Order and Payment Management System for

US Graphics (PVT) Ltd

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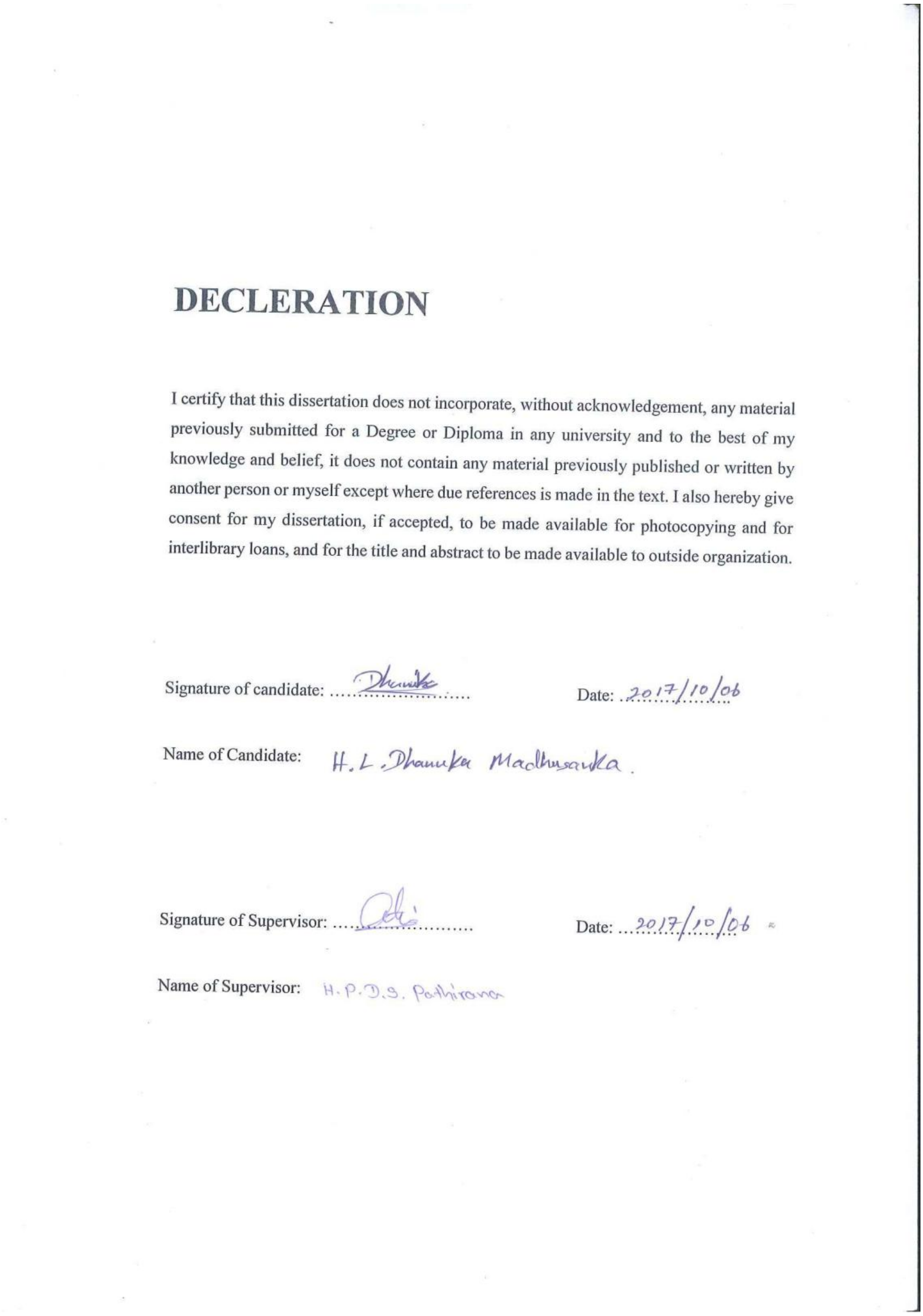
DECLARATION



DECLERATION

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Name of Supervisor: H.P.D.S. Pathirana

ABSTRACT

US Graphics (PVT) Ltd is a advertising firm in Kottawa established a few years ago. USG is doing offset printing including leaflets (handbills , posters , certificates , bookmarks , visiting cards) , booklets (books , invitations) , banners , artwork according to their customer requirements. Therefore, lot of daily transactions performed manually by employees. It is very difficult to handle the manual system for these transactions and functions.

The current system supports for transactions and orders are update in manually. It is very difficult to manage reorder order of the details. They want to give a special discount for day to day customers. They have to clash with lot of bills, paper records and may be some mistakes in their records. As a result of those problems they face many problems like data inaccuracy; data redundancy. And waste their customer’s time with their transaction delays.

The system is developed to standalone environment and it helps to manage their day to day transactions, order details, payment details, employee details, customer details and etc…This system supports report generating. Reports help to get decisions quickly and accurate.

NetBeans and JavaFX Scene Builder were used to implement the system in java, javaFX, MySQL, Hibernate technologies, MVC architecture and Object Oriented approach. Unified Modeling Language was used for analysis and designs the system. Jasper reports used to report generation. The proposed system is windows based solution.

The project will achieve the client’s functional and non-functional requirements and provide an efficient and user friendly environment. The system has been provided excellent solution to Order and Payment Management System activities.

ACKNOWLEDGEMENT

I would like take this space to acknowledge and extend my heartiest gratitude to those who have helped me in different ways throughout the project work to make this project a success.

First and foremost I owe my deep gratitude to the University Of Colombo School Of Computing for offering us this precious degree program and all its staff who guided me from the beginning.

A very special recognition should be given to my project supervisor Mr. H.P.D.S Pathirane for the extensive assistance and valuable guidance if their support is not received the completion of this project would have been extremely complicated. I also take this opportunity to thank Mr. Sumdu Lansantha the Co-owner and all the staff of US Graphics (PVT) Ltd., who gave me the opportunity to develop this system advertising firm company. All the staff gave me an enormous support to complete the project successfully.

It is my duty to thank Mr. R.D.D.Suranga the Managing director¸ Mr. Susith Sanasuma, Administrator, Lecture panel and all the staff at Earth University College, Colombo for giving me the academic knowledge for the BIT degree program and allowing me to use the college library throughout the period. Also, I honestly thank all my friends of Earth Institute and specially express my gratitude to my well educated lecturers who helped me a lot in numerous ways and encouraged me to complete the project successfully.

Finally I thank my family members for their unconditional love and support given in every way possible throughout the process of this degree program of three years.

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LIST OF ACRONYMS

GB - Giga Bytes

IDE - Integrated Development Environment

RAM - Random Access Memory

MVC - Model View Controller

NF - Normalization Form

RUP - Rational Unified Process

SQL - Structured Query Language

UI – User Interface

UML - Unified Modeling Language

CHAPTER 1 : INTRODUCTION

This chapter provides an introduction to the Order and Payment Management System for US Graphics (PVT) Ltd. with detail description on what its background, need for the project, motivation objectives and scope.

1.1 Introduction

US Graphics (PVT) Ltd is an advertising firm in Kottawa. This company is a leading advertising firm in Kottawa area. The company is growing very fast due to the remarkable service it provides.

US Graphics (PVT) Ltd was started as a small shop about 5 years ago with a small group of employee. At present the company has achieved large customer loyalty attaining Kottawa area. The owner of the US Graphics is a talented businessman and has more than ten years experience in the graphic field. Also he has professional qualifications in the industry. The honest and experienced staff always gives a huge contribution for the growth of the organization. So lots of customers are attracted to the company because of the unique service they provide. So US Graphics Private Limited's vision is to give a great service to their customers and company wants to speed up their day to day actions. US Graphics management welcomes new ideas to keep their path in a successful way.

When they need items they create a purchase order and send it to one of the suppliers they are dealing with. After receiving the purchased items from the supplier they add them to their stocks. And damaged and expired items in their stock are return to the particular suppliers.

1.2 Motivation

Today many companies convert their day to day operations into computer based systems. But US Graphics Private Limited doesn't have existing computer system to handle their day to day transactions. With a computer based solution the US Graphics Private Limited can get lot of benefits. Using computer base system they can manage large volume of data, reliability of handling information and security, handle data speedy to increase their business needs.

Current file base system has lot of problems. The user is confused with lot of bills in the office, long hour works and many other paper based documents. In billing processes bills are calculated manually and some mistakes can be occurred. Sometimes processed transactions are not inserted to their records. In such situations users have to face lot of problems and decision making is difficult.

- There is no proper mechanism to manage customer details, payment details and employees of the company separately.
- There is no systematic way to handle order details, leaflet and booklet details.
- No proper way to manage to give offers for customer.
- There is no proper mechanism to manage special customers by groups.
- There is no systematic way to generate daily, monthly and yearly reports. So it will take more time to achieve that task and the calculations won't be accurate too.
- No proper mechanism to manage income of the company daily, monthly and yearly.

The proposed system will help to do their transactions efficiently, reduce their workload and improve performance of their organization. It will help the company to manage item details, supplier details, purchase order details, quotation, records and all routine transactions. At the same time efficiency loss is a very critical problem in the organization. Currently four office members are working under this manual based system and sometimes their contribution is also not enough. With the introduction of automated system these losses can be mitigated easily.

1.3 Objectives and Scope

The main objectives of this automated system are to manage the business process in a failure-free way with the increase of speed and quality. The security and privacy of the data also can be managed in the system.

1.3.1 Main Objectives

Objectives are goals, plain and simple. These are the business objectives that you want the project to accomplish. Within project management, it is of utmost importance that a project's objectives are stated clearly as these will impact every decision in the project lifecycle.

- Reduce the time and human effort of day to day transactions.

  Time and money can be saved by increasing the speed of data transactions. Also human resource usage can be minimized.

- Enable automated data entry methods

  Instead of error prone human effort, the system will ease the entering, deleting, and updating information related to the printing company.

- Improve employee and item information management.

  The system will have very user friendly and fully functional modules to manage those details

- Improve simplicity with user friendliness.

  By using well color combinations and user interface designs user is guided to do the work accurately and easily.

- Reduce time and operational cost required to perform functions

  This system will be managed the processes of the company within time and without unnecessary costs.

- Improve security levels

  This system prevents unauthorized access of data by giving necessary privileges to suitable users.

1.3.2 Scope

Scope involves getting information required to start a project, and the features the product would have that would meet its stakeholder's requirements.

- Below types of details will be managed by the proposed system

- Employee details

  All the details of employees work in their organization are stored in database.

- Customer details

  All the details of customers in their organization are stored in database.

- Leaflet details

  All the details of leaflets in their organization are stored in database.

- Booklet details

  All the details of booklets in their organization are stored in database.

- Covers details

  All the details of covers in their organization are stored in database.

- Manage notifications for reordering of orders when they reach a minimum quantity for ordering.

- Payment details and pay slip management

  All the details of payments in their organization are stored in database.

- Job card and management

  The creating jobs and assign in their organization are stored in database.

- User management

  All the details of user accounts of system in their organization are stored in database.

- Privilege management

  The privilege details in their organization are stored in database.

- Reports Generating

Dynamic reports can be generated in the system. Especially the management needs more reporting facilities to make future decisions.

1.4 Structure of the Dissertation

CHAPTER 01: INTRODUCTION

This chapter provides information about the background of the US Graphics Private Limited. It describes the problems and the purpose of the project. This chapter also includes objective and the scope of the proposed system.

CHAPTER 02: ANALYSIS

This chapter provides the analyzing of functional and non-functional requirements.

UML diagrams were used to identify requirements.

CHAPTER 03: DESIGN

Give the design solutions for analyzed requirements. Describes software architecture of the system using diagrams including UML diagrams such as class diagrams, activity diagrams and sequence diagrams Database architecture using an entity relationship diagram.

CHAPTER 04: IMPLEMENTATION

This chapter explains the implementation of the project according to the system design. Implementation language, environment, software tools and technologies are explained.

CHAPTER 05: EVALUATION

This chapter describes testing the system by different kind of testing methods and evaluation of the system throughout the development stage. And the system was tested using sample data and the outcomes of the assessments.

CHAPTER 06: CONCLUSION

This chapter explains the summery of all chapters and what are the lessons were learnt during the project and how the system could be further improved will be given here.

CHAPTER 2 : ANALYSIS

2.1 Introduction

Requirement analysis is the first and most critical stage in the software development process. All other phases depend on the information gathered in this phase. Requirement analysis is the process of identifying users and their duties understand the problem domain and understand user requirements.

Requirements analysis is critical to the success of a systems or software development process. The requirements should be documented, measurable, testable, traceable, related to identified business needs or functionalities, and defined to a level of detail sufficient for system design.

After gathering the requirements using various requirement gathering techniques, they will be classified into functional and non-functional requirements. Feasibility analysis is done to see ability of developing the system.

2.2 Requirement Gathering Techniques

In system development process requirement analysis is a critical phase for entire development life cycle. Because the final solution depends on requirements, if we gather unclear and poor requirements the whole system will be affected. First the functional requirements will be collected and prepared. At the same time non functional requirements are also very important because a system without non-functional facilities is total failure.

Following are the three techniques used in this project to gather requirements from different stakeholders;

- Observation
- Reading Company Documentation Analysis
- Interview

Top level management was interviewed to discover information related to the management and administrative procedures. Only one person was interviewed at a time to get true information. Even though the receptionist is not in the management category of the company, she had to be asked many matters regarding the procedure. Simultaneously some questionnaires were given for the management and asked them to fill them as they understand. Really the owner and the top management gave a big support to gather information for the system.

The documentation of the company such as customer and employee registration forms, bills and payment slips greatly helped to study the system. Not only present documents, but also past documents of the company had to be closely studied to understand the behavior of the business. The acquired facts will be depicted using UML 2.0 diagrams.

2.2.1 Observation

Get an idea about the work of the current manual system in US Graphics Private Limited, observing their day to day transactions.

2.2.2 Reading Company Document Analysis

In the manual system many documents are created to handle transactions by the employees. Analyzing documents is the best method to gather information in a short time period. That is very useful to interview employee to get their attitude about the current process.

2.2.3 Interview

By interviewing employee can get clear idea about business process currently going on. Using this technique we can interview different level of users and calculate different type of requirements.

2.3 Existing System

All details of the customers, employees and money transactions of the organizations are manually handled in the current system.

Order Acceptance is done through interview and phone calls. Customers’ personal details are recorded during order accepting.

Really this manual process is very hard to continue with development of the business. Day by day customer population dramatically increases and transactions become more complex. So the company has a big need of a automated system to manage their business transactions. At the same time people who deal with the organization expects services from such a computerized system. The competitors in the same business field are a great threat for the organization and a well- developed system would be a great advantage for the company.

Figure 2.1: The Use Case Diagram of Existing System

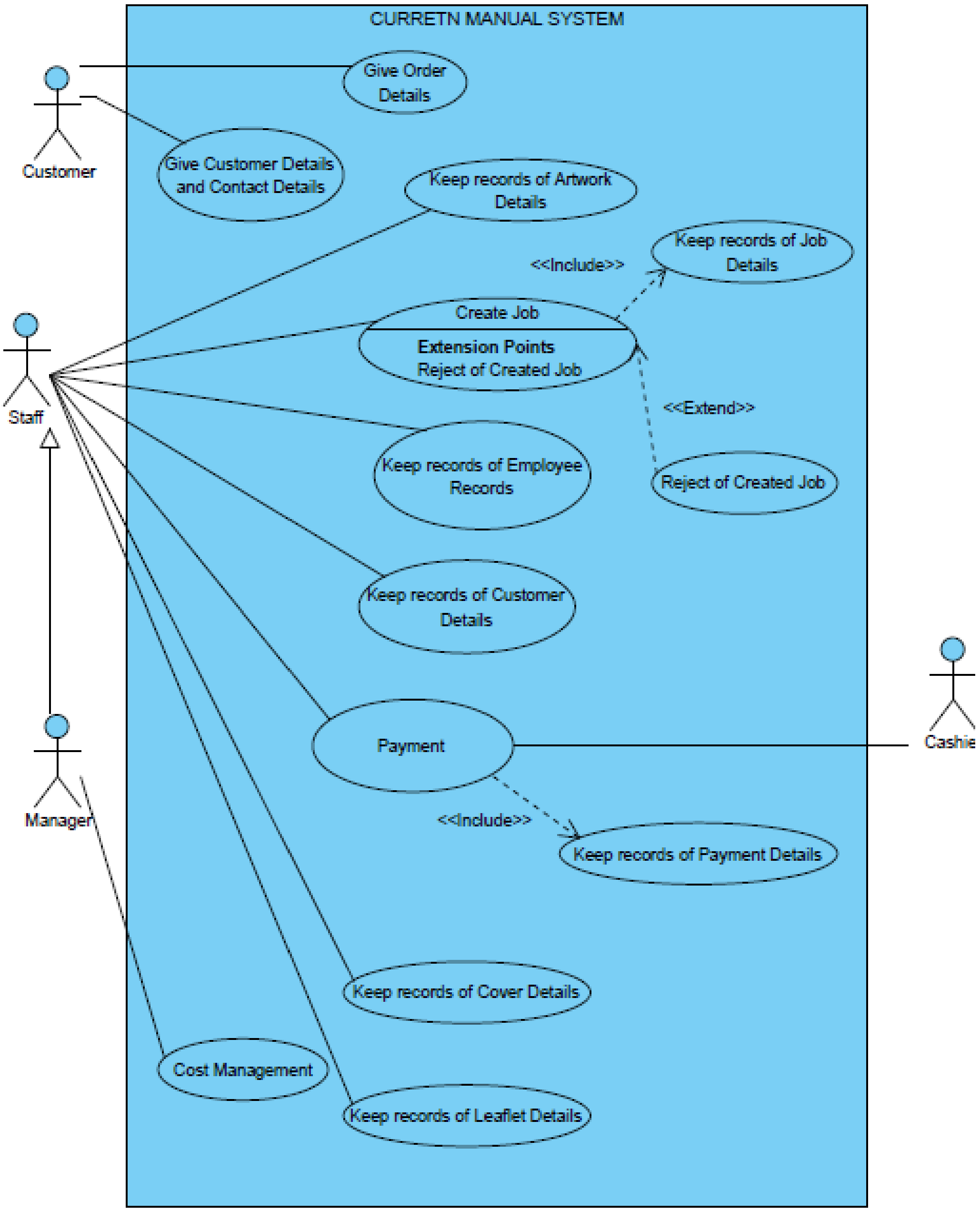

CURRETN MANUAL SYSTEM
Customer
Staff
Manager
Cashie
Give Order Details
Give Customer Details and Contact Details
Keep records of Artwork Details
Keep records of Job Details
<<Include>>
Create Job
Extension Points
Reject of Created Job
<<Extend>>
Reject of Created Job
Keep records of Employee Records
Keep records of Customer Details
Payment
<<Include>>
Keep records of Payment Details
Keep records of Cover Details
Cost Management
Keep records of Leaflet Details

Figure 2.1: The Use Case Diagram of Existing System

2.4 Weaknesses of existing manual system

- All documents are hand written documents

- Difficult to find employees’ and members’ details
- Difficult to change employees’ and members’ details
- Slow retrieval of data
- All calculations are done manually with calculators
- Data backups are not available
- High labor cost
- Management cannot monitor current business process when they want
- Difficulties of payment process
- Space consuming since the data and paper is stored in filing cabinets.

2.5 Functional requirement of the system.

“In software engineering, a functional requirement defines a function of a software system or its component. A function is described as a set of inputs, the behavior, and outputs.” [**1**].

Functional requirement describe the requirement or services that system should offer for its end users. Most of them are provided by users of the system. Because this project is constructed according to discipline of Scrum process model, most critical requirements are selected for the first iteration of development life cycle. Below list shows functional requirement gathered up to now.

2.5.1 Manage customer details

The customers are managed into two categories such as personal and company. In this form, system has facilitated to give discount for customers and view customer details in separately. This is a first stage of this business process.

- User can be able to insert, delete, update, view and search customer details.
- User can be able to generate reports of all information.
- Only Manager can be able to change discount rate according to job count.

2.5.2 Manage job card details

The job card management is a most critical and important stage of this business process and this is the second stage of this business process after the customer management module.

- After customer registration, user can be able to create order for customer needs.
- User can be assign employee according to order.

- User can be able to generate reports of all information.
- User can be able to view the order availability such as on-going, done.
- User can be able to search the order according to availability, date, customer name.

2.5.3 Manage employee details

These are also critical details the system should have kept accurately in this business domain.

- User can be able to insert, delete, update, view and search employee details.
- User can be able to generate reports of all information.

2.5.4 Manage privileges of employees

An Employer has an only one user account which is used to log into the system. Using that user account, user would log into the system and there should have assigned privileges which tell us the modules you can go and cannot go.

- Users can log into the system securely by validating username and password.
- System has provided facilitate to create, edit, view, delete new user.
- System has provided facilitate to assign user privileges based on the user level.
- System has provided facilitate to change password function.
- User can be logout from the system.

2.5.5 Manage payment issuing

This is the third stage of this business process and a most important stage. The records user is going to generate should be accurate.

- After customer, employee registration and according to order, user able to create payment slip.
- User can be able to generate reports of all information.

2.5.6 Generates reports

This system has facilitated to generate very effective, colorful and meaningful reports with pie charts and tables.

- System has facilitated to generate pay slips for each and every customer.
- System has facilitated to generate daily, monthly reports.
- System has facilitated to generate daily income reports, monthly income reports.

- System has facilitated to generate report for daily payments, daily orders reports etc.
- System can generate advance payment slip when customers do payments.

2.6 Nonfunctional Requirement of the system

“In systems engineering and requirements engineering, a non-functional requirement is a requirement that specifies criteria that can be used to judge the operation of a system, rather than specific behaviors.” [**2**].

Nonfunctional requirement describe the features that system should have. It is very difficult to manage nonfunctional requirement than functional requirement because each user have different perspectives. Nonfunctional requirement which hope to offer with proposed system are listed below.

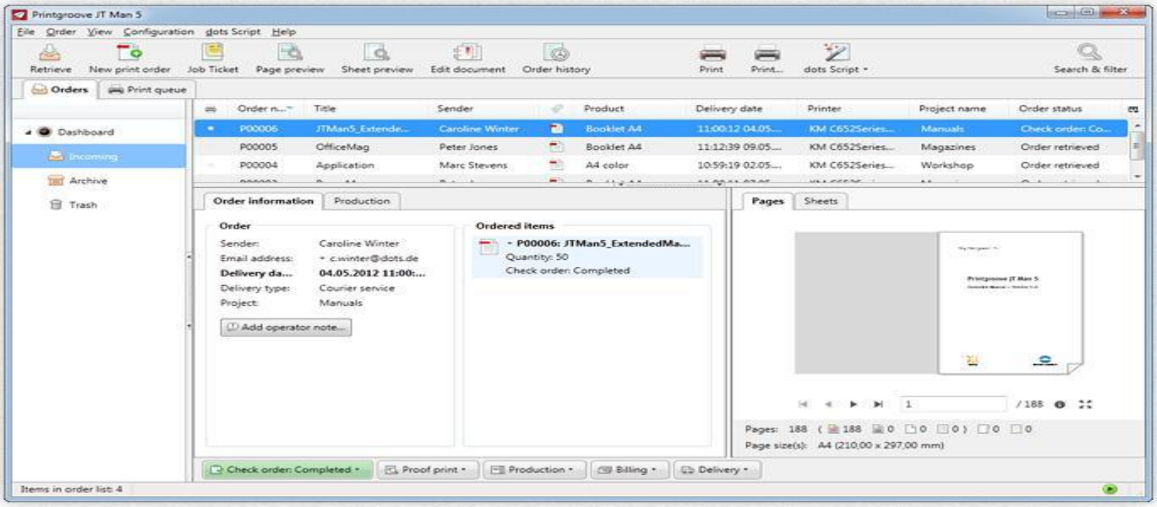
- User friendliness
- Interoperability with other software
- Accuracy
- Maintainability
- Security
- Usability
- Simplicity

2.7 Existing Similar Solutions

There are so many printing systems worldwide. Some of them are listed below.

1. Printgroove JT Man 5

Printgroove JT Man 5 is a Printing order management software that covers functions required in the print flow. it eliminate the existing disadvantages and supports to preview in high operability. Operations can check the finishing of the edited various documents, such as imposition and moving pages in the preview at the real time. Printgroove JT Man 5 provides simple operability to all users, since the interface is simple and user-friendly. For example, the dashboard manages the progress of the job or entire schedule. In this way, key operations can manage job comfortably, and the efficiency of work significantly improves. Printgroove JT Man 5 supports various print settings such as creep. This software meets various needs of the key operations. Also, the printing management can be made more e client by using the template of the print setting for each job. [**3**]



Order n...	Title	Sender	Product	Delivery date	Printer	Project name	Order status
P00006	JTMan5_Extende...	Caroline Winter	Booklet A4	11:00:12 04.05....	KM C652Series...	Manuals	Check order: Co...
P00005	OfficeMag	Peter Jones	Booklet A4	11:12:39 09.05....	KM C652Series...	Magazines	Order retrieved
P00004	Application	Marc Stevens	A4 color	10:59:19 02.05....	KM C652Series...	Workshop	Order retrieved

Order

Sender:	Caroline Winter
Email address:	c.winter@dots.de
Delivery da...	**04.05.2012 11:00:...**
Delivery type:	Courier service
Project:	Manuals

Ordered items

P00006: JTMan5_ExtendedMa...
Quantity: 50
Check order: Completed

1 / 188

Pages: 188 (188 0 0 0) 0 0
Page size(s): A4 (210,00 x 297,00 mm)

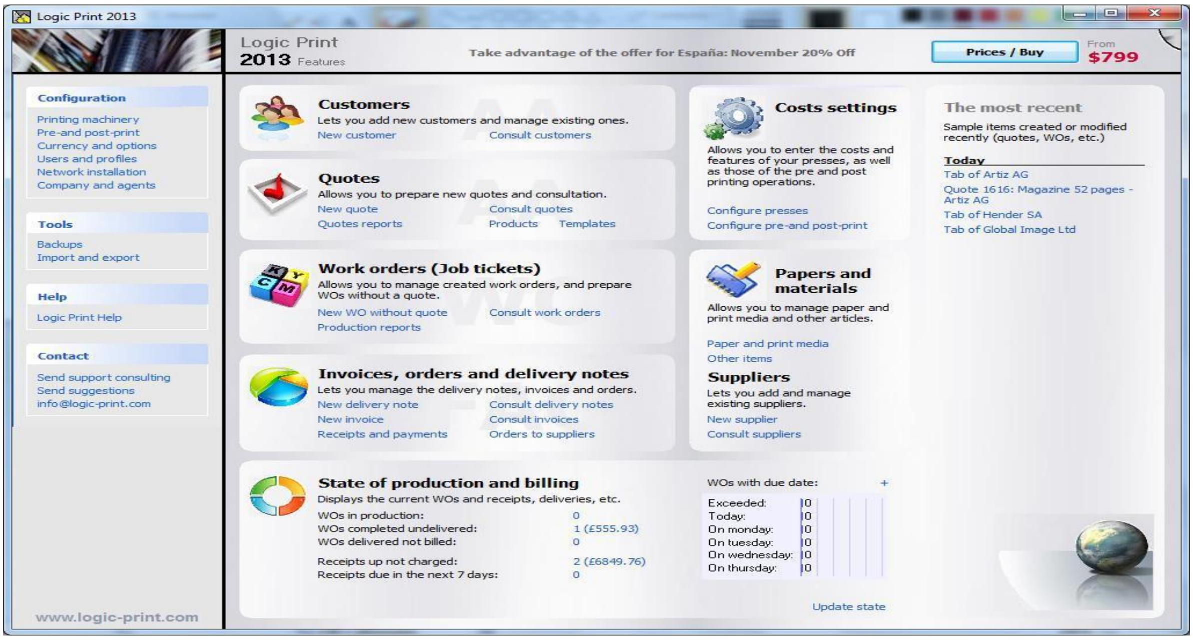
Items in order list: 4

Figure 2.2: Printgroove JT Man 5

2. Logic Print 2013

Logic Print 2013 offers flexibility, security and control such as configuration options for estimations, stock management, purchase orders, automatic calculation of needs, integration with Google Maps, packaging features, product control panel, global management of delivery dates and customer risk reports. Logic Print 2013 automates the entire business process from estimating to invoicing for small and medium commercial print shop, copy centers, print-for-pay companies, with offset, digital and silk screen printing environment. The flexibility turnkey print estimating software solution allows users to choose only the modules needs. The intuitive print management solution possesses the power, speed and flexibility to meet the fast-paced demands of today's printing industry. Logic Print 2013 also manages business more efficiently, reduces cost and maximizes profits. . [**4**]

Figure 2.3: Logic Print 2013



Customers

Lets you add new customers and manage existing ones.

New customer · Consult customers

Quotes

Allows you to prepare new quotes and consultation.

New quote · Consult quotes · Quotes reports · Products · Templates

Work orders (Job tickets)

Allows you to manage created work orders, and prepare WOs without a quote.

New WO without quote · Consult work orders · Production reports

Invoices, orders and delivery notes

Lets you manage the delivery notes, invoices and orders.

New delivery note · Consult delivery notes · New invoice · Consult invoices · Receipts and payments · Orders to suppliers

Costs settings

Allows you to enter the costs and features of your presses, as well as those of the pre and post printing operations.

Configure presses · Configure pre-and post-print

Papers and materials

Allows you to manage paper and print media and other articles.

Paper and print media · Other items

Suppliers

Lets you add and manage existing suppliers.

New supplier · Consult suppliers

The most recent

Sample items created or modified recently (quotes, WOs, etc.)

Today

Tab of Artiz AG
Quote 1616: Magazine 52 pages - Artiz AG
Tab of Hender SA
Tab of Global Image Ltd

State of production and billing

Displays the current WOs and receipts, deliveries, etc.

WOs in production:	0
WOs completed undelivered:	1 (£555.93)
WOs delivered not billed:	0
Receipts up not charged:	2 (£6849.76)
Receipts due in the next 7 days:	0

WOs with due date: +

Exceeded:	0
Today:	0
On monday:	0
On tuesday:	0
On wednesday:	0
On thursday:	0

Update state

Figure 2.3: Logic Print 2013

2.8 Process Model

The Waterfall Model–Even though this is an old approach to develop software, there are many software projects which have to be developed using this process model. The development life cycle is clearly divided into four main phases called requirements specification, software design, implementation, testing.

Figure 2.4: The Waterfall Model

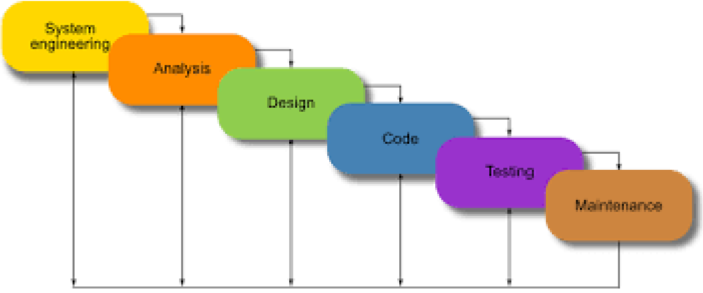


Figure 2.4: The Waterfall Model

Evolutionary Development Method –This is an iterative software development methodology. Initially a rapid version of the particular software is developed using extract knowledge. And then according to the customers' responses, the right product is developed.

Figure 2.5: Evolutionary Development Method

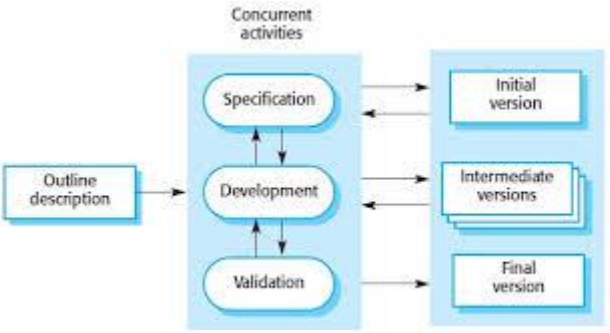


Figure 2.5: Evolutionary Development Method

Component-based Method- In this method the software is designed and developed based on reusable software components. Then the programming is shifted to software composing. This includes developing the software by choosing by ideal off-the-shelf components and then assembling them using a suitable architecture.

Figure 2.6: Component-based Method

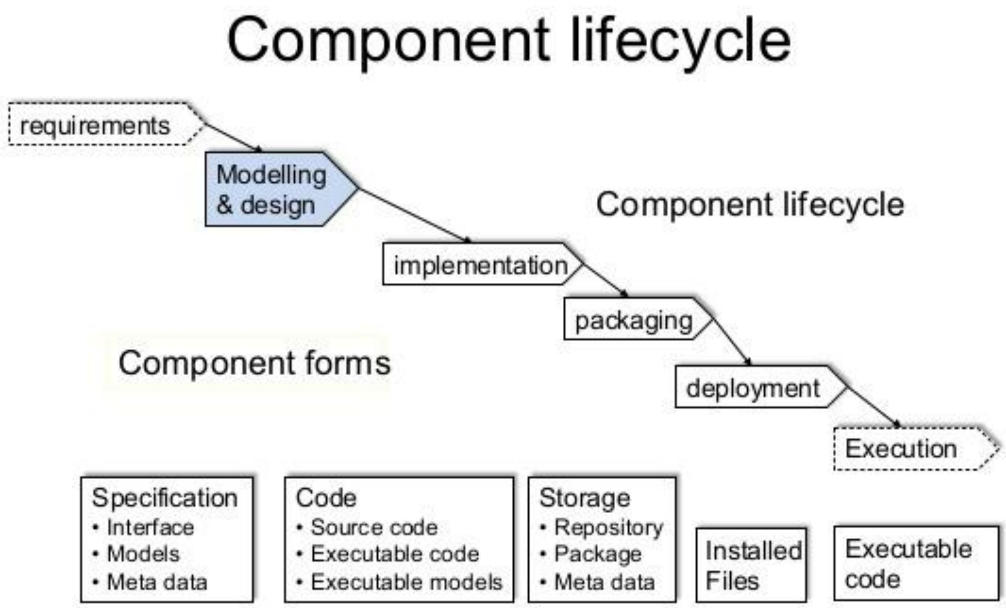


Figure 2.6: Component-based Method

Agile Development Method –Several iterative and incremental software methodologies have been categorized under this process model. Extreme Programming (XP), Scrum, Crystal, Dynamic Systems Development Method (DSDM), Lean Development, and Feature-Driven

Development (FDD) are some of most popular Agile based software development process models.

Figure 2.7: Agile Development Method

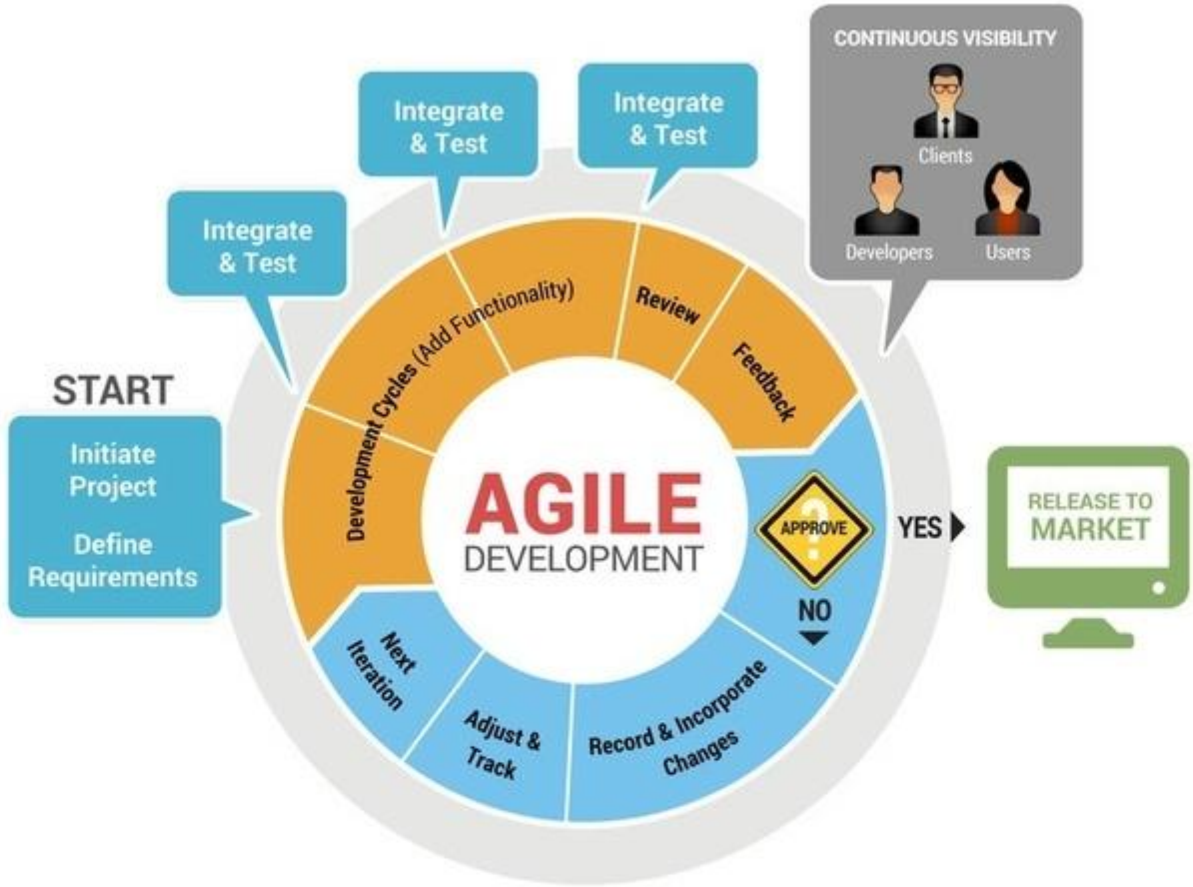


Figure 2.7: Agile Development Method

RAD Method - RAD model is Rapid Application Development model. It is a type of incremental model. In RAD model the components or functions are developed in parallel as if they were mini projects. The developments are time boxed, delivered and then assembled into a working prototype. This can quickly give the customer something to see and use and to provide feedback regarding the delivery and their requirements.

Figure 2.8: RAD Method

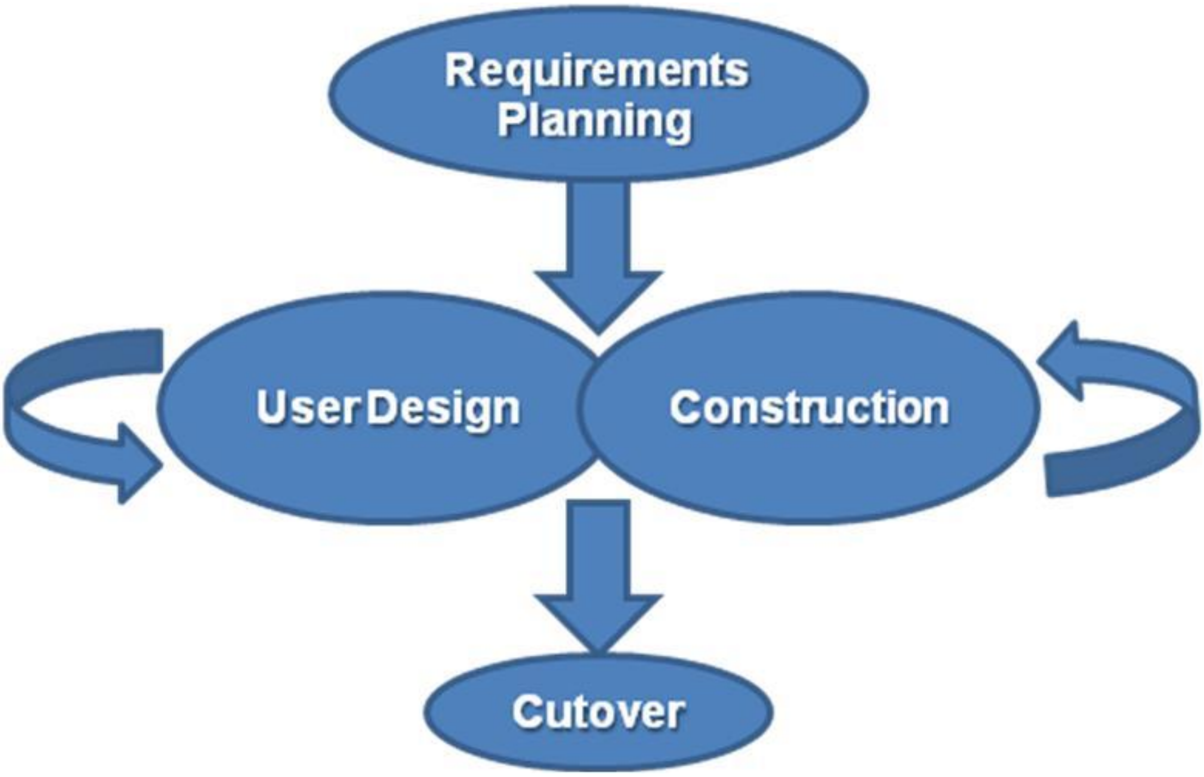


Figure 2.8: RAD Method

The Spiral Method - The spiral model combines the idea of iterative development with the systematic, controlled aspects of the waterfall model. This Spiral model is a combination of iterative development process model and sequential linear development model i.e. the waterfall model with a very high emphasis on risk analysis. It allows incremental releases of the product or incremental refinement through each iteration around the spiral.

Figure 2.9: The Spiral Method

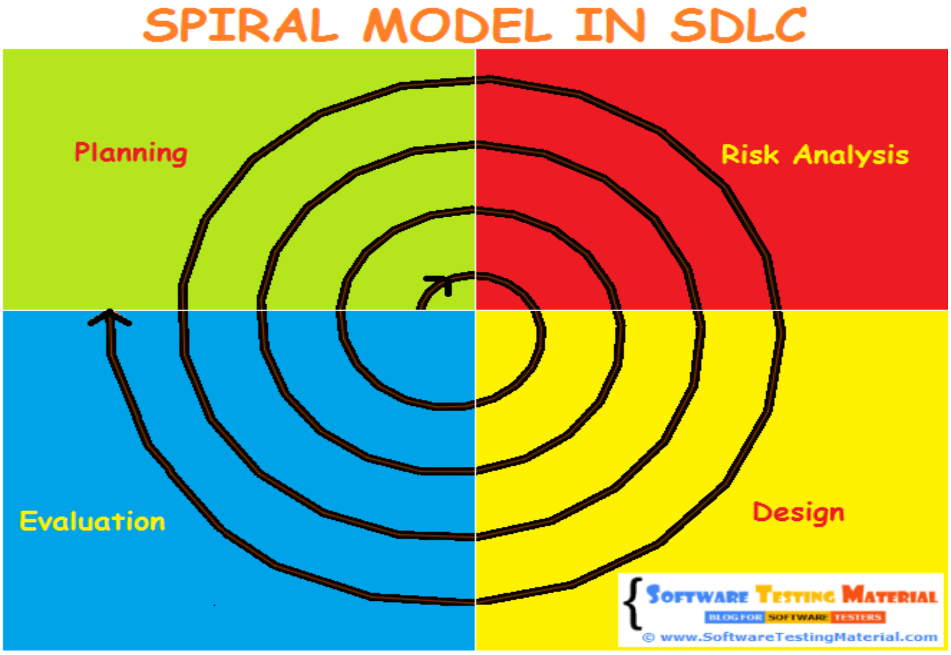

SPIRAL MODEL IN SDLC
Planning
Risk Analysis
Evaluation
Design
SOFTWARE TESTING MATERIAL
BLOG FOR SOFTWARE TESTERS
© www.SoftwareTestingMaterial.com

Figure 2.9: The Spiral Method

CHAPTER 3 : DESIGN

3.1 Introduction

In software designing, System should have good design before implementing. System design provides the detail and description of the system including components, interface, modules, architecture and data.
Software design is the process by which an agent creates a specification of a software artifact, intended to accomplish goals, using a set of primitive components and subject to constraints. Software design may refer to either "all the activity involved in conceptualizing, framing, implementing, commissioning, and ultimately modifying complex systems" or "the activity following requirements specification and before programming, as a stylized software engineering process.

Software design usually involves problem solving and planning a software solution. This includes both a low-level component and algorithm design and a high-level, architecture design.

3.2 Alternative solutions to the system

When discussing an alternative solution to this system it can categorize into few different sub topics.

- Maintain system based with old file system

  The entire factory working process based on the existing file based system can be used by the client. So it can maintain all the work by using paper and generate factory related reports and valuable feedbacks by analyzing those paper works when necessary. By choosing this method the client has to waste time to get even a trace of previous data.

- Using free software Packages

  Software demos to manage their work can be used by the client. The issue is the trustworthiness of those kinds of software. These kinds of demos can consist of different kinds of errors.

- Purchase Commercial stand-alone Software

  Purchases of commercial products to maintain each and every different kind of work in the company such as accounting, user managing and stock handling can be made by the client. The main issues that can occur when using these kinds of software are as follows:

  Platform dependence

  Different kinds of operating systems are required by different kinds of software. Therefore, different computer operating systems maintaining different relevant software packages must be maintained by the user.

  Software update dependencies

  Some software packages depend on updates. The functionality as required cannot be performed by the software without updates. Additional software is required to run by some updates (Frame works). Sometimes more system performances to run are required by that additional software. Updating the computer system into modern system to meet that required performance has to be done ultimately by the user. It costs a lot.

3.3 System as a Stand-alone Solution

The system will be developed as a stand-alone system since more advantages have been observed of a Stand-alone computer system rather than having a web based system. A stand-alone system will give an uninterrupted continuous service since the network facilities are not required for its functions. At the same time the organization won’t have to pay extra chargers for network facilities. With a network, one user may waste space by watching movies or listening to music. In turn, everyone else using the network may see slower computer performance. Another advantage of a standalone computer is damage control. For example, if something goes wrong, only that particular computer would be affected. At the same time this organization doesn’t have any network of branches yet. So considering all the above matters and owner’s likings, the system would be a stand-alone solution.

3.4 System Development Life Cycle

The systems development life cycle (SDLC), also referred to as the application development life-cycle, is a term used in systems engineering, information systems and software engineering to describe a process for planning, creating, testing, and deploying an information system. The systems development lifecycle concept applies to a range of hardware and software configurations, as a system can be composed of hardware only, software only, or a combination of both.

3.5 Methodology for the Proposed System

The Scrum Software Development Methodology was selected as the process model since it has distinguished advantages compared to the other process models. Scrum is an iterative and incremental agile software development framework for managing product development.

A key principle of Scrum is its recognition that during product development, the customers can change their minds about what they want and need (often called requirements volatility), and that unpredicted challenges cannot be easily addressed in a traditional predictive or planned manner. As such, Scrum adopts an evidence-based empirical approach accepting that the problem cannot be fully understood or defined, focusing instead on maximizing the team's ability to deliver quickly, to respond to emerging requirements and to adapt to evolving technologies and changes in market conditions.

Scrum development method consists of lots of advantages over other development methodologies; common few advantages are listed below.

- Fast moving, cutting edge developments can be quickly coded and tested using this method, as a mistake can be easily rectified.
- Due to short sprints and constant feedback, it becomes easier to cope with the changes.
- It is a lightly controlled method which insists on frequent updating of the progress in work through regular meetings. Thus there is clear visibility of the project development.
- It is easier to deliver a quality product in a scheduled time.
- Scrum methodology enables projects where the business requirement documentation is hard to quantify to be successfully developed.

Like any other agile methodology, this is also iterative in nature. It requires continuous feedback from the user.

3.6 Object Oriented Designing

Object-oriented analysis and design (**OOAD**) is a popular technical approach for analyzing and designing an application, system, or business by applying object-oriented programming, as well as using visual modeling throughout the development life cycles to foster better stakeholder communication and product quality. [**6**]

Object-oriented design is concerned with developing an object oriented model of a software system to implement the identified requirements. The main goal of this design approach is defining objects define objects and establishing relationship between classes by sending and receiving messages.

Object oriented design is a method which is used to collaborate objects and attributes and methods of their objects. Unified Modeling Language is the widely used designing tool to perform objects oriented designing. Unified Modeling Language depicts the model of the objects. This design approach is very efficient way to implement designing phase.

3.6.1 High Level Use Case Diagram for the Oder and Payment Management System

3.1 High Level Use Case Diagram

A main diagramming technique contained in the UML diagrams is, the Use Case diagram. The static view of the system is helped by this. In addition, this diagramming technique to identify the correct valid necessary system requirements from system users and to validate system requirements can be used by the system analyst.

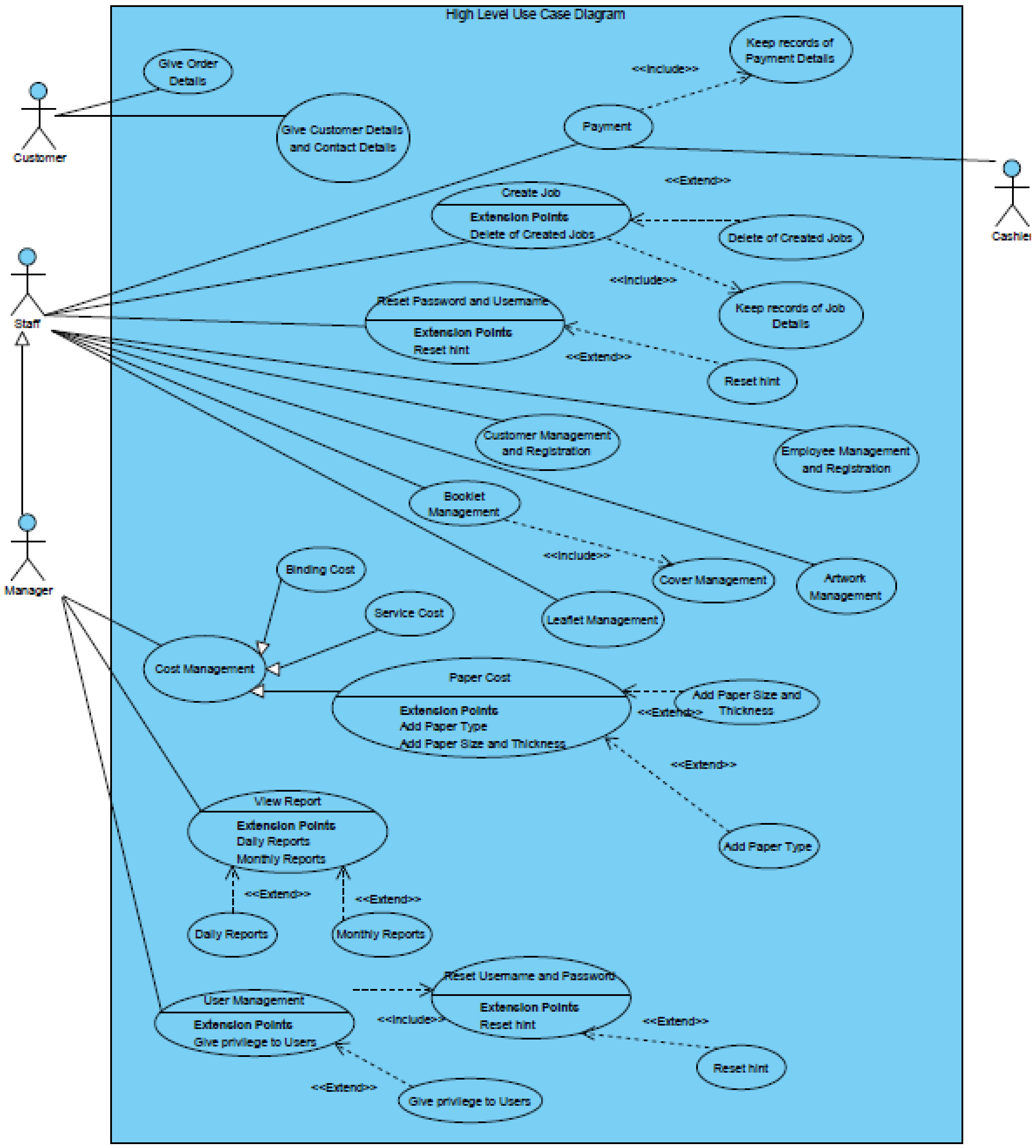


Figure 3.1: High Level Use Case

3.6.2 Use case for Customer Registration

Figure 3.2: Use case diagram for the Customer Registration

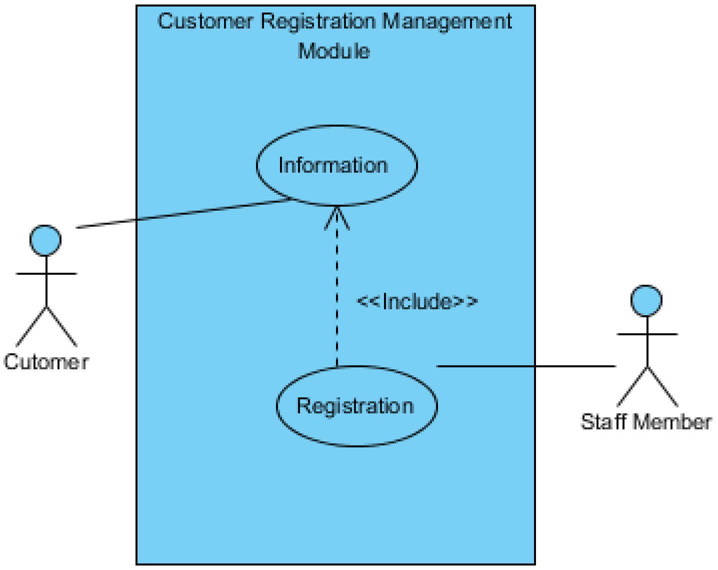


Figure 3.2: Class Diagram for the Customer Registration

3.6.3 Use case narratives for the Customer Registration

Use Case	Customer Registration Management
Actor	Staff Member
Description	Register the customer with essential details such as NIC , company registration number, mobile number etc.
Pre-Condition	Since this could be done by any employee (Designer, Manager) that responsible person must get the details carefully and he must responsible for the situation.
Flow of events	1. Address must be taken in detail as in NIC. 2. If Customer is as a company, then user must have to ask contact person details. 3. Select relevant customer 4. Update relevant customer 5. Delete relevant customer 6. Search relevant customer details by using customer id
Post – Conditions	For good report generation, these details would be very needful. So there must be clear details

Table 3.1: Use case narratives for the Customer Registration Details

3.6.4 Use case for the Job Card

Figure 3.2: Use case diagram for the Job Card

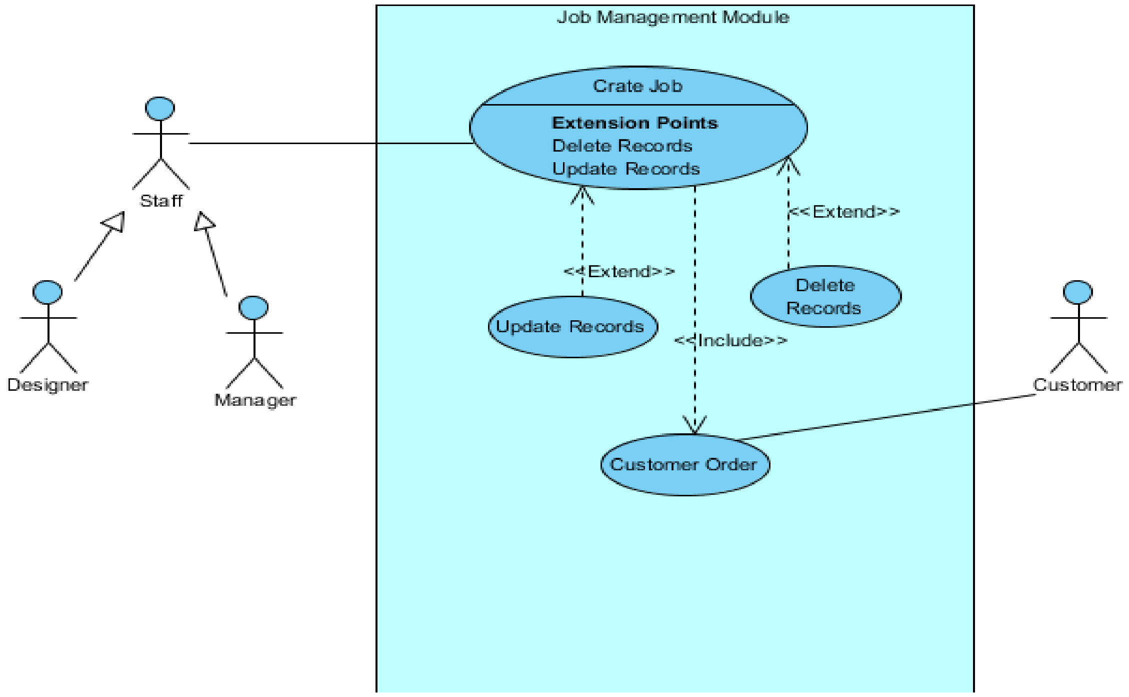


Figure 3.2: Class Diagram for the Job Card

3.6.5 Use case narratives for the Job Card

Use Case	Job Registration Management
Actor	Staff Member , Manager , Designer
Description	Register the job with essential details such as deliver date, assign employee, receive employee, job type and description
Pre-Condition	The Deliver Date should be taken by participating manager, available designer and due to company situation.
Flow of events	1. The Deliver Date must be taken in detail. 2. The Job type must be taken in detail. 3. Select relevant job record 4. Update relevant job record 5. Delete relevant job record 6. Search relevant job records by using job id
Post – Conditions	For good report generation, these details would be very needful. So there must be clear details

Table 3.1: Use case narratives for the Job Card Details

3.7 Class Diagram for the proposed system

“Class diagram is a static diagram. It represents the static view of an application. Class diagram is not only used for visualizing, describing, and documenting different aspects of a system but also for constructing executable code of the software application.

Class diagram describes the attributes and operations of a class and also the constraints imposed on the system. The class diagrams are widely used in the modeling of object oriented systems because they are the only UML diagrams, which can be mapped directly with object-oriented languages.” **[7]**

3.2 Class Diagram for the system

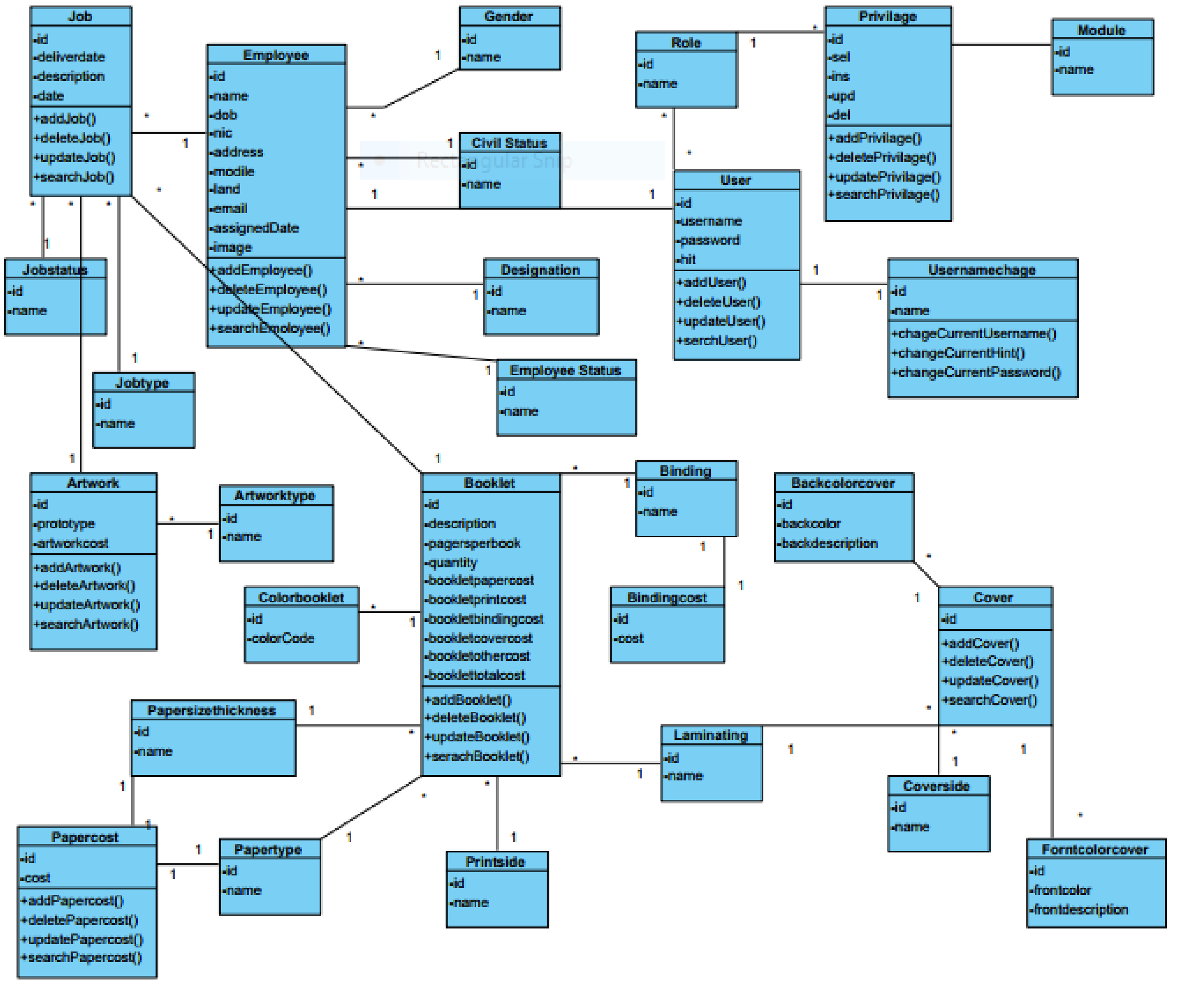


Figure 3.2: Class Diagram for the system

3.8 Sequence Diagram for the Customer Module

Figure 3.4: Sequence Diagram for the Customer Module

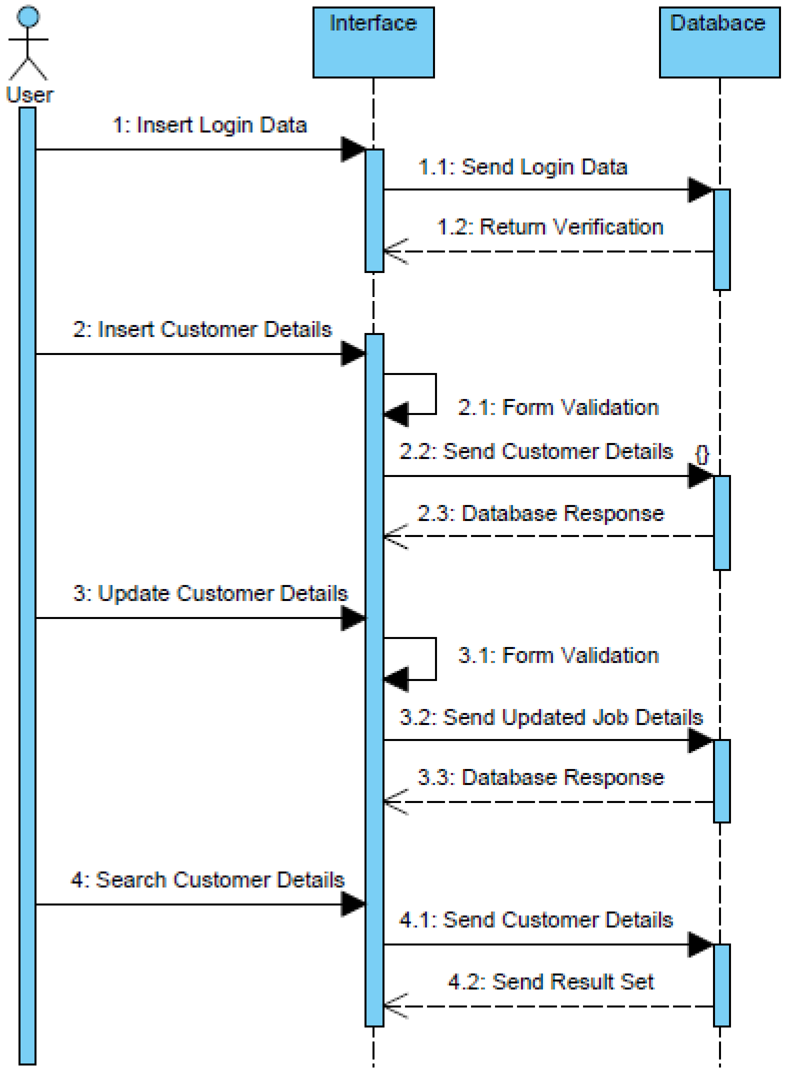


Figure 3.4: Sequence Diagram for the Customer Module

3.9 Sequence Diagram for the Payment Module

Figure 3.5: Sequence Diagram for the Payment Module

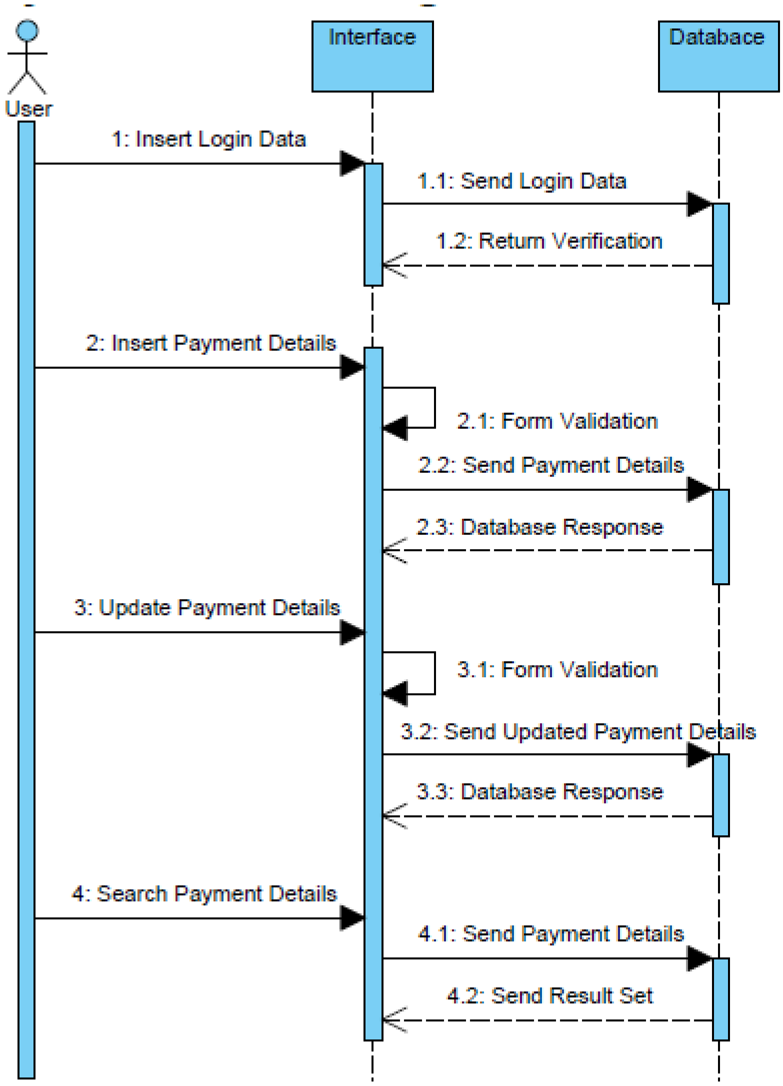


Figure 3.5: Sequence Diagram for the Payment Module

3.10 Sequence Diagram for the Job Module

Figure 3.6: Sequence Diagram for the Job Module

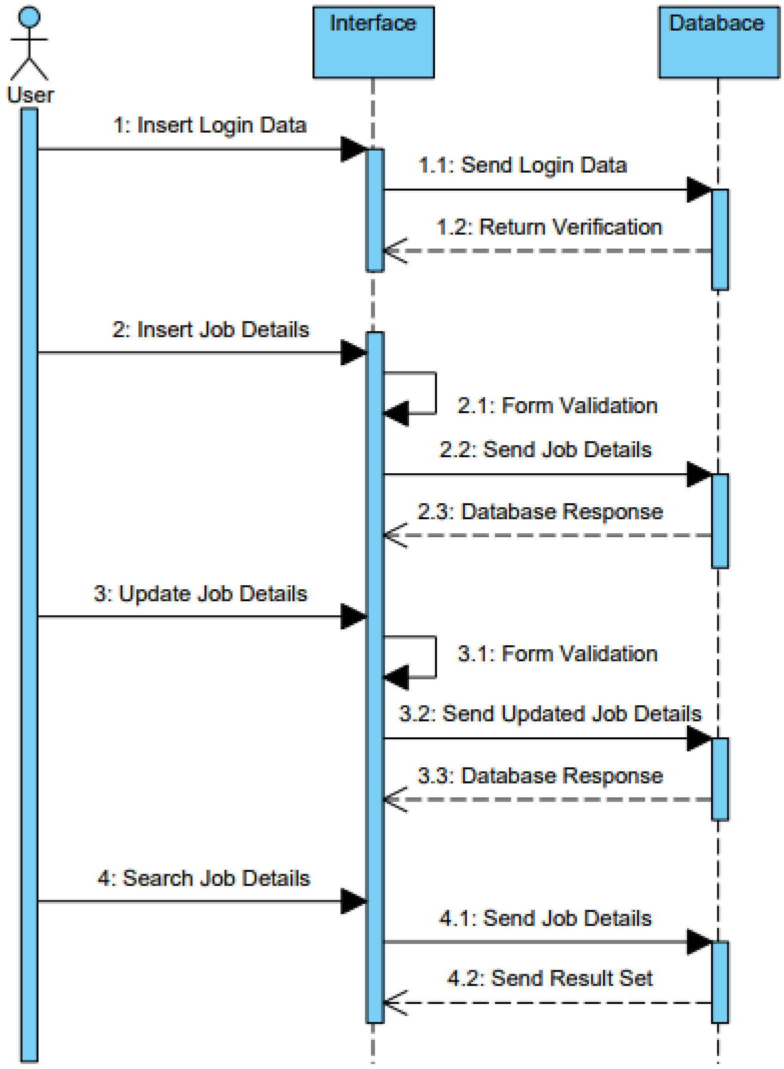


Figure 3.4: Sequence Diagram for the Job Module

3.11 Database Designing for the System

Valuable data can be kept in a proper order without losing them by a better database design. The above mentioned goal can be achieved by the database normalization method. Reduction of data redundancy and keeping consistency of the database is helped by it. Normalization consists with several normal form stages with different goals. They are First Normal Form (1NF), Second Normal Form (2NF) and Third Normal Form (3NF).

Figure 3.7: Database Design for the System

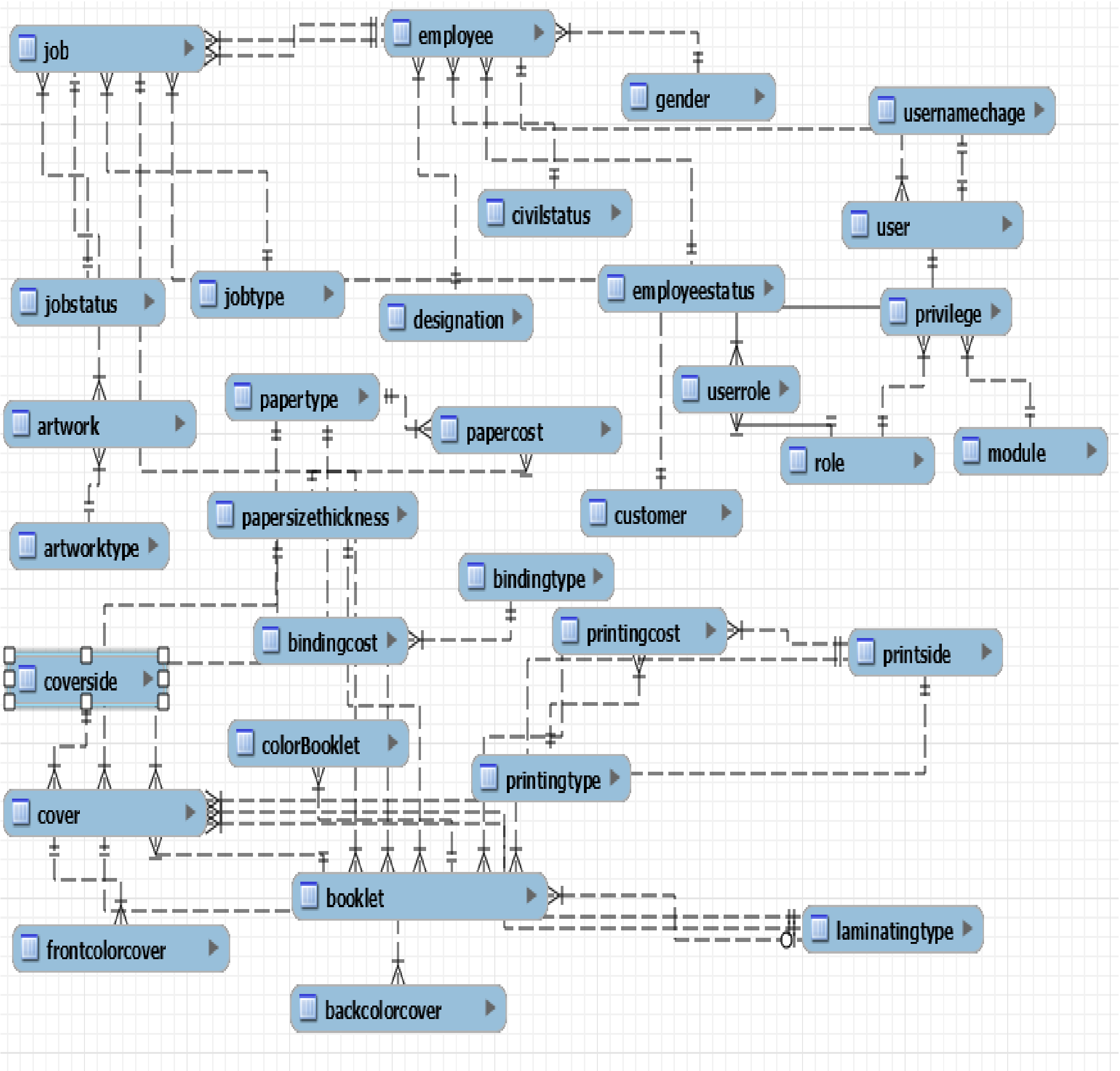


Figure 3.7: Database Design for the System

3.12 User Interface Designing for the System

Among all the major components of the system, a major role of the system is played by user interfaces. Interactivity in between system and the user is managed by the interface. User friendliness, integrated color combination and the well-organized components are dependent on it. Without having a user friendly interface, interaction with the system becomes hard. Privileges must be set by the System Administrator to users in different ways. Management of those privileges and presenting them effectively to users is helped by the interfaces.

3.12.1 Login Interface

The system login page which belongs to the developed system is displayed by figure 3.8.1 In any computerized system the first interface encountered by the user is the login page. Therefore, by designing and handling errors properly a pleasant feeling about the rest of the system can be created within the user.

Figure 3.8: Login Interface for the system

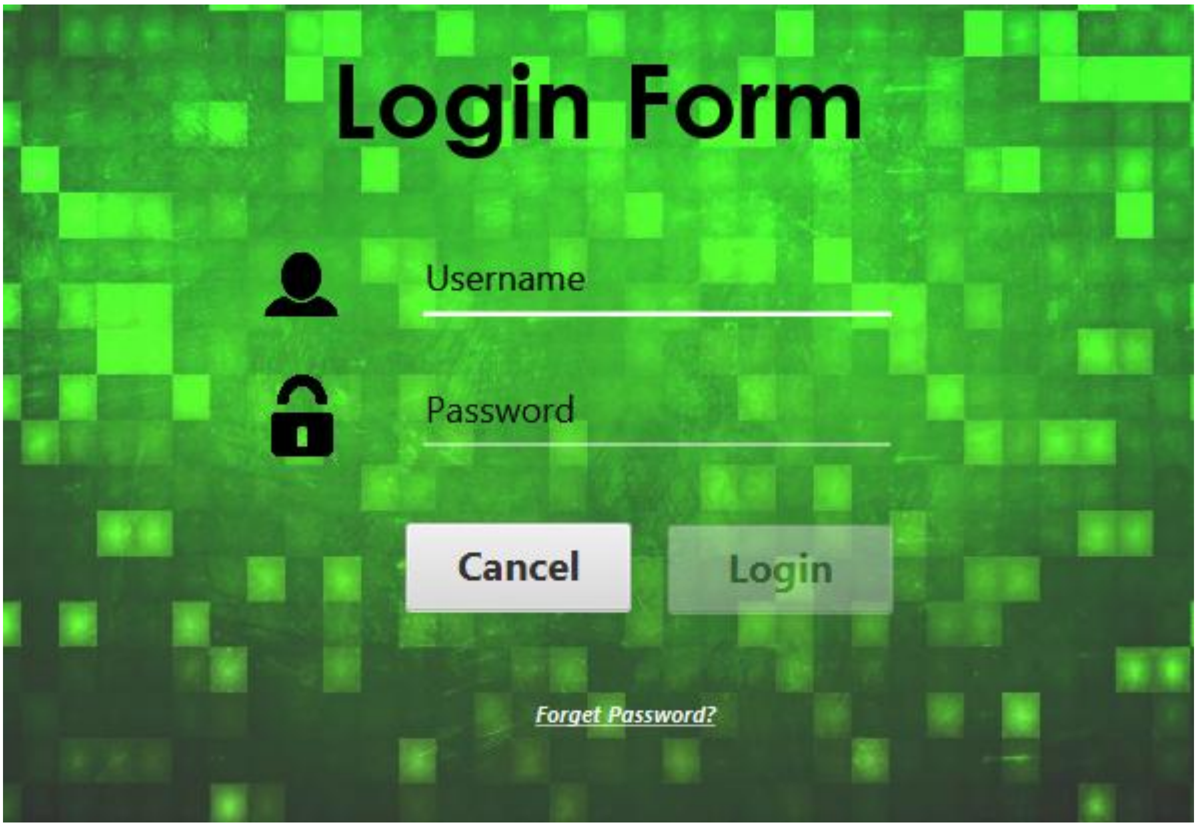


Figure 3.8: Login Interface for the system

3.12.1.1 Design Decision for Login Interface

In the Login Form, Two input fields and two buttons are used. And also “Forget Password” linked used if user has been forgotten his/her password, the user can be used to know the hint of user entered in the User Management Module according to correct username. That means the hint will be shown if only username is correct.

Two input fields are username and password filed used to catch username and password when login button is clicked. The Cancel button is used to clear username and password fields.

3.12.2 Home Page

The home page of this system is displayed by figure 3.8.2. According to the client's requirements as well as by studying other similar standalone system interfaces, the final output had been created. The basic information of the user, login time and the user's profile picture is displayed by it.

Figure 3.9: Home Page

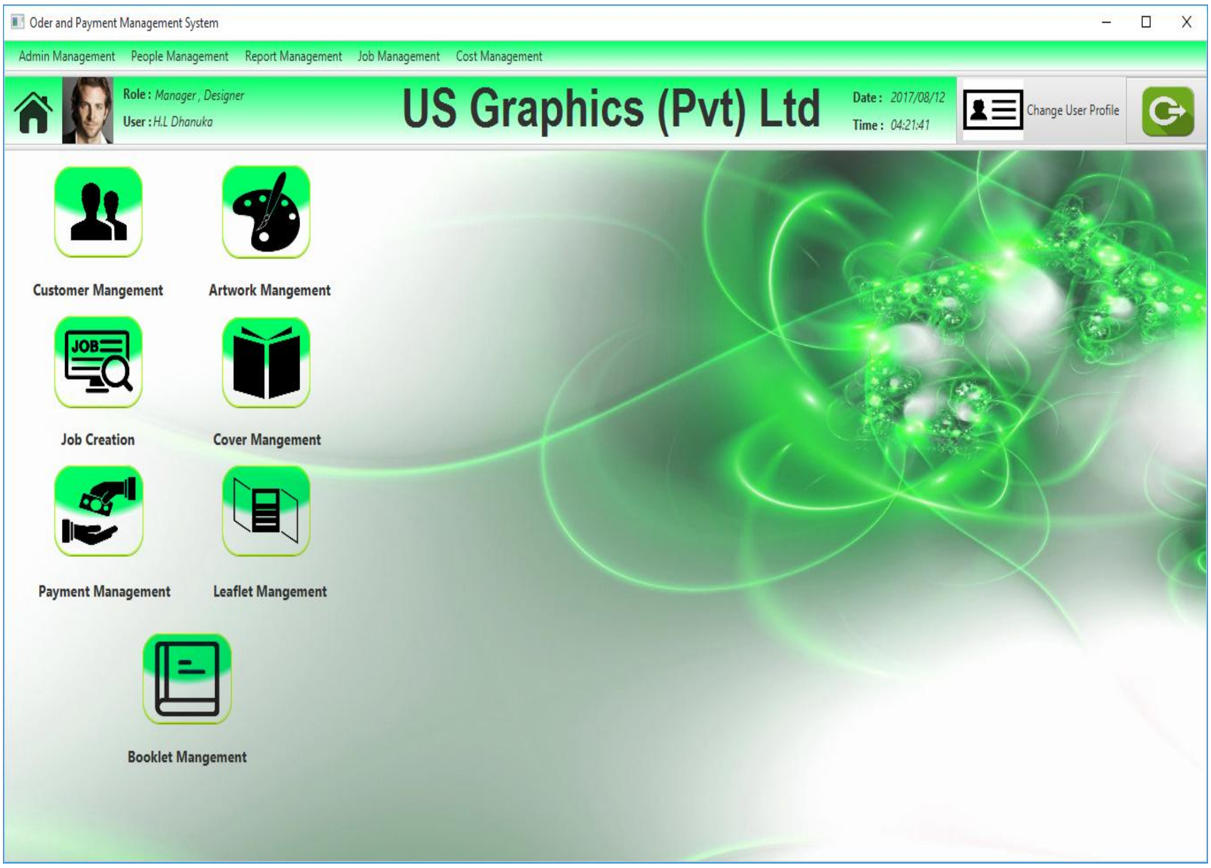


Figure 3.9: Home Page

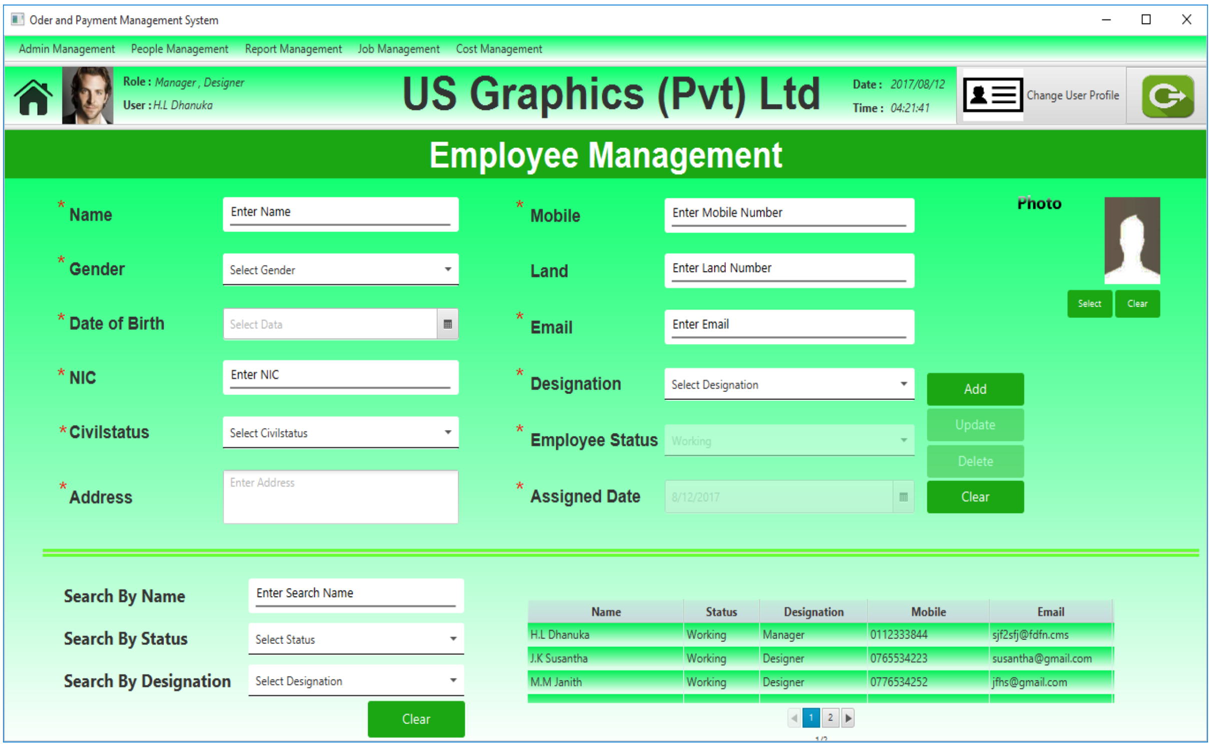
3.12.2.1 Design Decision for Home Page

In this main page, there is several components such as buttons, background image, button image and menu item. Using menu items, user can be entered forms so easily as user wishes.

3.12.3 Employee Information Management Page

The interface which belongs to user fields that helps to add new users' information to the system is displayed in figure 3.8.3. User can understand which data should be added using "*"symbol.

Figure 3.10: Employee Information Management



Role : Manager , Designer
User : H.L Dhanuka
Date : 2017/08/12
Time : 04:21:41

* Name: Enter Name
* Gender: Select Gender
* Date of Birth: Select Data
* NIC: Enter NIC
* Civilstatus: Select Civilstatus
* Address: Enter Address
* Mobile: Enter Mobile Number
Land: Enter Land Number
* Email: Enter Email
* Designation: Select Designation
* Employee Status: Working
* Assigned Date: 8/12/2017

Search By Name: Enter Search Name
Search By Status: Select Status
Search By Designation: Select Designation

Name	Status	Designation	Mobile	Email
H.L Dhanuka	Working	Manager	0112333844	sjf2sfj@fdfn.cms
J.K Susantha	Working	Designer	0765534223	susantha@gmail.com
M.M Janith	Working	Designer	0776534252	jfhs@gmail.com

1 2
1/2

Figure 3.10: Employee Information Management

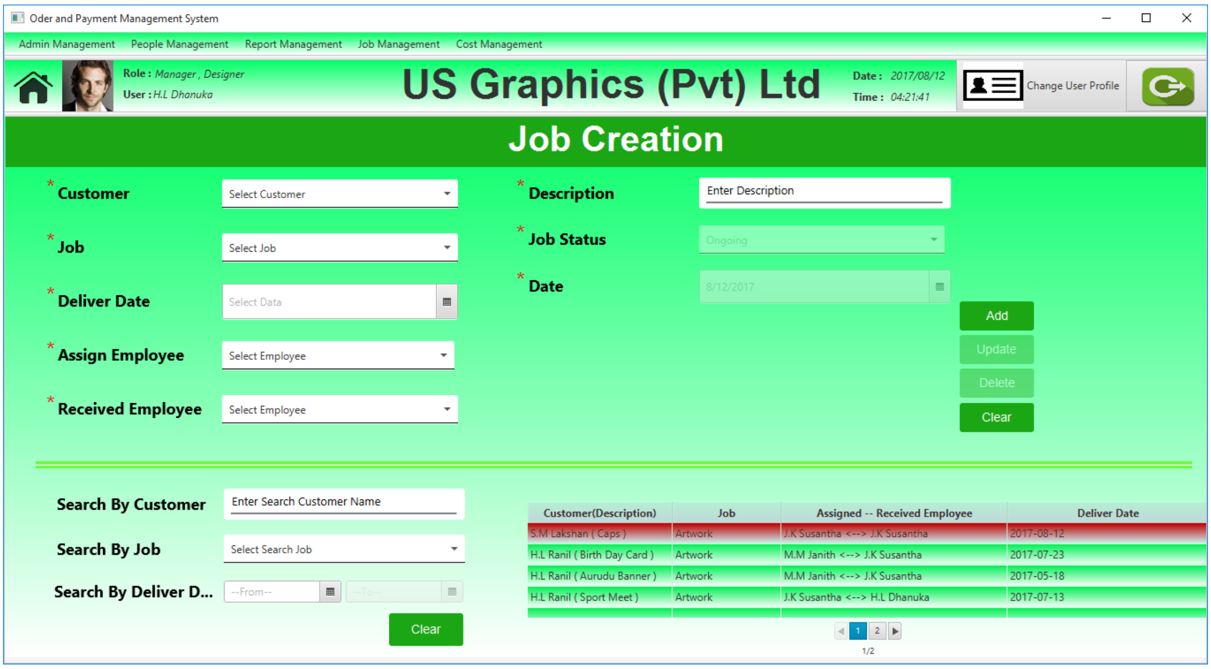
3.12.3.1 Design Decision for Employee Information Management Page

In this form, the text fields, combo boxes, buttons (Add, Delete, Clear, Update) and tables are used to improve usability and user friendliness. The table contains rows, which is used to show data on.

3.12.4 Job Management Page

In this form, User can identify whether orders are passed deliver date using table row color red and using confirmation message, this system is facilitated to show to user whether this order is passed or not.

Figure 3.11: Job Management Page



Role : Manager , Designer
User : H.L Dhanuka

Date : 2017/08/12
Time : 04:21:41

Customer(Description)	Job	Assigned -- Received Employee	Deliver Date
S.M Lakshan (Caps)	Artwork	J.K Susantha <--> J.K Susantha	2017-08-12
H.L Ranil (Birth Day Card)	Artwork	M.M Janith <--> J.K Susantha	2017-07-23
H.L Ranil (Aurudu Banner)	Artwork	M.M Janith <--> J.K Susantha	2017-05-18
H.L Ranil (Sport Meet)	Artwork	J.K Susantha <--> H.L Dhanuka	2017-07-13

Figure 3.11: Job Management Page

3.12.4.1 Design Decision for Job Management Page

In this form, the text fields, combo boxes, buttons (Add, Delete, Clear, Update) and tables are used to improve usability and user friendliness. The table contains rows, which is used to show data on.

CHAPTER 4 : IMPLEMENTATION

4.1 Introduction

“A product software implementation method is a systematically structured approach to effectively integrate a Software Based service or component into the workflow of an organizational structure or an individual end-user.” **[8]**

This is the phase that software becomes executable. In this phase software is developed according to the detail design based on the client requirements. Implementation phase is a very time consuming phase in the software development life cycle. The main objective of this phase is transforming the detail design into executable format effectively. When coding the system, using comments is a very important thing to consider, because if we want to rework and change the code it is easy to maintain it. Validation is also an important thing to consider while we programming. Further code should be readable.

Implementation process, hardware and software needed, design patterns, tools, languages and frameworks used in the system are briefly described in this chapter.

4.2 Implementation Environment

4.2.1 Hardware Requirements

- Computer with processing power 2.50Hz or above
- RAM – 4GB or above
- Hard disk – 250GB or above

4.2.2 Software requirements

- MySQL Server 5.5
- MySQL Workbench
- MySQL Query Browser
- NetBeans IDE
- JavaFX Scene Builder
- Jasper Report
- Hibernate

- Visual Paradigm
- Windows 8.1 or above

Although Payment and Order Management System was developed with above configuration, the system is fully compatible with windows XP and windows Vista.

4.3 Development Tools

4.3.1 NetBeans 8.0

“NetBeans is a software development platform written in Java. The NetBeans Platform allows applications to be developed from a set of modular software components called modules. Applications based on the NetBeans Platform, including the NetBeans integrated development environment (IDE), can be extended by third party developers.

The NetBeans IDE is primarily intended for development in Java, but also supports other languages, in particular PHP, C/C++and HTML5.[4]

NetBeans is cross-platform and runs on Microsoft Windows, Mac OS X, Linux, Solaris and other platforms supporting a compatible JVM.

The editor supports many languages from Java, C/C++, XML and HTML, to PHP, Groovy, Javadoc, JavaScript and JSP. Because the editor is extensible, you can plug in support for many other languages.

The NetBeans Team actively supports the product and seeks feature suggestions from the wider community. Every release is preceded by a time for Community testing and feedback. Over 18 million downloads of the NetBeans IDE to date, and over 800,000 participating developers, the NetBeans project is thriving and continues to grow.

A new version was released 8.2/october 3,2016.NetBeans IDE is the official IDE for Java 8. With its editors, code analyzers, and converters, you can quickly and smoothly upgrade your applications to use new Java 8 language constructs, such as lambdas, functional operations, and method references.” **[9]**

4.3.2 Java Language

“Java is a general-purpose computer programming language that is concurrent, class-based, object-oriented, and specifically designed to have as few implementation dependencies as possible. It is intended to let application developers "write once, run anywhere" (WORA), meaning that compiled Java code can run on all platforms that support Java without the need for recompilation.[17] Java applications are typically compiled to bytecode that can run on any Java virtual machine (JVM) regardless of computer architecture. As of 2016, Java is one of the most popular programming languages in use, particularly for client-server web applications, with a reported 9 million developers. Java was originally developed by James Gosling at Sun Microsystems(which has since been acquired by Oracle Corporation) and released in 1995 as a core component of Sun Microsystems' Java platform. The language derives much of its syntax from C and C++, but it has fewer low-level facilities than either of them.

The original and reference implementation Java compilers, virtual machines, and class libraries were originally released by Sun under proprietary licenses. As of May 2007, in compliance with the specifications of the Java Community Process, Sun relicensed most of its Java technologies under the GNU General Public License. Others have also developed alternative implementations of these Sun technologies, such as the GNU Compiler for Java (bytecode compiler), GNU Classpath (standard libraries), and IcedTea-Web (browser plugin for applets).

The latest version is Java 9, released on September 21, 2017, and is one of the two versions currently supported for free by Oracle. Versions earlier than Java 8 are supported both by Oracle and other companies on a commercial basis.“ **[10]**

4.3.3 MySQL

“MySQL (officially pronounced is an open-source relational database management system(RDBMS). Its name is a combination of "My", the name of co-founder Michael Widenius's daughter, and "SQL", the abbreviation for Structured Query Language. The MySQL development project has made its source code available under the terms of the GNU General Public License, as well as under a variety of proprietary agreements. MySQL was owned and sponsored by a single for-profit firm, the Swedish company MySQL AB, now owned by Oracle Corporation. For proprietary use, several paid editions are available, and offer additional functionality.

MySQL is a central component of the LAMP open-source web application software stack (and other "AMP" stacks). LAMP is an acronym for "Linux, Apache, MySQL, Perl/PHP/Python".

Applications that use the MySQL database include: TYPO3, MODx, Joomla, WordPress, phpBB, MyBB, and Drupal. MySQL is also used in many high-profile, large-scale websites, including Google (though not for searches), Facebook, Twitter, Flickr, and YouTube.” **[11]**

4.3.4 JavaFX Scene Builder

JavaFX Scene Builder is a visual layout tool that lets users quickly design JavaFX application user interfaces, without coding. It is fully written with JavaFX 2.0 APIs. It helps designers and developers to build JavaFX-based UIs and to explore and learn about JavaFX objects.

4.3.5 Visual Paradigm

“Visual Paradigm (VP-UML) is a UML CASE Tool supporting UML 2, SysML and Business Process Modeling Notation (BPMN) from the Object Management Group (OMG). In addition to modeling support, it provides report generation and code engineering capabilities including code generation. It can reverse engineer diagrams from code, and provide round-trip engineering for various programming languages.” **[12]**

4.3.6 Hibernate

Hibernate is an object-relational mapping (ORM) library for the Java language, providing a framework for mapping an object-oriented domain model to a traditional relational database. It solves the object-relational impedance mismatch problems by replacing direct persistence-related database accesses with high-level object handling functions.

Figure 4.1: Hibernate

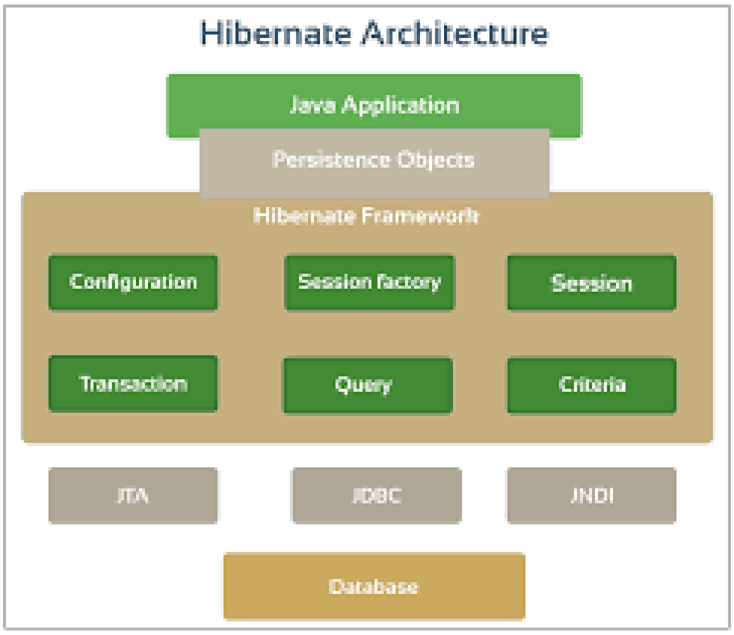


Figure 4.1: Hibernate

Hibernate maps Java classes to database tables and from Java data types to SQL data types. It provides simple APIs for storing and retrieving Java objects directly to and from the database. It does not require an application server to operate. It supports almost all the major RDBMS such as MySQL, Oracle, HSQL Database Engine, PostgreSQL etc.

4.3.7 Jasper Reports

" Jasper Reports is an open source Java reporting tool that can write to a variety of targets, such as: screen, a printer, into PDF, HTML, Microsoft Excel, RTF, ODT, Comma-separated values or XML files.

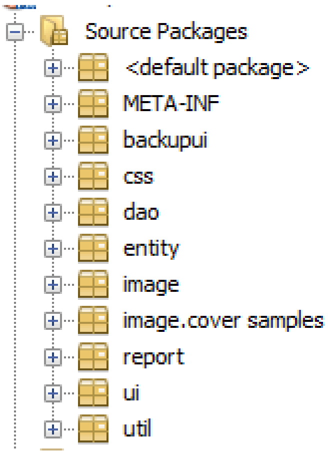
It can be used in Java-enabled applications, including Java EE or web applications, to generate dynamic content. It reads its instructions from an XML or .jasper file.

Jasper Reports is part of the Lisog open source stack initiative." **[13]**

4.3.8 JPA - Java Persistence API

"The Java Persistence API (JPA) is a Java application programming interface specification that describes the management of relational data in applications using Java Platform, Standard Edition and Java Platform, Enterprise Edition. " **[14]**

How classes are organize in the system is given in Figure 4.2: JPA - Java Persistence API



```
Source Packages
  <default package>
  META-INF
  backupui
  css
  dao
  entity
  image
  image.cover samples
  report
  ui
  util
```

Figure 4.2: JPA - Java Persistence API

4.4 Implementation

The Architecture used to implement the system was MVC model. It states to Model View-Controller. MVC is a most applying design pattern since of its reliability & other key usages. It is reusable & communicative that lets more readable & portable. Model–view–controller (MVC) is a software design pattern for constructing user interfaces. It splits a given software application into three interrelated parts, so as to distinct inner representations of information from the ways that information is offered to or accepted from the user.

Model - This is the layer which switches data in the system. It realizes all facts about data which required being presented. It also controls the rules to entree the data objects and complete any kind of operation on them. This layer is liberated from other system layers such as, View and Controller. Model denotes an object or JAVA POJO carrying data. It can also have logic to modify controller if its data modifications.

View - This is the layer which routines Model's data querying methods to acquire the data for the purpose of representing. This layer is liberated from application logic. A view must guarantee that its presence replicates the state of the model.

Controller - Controller acts on both model and view. It controls the data stream into model object and updates the view whenever data changes. It keeps view and model separate.

Figure 4.3: Implementation

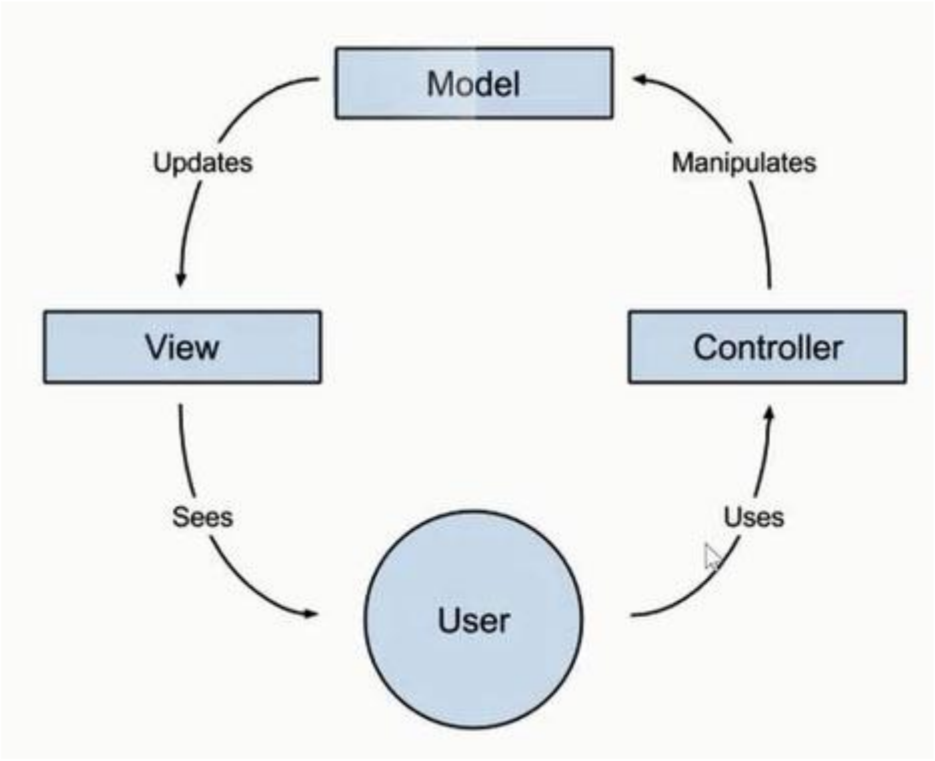


Figure 4.3: Implementation

4.5 Code Segments and Model Layer Implementation

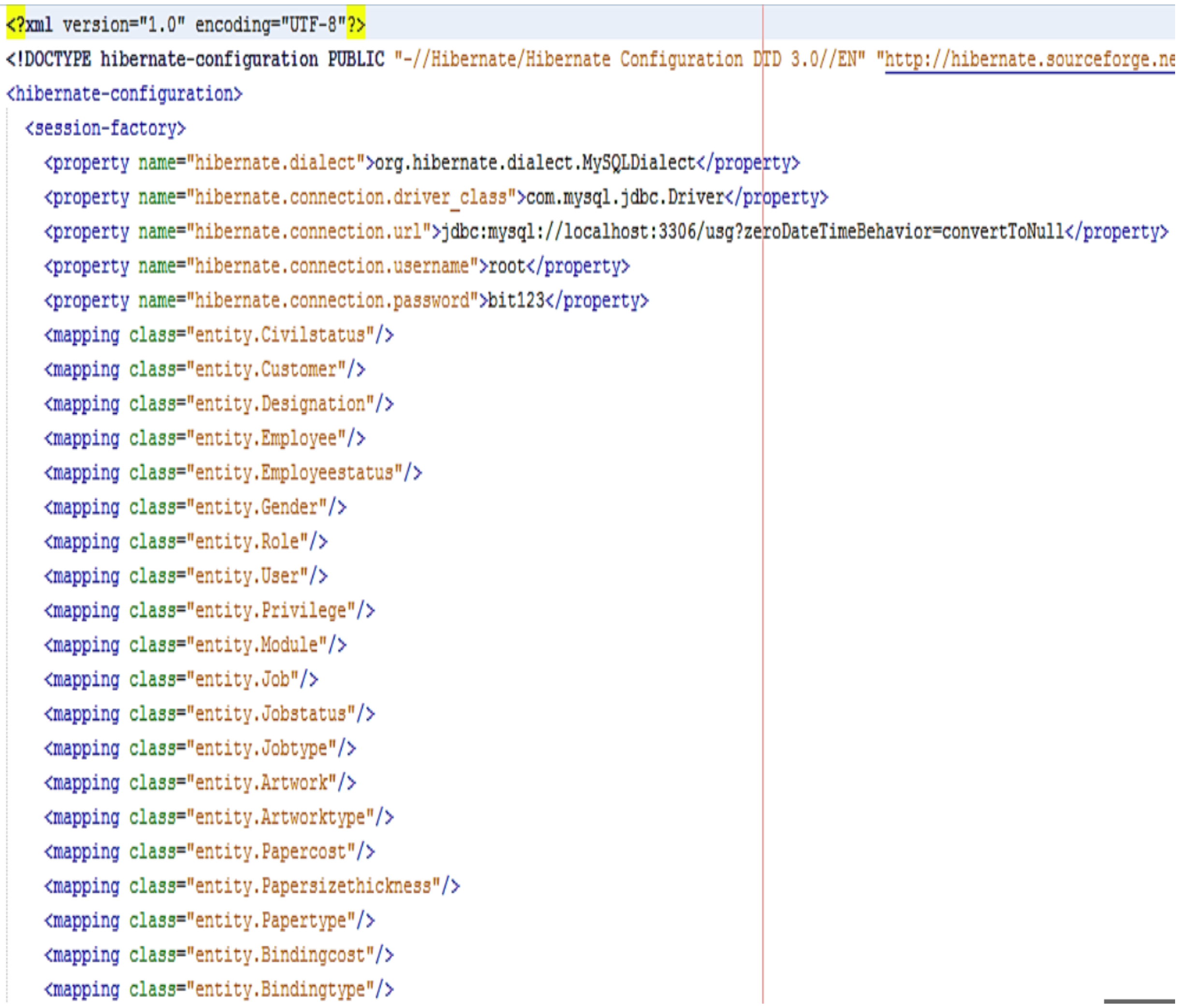
MySQL Server 5.5 was used as the DBMS and MySQL Workbench was used as a graphical tool to develop the database.

In this layer hibernate framework is used to map database tables with our model classes that have relations and relationship between them like, one-to-one, one-to-many, many-to-many, etc. It allows to perform CRUD operations.

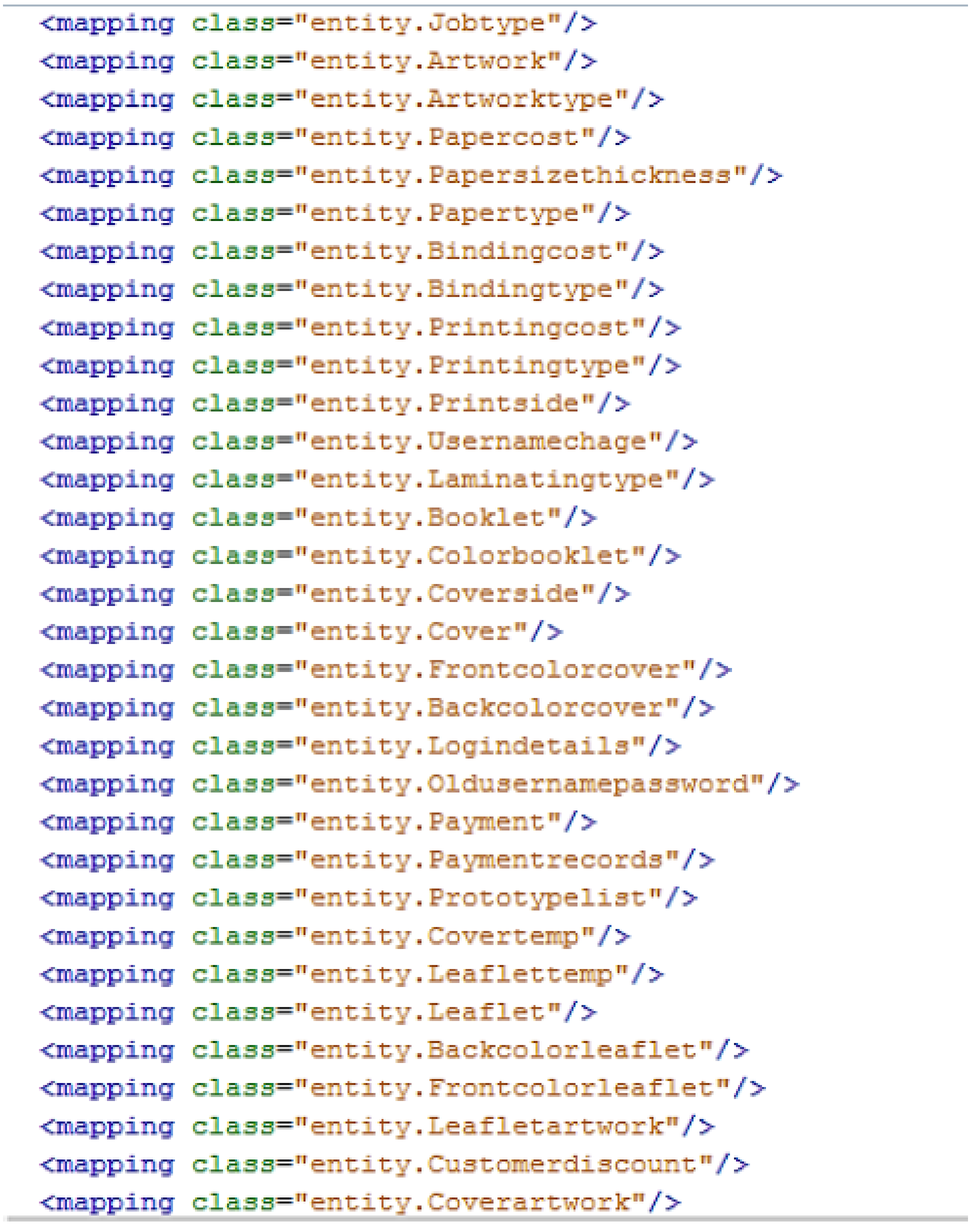
4.5.1 Hibernate Configuration

We need to create an XML file named hibernate.cfg.xml which includes all the information about mapping like which Java classes are mapped to the database tables and some other properties about the database.

Following shows hibernate configuration file (*Code 4.1*)



```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE hibernate-configuration PUBLIC "-//Hibernate/Hibernate Configuration DTD 3.0//EN" "http://hibernate.sourceforge.ne
<hibernate-configuration>
  <session-factory>
    <property name="hibernate.dialect">org.hibernate.dialect.MySQLDialect</property>
    <property name="hibernate.connection.driver_class">com.mysql.jdbc.Driver</property>
    <property name="hibernate.connection.url">jdbc:mysql://localhost:3306/usg?zeroDateTimeBehavior=convertToNull</property>
    <property name="hibernate.connection.username">root</property>
    <property name="hibernate.connection.password">bit123</property>
    <mapping class="entity.Civilstatus"/>
    <mapping class="entity.Customer"/>
    <mapping class="entity.Designation"/>
    <mapping class="entity.Employee"/>
    <mapping class="entity.Employeestatus"/>
    <mapping class="entity.Gender"/>
    <mapping class="entity.Role"/>
    <mapping class="entity.User"/>
    <mapping class="entity.Privilege"/>
    <mapping class="entity.Module"/>
    <mapping class="entity.Job"/>
    <mapping class="entity.Jobstatus"/>
    <mapping class="entity.Jobtype"/>
    <mapping class="entity.Artwork"/>
    <mapping class="entity.Artworktype"/>
    <mapping class="entity.Papercost"/>
    <mapping class="entity.Papersizethickness"/>
    <mapping class="entity.Papertype"/>
    <mapping class="entity.Bindingcost"/>
    <mapping class="entity.Bindingtype"/>
```



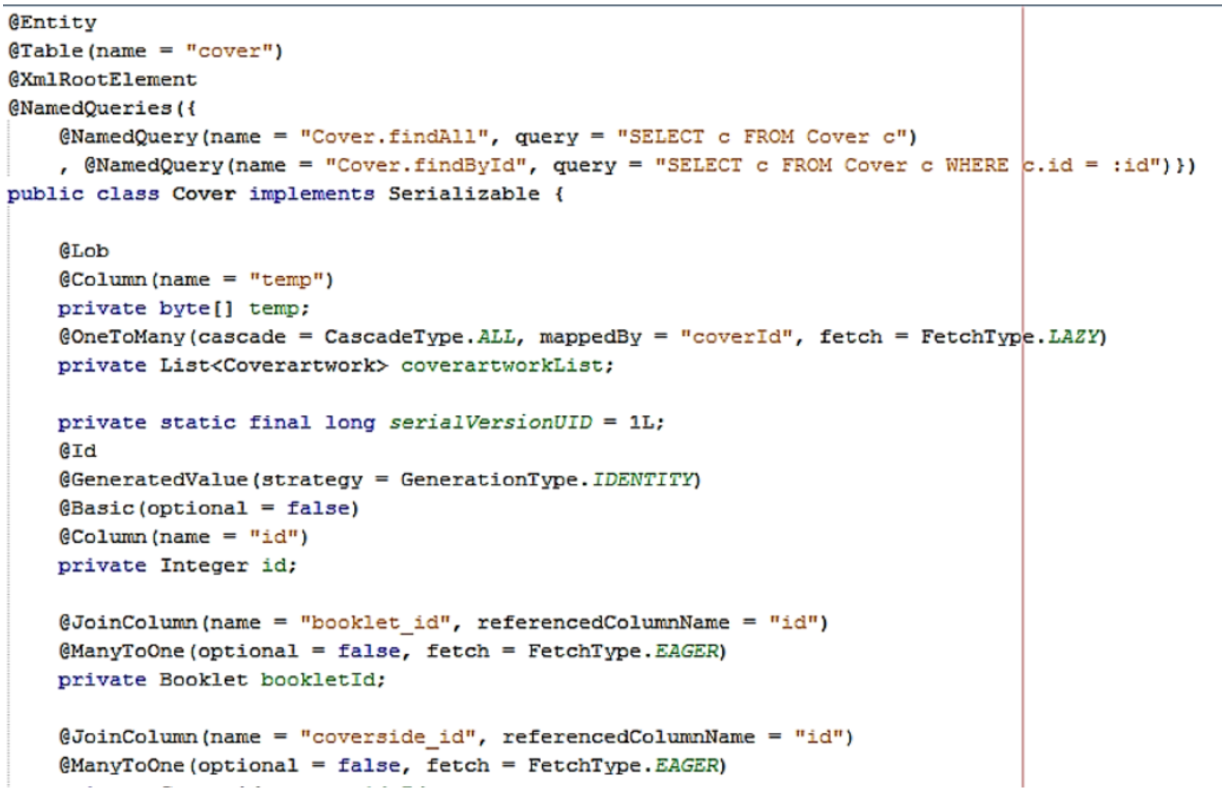
```
<mapping class="entity.Jobtype"/>
<mapping class="entity.Artwork"/>
<mapping class="entity.Artworktype"/>
<mapping class="entity.Papercost"/>
<mapping class="entity.Papersizethickness"/>
<mapping class="entity.Papertype"/>
<mapping class="entity.Bindingcost"/>
<mapping class="entity.Bindingtype"/>
<mapping class="entity.Printingcost"/>
<mapping class="entity.Printingtype"/>
<mapping class="entity.Printside"/>
<mapping class="entity.Usernamechage"/>
<mapping class="entity.Laminatingtype"/>
<mapping class="entity.Booklet"/>
<mapping class="entity.Colorbooklet"/>
<mapping class="entity.Coverside"/>
<mapping class="entity.Cover"/>
<mapping class="entity.Frontcolorcover"/>
<mapping class="entity.Backcolorcover"/>
<mapping class="entity.Logindetails"/>
<mapping class="entity.Oldusernamepassword"/>
<mapping class="entity.Payment"/>
<mapping class="entity.Paymentrecords"/>
<mapping class="entity.Prototypelist"/>
<mapping class="entity.Covertemp"/>
<mapping class="entity.Leaflettemp"/>
<mapping class="entity.Leaflet"/>
<mapping class="entity.Backcolorleaflet"/>
<mapping class="entity.Frontcolorleaflet"/>
<mapping class="entity.Leafletartwork"/>
<mapping class="entity.Customerdiscount"/>
<mapping class="entity.Coverartwork"/>
```

Code 4.1: hibernate.cfg.xml

Java entities whose objects or instances will be warehoused in database tables are called persistent classes in Hibernate. Hibernate works best if these entities follow some simple rules, also known as the Plain Old Java Object (POJO) programming model. An annotation, in the Java computer programming language, is a form of syntactic metadata that can be added to Java source code. Classes, methods, variables, parameters and packages may be annotated.

4.5.2 Create Java Classes

Following shows the java codes use for create java class (*Code 4.2)*



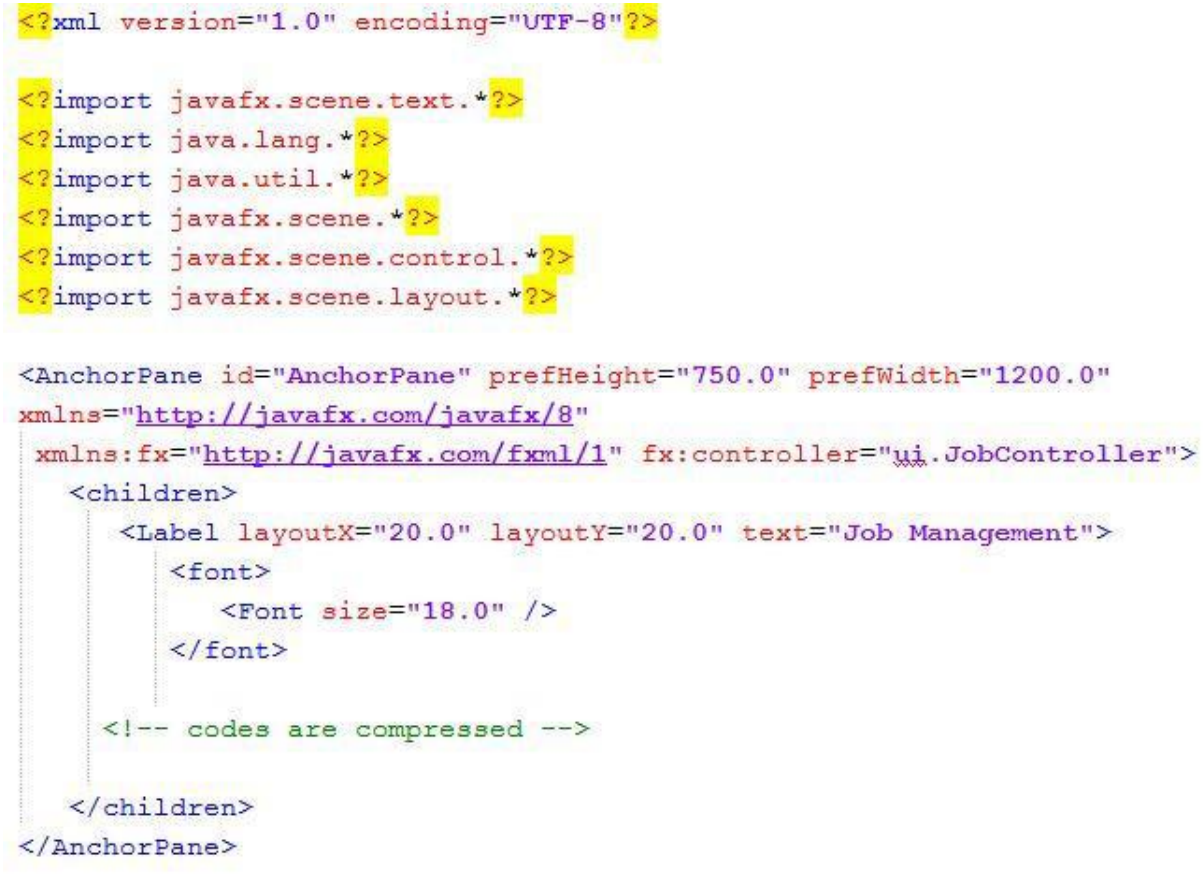
```
@Entity
@Table(name = "cover")
@XmlRootElement
@NamedQueries({
    @NamedQuery(name = "Cover.findAll", query = "SELECT c FROM Cover c")
    , @NamedQuery(name = "Cover.findById", query = "SELECT c FROM Cover c WHERE c.id = :id")})
public class Cover implements Serializable {

    @Lob
    @Column(name = "temp")
    private byte[] temp;
    @OneToMany(cascade = CascadeType.ALL, mappedBy = "coverId", fetch = FetchType.LAZY)
    private List<Coverartwork> coverartworkList;

    private static final long serialVersionUID = 1L;
    @Id
    @GeneratedValue(strategy = GenerationType.IDENTITY)
    @Basic(optional = false)
    @Column(name = "id")
    private Integer id;

    @JoinColumn(name = "booklet_id", referencedColumnName = "id")
    @ManyToOne(optional = false, fetch = FetchType.EAGER)
    private Booklet bookletId;

    @JoinColumn(name = "coverside_id", referencedColumnName = "id")
    @ManyToOne(optional = false, fetch = FetchType.EAGER)
```

Code 4.2: Cover.java

Purpose of the Java class is cover objects and their details from user interfaces to controller classes and controller classes to user interfaces.

4.6 Interface Layer Implementation

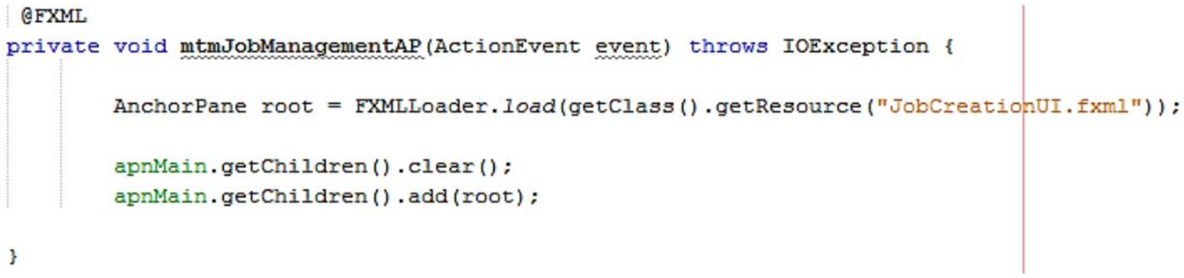
Following shows the auto generated xml codes for creating Job Card user interface using JavaFX Scene Builder. (*Code 4.3*)



```
<?xml version="1.0" encoding="UTF-8"?>

<?import javafx.scene.text.*?>
<?import java.lang.*?>
<?import java.util.*?>
<?import javafx.scene.*?>
<?import javafx.scene.control.*?>
<?import javafx.scene.layout.*?>

<AnchorPane id="AnchorPane" prefHeight="750.0" prefWidth="1200.0"
xmlns="http://javafx.com/javafx/8"
 xmlns:fx="http://javafx.com/fxml/1" fx:controller="ui.JobController">
   <children>
      <Label layoutX="20.0" layoutY="20.0" text="Job Management">
         <font>
            <Font size="18.0" />
         </font>

     <!-- codes are compressed -->

   </children>
</AnchorPane>
```

Code 4.3: JobCreationUI.fxml

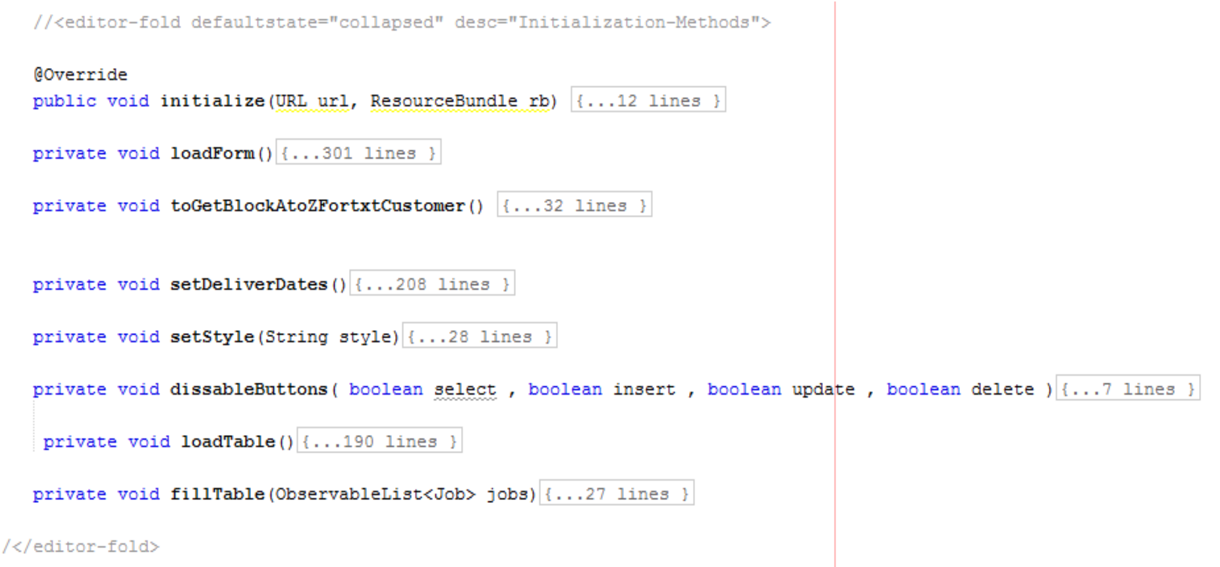
Following shows the java codes use for load the above *JobCreationUI.fxml* into the Java Application class.(*Code 4.4*)



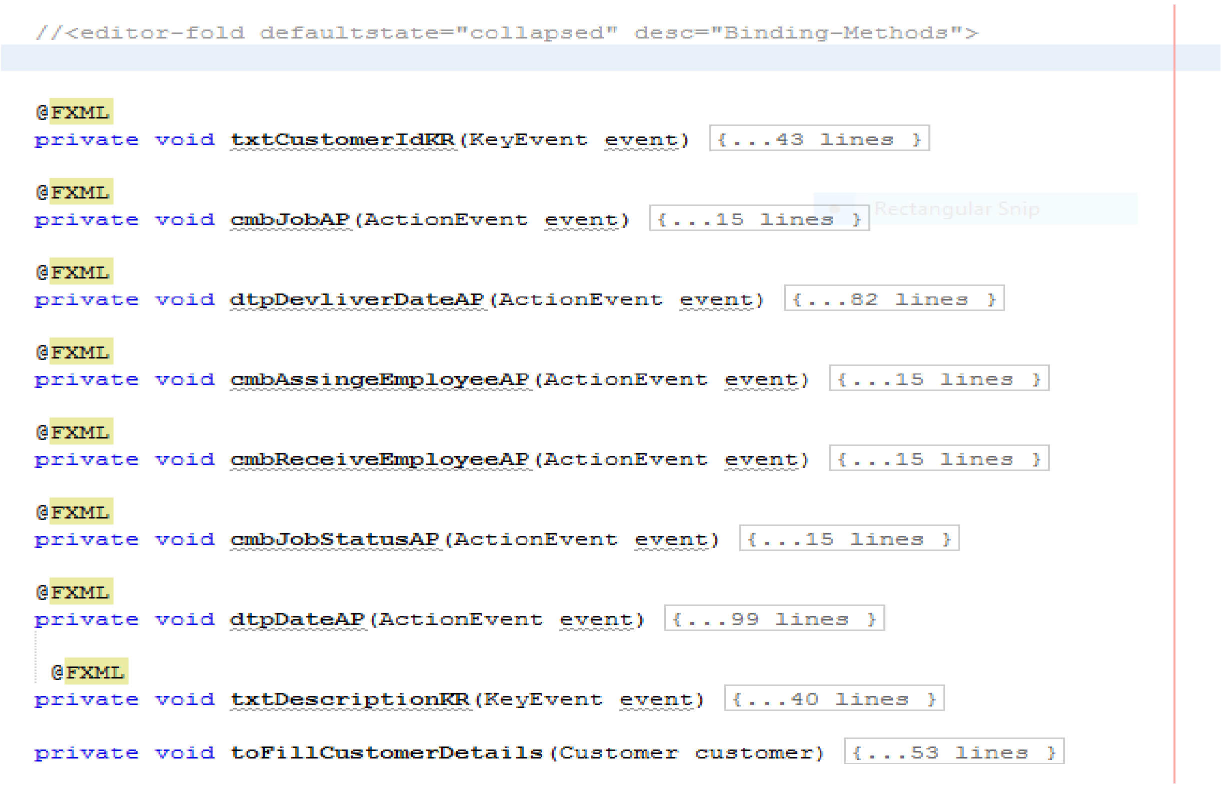
```
 @FXML
private void mtmJobManagementAP(ActionEvent event) throws IOException {

        AnchorPane root = FXMLLoader.load(getClass().getResource("JobCreationUI.fxml"));

        apnMain.getChildren().clear();
        apnMain.getChildren().add(root);

}
```

Code 4.4: MainWindowController.java

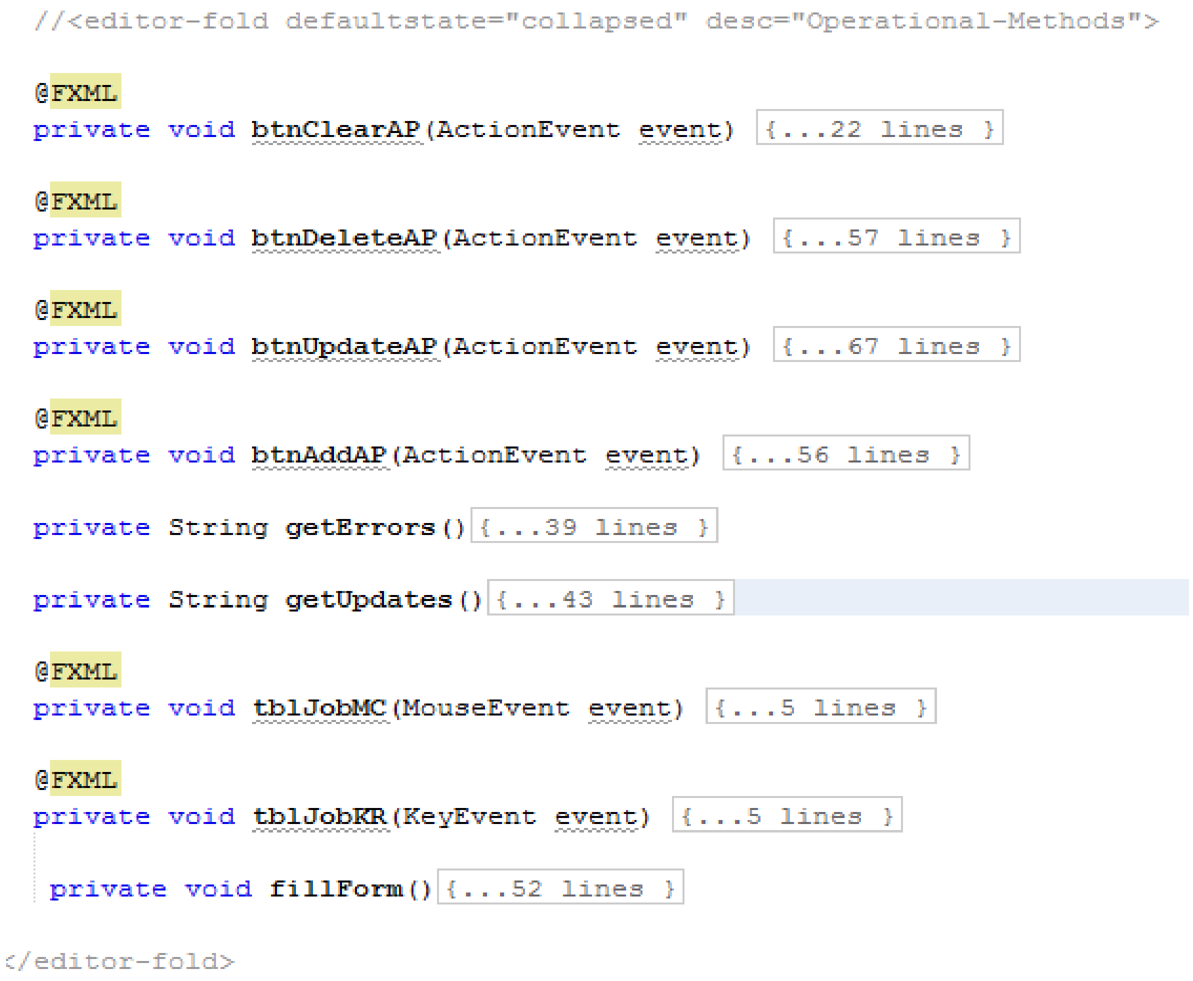
Following shows the java code for user interface controller class. (*Code 4.5*)



```
  //<editor-fold defaultstate="collapsed" desc="Initialization-Methods">

  @Override
  public void initialize(URL url, ResourceBundle rb) {...12 lines }

  private void loadForm() {...301 lines }

  private void toGetBlockAtoZFortxtCustomer() {...32 lines }


  private void setDeliverDates() {...208 lines }

  private void setStyle(String style) {...28 lines }

  private void dissableButtons( boolean select , boolean insert , boolean update , boolean delete ) {...7 lines }

   private void loadTable() {...190 lines }

  private void fillTable(ObservableList<Job> jobs) {...27 lines }

/</editor-fold>
```



```
  //<editor-fold defaultstate="collapsed" desc="Binding-Methods">


  @FXML
  private void txtCustomerIdKR(KeyEvent event) {...43 lines }

  @FXML
  private void cmbJobAP(ActionEvent event) {...15 lines }

  @FXML
  private void dtpDevliverDateAP(ActionEvent event) {...82 lines }

  @FXML
  private void cmbAssingeEmployeeAP(ActionEvent event) {...15 lines }

  @FXML
  private void cmbReceiveEmployeeAP(ActionEvent event) {...15 lines }

  @FXML
  private void cmbJobStatusAP(ActionEvent event) {...15 lines }

  @FXML
  private void dtpDateAP(ActionEvent event) {...99 lines }

   @FXML
  private void txtDescriptionKR(KeyEvent event) {...40 lines }

  private void toFillCustomerDetails(Customer customer) {...53 lines }
```



```
  //<editor-fold defaultstate="collapsed" desc="Operational-Methods">

  @FXML
  private void btnClearAP(ActionEvent event) {...22 lines }

  @FXML
  private void btnDeleteAP(ActionEvent event) {...57 lines }

  @FXML
  private void btnUpdateAP(ActionEvent event) {...67 lines }

  @FXML
  private void btnAddAP(ActionEvent event) {...56 lines }

  private String getErrors() {...39 lines }

  private String getUpdates() {...43 lines }

  @FXML
  private void tblJobMC(MouseEvent event) {...5 lines }

  @FXML
  private void tblJobKR(KeyEvent event) {...5 lines }

   private void fillForm() {...52 lines }

</editor-fold>
```

Code 4.5: JobController.java

4.7 CONTROL LAYER IMPLEMENTATION

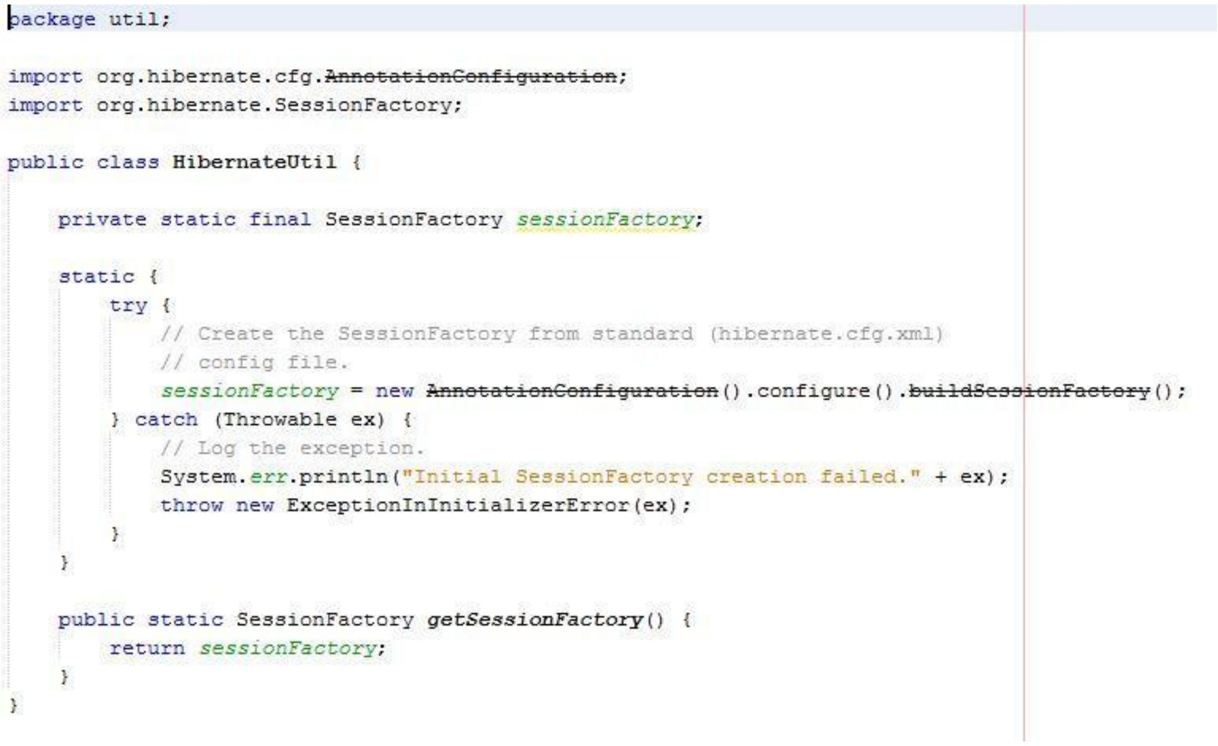
Control layer is the link between data layer & the interface layer. Here logical concept is, Parse a user request (i.e., "read" it), validate the user request (i.e., assure it on forms to application's requirements), determine what the user is trying to do (based on form elements), obtain data from the Model (if necessary) to include in response to user, select the next View the client should see.

The sequencing of calls to the Model (business-logic layer), and/or the sequencing of views and required input from the user defines the application's workflow. Workflow is thus defined in the Controller layer of the application.

4.7.1 Hibernate Sessions

The Session Factory is the concept that is a single data store and thread safe. Because of this feature, many threads can access this concurrently and the sessions are requested, and also the cache that is immutable of compiled mappings for a specific database. A Session Factory will be built only at the time of its startup. In order to access it in the application code, it should be wrapped in singleton. This wrapping makes the easy accessibility to it in an application code.

Following shows the java code for create session factory. (*Code 4.6*)



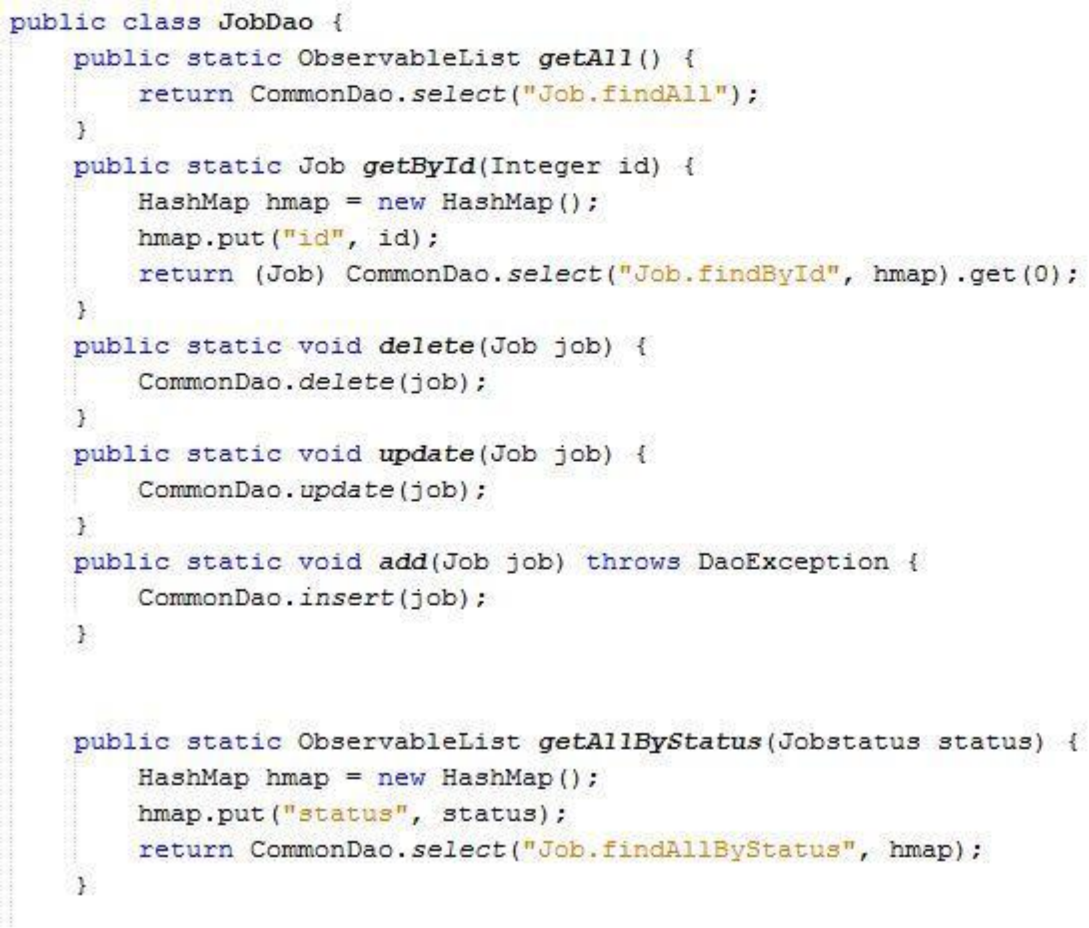
```
package util;

import org.hibernate.cfg.~~AnnotationConfiguration~~;
import org.hibernate.SessionFactory;

public class HibernateUtil {

    private static final SessionFactory sessionFactory;

    static {
        try {
            // Create the SessionFactory from standard (hibernate.cfg.xml)
            // config file.
            sessionFactory = new ~~AnnotationConfiguration~~().configure().~~buildSessionFactory~~();
        } catch (Throwable ex) {
            // Log the exception.
            System.err.println("Initial SessionFactory creation failed." + ex);
            throw new ExceptionInInitializerError(ex);
        }
    }

    public static SessionFactory getSessionFactory() {
        return sessionFactory;
    }
}
```

Code 4.6: HibernateUtil.java

4.7.2 DAO (Data Access Object)

In computer software, a data access object (DAO) is an object that provides an abstract interface to some type of database or other persistence mechanism. By mapping application calls to the persistence layer, DAO provides some specific data operations without exposing details of the database. This isolation supports the Single responsibility principle. It separates what data accesses the application needs, in terms of domain-specific objects and data types (the public interface of the DAO), from how these needs can be satisfied with a specific DBMS, database schema, etc. (the implementation of the DAO).

Following shows the java code for JobDao.java class. (*Code 4.7*)



```
public class JobDao {
    public static ObservableList getAll() {
        return CommonDao.select("Job.findAll");
    }
    public static Job getById(Integer id) {
        HashMap hmap = new HashMap();
        hmap.put("id", id);
        return (Job) CommonDao.select("Job.findById", hmap).get(0);
    }
    public static void delete(Job job) {
        CommonDao.delete(job);
    }
    public static void update(Job job) {
        CommonDao.update(job);
    }
    public static void add(Job job) throws DaoException {
        CommonDao.insert(job);
    }


    public static ObservableList getAllByStatus(Jobstatus status) {
        HashMap hmap = new HashMap();
        hmap.put("status", status);
        return CommonDao.select("Job.findAllByStatus", hmap);
    }
```

Code 4.7: JobDao.java

CHAPTER 5 : EVALUATION

To evaluate a project or an activity someone should check or test and verify whether the intended components of the system or the project are full filed satisfactorily, with the specified project activities carried out. The evaluation test should identify the gaps, errors or removing any activity Mentioned in the original proposal.

For a software development project, it should be checked whether the system meets the specifications with validations. Whether it has full filed its intended purpose, Verification is process of evaluating software to determine whether the products of a given development phase satisfy the conditions imposed at the start of that phase. Validation checks that the product design satisfies or fits the intended use or the software meets the user requirements.

5.1 TEST STRATEGIES

The system is tested using various kinds of test types, such as unit testing, integrated testing, system testing and etc. Testing is implemented while development process going on. Test cases and test data are used for investigation.

5.1.1 Unit testing

Unit testing is a testing framework by which individual units of source code, sets of one or more computer program modules together with related control data, usage processes, and operating processes, are tested to describe if they are ready for use. Most of the cases, the smallest testable portion of an application is considered as a unit. In OOP it can be an interface such as a class or an individual service or method. Unit testing was performed while developing the system to verify whether the source codes are accurate and working well.

5.1.2 Integrated Testing

Integration testing is a software development process which program units are combined and tested as groups in multiple ways and carried out after unit testing & before the system validation phase. The purpose of this is to expose faults in the interaction between integrated units. Either Developers themselves or independent Testers perform Integration Testing.

5.1.3 System Testing

System Testing is a software testing process which is performed on the entire system in the context of a Functional Requirement Specification and/or a System Requirement Specification. It is also intended to test up to and beyond the bounds defined in the software/hardware requirements specifications. It is performed after Integration Testing by independent testers.

This is a black box type of testing where external working of the software is evaluated with the help of requirement documents & it is totally based on Users point of view. As a rule, system testing takes, as its input, all of the "integrated" software components that have passed the integration testing and also the software system itself integrated with any applicable hardware systems.

5.2 Test Cases

A test case has components that describe an input, action or event and an expected response, to determine if a feature of an application is working correctly.

5.2.1 Test cases and test results for Customer Module

Following table 5.1: shows Test Cases and Test Results for Customer Module

Test No	**Test Description**	**Expected Result**	**Pass / Fail**
1	Auto generated Customer ID	Increment customer ID by 1	Pass
2	Customer name is typed wrong	Name field background color change to Light Red.	Pass
3	Address is typed wrong	Address field background color change to Light Red.	Pass
4	Mobile number contain nine numbers and starting with zero and without any exciting formats	Telephone field appear in Light Red.	Pass
5	Mobile number contain ten numbers and starting with any number except zero and seven and without any exciting formats	Telephone field appear in Light Red.	Pass
6	Mobile number contain ten numbers and starting with zero and seven(07xxxxxxxx) and with any exciting formats	Telephone field appear in Light Green.	Pass

7	TP No Same as mobile number criteria	If all constrains are fulfill TP No number field appear as Light Green and if it is not it appear as Light Red.	Pass
8	Email is empty	Email field background color change to Light Red	Pass
9	Email is empty and without ’@’ mark	Email field appear in Light Red	Pass
10	Email contains '@' mark in the body	Email field appear in Light Green	Pass
11	Customer Assigned Date is automatically filled when module is opened.	Customer Assigned Date is disabled and appear in Light Green	Pass
12	When form load, Both add and Clear button should be enabled and both Delete and Update button should be disabled.	When the form load both Start and Clear button is enabled and others are disabled	Pass
13	Nic is empty.	Nic field appear in Light Red	Pass
14	Nic is empty and invalid both new and old format	Nic field appear in Light Red	Pass
15	When Add button is clicked without filling Mobile field or invalid mobile , error message should be prompted as “Mobile is invalid”	Error message appear as “Mobile is invalid”	Pass
16	After clicking the inserted record in the table view and When Update button is clicked and all fields are filled with errors, error message should be prompted according to fields.	Error message appears.	Pass
17	After clicking table view, the data records fill correctly.	All Fields appear in Light Green	Pass
18	Fields are updated.	The updated filed appear in Light Orange	Pass
19	When Update button is clicked and all fields are filled appropriately, Update message should be appeared as "current data values changed to new data values"	When Update button is clicked and all fields are filled appropriately Update message should be appeared as "current data values changed to new data values" When Ok button is clicked record is updated and switch to Search view. When Cancel button is clicked do not	Pass

		update record and appear same page.	
20	Click Clear button	Clear text Fields data and clear selection of the table	Pass

Table 5.1: Test Cases and Test Results for Customer Module

5.2.2 Test cases and test results for Job Module

Following table 5.2: shows Test Cases and Test Results for Job Module

Test No	**Test Description**	**Expected Result**	**Pass / Fail**
1	Auto generated Job ID	Increment job ID by 1	Pass
2	Customer ID is typed the customer id which not in customer main table	Customer ID field background color change to Light Red.	Pass
3	Job Assigned Date is automatically filled when module is opened.	Job Assigned Date is disabled and appear in Light Green	Pass
4	Show Customer Details according to the typed customer id	Show details of the Customer in customer details area	Pass
5	Job Status is automatically filled when module is opened.	Job Status is disabled and appear in Light Green	Pass
6	Deliver Date is picked as today or future date	Deliver Date field appear in Light Green	Pass
7	Deliver Date is picked as past day	Deliver Date field appear in Light Red	Pass
8	When Add button is clicked without picking Deliver Date or other Compulsory fields or invalid Customer Id , error message should be prompted as “Mobile is invalid”	Error message appears.	Pass
9	After clicking the inserted record in the table view and When Update button is clicked and all fields are filled with errors, error message should be prompted according to fields.	Error message appears.	Pass

10	After clicking table view, the data records fill correctly.	All Fields appear in Light Green	Pass
11	Fields are updated.	The updated filed appear in Light Orange	Pass
12	When Update button is clicked and all fields are filled appropriately, Update message should be appeared as "current data values changed to new data values"	When Update button is clicked and all fields are filled appropriately Update message should be appeared as "current data values changed to new data values" When Ok button is clicked record is updated and switch to Search view. When Cancel button is clicked do not update record and appear same page.	Pass
13	Click Clear button	Clear text Fields data and clear selection of the table	Pass

Table 5.2:Test Cases and Test Results for Job Module

5.2.3 Test cases and test results for Artwork Module

Following table 5.3: shows Test Cases and Test Results for Artwork Module

Test No	Test Description	Expected Result	Pass / Fail
1	Auto generated Artwork ID	Increment job ID by 1	Pass
2	Job ID is typed the customer id which is not in customer main table	Job ID field background color change to Light Red.	Pass
3	Show Job Details according to the typed customer id	Show details of the job in customer details area	Pass
4	Artwork Cost Field is invalid (User can not be typed letters in artwork cost field)	User can be typed only numeric	Pass
5	Artwork Cost Field is invalid cost format	After typing and when lost focus , automatically update into valid cost format	Pass
6	When uploading a artwork, user should be seen where it should be dropped	Change the image of the image view	Pass
7	When Add button is clicked without picking Deliver Date or other Compulsory fields or invalid Customer Id , error message should be prompted as “Mobile is	Error message appears.	Pass

	invalid”		
8	After clicking the inserted record in the table view and When Update button is clicked and all fields are filled with errors, error message should be prompted according to fields.	Error message appears.	Pass
9	After clicking table view, the data records fill correctly.	All Fields appear in Light Green	Pass
10	Fields are updated.	The updated filed appear in Light Orange	Pass
11	When Update button is clicked and all fields are filled appropriately, Update message should be appeared as "current data values changed to new data values"	When Update button is clicked and all fields are filled appropriately Update message should be appeared as "current data values changed to new data values" When Ok button is clicked record is updated and switch to Search view. When Cancel button is clicked do not update record and appear same page.	Pass
12	Click Clear button	Clear text Fields data and clear selection of the table	Pass

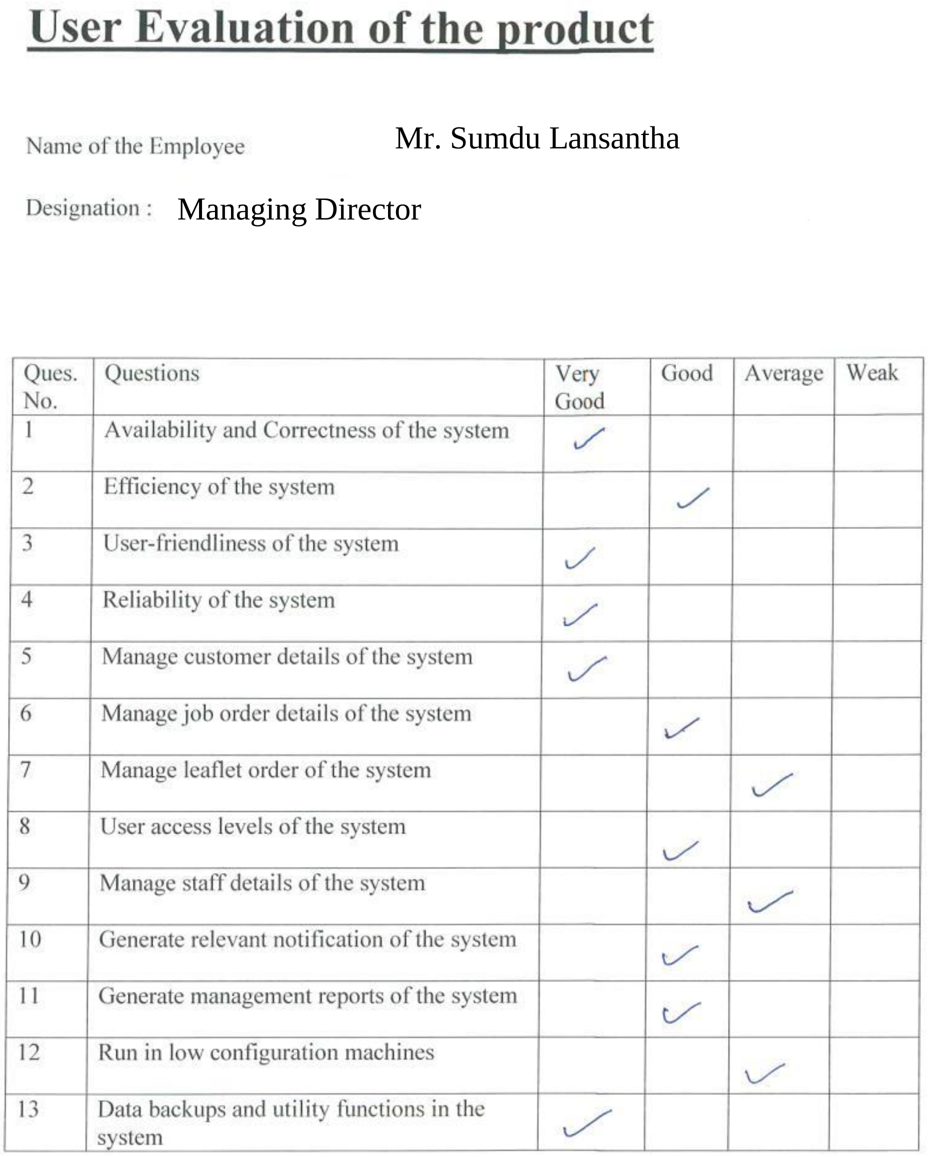
Table 5.3:Test Cases and Test Results for Artwork Module

5.3 Use Acceptance Testing

Finally the system is tested by the user for acceptance testing. The acceptance testing is carried out by implementing the system at the real working environment along with the real test data and available conditions in the actual background. Then the user can decide if all the functional and non-functional requirements are included in the system or not. The response of the user was shown that all the expected system modules were implemented and that he/she was satisfied with the system. The performance & drawbacks were monitored as well as the test results & the user friendliness of the system. Over all valuation of user feedback was done as the final stage.

The overall system was tested by the client; changing the user’s privileges. After testing the system, it had been requested to test the system using the staff members. When finishing their session there was a pleasant response about the system. Manager and other designers were pleasant about their functional requirements are included in the system. And all users were pleasant about the user interfaces and functions of the system.

Following figure 5.1: shows User evaluation Feedback and figure 5.2: shows User evaluation Feedback



User Evaluation of the product

Name of the Employee Mr. Sumdu Lansantha

Designation : Managing Director

Ques. No.	Questions	Very Good	Good	Average	Weak
1	Availability and Correctness of the system	✓			
2	Efficiency of the system		✓		
3	User-friendliness of the system	✓			
4	Reliability of the system	✓			
5	Manage customer details of the system	✓			
6	Manage job order details of the system		✓		
7	Manage leaflet order of the system			✓	
8	User access levels of the system		✓		
9	Manage staff details of the system			✓	
10	Generate relevant notification of the system		✓		
11	Generate management reports of the system		✓		
12	Run in low configuration machines			✓	
13	Data backups and utility functions in the system	✓			

Figure 5.1: User evaluation Feedback

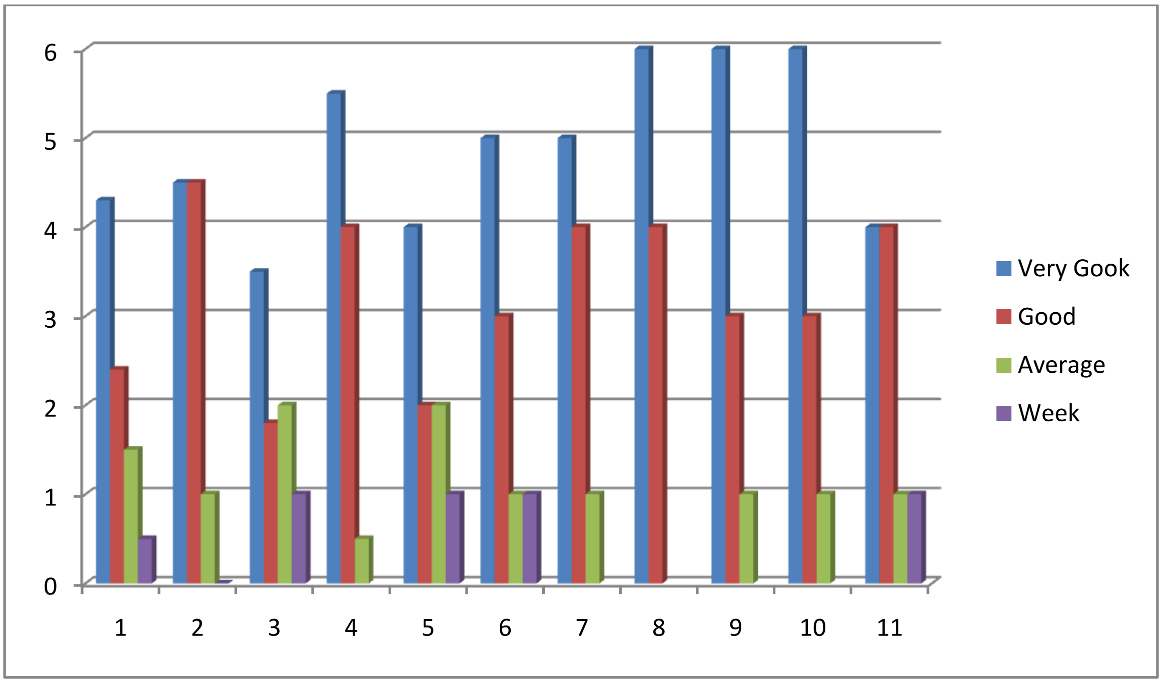
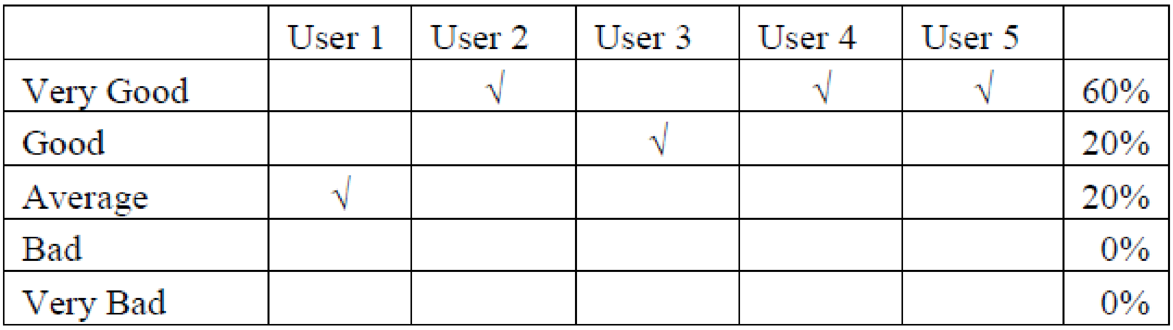


Figure 5.2: User evaluation Feedback



	User 1	User 2	User 3	User 4	User 5	
Very Good		√		√	√	60%
Good			√			20%
Average	√					20%
Bad						0%
Very Bad						0%

Figure 5.3: User evaluation Feedback 2

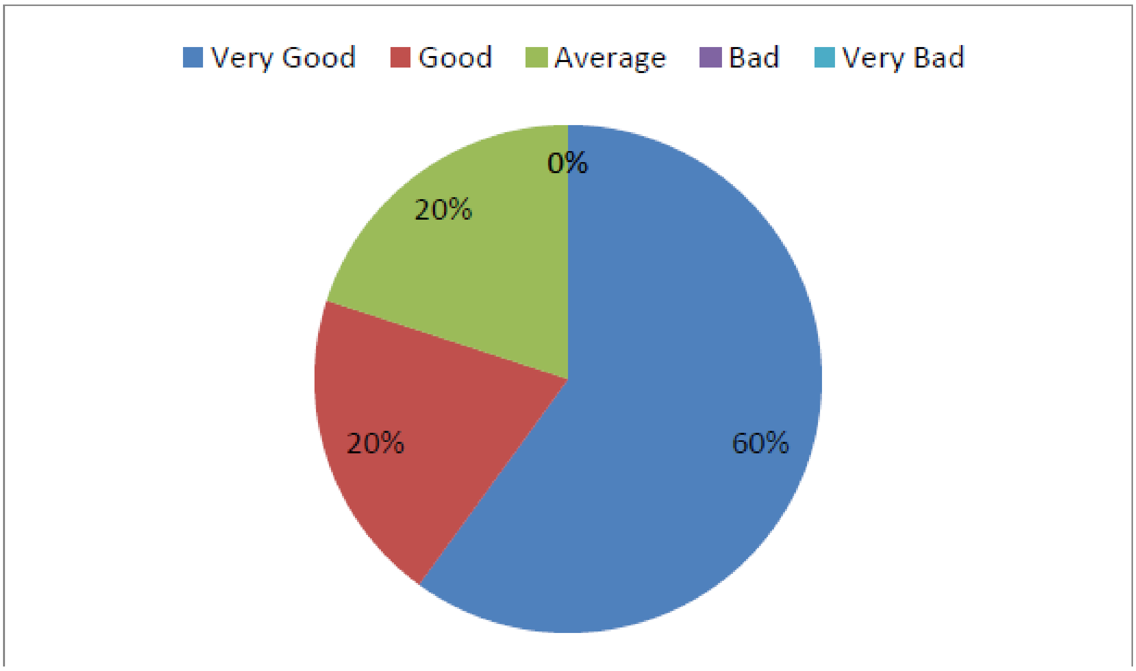


Figure 5.4: User evaluation Feedback 2

CHAPTER 6 : CONCLUTION

6.1 Introduction

The “Order & Payment Management System” for the US Graphics (PVT) Ltd has been ultimately reached to the goal welcoming challenges and learning new skills that allowed master the challenges. There were major objectives to cover that the client required from the developed system.

From the start of the company, they have maintained the business process by using a traditional manual system. With the manual system they had faced lots of difficulties when dealing with main business processes within the company such as maintaining job card, maintaining artwork prototypes, managing payment records and to give discount for their frequent customers. This System was developed to address those drawbacks as well as to optimize their overall business process and through this to help them to keep their brand name at the top of the market.

One is to improve the efficiency of the business process. To enhance the productivity of the business it is necessary to get higher efficiency from the employees and also the report generating process will allow to the management for better decision making to implement new business strategies. And also it was understood when using a software system the security of this data is very important. So new requirements were raised like Keeping a backup and log files and user management. The technical and the methodical advancement have reasoned to huge functional and non-functional enhancements of the office environment as well as the performance of the employees by getting easier the individual tasks and motivating them. The whole process of the business organization also engages positively with increasing productivity.

This is revealed by the feedback of client’s as well as the employee’s and the new behavior of the business environment.

6.2 Future Improvements

Developing a commercial level system is a huge task. Some suggestions for improvements in the future are as follows:

- Providing Online Payment Facility

  By implementing this suggestion, the internal user as well as the external user can do their transactions via the system using a payment gateway.

- Provide SMS facility after processing orders and for special tasks

  By implementing this suggestion, users can get relevant information from the system without accessing the system or email account.

- Add customized profile facility

  By implementing this suggestion, administrator can customize the profile as he wants and can set privileges according to the user type.

- To create group projects with other companies

  By implementing this suggestion, system can stored a lot of employees and other companies.

- To online job handling

  By implementing this suggestion, user can uploaded their anywhere at any time.

6.3 Lessons Learnt

As an undergraduate the knowledge gained throughout the project was really valuable. In addition this gave me an exceptional experience of being in a complete software development life cycle, starting from feasibility studies to the conclusion of the project.

This project gave an opportunity to get extensive knowledge of JavaFX, XML, Hibernate, MVC, MySQL, NetBeans and many more languages, tools and technologies. And also it helped to test and implement most important theories and technologies learnt throughout the BIT degree program.

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APPENDX A - SYSTEM DOCUMENTATION

SYSTEM MANUAL

This documentation provides guidelines prior to the setup of the Order and Payment Management System. This is to assist the software engineers, Administrators and managers to install the Order and Payment Management System in their PC""s, Servers or Workstations. The system documentation can be referred if there are any changes to be made in the Order and Payment Management System.

Hardware & software configuration requirements,

Hardware requirements

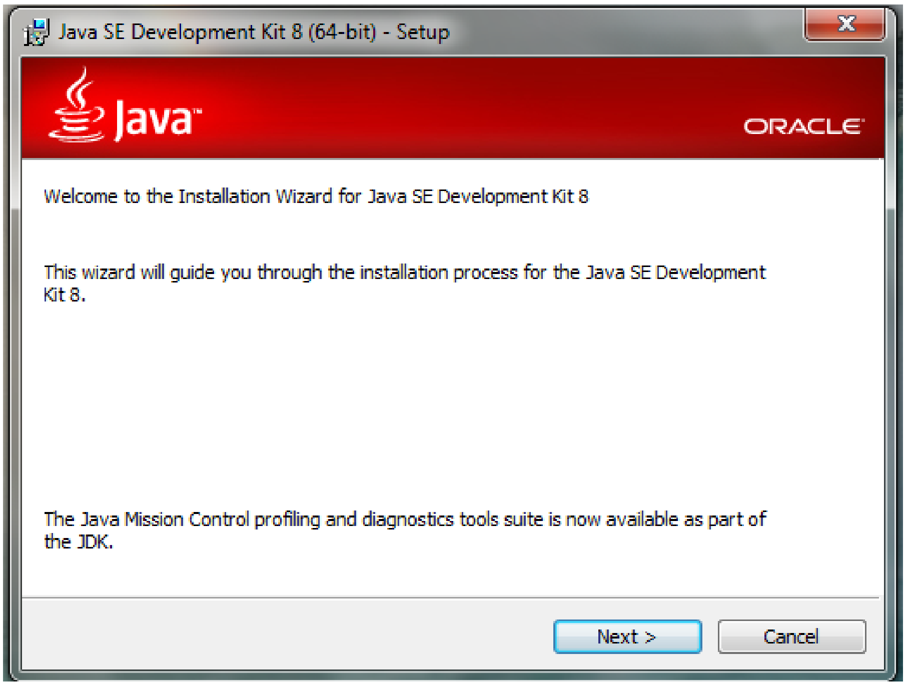
- System configuration should be more than Pentium IV, 2.6 GHz or above.
- processing power 2 GB or above RAM.
- Screen resolution is 1366*768.

Software requirements

- MySQL Server 5.5
- NetBeans IDE
- Windows 8 or above

A.1 Software Installation and Configuration

A.1.1 Install Java Run Time on Client Machine

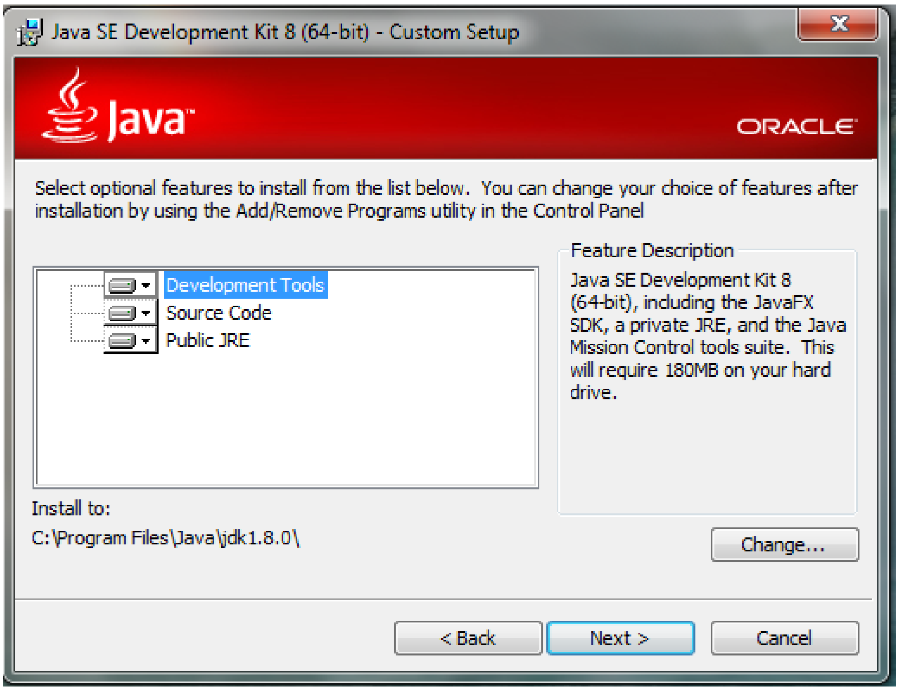


Java SE Development Kit 8 (64-bit) - Setup

Welcome to the Installation Wizard for Java SE Development Kit 8

This wizard will guide you through the installation process for the Java SE Development Kit 8.

The Java Mission Control profiling and diagnostics tools suite is now available as part of the JDK.



Java SE Development Kit 8 (64-bit) - Custom Setup

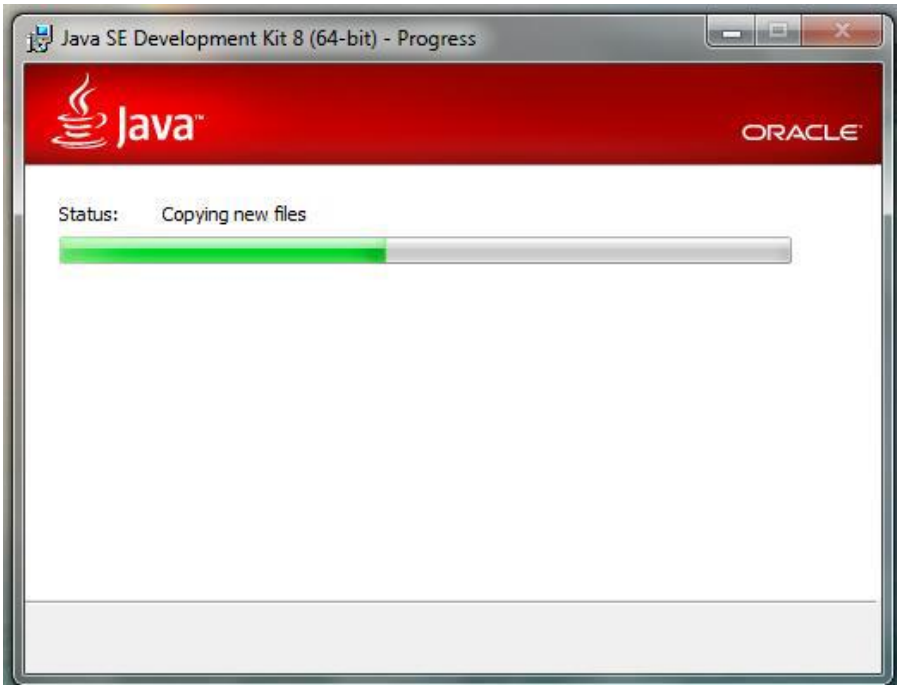
Select optional features to install from the list below. You can change your choice of features after installation by using the Add/Remove Programs utility in the Control Panel

- Development Tools
- Source Code
- Public JRE

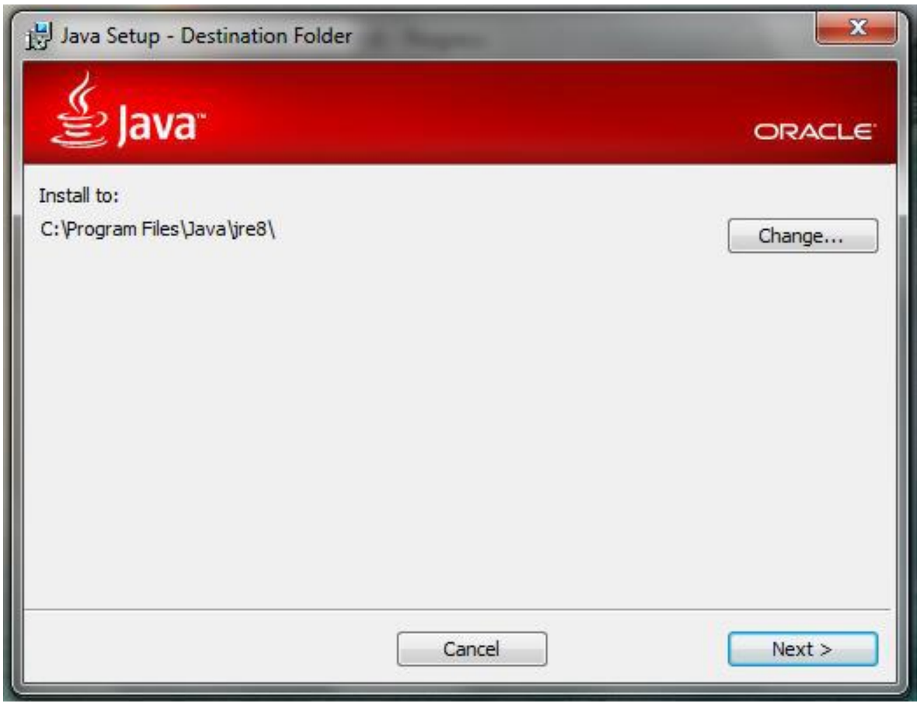
Feature Description

Java SE Development Kit 8 (64-bit), including the JavaFX SDK, a private JRE, and the Java Mission Control tools suite. This will require 180MB on your hard drive.

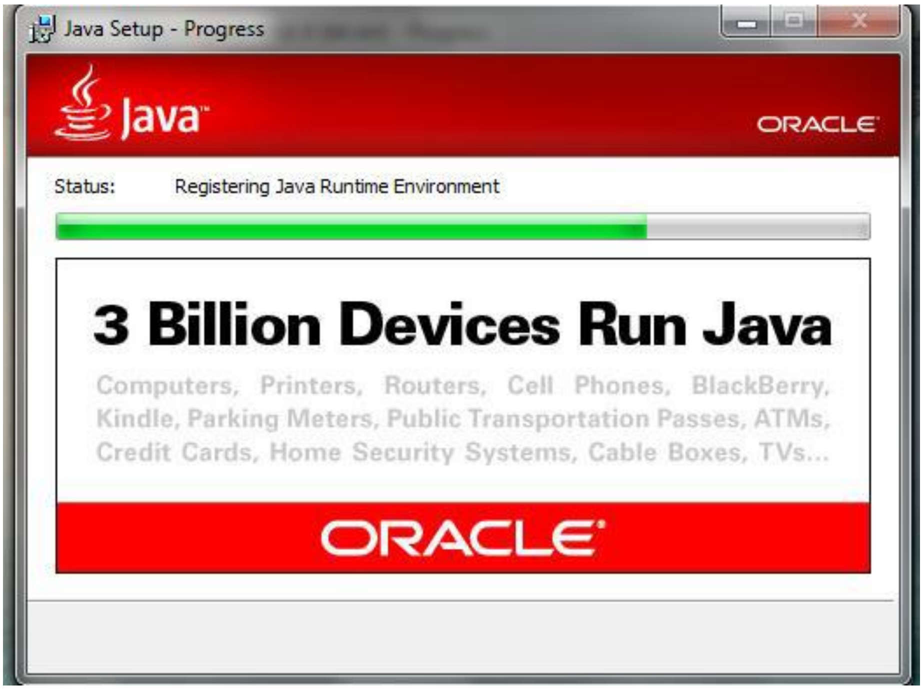
Install to:
C:\Program Files\Java\jdk1.8.0\



Status: Copying new files

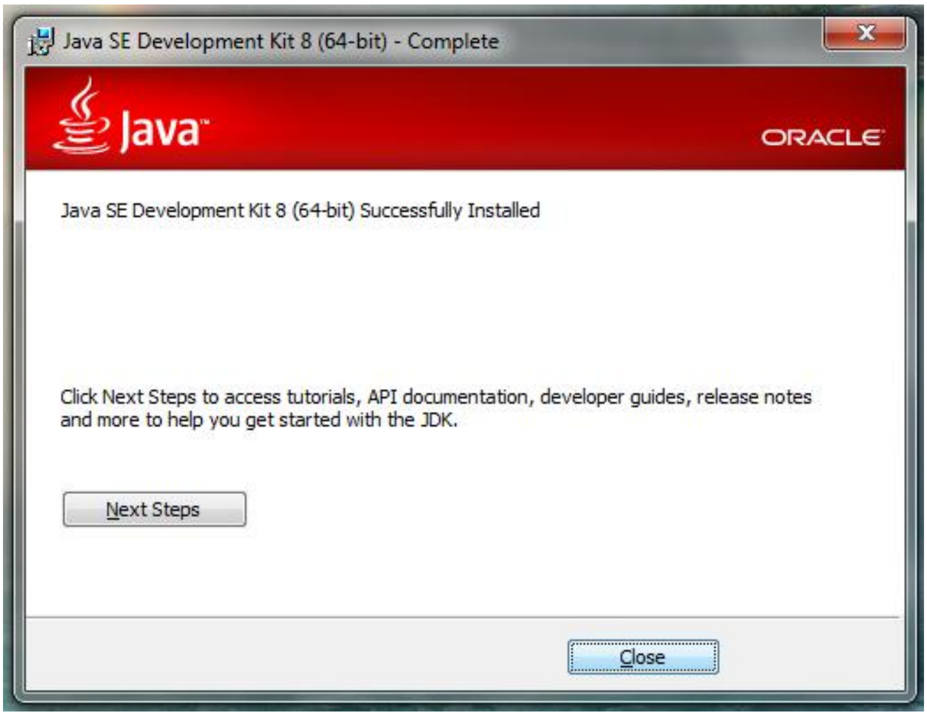


Install to:
C:\Program Files\Java\jre8\


Java Setup - Progress
Java
ORACLE

Status: Registering Java Runtime Environment

3 Billion Devices Run Java
Computers, Printers, Routers, Cell Phones, BlackBerry, Kindle, Parking Meters, Public Transportation Passes, ATMs, Credit Cards, Home Security Systems, Cable Boxes, TVs...
ORACLE



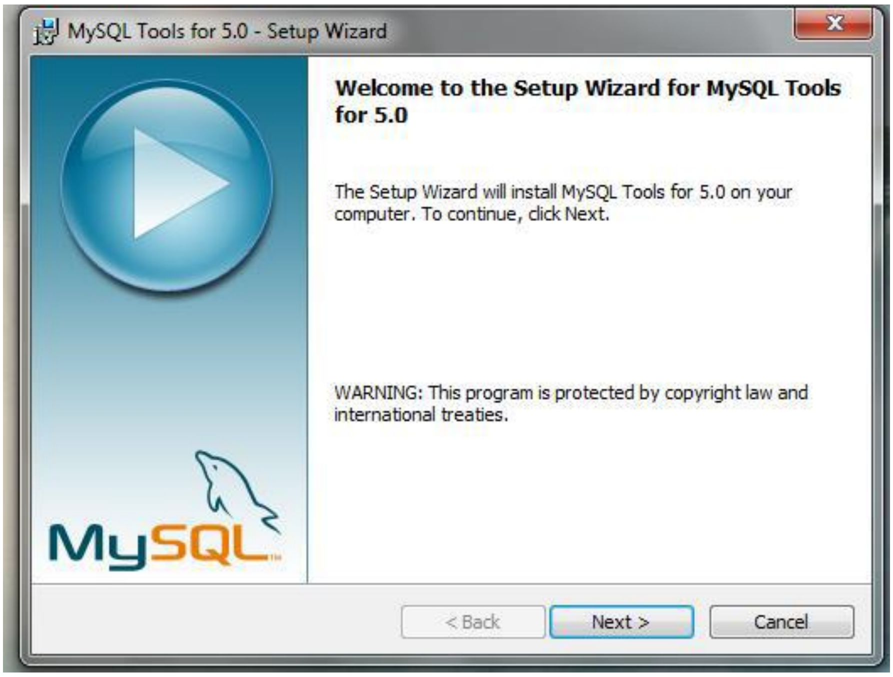
Java SE Development Kit 8 (64-bit) Successfully Installed

Click Next Steps to access tutorials, API documentation, developer guides, release notes and more to help you get started with the JDK.

A.1.2 Installing My SQL Server 5.5

Step 1: Download MySQL Community Server 5.5 installation file appropriate for the platform. Open installation file for MySQL Community Server and press “Next”.

Step 2: Choose “Typical” setup type, click “Next” and “Install”.

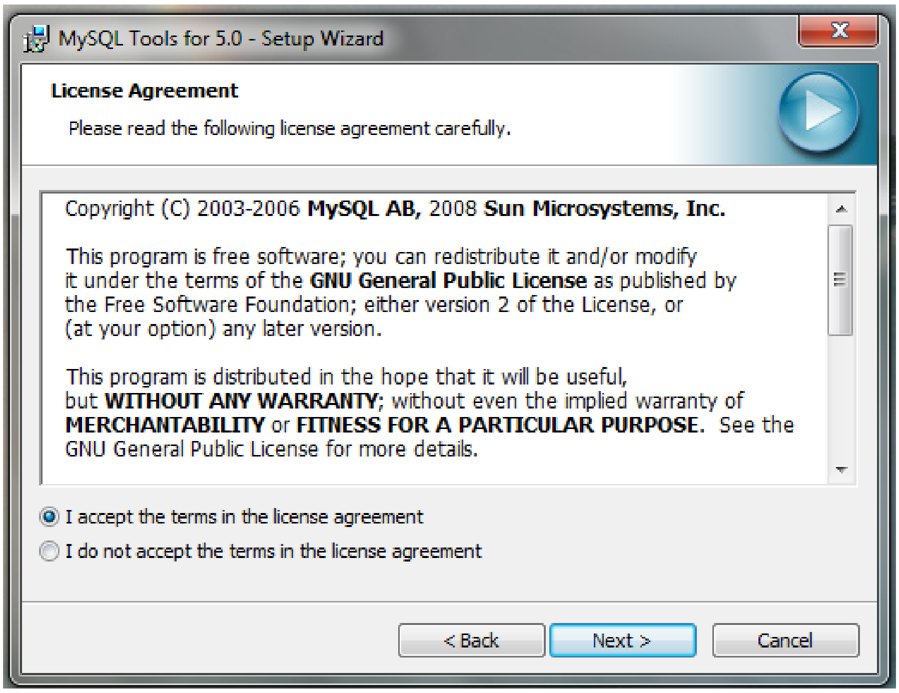


MySQL Tools for 5.0 - Setup Wizard

Welcome to the Setup Wizard for MySQL Tools for 5.0

The Setup Wizard will install MySQL Tools for 5.0 on your computer. To continue, click Next.

WARNING: This program is protected by copyright law and international treaties.



MySQL Tools for 5.0 - Setup Wizard

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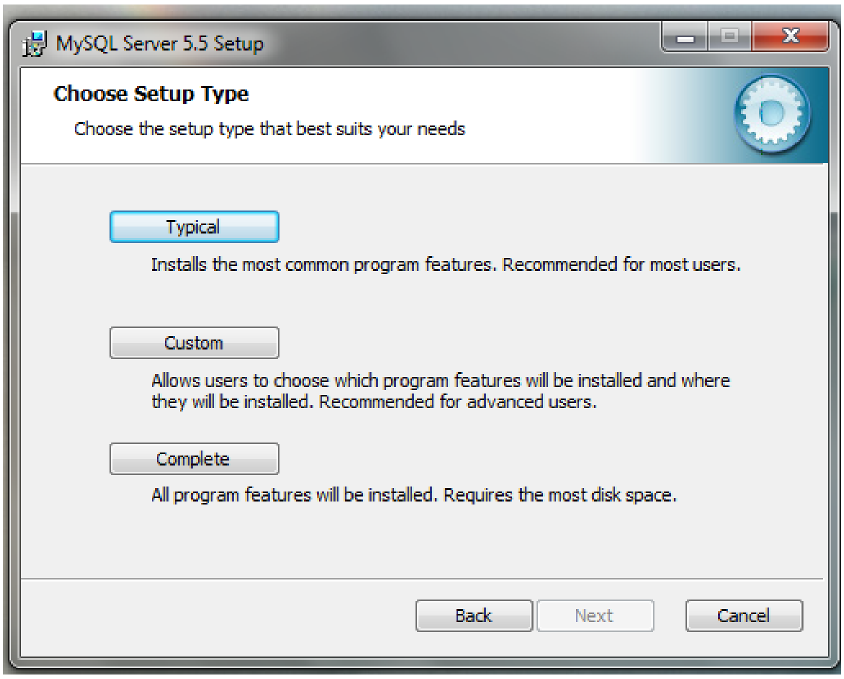
○ I do not accept the terms in the license agreement

Step 3: Choose “Typical” setup type, click “Next” and “Install”.

Step 4: Click “Install” to begin the installation.



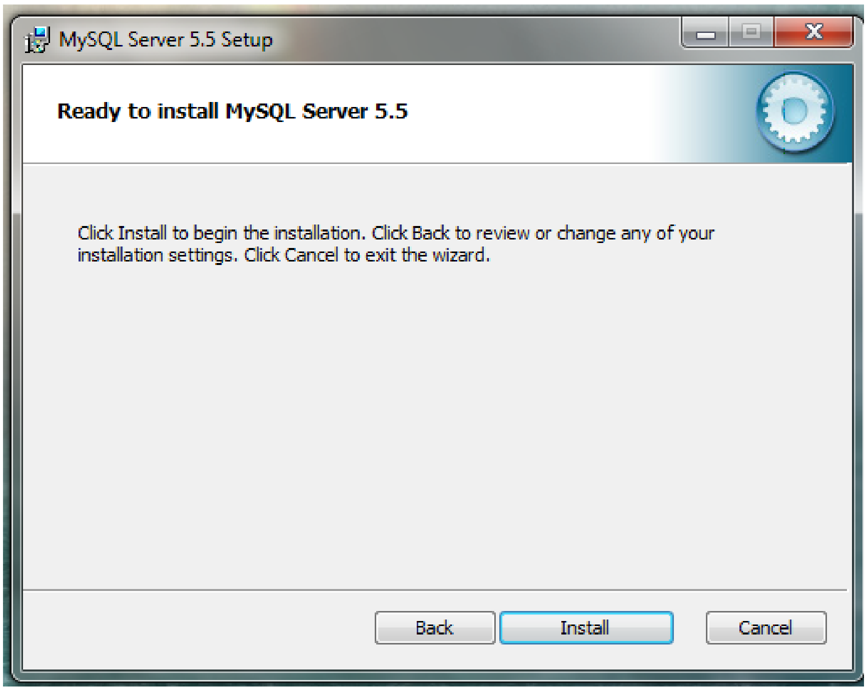
Choose Setup Type

Choose the setup type that best suits your needs

Installs the most common program features. Recommended for most users.

Allows users to choose which program features will be installed and where they will be installed. Recommended for advanced users.

All program features will be installed. Requires the most disk space.

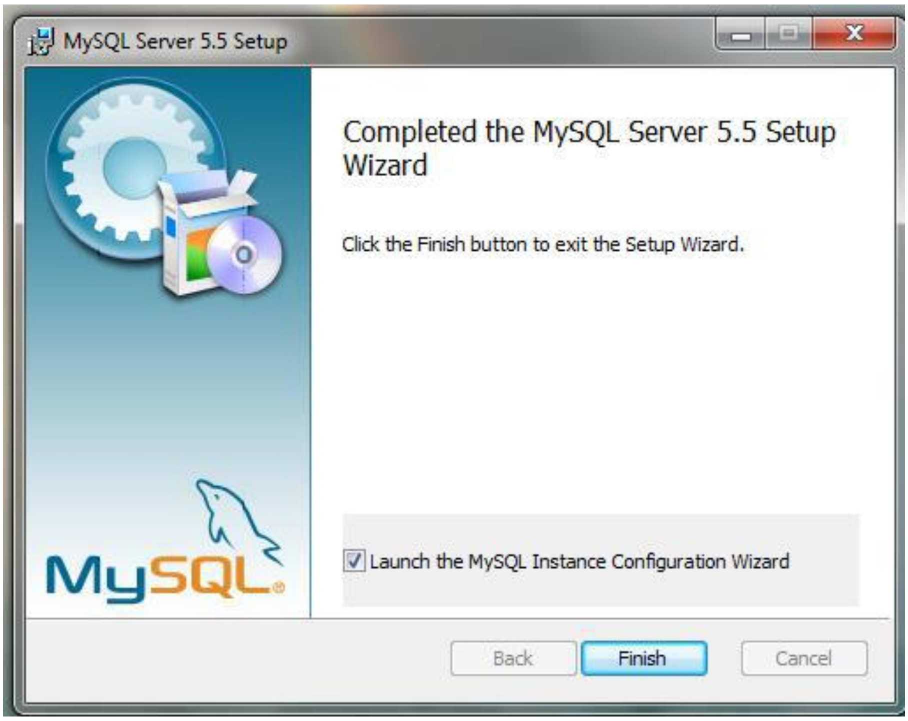


Ready to install MySQL Server 5.5

Click Install to begin the installation. Click Back to review or change any of your installation settings. Click Cancel to exit the wizard.

Step 5: After installation process is completed, check “Launch the MySQL Instance Configuration Wizard” and click “Finish”.

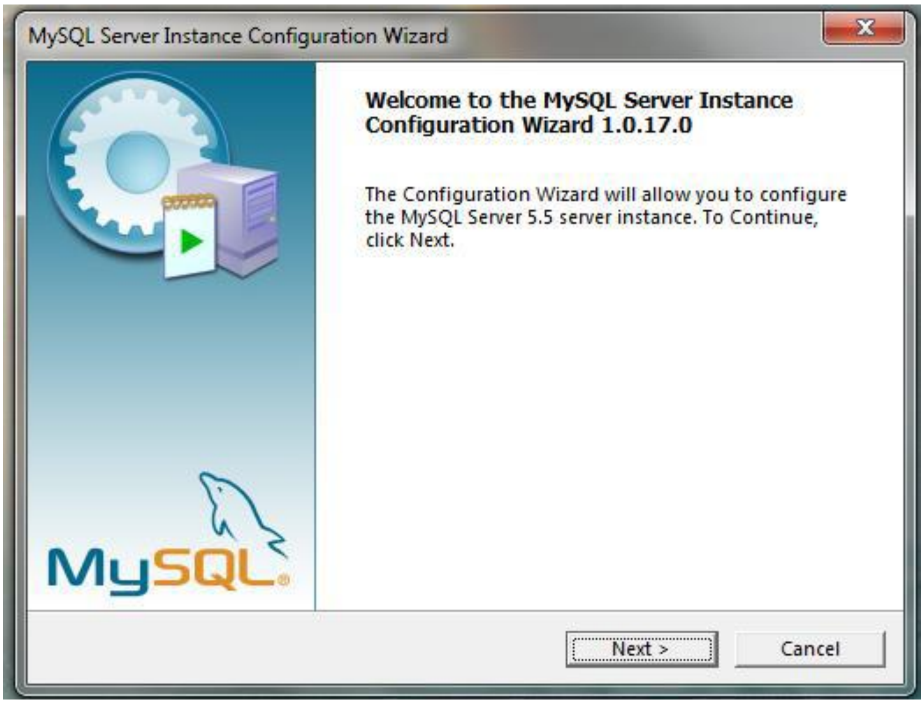
Step 6: Click “Next” when “Configuration Wizard” appears.



Completed the MySQL Server 5.5 Setup Wizard

Click the Finish button to exit the Setup Wizard.

☑ Launch the MySQL Instance Configuration Wizard



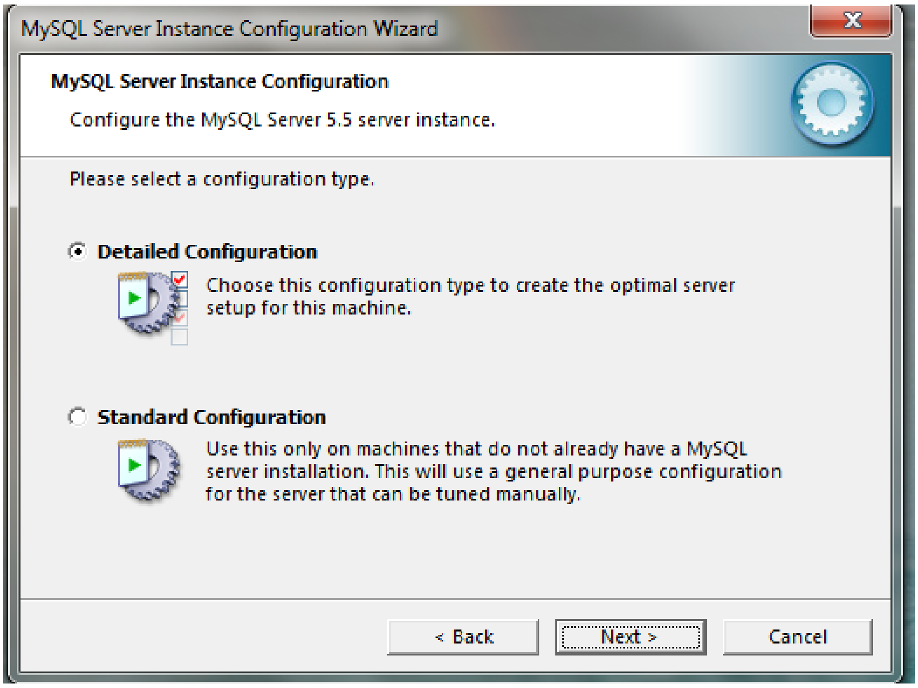
Welcome to the MySQL Server Instance Configuration Wizard 1.0.17.0

The Configuration Wizard will allow you to configure the MySQL Server 5.5 server instance. To Continue, click Next.

Step 7: Choose “Standard Configuration” and click “Next”.

Step 8: Check “Install as Windows Service”, select service name “MySQL”. Check

“Launch the MySQL Server automatically”. Then check “Include Bin Directory in Windows PATH” and click “Next”.



MySQL Server Instance Configuration Wizard

MySQL Server Instance Configuration

Configure the MySQL Server 5.5 server instance.

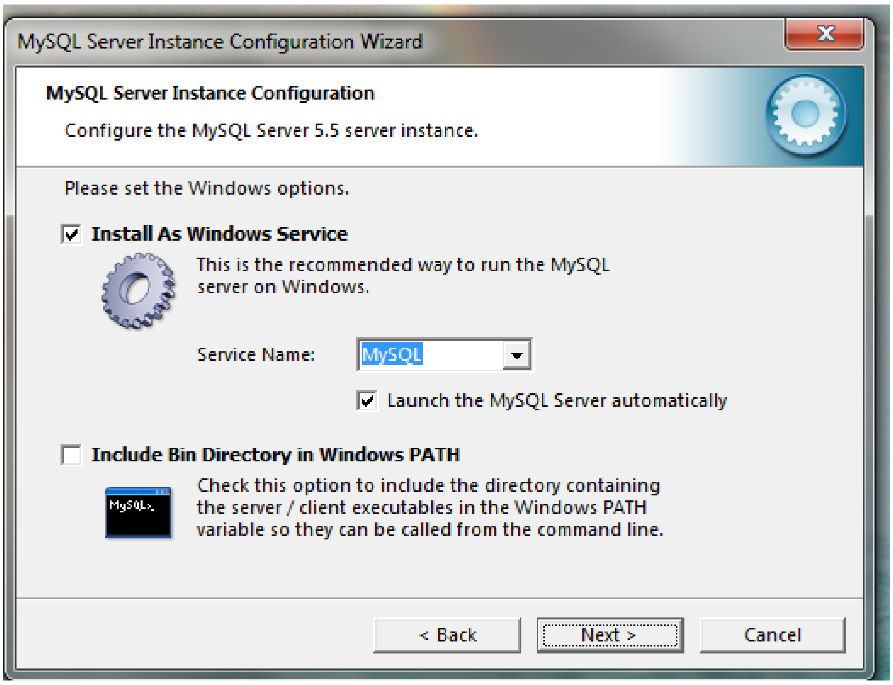
Please select a configuration type.

● **Detailed Configuration**

Choose this configuration type to create the optimal server setup for this machine.

○ **Standard Configuration**

Use this only on machines that do not already have a MySQL server installation. This will use a general purpose configuration for the server that can be tuned manually.



MySQL Server Instance Configuration Wizard

MySQL Server Instance Configuration

Configure the MySQL Server 5.5 server instance.

Please set the Windows options.

☑ **Install As Windows Service**

This is the recommended way to run the MySQL server on Windows.

Service Name: MySQL

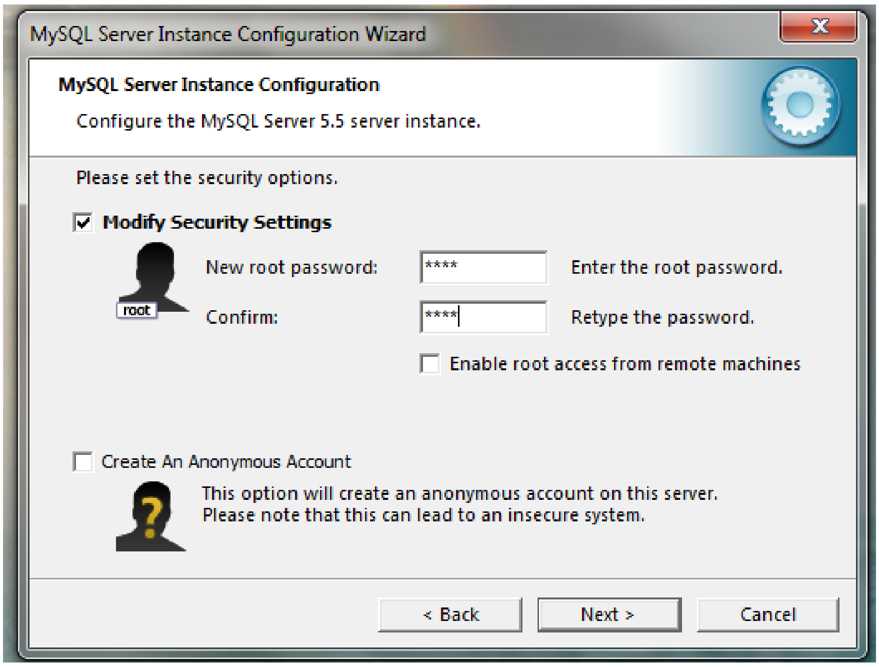
☑ Launch the MySQL Server automatically

□ **Include Bin Directory in Windows PATH**

Check this option to include the directory containing the server / client executables in the Windows PATH variable so they can be called from the command line.

Step 9: Check “Modify Security Settings”, Set a new password to the “root” user. Check “Enable root access from remote machines”. Click “Next” and then “Execute”.

Step 10: After configuration process is completed click “Finish”.



MySQL Server Instance Configuration Wizard

MySQL Server Instance Configuration

Configure the MySQL Server 5.5 server instance.

Please set the security options.

☑ **Modify Security Settings**

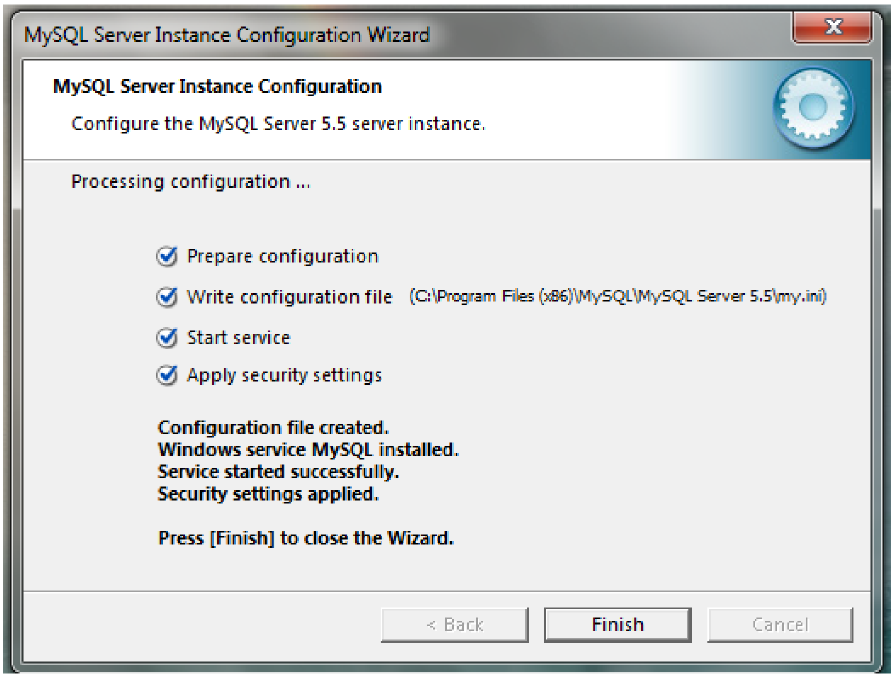
New root password: **** Enter the root password.

Confirm: **** Retype the password.

□ Enable root access from remote machines

□ Create An Anonymous Account

This option will create an anonymous account on this server.
Please note that this can lead to an insecure system.



MySQL Server Instance Configuration Wizard

MySQL Server Instance Configuration

Configure the MySQL Server 5.5 server instance.

Processing configuration ...

✓ Prepare configuration

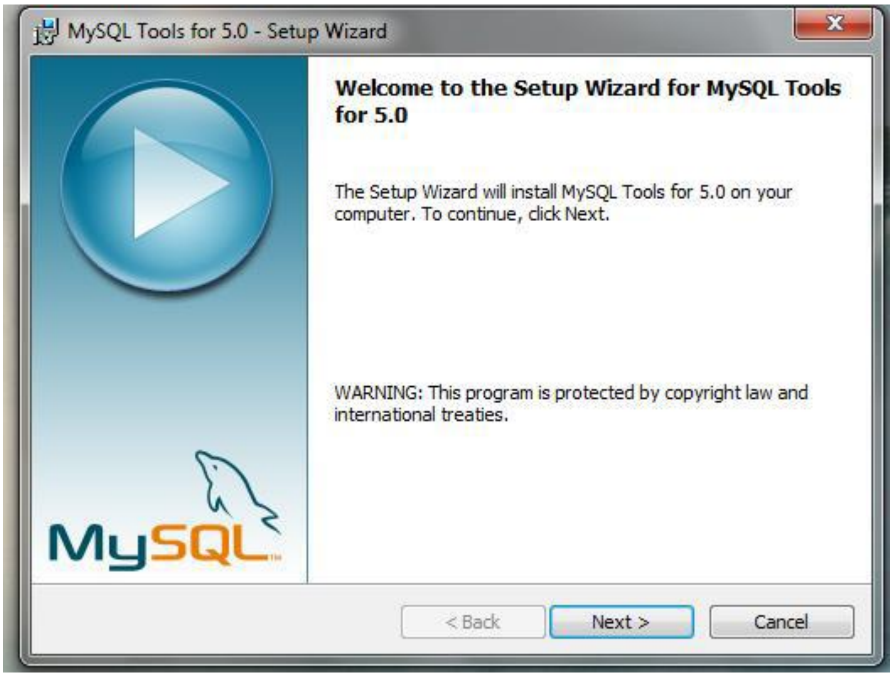
✓ Write configuration file (C:\Program Files (x86)\MySQL\MySQL Server 5.5\my.ini)

✓ Start service

✓ Apply security settings

Configuration file created.
Windows service MySQL installed.
Service started successfully.
Security settings applied.

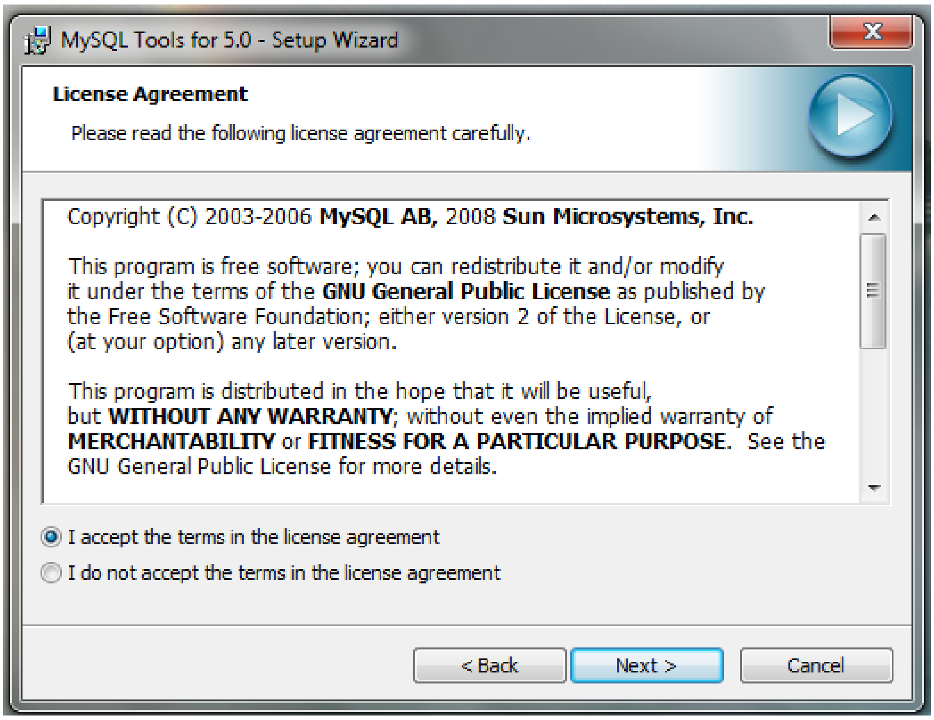
Press [Finish] to close the Wizard.



Welcome to the Setup Wizard for MySQL Tools for 5.0

The Setup Wizard will install MySQL Tools for 5.0 on your computer. To continue, click Next.

WARNING: This program is protected by copyright law and international treaties.



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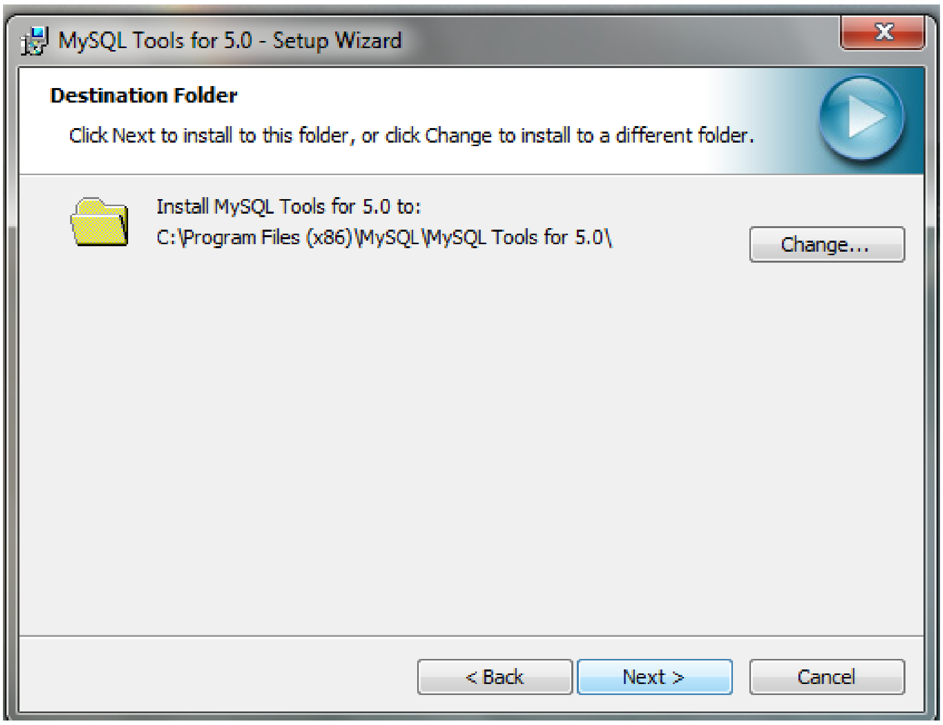
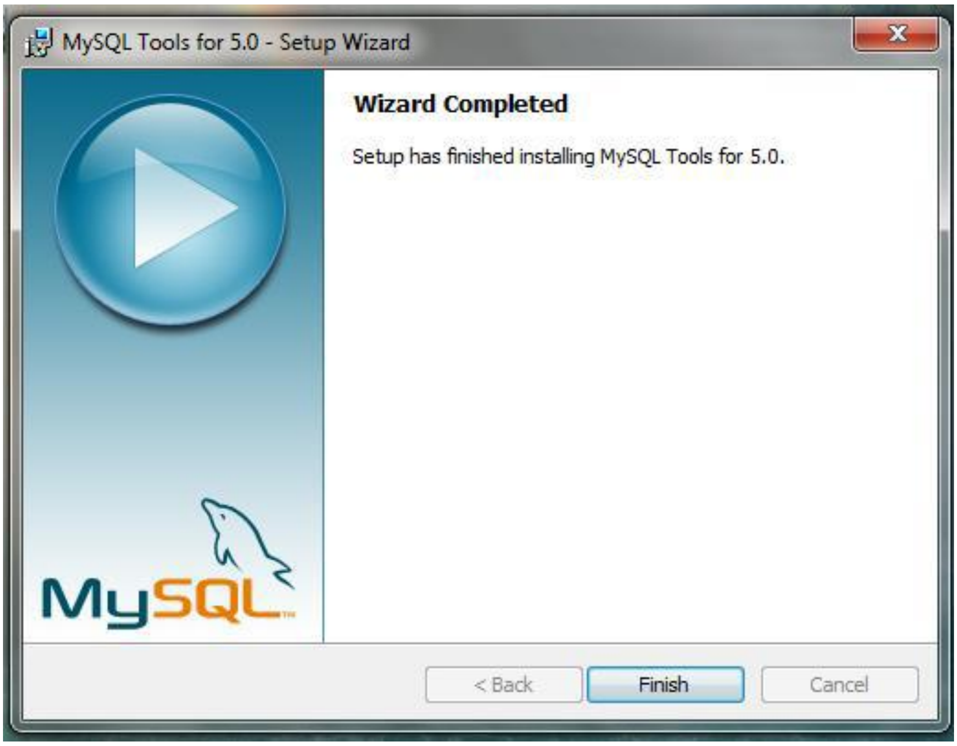


MySQL Tools for 5.0 - Setup Wizard

Destination Folder

Click Next to install to this folder, or click Change to install to a different folder.

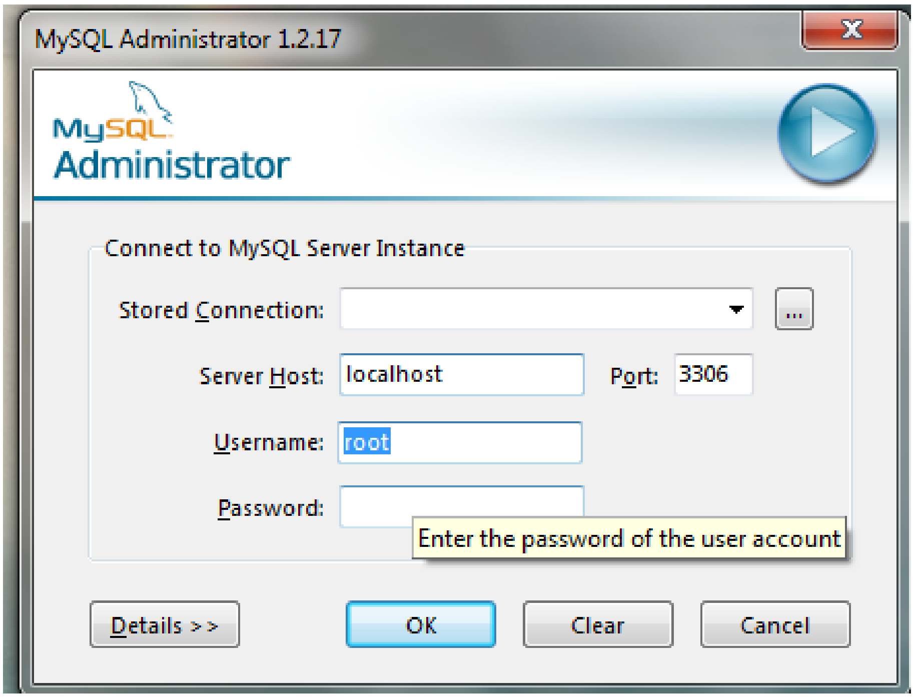
Install MySQL Tools for 5.0 to:
C:\Program Files (x86)\MySQL\MySQL Tools for 5.0\



MySQL Tools for 5.0 - Setup Wizard

Wizard Completed

Setup has finished installing MySQL Tools for 5.0.



Connect to MySQL Server Instance

Stored Connection:

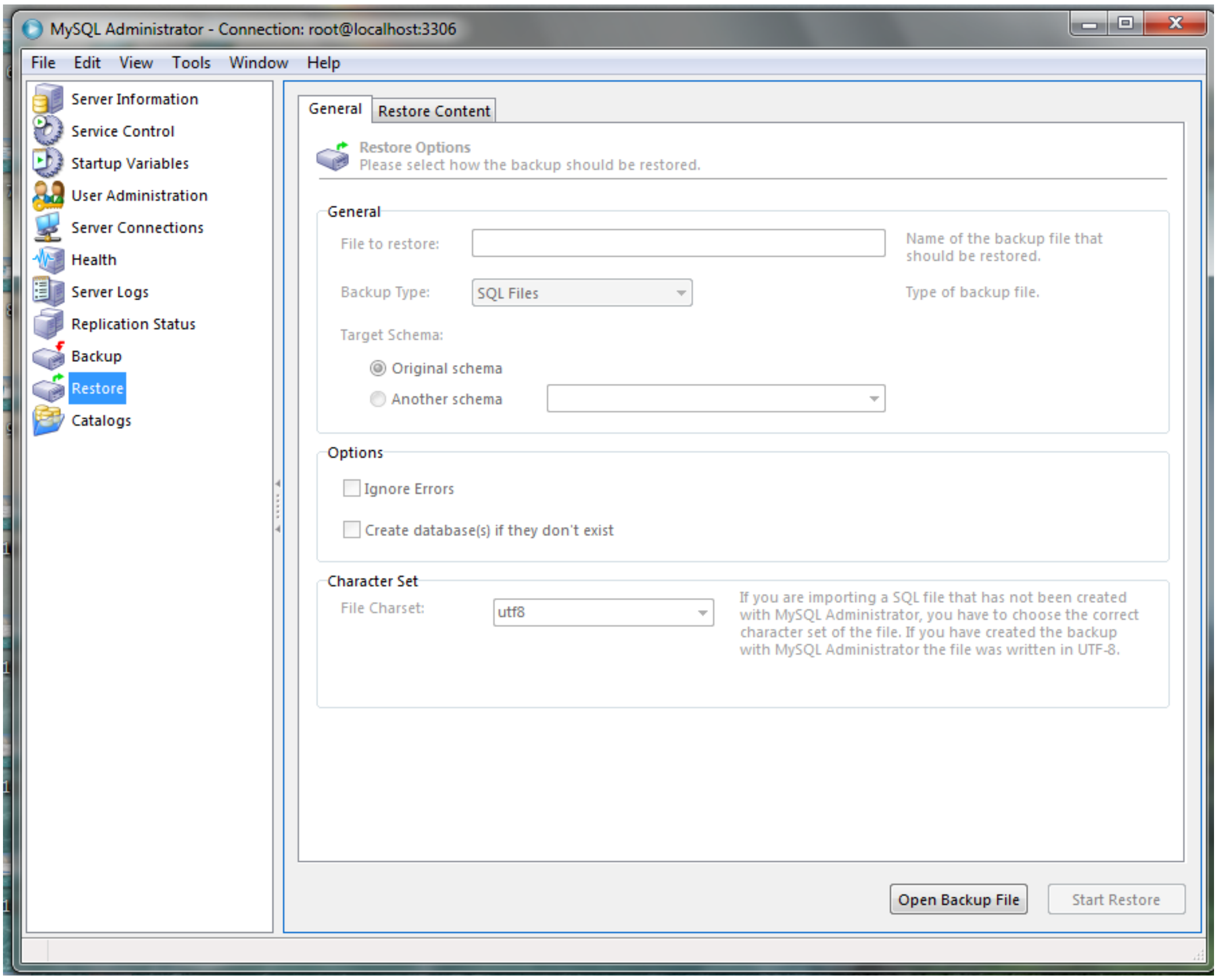
Server Host: localhost

Port: 3306

Username: root

Password:

Enter the password of the user account



Restore Options

Please select how the backup should be restored.

General

File to restore: — Name of the backup file that should be restored.

Backup Type: SQL Files — Type of backup file.

Target Schema:

● Original schema

○ Another schema

Options

□ Ignore Errors

□ Create database(s) if they don't exist

Character Set

File Charset: utf8

If you are importing a SQL file that has not been created with MySQL Administrator, you have to choose the correct character set of the file. If you have created the backup with MySQL Administrator the file was written in UTF-8.

A.1.4 Oder and Payment Management System

After setting up the database,

Select from device

Click Add &

Browse the **Oder and Payment Management System** file from CD

Run the setup.exe file located in CD.

APPENDX B - DESIGN DOCUMENTATION

Use case Diagrams with Detailed information

In this section the diagrams and relevant details in the chapter 3 are described in detail since adding all them there was not possible. The business process has major 6 modules. Especially use cases relevant to those modules are described here with diagrams.

Customer Management Module

Customers for the business process are registered in this module. When a customer is registered. The customer can be registered by any employee except a laborer. So there are many actors for this task. So this module connects all over the other modules in the business process. Therefore getting correct customer details would be very critical for the entire organization.

Following figure B.1 describes the customer registration of the organization. The description of the use case is done by Table B.1

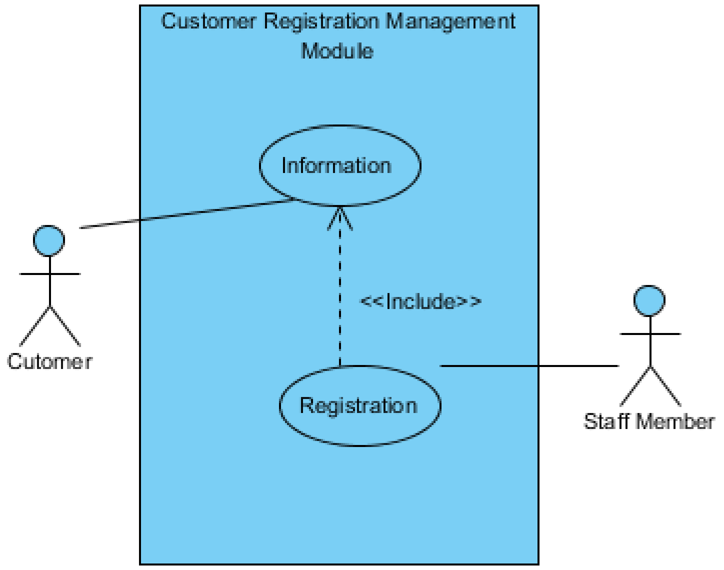


Figure B.1: the Customer Registration Of The Organization

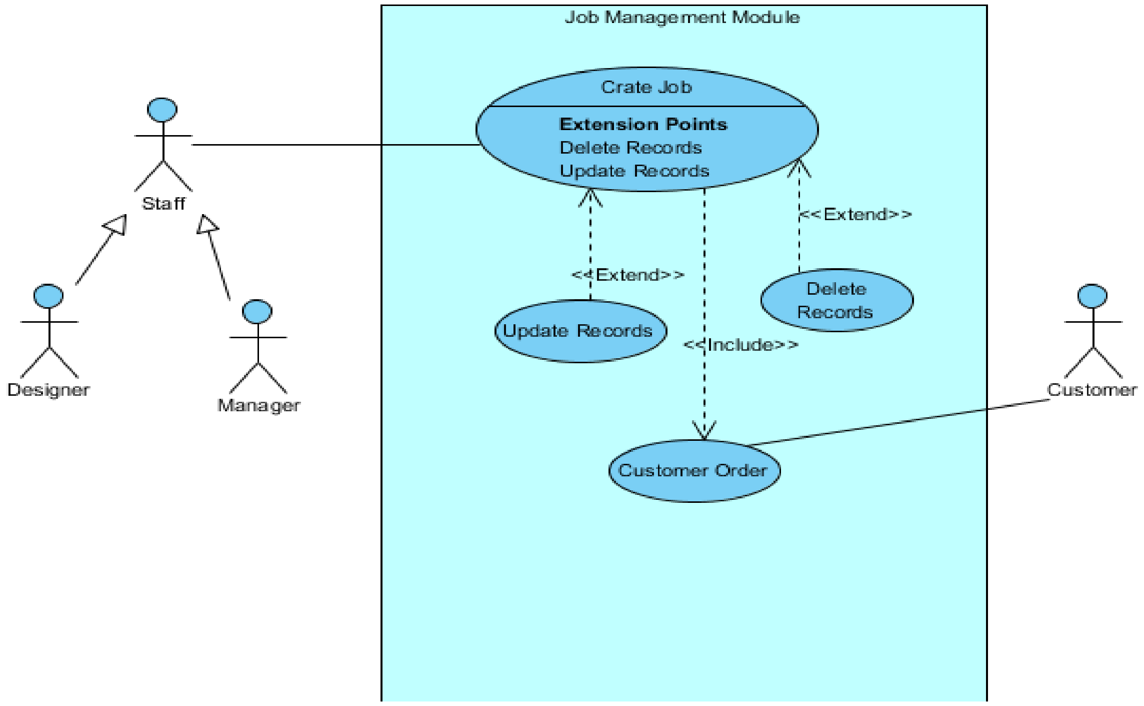
Use Case	Customer Registration Management
Actor	Staff Member
Description	Register the customer with essential details such as NIC , company registration number, mobile number etc.
Pre-Condition	Since this could be done by any employee (Designer, Manager) that responsible person must get the details carefully and he must responsible for the situation.
Flow of events	7. Address must be taken in detail as in NIC. 8. If Customer is as a company, then user must have to ask contact person details.
Post – Conditions	For good report generation, these details would be very needful. So there must be clear details

Table 0-1 - Use case for Customer Registration Module

Job Management Module

The Job is registered just after the customer information is registered if the customer is especially new.

Following figure B.2 describes the job registration of the organization. The description of the use case is done by Table B-2.



B.2: The Job Registration of the Organization

Use Case	Job Registration Management
Actor	Staff Member , Manager , Designer
Description	Register the job with essential details such as deliver date, assign employee, receive employee, job type and description
Pre-Condition	The Deliver Date should be taken by participating manager, available designer and due to company situation.
Flow of events	7. The Deliver Date must be taken in detail. 8. The Job type must be taken in detail.
Post – Conditions	For good report generation , these details would be very needful. So there must be clear details

Table B-2: Job Registration of the Organization

Artwork Management Module

The Artwork is registered just after the job information is registered according to customer need.

Following figure B.3 describes the artwork registration of the organization. The description of the use case is done by Table B-3.

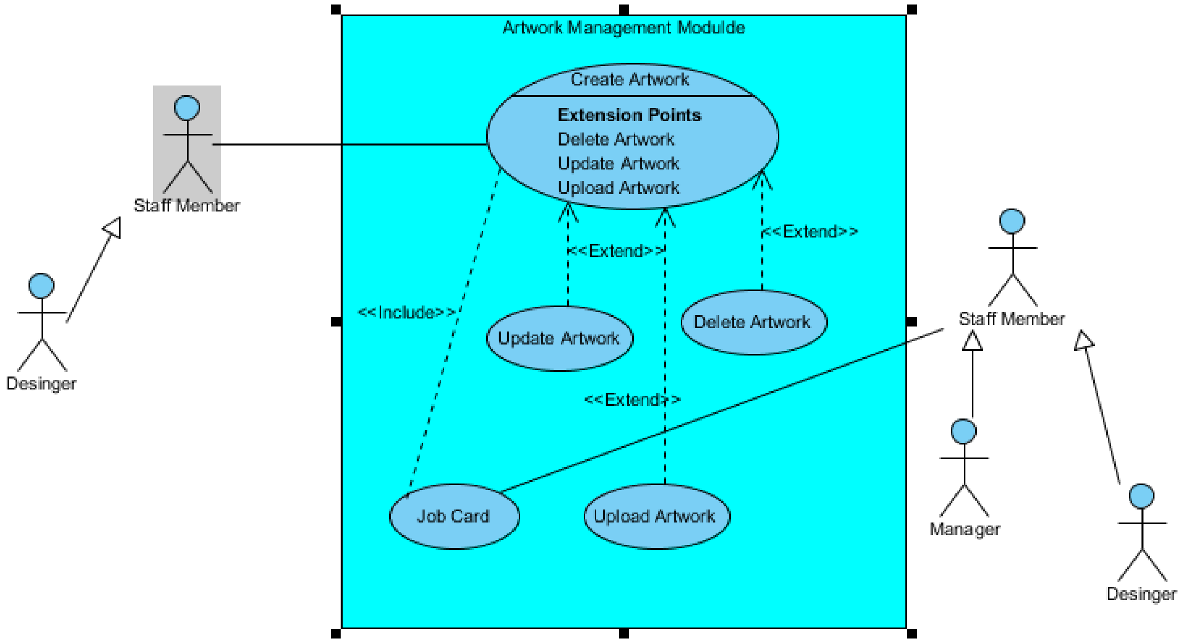


Figure B.3 Describes the Artwork Registration of the Organization

Use Case	Artwork Registration Management
Actor	Manager , Designer
Description	Register the artwork with essential details such as artwork cost, description about artwork according to job and customer, artwork type
Pre-Condition	The Artwork Cost should be taken by participating manager, designer and due to company situation and customer. The Artwork Type should be selected according to customer.
Flow of events	1. The Artwork Cost must be taken in detail. 2. The Artwork type must be taken in detail.
Post – Conditions	For good report generation, these details would be very needful. So there must be clear details

Table B-3: The Artwork Registration of the Organization

APPENDX C - USER DOCUMENTATION

All system users have one login module to access the system. All the users have been given different privileges by the system with separated user names and passwords. Some of user roles are receptionist, manager, designer, owner of the company etc. Even though there are such different user levels, only administration user role (she/he has all the system privileges) is described in this document.

Until the user fill both username and password field the login button does not become to enable state. Otherwise the user may be misguided and click the login button once he fills one of fields.

- Login Interface

Preventing the user attempting for the system any number of times has been depicted by Figure C.1: Login Interface

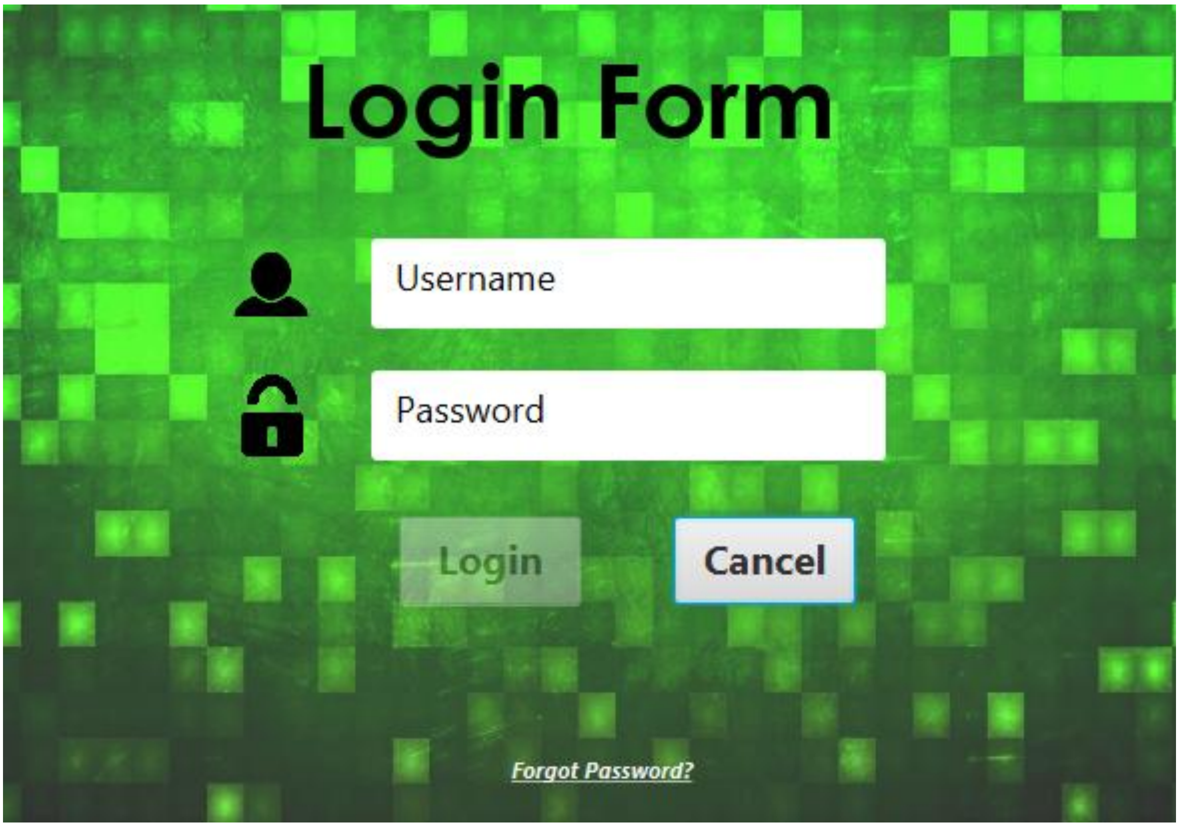
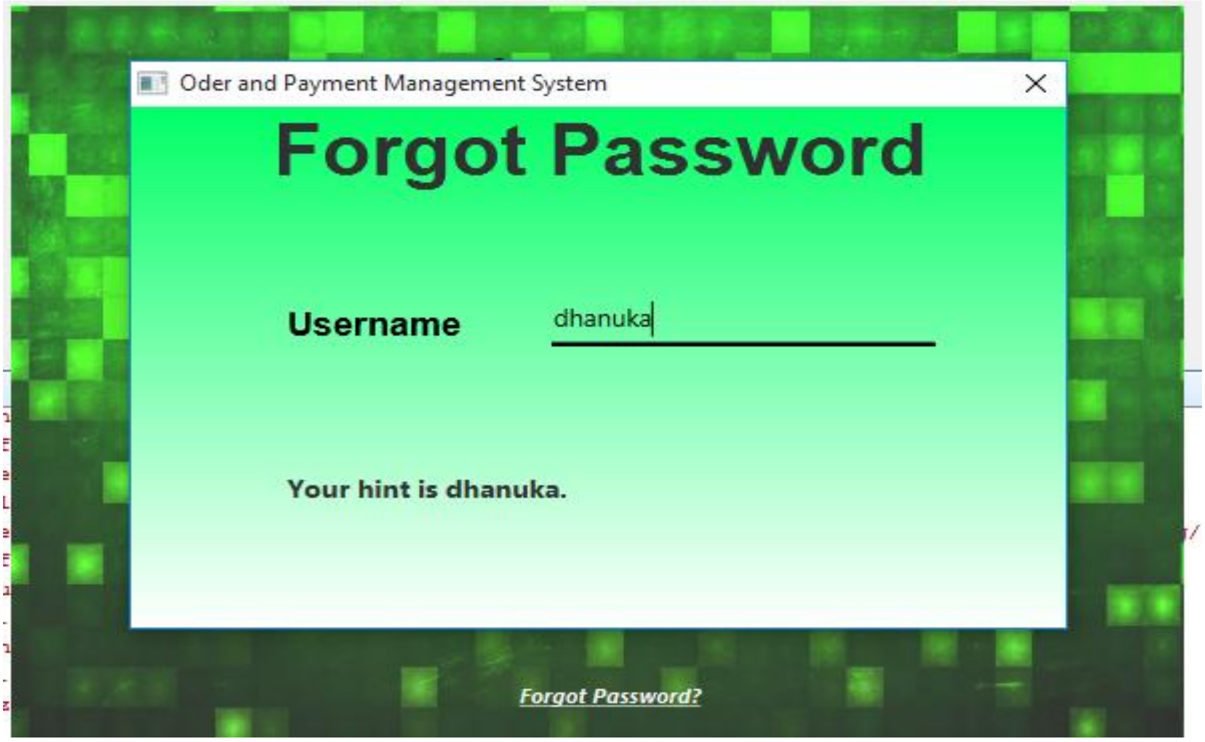


Figure C.1: Login Interface

To stop brute force attacks a particular user is given only limited number of times to enter the user name and password continuously. When the more tries to log, the login window will be automatically blocked. Otherwise user may try to enter the system by entering username and password any amount of time and get the permission to the system.

Some users who log in to the system rarely may forget their usernames and passwords. Then they have to get supports from the administration to enter the system. In such a situation when the user only remembers the username correctly he can click the link below and see password hint. But form this facility the password hint has to bee entered into the database firstly by the administrator or privileged user.

Figure C.2 shows the interface to see the user hint.



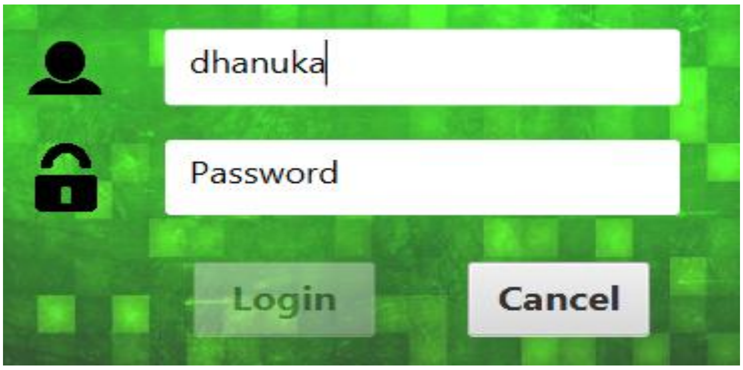
Username: dhanuka

Your hint is dhanuka.

Figure C.2: The Interface to See the User Hint

At the same time the login button will not be enabled until the user adds both the username and the passwords to the fields. Otherwise the user may be misguided by seeing the enabled login button when he only enters in one field.

Figure C.3 shows the disabled login button until both fields are filled



dhanuka

Figure C.3: The Disabled Login Button

- Change Password Option

  When security is concerned the users may need to get changed their password often. In such situations user can get changed their password by clicking "change password" button in the main window.

Figure C.4 indicates the interface for changing password

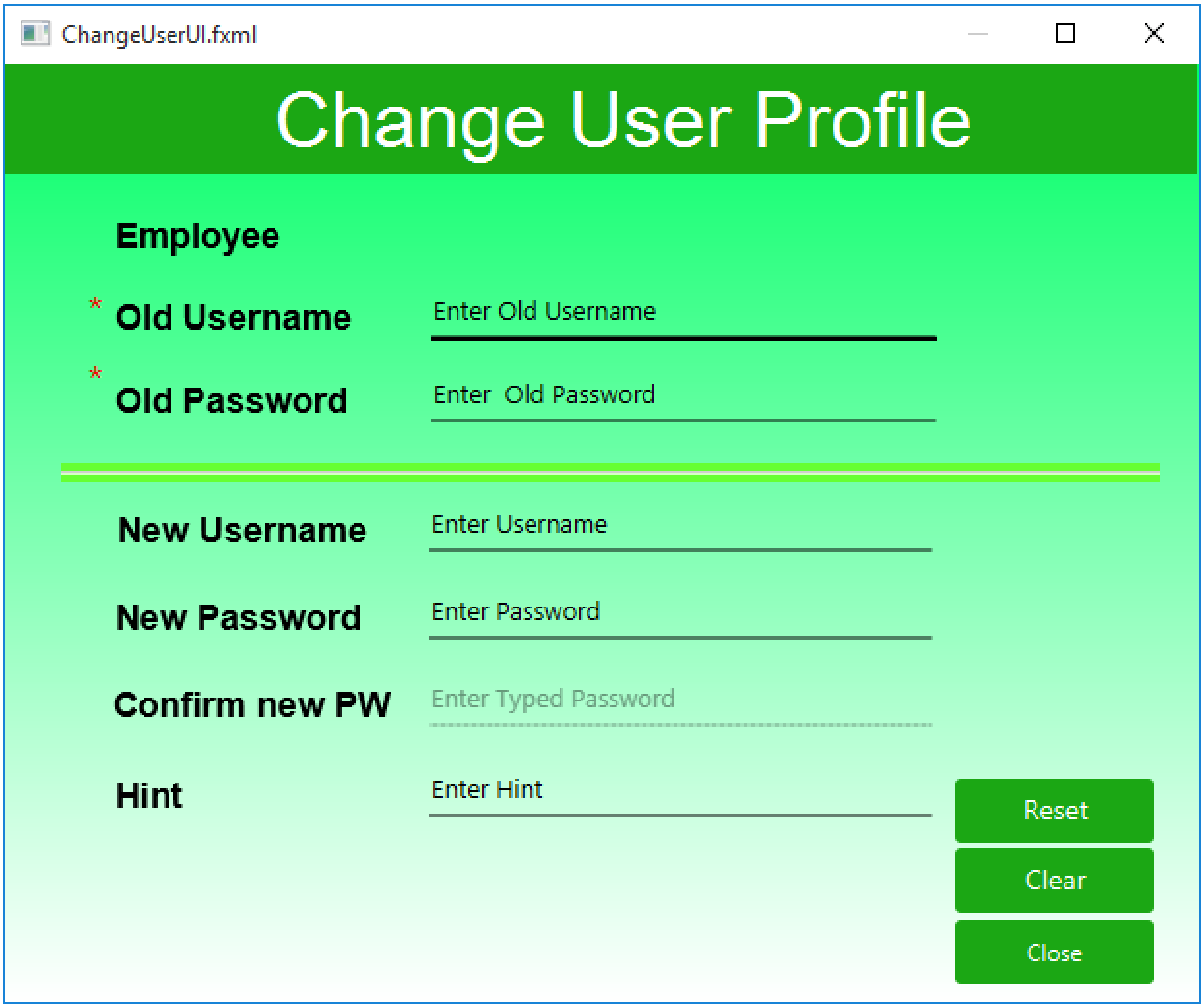
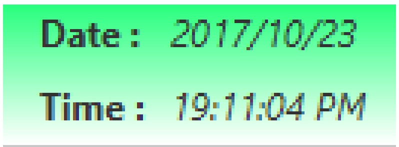


Figure C.4: The Interface for Changing Password

- Login information.

  Basic information about login such as logged time, date, username and role have been indicated at the top of the main window

Figure C.5 shows login time and date

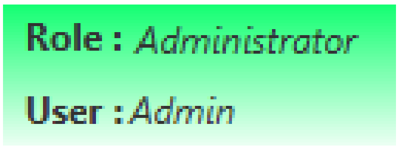


Date : 2017/10/23

Time : 19:11:04 PM

Figure C.5: Login Time and Date

Figure C.6 Login information (user and roles)



Role : Administrator

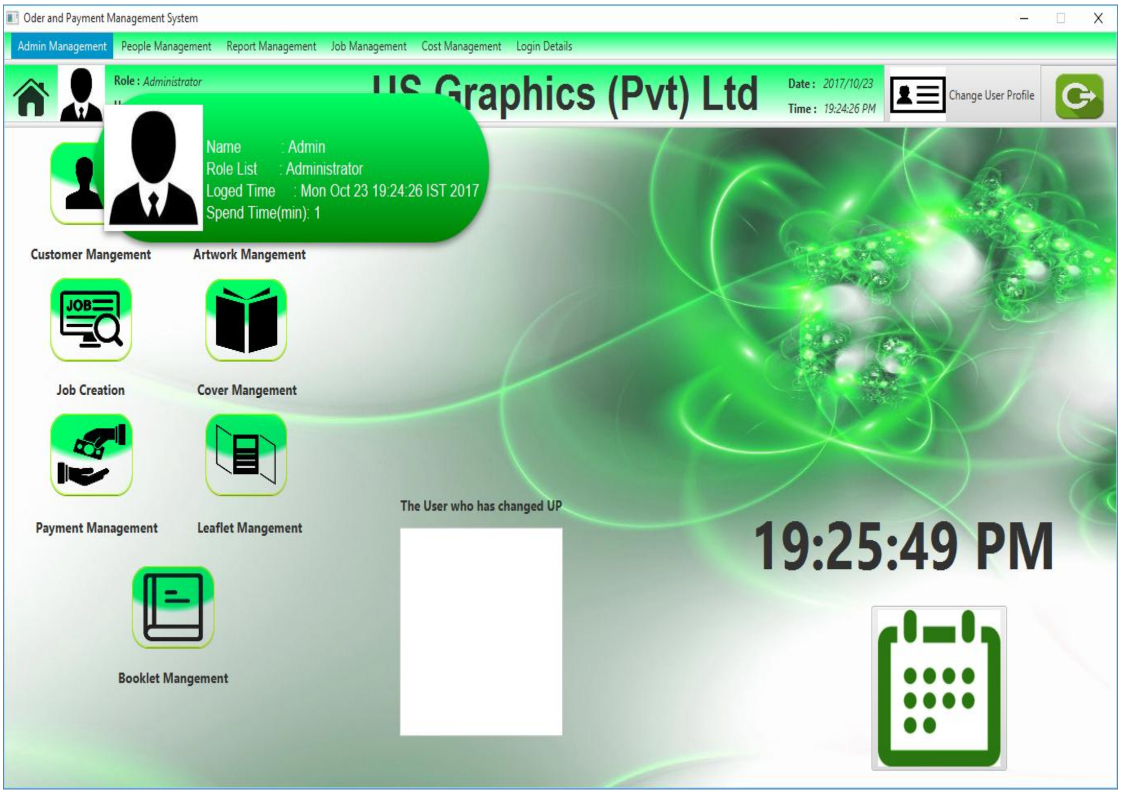
User : Admin

Figure C.6: Login Information

- Employee user profile

  User can be viewed his/her profile details and uploaded image as well as how much time he/she spent.

Figure C.7 shows employee profile



Role : Administrator

Date : 2017/10/23

Time : 19:24:26 PM

Name : Admin

Role List : Administrator

Loged Time : Mon Oct 23 19:24:26 IST 2017

Spend Time(min): 1

Figure C.7: Employee Profile

- Home button and Log Out buttons

Figure C.8 and C.9 shows home button and the log out button of the main window. The user can use log out button to log out from the system and home button is used to navigate to the main window. These buttons are designed at the top of the main window for the easy use.

Figure C.8 shows home button

Figure C.8: Home Button

Figure C.9 shows log out button

Role : Administrator

User : Admin

Figure C.9: Log out Button

- User menu bar through all the modules easily

Figure C.10 shows the main business categories

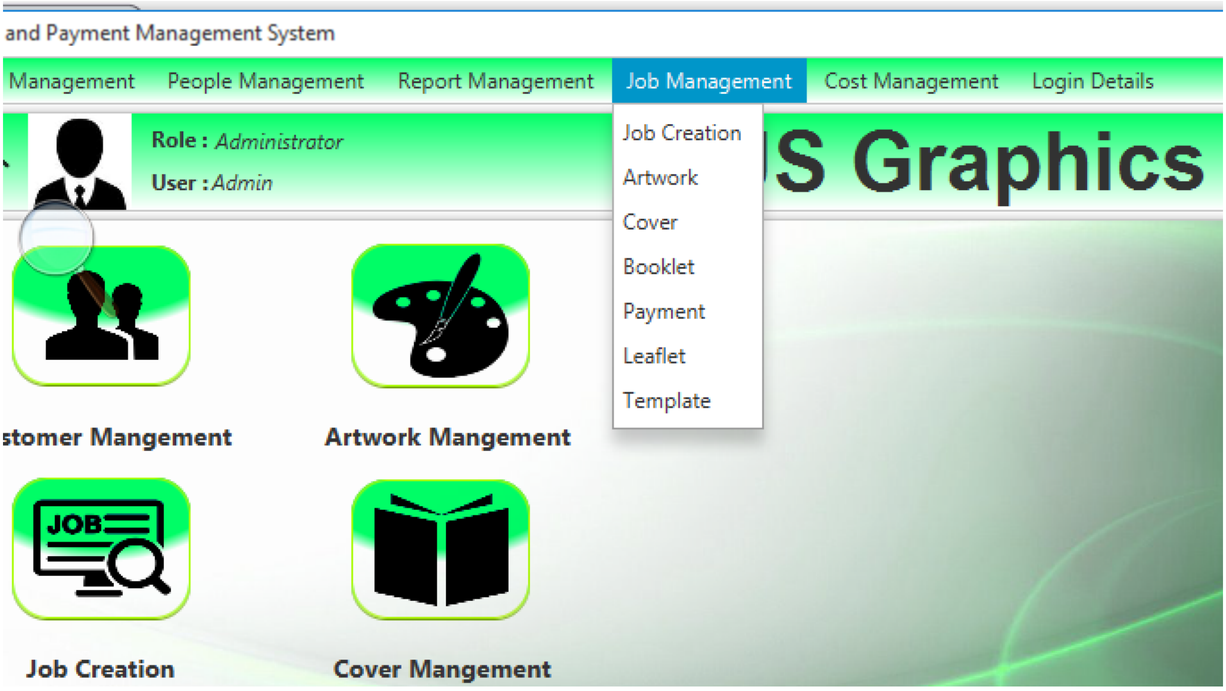
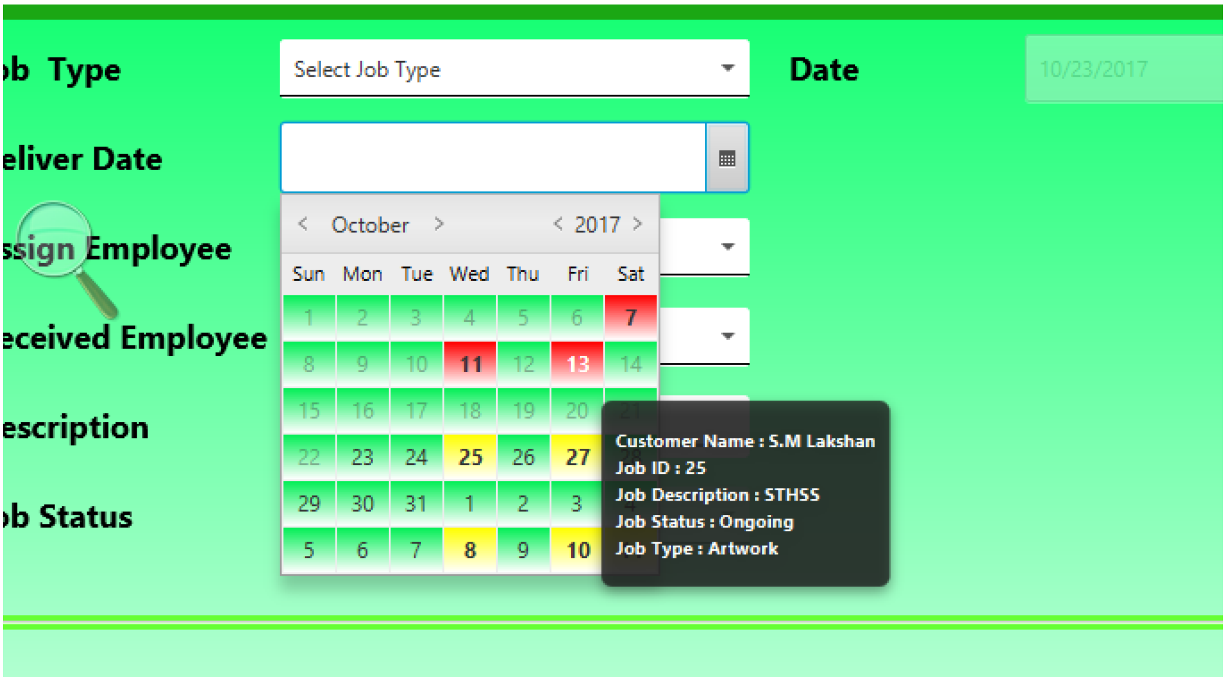


Figure C.10: the Main Business Categories

- Job Management Module

  Job management module may be the most important module in the project. So many design strategies have been used to make the interface easy and user friendly for the user. In this module, user can be viewed assigned job details in many ways as well as assigned jobs according to designer. User can be known how many days will have to deliver which in table view without clicking table row.

Figure C.11 shows the job details according to deliver date in deliver date filed



ob Type

Select Job Type

Date 10/23/2017

eliver Date

ssign Employee

eceived Employee

escription

ob Status

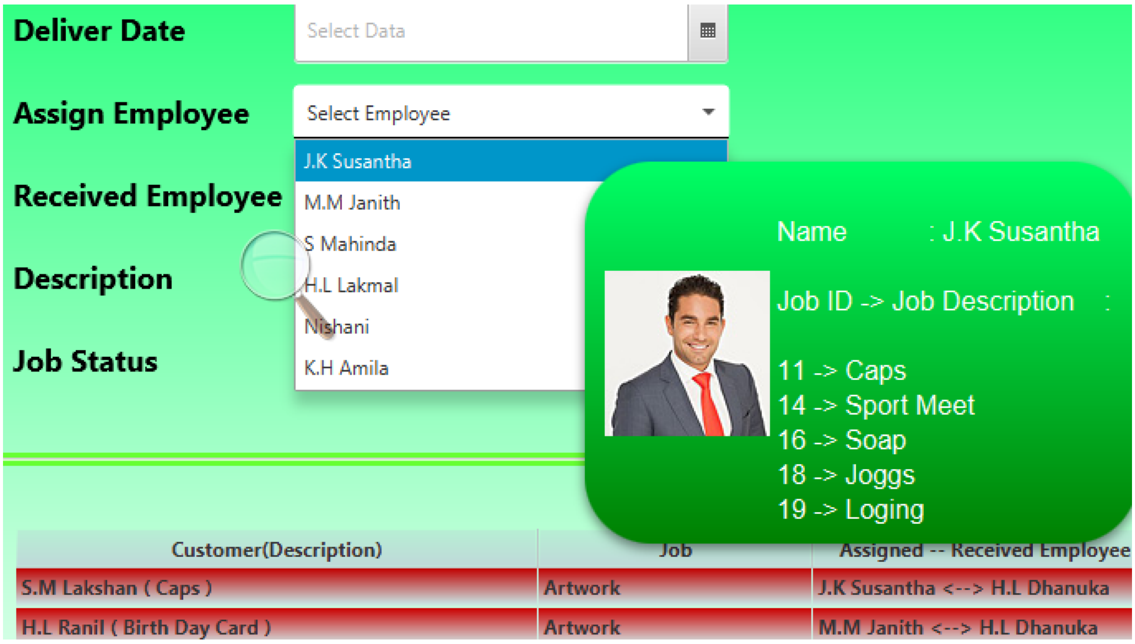
< October > < 2017 >

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	
29	30	31	1	2	3	
5	6	7	8	9	10	

Customer Name : S.M Lakshan
Job ID : 25
Job Description : STHSS
Job Status : Ongoing
Job Type : Artwork

Figure C.11: the Job Details

Figure C.12 shows the assigned job details according to employee in assigning employee filed



Deliver Date

Select Data

Assign Employee

Select Employee

- J.K Susantha
- M.M Janith
- S Mahinda
- H.L Lakmal
- Nishani
- K.H Amila

Received Employee

Description

Job Status

Name : J.K Susantha

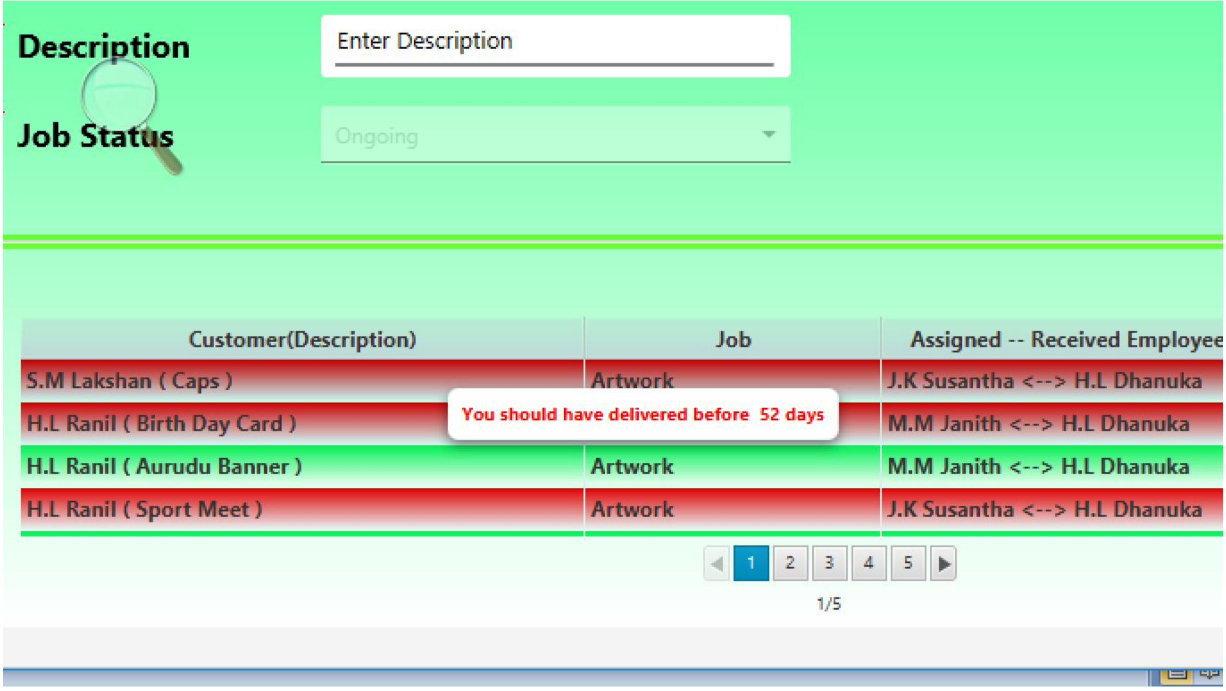
Job ID -> Job Description :

11 -> Caps
14 -> Sport Meet
16 -> Soap
18 -> Joggs
19 -> Loging

Customer(Description)	Job	Assigned -- Received Employee
S.M Lakshan (Caps)	Artwork	J.K Susantha <--> H.L Dhanuka
H.L Ranil (Birth Day Card)	Artwork	M.M Janith <--> H.L Dhanuka

Figure C.12: the Assigned Job Details

Figure C.13 shows the days will have to deliver job details according to deliver date



Description: Enter Description

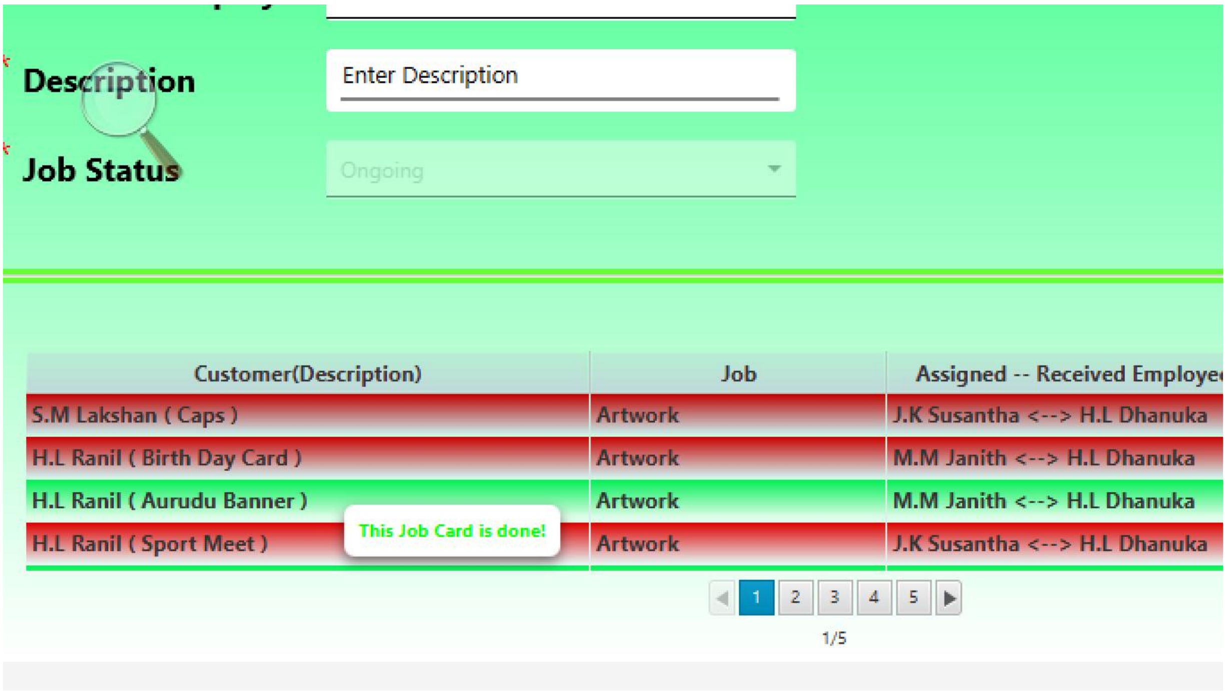
Job Status: Ongoing

Customer(Description)	Job	Assigned -- Received Employee
S.M Lakshan (Caps)	Artwork	J.K Susantha <--> H.L Dhanuka
H.L Ranil (Birth Day Card)		M.M Janith <--> H.L Dhanuka
H.L Ranil (Aurudu Banner)	Artwork	M.M Janith <--> H.L Dhanuka
H.L Ranil (Sport Meet)	Artwork	J.K Susantha <--> H.L Dhanuka

You should have delivered before 52 days

Figure C.13: the Days Will Have To Deliver Job Details

Figure C.14 shows the days will have to deliver job details according to job status



Description: Enter Description

Job Status: Ongoing

Customer(Description)	Job	Assigned -- Received Employe
S.M Lakshan (Caps)	Artwork	J.K Susantha <--> H.L Dhanuka
H.L Ranil (Birth Day Card)	Artwork	M.M Janith <--> H.L Dhanuka
H.L Ranil (Aurudu Banner)	Artwork	M.M Janith <--> H.L Dhanuka
H.L Ranil (Sport Meet)	Artwork	J.K Susantha <--> H.L Dhanuka

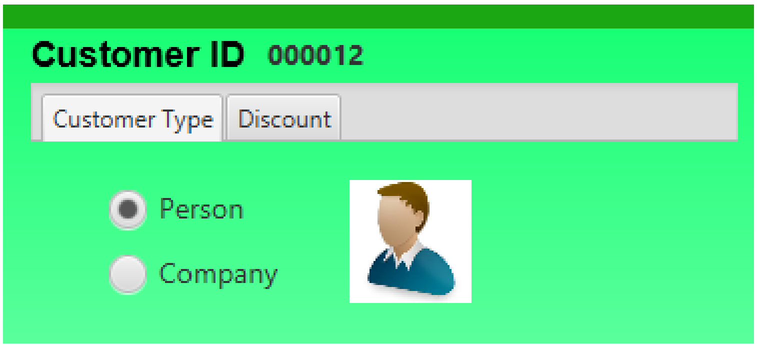
This Job Card is done!

Figure C.14: the Days Will Have To Deliver Job Details

- Specialties of Customer Registration

  The customers can be categorized into two categories called personal and company. So there must be a suitable identification for both of these categories. The NIC number is compulsory for the personal and company details are compulsory for company registration. Radio buttons have been used to categorize them and above details are compulsory to register a customer for the organization.

Figure C.15 shows customer categorization at the registration



Customer ID 000012

● Person
○ Company

Figure C.15: Customer Categorization

- Specialties of Main Window of the System

  In the Main Window, User can be used to go as effectively as possible by using creative buttons which can be identified easily on the picture. User can be viewed job details according to the delivery date by clicking on the calendar.

Figure C.16 shows main window creative buttons

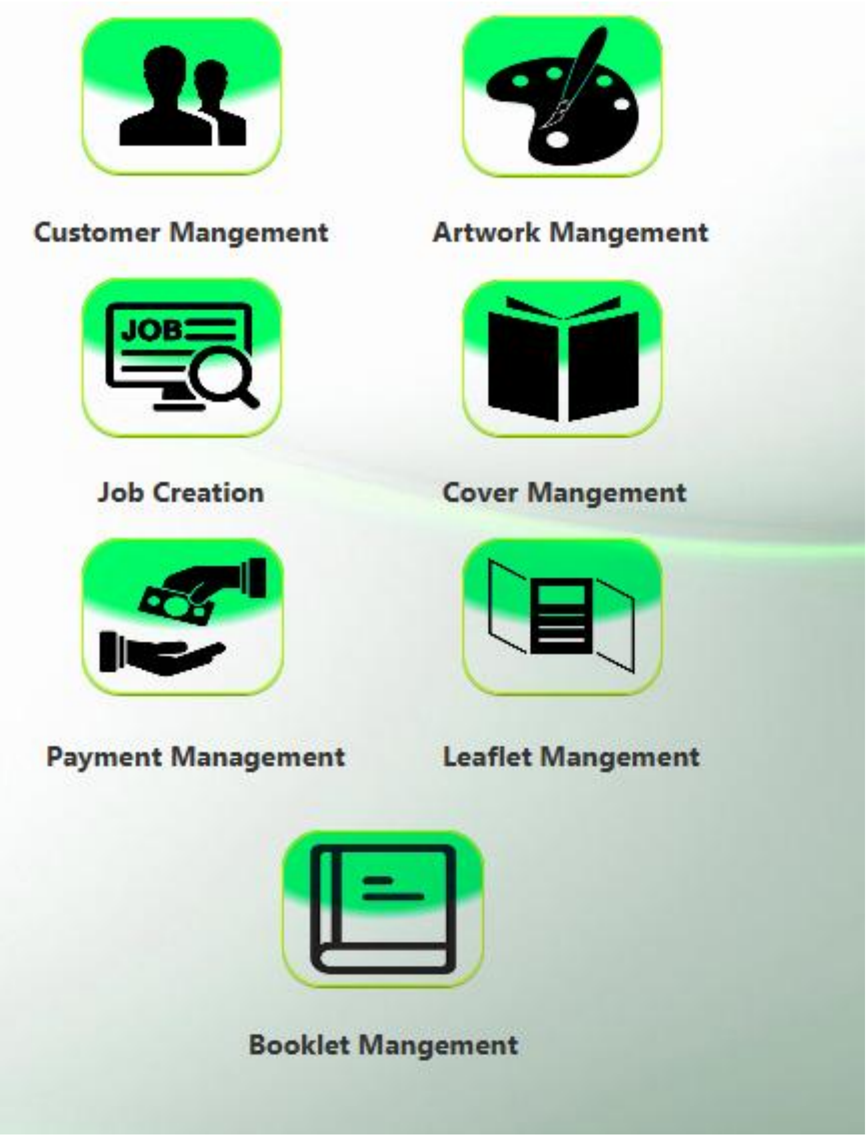
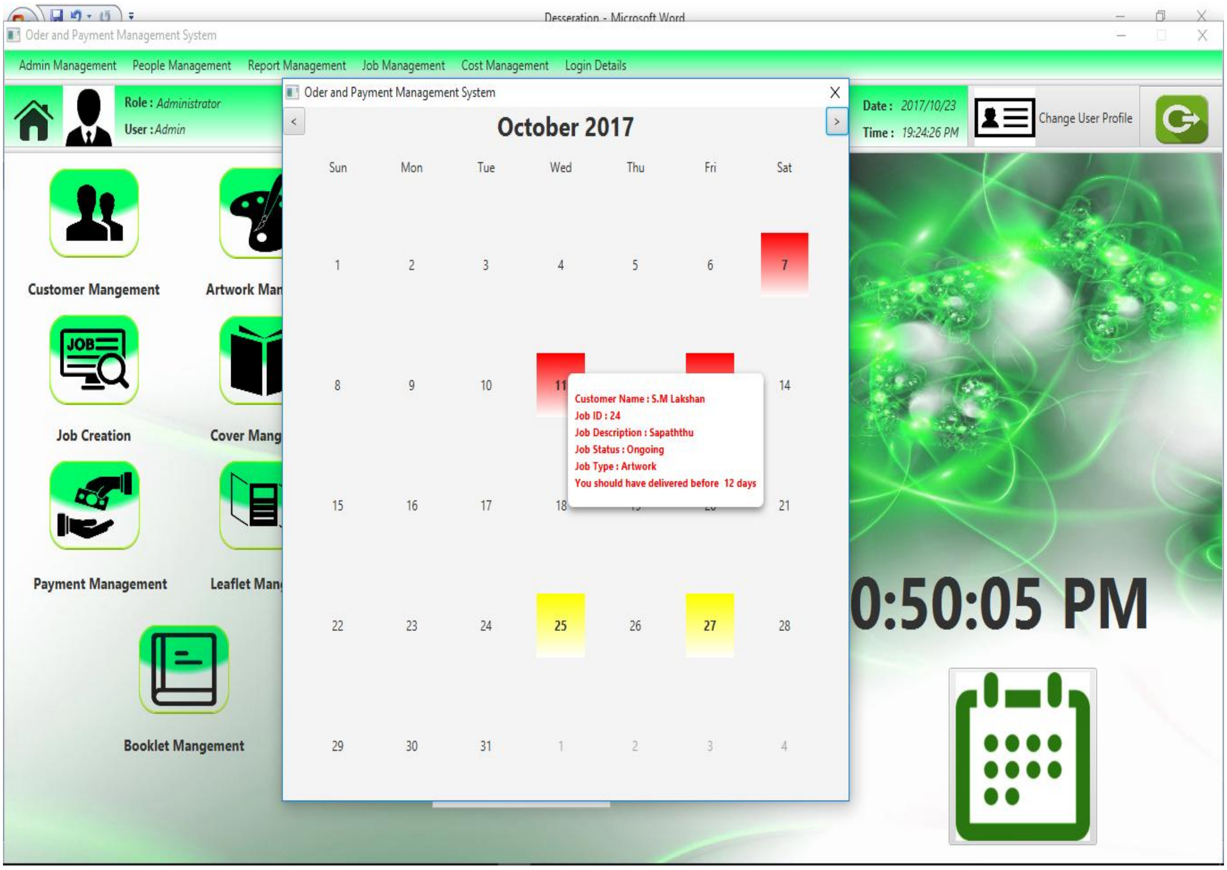


Figure C.16: Main Window Creative Buttons

Figure C.17 shows the Caldara



Role : Administrator

User : Admin

Date : 2017/10/23

Time : 19:24:26 PM

Oder and Payment Management System

October 2017

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11			14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	1	2	3	4

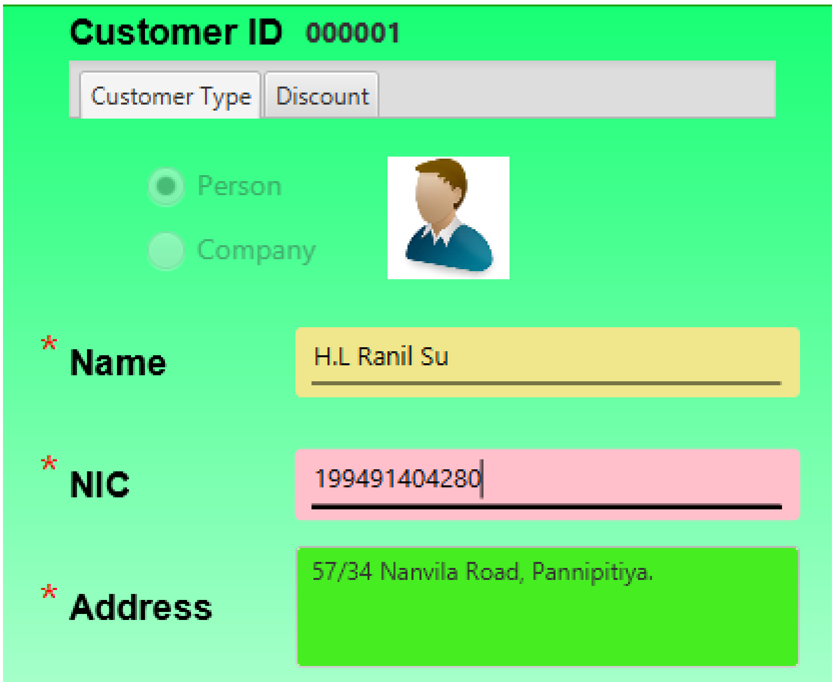
Customer Name : S.M Lakshan
Job ID : 24
Job Description : Sapaththu
Job Status : Ongoing
Job Type : Artwork
You should have delivered before 12 days

Figure C.17: the Calendar

- Text Field Color Arrangement

Color changes have been used when filling the form data. Light green , pink, and yellow colors have been used respectively for validation, incorrect fields and updated fields. This color changes is very useful for the user to have a understanding about the data he must filled in the fields. If these changes are not given as real time indication, the user gets to know about fields he filled only when he clicks save, update buttons. Then again user has to come to the beginning.

Figure C.18 shows the real time validation on the data entering fields



Customer ID 000001

● Person

○ Company

* Name: H.L Ranil Su

* NIC: 199491404280

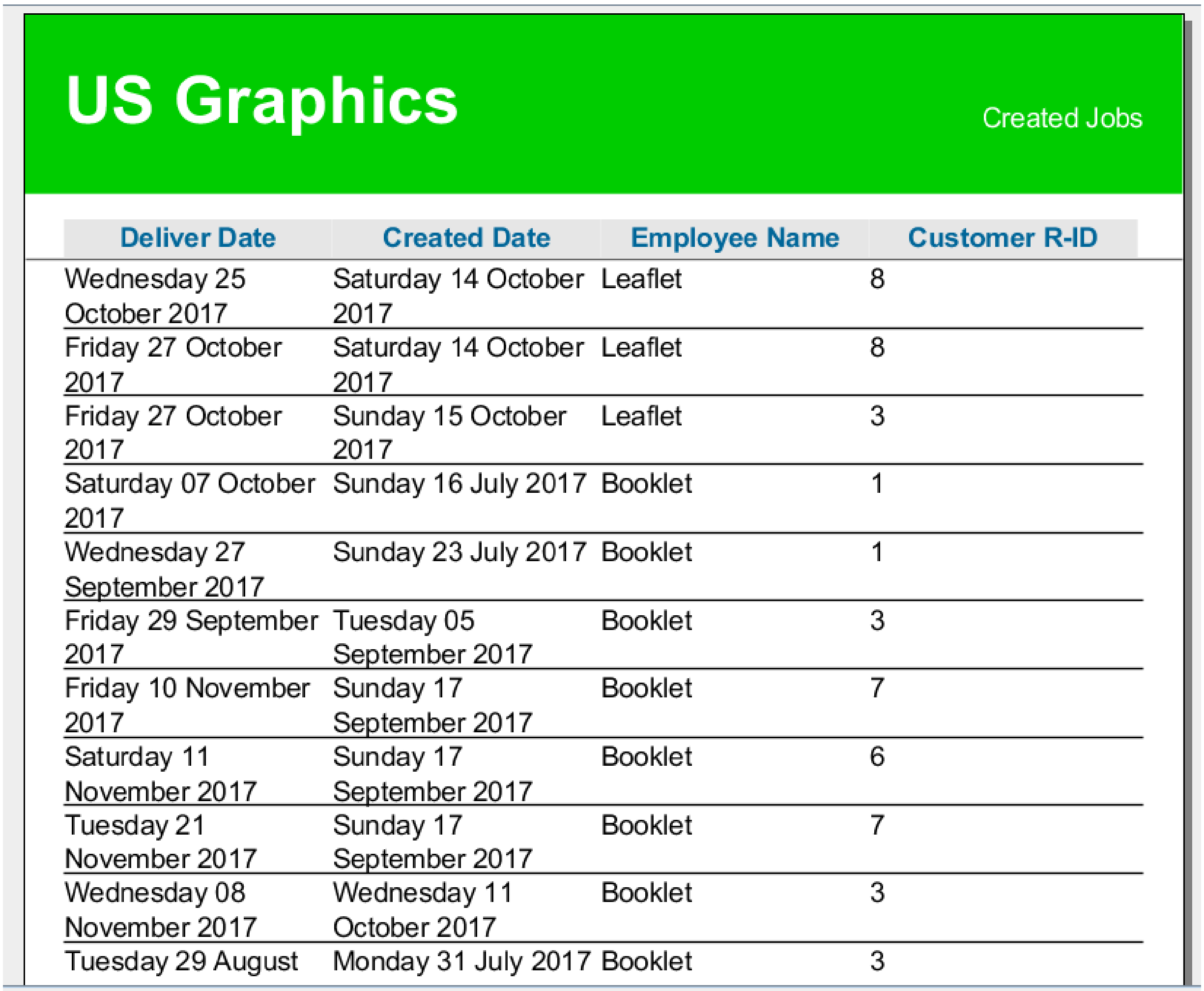
* Address: 57/34 Nanvila Road, Pannipitiya.

Figure C.18: the Real Time Validation

APPENDX D – MANAGEMENT REPORTS

Figure D.1 shows the job card report

- Job Card Report



US Graphics

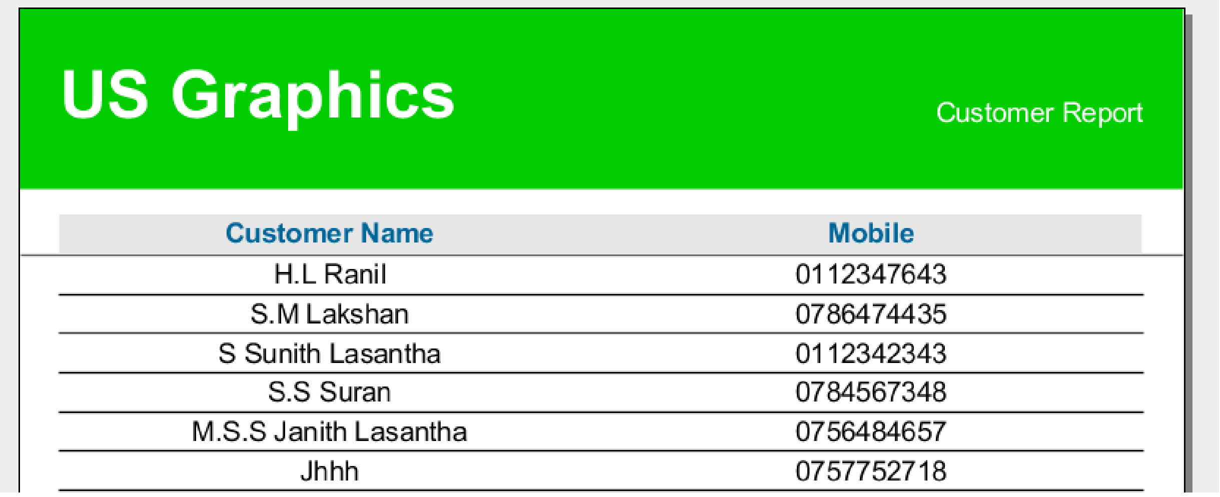
Created Jobs

Deliver Date	Created Date	Employee Name	Customer R-ID
Wednesday 25 October 2017	Saturday 14 October 2017	Leaflet	8
Friday 27 October 2017	Saturday 14 October 2017	Leaflet	8
Friday 27 October 2017	Sunday 15 October 2017	Leaflet	3
Saturday 07 October 2017	Sunday 16 July 2017	Booklet	1
Wednesday 27 September 2017	Sunday 23 July 2017	Booklet	1
Friday 29 September 2017	Tuesday 05 September 2017	Booklet	3
Friday 10 November 2017	Sunday 17 September 2017	Booklet	7
Saturday 11 November 2017	Sunday 17 September 2017	Booklet	6
Tuesday 21 November 2017	Sunday 17 September 2017	Booklet	7
Wednesday 08 November 2017	Wednesday 11 October 2017	Booklet	3
Tuesday 29 August	Monday 31 July 2017	Booklet	3

Figure D.1: the Job Card Report

Figure D.2 shows the customer report

- Customer Report



US Graphics

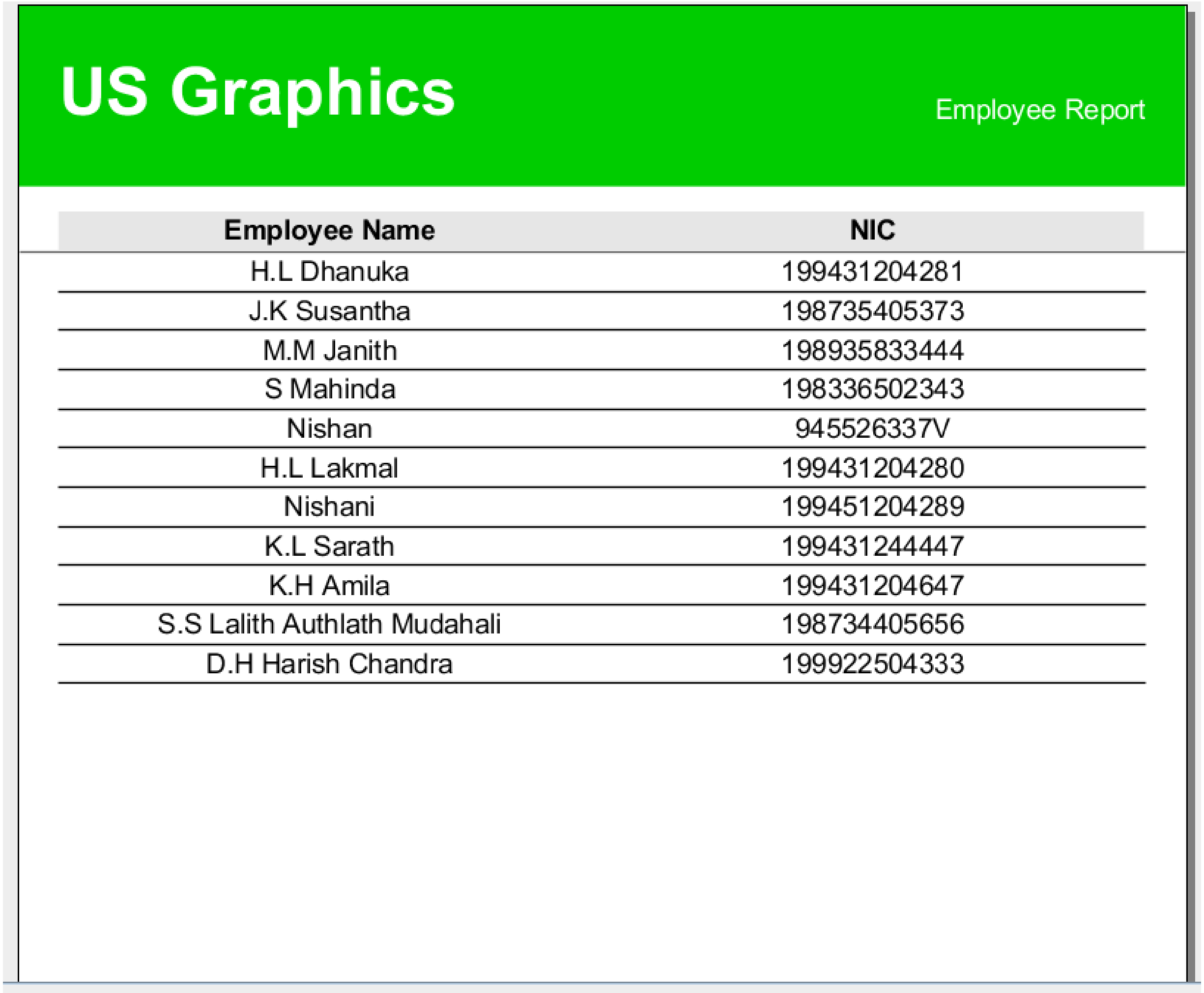
Customer Report

Customer Name	Mobile
H.L Ranil	0112347643
S.M Lakshan	0786474435
S Sunith Lasantha	0112342343
S.S Suran	0784567348
M.S.S Janith Lasantha	0756484657
Jhhh	0757752718

Figure D.2: the Customer Report

Figure D.3 shows the employee report

- Employee Report



US Graphics

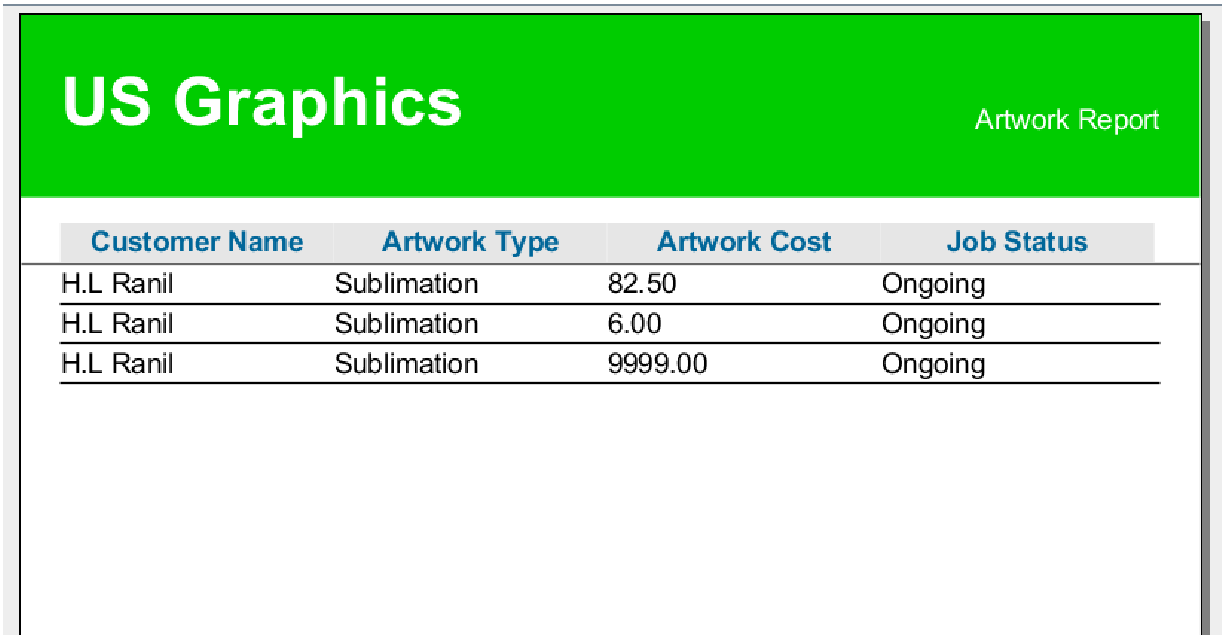
Employee Report

Employee Name	NIC
H.L Dhanuka	199431204281
J.K Susantha	198735405373
M.M Janith	198935833444
S Mahinda	198336502343
Nishan	945526337V
H.L Lakmal	199431204280
Nishani	199451204289
K.L Sarath	199431244447
K.H Amila	199431204647
S.S Lalith Authlath Mudahali	198734405656
D.H Harish Chandra	199922504333

Figure D.3: the Employee Report

Figure D.4 shows the artwork report

- Artwork Report



US Graphics

Artwork Report

Customer Name	Artwork Type	Artwork Cost	Job Status
H.L Ranil	Sublimation	82.50	Ongoing
H.L Ranil	Sublimation	6.00	Ongoing
H.L Ranil	Sublimation	9999.00	Ongoing

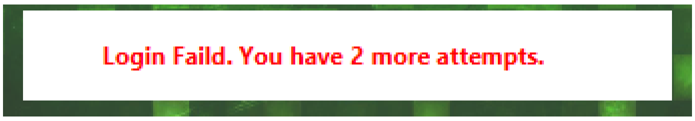
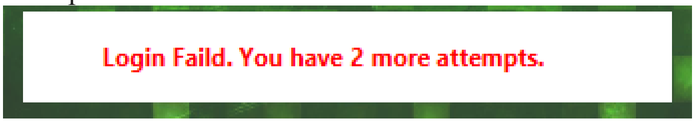
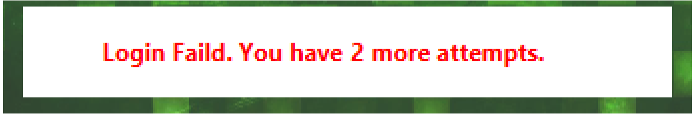
Figure D.4: the Artwork Report

APPENDX E – TEST RESULTS

As discussed in the Evaluation chapter, the results for the referred test cases are included in this chapter. More test cases and results are mentioned in this chapter.

Test Results for Login Module

The test cases with results belong to Login Module are shown by figure E.1

Test Number	Steps to Test	Expected Result	Status
1	Enter correct username Enter correct password Press login button	Successfully login to the system(Main Window)	Pass
2	Enter incorrect username Enter correct password Press login button	A message is displayed saying “Login failed. You have 5 more attempts”  Login Faild. You have 2 more attempts.	Pass
3	Enter correct username Enter incorrect password Press login button	A message is displayed saying “Login failed. You have 5 more attempts”  Login Faild. You have 2 more attempts.	Pass
4	Enter incorrect username Enter incorrect password Press login button	A message is displayed saying “Login failed. You have 5 more attempts”  Login Faild. You have 2 more attempts.	Pass
5	Enter incorrect username Enter incorrect password More than 5 times	The login window disappears	Pass

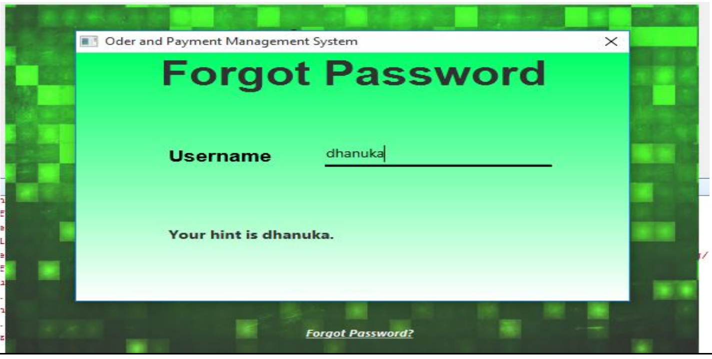
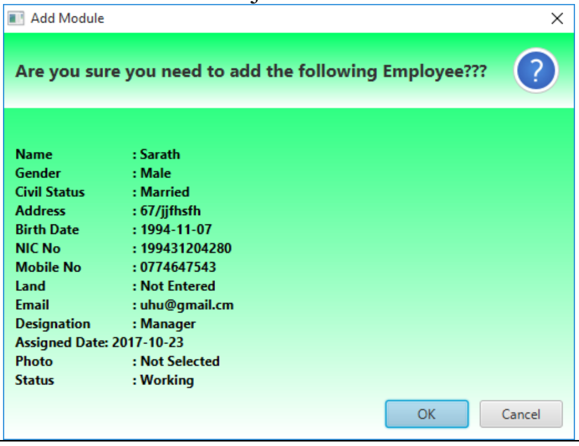
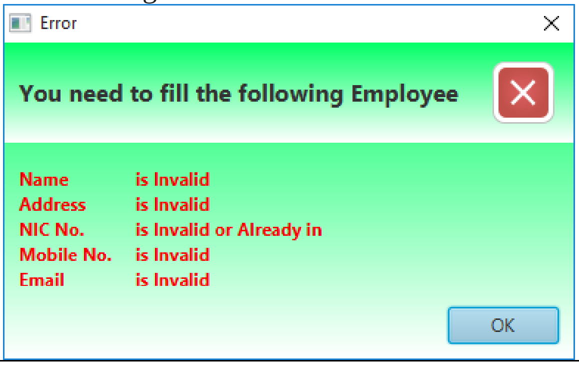
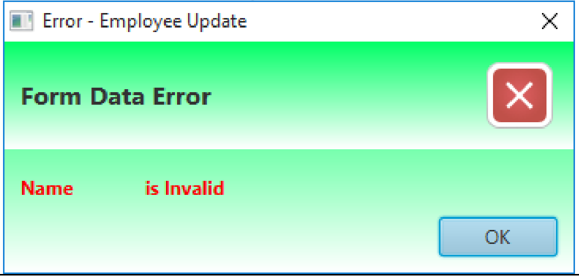
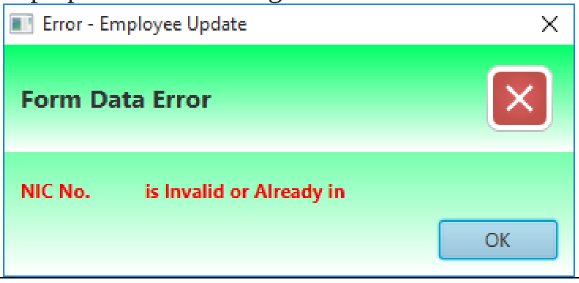
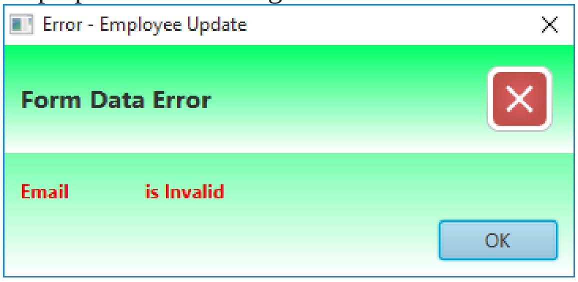
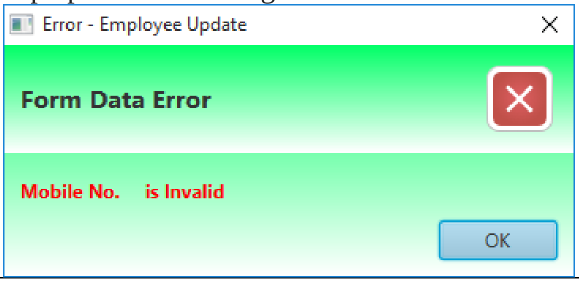
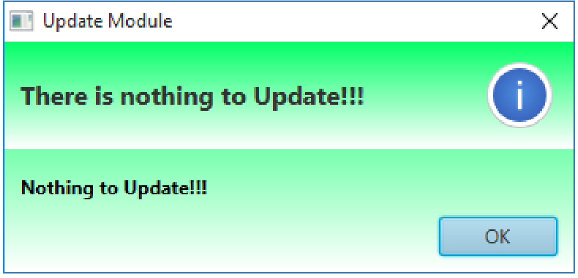
6	Press "Forgot Password " in the login window	There must be a method to see password hint.  Forgot Password Username dhanuka Your hint is dhanuka. 	pass

Figure E.1: The Login Module

The Test Results for Employee Management Module

The test cases and results belong to the employee module are shown by figure E.2

Test Number	Steps to test	Expected Result	Status
1	Insert all the details as required in the text fields of the interface. Press save option	Popup confirmation message saying "Are you sure want to save the job details"  Are you sure you need to add the following Employee??? Name : Sarath Gender : Male Civil Status : Married Address : 67/jjfhsfh Birth Date : 1994-11-07 NIC No : 199431204280 Mobile No : 0774647543 Land : Not Entered Email : uhu@gmail.cm Designation : Manager Assigned Date: 2017-10-23 Photo : Not Selected Status : Working 	Pass
2	Try to click save button without adding all the details or adding avoiding compulsory fields.	Popup an error message saying "You need to fill the following fields"  You need to fill the following Employee Name is Invalid Address is Invalid NIC No. is Invalid or Already in Mobile No. is Invalid Email is Invalid 	Pass

3	Try to click save/update button without entering employee name	Pop up a error message.  Form Data Error Name is Invalid 	Pass
4	Try to save/update button without entering or existing employee nic number	Pop up an error message.  Form Data Error NIC No. is Invalid or Already in 	Pass
5	Try to save/update button without entering email address or invalid format	Pop up an error message.  Form Data Error Email is Invalid 	Pass
6	Try to save/update button without entering mobile number or invalid format	Pop up an error message.  Form Data Error Mobile No. is Invalid 	Pass
7	Try to update vehicle information without doing any changes	A pop up message must say “There is nothing to update”.  There is nothing to Update!!! Nothing to Update!!! 	Pass

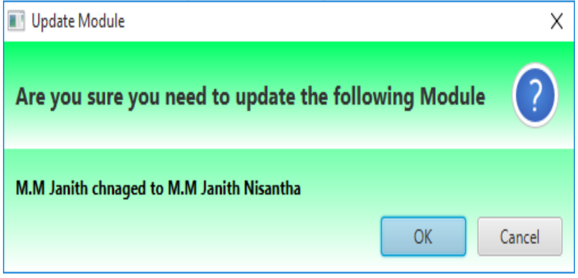
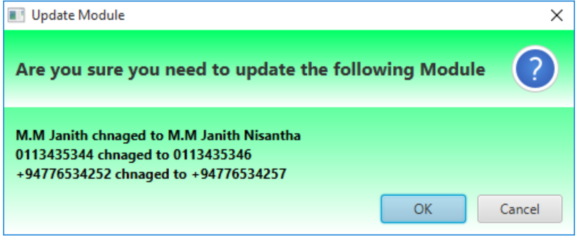
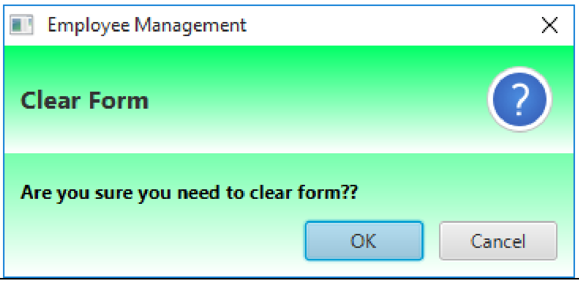
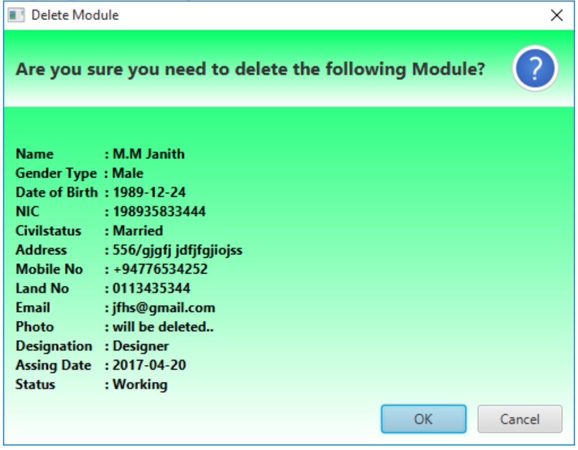
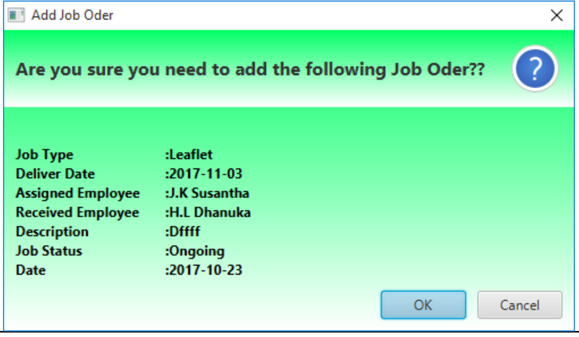
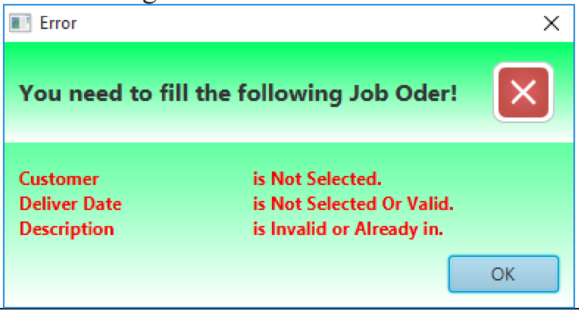
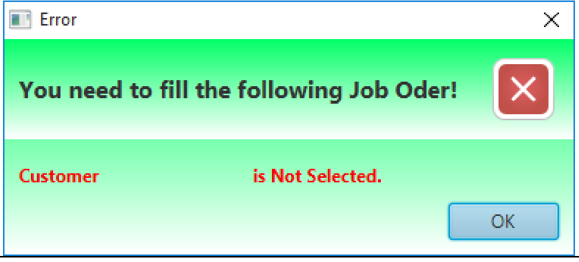
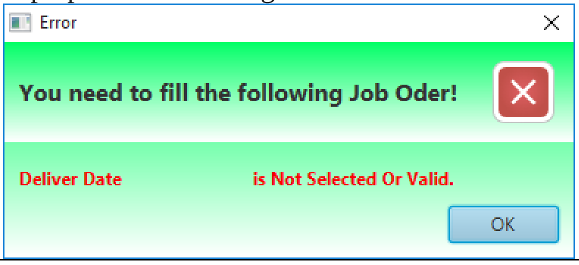
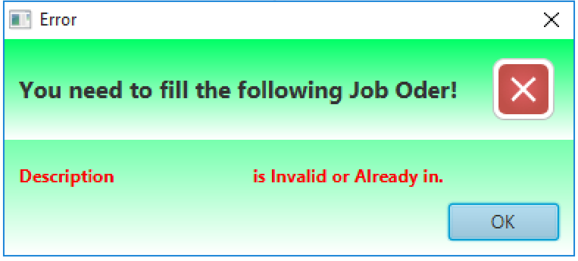
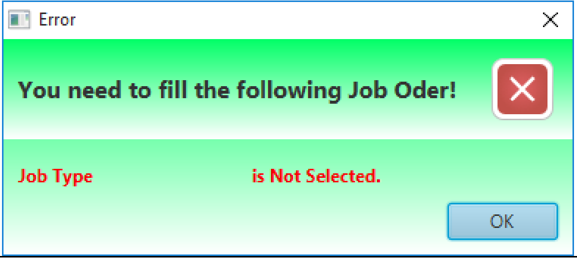
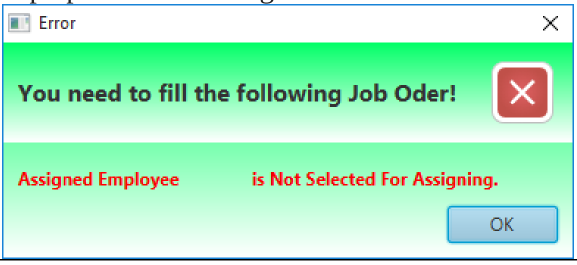
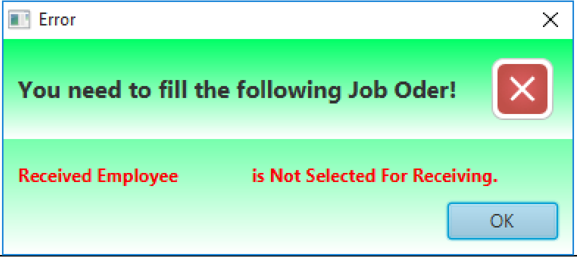
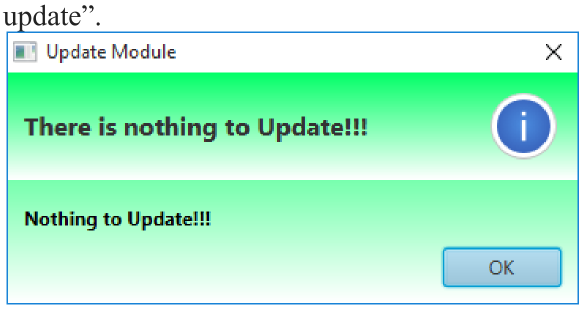
8	Try to update employee details only changing name of the name of employee	Pop up a message according to filed update.  Are you sure you need to update the following Module M.M Janith chnaged to M.M Janith Nisantha	Pass
9	Try to update employee details one or more	Pop up a message.  Are you sure you need to update the following Module M.M Janith chnaged to M.M Janith Nisantha 0113435344 chnaged to 0113435346 +94776534252 chnaged to +94776534257	Pass
10	Press clear button so that clear the details on the interface	Pop up a confirmation message asking "Are you sure want to clear the form?"  Clear Form Are you sure you need to clear form??	Pass
11	Press delete button so that delete the details on the interface	Pop up a message.  Are you sure you need to delete the following Module? Name : M.M Janith Gender Type : Male Date of Birth : 1989-12-24 NIC : 198935833444 Civilstatus : Married Address : 556/gjgfj jdfjfgjiojss Mobile No : +94776534252 Land No : 0113435344 Email : jfhs@gmail.com Photo : will be deleted.. Designation : Designer Assing Date : 2017-04-20 Status : Working	Pass

Figure E.2: The Employee Module

The Test Results for Job Management Module

The test cases and results belong to the job module are shown by figure E.3

Test Number	Steps to test	Expected Result	Status
1	Insert all the details as required in the text fields of the interface. Press save option	Popup confirmation message saying "Are you sure want to save the job details"  Add Job Oder Are you sure you need to add the following Job Oder?? Job Type :Leaflet Deliver Date :2017-11-03 Assigned Employee :J.K Susantha Received Employee :H.L Dhanuka Description :Dffff Job Status :Ongoing Date :2017-10-23 	Pass
2	Try to click save button without adding all the details or adding avoiding compulsory fields.	Popup an error message saying "You need to fill the following fields"  Error You need to fill the following Job Oder! Customer is Not Selected. Deliver Date is Not Selected Or Valid. Description is Invalid or Already in. 	Pass
3	Try to click save/update button without entering customer id	Pop up an error message.  Error You need to fill the following Job Oder! Customer is Not Selected. 	Pass
4	Try to save/update button without entering or invalid select on deliver date picker field	Pop up an error message.  Error You need to fill the following Job Oder! Deliver Date is Not Selected Or Valid. 	Pass

5	Try to save/update button without entering description or invalid format	Pop up an error message.  You need to fill the following Job Oder! Description is Invalid or Already in.	Pass
6	Try to save/update button without selecting job type	Pop up an error message.  You need to fill the following Job Oder! Job Type is Not Selected.	Pass
7	Try to save/update button without selecting assigned employee	Pop up an error message.  You need to fill the following Job Oder! Assigned Employee is Not Selected For Assigning.	Pass
8	Try to save/update button without selecting receive employee	Pop up an error message.  You need to fill the following Job Oder! Received Employee is Not Selected For Receiving.	Pass
9	Try to update vehicle information without doing any changes	A pop up message must say “There is nothing to update”.  There is nothing to Update!!! Nothing to Update!!!	Pass

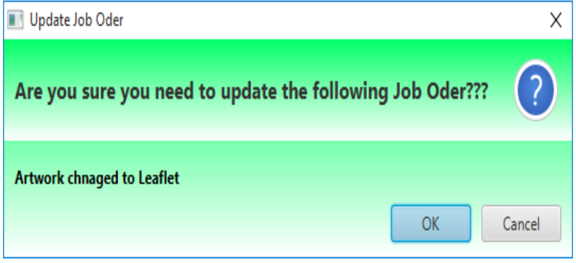
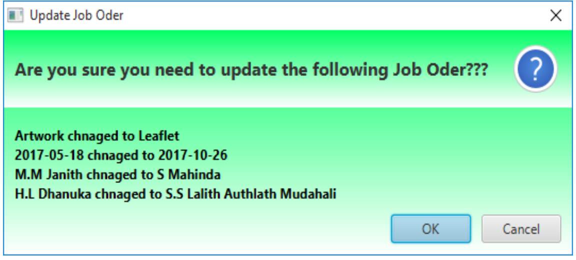
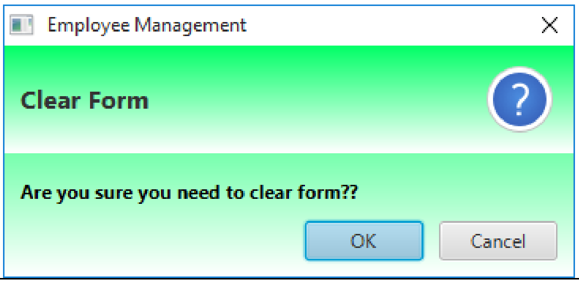
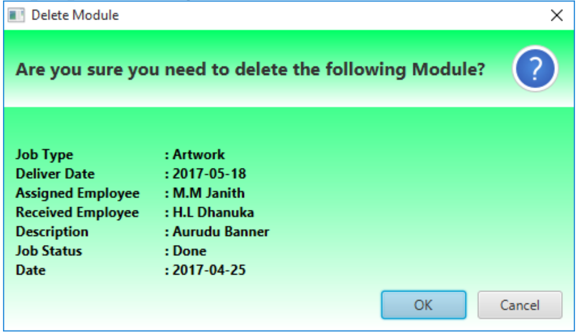
10	Try to update employee details only changing field	Pop up a message according to filed update.  Are you sure you need to update the following Job Oder??? Artwork chnaged to Leaflet 	Pass
11	Try to update employee details one or more	Pop up a message.  Are you sure you need to update the following Job Oder??? Artwork chnaged to Leaflet 2017-05-18 chnaged to 2017-10-26 M.M Janith chnaged to S Mahinda H.L Dhanuka chnaged to S.S Lalith Authlath Mudahali 	Pass
12	Press clear button so that clear the details on the interface	Pop up a confirmation message asking "Are you sure want to clear the form?"  Clear Form Are you sure you need to clear form?? 	Pass
13	Press delete button so that delete the details on the interface	Pop up a message.  Are you sure you need to delete the following Module? Job Type : Artwork Deliver Date : 2017-05-18 Assigned Employee : M.M Janith Received Employee : H.L Dhanuka Description : Aurudu Banner Job Status : Done Date : 2017-04-25 	Pass

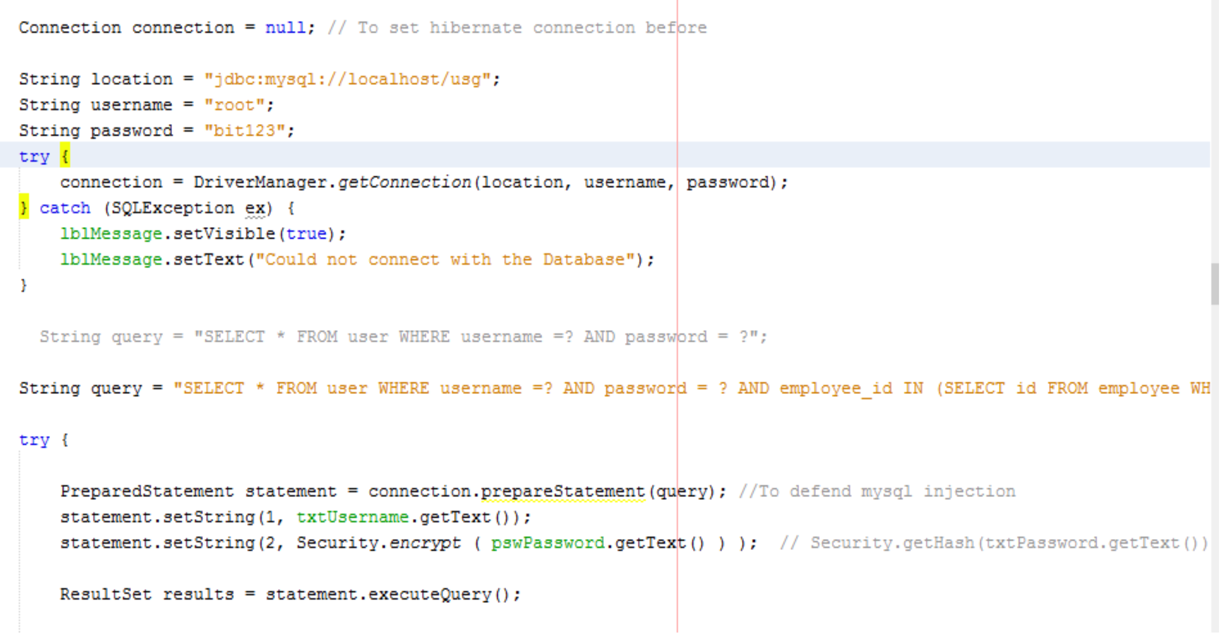
Figure E.3: The Job Module

APPENDX F – CODE LISTING

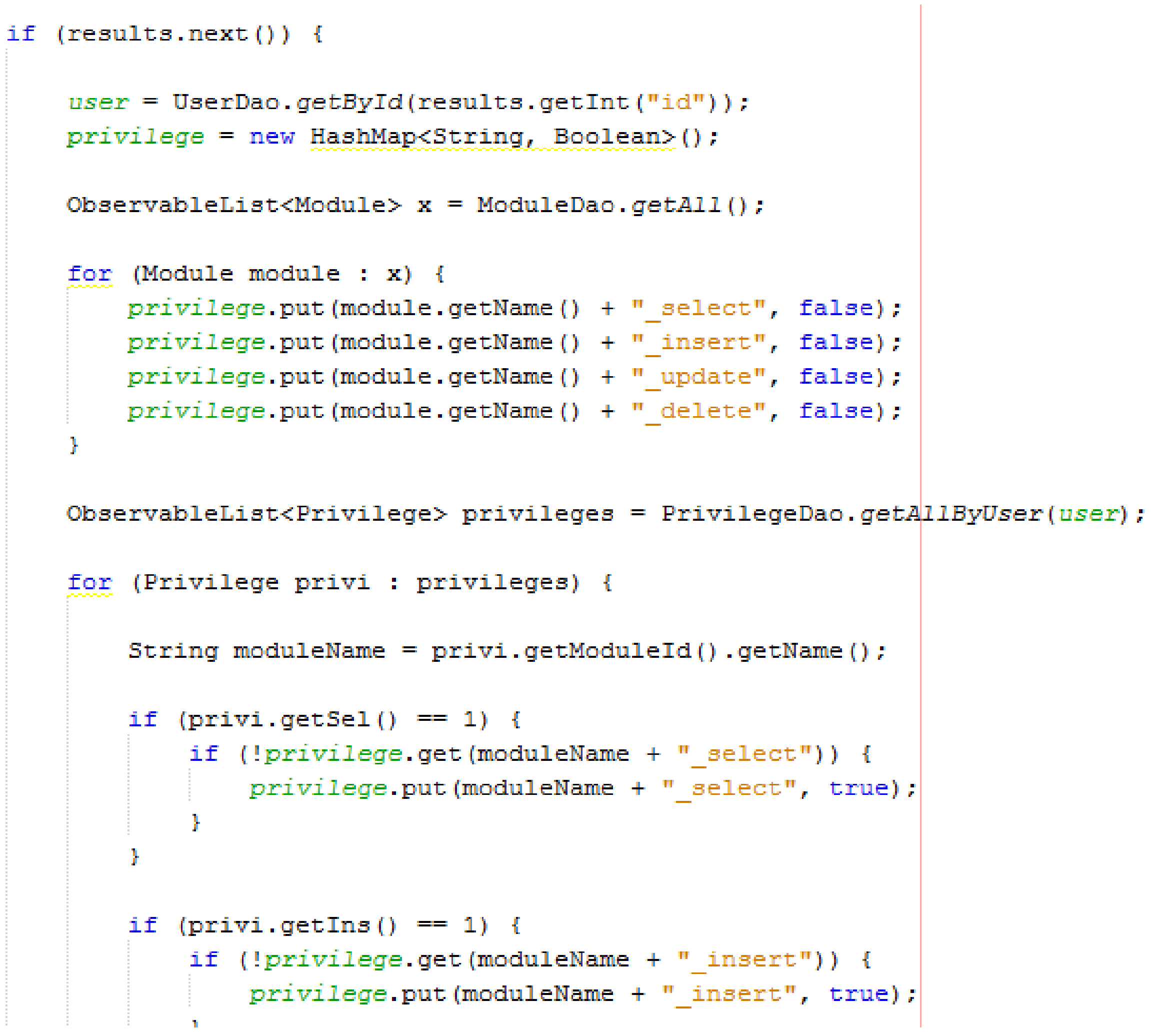
Code segments from main modules are referred here. If someone is interested, he/she may read and understand them easily since all good coding practices have been used as much as possible when the modules are coded.

Login Module

The starting module is the login module and the privileges are checked in this module. So if someone is interested in how to give privileges at the beginning, he may learn how to do it from these codes.



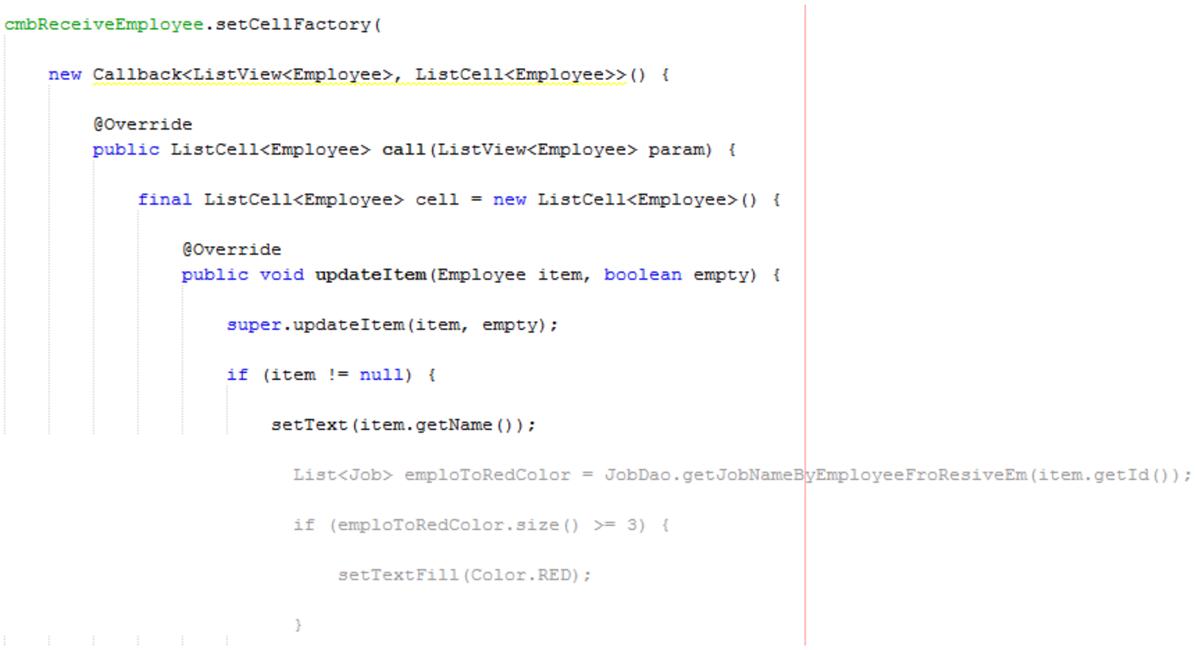
```
Connection connection = null; // To set hibernate connection before

String location = "jdbc:mysql://localhost/usg";
String username = "root";
String password = "bit123";
try {
    connection = DriverManager.getConnection(location, username, password);
} catch (SQLException ex) {
    lblMessage.setVisible(true);
    lblMessage.setText("Could not connect with the Database");
}

  String query = "SELECT * FROM user WHERE username =? AND password = ?";

String query = "SELECT * FROM user WHERE username =? AND password = ? AND employee_id IN (SELECT id FROM employee WH

try {

    PreparedStatement statement = connection.prepareStatement(query); //To defend mysql injection
    statement.setString(1, txtUsername.getText());
    statement.setString(2, Security.encrypt ( pswPassword.getText() ) );  // Security.getHash(txtPassword.getText())

    ResultSet results = statement.executeQuery();
```



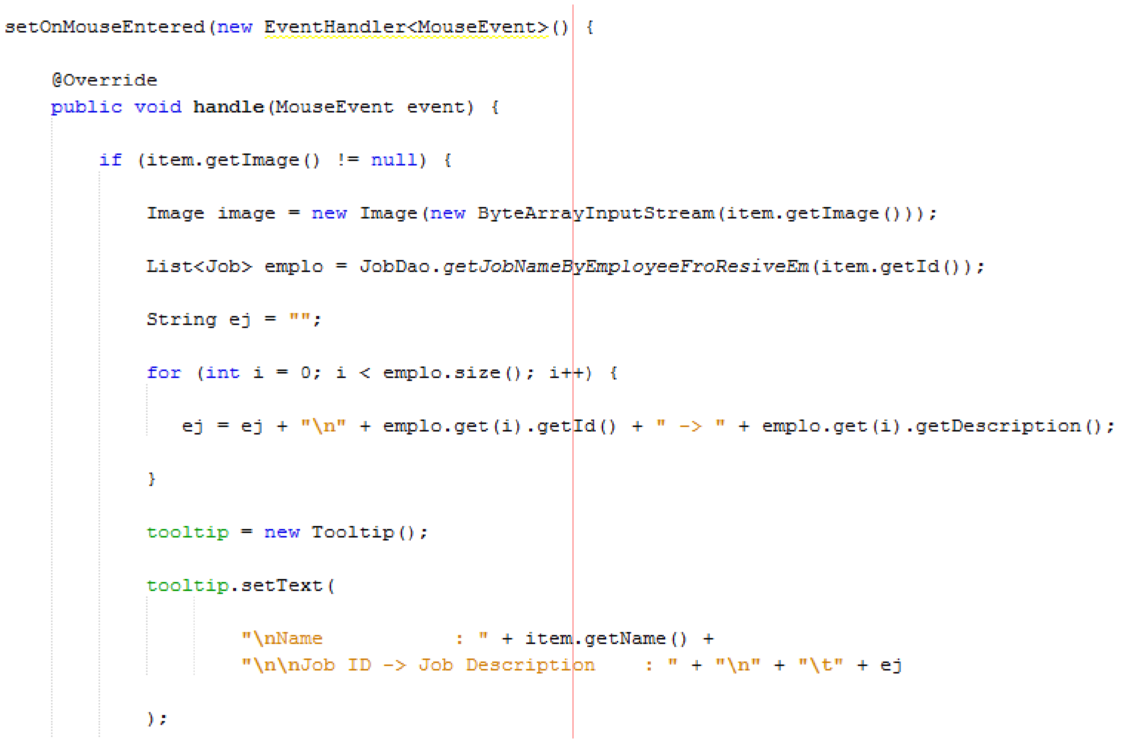
```
if (results.next()) {

    user = UserDao.getById(results.getInt("id"));
    privilege = new HashMap<String, Boolean>();

    ObservableList<Module> x = ModuleDao.getAll();

    for (Module module : x) {
        privilege.put(module.getName() + "_select", false);
        privilege.put(module.getName() + "_insert", false);
        privilege.put(module.getName() + "_update", false);
        privilege.put(module.getName() + "_delete", false);
    }

    ObservableList<Privilege> privileges = PrivilegeDao.getAllByUser(user);

    for (Privilege privi : privileges) {

        String moduleName = privi.getModuleId().getName();

        if (privi.getSel() == 1) {
            if (!privilege.get(moduleName + "_select")) {
                privilege.put(moduleName + "_select", true);
            }
        }

        if (privi.getIns() == 1) {
            if (!privilege.get(moduleName + "_insert")) {
                privilege.put(moduleName + "_insert", true);
            }
```

Job Management Module

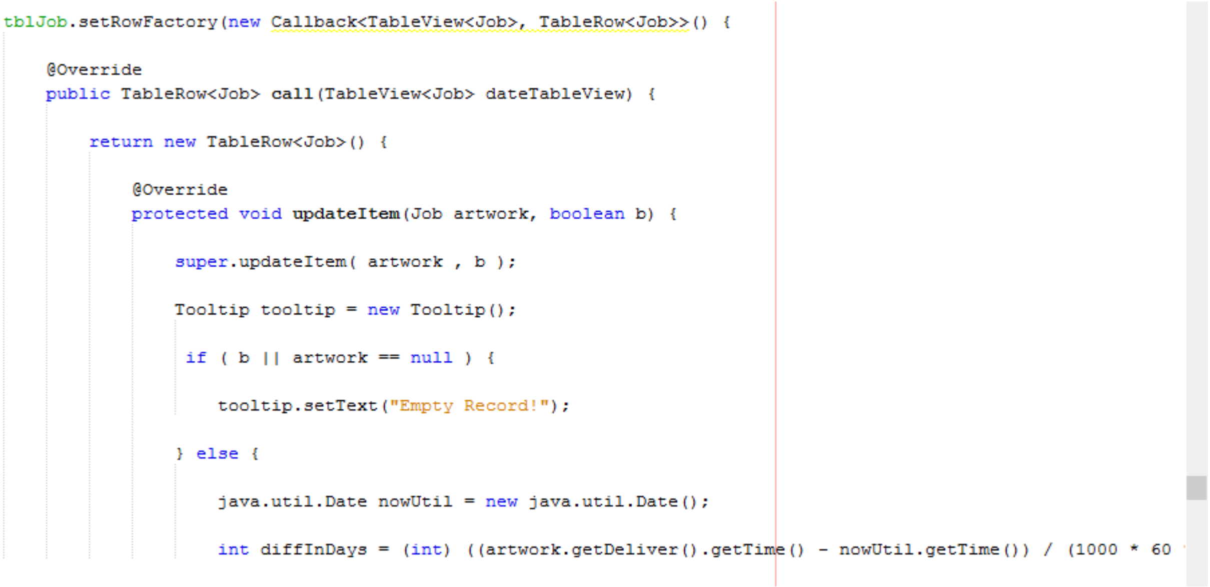
The most important module in the system is estimation module. So, somewhat difficult code segments have been used in this module. Specially in this module, the job details can be viewed in date picker without clicking any table row and to show up different colors in table row in table rows according to deliver date as well as job status. The assigned job details according to each employee can be viewed with employee inserted image on assigned employee combo box.



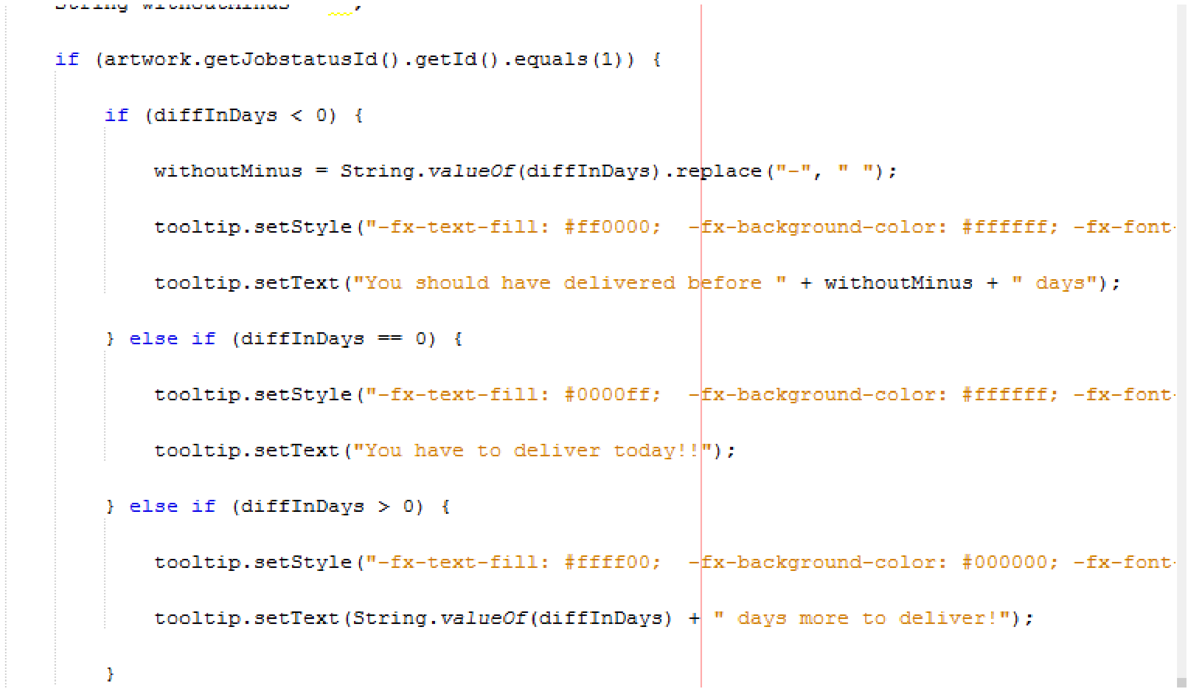
```
cmbReceiveEmployee.setCellFactory(

    new Callback<ListView<Employee>, ListCell<Employee>>() {

        @Override
        public ListCell<Employee> call(ListView<Employee> param) {

            final ListCell<Employee> cell = new ListCell<Employee>() {

                @Override
                public void updateItem(Employee item, boolean empty) {

                    super.updateItem(item, empty);

                    if (item != null) {

                        setText(item.getName());

                        List<Job> emploToRedColor = JobDao.getJobNameByEmployeeFroResiveEm(item.getId());

                        if (emploToRedColor.size() >= 3) {

                            setTextFill(Color.RED);

                        }
```



```
setOnMouseEntered(new EventHandler<MouseEvent>() {

    @Override
    public void handle(MouseEvent event) {

        if (item.getImage() != null) {

            Image image = new Image(new ByteArrayInputStream(item.getImage()));

            List<Job> emplo = JobDao.getJobNameByEmployeeFroResiveEm(item.getId());

            String ej = "";

            for (int i = 0; i < emplo.size(); i++) {

               ej = ej + "\n" + emplo.get(i).getId() + " -> " + emplo.get(i).getDescription();

            }

            tooltip = new Tooltip();

            tooltip.setText(

                    "\nName             : " + item.getName() +
                    "\n\nJob ID -> Job Description    : " + "\n" + "\t" + ej

            );
```

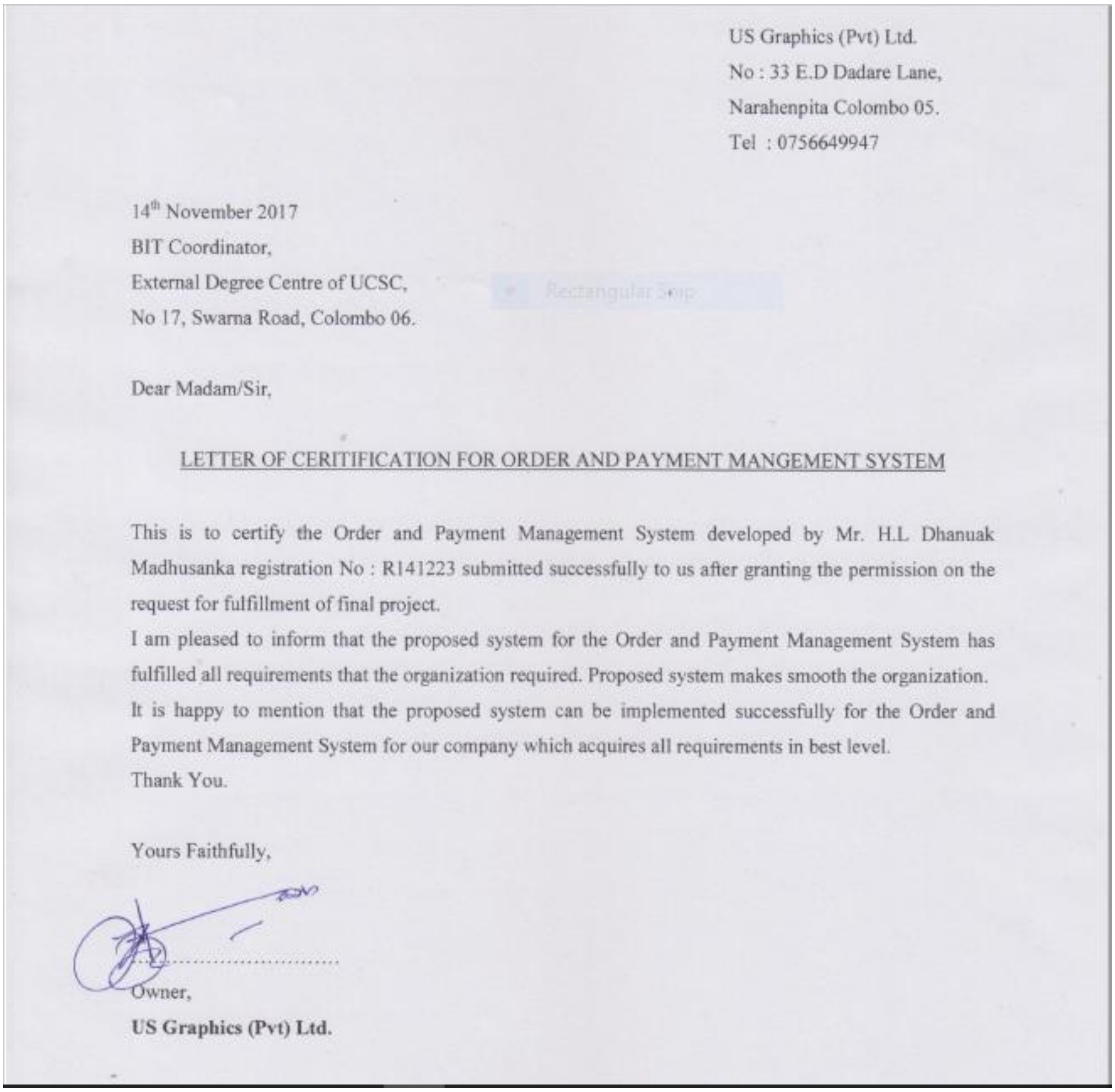


```
tblJob.setRowFactory(new Callback<TableView<Job>, TableRow<Job>>() {

    @Override
    public TableRow<Job> call(TableView<Job> dateTableView) {

        return new TableRow<Job>() {

            @Override
            protected void updateItem(Job artwork, boolean b) {

                super.updateItem( artwork , b );

                Tooltip tooltip = new Tooltip();

                 if ( b || artwork == null ) {

                    tooltip.setText("Empty Record!");

                } else {

                    java.util.Date nowUtil = new java.util.Date();

                    int diffInDays = (int) ((artwork.getDeliver().getTime() - nowUtil.getTime()) / (1000 * 60
```



```
    String withoutMinus = "";

    if (artwork.getJobstatusId().getId().equals(1)) {

        if (diffInDays < 0) {

            withoutMinus = String.valueOf(diffInDays).replace("-", " ");

            tooltip.setStyle("-fx-text-fill: #ff0000;  -fx-background-color: #ffffff; -fx-font

            tooltip.setText("You should have delivered before " + withoutMinus + " days");

        } else if (diffInDays == 0) {

            tooltip.setStyle("-fx-text-fill: #0000ff;  -fx-background-color: #ffffff; -fx-font

            tooltip.setText("You have to deliver today!!");

        } else if (diffInDays > 0) {

            tooltip.setStyle("-fx-text-fill: #ffff00;  -fx-background-color: #000000; -fx-font

            tooltip.setText(String.valueOf(diffInDays) + " days more to deliver!");

        }
```

APPENDX G – CLIENT CERTIFICATE



US Graphics (Pvt) Ltd.
No : 33 E.D Dadare Lane,
Narahenpita Colombo 05.
Tel : 0756649947

14th November 2017
BIT Coordinator,
External Degree Centre of UCSC,
No 17, Swarna Road, Colombo 06.

Dear Madam/Sir,

LETTER OF CERITIFICATION FOR ORDER AND PAYMENT MANGEMENT SYSTEM

This is to certify the Order and Payment Management System developed by Mr. H.L Dhanuak Madhusanka registration No : R141223 submitted successfully to us after granting the permission on the request for fulfillment of final project.

I am pleased to inform that the proposed system for the Order and Payment Management System has fulfilled all requirements that the organization required. Proposed system makes smooth the organization. It is happy to mention that the proposed system can be implemented successfully for the Order and Payment Management System for our company which acquires all requirements in best level.

Thank You.

Yours Faithfully,

....
Owner,
US Graphics (Pvt) Ltd.

GLOSSARY

- **Dao Class** – This means Data Access Object. This provides abstract interact interface for some databases.

- **Entity Class** – Entity classes represent objects in java programming language and it was earlier called as POJO Classes.

- **Estimation** – Estimation is rough calculation of value, number or quantity of something.

- **Hibernate** – Hibernate is an Object Relational Mapping tool for Java programming language.

- **Java – Java** is a computer programming language which is based on object oriented concepts.

- **Java FX -** is a software platform for creating and delivering desktop applications, as well as rich internet applications (RIAs) that can run across a wide variety of devices.

- **Mysql -** This is a database management system that is freely available. Most developers and companies use this system for their database needs.

- **Scrum -** That is a software development methodology widely used in the software development industry. Scrum follows agile development principle.

- **Sprint** - Sprint is the basic unit of development in scrum. It's time boxed and the duration is one week to four weeks.

- **Stand – alone System –** The computer programmers those work without using internet facilities are called as stand-alone programs.

- **UML** – Unified Modeling Language. This is mostly used in designing computer systems.

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