Job Management System. Specially customers can register in the system easily and the logged customer interfaces are very simple and easily adoptable.

2.1.3 Data Flow

There are several processes going on in this system, such as registration process, request for quotation process, online ordering process, bill printing process, report generation processes etc. Those processes are specific to the user roles and there are several steps need to perform a process.

For an example if we describe about the online ordering process, only the Registered Customer is eligible to perform the online ordering. Initially customer needs to login to the system. Then he can click on place an order tab and enter the order details there. Details of the order will be captured by the Order Details Form. Then the customer can confirm and place the order. After that the Staff member or the Administrator can view the order details and he can confirm the order. Then the notification will be sent to the customer and he can view the status of the printing process.

Following data flow diagram illustrate the process of online ordering performed by a Registered Customer.

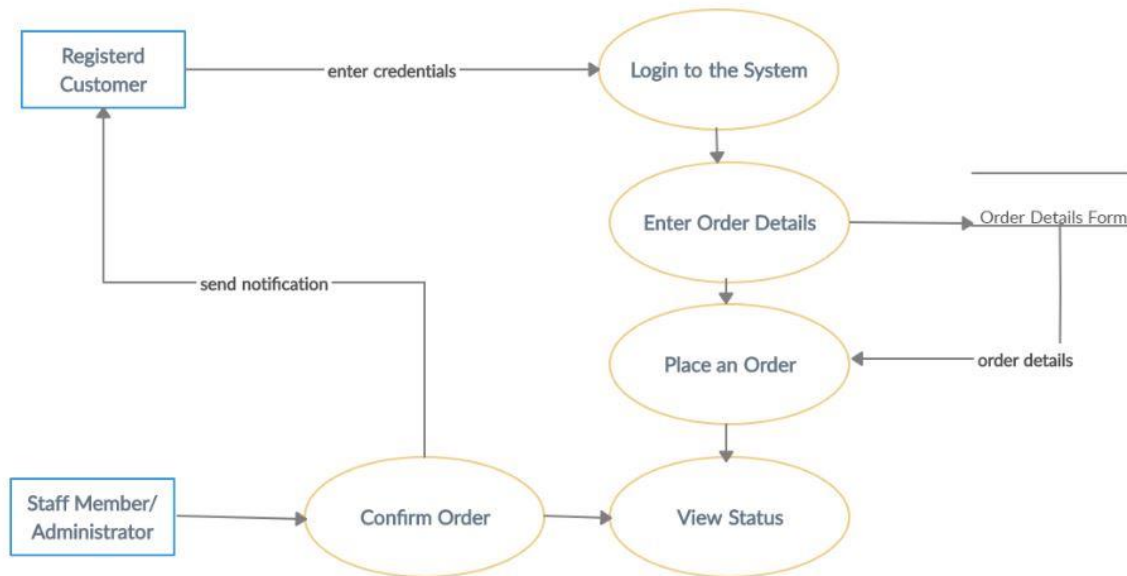


Figure 2.1: Data Flow Diagram for online ordering process

Bill printing process can be done by the Administrator or Staff Member. He can view the order list and find out the corresponding order which is going to make the payment, based on the order id or customer NIC. Then he can add the payment details of the order and payment details of the order will be updated. If the customer make the full payment order will be sent to the completed orders. If not the remaining payment will be updated in the database in the corresponding order. Later he can view the payment details and generate a bill. Then he will allow to print the bill.

The data flow diagram below is an illustration of bill printing process.

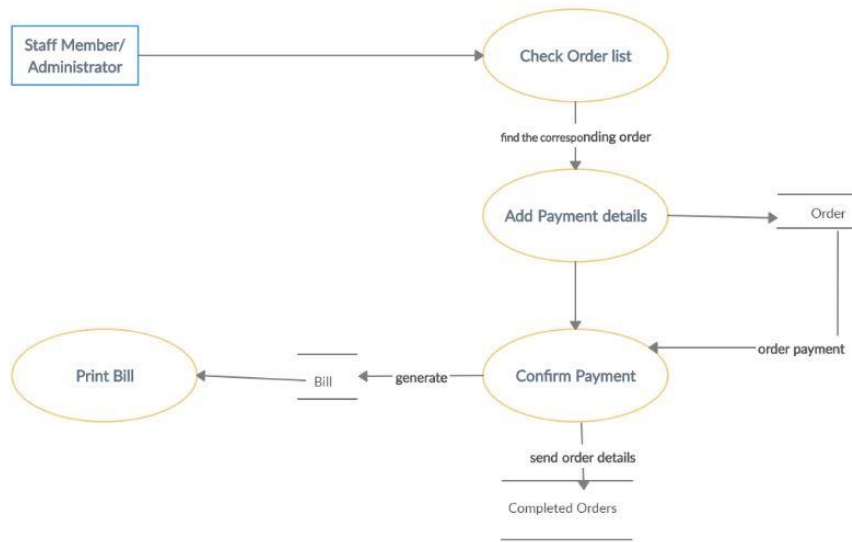


Figure 2.2: Data flow diagram of bill printing process

2.2 Review of Similar Systems and Technologies

When reviewing existing software on Printing Management there are number of build-up commercial software available. Some of the most popular Printing Management systems around the world are Print Shop Manager, EFI Pace, Easy Cut Studio, Printvis etc. These commercial software applications are online portals and main intention is to have a better customer relationship management. These applications help printers to meet customer demands, while capturing data about buying behavior. Some of the applications are focused on financial and operation management. Those are driving more efficient workflows, leading to cost savings and reduced cycle times for both production and accounting tasks. Basically all of these applications supports for finance, sales and marketing, operations and human resource management.

Printers basically expect in a software to effectively manage materials, order communication, production cost tracking as the operations management. For the financial management general ledger, account receivable and payable, purchasing recodes should be maintained. If it is a large company human resource management is also important and payroll management, maintain employee records should be handle by an effective commercial software solution.

One of the best commercial software application is Print Shop Manager. Print Shop Manager can be purchased in several versions based on the number of employees in the organization and the

interest and the budget of the organization. There specific features to the Print Shop Manager such as flexible and powerful print estimating, use multiple pricing rates for multiple customer types, create templates for special sales items or common jobs, set up several levels of prices in the same pricing tables etc.

PrintVis is the Microsoft-certified ERP/MIS built specifically for the print industry. PrintVis is sold and implemented exclusively for partners in Europe, North America, The Middle East, Africa, Asia and Australia. It provides valuable functions such as;

- Estimating and Quoting
- Case Management (full view of cases with detailed information on deadlines, delivery dates, customer information, job history, etc.)
- Planning and scheduling
- Shop floor management
- Inventory and purchasing
- Job costing
- Invoicing
- Financial Management
- Integrations

EFI Pace is a browser-based, scalable and customizable print management system. EFI Pace enables organization to plan sales and marketing projects, activities and related costs to projects, and track results against budgets and link campaigns. Although reporting capabilities helps to track opportunities by account, from campaigns, by representative and by a specific date range. This application also facilitates for estimating and quoting, financial management, inventory management, job control and scheduling, job production and costing and purchasing.

In Sri Lankan context still most of the customers used to visit the print shop and get the service. Printers also use a manual system for handling their internal jobs. Now a days there is a trend to moving to an automated system. Some of the popular print shops in Sri Lanka also maintaining their own websites and provides a good customer relationship. As an example Anim8.lk is popular digital printing service provider in Colombo and they provide user-friendly interactive website to capture the client real requirement. They provide their products and templates such as gift ideas, wedding cards, business and marketing materials, invitations, mugs, textile printing, interior decor and so on. They have shown their own templates and client can customize those templates and upload their images and files based on their requirement.

Most of the popular printers within Colombo have their own websites, but most websites are static and just to view their details of the organization rather than having an active communication with the customers. Print shops such as Metropolitan Print Hub, Softwave have published in their websites about contact details, services, and newsfeeds etc. But if a customer need to place an order, he has to make phone call or mail to their official email. The advantage of their website is customers can view the contact details and services of them.

When comparing to those systems Web Based Printing Job Management System special since I expect to build better customer relationship through the system. Customers will be able to satisfy their printing requirements without visiting to the print shop. They will be able to view all the printing capabilities of Nihal Printers in the website and they will be able to choose the printing categories, colors and materials. This system will enable the online file transactions and customers can send their images, files and document to be printed through the system. Then the staff member can accept or reject the print. Customers can visible the printing progress through the system. Once the printing job completed customer will receive a notification. Therefore this system is very user friendly and both the customers and staff will keep closely. Although as a special feature in this system the customers can generate quotations providing their requirements. Most likely to the commercial software applications, this Web Based Printing Job Management System enables finance management, inventory control, invoicing etc. But those functionalities are specific to the Nihal Printers.

Chapter 3. Methodology

3.1 Development Model

The development model for this project iterative and incremental development. This is a combination of both iterative design and incremental build model for software development. The requirement of this project is some sort of fixed well known requirements for the client. Therefore it suits for the waterfall model also.

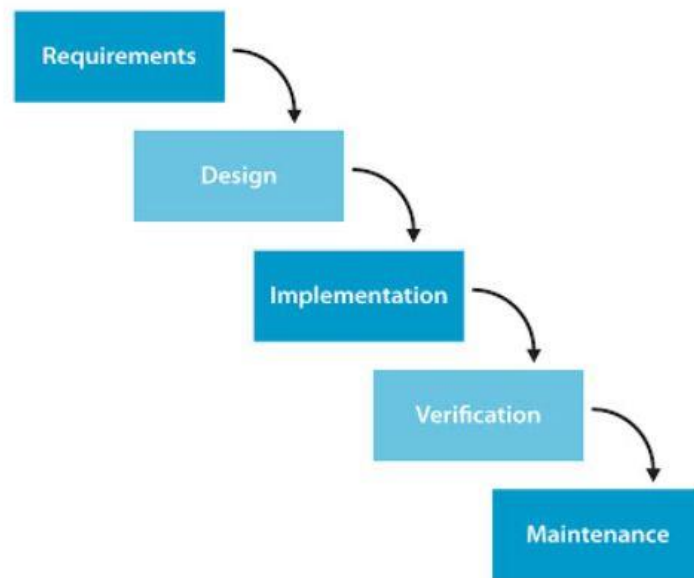


Figure 3.1: Waterfall Model

As the above figure shown in the waterfall model the project can be implemented phase by phase. The output of the project will be delivered at the end of all phases. As if it is simple and easy to manage, but it will not accept the changes in the mid of the phases, such as implementation, verification and maintenance. Testing and verification comes quiet late in the process and high risk to go beyond the schedule by following waterfall model.

To mitigate all those drawbacks I chose combination of iterative and incremental development model for this project. The entire project will be break down into smaller increments. Mistakes and lesson learnt from the previous iteration can be used for the next iteration using this model.

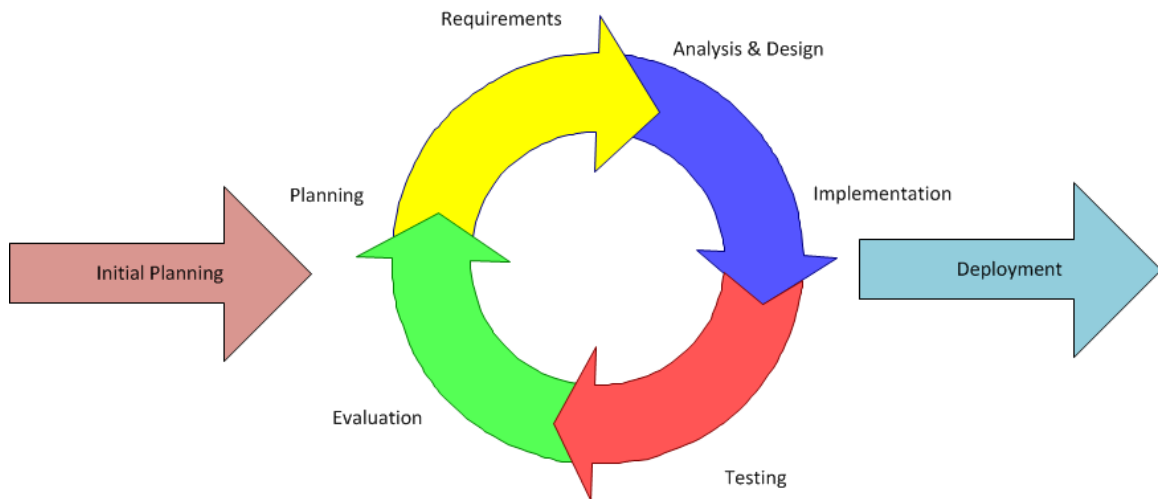


Figure 3.2: Iterative and Incremental Development Model

When each iteration is finished we can demonstrate it to stakeholders. Then the feedbacks will be help for the learning process and any modifications can be carry out to the next iteration. Although it will be much easier to spot problems and to take corrective actions early. Unlike the waterfall model this model each phase of the software development life-cycle (SDLC) will be fully completed until the next iteration starts.

One of the main advantages of iterative development is that it allows more flexibility to adapt to changes. Unlike the waterfall model where unforeseen problems in the project and are very costly to fix, iterative approach, on the other hand, goes through short cycles that allow to learn, adapt and change the direction in the next iteration.

Agile methodologies are the most popular software development methodology recently. There is a high stakeholder involvement in agile method and welcome the changes in project. And also agile provide early prediction on cost and schedule. But it is difficult to use agile methodologies such as Scrum and Kanban in this project. Such kind of methodologies usually performed by a cross functional team. But this is an individual project and I reject the agile methodologies to implement this project. Hence I am using iterative and incremental development model, I also following some sort of agile practises as well.

3.2 Work Breakdown Structure

As I defined to develop the project in iterative and incremental model, I have to develop this project into several iterations. Therefore I have break down this project into several modules as followings;

- User management module
 - User registration
 - Edit and update profile
 - Add another user(if staff member)
- Stroke management module
 - Add items
 - Purchase items
 - View the available items
 - View reorder levels
- Supplier management module
 - Add suppliers
 - Edit and update supplier details
 - Add products to the suppliers
 - Purchase items from suppliers
 - Make payments
- Bill printing and sales module
 - Add orders
 - Update the status of the orders
 - View the status to the customer
 - Generate bills
- Report generation module
 - View customer printing pattern
 - Calculate the expenses for the suppliers
 - Calculate the usage of raw materials
 - Generate supplier report
 - View the completed printings on products.

3.3 Plan and Management

The task list was then used to produce a Gantt chart shown in below. This gave a clearer breakdown of the tasks and allowed for them to be scheduled easier. The Gantt chart played a crucial role in time keeping of the project and was often referred back to in order to ensure the tasks were completed on time and were deliverables meeting their deadlines. The Gantt chart was updated throughout the duration of the project to reflect any deviations from the original plans. This included any unforeseen problems not already compensated for by the risk analysis.

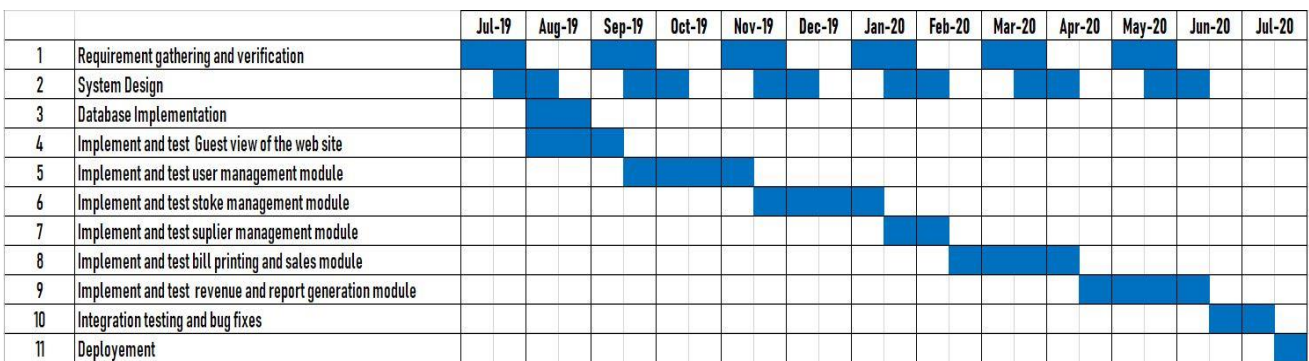


Figure 3.3 Gantt chart

A folder structure is maintaining to keep backups of all reports, code, diagrams and notes on hard disk. As well making a backup of the most recent changes of the application, individual backups of every major version were kept. This was done not only to minimize the impact of lost work, but also to refer back to previous working versions should any faulty code need reverting to a previous state.

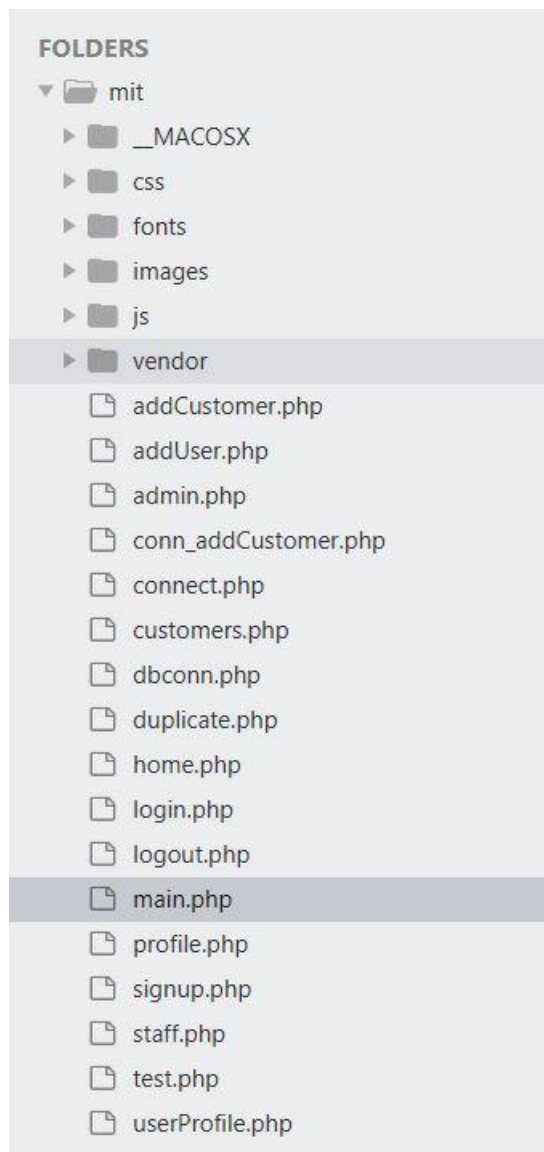


Figure 3.4: Folder Structure

Although the coding conventions are used as a best practice though out the project, such as file organization, indentation, comments, declarations, statements, naming conventions, programming practices, programming principles etc. These coding conventions will help improve the readability of the source code and make software maintenance easier. Coding conventions will applicable for future enhancement and modifications to be made. Comment conventions, Naming conventions, indent style conventions will improve the readability of the source code and it can be considered for refactoring.

```
main.php x admin.css x admin.php x userProfile.css x userProfile.php x customers.php x addUser.p
1 <?php session_start();?>
2 <?php include ("dbconn.php");?>
3 <?php
4 //checking if a user is logged in
5 if(!isset($_SESSION['user_id'])){
6     header('Location: login.php');
7 }
8
9 ?>
10
11 <!DOCTYPE html>
12 <html>
13 <head>
14 <meta name="viewport" content="width=device-width, initial-scale=1.0">
15 <link rel="stylesheet" type="text/css" href="css/admin.css">
16 <link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/font-awesome/4.7.0/css/font-awesome.min.css">
17
18 <!--verify the user to logout from the system-->
19 <script>
20     function confirmLogout() {
21         alert("Are you sure you want to logout");
22         window.location='login.php';
23     }
24 </script>
25
26 <!-- active the clicked tab-->
27 <script>
28     function openTab(Name) {
29         var i;
30         var x = document.getElementsByClassName("city");
31         for (i = 0; i < x.length; i++) {
32             x[i].style.display = "none";
33         }
34         document.getElementById(id).style.sidebar.active.backgroundColor= "#800080"
35     }
36 </script>
37
38 </head>
39 <body>
40
```

Figure 3.5: Coding Conventions

3.4 Use case Diagram

Following use case diagram illustrates the high level view of the actor privileges. This use case diagram has prepared according to the functional requirements gathered from Nihal Printers.

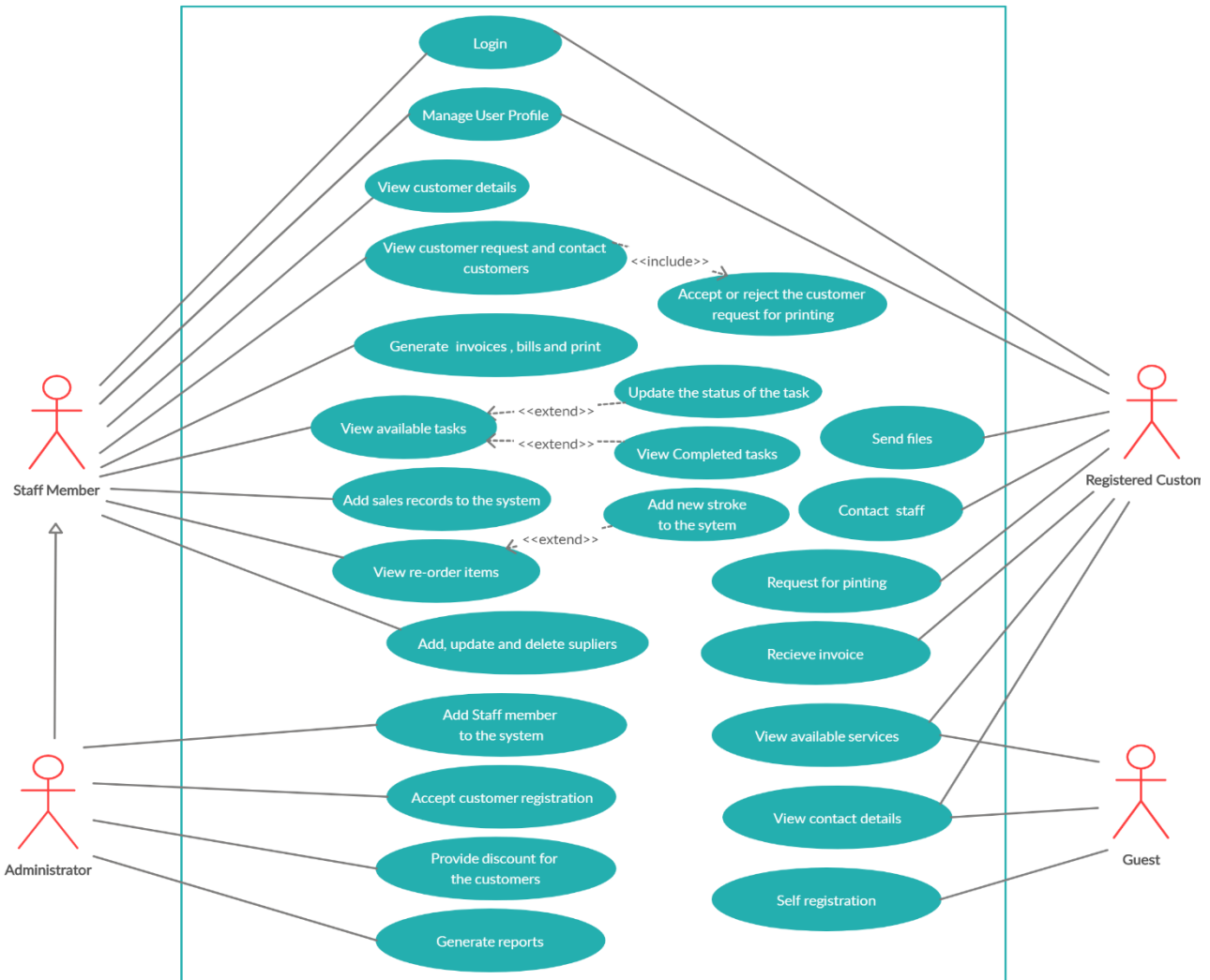


Figure 3.6: Use case Diagram

3.4.1 Use case Diagram of Administrator

Administrator is the main role of this system. The owner of the Nihal Printers can be act as the administrator.

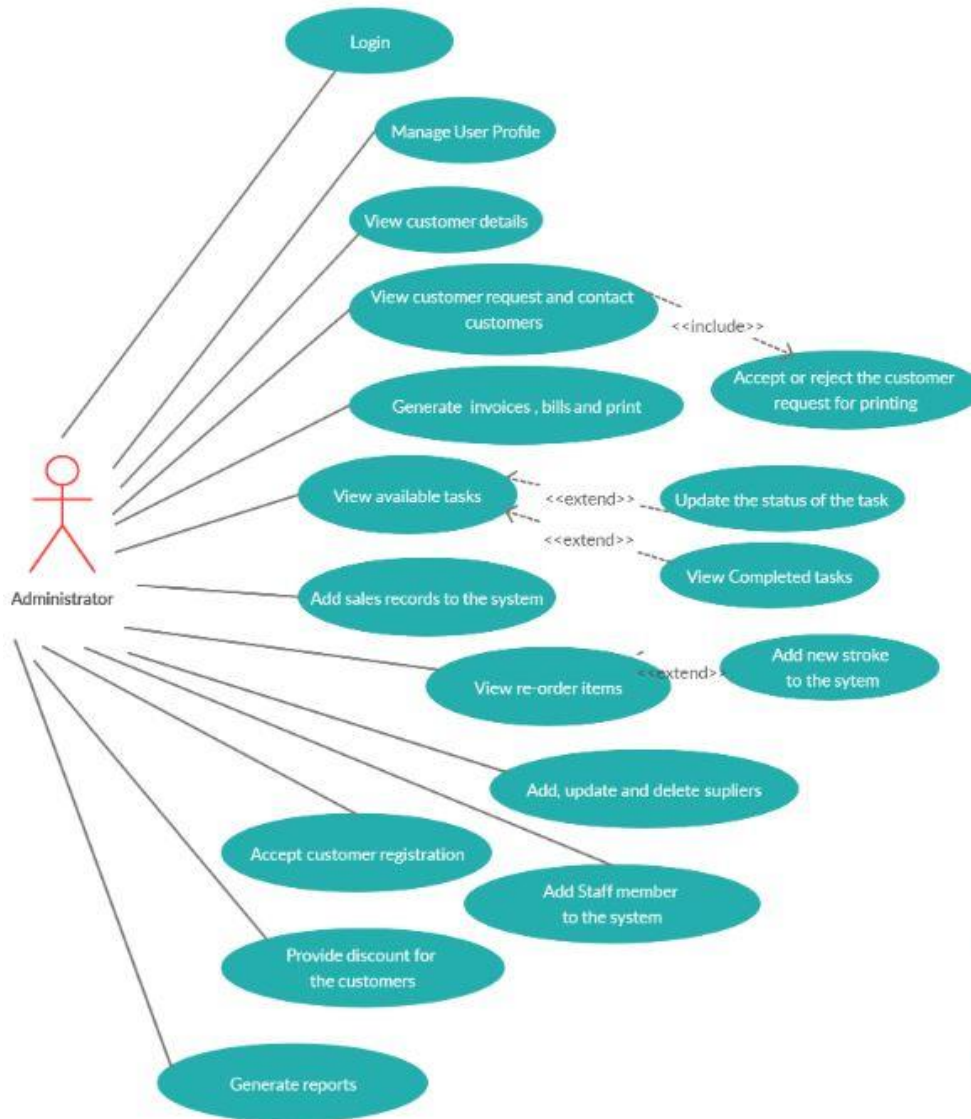


Figure 3.7: Use case of Administrator

3.4.2 Use case Diagram of Staff Member

Staff work in the Nihal Printers will be given the access as a staff member and Administrator should register them in the system to get the privileges. Administrator has given all the privileges of staff member and staff member cannot perform all the functionalities of Administrator.

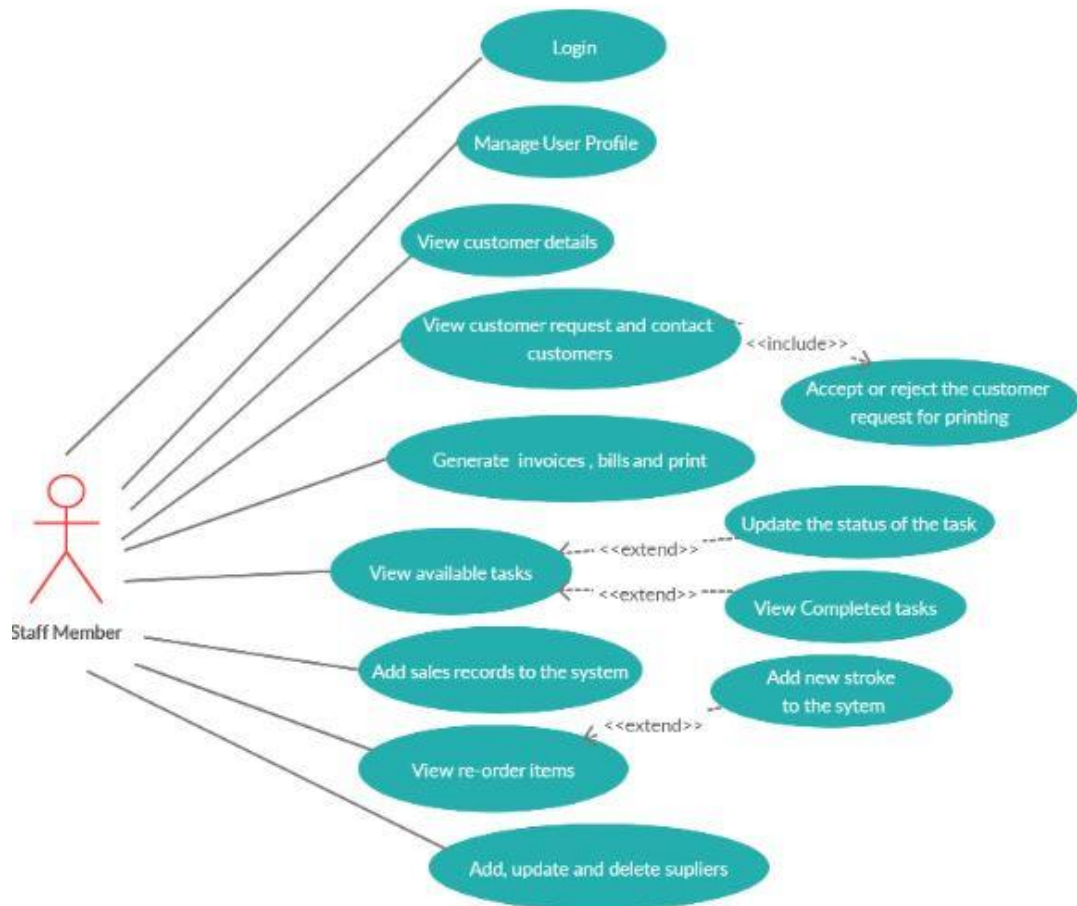


Figure 3.8: Use case of Staff Member

3.4.3 Use case Diagram of Registered Customer

Registered Customer has given the following privileges.

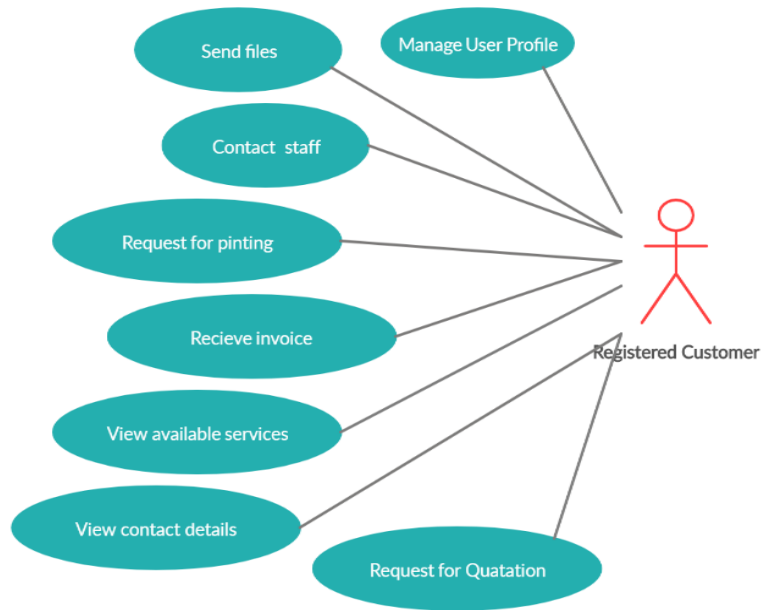


Figure 3.9: Use case of Registered Customer

3.4.4 Use case Diagram of Guest

Guest can be an external person interested in Nihal Printers.

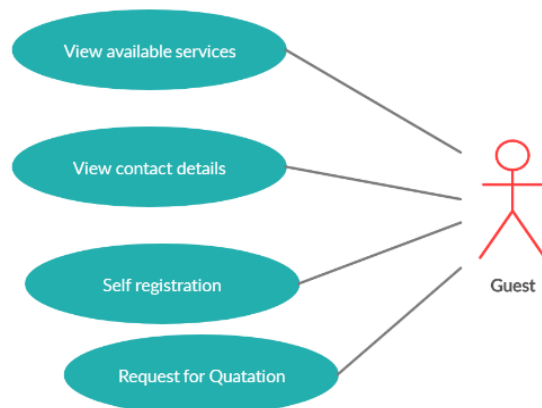


Figure 3.10: Use case of Guest

3.5 Entity Relationship Diagram

I have used relational database for this system and ER diagram below will illustrate the database design of the system.

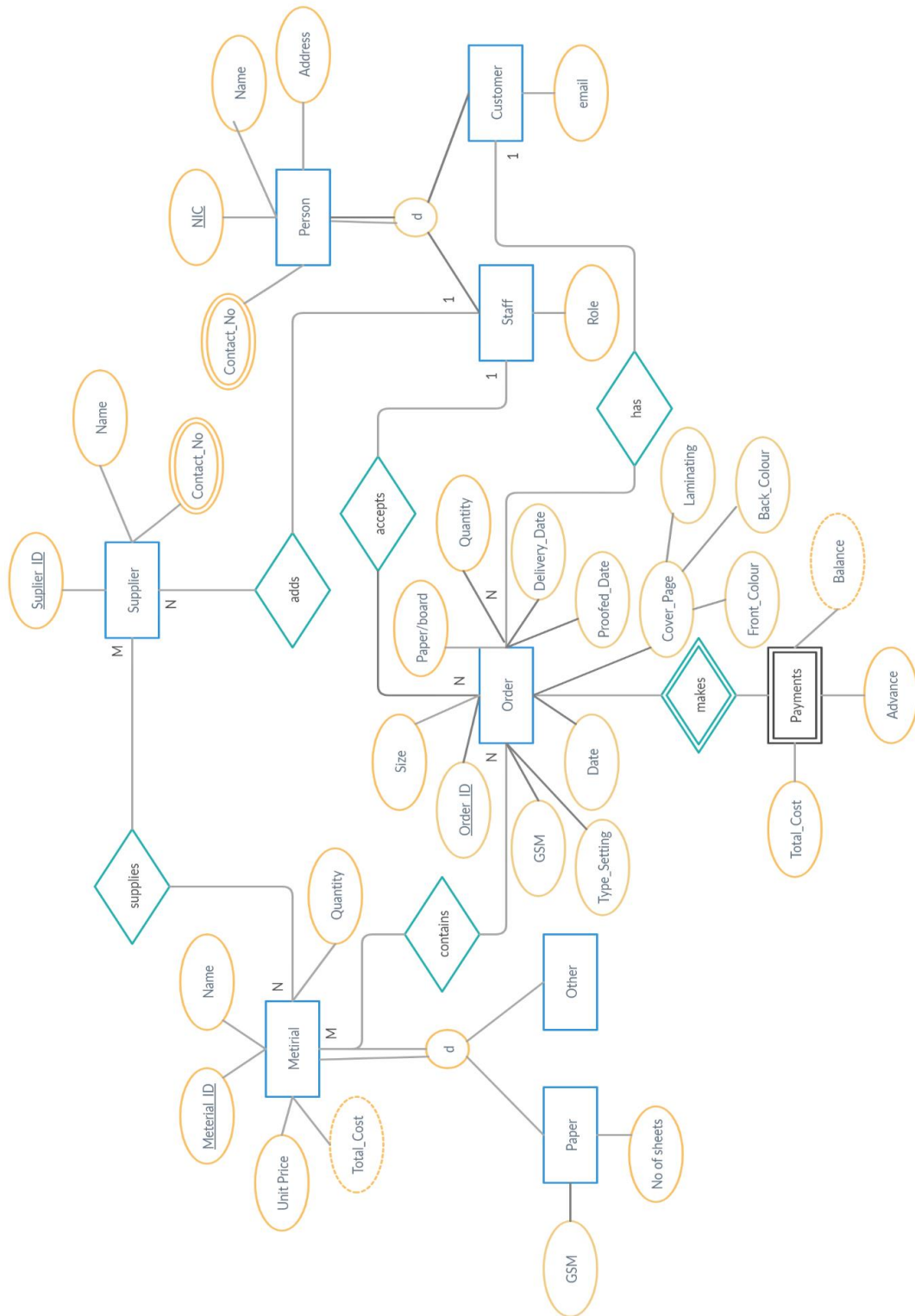


Figure 3.11: ER Diagram

3.6 Class Diagram

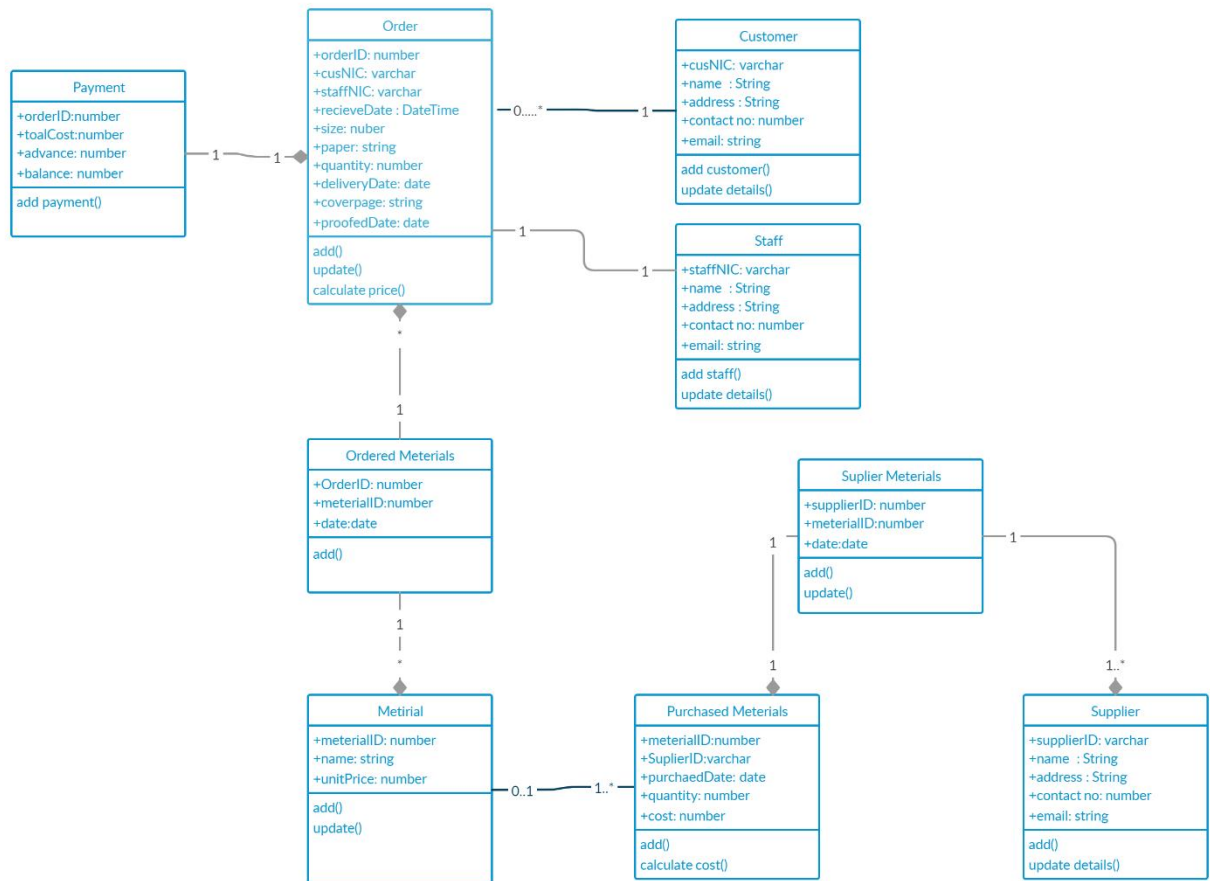


Figure 3.12: Class Diagram

3.7 Implementation Environment

This system is a web based solution for Nihal Printers, therefore I have basically used PHP for backend development. HTML, CSS and Bootstrap used for the front end development. Although JavaScript is used for the backend development to generate confirmation messages and navigate across the pages.



Also I Used MySQL as database and XAMP as the server. Following configurations I have used to develop the Printing Job Management System for Nihal Printers.

- XAMP v3.2.2
- PHP 7
- HTML 5
- Bootstrap 4

Generating bills, invoices and quotations was generated by the TCPDF library. CanvasJS templates are used to generate the graphs.

I used several online tools for designing. I have drawn diagrams; use case, class and entity relationship diagram using tools such as Smartdraw and Createlty.

3.8 Testing

Several types of testing methods are performing throughout the entire development cycle in order to ensure the product functioning properly and met the required specifications.

The first form of testing is unit testing. This was a key consideration in the design of the system and indeed one of the main reasons for developing the software as a number of subsystems. Unit testing is the process of ensuring the individual components of an application all work as intended, this was a very straightforward procedure. This meant each modules of system can be tested in isolation without any external interference. When the various units can bring together in the final system can be tested by the integration testing.

Another continuous process performed throughout the life of the software development process is requirement testing. This concerned whether or not the software was satisfying the requirements outlined at the start of the project. As well as it will be a safeguard to keep development on the right track, it also allowed me to determine when the final system is at an acceptable stage of completion.

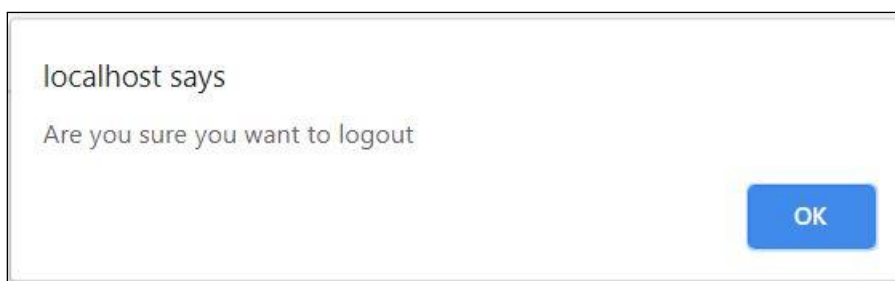
At the final stage of the project user acceptance testing will be performed. Staff of the Nihal Printers and small number of volunteers ask to use the final product and rate the experience of product. This testing will be emphasize the usability of the system and effectiveness of the product to the Nihal Printers.

When discussing with the validations, there are serval kind of validating techniques used to mitigate the human error and slips. Error messages, verification alerts are used to restrict the mistakes happened by the user.



The screenshot shows a web form titled "Add New User". It contains four input fields: "NIC" (with value "763489412V"), "Name" (with a single character "|"), "Role" (a dropdown menu with "Staff Member" selected), and "Address" (with value "Colombo 05"). A red error message box is overlaid on the "Role" field, containing a warning icon and the text "Please fill out this field.".

Figure 3.13: Error Messages



The screenshot shows a verification dialog box with the text "localhost says" and "Are you sure you want to logout". A blue "OK" button is located in the bottom right corner.

Figure 3.14: Verification Message

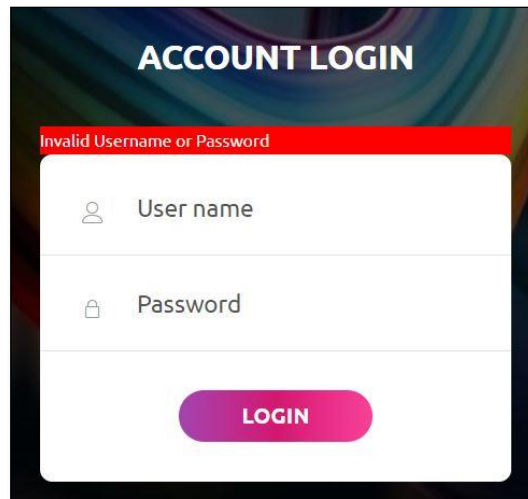


Figure 3.15: Validations

Functional testing is basically I have performed in manually. Here I have included some of the test cases that I have executed in this Printing Job Management System. Following test cases are executed for the user login and sign up pages.

1) User Login

Test Case #: 01	Test Case Name: User Login
System: Printing Job Management System	Subsystem:
Designed by:	Design Date:
Executed by:	Execution Date:
Short Description: User can be the Administrator, Staff Member or Registered Customer	

Pre-Conditions
User should has an account

Step	Action	Expected System Response	Pass/Fail	Step
1	User enters valid username and password and click login	User is redirected to homepage	Pass	Login
2	Click on “Login” button without inserting username and password	Display a message “Please insert user name and password”	Pass	Login
3	Click on “Login” button without giving password	Display message “Please enter password”	Pass	Login
4	User enters a wrong username	Display an error “Wrong username”	Pass	Login

5	User enters wrong password.	Display an error “Wrong password”	Pass	Login
6	User enters invalid username and password	Display message “Please enter valid user name and password”	Pass	Login

Post-Conditions
User is granted access Users are able to view main interfaces allowed for them separately.

2) Sign up

Test Case #: 02	Test Case Name: Add user – Admin Staff
System: Printing Job Management System	Subsystem:
Designed by:	Design Date:
Executed by:	Execution Date:
Short Description: Guest users can sign up in the system himself.	

Pre-Conditions
User needs to visit the website of Nihal Printers

Step	Action	Expected System Response	Pass/Fail	Step
1	Click on “Sign Up” button.	User is directed to the sign up page	Pass	Sign Up
2	Enter user details correctly and completely. Then click on “Submit” button.	User will add to the system and he will directed to the login page	Pass	Sign Up > Submit
3	Keep all the empty fields and Click on “Submit” button.	Display an error message “Please enter required fields”	Pass	Sign Up > Submit
4	Enter NIC less than 9 digits and fill all other details correctly.	Display an error message “Please enter a valid NIC”	Pass	Sign Up > Submit

5	Enter username only with letters and click on submit button	Display an error message "Please enter required fields"	Pass	Sign Up > Submit
6	Enter name with numbers and symbols and click on submit button	Display an error message "User name is invalid. Please enter required fields"	Pass	Sign Up > Submit
7	Enter invalid email without "@" sign and fill all other details correctly.	Display an error message "Please enter a valid email"	Pass	Sign Up > Submit
8	Enter letters in contact number and click on submit button	Display an error message "Contact number is invalid. Please enter required fields"	Pass	Sign Up > Submit
9	Enter two different password for password and confirm password fields. Enter all other details correctly and click on submit button.	Display error message "Passwords do not match"	Pass	Sign Up > Submit

Post-Conditions

Customer will directed to the login page and he will be able to login to the system by using his username and password given.

Chapter 4. Evaluation

This Printing Job Management System is a customized solution for the Nihal Printers. They expect basically a system to manage their internal jobs through a computerized solution. But for value addition I have integrated a web system for the customers of the Nihal Printers to easily interact with the printing process. Most important feature of this system is customers are able to place an order remotely. They can send sample documents, need to print through this system. Customers can easily communicate with the staff and it is visible the printing status for the customers.

I have made visible the printing products in the website and the guests can get an idea about services of Nihal Printers. Thereafter, guests can request for quotation if they need through the system. Therefore, these kinds of functionalities will help to enhance the customer base for Nihal Printers.

One of the negative aspects of this system is there can be people who misuse the customer self-registration. People can make fake accounts and request for printings. To restrict such cases, once the printing request receives, staff members need to verify manually by contacting the customer and asking to make an advance payment before the printing process begins. At this stage, I have not implemented an online payment facility and staff members need to add payment records manually into the system, after a confirmation. In future enhancement, I have suggested the Nihal Printers to add an online payment facility for customer convenience.

When discussing about implementation, initially I planned to develop the system using the Laravel framework. I failed to use Laravel, because of its complex syntax and it consumes time to learn the Laravel rather than developing the system. Since we have a limited time period, I used pure PHP to develop the system and there are also a number of things that I had to study myself on Javascript, Bootstrap, session handling and mailing etc.

I used TCPDF library to generate bills and invoices. Then I tried to use the same library for generating graphs. But it was not successful and I found JavaScript API, CanvasJS which creates attractive charts and graphs.

Chapter 5. Conclusion

For the future enhancement of this system we can add an account to the suppliers as well. Then it will be ease for the staff to make the purchases through the system. Currently I did not implement such kind of a functionality, because the suppliers used to visit all the printing shops around and sell their materials. They do not visit Nihal Printers specially for selling the row materials. But once the business growing Nihal Printers may need to deliver the material from the suppliers. In such a situation it will be important to have a user account for suppliers. Then the staff can send a request to suppliers online and make the purchases.

Another way to enhance the system is to enable online payment for the customers. But at the movement they are only using cash to make the payment. Nihal Printer do not facilitate to use debit or credit card as well. But in nearly future they may have a requirement for using online payment and using debit and credit cards.

At the movement the biggest challenge for Nihal Printers is to attract the guest and improve the customer satisfaction. Nowadays people do not like to go here and there to satisfy their needs. They want to full fill their needs over a mobile phone or laptop as much as possible. Therefore this Printing Job Management System will be an ideal solution for Nihal Printers to keep the customers close and maximize the customer satisfaction. When the business grows the requirements of them also may change. Then it is important to maintain the system and integrate with new functionalities.

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Appendix

Appendix A: Screenshots of the system

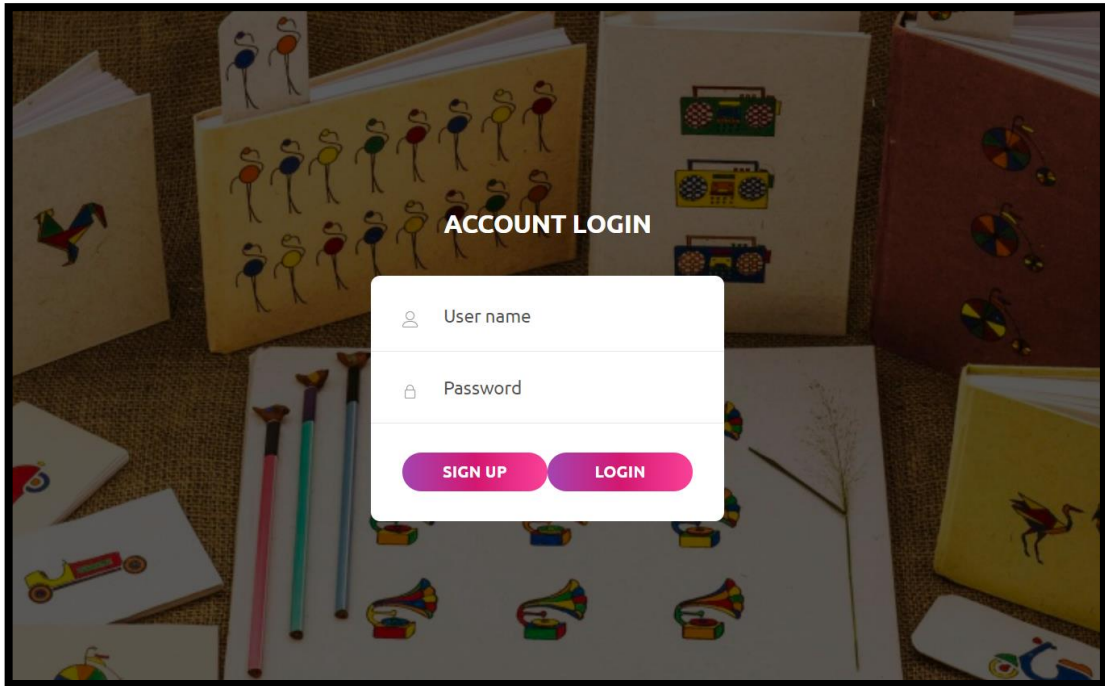


Figure 1: System Login

Add Customer ×

NIC:

User Name:

Address:

Contact Number:

Email:

Figure 2: Add Customer

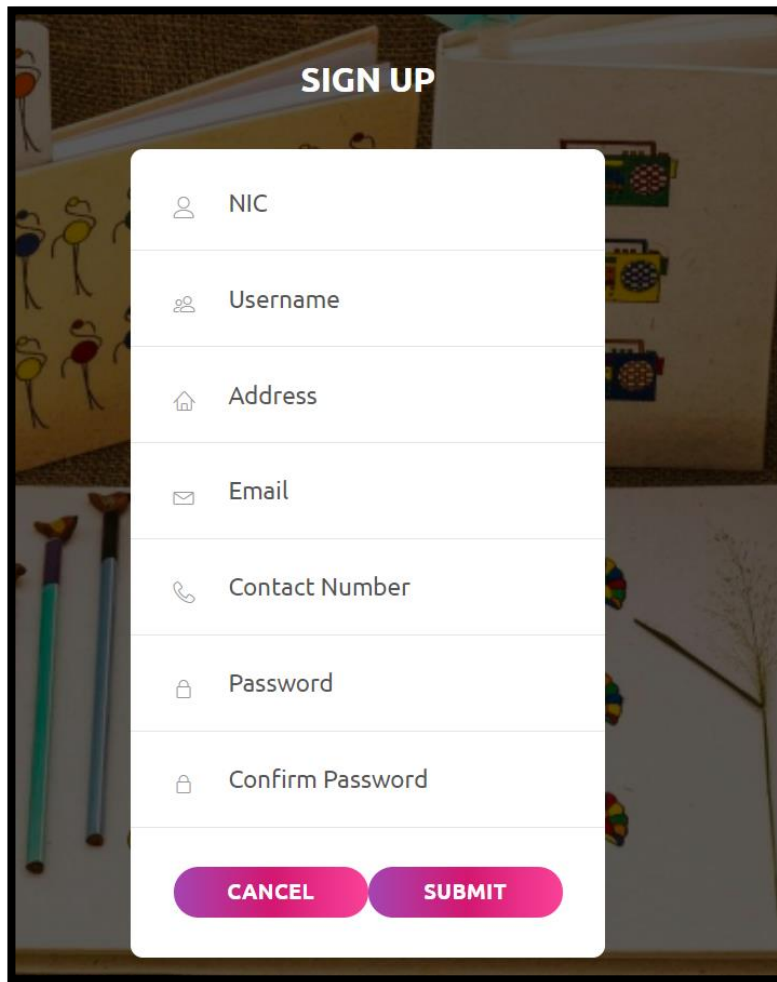


Figure 3: Sing up

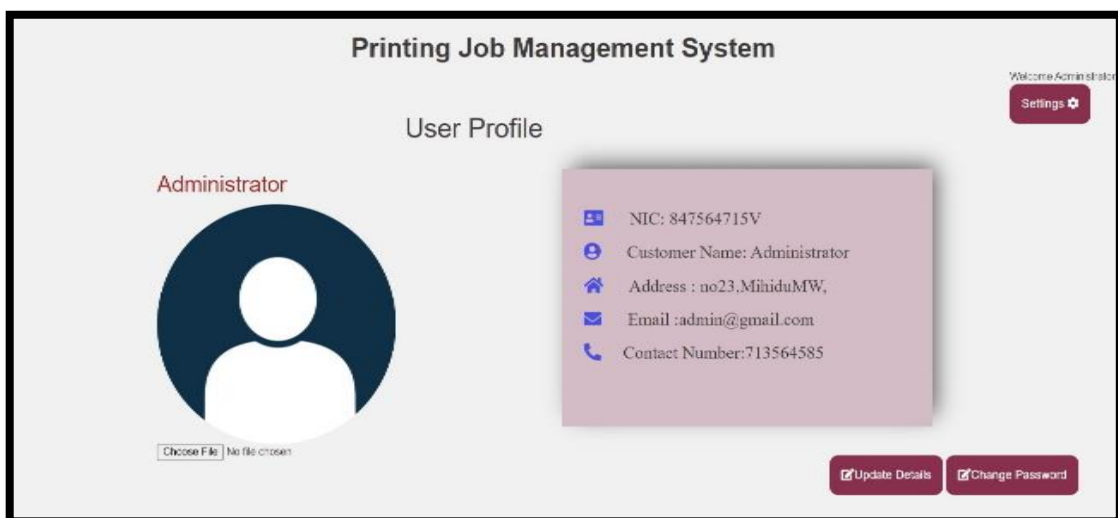


Figure 4: Personal Profile

Printing Job Management System

Welcome abc [Settings](#)

Place an Order

Item:

Size (height x width):

Number of Pages:

Quantity:

Paper:

Front page colour:

Back page colour:

Laminating:

Print in:

Date Required:

Sample Document: No file chosen

Description:

Figure 5: Place an Order

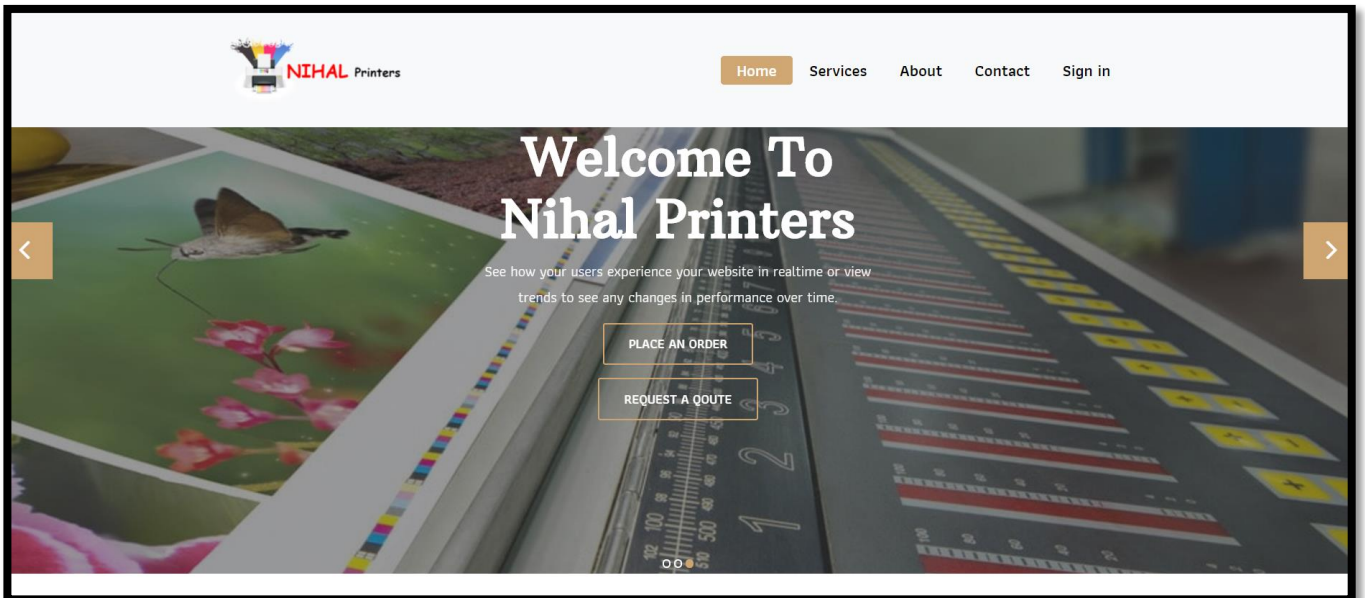


Figure 6: Website Homepage

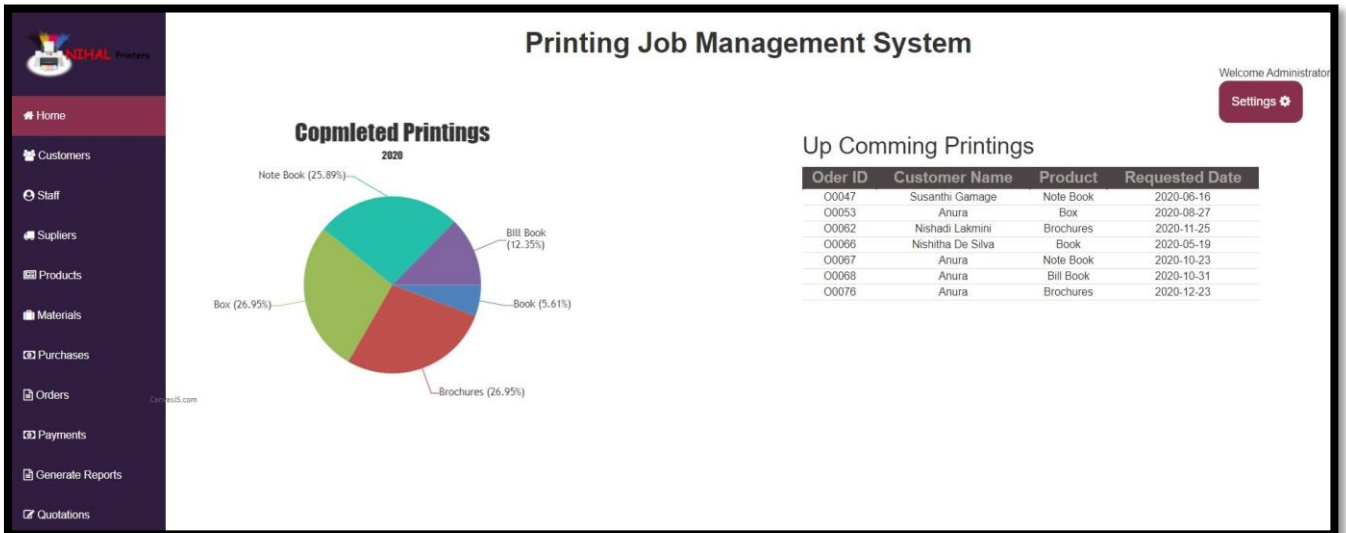


Figure 7: Administrator Homepage

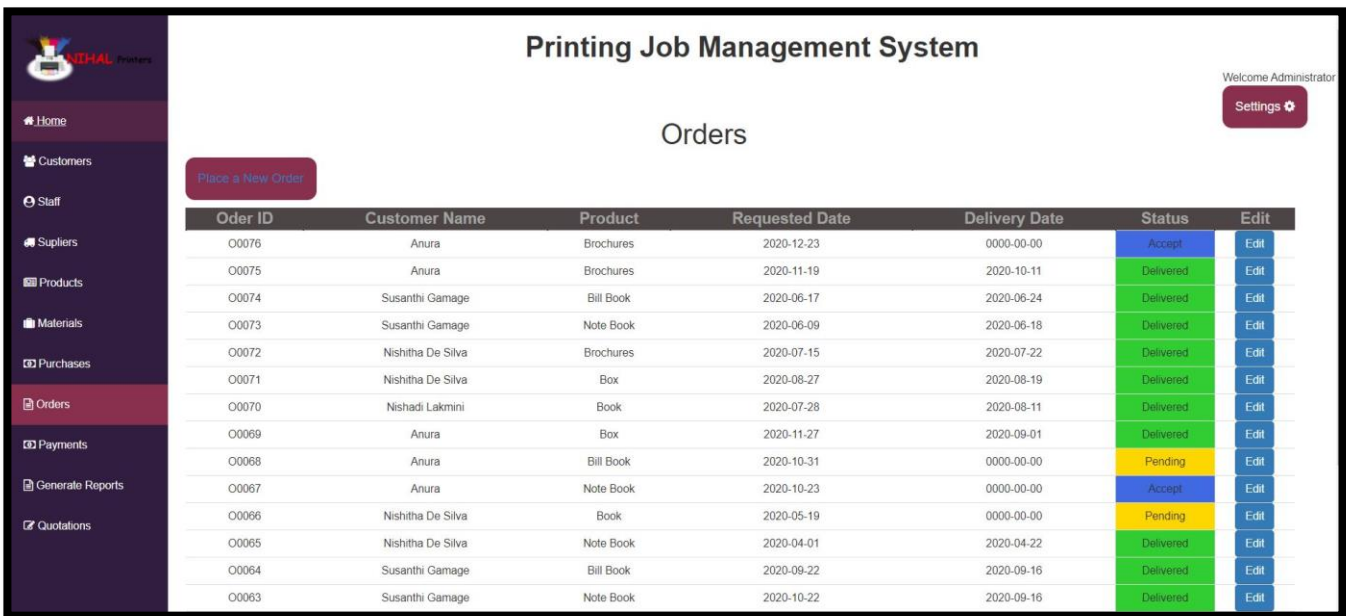


Figure 8: List of the Orders Received

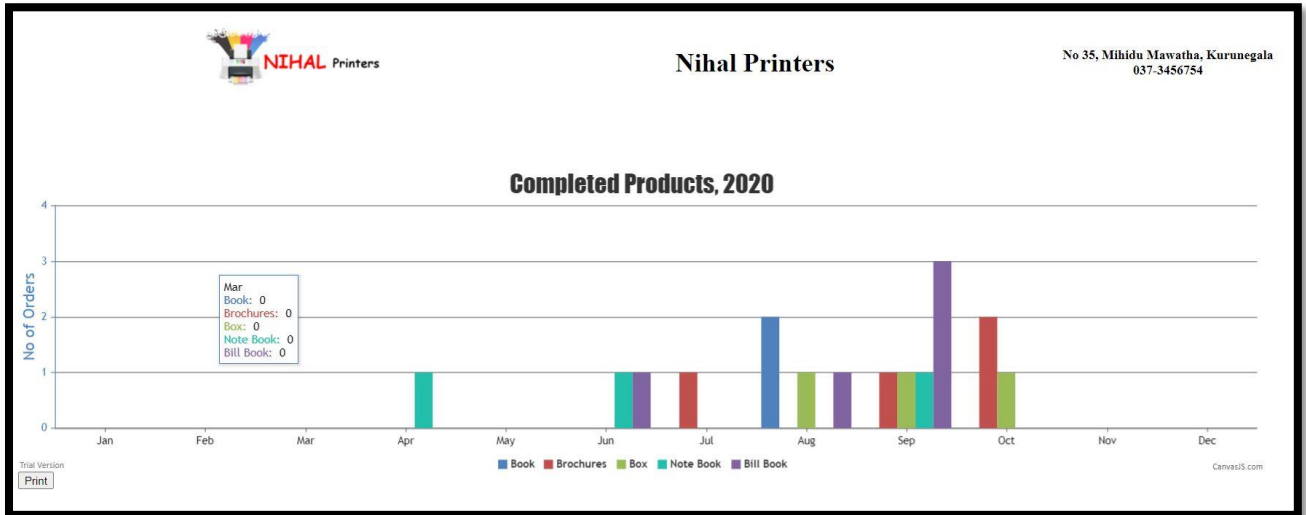


Figure 9: Report of Completed Products

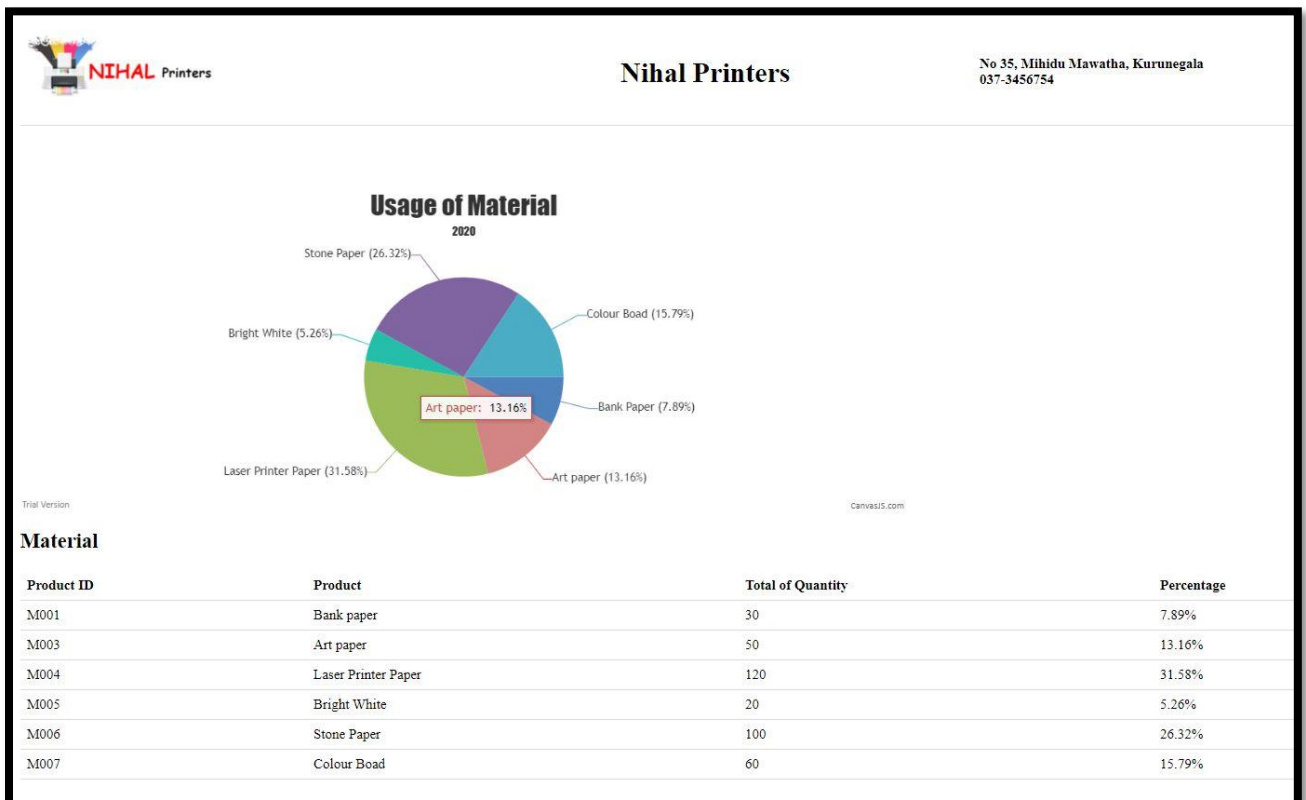


Figure 10: Report of Material Usage