

# **Gate Pass Management System (GPMS) for Antler Group**

**H M Manushi Herath  
2018**




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Project Title	Gate Pass Management System (GPMS) for Antler Group
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# **Gate Pass Management System (GPMS) for Antler Group**

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

**H M Manushi Herath  
University of Colombo School of Computing  
2018**



## **Declaration**

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

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

Student Name: H M Manushi Herath

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Date: 14<sup>th</sup> July 2018

This is to certify that this thesis is based on the work of

Ms. H M Manushi Herath under my supervision. The thesis has been prepared according to the format stipulated and is of acceptable standard.

Certified by:

Supervisor Name: Mr. G K A Dias

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Signature:

Date:

## **Abstract**

“Digital is way better than the paper work”, the main concept of the system is to enhance security process while reducing the involvement of human resources.

Enhancing security at the gate level is essential in every organization, Poor security at gate level to track existing materials and its movement, transit of employee during the working hours and visitors entering the premises could affect the reputation of the whole organization. The Gate Pass is an important document for this purpose. It will be great to implement an automated process for Gate Pass Management that aims to replace the manual process. The manual system results a lot of inefficiency and unaccountability due to cumbersome and inaccurate record keeping with inconsistent maintenance of security about the movements.

In order to finalize the methodology that going to be used for the implementation, performed a comparison between similar systems and newly implementing system. Main functions such as technology used, hardware, etc. were considered during the comparison and according to the outcome, designing methodology was decided. Two phases are included in designing section. First, the logical design which includes the design of forms and reports, the design of the interface and the design of database. Then the physical design which is concerned about the physical database, program, processes and the distributed systems. The methodology used for the development and implementation of system is “Waterfall Model”. The generic approach for software designing is Top-Down design.

For the material movement between the factory locations or from a factory location to a different location, Material Gate Pass Management System will track from top to bottom process which includes all processes between requisition and material in out process. Employee Gate Pass Management System will track employees who are moving in and out of the organization during working hours. Though in and out time is tracked by the employee ID card there is no documented process to verify the acceptance of movement of employee. Employee Gate Pass Management System act as the monitoring system which track all the processes related to employee movements. Visitor Gate Pass Management System track visitors who visit to the organization premises for the official purposes. This tracks all the details related visitors gate pass management according to date, time and purpose. As a privilege this system can also track visitors who come without prior notification, by maintaining visitors’ room log.

For implementation, Windows was selected as the platform as the client has their own windows servers and local intranet with strong Virtual Private Network (VPN) connection. To develop the system .NET 4.5 framework was used along with the C# language. Also Ms. SQL Server used to have the database connection with the program.

Automated Gate Pass Management System enabled the right security, where could keep a vigilant eye on the material movement, transit of employee during working hours and the visitors who are gain the access to the premises. The system restricted the unauthorized movement in organizations’ premises, and apart from this, the gate pass allowed the organization to get a record of the time of movement and to track the person responsible for the movement. The gate pass management system enabled to save time by increasing the interaction between relevant departments which are responsible for movement of materials, employee and visitors through gate.

## **Acknowledgement**

When performing system implementation, I had to take many guidelines and help from some respected persons, who deserve my greatest gratitude. I like to show my gratitude to Mr. G.K.A Dias for giving me guidelines for success on this implementation.

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## List of Abbreviations

EGP	Employee Gate Pass
EGPR	Employee Gate Pass Request
ER	Entity – Relationship
ESS	Employee Self Service
FAR	Fixed Asset Registry
GP	Gate Pass
GPMS	Gate Pass Management System
GPR	Gate Pass Request
HR	Human Resource
MGP	Material Gate Pass
MGPR	Material Gate Pass Request
VGP	Visitor Gate Pass
VGPR	Visitor Gate Pass Request

# Chapter 1 INTRODUCTION

## 1.1 The Problem Domain

In all organizations, irrespective of their capacity, a large number of movements take place every day at the gate level. It may be employees moving in or out, visitors entering the premises, movement of materials etc. All these movements occur at the organization's premises, factories and companies needs to be monitored and controlled. This is where the concept of a gate pass comes into play. Gate pass can be used to authorize the movements of humans, materials and machines to or from the premises of the organization. It will help to monitor and track all the movements happening in an organization.

## 1.2 The problem

Enhancing security at the gate level is essential in every organization, as the poor security of material existing and its movement, transit of employee during the working hours and visitors entering the premises could ruin the reputation of the whole organization. Keeping records of above processes should be standardized. The Gate Pass is an important document for this purpose.

Currently **Antler Group** operates and monitors this process manually. So, it will be great to implement an automated process for Gate Pass Management that aims to replace the manual process currently using. Because the manual system resulting a lot of inefficiency and unaccountability due to cumbersome and inaccurate record keeping with inconsistent maintenance of security about the movement of company material, employees and visitors in and out of the organization. Also, when there is a non-conformity related to material or the people who are moving through the gate, then there is no process to back track the details related to the respective incident.

Reviewed online software which are relevant to gate pass management. But no integrated software which covers material, employee and visitors available online. All the software covers these areas individually. But the customer requirement is a one solution which address all 3 areas, as the personnel available at the security desk is not well experienced on computer based systems. When compared to other available systems, new system specifically addresses the process flow of customer and align with their manual process. So, it'll be easy for the employees to get use to the system. The significant difference between the implementing system and other available systems is, once log into the system personnel available at security desk can manage all the procedures related to Gate Pass Management. This is very useful for them as they are busy with all general security processes.

## **1.3 Motivation**

The security of the business depends on lot of factors and if it is less attentive, then might risk the security of the entire organization. To make sure that everything is under control, must implement right measures and this drives the organization towards a solution that takes care of the security at the gate. Gate Pass Management System enables the right security, where could keep a vigilant eye on the material movement, transit of employee during working hours and the visitors who are gain the access to the premises.

Can gain numerous advantages when gate pass system is implemented in an organization. The first and foremost being the restriction of unauthorized movement in organizations' premises, and apart from this, the gate pass allows the organization to get a record of the time of movement and to track the person responsible for the movement. In the case of materials, gate pass prevents the unauthorized transactions. The system improves the accuracy of data and eases the process of fetching data out of the system.

The system cares the overall security of the organization while improving the discipline inside the organization. It also enhances the company image by incorporating with systems that are technologically sound. This gives a positive view for people who visit the organization. Once they experienced the methods that have been used by the company will increase their positive attitudes towards the organization.

“Digital is way better than the paper work”, the main concept of the system is to enhance security process while reducing the involvement of human resources.

## **1.4 Aims and Objectives**

Aim is to implement an integrated and user friendly system which tracks all transactions of material, employee and visitors, which occurs through the gate.

Objectives which will increase the effectiveness of Gate Pass Management System is as follows:

- The main objective is to implement an automated system that will be used to manage Gate Pass for material, employees and visitors more accurately, with the aim of minimizing human intervention by replacing the current manual process.
- To improve the efficiency and accountability of security process by using an automated system.
- To improve the data management by making the link with respective departments and security desk.
- To establish a system which will align with other automated systems to increase the traceability and compliance of records, to the requirements of the organization.

## 1.5 Scope

This study focuses as stated, on the security of the organization. Here the material, employees and visitors considered, and this automated system follows a unique procedure to help maximize the security of above resources.

Material Gate Pass Management System will track material which are moving in or out of the organization. The loss of material can be reduced to the barest minimum through the usage of the system because it has a provision for supporting all steps involved in the transit of material, and the system will quickly tackle any issue.

For the material movement between the factory locations or from a factory location to a different location, as the first step it is required to make a request. The requests will be confirmed by an authorized person. The next step is the creation of Gate Pass by Finance Division based on the request. Then the Gate Pass will send to the approval stage and this needs the consent of the employee, so the Gate Pass can be processed. The dispatch stage comes next and there the material is sent outside the organization along with the printed gate pass, by Security personnel. Final stage of the procedure is the return acceptance, returns could also include dispatched material which are returnable.

Employee Gate Pass Management System will track employees who are moving in and out of the organization during working hours. This is ideally laid out to give the best safety feature, solving all the security issues. Even though in and out time is tracked by the employee ID card there is no documented process to verify the acceptance of movement of the employee. This act as an Employee Self Service (ESS) facility.

Employees, who have ESS facility, can make a request to go outside during the working hours or to departure early through Employee Gate Pass Request. Employees, who don't have the ESS facility, have to request through Human Resource (HR) department. HR department will generate an EGPR on behalf of the employee. The request will be reviewed and approved by an authorized person. The next step is the creation of Gate Pass by HR division based on the approved request. The departure stage comes next with the involvement of security desk. Departure is marked and the Gate Pass will be printed and issued by the security desk. Final stage of the procedure is the return acceptance; returns could also include people who did departure with a returnable gate pass.

Visitor Gate Pass Management System has always been the best security feature that has been utilized to track visitors who visit to the organization premises for the official purpose. This system allows keeping track of all the individuals who entered and exit the premises, and can trace all the details according to the date, time and purpose.

First the employee from respective division would beforehand put a request for the attendance of visitor(s) who comes with prior notice. The requests will be confirmed by an authorized person and it will convert to a Visitor Gate Pass. When visitor arrives at the gate, the security desk will acquire the information from the visitor and will cross check with the details entered in the system. After conforming, the security desk will issue a printed Gate Pass for the visitor. After visiting the respective employee, visitor will take the belongings from the security desk; will report at the gate for exit. Security desk will update the system accordingly after the visitor signed off the gate pass.

Visitors, who come without prior notice, will inform security desk about the person he/she needs to meet. Security desk informs the responsible employee and verify the details of visitor through telecommunication. Once the visitor is verified, security desk informs employee to meet the visitor at the visitors' room. The required records will be maintained in the Visitors' Room Log form. If the visitor needs to visit the organization premises, then security desk asks relevant employee to generate Gate Pass as per above procedure.

## **1.6 Structure of the Dissertation**

The respective thesis is consists of following sections which describe the new system implementation with relevant mechanisms. The brief description contains main implementation, methodology used and any other information related to implementation.

Chapter 2- Background: It consists of the main background information, review of similar system available related to Gate Pass Management, Hardware and software technologies using to implement the new system and the alternative technologies available. At last the summary of implementation tools.

Chapter 3 –Analysis and Design: This chapter consists of two main sections. They are Analysis and Design.

Analysis section covers functional and non-functional requirement analysis. And based on the analysis, use case diagrams were drawn and using the diagrams, use case narratives were created.

Design section covers the design of the solution by considering the alternative solutions and the methodology using along with the software development life cycle and design aspects. Main design aspects are software architecture, database modeling and design and user interface design. Apart from that process flow diagrams and Unified Modeling Language (UML) diagrams such as class diagrams were added. At last summary of analysis and design.



Chapter 4 – Implementation: It consists of implementation technology such as language, platform and frame work. Also consist of important areas of user interfaces such as In Out Process and Summary Reports. During this chapter, has been briefly describe about Software engineering aspects which includes Waterfall Model, Top Down Design Approach used in implementation. At last summary of the implementation.

Chapter 5 – Evaluation and Testing: This chapter consists of two main sections. They are Evaluation and Testing Process.

Evaluation section covers Sampling of Subject, Evaluation Scenarios and Tools such as Questionaries' Survey and Interviews.

Testing section covers the testing methodology, test plan and test cases. At last summary of evaluation and testing.

Chapter 6 – Conclusion and Future Works: It consists of summary of the work carried out, its findings, limitation of the current work, lesson learnt, achievement of objectives, areas of improvements and how the work could be extended.

## **Chapter 2 BACKGROUND**

This chapter consists of the main background information, review of similar system available related to Gate Pass Management, Hardware and software technologies using to implement the new system and the alternative technologies available.

### **2.1 Background Information**

Industries faced difficulties when handling materials and human resources which moves in and out through security points as there were higher number of movements per day. As a solution for this organization started to implement gate pass management process. Even though the process is called as an automotive process still requires a considerable involvement of human resource. This will reduce the efficiency and the effectiveness of the process as it wastes certain amount of man hours. Therefore a requirement for a completed automated system arises.

The main benefit of newly implementing gate pass management system is it act as a complete automotive system, once the system is it initiate by a personnel. This will reduce the number of man hours on the resources wasted on maintenance on basic gate pass management system. The most unique feature in the newly implementing gate pass management system is the ability to manage all transaction of materials, employees and visitors in a one framework.

Generation of frequent status reports, providing different authorization levels for all the transaction, availability of Employee Self Services (ESS) facility and traceability between each and every records will make system more expertise on gate pass management.

The main different between the basic gate pass management system and the newly implementing system is the extended scope which address security desk and improve the processes of security desk by introducing automated processes.

### **2.2 Review of Similar Systems**

During the revision of open source and proprietary available gate pass management system, it was identified that the absence of integrated software which covers materials, employees and visitors gate passes process.

Following were few similar trending software which were found during the revision process.

## 2.2.1 Foreign Studies

### WINHMS GATE PASS [1]

“The WINHMS Gate Pass module monitors and maintains gate registers for materials, visitors and company vehicles. Returnable and non-returnable pass types are supported for both inward and outward movements. In the case of returnable gate passes, the original gate pass transaction is always referenced so that the pending returnable details can be obtained from the system at any point of time.

Materials dispatched may be from user departments or material stores. When materials are routed through a store, store issue documentation is referenced during gate pass creation. The system automatically generates unique gate pass sequence numbers individually for inward and outward gate passes. Movement of vendors, customers, sales personnel and visitors are maintained and tracked at all times. Within the visitor input form the visitor name, address, company details, purpose of visit, designated contact etc. are captured.

Reports are provided for registers such as material inward register, pending gate pass register, vehicle movement register and vehicle availability status.”

This system covers the gate pass process of materials, visitors and company vehicles. The main difference between this system and the newly implementing system is that it covers the company vehicle gate pass process also. But absence of gate pass process for employee transactions is the main disadvantage of this system. Even though above mentioned system covers the transaction of company vehicles, haven’t considered this as a requirement newly implementing Gate Pass system.

### TOUCHPOINT MATERIAL GATE PASS MANAGEMENT SOFTWARE [2]

“Materials management is very essential in any industry, whether hospitality or manufacturing units. It is because materials play an increasingly critical role in the profitability of your business operation. TouchPoint material gate pass management software is perfectly positioned to provide you with a tailored solution, which adheres to ISO 27001 norms to satisfy your material tracking needs now and in the future.

TouchPoint’s material gate pass software is programmed to keep track of materials moving in and out of the facility. By automating the entire process of tracking the movement, companies can reduce loss of material and also prevent unauthorized access to materials. Your material ordering quantities can now be monitored as this gate pass software enables the tracking of quantities of materials on hand and also assigns an employee responsibility to every asset.”

This system covers only the transaction of the materials. The additional feature that available is the ability to monitor the quantity of ordered material, as it tracks of quantities of materials on hand and also assigns an employee responsible for each and every asset. This feature is not covered by the newly implementing Gate Pass system as it only tracks the transaction of materials.

### TOUCHPOINT VISITOR MANAGEMENT SYSTEM [3]

“TouchPoint Visitor Management is futuristic web based software to manage visitors at office. It does away with the obsolete pen and paper system of gathering visitor information and brings in a professional approach to visitor management. No more scribbling in the visitor book, issuing used badges, calling the employee to inform of the visitor's arrival, unattended visitors in crowded reception areas and most importantly, worrying about security issues. Manual systems are boring and time consuming. This visitor management software records all-relevant information about the visitor, which is automatically captured in a database. Then ID scanning is done, and a professional quality visitor badge/pass is printed. “

This web based system covers only the transaction of the visitors. The additional feature that available is ability to print a professional visitor badge/pass by scanning visitor’s ID. Since the scanning of different types of visitor’s ID is time considerable process at the gate level, the newly implementing system will only print the generated gate pass at the security desk.

### TOPNOTCH MATERIAL GATE PASS [4]

“A gate pass as the name suggests is the activity of the security personnel and is the focal point of an organization’s security set up. The gate pass is an essential document to monitor the Material movement in and out of an organization. Topnotch provides a unique module, which assists you in professionalizing the manner in which you control the Material flow of which the gate pass is an integral part.

Materials play a vital role in the profitability of your business organization. Topnotch is your answer to increasing cost effectiveness by satisfying your material tracking needs. And increase the efficiency, productivity, and customer satisfaction of your businesses.

- Record entry, exit of Visitors, Contract workers, Vehicles and Materials
- Authorize all entries & Allow, Forward or Reject a request
- Pass formats: Use from the database or design your own
- Detailed onscreen and back-office MIS & One day and long-duration, multi-entry passes
- Custom data entry forms (fields and labels) Informative control centers – current visitors, visit history, waiting for authorization, online users
- Data Import: Users, departments, contract workers
- Intuitive and simple user interface for security users
- User and Role definition”

This system covers the gates pass process of materials, visitors and vehicles. The main difference between this system and the newly implementing system is that it covers the vehicle gate pass process also. But absence of gate pass process for employee transactions is the main disadvantage of this system. Additional features available are multi-entry passes. Even though above mentioned system covers the transaction of company vehicles, haven't considered this as a requirement in newly implementing Gate Pass system. Multi – entry passes were disallowed in the newly implementing system is to ease track the data entries.

## VISITOR ACCESS MANAGEMENT SYSTEM [5]

“In many environments, visitors are still asked to enter their information in a paper log book. While this method is perceived as quick and easy, it provides little security and leaves visitor information available for anyone to see. To address these issues, Topnotch Visitor access Management solutions allow organizations to automate the entire process of registering a visitor, printing a badge and capturing detailed information in seconds by simply Finger print and Barcode.

The solution is flexible, customizable and feature-rich to meet the needs of small and enterprise organizations with diverse visitor management processes and policy requirements

- Enhances the professionalism of an organization by streamlining the visitor check-in process and providing high quality badges for all visitors.
- Improves security by enabling organizations to identify exactly who is in their facilities and the reason why. Allows users to create watch lists and screen against unwanted visitors.
- Captures detailed visitor information more accurately and distinguishes between different categories of visitors. Performs analysis/reporting on visitor data across multiple locations.
- Work permits for Regular Visitors, Temporary employee, vendors etc.
- Affordable, easy to use and simple to install.”

This system covers only the transaction of the visitors. The additional features are, ability to allow work permits for regular visitors, temporary employee, vendors etc., printing a badge and capturing detailed information by simply Finger print and Barcode. The newly implementing system will only allowed registering internal users due to confidentiality.

## **2.2.2 Local Studies**

BAR TECH SOLUTION (PVT) LTD, SRI LANAKA – GATE PASS MONITORING SYSTEM [6]

“GPMS is a client- server Enterprise Security Management application that manages activities at the entry points of an organization. It is a comprehensive security management application for large organizations having multiple entry points where visitors are required to be authorized by the staff before gaining entry into the premises. GPMS Gate pass is highly effective in managing products/ documents / visitors at the entry points. It has helped us in facilitating more documents/ visitors with the same staff and has many advantages over manual system like getting immediate approval before allowing a visitor inside. Date entry is fast and simple because it automatically picks up information about document/ visitors from the database on subsequent. Outgoing entry is also quick and simple with the use of barcode reader.”

This system covers the gate pass process of products, documents and visitors. The additional feature that available is tracking outgoing entries with a use of barcode reader. The newly implementing system uses a simplified method which uses asset number to track outgoing entries.

## **2.3 Alternative Technology**

The newly implementing system is made to operate on the most popular Microsoft Windows Operating System platform (Windows 7, Windows 8, and Windows 10) and the server software is Microsoft Windows 2003/2008/2012 Server.

The application will be designed by using Microsoft Visio 2013 and will develop by using Microsoft .NET framework version 4.5. Microsoft Visual Studio 2013 will be used as Integrated Development Environment (IDE) and Crystal Report 8.5 has been used for report development. For Database support, Microsoft SQL Server 2012 Database Engine will be used.

To access the additional features, client software applications such as Adobe Acrobat Reader version 7 or higher (is required to open documents exported from the system in PDF format) and Microsoft Office 2007 compatibility pack (is required to open documents exported from the system) are recommended.

Basic knowledge on Microsoft Windows operational procedures which are expected from the staff should attach to the training program. Need to identify users by conducting training need analysis for all the departments. Training will be conducted on hierarchical basis as and when the implementation of the system. There will also be a comprehensive training for end uses on the software system. Special training programs for security desk.

Hardware Requirement will be minimum 2 GB of RAM (recommended: 4 GB of RAM), processor Dual Core and above for computers and the bandwidth needed will be 256 Kbps and above. Other hardware interfaces will be Dot Matrix Printers (Epson LX 300+ or Epson LQ 300+).

Alternative technologies can be used to address the hardware and software requirements, as a part of the development process of the system.

Today open source operating systems such as Ubuntu, OpenSolaris, etc. are available. The most widely used open source data base is Ubuntu. It is a Linux based operating system and is distributed free along with the source code. Almost all software support for this. As example LibreOffice which is free and open source office suite support available on Ubuntu.

For the development of the system can use Java platform and to develop the database can use MySQL, where both are open source. Java is a set of computer software and specification, which provides a system for developing application software and deploying it in a cross-platform computing environment. MySQL is relational database management system based on Structured Query Language (SQL).

Applications that developed with the use of web based technology have done substantial impact to the business. Client side and the server side are the main two categories of coding, scripting and programming for creating web applications. Common Client Side Scripting technologies are HTML (HyperText Markup Language), CSS (Cascading Style Sheets), JavaScript, Ajax (Asynchronous JavaScript and XML), jQuery (JavaScript Framework Library - commonly used in Ajax development), etc. Common Server Side Scripting technologies are PHP (very common Server Side Scripting language - Linux / Unix based Open Source - free redistribution, usually combines with MySQL database), ASP (Microsoft Web Server (IIS) Scripting language), ASP.NET (Microsoft's Web Application Framework - successor of ASP), etc.

For further improvements of the application Fingerprint scanners, Finger Punching Machines, Web-Cams, Document Scanners, Barcode Scanners and Barcode-Printers can be used. To track the movement of personnel and material these equipment can be used. But they were not considered as an option as we need to maintain the simplicity of the application. Also the same was not addressed in the scope of user requirement.

Fingerprint scanners are security systems of biometrics and used in computers. The basic function of these scanners to get an image of persons' fingerprint and find a match for the same in the database. Finger punching attendance machine is also a biometrics time clock which has an electronic device called sensor and is used to capture digital reflection of fingerprint.

A Web-Cam is a video camera that feeds or streams its image in real time through a computer. The image or the video stream may be saved, viewed or sent on to another networks via internet or via emailed as an attachment, when captured by the computer. Document Scanner is a device which converts a document or a text from into a digital format. The current trend in document scanner is considered as a big step toward effective document management.

A barcode is an optical, machine-readable, representation of data which describes some properties of object that carries the barcode. A barcode scanner is an electronic device that can read and export data of printed barcode to a computer. Like a flatbed scanner, it consists of a light source, a lens and a light sensor translating optical impulses into electrical ones. A barcode printer is a computer peripheral for printing barcode labels or tags that can be attached to, or printed directly on, physical objects.

## **2.4 Summary**

The system will be implementing by using latest simplest technology. The system will be designed by using Microsoft Visio 2013. For the database support, Microsoft SQL Server 2012 Database Engine and for the system development, Microsoft .NET framework version 4.5 will be used. Report development will be done by using Crystal Report 8.5.



## Chapter 3 ANALYSIS AND DESIGN

This chapter consists of two main sections. They are Analysis and Design. Analysis section covers functional and non-functional requirement analysis. And based on the analysis, use case diagrams were drawn and using the diagrams, use case narratives were created.

Design section covers the design of the solution by considering the alternative solutions and the methodology using along with the software development life cycle and design aspects. Main design aspects are software architecture, database modeling and design and user interface design. Apart from that process flow diagrams and Unified Modeling Language (UML) diagrams such as class diagrams were added.

### 3.1 Analysis

#### 3.1.1 Requirement Analysis

The output from the requirements capturing process must be analyzed to obtain a complete list of functional and non-functional requirements that can be used to design and implement the system. This analysis forms a fundamental base of the system design stage by building on the requirements captured and creating a comprehensive appreciation of what must be achieved.

##### 3.1.1.1 Functional Requirements

Based on the Use Case diagrams, a list of requirements is produced at a lower level of abstraction to the design and implementation which incorporate to the appropriate functionality. This addresses the requirements of functions which affects the smooth functionality of system.

The system focuses on the security of the organization through gate pass management by considering the material, employees and visitors movement.

Material Gate Pass Management Functional Requirements can be categorized into following categories.

- Creation and Confirmation of Material Gate Pass Request
  - Make a request for the Material Gate Pass Request (MGPR).  
If the material is in asset category then it will be verified with existing Fixed Asset Registry (FAR).
  - Confirm the MGPR.  
Also, it is allowed to cancel or resubmit if required.  
If Redo, then can amends the previous MGPR and can resubmit for confirmation.

- Creation and Approval of Material Gate Pass
  - Create the Material Gate Pass (MGP) for a confirmed MGPR.  
For special incidents, is allowed to create MGP without a MGPR.
  - Approve the created MGP.  
Also, it is allowed to cancel the gate pass or redo the creation.  
If an approved MGP needs to be cancelled, during the dispatch process, system allowed authorized personnel to cancel the MGP.
- Material Gate Pass Print , Dispatch and Return Acceptance
  - Material is verified and dispatched after the MGP is printed and issued.  
Re-print of MGP is allowed for special incidents.
  - Out can be marked after completing the dispatch of the material.
  - If the MGP is a returnable one, then IN can be marked when the material return.

Employee Gate Pass Management Functional Requirements can be categorized into following categories.

- Creation and Approval of Employee Gate Pass Request
  - Make a request for the Employee Gate Pass Request (EGPR).  
Requesting employee will be validating with the existing Meal System.  
For the Employees who don't have the ESS facility, HR division can generate EGPR on behalf of employee.
  - Approve the EGPR.  
Apart from confirmation, it is allowed to cancel if required.
- Creation of Employee Gate Pass
  - Create Employee Gate Pass (EGP) for an approved EGPR.
- Employee Gate Pass Print , Departure and Return Acceptance
  - Departure of employee is marked and the EGP will be printed and issued.  
Re-print of EGP is allowed for special incidents.
  - If the EGP is a returnable one, then IN can be marked when the employee returned to the premises.

Visitors Gate Pass Management Functional Requirements can be categorized into following categories.

- Creation and Approve of Visitors Gate Pass Request
  - Make a request for visitor(s) who come with a prior notification through a Visitors Gate Pass Request (VGPR).
  - Approve the VGPR and it will convert to a VGP (Visitor Gate Pass). Apart from confirmation, it is allowed to redo or cancel if required. If Redo, then can amend the VGPR and can resubmit for approval.
- Visitors Gate Pass Print, Arrival and Return Acceptances
  - At the visitors' arrival, issue a print of approved VGP after update the arrival. Re-print of VGP is allowed for special incidents.
  - At the exit of visitor(s), updates the exit accordingly.
- Maintenance of Visitor's Room Log (VRL)
  - Visitors, who come without a prior notification, meet the relevant employee at the Visitors' Room. Details will record in the Visitor's Room Log (VRL) form.

### **3.1.1.2 Non- Functional Requirements**

The non-functional requirements for the system include a set of criteria which are not directly affecting the functionality of system, but mandatory for correct flow of the system. These concerns were coming into action through the interviews conducted with users. The user interface will be the best place to increase the effectiveness and integrity of the system for users. The security aspects must be kept simple in such a way once user logs in to system, he must be able to easily manage all system functions. Though this requirement is not explicitly dealt with in terms of functional requirements, the non-functional requirements should address this requirement. They are no less important than the functional requirements.

Non-functional requirements can be categorized into following categories and newly implementing system should be able to comply with the mentioned requirements.

- Performance: Gate pass management system should be able to perform all functions smoothly whole time, without any failures.
- Security: Newly implementing system should have proper user role configuration mechanism, which will define the scope of each user within the system to make sure each and every process is well secured
- Reliability: System should be able to perform user required functions without any deviations, which will increase the effectiveness of gate pass management process

- **Maintainability:** System should be able to function smoothly with less maintenance. If there is any requirement for a maintenance, it should be able to perform within a short time period.
- **Transferability:** System should be able to integrate with currently available systems. Also, it should be able to adopt to technological updates
- **Usability:** System should have user friendly functions which helps user to learn and adopt to the system easily.
- **Metrics and measurements:** System should possess improved and specific analytical methods to analyze the information of any function and should be able to generate user required output within a short time frame.

### **3.1.2 High Level Diagrams of Analysis**

The relevant high level UML diagram of newly implementing system for is mentioned below.

#### **3.1.2.1 Use Case Diagrams**

One of the main uses of the interviews that were held at Antler Group is to create Use Case diagrams that provide a high level model of what should be achieved in the system. A Use Case diagram provides not only a simple way of communicating ideas with users but also, when complete, produces a high level understanding of what must be achieved in the system.

In the use case diagram section, gate pass management overall picture (Figure 3.1) and gate pass management for material (Figure 3.2), employees (Figure 3.3), visitors (Figure 3.4) and user roll configuration (Figure 3.5) were addressed separately.

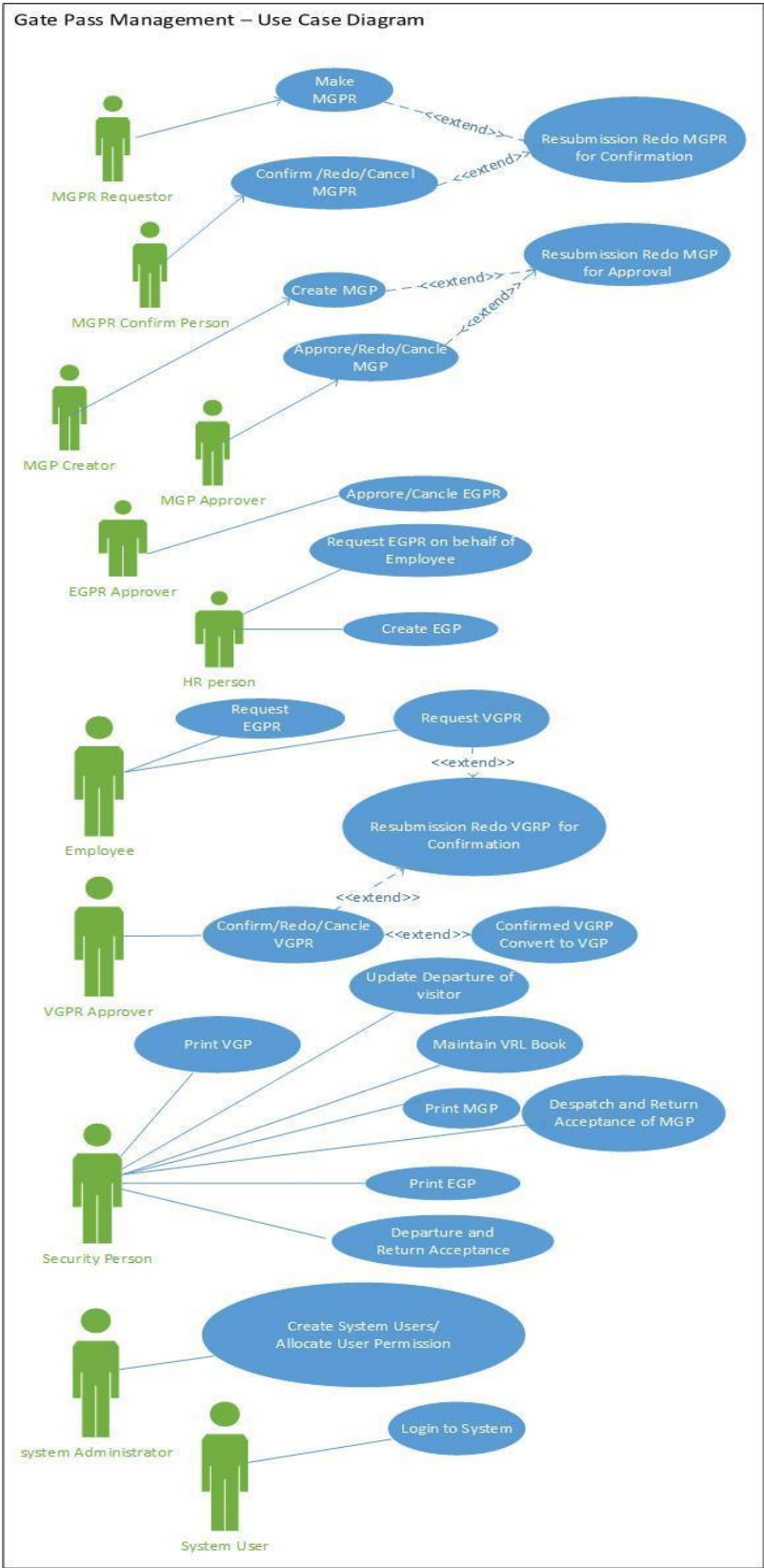


Figure 3.1 Use Case Diagram for Gate Pass Management System

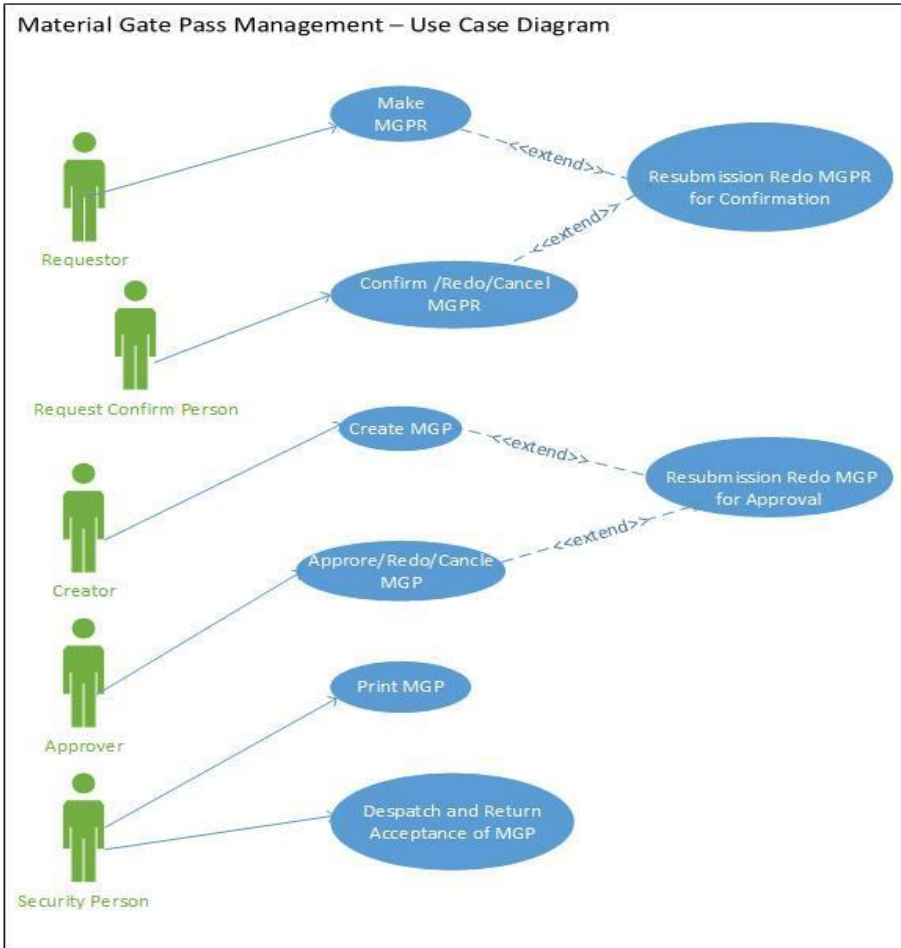


Figure 3.2 Use Case Diagram for Material Gate Pass Management

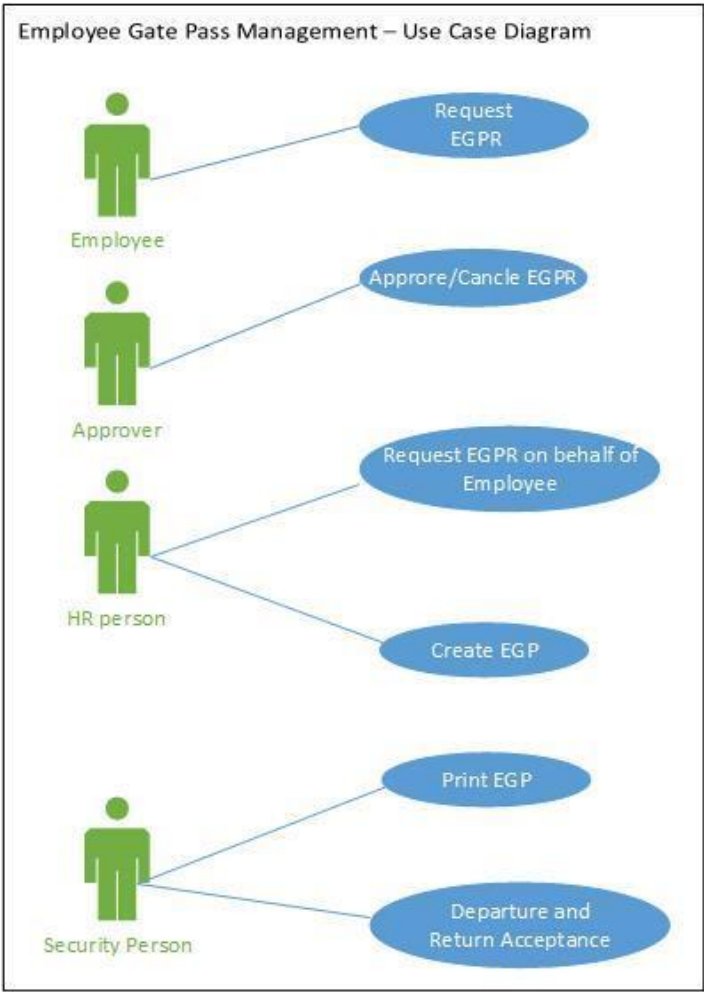


Figure 3.3 Use Case Diagram for Employee Gate Pass Management

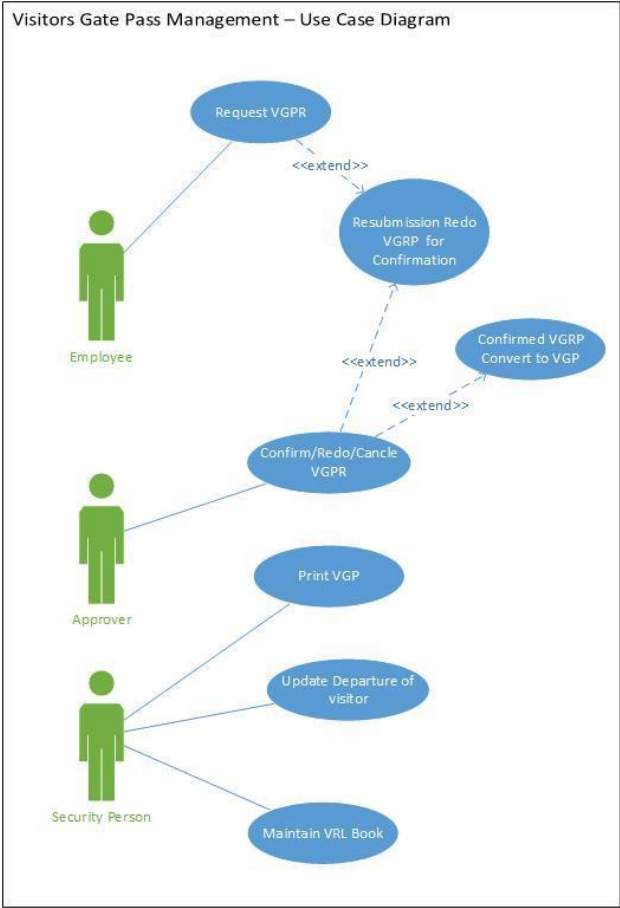


Figure 3.4 Use Case Diagram for Visitors Gate Pass Management

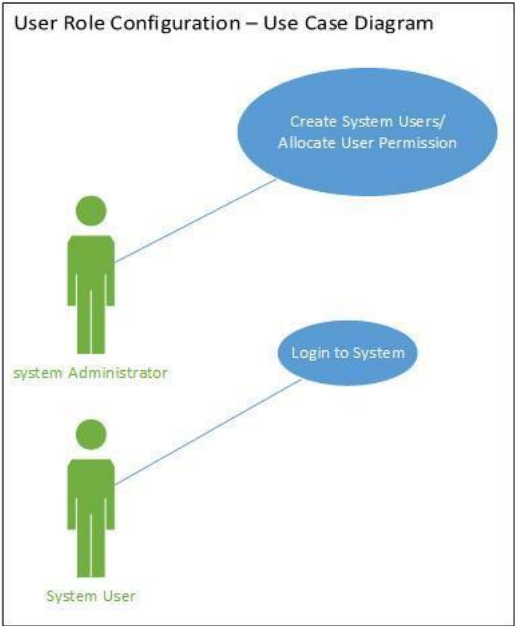


Figure 3.5 Use Case Diagram for User Role Configuration



### 3.1.2.2 Use Case Narratives

Based on the use case diagram use case narratives were build. Use case narratives explained the use case by describing the interaction between actors to achieve a goal with an observable value.

Use case diagrams were separated as gate pass management for material, gate pass management for employees, gate pass management for visitors and user roll configuration. Use case narratives and sequence diagrams of relevant diagrams also mentioned.

Material Gate Pass Management consists of Use Case Narratives for Make Material Gate Pass Request (Refer Appendix E :Table E-1) Confirm or Redo or Cancel Material Gate Pass Request (MGPR) (Refer Appendix E :Table E-2) Create Material Gate Pass (MGP) (Refer Appendix E :Table E-3), Approve or Redo or Cancel Material Gate Pass (MGP) (Refer Appendix E :Table E-4), Print Material Gate Pass (MGP) ,Dispatch (Refer Appendix E :Table E-5) and Return Acceptance of Material Gate Pass (MGP) (Refer Appendix E :Table E-6). The Sequence Diagram of Material Gate Pass Management (Figure 3.14) and Use Case Diagram of Material Gate Pass Management (Figure 3.2) also describe the same.

Employee Gate Pass Management consists of Use Case Narratives for Make Employee Gate Pass Request (EGPR) (Refer Appendix E :Table E-7), Make Employee Gate Pass Request (EGPR) on behalf of Employee (Refer Appendix E :Table E-8), Approve or Cancel Employee Gate Pass Request (EGPR) (Refer Appendix E :Table E-9) , Create Employee Gate Pass (EGP) (Refer Appendix E :Table E-10) , Print Employee Gate Pass (EGP) (Refer Appendix E :Table E-11) and Departure and Return Acceptance of Employee (Refer Appendix E :Table E-12). The Sequence Diagram of Employee Gate Pass Management (Figure 3.15) and Use Case Diagram of Employee Gate Pass Management (Figure 3.3) also describe the same.

Visitors Gate Pass Management consists of Use Case Narratives for Make Visitors Gate Pass Request (VGPR) (Refer Appendix E :Table E-13) , Confirm or Redo or Cancel Visitors Gate Pass Request (VGPR) (Refer Appendix E :Table E-14) , Print Visitors Gate Pass (VGP) (Refer Appendix E :Table E-15) , Departure of Visitor (Refer Appendix E :Table E-16) and Maintained Visitors' Room Log (VRL) Form (Refer Appendix E :Table E-17) . The Sequence Diagram of Visitors Gate Pass Management (Figure 3.16) and Use Case Diagram of Visitors Gate Pass Management (Figure 3.4) also describe the same.

User Role Configuration consists of Use Case Narratives for Create System User and Permission Allocation (Refer Appendix E: Table E-18) and Login (Refer Appendix E: Table E-19) . The Use Case Diagram of User Role Configuration (Figure 3.5) also describe the same.

## 3.2 Design

### 3.2.1 Methodological Approach

As a result of the analysis from the previous stage will aid the design of the system before any implementation is to take place.

This phase looks at how the software will be built and how the system will operate with particular emphasis on hardware, software, network infrastructure and user interface. The main purpose of this stage is to create a blueprint that will satisfy all documented requirements, then to identify all inputs, processes and outputs needed and also to help avoid misunderstandings by involving the stakeholders such as managers and users.

There are two types of design to be considered. First, the logical design which includes the design of forms and reports, the design of the interface and the database design. Then the physical design which is concerned with design the physical database, the program, processes and the distributed systems. The design chapter will include a project scope, a system design, component and process design, data design, user displays and output reports.

To finalize the methodology that going to use for the implementation, here with have performed a comparison between similar systems and newly implementing system. Main functions such as technology used, hardware, etc. were considered during the comparison and outcome is mentioned below;

WINHMS GATE PASS [1]

This system covers the gates pass process of materials, visitors and company vehicles. The main difference between this system and the newly implementing system is that though it covers the company vehicle gate pass process, but don't track employee transactions. Newly implementing system consists of simple process flow through the system than the mentioned solution

TOUCHPOINT MATERIAL GATE PASS MANAGEMENT SOFTWARE [2]

This system covers only the transaction of the materials. The additional feature that available is the ability to monitor the quantity of ordered material, as it tracks of quantities of materials on hand and also assigns an employee responsible for each and every asset. Newly implementing system only tracks the transaction of materials, but additionally it tracks the exact location of material, in and out time and the return time if material is returnable.

### TOUCHPOINT VISITOR MANAGEMENT SYSTEM [3]

This web based system covers only the transaction of the visitors. The additional feature that available is ability to print a professional visitor badge/pass by scanning visitor's ID. Since the scanning of different types of visitor's ID is time considerable process at the gate level, the newly implementing system will only print the generated gate pass at the security desk.

### TOPNOTCH MATERIAL GATE PASS [4]

This system covers the gates pass process of materials, visitors and vehicles. The main difference between this system and the newly implementing system is that it covers the vehicle gate pass process also. Additional features available are multi-entry passes which give privilege to user to visit the premises several time within a given time period. Even though above mentioned system covers the transaction of company vehicles, haven't considered this as a requirement in newly implementing Gate Pass system. Multi – entry passes were disallowed in the newly implementing system to ease tracking records of visitors.

### VISITOR ACCESS MANAGEMENT SYSTEM [5]

This system covers only the transaction of the visitors. The additional features are, ability to allow work permits for regular visitors, temporary employee, vendors etc...., printing a badge and capturing information by simply Fingerprint and Barcode. The newly implementing system will only allowed to register internal users which helps to increase the confidentiality.

### BAR TECH SOLUTION (PVT) LTD, SRI LANAKA – GATE PASS MONITORING SYSTEM [6]

This system covers the gate pass process of products, documents and visitors. The additional feature that available is tracking outgoing entries by using a barcode reader. The newly implementing system uses simplified methods which use asset number to track outgoing entries. The new system didn't consider document transaction as a major category as the organization already has document management systems to track the same.

If consider all alternative solutions, the newly implementing system is an integrated solution to track all transactions of material, employee and visitors. Also all mentioned solutions didn't address transactions of employee in a way that unable management to maintain confidentiality.

The methodology used for the developing of system is “Waterfall Model”.

This approach suggests the mechanism where making just one attempt in a project and getting it correct at the first time. When this mechanism working well, it allows project completion times to be forecast with more confidence than with some more iterative approaches, allowing projects to be controlled effectively.

The approach is generally suited for the project of existing customer. The process has the advantage of being able to determine exactly which stage the project is up to. For this reason, the overall aspect of the Waterfall cycle will be adopted for this project.

Along with the waterfall model, software development life cycle (SDLC) concepts used as follows.

- Problem Definition

Currently Antler Group operates and monitors the gate pass process manually. So, it will be great to implement an automated process for Gate Pass Management that aims to replace the manual process which currently used by the customer. Because the manual system resulting a lot of inefficiency and unaccountability due to cumbersome and inaccurate record keeping with inconsistent maintenance of security about the movement of company material, employees and visitors in and out of the organization.

- System Analysis

The main requirement of the newly implementing system is to automate the process that used to manage Gate Pass for material, employees and visitors more accurately, with the aim of minimizing human intervention by replacing the current manual process.

- System Design

Newly implementing system considered material, employees and visitors, and this automated system follows a unique procedure to help to maximize the security of above resources.

Material Gate Pass Management System is designed to track material which are moving in or out of the organization.

Employee Gate Pass Management System is designed to track employees who are moving in and out of the organization during working hours.

Visitor Gate Pass Management System has always been the best security feature that has been designed to track visitors who visit to the organization premises for the official purpose.

- System Implementation

The new system has been developed by using design phase details. The new components and programs of implementing system obtained and installed. At this stage users of the system trained on its use, and all aspects of performance tested.

- System Testing

The system starts to use in the organization. As planned replace the new system by gradually replacing current manual system.

The remaining phase in the SDLC is planned as follows.

- Maintenance

Once the new system is up and running for a while, it should be closely evaluated. Users of the system should keep up-to-date concerning the latest modifications and procedures.

### 3.2.2 Software Architecture

Software Architecture Design is a crucial step for software and application developers to describe the basic software structure by separating functional areas into layers. It depicts how a typical software system might interact with its users, external systems, data sources, and services. The architecture of implementing system is mentioned below (Figure 3.6).

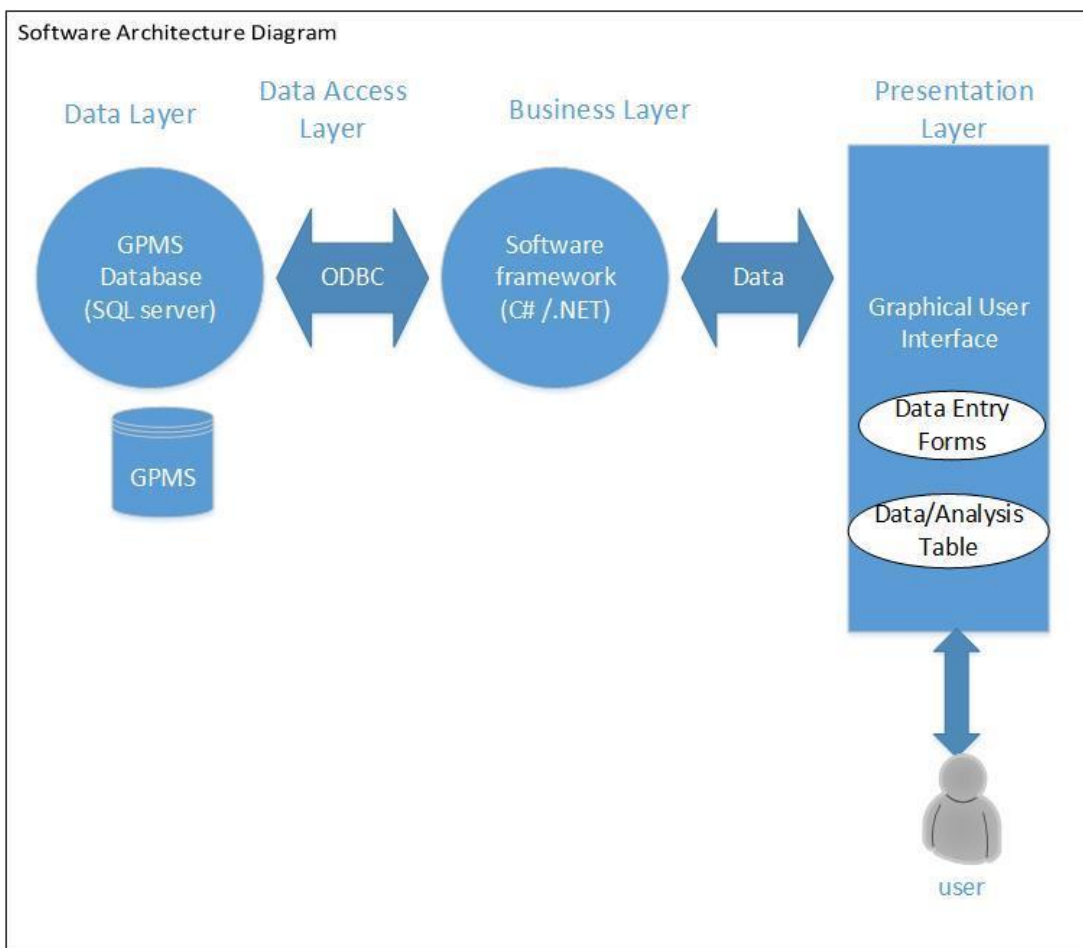


Figure 3.6 Software Architecture Diagram

### 3.2.3 Process Flow Design

A process flow diagram is used to indicate the general flow of main processes with their relevant sub processes. Here it is divided into three main processes. They are Material Gate Pass Management Process, Employee Gate Pass Management Process and visitors Gate Pass Management Process. The completed process flow diagrams for material gate pass management (Figure 3.7), employee's gate pass management (Figure 3.8) and visitor's gate pass management (Figure 3.9) are mentioned below.

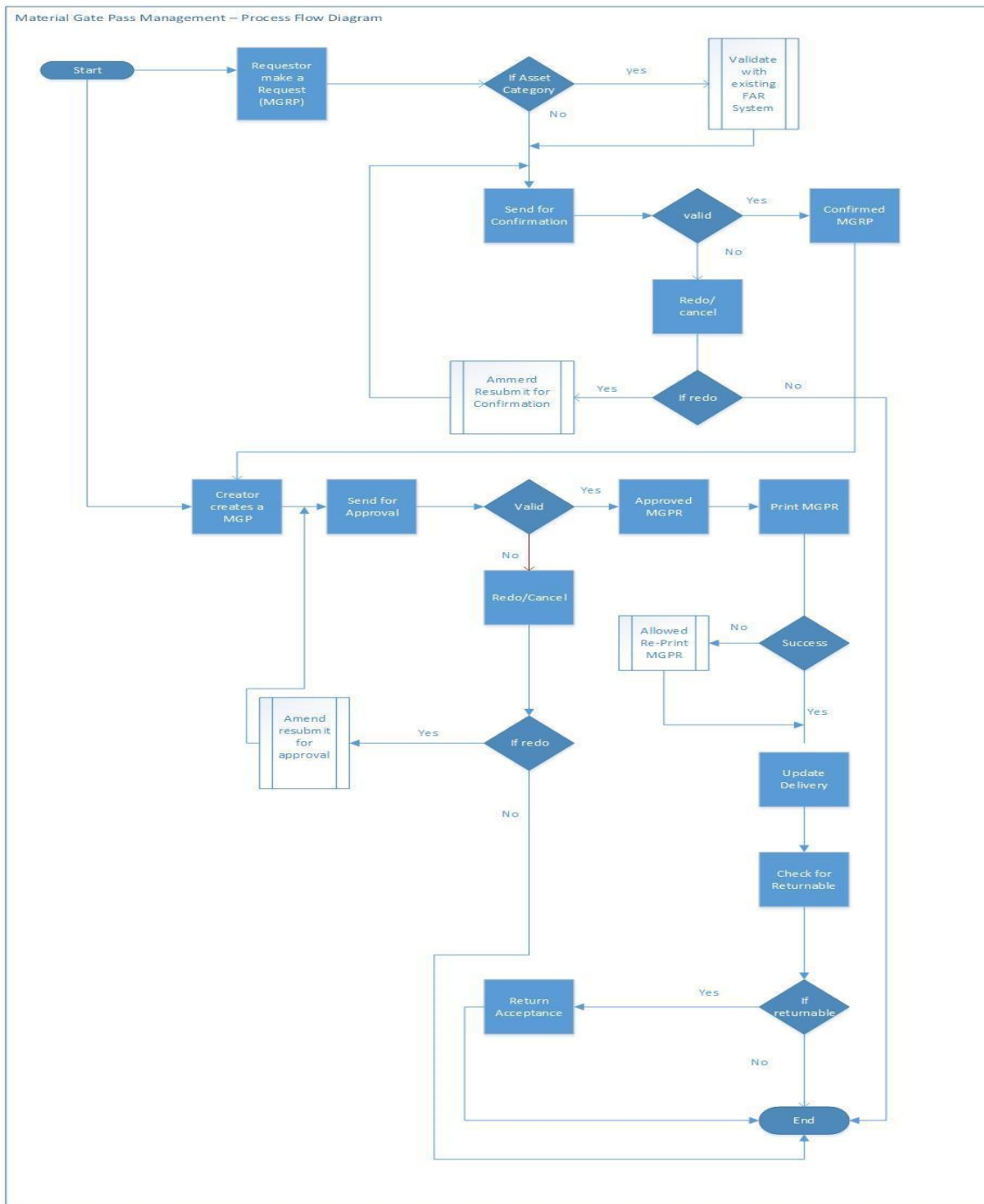


Figure 3.7 Process Flow Diagram for Material Gate Pass Management

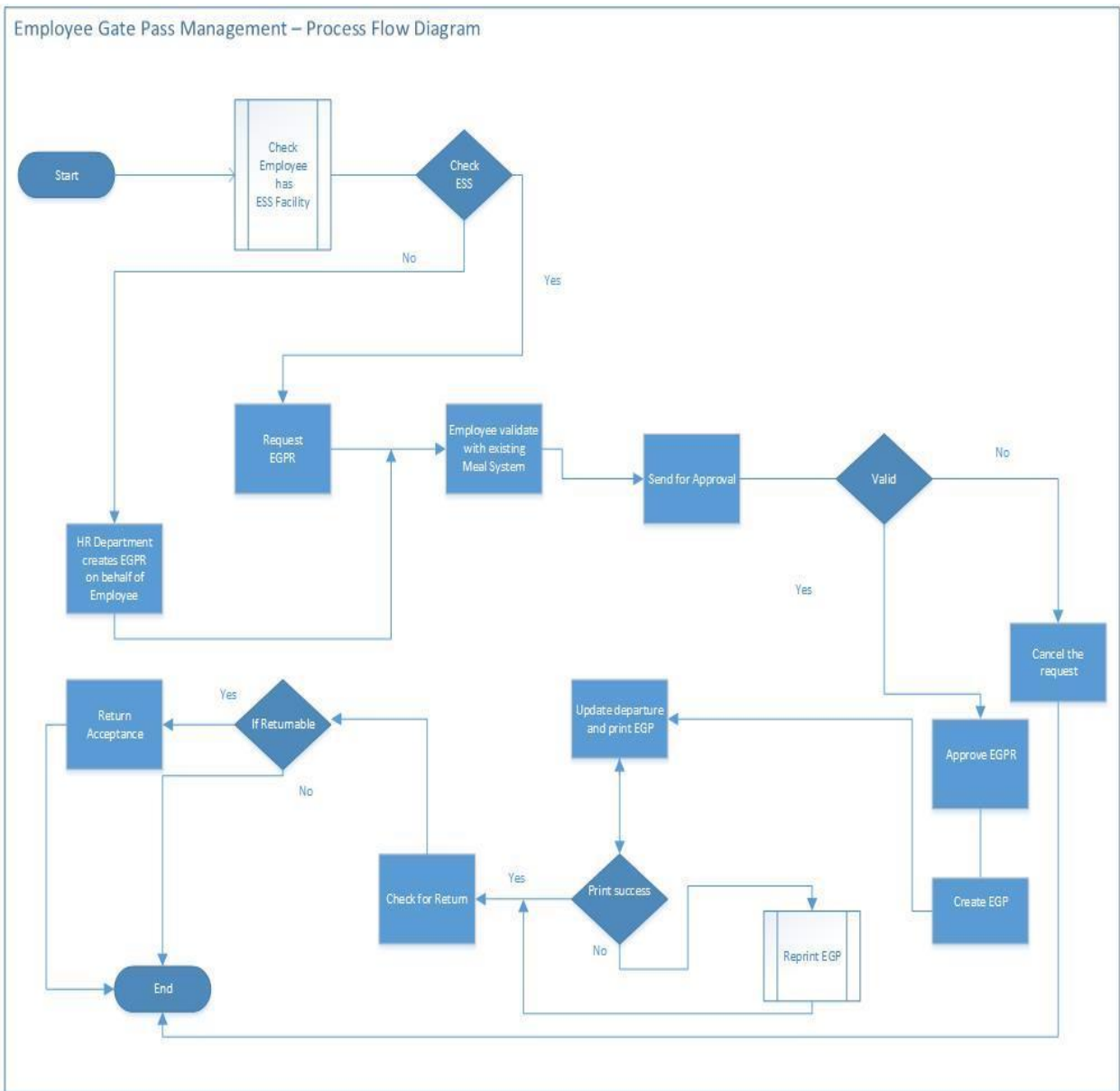


Figure 3.8 Process Flow Diagram for Employee Gate Pass Management

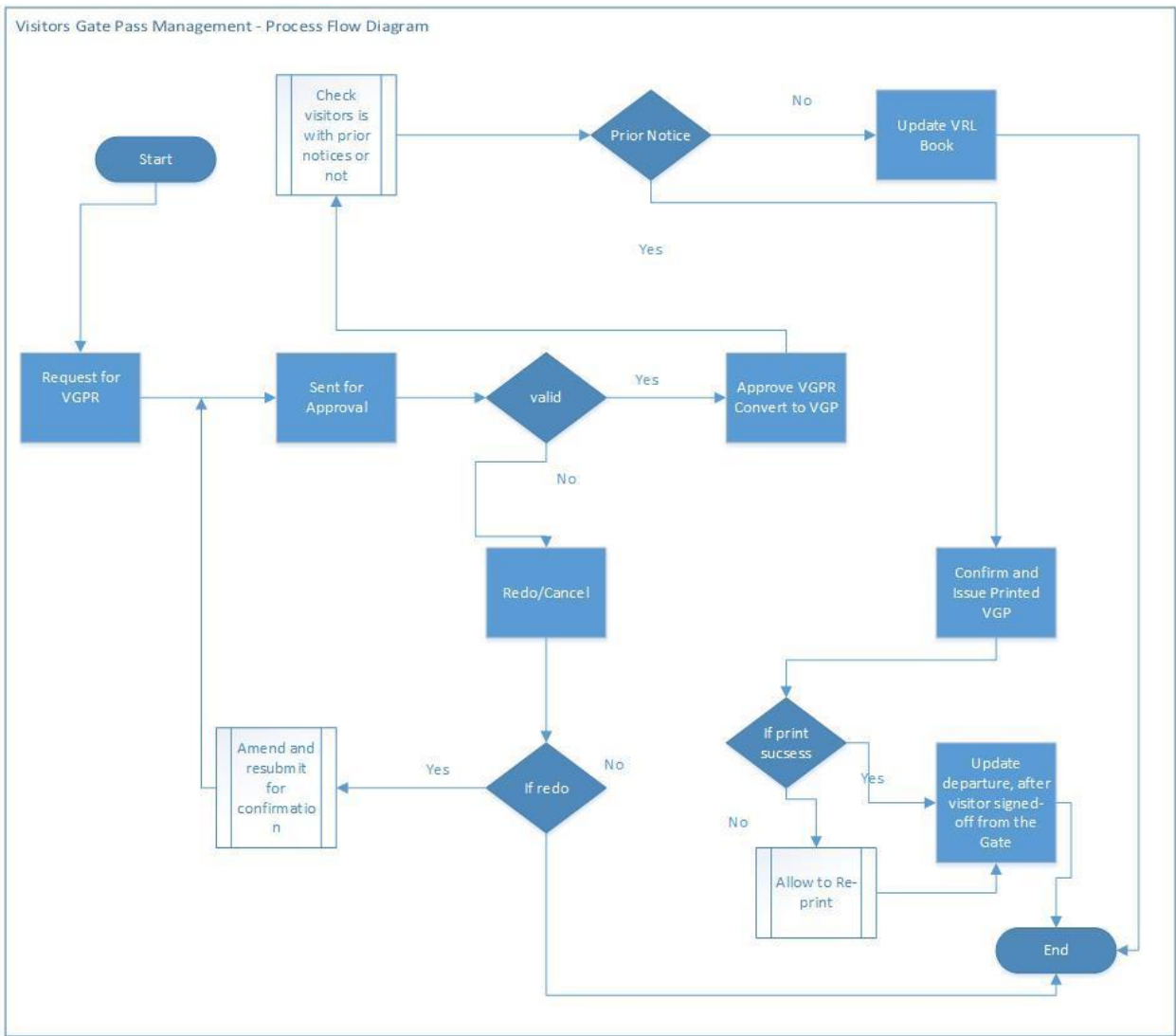


Figure 3.9 Process Flow Diagram for Visitors Gate Pass Management



### **3.2.4 Database Design**

A sound database design will be the key to success of proper system. To ensure the same, at this stage, all the relevant information is incorporated into the system, the rest of the system design will fall easily around the database. Database design is generally involves the modeling of different Entities, Relationships and Attributes. The design of the database is broken down into three different stages:

- Conceptual database design
- Logical database design
- Physical database design

The conceptual design stage is used to build an understanding of each of the entities, relationships and attributes that have been identified. This is then translated to form a logical design by creating valid relations. The physical design must then be created and will be dependent on the Database Management System in use.

#### **3.2.4.1 Conceptual Database Design**

The Entity-Relationship (ER) diagram allows the database designer to get a clear picture of how different entities relate to one-another. Requirement analysis is the most important step of the database life cycle and is typically the most intensive.

The below E-R diagram (Figure 3.10) and the Extended E-R diagram (Refer Appendix F : Figure F.1) illustrates the entire conceptual database design.

Gate Pass Management System - Entity Relationship Diagram

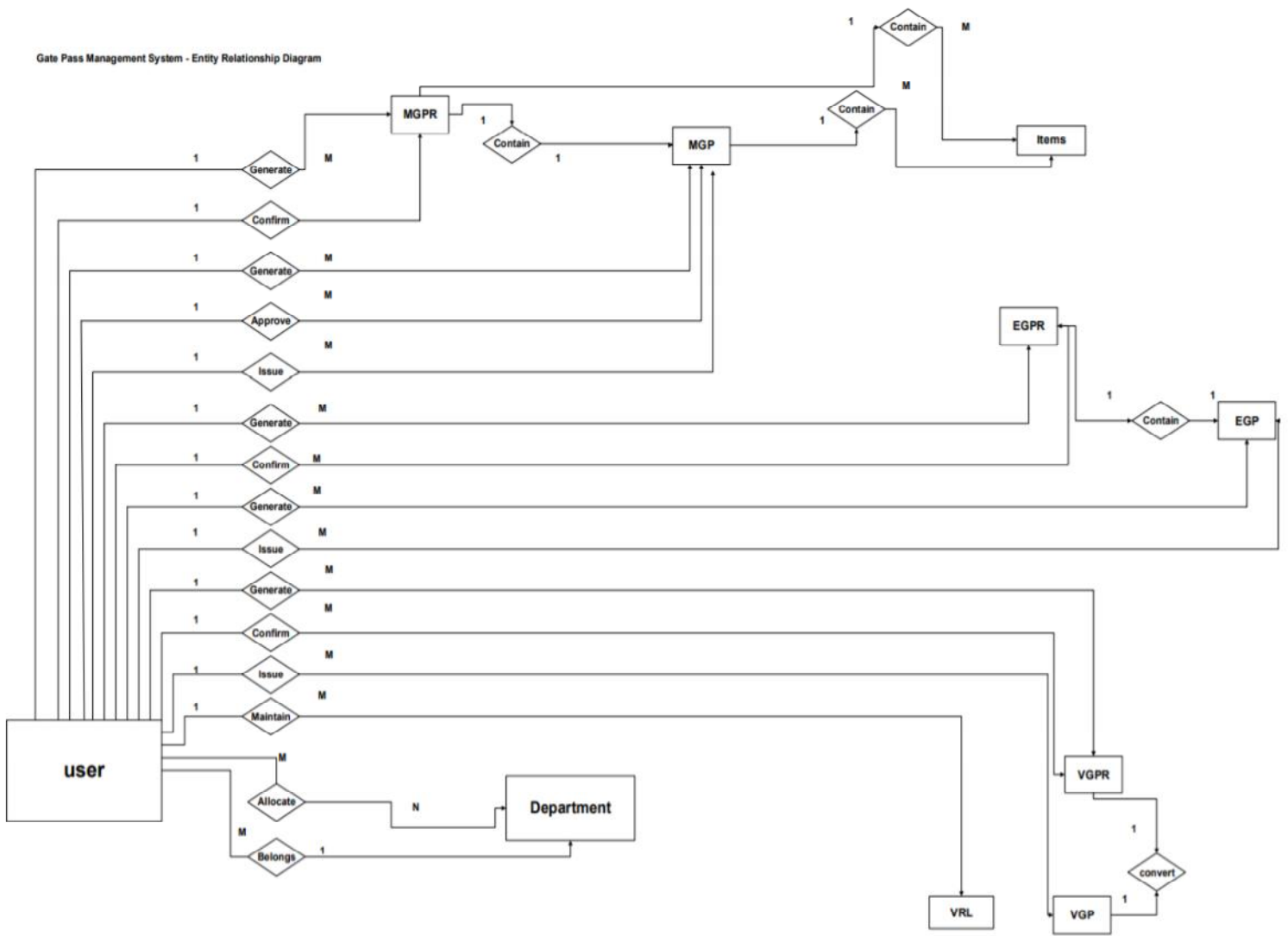


Figure 3.10 Entity-Relationship (ER) Diagram for Gate Pass Management System

### 3.2.4.2 Logical Database Design

Once the conceptual model completed, the logical database design which incorporates the tasks of deriving relations, validating the relations using normalization, ensuring that all constraints are analyzed and checking and design and implementation of the gate pass management system. From the conceptual model (the E-R diagram) Normalization must be carried out by defining the primary keys and foreign keys. The normalization process of implementing system is mentioned below (Figure 3.11).

<b>MGPR</b>												
MGPR No (PK)	Date	Time	Delivery Location	Contact Person	Item Issue From	Type	Status	Remarks	Request Id (FK)	Confirm Id (FK)	Department Id (FK)	MGP No (FK)
<b>MGP</b>												
MGP No (PK)	Date	Time	Delivery Location	Contact Person	Item Issue From	Type	Status	Print Location	Remarks	Create Id (FK)	Approve Id (FK)	Issue Id (FK)
<b>Items</b>												
Item Id (PK)	Item No	Item Description	Quantity	Unit	Reason	FAR No (FK)	MGPR No (FK)	MGP No (FK)				
<b>EGPR</b>												
EGPR No (PK)	Date	Time	Time In	Time Out	Type	Reason	EPF No	Duration	Request Id (FK)	Confirm Id (FK)	EGP No (FK)	

**EGP**

EGP No (PK)	Status	Print Location	Create Id (FK)	Issue Id (FK)	EGPR No (FK)
----------------	--------	-------------------	-------------------	------------------	-----------------

**VGPR**

VGPR No (PK)	Request Date	Request Time	Visitor NIC	Visitor Name	Visit Reason	Visit Location	Visitor Company	Date In	Time In	Time Out	Contact Person	Department ID (FK)	Status	Remarks	Request Id (FK)	Confirm Id (FK)	VGP No (FK)
-----------------	--------------	--------------	-------------	--------------	--------------	----------------	-----------------	---------	---------	----------	----------------	-----------------------	--------	---------	--------------------	--------------------	----------------

**VGP**

VGP No (PK)	Date	Time	Status	Issue Id (FK)
----------------	------	------	--------	------------------

**VRL**

VRL Id (PK)	Visitor Name	Visitor Id	Visit Reason	Date	Time In	Time Out	Contact Person	Create Id (FK)	Status	Department ID (FK)	Visitors Company	Visit Location
----------------	--------------	------------	--------------	------	---------	----------	----------------	-------------------	--------	-----------------------	------------------	----------------

**User**

User Id (PK)	User Name	Password	Name	EPF No	Status	Active Status	Department Id (FK)	User Type Id (FK)
-----------------	-----------	----------	------	--------	--------	---------------	-----------------------	----------------------

**Department**

Department Id (PK)	Department Name
--------------------	-----------------

**FAR**

FAR No (PK)	FAR Item Description	Unit	Status
----------------	----------------------	------	--------

**Employee**

EFP No (PK)	Full Name	Date Of Join	Status	Department Id (FK)
----------------	-----------	--------------	--------	-----------------------

Figure 3.11 Normalization for Gate Pass Management System

### 3.2.4.3 Physical Database Design

By having a suitable logical design, the physical database is reasonably easy. A full script containing the implementation of the database can be found below. This specifies the entire database schema including the data type of each attribute.

Herewith have mentioned the figure of the physical database (Figure 3.12) which created for the implanting system.

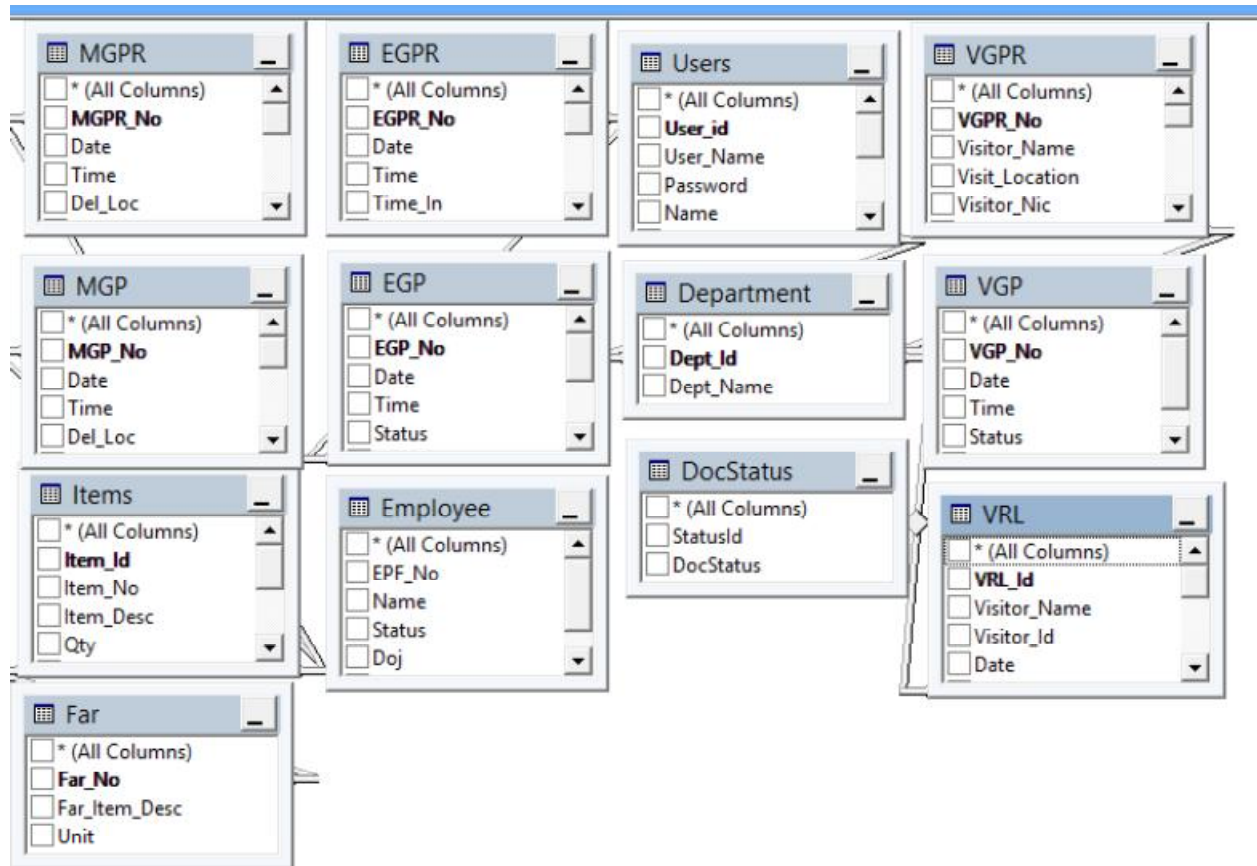


Figure 3.12 Physical Database Design for Gate Pass Management System

### 3.2.5 High Level UML Design Diagrams

The relevant high level UML diagrams of newly implementing system is mentioned below.

#### 3.2.5.1 Class Diagram

A class diagram is an illustration of the relationships and source code dependencies among classes, using Unified Modeling Language (UML). The completed class diagram is mentioned below (Figure 3.13).

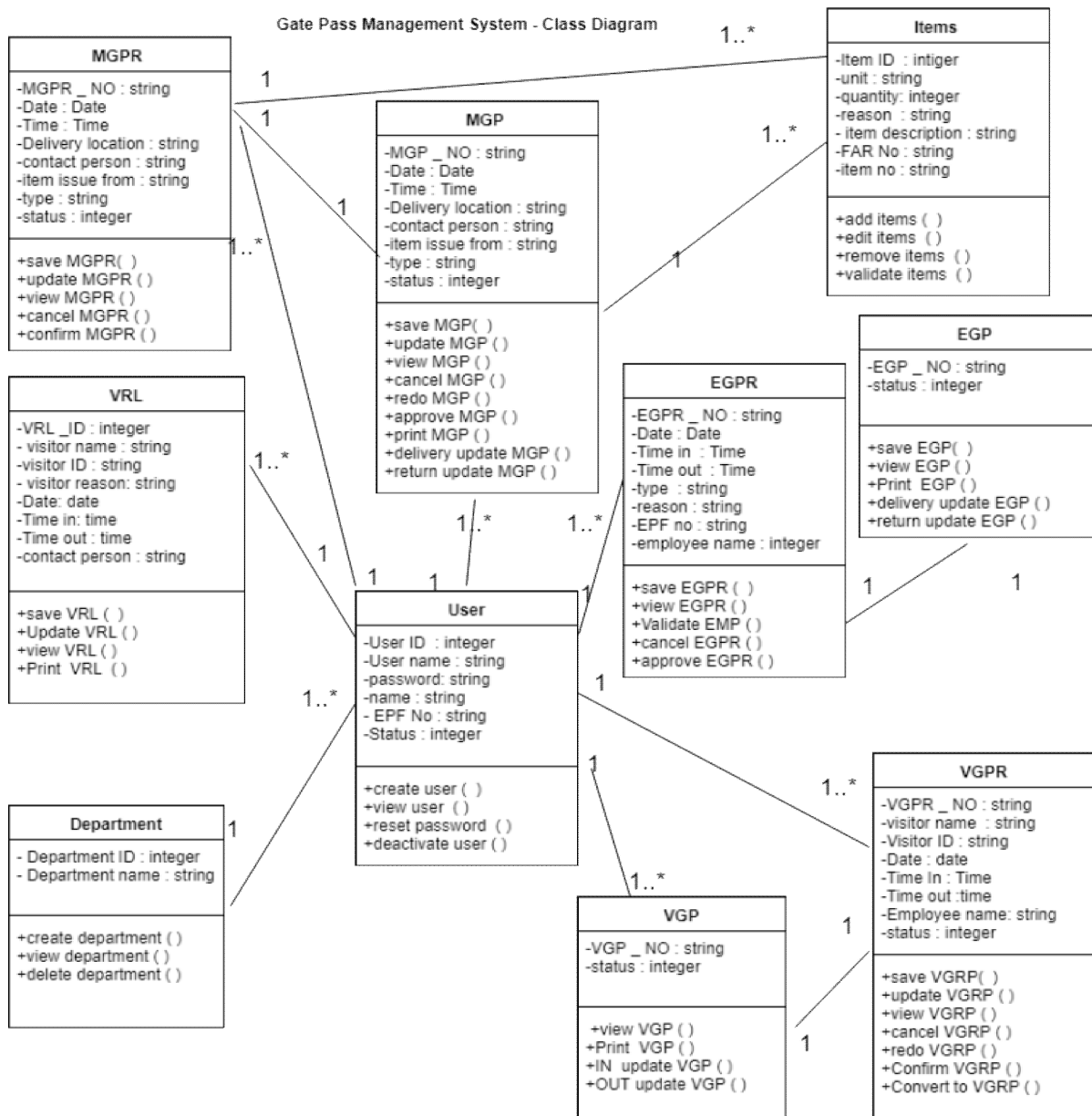


Figure 3.13 Class Diagram for Gate Pass Management System

### 3.2.5.2 Sequence Diagrams

A sequence diagram shows how objects operate with one another and in what order. Here sequence diagrams are divided into three main processes. They are Material Gate Pass Management Process, Employee Gate Pass Management Process and visitors Gate Pass Management Process. The completed sequence diagrams for gate pass management of materials (Figure 3.14), employees (Figure 3.15) and visitors (Figure 3.16) are mentioned below.

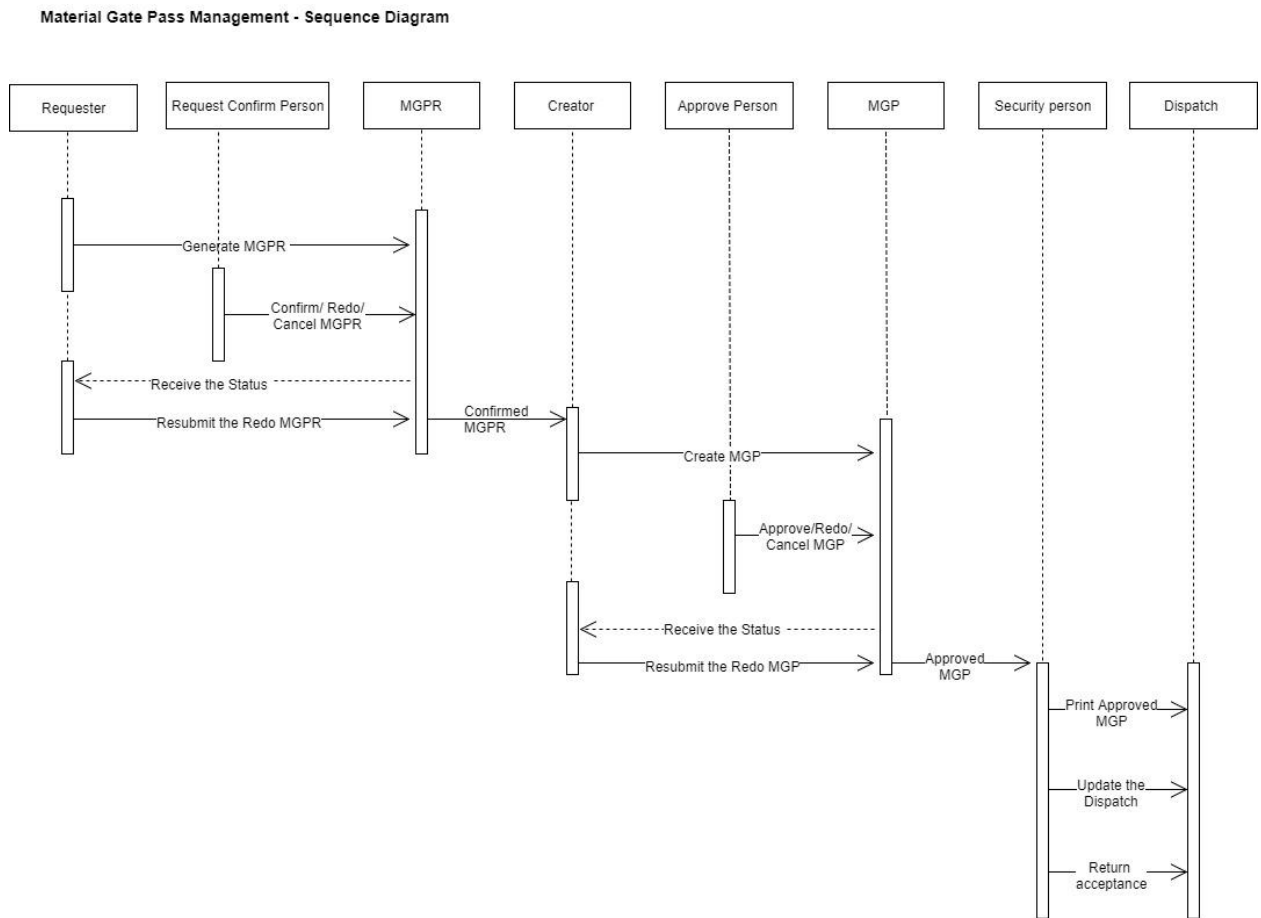


Figure 3.14 Sequence Diagram for Material Gate Pass Management

Employee Gate Pass Management - Sequence Diagram

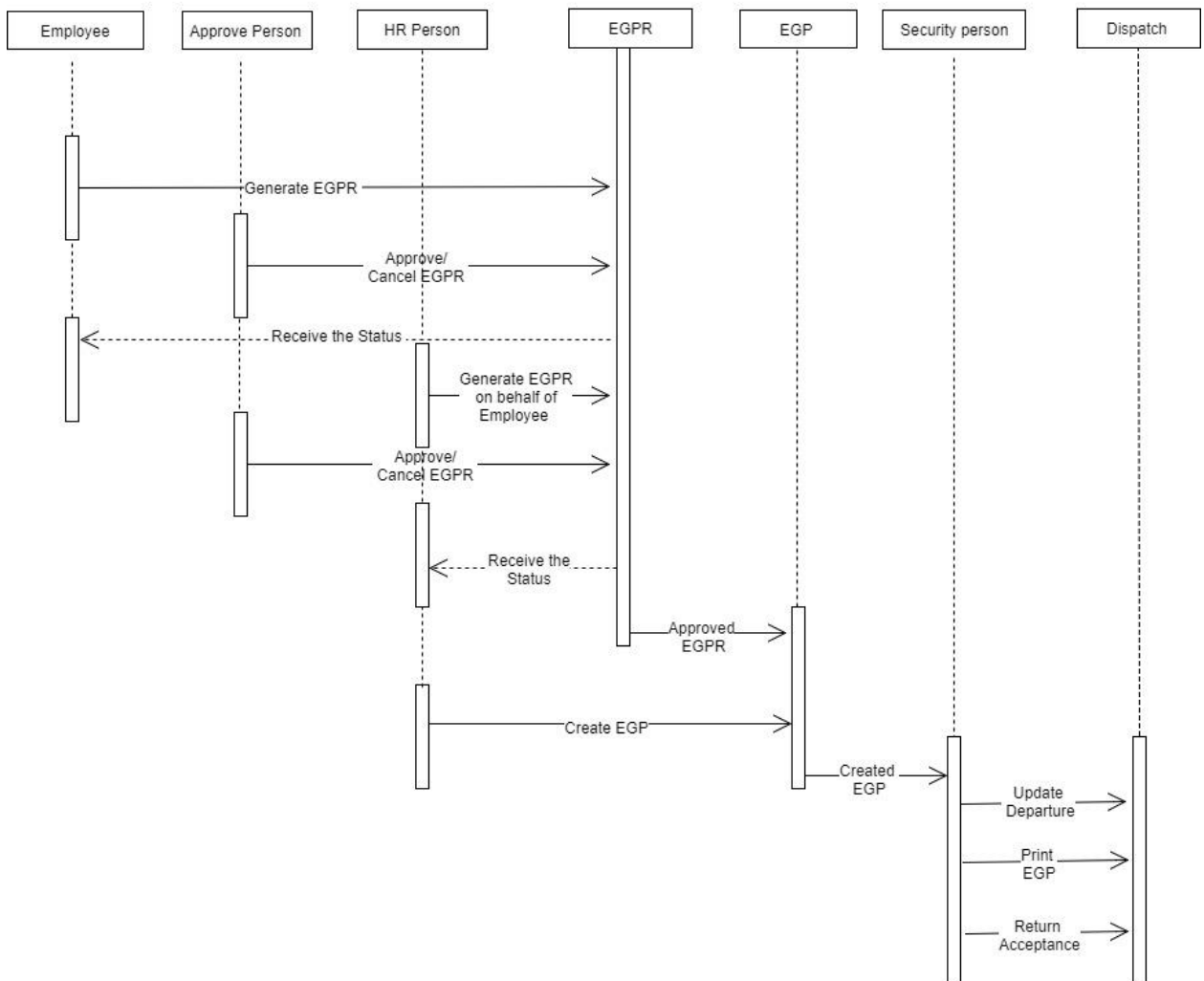


Figure 3.15 Sequence Diagram for Employee Gate Pass Management



Visitor Gate Pass Management - Sequence Diagram

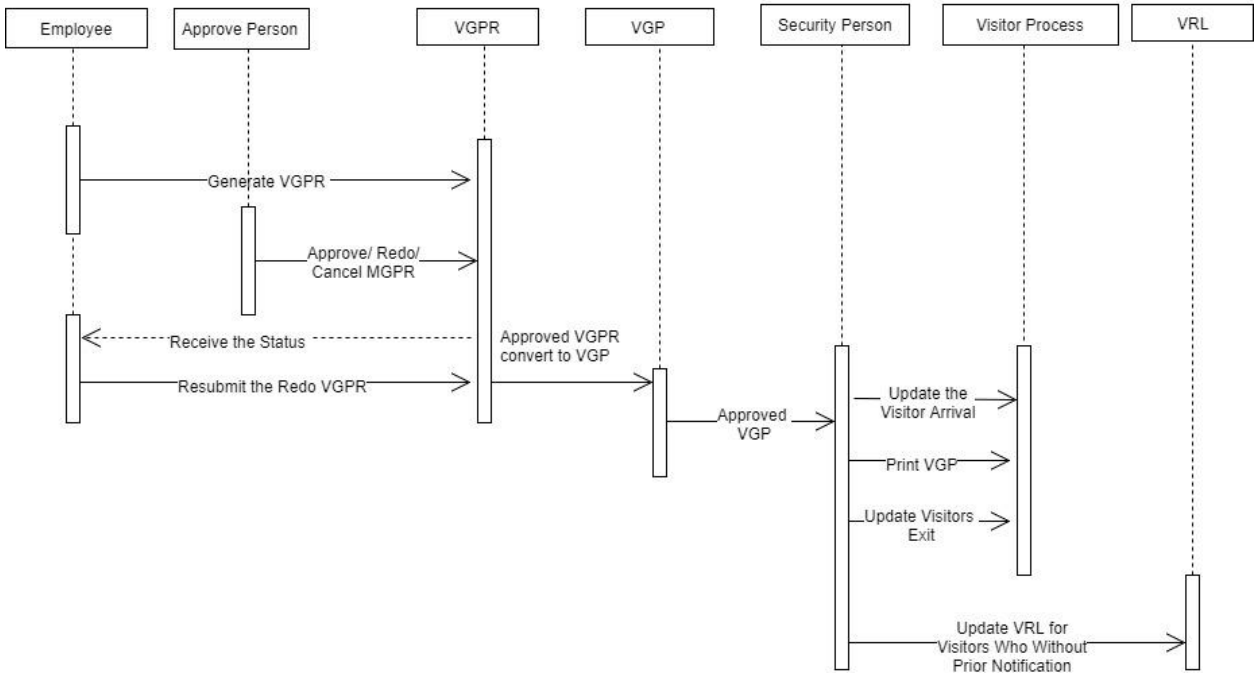


Figure 3.16 Sequence Diagram for Visitors Gate Pass Management

### 3.2.6 User Interface Design

A discrepancy in usability is an important issue that must be addressed during the design of the user interface. Though the system is not intensively used, it is still important to try to reduce the time it takes to carry out a task. While it is perceivable that cutting the time it takes to carry out a task by a fraction of a second may save time cost for most of the companies. More importantly, interface must design in way such that learning the system is simple and carrying out day-to-day tasks is more efficient than the current manual system.

Sketch images of user interfaces in major functions are attached module wise below. If consider from the beginning Figure 3.17 shows the sketch interface of Material Gate Pass Request (MGPR) Process, Figure 3.18 shows the sketch interface of Material Gate Pass (MGP) Process, Figure 3.19 shows the sketch interface of Employee Gate Pass Process, Figure 3.20 shows the sketch interface of Visitors Gate Pass Process and Figure 3.21 shows the sketch interface of Visitors' Room Log (VRL) Process.

Item No	FAR No	Item Description	Unit	Quantity	Reason
*					

Figure 3.17 User Interface Design for Material Gate Pass Request (MGPR) Process

Design decisions of the User Interface for Material Gate Pass Request (MGPR) Process is as follows.

- Material Gate Pass Request Creation Process
  - Request No - Auto generated (Format: MGPR/00001) – Allowed to search a previously saved MGPR number because to view and edit the document
  - Request Date & Time (disable) – Server date and time
  - Request Type – Selection: Returnable or Non-Returnable
  - Delivery Location & Contact Person – Type
  - Item Issue From – Selection: Head Office, Factory Location 1, etc.
  - Remarks – Type (Not Mandatory)
  - Department, Request By & Request Through – Get the details from the login
  - Item No - Auto generated number, only to a document
  - FAR – If ticked the FAR then display FAR details and allow to select, then display FAR Number, Unit and Item Description
  - If not a FAR - To type Item Description and to select Unit
  - Quantity and Reason – Type
  - Add/Update Button - Add or update item details to grid
  - Remove Button - When load the added item from the grid and if need to remove before save
  - Clear Button - To clear details in text boxes, etc.
  - New Button - To get the next MGPR number
  - Save /Update Button - To save the MGPR or update the MGPR if the status of the document is Redo (Need to change the status as pending after save or update)
  - Clear Button - To clear details in the entire form
  
- Material Gate Pass Request Confirm Process
  - View Allocated Request – Default this will be marked and can view only allocated MGPR
  - View All Request – This is visible only for users with All user permission
  - Grid - All the pending confirmation request loaded with the user permission wise
  - Gate Pass Request Details - When click a record in the grid load data to relevant textboxes and item detail grid
  - Confirm Button - To change the status as confirmed and then this will open to pending MGP creation
  - Redo Button - Change the status as Redo and it will open to update the MGPR
  - Cancel Button - Change the status as Cancel

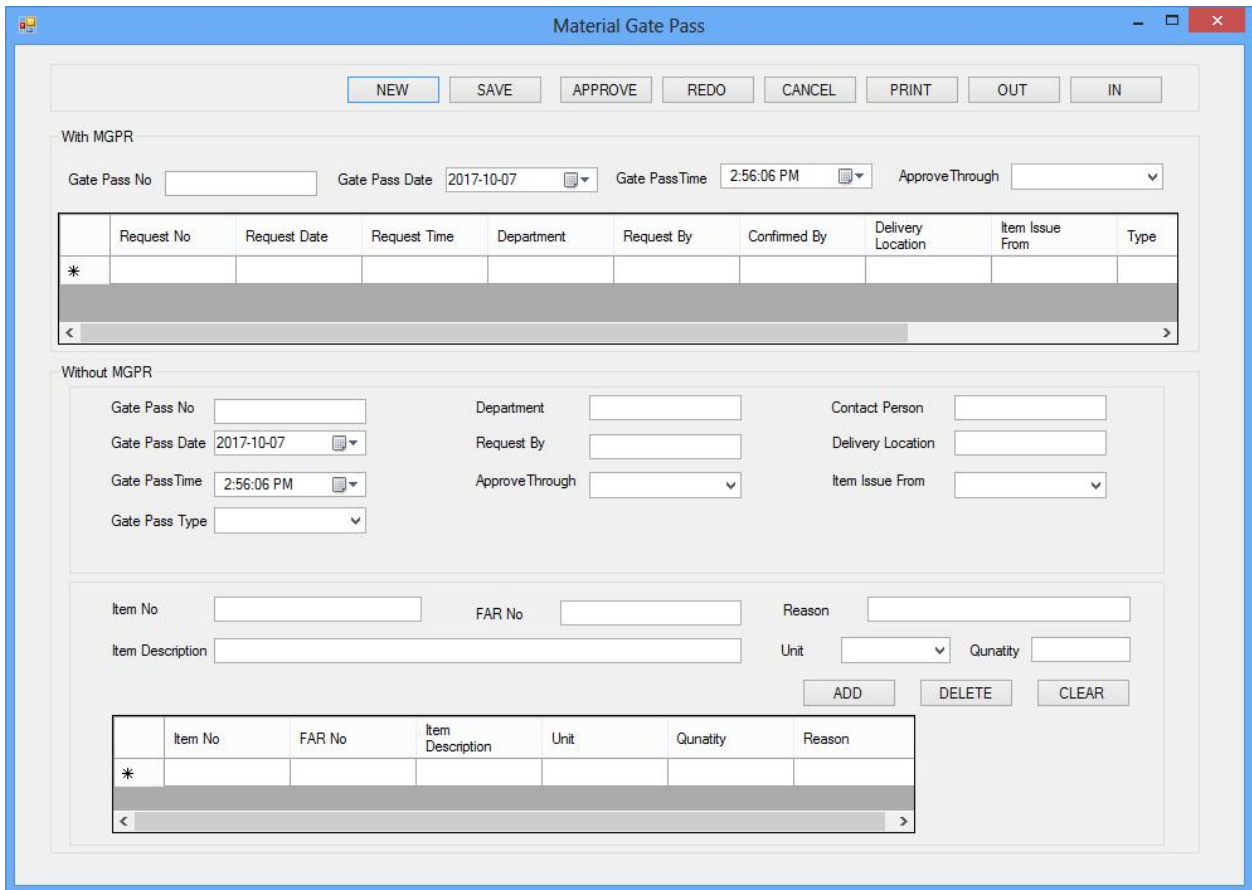


Figure 3.18 User Interface Design for Material Gate Pass (MGP) Process

Design decisions of the User Interface for Material Gate Pass (MGP) Process is as follows.

- Material Gate Pass Create Process
  - Gate Pass No- Auto generated (Format: MGP/00001) – Allowed to search a previously saved MGP number because to view and edit the document
  - Gate Pass Print Location – Selection: Head Office, Factory Location 1, etc.
  - Gate Pass Date & Time (disable) – Server date and time
  - Grid - Confirmed MGPR, and pending creation of MGP
  - Gate Pass Request Detail - When click a record in the grid to load data to relevant textboxes and item detail grid
  - New Button - To get the next MGP number
  - Save / Update Button - To save the MGP or Update the MGP if the status of the document is Redo (change the status as pending after save or update)
  - Clear Button - To clear details in the entire form

- Material Gate Pass Create -Without Request Process
  - Gate Pass No- Auto generated (Format: MGP/00001) – Allowed to search a previously saved MGP number because to view and edit the document
  - Gate Pass Date & Time (disable) – Server date and time
  - Gate Pass Type – Selection: Returnable or Non-Returnable
  - Gate Pass Print Location – Selection: Head Office, Factory Location 1, etc
  - Special Reason, Delivery Location & Contact Person – Type
  - Item Issue From – Selection: Head Office, Factory Location 1, etc.
  - Remarks – Type (Not Mandatory)
  - Department, Request By & Approve Through – Get the details from the login
  - Item - Auto generated number, only to a document
  - FAR – If ticked the FAR then display FAR details and allow to select, then display FAR Number, Unit and Item Description
  - If not a FAR – Type Item Description and to select Unit
  - Quantity and Reason - Type
  - Add / Update Button - To add or update item details to grid
  - Remove Button - When load the added item from the grid and if need to remove before save
  - Clear Button - To clear details in text boxes, etc.
  - New Button - To get the next MGP number
  - Save / Update Button - To save the MGP or Update the MGP if the status of the document is Redo (change the status as pending after save or update)
  - Clear Button - To clear details in the entire form
  
- Material Gate Pass Approve Process
  - View Pending Approve Gate Pass– Default this will be marked
    - Grid: All the pending approve gate pass to be loaded
  - View Approved Gate Pass–
    - Grid: All the approved and printed gate pass to be loaded
  - Gate Pass Details - when click a record in the grid load data to relevant textboxes and item detail grid
  - Approve Button - To change the status as approved and then this will open as pending Print MGP
  - Redo Button - To change the status as Redo and it will open to update the MGP
  - Cancel Button - To change the status as Cancel
  - Reprint Button - To change the status as allowed reprint of MGP

- Material Gate Pass InOutPro Process
  - Print Button - View Pending Print Gate Pass– Default this to be marked  
Grid: All the pending print or reprint allowed gate pass to be loaded
  - Out Button - Non Delivered Gate Pass–  
Grid: All the printed gate pass to be loaded
  - In Button - Pending Return Gate Pass –  
Grid: All the delivered gate pass with the Gate Pass Type ‘Returnable’ only
  - Gate Pass Preview – Preview of the gate pass print

Figure 3.19 User Interface Design for Employee Gate Pass Process

Design decisions of the User Interface for Employee Gate Pass (EGP) Process is as follows.

- Employee Gate Pass Request Process
  - Request No- Auto generated (Format: EGPR/00001)
  - Request Date & Time (disable) – Server date and time
  - Department, EFP No & Employee Name (disable) – To display user’s belonging department
  - Request Type – Selection: Early Departure & Official
  - Departure Time - Selection of Time
  - Arrival Time - Selection of Time if the Request Type is Official
  - Reason – Type
  - Remarks – Type (Not Mandatory)
  - New Button - To get the next EGPR number
  - Save Button - To save the EGPR
  - Clear Button - To clear details in the entire form

- Employee Gate Pass Request Approve Process
  - View Allocated Request – Default this to be marked and can view only allocated EGPR
  - View All Request – This is visible only for users with All user permission
  - Grid - All the pending approval request loaded with the user permission wise
  - Gate Pass Request Details - When click a record in the grid load data to relevant textboxes and item detail grid
  - Approve Button - To change the status as confirmed and then this will open to pending EGPR creation
  - Cancel Button - To change the status as Cancel
  
- Employee Gate Pass Create User Process
  - Gate Pass No- Auto generated (Format: EGP/00001)
  - Gate Pass Print Location – Selection: Head Office, Factory Location 1, etc
  - Gate Pass Date & Time (disable) – Server date and time
  - Grid: Approved EGPR, and pending creation of EGP
  - Gate Pass Request Details: When click a record in the grid need to load data to relevant textboxes and item detail grid
  - New Button -To get the next EGP number
  - Create Button - To save the EGP
  - Clear Button - To clear details in the entire form
  
- Employee Gate Pass InOutPro Process
  - Print Button - View Pending Print Gate Pass– Default this to be marked  
Grid: All the pending print or reprint allowed gate pass to be loaded
  - Out Button - Non Out Gate Pass–  
Grid: All the printed gate pass to be loaded
  - In Button - Pending Official Gate Pass –  
Grid: All the out gate pass with the Gate Pass Type ‘Official’
  - Gate Pass Preview – preview of the gate pass print

Figure 3.20 User Interface Design for Visitors Gate Pass Process

Design decisions of the User Interface for Visitors Gate Pass (VGP) Process is as follows.

- Visitors Gate Pass Request Process
  - Request No- Auto generated (Format: VGPR/00001) – Allowed to search a previously saved VGPR number because to view and edit
  - Request Date & Time (disable) – Server date and time
  - Visit Location – Selection: Head Office, Factory Location 1, etc
  - Contact Person, Visitor’s NIC Number, Visitor’s Name, Visitor’s Company, and Reason for Visit – Type
  - Remarks – Type (Not Mandatory)
  - EFP No, Employee Name , Request Through – Get the details from the login
  - Arrival Date – Selection of Date
  - Arrival Time, Departure Time - Selection of Time
  - Duration – Calculate from Arrival Time and Departure Time
  - New Button - To get the next VGPR number
  - Save /Update Button - To save the VGPR or Update the VGPR if the status of the document is Redo (To change the status as pending after save or update)
  - Clear Button - To clear details in the entire form



- Visitors Gate Pass Request Confirm Process
  - View Allocated Request – Default this to be marked and can view only allocated VGPR
  - View All Request – This is visible only for users with All user permission
  - Grid: All the pending confirmation request loaded with the user permission wise
  - Gate Pass Request Details: When click a record in the grid load data to relevant textboxes and item detail grid
  - Approve Button : To change the status as confirmed and then this will changed to VGPR
  - Redo Button - To change the status as Redo and it will open to update the VGPR
  - Cancel Button - To change the status as Cancel
  - Gate Pass No - Auto generated (Format: VGP/00001)
  
- Visitors Gate Pass InOutPro Process
  - Print Button - View Pending Print Gate Pass– Default this to be marked  
Grid: All the pending print or reprint allowed gate pass need to be loaded
  - In Button - Pending Arrival Gate Pass –  
Grid: All the printed gate pass
  - Out Button - Non Departure Gate Pass–  
Grid: All the arrived & non-departure gate pass to be loaded
  - Gate Pass Preview – preview of the gate pass print

The screenshot shows a software window titled "Visitor's Room Log". At the top right of the window are standard window controls (minimize, maximize, close). Below the title bar is a horizontal bar containing four buttons: "NEW" (highlighted in blue), "SAVE", "IN", and "OUT". The main area of the window is a form with several input fields:

- Visit Date:** A date picker showing "2017-10-07".
- Visitor's NIC:** An empty text input field.
- Visitor's Name:** An empty text input field.
- Contact Person:** An empty text input field.
- Reason For Visit:** A wide empty text input field.

Below these fields is a section titled "Update Visit Details" which contains two time pickers:

- Visitor In Time:** A time picker showing "3:00:02 PM".
- Visitor Out Time:** A time picker showing "3:00:02 PM".

Figure 3.21 User Interface Design for Visitors' Room Log (VRL) Process

Design decisions of the User Interface for Visitors Room Log (VRL) Process is as follows.

- Visitors Room Log Process
  - Log No- Auto generated (Format: VRL/00001)
  - Log Date & Time (disable) – Server date and time
  - Visit Location – Selection: Head Office, Factory Location 1, etc.
  - Department - Selection
  - Contact Person, Visitor’s NIC Number, Visitor’s Name, Visitor’s Company, and Reason for Visit – Type
  - Remarks – Type (Not Mandatory)
  - Visitors NIC No (in Arrival and Departure details) – Search from NIC to update Arrival and Departure details
  - Visitors Name (in Arrival and Departure details)– Display the name of visitors against the search NIC number
  - Arrival Date – Selection of Date
  - Arrival Time, Departure Time - Selection of Time
  - Duration – Calculate from Arrival Time and Departure Time
  - New Button - To get the next VRL number
  - Save /Update Button - To save the VRL
  - Clear Button - To clear details in the entire form
  - Update Departure Button - To update the arrival and departure details

### **3.3 Summary**

Analysis covers functional and non-functional requirement analysis. Use case diagrams and user case narratives were prepared as the high level diagrams of the analysis. In design phase as the methodology approach considered the alternative solutions and the methodology using along with the software development life cycle and design aspects. Main design aspects are software architecture, database modeling and design and user interface design. Process flow diagrams and Unified Modeling Language (UML) diagrams such as class diagrams, sequence diagrams.

## **Chapter 4 Implementation**

This chapter consists of implementation technology such as language, platform and framework. Also consist of important areas of user interfaces such as In Out Process and Summary Reports. During this chapter, has been briefly describe about Software engineering aspects which includes Waterfall Model, Top Down Design Approach used in implementation.

### **4.1 Implementation Technology**

For implementation, windows was selected as the platform as the client has their own windows servers. This was really helpful to reduce the cost of establishing core of the system. Another reason to use windows platform is client already has local intranet with strong Virtual Private Network (VPN) connection. To develop the system .NET 4.5 framework was used along with the C# language as it supports the object oriented concepts and productivity of language is high. Also since the client already has the license version of Ms. SQL Server it would be easier to have the database connection with the program. Most precious privilege gain by using C# language is that the ease of generating real applications for windows. .NET framework enhance this privilege by giving access to powerful forms engine.

### **4.2 Important Areas of User Interfaces**

Few images of In Out Process of an approved gate pass are mentioned below. This process is the most important process as it state the status of the transaction point of all material employee and visitor transaction. Also few images of summary reports of transactions categories have mentioned. These summary reports included the high information related to those transactions.

Figure 4.1 shows the In Out Process of the Material Gate Pass Process, Figure 4.2 shows the In Out Process of the Employee Gate Pass Process and Figure 4.3 shows the In Out Process of the Visitor's Gate Pass Process.

Figure 4.4 shows the summary report of Material Gate Pass Process, Figure 4.5 shows the summary report of Employee Gate Pass Process and Figure 4.6 shows the summary report of Visitors Gate Pass Process.

Material Gate Pass InOutPro

PRINT OUT REPRINT IN

Pending Print Gate Pass
  Non Delivered Gate Pass
  Pending Return Gate Pass
  Reprint Gate Pass

	Gate Pass No	Gate Pass Date	Gate Pass Time	Department	Request By	Request Type	Item Issue From	Delivery Location	Contact Person
*									

Gate Pass Preview

Figure 4.1 Material Gate Pass In Out Process Screen View

Employee Gate Pass InOutPro

OUT PRINT REPRINT IN

Non Departure Gate Pass
  Pending Print Gate Pass
  Pending Arrival Gate Pass
  Reprint Gate Pass

	Gate Pass No	Gate Pass Date	Gate Pass Time	EPF No	Employee Name	Department	Request Type	Request Approved By	Departure Time
▶	EGPR/2	2018-01-11	12:33:00	3	request1 request2...	IT	4	1	Official
	EGPR/3	2018-02-07	23:32:46	3	request1 request2...	IT	1	1	Official
*									

Gate Pass Preview

Figure 4.2 Employee Gate Pass In Out Process Screen View

Visitors Gate Pass InOutPro

IN PRINT OUT REPRINT

Pending Arrival Gate Pass
  Pending Print Gate Pass
  Non Departure Gate Pass
  Reprint Gate Pass

Gate Pass No	Gate Pass Date	Gate Pass Time	Department	Request By	Request Approved By	Contact Person	Reason For Visit	Visit Location
*								

Gate Pass Preview

Figure 4.3 Visitor's Gate Pass In Out Process Screen View

**Antler Group**

Material Gate Pass List - Summary

Date Period From : 2018-01-01 To: 2018-03-20

Print Date : 2018-03-22

GP No	GP Date & Time	Department	Request By	GPR No	Type	Del. Location	Con. Person	Issued From	Print Loc.	Remarks	Status
MGP/1	2018-02-02 08:15	Marketing	upekshaw	MGPR/2	Returnable	Hirdaramani Garments, Katunayake	Priyan Perera	Antler JM 1	Guard Room J	Pattern Boards	MGP Pending Ap
MGP/2	2018-02-05 08:30	Production	sunethp	MGPR/3	Non Retur	Hirdaramani Garments, Maharagama	Natasha Fernand	Antler JM 2	Guard Room J		MGP Pending Ap
MGP/3	2018-02-06 08:45	Procument	ruviniw	MGPR/4	Returnable	Chemanex Plc, Colombo	Ranga Premarat	Antler HO	Guard Room H		MGP Approved
MGP/4	2018-02-07 09:00	Maintenance	Lalithw	MGPR/5	Non Retur	Coolline Ac Center, Sri Jayawardanepura Kotte	Jagath Rajapaks	Antler JM 1	Guard Room J		MGP Redo
MGP/5	2018-02-08 09:15	Marketing	upekshaw	MGPR/6	Returnable	Brandix Intimate Apparel, Katunayake	Jayantha Senevi	Antler JM 2	Guard Room J		MGP Cancel
MGP/6	2018-02-09 09:30	Production	sunethp	MGPR/7	Non Retur	MAS Intimates, Pahalalalugama	Kanishka Rathna	Antler HO	Guard Room H		MGP Printed
MGP/7	2018-02-12 09:45	Procument	ruviniw	MGPR/8	Returnable	Glorchem Enterprise, Colombo	Savini Pathirage	Antler JM 1	Guard Room J		MGP In
MGP/8	2018-02-13 10:00	Maintenance	Lalithw	MGPR/9	Non Retur	DataCore Technologies (Pvt) Ltd, Colombo	Chinthaka Amaras	Antler JM 2	Guard Room J		MGP Out

Figure 4.4 Material Gate Pass Summary Report

## Antler Group

### Employee Gate Pass List - Summary

Date Period From : 2018-01-01 To: 2018-03-20

Print Date : 2018-03-22

GP No	GP Date & Time	EPF No & Name	Department	Type	Reason	Req. No	Status
EGP/1	2018-02-23 09:15	8 Saumya Jagathilaka	Administration	Official	Visit to Bank	EGPR/4	EGP Created
EGP/2	2018-02-26 09:30	6 Hasanthi Dediyaigala	HR	Eraly Departu	Personal	EGPR/5	EGP Printed
EGP/3	2018-02-27 09:45	7 Anoma Kumarasinghe	Sample	Official	Visit to Bank	EGPR/6	EGP Out
EGP/4	2018-02-28 10:00	8 Saumya Jagathilaka	Administration	Eraly Departu	Personal	EGPR/7	EGP In
EGP/5	2018-02-28 10:15	8 Saumya Jagathilaka	Administration	Official	Visit to Bank	EGPR/8	EGP In

Figure 4.5 Employee Gate Pass Summary Report

## Antler Group

### Visitors Gate Pass List

Date Period From : 2018-01-01 To: 2018-03-20

Print Date : 2018-03-22

Req. No	Req. Date/Time	Visit Location	Visitor's Name	Visitor's Company	Cont. Person	Reason	Req. By	Department	GP No	Status
VGPR/5	2018-03-08 09:00	Guard Room JM1	Asanthi Weerasignhe	National Savings Bank - C	10	Official	dilshanis	Finance	VGP/1	VGP Created
VGPR/6	2018-03-09 09:15	Guard Room JM2	Suren Fernando	EY Office, Colombo	11	Official	chandanas	Administration	VGP/2	VGP Printed
VGPR/7	2018-03-12 09:30	Guard Room HO	Gayani Abesinghe	DataCore Technologies (	9	Official	pasanj	IT	VGP/3	VGP In
VGPR/8	2018-03-13 09:45	Guard Room JM1	Malsha Kumarage	Commercial Bank, Col	10	Official	dilshanis	Finance	VGP/4	VGP Out

Figure 4.6 Visitor's Gate Pass Summary Report

### 4.3 Software Engineering Aspects Used In Implementation

At the beginning of the implementation prepared a planned which state the developments that has to be carried out with expected time frames. During the implementation few minor deviations were identified against the plan and has taken the necessary actions to prevent the recurrence. These actions plans with time line were recorded in a separate design pattern which consists the description of the problem and the essence solution. Design pattern was studied when preparing the test plan to enhance the upcoming procedures.

Initiated the implementation in advance to prevent any possibilities to get it delayed. As the first implementation developed the system to trace material transactions. In the second stage system was further developed to trace employee transactions. Developed the system to trace these transactions initially because it was ease to develop as both material and employee are from internal environment of the organization. At the last stage developed the system to trace visitor’s transactions.

The methodology used to develop and implement the system is “Waterfall Model”. This approach suggests the mechanism where making just one attempt in a project and getting it correct at the first time. With inputs from the system designing phase, the newly implementing system is first developed and tested for its functionality in this implementation phase.

The generic approach which used for software designing is Top-Down design. This design takes the whole Gate Pass Management System as one entity and then decomposes it to achieve more than one sub-system or component based on some characteristics such as Material, Employees and Visitors. Each sub-system or component is then treated as a system and decomposed further, as shown in the below modular structure (Figure 4.7).

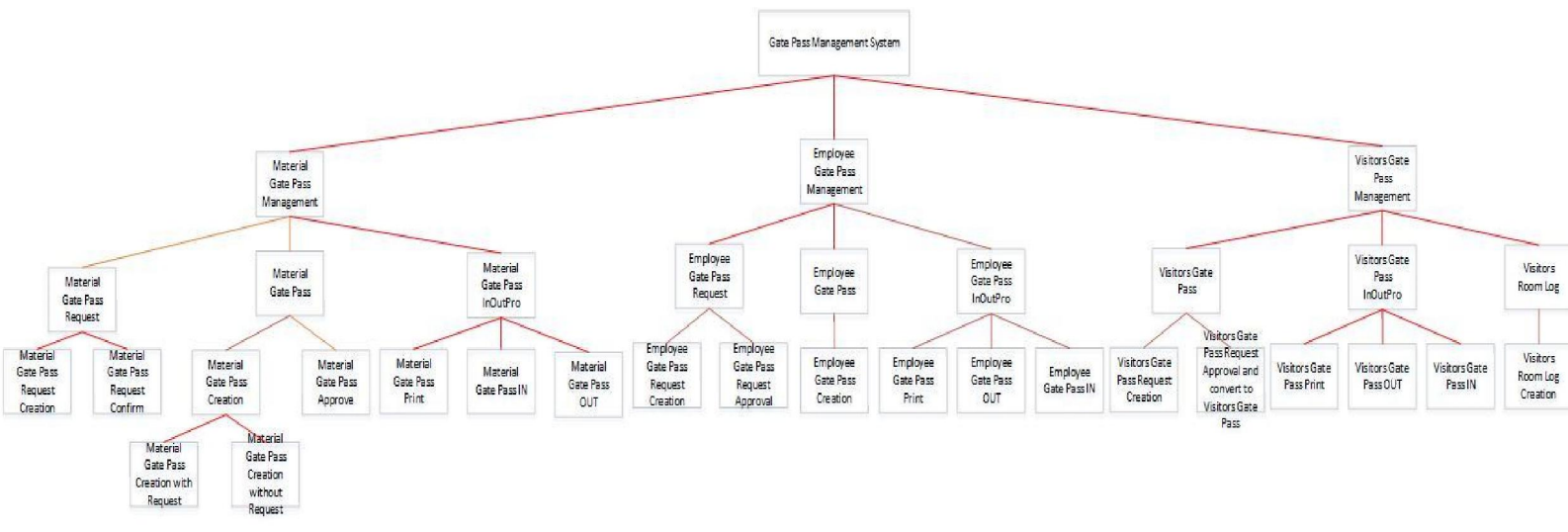


Figure 4.7 Modular Structure for Gate Pass Management System

## 4.4 Summary

Mentioned the benefits getting by using above mentioned resources to implement the system. Describe the implemented plan and the design patterns which describe the deviation occurred during implementation.



## **Chapter 5 Evaluation & Testing**

This chapter consists of two main sections. They are Evaluation and Testing Process. Evaluation section covers Sampling of Subject, Evaluation Scenarios and Tools such as Questionnaires' Survey and Interviews. Testing section covers the testing methodology, test plan and test cases.

### **5.1 Evaluation**

The ultimate expectation of user evaluation which was conducted is to improve features of the system and enhance the interaction of new users. User evaluation was conducted in the first two weeks since the finalization of the implementation. During the evaluation a sample was picked as per the criteria mentioned in the next section. User evaluation was conducted as per the criteria mentioned in the upcoming section, by using questionnaires' survey and conducting interviews.

#### **5.1.1 Sampling of Subject**

The sample size of the users at the client base of which the data were expected to gather was identified. The ideal sample size of users were 25. The composition of the intake was 10 from request users, 5 from the creation users, 5 from the confirm or approval, for In Out Process 3 users and to monitor and evaluate the data and reports 2 users.

Thereafter, 25 users was selected from different types of departments and different locations in the client company. A wide variety of departments was selected to gain more accurate data from users. Of them Finance Users, HR Users and Security Users were the key concern since they had a wide knowledge on the subject mentioned. Also, a few paper questionnaires were distributed to users to pre-check sequencing and completeness.

#### **5.1.2 Evaluation Scenarios**

Gate Pass Management System focuses, on the security of the organization. Here the material, employees and visitors considered and user evaluation scenarios were identified based on that.

##### **➤ Material Gate Pass Management System**

Tracking of materials which are moving in or out of the organization by the Material Gate Pass Management System and its user evaluation scenario is as follows.

- Requester make a request for the material (MGPR – Material Gate Pass Request).
- The authorized person confirm the MGPR.  
Also, authorized person is allowed to cancel or ask requestor to resubmit if required.  
If Redo, then requestor can amend the previous MGPR and can resubmit for confirmation.
- Gate Pass Creator create the Material Gate Pass (MGP) for a confirmed MGPR.  
For special incidents, system is allowed to create MGP without a MGPR.
- Approver approve the created MGP.
- Material is verified and dispatched after the MGP is printed and issued by security desk.  
Re-print of MGP is allowed for special incidents.
- Out can be marked from security desk after completing the dispatch of the material.
- IN can be marked when the material return. So, if there are any returnable material, can track them till return.

➤ Employee Gate Pass Management System:

Tracking of employees who are moving in and out of the organization during working hours by Employee Gate Pass Management System and its user evaluation scenario is as follows.

- Employee make a request to go to outside during the working hours or as an early departure (EGPR – Employee Gate Pass Request).
- For the Employees who don't have the ESS facility, HR division can generate EGPR on behalf of employee.
- Approver approve the EGPR.  
Apart from confirmation, it is allowed to cancel if required.
- Gate Pass Creator can create Employee Gate Pass (EGP) for an approved GPR.
- Departure is marked and the EGP will be printed and issued by the security desk.  
Re-print of EGP is allowed for special incidents.
- If the EGP is a returnable one, then IN can be marked in the system when the employee returned to the premises.

➤ Visitor Gate Pass Management System:

Tracking of visitors who visit the organization premises for the official purpose by Visitor Gate Pass Management System and its user evaluation scenario is as follows.

- Requestor beforehand make a request for visitor(s) who come with a prior notification, (VGPR – Visitor Gate Pass Request).
- Approver approve the VGPR, and it will convert to a VGP (Visitor Gate Pass).  
Also, it is allowed to redo or cancel if required.  
If Redo, then the requester can amend the VGPR and can resubmit for approval.

- At the visitors' arrival, security desk will cross check the information and will issue a print of approved VGP after update the system.  
Re-print of VGP is allowed for special incidents.
- Visitors who come without a prior notification, meet the relevant employee at the Visitors' Room. All the details relevant to the convention with visitors will record in the Visitor's Room Log (VRL) form by security desk.
- At the exit of visitor(s), security desk updates the system accordingly.

### 5.1.3 Tools

The evaluation tools allow in the pursuit of analyzing system developed and subsequently leading an effective solution for the problem. Questionnaires survey and Interviews were the methodologies used as the system evaluation tools.

#### ➤ Questionnaires Survey

The questionnaire survey was prepared with comprised of 12 choose form questions. The questions that were given to choose from were constructed to evaluate the new system level, information level, security level, priority level and trust level of the system. These questions were used for the preparation of interviews. Figure B.1 shows the user survey questionnaire format used for the evaluation of Gate Pass Management System.

#### ➤ Interviews

Interviews conducted after the completion of the questionnaire stage. From the information that gained through questionnaires, points to be interviewed was developed. The interviews are very brief which lasted only 15 minutes. Interviews covered questions such as comparison of manual process and automated process, process improvements and security improvements. By conducting interviews important facts was derived, which directly related to the objectives of the project.

The summary of the interview questions were as follows.

1. What kind of dedicated connection do you have with the Gate Pass Management System?
2. How you use privileges of Gate Pass Management System, as a user?
3. What kind of intrusions are prevented from the newly implemented Gate Pass Management System when compared to the manual gate pass process carried out?
4. Do you satisfied with the newly implemented Gate Pass Management System?  
Yes/No, If No from which point you are disappointed?
5. Are you comfortable to rely on the information of Gate Pass Management System?
6. Are you and your team able to fulfil your reporting requirements through Gate Pass Management System and how the same helps to monitor transactions in the process?

7. Does the system increase your productivity? How it helps to reduce the number of steps of the manual process?
8. Are you able to extract updated information from the system?
9. How the efficiency when compared to manual process?
10. What is your opinion about the overall performance of the Gate Pass Management System?

### 5.1.4 Data Analyzing

The raw data collected (Table B.1 - Variable View & Table B.2 Data View) were converted to graphical representations which comprised of graphs and charts as to obtain a comparative view and to carry out a simple numerical comparative quantitative analysis. SPSS (Statistical Package for the Social Sciences) Statics Software was used as the analysis program in order to organize data, to manipulate data in an effective manner and to format and fit the needs.

The analysis is represented as Pie Charts (Figure 5.1, Figure 5.2 and Figure 5.3) and Bar Charts (Figure 5.4, Figure 5.5, Figure 5.6, Figure 5.7, Figure 5.8 and Figure 5.9) using SPSS (Statistical Package for the Social Sciences) Statics Software.

#### ➤ Analysis and Interpretation from Pie Charts

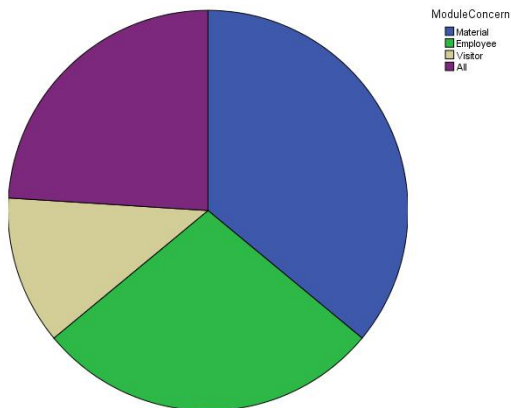


Figure 5.1 Pie Chart for Composition of Modules

- Figure 5.1 illustrate the pie chart for Composition of Modules in Gate Pass Management System
- There are 4 modules such as Material, Employee, Visitors and All.

- Among the 25 sample user set 9 users (36%) concern for Material Gate Pass Management System, 7 users (28%) concern for Employee Gate Pass Management System, 4 users (16%) concern for Visitor Gate Pass Management System and 5 users (20%) concern all the modules.

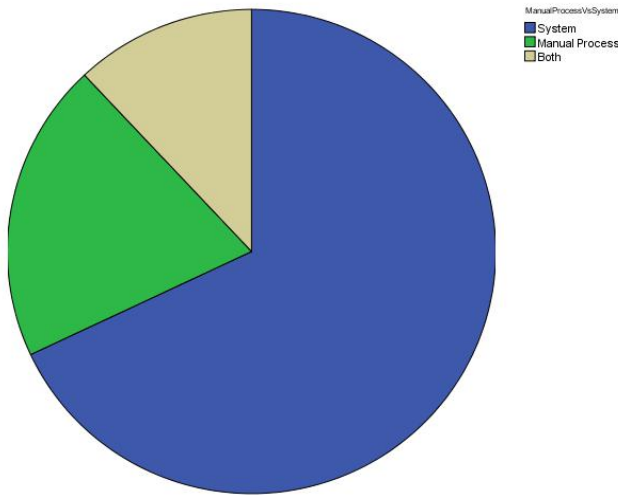


Figure 5.2 Pie chart for Comparison between Manual Gate Pass Process and Gate Pass Management System

- Figure 5.2 illustrate the Pie chart for Comparison between Manual Gate Pass Process and Gate Pass Management System
- There are 3 categories, such as System, Manual Process and Both.
- Among the 25 sample user set 17 users (68%) were willing for the Gate Pass Management System, 5 users (20%) still willing to have the manual Process and 3 users (12%) wished to have both the Gate Pass Management System and manual Process.

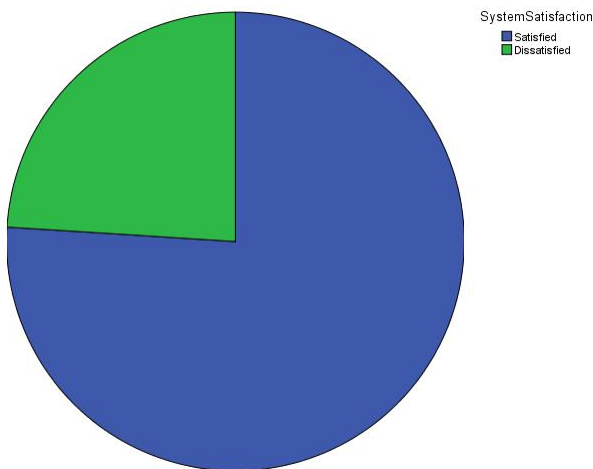


Figure 5.3 Pie chart for Satisfaction Level

- Figure 5.3 illustrate the Pie chart for Satisfaction Level of Gate Pass Management System
- There are 2 categories, such as Satisfied and Dissatisfied.
- Among the 25 sample user set 19 users (76%) were satisfied for the implementation of Gate Pass Management System and 6 users (24%) were dissatisfied for the implementation of Gate Pass Management System.

➤ **Analysis and Interpretation from Bar Charts**

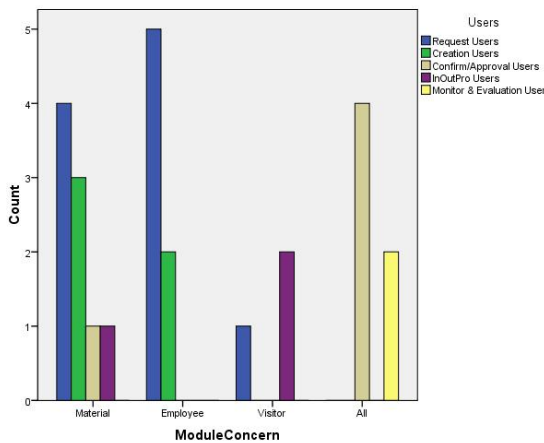


Figure 5.4 Count Bar Chart for Composition of Modules with User Types

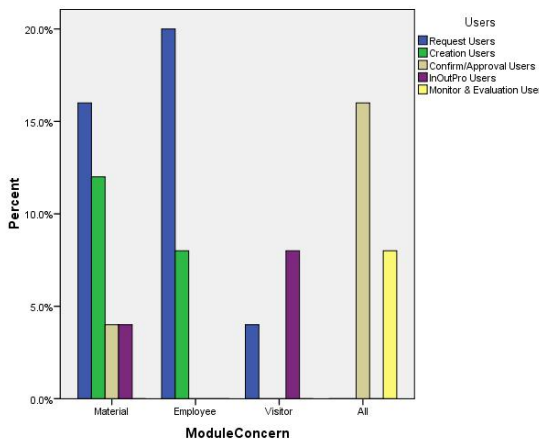


Figure 5.5 Percentage Bar Chart for Composition of Modules with User Types

- Figure 5.4 illustrate the Count Bar Chart and Figure 5.5 illustrate the Percentage Bar Chart for Composition of Modules in Gate Pass Management System with User Types.
- There are 4 module categories, such as Material, Employee, Visitor and All.
- Also there are 5 user types such as Request Users, Creation Users, Confirm & Approval Users, InOutPro Users and Monitor & Evaluation Users.

- Among the 25 sample user set 4 (16%) Request Users, 3 (12%) Creation Users, 1 (4%) Confirm & Approval Users and 1 (4%) InOutPro Users concern Material Gate Pass Management.
- Among the 25 sample user set 5 (20%) Request Users and 2 (8%) Creation Users concern Employee Gate Pass Management.
- Among the 25 sample user set 1 (4%) Request Users and 2 (8%) InOutPro Users concern Visitor Gate Pass Management.
- Among the 25 sample user set 4 (16%) Request Users and 2 (8%) Monitor & Evaluation Users concern all Material, Employee and Visitor Gate Pass Management.

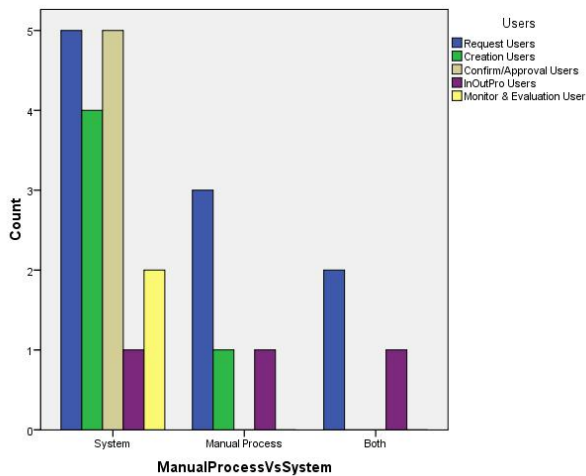


Figure 5.6 Count Bar Chart for Comparison between Manual Gate Pass Process and Gate Pass Management System with User Types

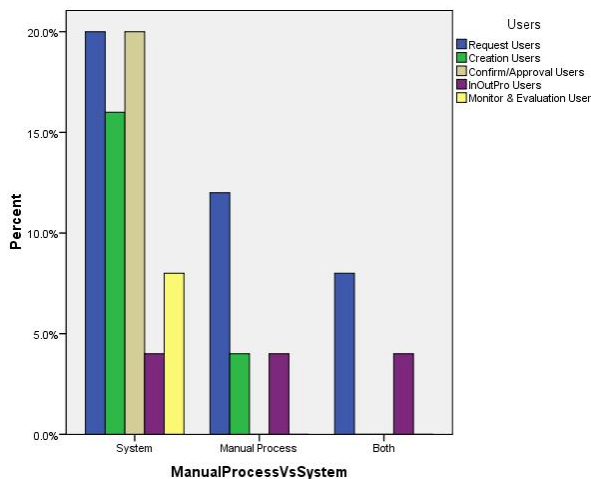


Figure 5.7 Percentage Bar Chart for Comparison between Manual Gate Pass Process and Gate Pass Management System with User Types

- Figure 5.6 illustrate the Count Bar Chart and Figure 5.7 illustrate the Percentage Bar Chart for Comparison between Manual Gate Pass Process and Gate Pass Management System with User Types

- There are 3 categories, such as System, Manual Process and Both.
- Also there are 5 user types such as Request Users, Creation Users, Confirm & Approval Users, InOutPro Users and Monitor & Evaluation Users.
- Among the 25 sample user set 5 (20%) Request Users, 4 (16%) Creation Users, 5 (20%) Confirm & Approval Users, 1 (4%) InOutPro Users and 2 (8%) Monitor & Evaluation Users were willing for the Gate Pass Management System.
- Among the 25 sample user set 3 (12%) Request Users, 1 (4%) Creation Users and 1 (4%) InOutPro Users were still willing to have the manual Process.
- Among the 25 sample user set 2 (8%) Request Users and 1 (4%) InOutPro Users wished to have both the Gate Pass Management System and manual Process.

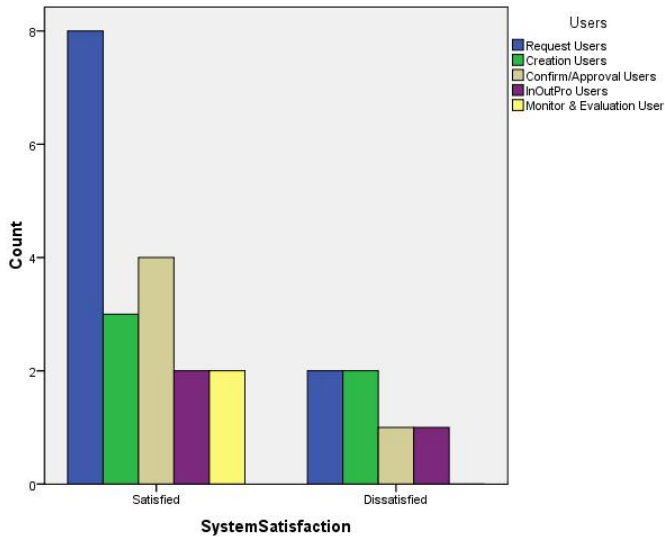


Figure 5.8 Count Bar chart for Satisfaction Level

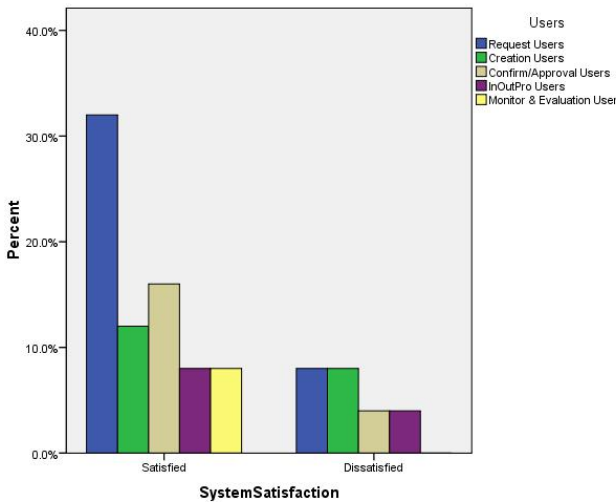


Figure 5.9 Percentage Bar chart for Satisfaction Level



- Figure 5.8 illustrate the Count Bar Chart and Figure 5.9 illustrate the Percentage Bar Chart for Satisfaction Level of Gate Pass Management System with User Types
- There are 2 categories, such as Satisfied and Dissatisfied.
- Also there are 5 user types such as Request Users, Creation Users, Confirm & Approval Users, InOutPro Users and Monitor & Evaluation Users.
- Among the 25 sample user set 8 (32%) Request Users, 3 (12%) Creation Users, 4 (16%) Confirm & Approval Users, 2 (8%) InOutPro Users and 2 (8%) Monitor & Evaluation Users were satisfied for the implementation of Gate Pass Management System.
- Among the 25 sample user set 2 (8%) Request Users, 2 (8%) Creation Users, 1 (4%) Confirm & Approval Users and 1 (8%) InOutPro Users were dissatisfied for the implementation of Gate Pass Management System.

## 5.2 Testing

The testing process was executed parallels with other processes. During the development phase of the system, test cases for separate modules were created to identify whether newly implementing system is working properly after developing as stated or generate erroneous output. As the same testing process applied to entire system for testing and once the whole system works perfectly as preferred, integrated test suites were made to test the continuous functionality of the system.

No automated processes were included in the testing cycle. Only manual testing mechanisms were included following the test plan and the test cases, to assess that system meets the exact user requirements and the processes are interlinked. The newly implementing system is developed in windows environment and convenient to carry out ad-hoc testing through the manual testing process with the use of developed test cases rather than focusing with the automated tools. Manual testing process was more reliable to carry out easily and the test cases were updated with less time period. Since there are large number of users and different types of users in the client site, carrying out testing process manually was convenient, as it identified the user experience and their behaviors easily.

### 5.2.1 Test Plan

The system tested at several levels with several testing techniques. Initially all the operations were tested separately parallel to the development. This was a Unit Testing method and once it done White Box testing was performed. Once the operations were tested separately they were integrated with the other modules and performed integration with the Black Box testing.

After the main testing methods, software was tested at in software validation level and the testing was performed based on test case. The other sub testing techniques include Interface Testing, Performance Testing, Final Testing, Alpha Testing and Stress Testing. All the module were tested and necessary modification was made accordingly. Figure C.1 shows the Test Plan for Gate Pass Management System.

### **5.2.2 Test Cases**

Test cases were prepared based on the Functional and Non Functional requirements. As functional requirements, Material Gate Pass Management Process, Employee Gate Pass Management Process, Visitors Gate Pass Management Process and User Authentication process were considered. The system was tested with different types of values such as single value, multiple values and it can generate expected output. Table D-1 shows the high level test cases written for Gate Pass Management System.

### **5.3 Summary**

Described the evaluation plan, sampling mechanism with the composition of users. Evaluation methodologies used were questionnaires' survey and interviews. Explained the evaluation scenarios and implemented the test case and test plan.

## Chapter 6 Conclusion and Future Work

In all organizations, irrespective of their capacity, a large number of movements take place every day at the gate level. It may be employees moving in or out, visitors entering the premises, movement of materials etc. All these movements occur needs to be monitored and controlled. This is where the concept of a gate pass comes into play. Gate pass can be used to authorize the movements of humans, materials and machines to or from the premises of the organization.

For the material movement between the factory locations or from a factory location to a different location, Material Gate Pass Management System will track from top to bottom process which includes all processes between requisition and material in out process. Employee Gate Pass Management System will track employees who are moving in and out of the organization during working hours. Though in and out time is tracked by the employee ID card there is no documented process to verify the acceptance of movement of employee. Employee Gate Pass Management System act as the monitoring system which track all the processes related to employee movements. Visitor Gate Pass Management System track visitors who visit to the organization premises for the official purposes. This tracks all the details related visitors gate pass management according to date, time and purpose. As a privilege this system can also track visitors who come without prior notification, by maintaining visitor's room log.

Reviewed online software which are relevant to gate pass management. But no integrated software which covers material, employee and visitors available online. All the software covers these areas individually. But the customer requirement is a one solution which address all 3 areas, as the personnel available at the security desk is not well experienced on computer based systems. When compared to other available systems, new system specifically addresses the process flow of customer and align with their manual process. So, it'll be easy for the employees to get use to the system. The significant difference between the implementing system and other available systems is, once log into the system personnel available at security desk can manage all the procedures related to Gate Pass Management. This is very useful for them as they are busy with all general security processes.

In order to finalize the methodology that going to be used for the implementation, performed a comparison between similar systems and newly implementing system. Main functions such as technology used, hardware, etc. were considered during the comparison and according to the outcome, designing methodology was decided. Two phases are included in designing section. First, the logical design which includes the design of forms and reports, the design of the interface and the design of database. Then the physical design which is concerned about the physical database, program, processes and the distributed systems. The methodology used for the development and implementation of system is "Waterfall Model". The generic approach for software designing is Top-Down design.

For implementation, Windows was selected as the platform as the client has their own windows servers and local intranet with strong Virtual Private Network (VPN) connection. To develop the system .NET 4.5 framework was used along with the C# language. Also Ms. SQL Server used to have the database connection with the program.

The sample size of the users at the client base of which the data were expected to gather was identified. The ideal sample size of users were 25. Questionnaires survey and Interviews were the methodologies used as the system evaluation tools. SPSS (Statistical Package for the Social Sciences) Statics Software was used as the analysis program in order to organize data, to manipulate data in an effective manner and to format and fit the needs.

The system tested at several levels with several testing techniques. No automated processes were included in the testing cycle. Only manual testing mechanisms were included following the test plan and the test cases. Test cases were prepared based on the Functional and Non Functional requirements. The system was tested with different types of values such as single value, multiple values and it can generate expected output.

At the data analyzing stage after the user evaluation, found that more users were focused on Material Gate Pass Management System, Employee Gate Pass Management System and Visitor Gate Pass Management System respectively. At the user evaluation it was found that 68% accepted the Gate Pass Management System and satisfaction level of the users for the system was 76%.

Automated Gate Pass Management System enabled the right security, where could keep a vigilant eye on the material movement, transit of employee during working hours and the visitors who are gain the access to the premises. The system restricted the unauthorized movement in organizations' premises, and apart from this, the gate pass allowed the organization to get a record of the time of movement and to track the person responsible for the movement. The gate pass management system enabled to save time by increasing the interaction between relevant departments which are responsible for movement of materials, employee and visitors through gate.

The main limitation of the system is that to use Gate Pass Management System, is every user needs to have computer access and user access to the system. Also users need to have intranet network to access the system. Another limitation of the system is that documents can create only for current date & time and due to this cannot create gate passes for upcoming movements. Also person who approves/Conforms, needs to be available during the processing process to proceed the gate pass processes.

When implementing the new system learnt about user types, user levels and their attitudes towards a new system, since users are familiar with manual process. Adherence of users to the automated system is environment is different. Also faced difficulties to gather correct requirement from end users and this caused gaps after system presentation. Another lesson learnt was how to move a system from test environment to live environment.

As system improvements, this system can convert to a paperless system. Instead of printing gate passes can use a mobile device or any device to get a print preview and from there onwards can continue the In & Out process. Also, can convert system to a web based application to access the system from anywhere at any time. Instead of Employee Card or NIC, can introduce face detection mechanism. In further, need to identify the deviations of developed system and take the necessary actions to correct them and take preventive actions to stop the recurrence.

## References

- [1] “WINHMS Hospitality Management Software” Internet: [www.winhms.com/gatepass.html](http://www.winhms.com/gatepass.html)
- [2] “TouchPoint Visitor Delight” Internet: [www.usetouchpoint.com/material-management.html](http://www.usetouchpoint.com/material-management.html)
- [3] “TouchPoint Visitor Delight” Internet: [www.usetouchpoint.com/visitor-management.html](http://www.usetouchpoint.com/visitor-management.html)
- [4] “Topnotch” Internet: [topnottchsoftsol.com/index.php/mgp](http://topnottchsoftsol.com/index.php/mgp)
- [5] “Topnotch” Internet: [topnottchsoftsol.com/index.php/products/enterprise-visitor-access-management-system/vams](http://topnottchsoftsol.com/index.php/products/enterprise-visitor-access-management-system/vams)
- [6] “Bar Tech” Internet:  
[www.bartecsoftware.com/software\\_products\\_time\\_attendance\\_payroll\\_systems/index.php](http://www.bartecsoftware.com/software_products_time_attendance_payroll_systems/index.php)

## Appendices

### Appendix A : User Manual

# GATE PASS MANAGEMENT SYSTEM User Guide



# Gate Pass Management System User Guide - Table Of Contents

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## General Information

### System Overview

Gate Pass Management System (GPMS) are software systems for gate pass management, encompassing modules supporting functional areas such as materials, employees and visitors.

#### Main Advantages of using Gate Pass Management System

- Restriction of unauthorized movement in organizations' premises
- Get a record of the time of movement and to track the person responsible for the movement
- Improves the accuracy of data and eases the process of fetching data out of the system
- Cares the overall security of the organization while improving the discipline inside the organization.
- Enhances the company image by incorporating with systems that are technologically sound.

### Organization of the Manual

The User's Manual consists of five sections: General Information, System Summary, Getting Started, Using the System and Reporting of the system.

- **General Information** section explains in general terms the system and the purpose for which it is intended.
- **System Summary** section provides a general overview of the system. The summary outlines the uses of the system's software requirement, system's configuration, user access levels and system's behavior in case of any contingencies.
- **Getting Started** section explains how to obtain and implement Gate Pass Management System.
- **Using the System** section provides a detailed description of the system functions.
- **Reporting** section describes in what way information collected by the system are presented and how to access the information.

## **SYSTEM SUMMARY**

System Summary section provides a general overview of the system. The summary outlines the uses of the system's software requirements, system's configuration, user access levels and system's behavior in case of any contingencies.

### **System Configuration**

Gate Pass Management System operates on Personal Computer devices with minimum Dual Core speed Processor, 1GB of RAM, 200MB of free disk space and Windows operating system. It is compatible with Windows 7 and higher versions. .NET Framework and Crystal Report Run Time Version 13 is needed for client end and for server end Windows Server 2008R2 or above as operating system and MS SQL Server 2008R2 or above as for database needed. After the system is installed from the shared location of the server, GPMS can be used immediately without any further configuration.

### **User Access Levels**

The employees and top management who have registered with the Company could access the application.

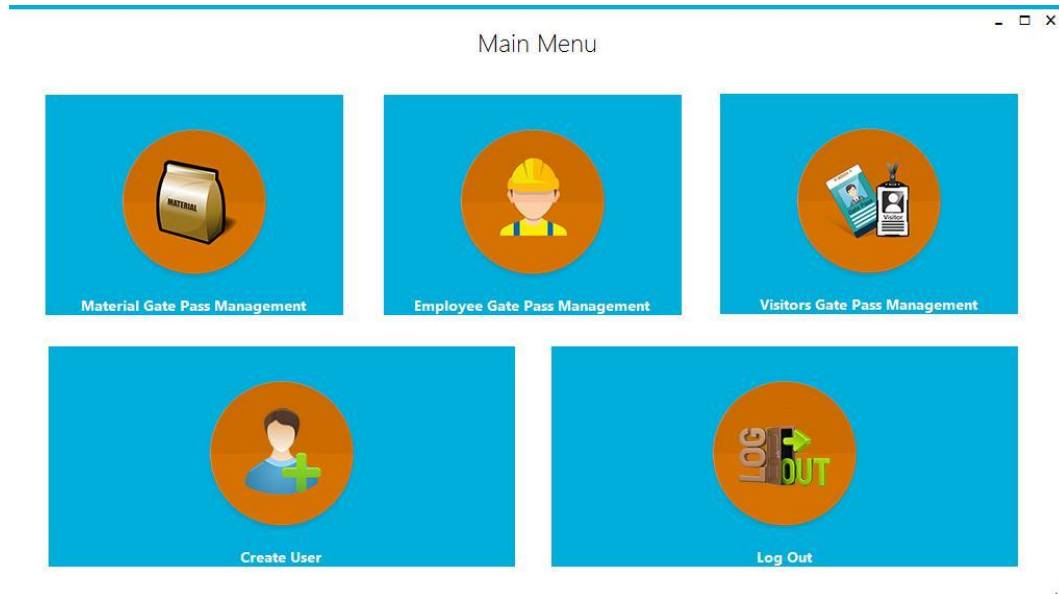
### **Contingencies**

In case of power outage of the Personal Computers, data will not be saved in the database and in case there is no network connection data cannot be saved.

## GETTING STARTED

Given below are the instructions to be followed for the installation of Gate Pass Management System. This section also briefly presents the system menu.

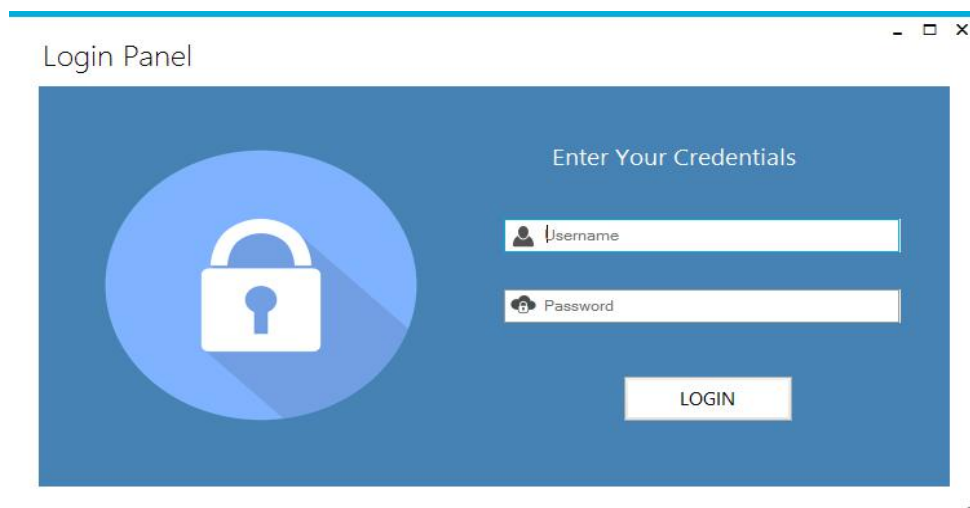
### Application Layout



### Installation and Logging In

The latest and currently available installation version of Gate Pass Management System can be get from shared location to the required personal computers. User Name and password are delivered to user over via an e-mail.

#### Logging In



- Here, the existing user could log in by using the relevant user ID & Pass Word

## USING THE SYSTEM


### User Configuration

← User Creation - □ ×

**NEW** **SAVE** **UPDATE** **CLEAR**

EPF No.	<input type="text"/>
Employee Name	<input type="text"/>
Department	<input type="text"/>
Username	<input type="text"/>
Password	<input type="text"/>
User Type	<input type="text" value="v"/>
Status	<input type="text" value="v"/>

⋮



- A new user creation could be done here, while the User Name, Initial Pass Word & User Type is assigned for a new user through this as well.
- User Name & Pass Word can be used for system login.

# Material Gate Pass Management System

← Material Gate Pass Management Menu



Gate Pass Request



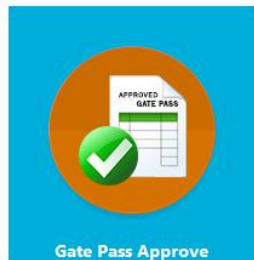
Confirm Gate Pass Request



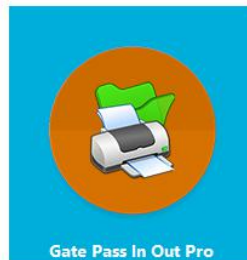
Create Gate Pass



Create Gate Pass Without Request



Gate Pass Approve



Gate Pass In Out Pro



Reports

## Material Gate Pass Request

← Material Gate Pass Request
⌵ □ ✕

NEW UPDATE CLEAR

Request No	<input type="text"/>	Request Type	<input type="text"/>	Remarks	<div style="border: 1px solid #ccc; height: 80px;"></div>
Request Date	19-Mar-2018	Delivery Location	<input type="text"/>		
Request Time	20:50	Item Issue From	<input type="text"/>		
		Contact Person	<input type="text"/>		

**Item Details**

Item No	1	<input type="checkbox"/> FAR	FAR No	<input type="text"/>	Unit	<input type="text"/>	Quantity	<input type="text"/>
Item Description	<div style="border: 1px solid #ccc;"></div>			Reason	<div style="border: 1px solid #ccc;"></div>			

UPDATE REMOVE CLEAR

	Item No	FAR No	Item Description	Unit	Quantity	Reason
*						

- The Material Gate Pass Request will be proceeded according to the requisition. Here the Request Type, Delivery Location, Item Issue From, Contact Person and Item Details will be entered and thereafter, the document should be confirmed.
- Here, multiple items can be added with relevant details and if the material is under the FAR category then the item will be validated.
- Gate Pass Requisition can be edit and resubmit for the confirmation when it redo by an authorized user.

# Material Gate Pass Request Confirmation

← Material Gate Pass Request Confirmation
- □ ×

View Department Request
 View All Request

CONFIRM

REDO

CANCEL

*	Request No	Request Date	Request Time	Department	Request By	Request Type	Item Issue From	Delivery Location	Contact Person

**Gate Pass Request Details**

Request No	Request Number	Department	Department	Request Type	Request Type
Request Date	Request Date	Request By	Request By	Delivery Location	Delivery Location
Request Time	Request Time	Contact Person	Contact Person	Item Issue From	Item Issue From

**	Item No	FAR No	Item Description	Unit	Quantity	Reason

- Once the Gate Pass Requisition is entered to the system and in order to begin the gate pass create process initially it is required to confirm a Gate Pass Request. The details required for the gate pass confirmation is display here.
- A Gate Pass Requisition cancellation or redo is possible only before confirm the Gate Pass Request.

## Material Gate Pass Creation

← Material Gate Pass Creation
- □ ×

Gate Pass No	<input type="text"/>	GP Print Location	<input type="text"/>
Gate Pass Date	<input type="text"/>	Gate Pass Time	<input type="text"/>

*	Request No	Request Date	Request Time	Department	Request By	Confirmed By	Request Type	Item Issue From	Delivery Location	Contact Person

**Gate Pass Request Details**

Request No	<input type="text"/>	Department	<input type="text"/>	Request Type	<input type="text"/>
Request Date	<input type="text"/>	Request By	<input type="text"/>	Delivery Location	<input type="text"/>
Request Time	<input type="text"/>	Confirmed By	<input type="text"/>	Item Issue From	<input type="text"/>
Remarks	<input type="text"/>			Contact Person	<input type="text"/>

**	Item No	FAR No	Item Description	Unit	Quantity	Reason

- The Material Gate Pass Creation will be proceeded according to the Material Gate Pass Request.
- The place to where the gate pass should be printed has to be mentioned here and thereafter, the document should be approved.
- Gate Pass can be edit and resubmit for the approval when it redo by an authorized user.



## Material Gate Pass Creation – Without Request

← Material Gate Pass Creation - Without Request
- □ ×

NEW
UPDATE
CLEAR

Gate Pass No	<input type="text"/>	GP Print Location	<input type="text"/>	Delivery Location	<input type="text"/>	
Gate Pass Date	20-Mar-2018	Remarks	<div style="border: 1px solid #ccc; height: 40px;"></div>		Item Issue From	<input type="text"/>
Gate Pass Time	23:09				Contact Person	<input type="text"/>
Gate Pass Type	<input type="text"/>					
Special Reason						

**Item Details**

Item No	Item No	<input type="checkbox"/>	FAR	FAR No	<input type="text"/>	Unit	<input type="text"/>	Quantity	<input type="text"/>
Item Description					Reason				

UPDATE
REMOVE
CLEAR

	Item No	FAR No	Item Description	Unit	Quantity	Reason
*						

- The Material Gate Pass Creation can be proceeded without the requisition by specified the Special Reason. Here the Request Type, Delivery Location, Item Issue From, Contact Person, Print Location and Item Details will be entered and thereafter, the document should be confirmed.
- Here, multiple items can be added with relevant details and if the material is under the FAR category then the item will be validated.
- Gate Pass can be edit and resubmit for the approval when it redo by an authorized user.

# Material Gate Pass Approval

← Material Gate Pass Request Approval
⌵ □ ✕

View Pending Gate Pass
  View Approved Gate Pass
 

APPROVE
REDO
CANCEL

	Gate Pass No	Gate Pass Date	Gate Pass Time	Department	Request By	Confirmed By	Request Type	Item Issue From	Delivery Location	Contact Person	GP Print Location	Special Reason
*												

**Gate Pass Details**

Gate Pass No	Gate Pass No	Department	[Text Box]	Delivery Location	[Text Box]
Gate Pass Date	Gate Pass Date	Request By	[Text Box]	Item Issue From	[Text Box]
Gate Pass Time	Gate Pass Time	Confirmed By	[Text Box]	Contact Person	[Text Box]
Gate Pass Type	[Text Box]	GP Print Location	[Text Box]	Special Reason	[Text Box]

	Item No	FAR No	Item Description	Unit	Quantity	Reason
*						

- Once the Gate Pass is entered to the system and in order to begin the gate pass In Out Process it is required to approve a Gate Pass. The details required for the gate pass approval is display here.
- A Gate Pass cancellation or redo is possible only before raising the gate pass print.

# Material Gate Pass InOutPro

Material Gate Pass InOutPro

Pending Print Gate Pass     Non Delivered Gate Pass     Pending Return Gate Pass     Reprint Gate Pass

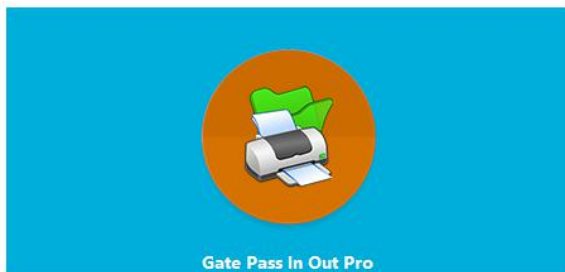
	Gate Pass No	Gate Pass Date	Gate Pass Time	Department	Request By	Request Type	Item Issue From	Delivery Location	Contact Person
*									

Gate Pass Preview

- The Material Gate Pass will be printed here with its details.
- In and Out of a printed Material Gate Pass could also be marked.

# Employee Gate Pass Management

## Employee Gate Pass Management Menu



## Employee Gate Pass Request

← Employee Gate Pass Request- □ ×

NEW SAVE CLEAR

Request No	EGPR/4	Request Date	19-Mar-2018	Request Time	21:00
EFP No	<input type="text" value="1"/>	Employee Name	<input type="text" value="name1 name2"/>		
Department	<input type="text" value="3"/>	Request Type	<input type="text" value="v"/>		
Departure Time	<input type="text" value=""/>	Arrival Time	<input type="text" value=""/>	Duration (Mins)	<input type="text" value=""/>
Reason	<input type="text" value=""/>	Remarks	<input type="text" value=""/>		

- The Employee Gate Pass Request will be proceeded according to the employee requisition. Here the Request Type, Reason, Departure Time and Arrival Time (if only Request Type is Official) will be entered and thereafter, the document should be authorized.

## Employee Gate Pass Request Approval

← Employee Gate Pass Request Approval
- □ ×

View Department Request
 View All Request

APPROVE
CANCEL

*	Request No	Request Date	Request Time	EPF No	Employee Name	Department	Request By	Request Type

**Gate Pass Request Details**

<b>Request No</b>	Request No	<b>Request Date</b>	Request Date	<b>Request Time</b>	Request Time
<b>EPF No</b>	<input type="text"/>	<b>Employee Name</b>	<input type="text"/>		
<b>Department</b>	<input type="text"/>	<b>Request By</b>	<input type="text"/>		
<b>Request Type</b>	<input type="text"/>	<b>Reason</b>	<input type="text"/>		
<b>Departure Time</b>	Departure Time	<b>Arrival Time</b>	Arrival Time	<b>Duration (Minutes)</b>	<input type="text"/>
<b>Reason</b>	<input type="text"/>				

- Once the Gate Pass Requisition is entered to the system and in order to begin the gate pass create process initially it is required to approve a Gate Pass Request. The details required for the gate pass approval is display here.
- A Gate Pass Requisition cancellation is possible only before confirm the Gate Pass Request.

## Employee Gate Pass Creation

← Employee Gate Pass Creation
- □ ×

Gate Pass No	EGP/4	GP Print Location	<input type="text"/>
Gate Pass Date	19-Mar-2018	Gate Pass Time	21:01

	Request No	Request Date	Request Time	EPF No	Employee Name	Department	Request By	Request Approved By	Request Type
▶	EGPR/3	2018-02-07	23:32:46	3	request1 request2 ...	IT	1	1	Official
*									

**Gate Pass Request Details**

Request No	<input type="text"/>	Request Date	<input type="text"/>	Request Time	<input type="text"/>
EPF No	<input type="text"/>	Employee Name	<input type="text"/>		
Department	<input type="text"/>	Request By	<input type="text"/>	Request Approved By	<input type="text"/>
Request Type	<input type="text"/>	Reason	<input type="text"/>		
Departure Time	<input type="text"/>	Arrival Time	<input type="text"/>	Duration (Minutes)	<input type="text"/>
Remarks	<input type="text"/>				

- The Employee Gate Pass Creation will be proceeded according to the Employee Gate Pass Request.
- The place to where the gate pass should be printed has to be mentioned here.

# Employee Gate Pass InOutPro



Employee Gate Pass InOutPro



Non Departure Gate Pass

Pending Print Gate Pass

Pending Arrival Gate Pass

Reprint Gate Pass

	Gate Pass No	Gate Pass Date	Gate Pass Time	EPF No	Employee Name	Department	Request Type	Request Approved By	Departure Time
▶	EGPR/2	2018-01-11	12:33:00	3	request1 request2...	IT	4	1	Official
	EGPR/3	2018-02-07	23:32:46	3	request1 request2...	IT	1	1	Official
*									

Gate Pass Preview



- The Employee Gate Pass will be printed here with its details.
- In and Out of a printed Employee Gate Pass could also be marked.



# Visitors Gate Pass Management



← Visitors Gate Pass Management Menu

Gate Pass Request

Gate Pass Approve

Gate Pass In Out Pro

Visitors' Room Log

Reports

## Visitors Gate Pass Request

← Visitors Gate Pass Request

- □ ×

NEW UPDATE CLEAR

Request No	<input type="text"/>	Request Date	20-Mar-2018	Request Time	23:22
Visit Location	<input type="text"/>	Contact Person	<input type="text"/>	Visitors NIC No	<input type="text"/>
Visitors Name	<input type="text"/>			Visitors Company	<input type="text"/>
Reason For Visit	<input type="text"/>				
Arrival Time	5:30:00 AM	Departure Time	5:30:00 AM	Duration (Minutes)	<input type="text"/>
Arrival Date	2018-03-20	Remarks	<input type="text"/>		

- The Visitors Gate Pass Request will be proceeded according to the employee requisition. Here the Visit Location, Visitor's NIC, Visitor's Name, Visitors' Company, Reason for Visit, Contact Person and Arrival and Departure will be entered and thereafter, the document should be authorized.
- Gate Pass Requisition can be edit and resubmit for the approval when it redo by an authorized user.

# Visitors Gate Pass Request Approval

← Visitors Gate Pass Request Approval
- □ ×

View Department Request
  View All Request
 

APPROVE
REDO
CANCEL

Request No	Request Date	Request Time	Department	Request By	Contact Person	Reason For Visit	Visit Location
*							

**Gate Pass Request Details**

Request No	<input type="text"/>	Request Date	<input type="text"/>	Request Time	<input type="text"/>
Department	<input type="text"/>	Request By	<input type="text"/>	Contact Person	<input type="text"/>
Visitors Name	<input type="text"/>		Visitors NIC No	<input type="text"/>	
Reason For Visit	<input type="text"/>		Visitors Company	<input type="text"/>	
Arrival Time	<input type="text" value="5:30:00 AM"/>	Departure Time	<input type="text" value="5:30:00 AM"/>	Duration (Minutes)	<input type="text"/>
Arrival Date	<input type="text" value="2018-03-20"/>	Remarks	<input type="text"/>		

**Gate Pass Request Details**

Gate Pass No	VGP/2	Gate Pass Date	20-Mar-2018	Gate Pass Time	23:22
--------------	-------	----------------	-------------	----------------	-------

- Once the Gate Pass Requisition is entered to the system and in order to begin the gate pass process initially it is required to approve a Gate Pass Request. The details required for the gate pass approval is display here.
- After the approval of the gate pass requisition it will be convert to a Visitor Gate Pass.
- A Gate Pass cancellation or redo is possible only before raising the gate pass print.

## Visitors Gate Pass InOutPro

← Visitors Gate Pass InOutPro- □ ×

INPRINTOUTREPRINT

Pending Arrival Gate Pass     Pending Print Gate Pass     Non Departure Gate Pass     Reprint Gate Pass

*	Gate Pass No	Gate Pass Date	Gate Pass Time	Department	Request By	Request Approved By	Contact Person	Reason For Visit	Visit Location

Gate Pass Preview

- The Visitors Gate Pass will be printed here with its details.
- In and Out of a printed Visitors Gate Pass could also be marked.

## Visitors Room Log

← Visitors Room Log NEW SAVE CLEAR

Log No	VRL/2	Log Date	Log Date
Contact Person	<input type="text"/>	Log Time	Log Time
Visitors Name	<input type="text"/>	Visitors NIC No	<input type="text"/>
Department	<input type="text"/>	Visitors Company	<input type="text"/>
Reason For Visit	<input type="text"/>	Visit Location	0
Remarks	<input type="text"/>		

**Arrival and Departure Details**

Visitors NIC No	<input type="text"/>	Visitors Name	<input type="text"/>	
Arrival Date	2018-03-19	Arrival Time	5:30:00 AM	<span>UPDATE DEPARTURE</span>
Departure Time	5:30:00 AM	Duration (Minutes)	<input type="text"/>	

- The Visitors Room Log will be proceeded according to the visitor's arrival. Here the Visit Location, Visitor's NIC, Visitor's Name, Visitors' Company, Reason for Visit, Contact Person and Arrival and Departure will be entered.

# REPORTING

## ➤ Material Gate Pass Management Reports

### • Material Gate Pass Request List - Summary

Antler Group

[Material Gate Pass Request List - Summary](#)

Date Period From : 2018-01-01 To: 2018-03-20

Print Date : 2018-03-22

Req. No	Req. Date & Time	Department	Request By	Type	Del. Location	Goods Issue	Status
MGPR/1	2018-02-01 08:00	Marketing	upekshaw	Non Returna	Brandix Apparel Solutions L	Antler HO	MGPR Pending Conf
MGPR/10	2018-02-14 10:15	Production	sunethp	Returnable	MAS Holdings, Colombo 2	Antler HO	MGPR Confirmed
MGPR/11	2018-02-15 10:30	Procument	ruviniw	Non Returna	Uniken Lanka LTD, Colomb	Antler JM 1	MGPR Redo
MGPR/12	2018-02-16 10:45	Maintenance	Lalithw	Returnable	DataCore Technologies (Pv	Antler JM 2	MGPR Cancel
MGPR/2	2018-02-02 08:15	Marketing	upekshaw	Returnable	Hirdaramani Garments, Kat	Antler JM 1	MGP Created
MGPR/3	2018-02-05 08:30	Production	sunethp	Non Returna	Hirdaramani Garments, Mah	Antler JM 2	MGP Created
MGPR/4	2018-02-06 08:45	Procument	ruviniw	Returnable	Chemnex Plc, Colombo	Antler HO	MGP Created
MGPR/5	2018-02-07 09:00	Maintenance	Lalithw	Non Returna	Coolline Ac Center, Sri Jaya	Antler JM 1	MGP Created
MGPR/6	2018-02-08 09:15	Marketing	upekshaw	Returnable	Brandix Intimate Apparel, K	Antler JM 2	MGP Created
MGPR/7	2018-02-09 09:30	Production	sunethp	Non Returna	MAS Intimates, Pahalakai	Antler HO	MGP Created
MGPR/8	2018-02-12 09:45	Procument	ruviniw	Returnable	Glorchem Enterprise, Colom	Antler JM 1	MGP Created
MGPR/9	2018-02-13 10:00	Maintenance	Lalithw	Non Returna	DataCore Technologies (Pv	Antler JM 2	MGP Created

### • Material Gate Pass Request List - Detail

Antler Group

[Material Gate Pass Request List - Detailed](#)

Date Period From : 2018-01-01 To: 2018-03-20

Print Date : 2018-03-23

Req. No	Req. Date & Time	Department	Request By	Type	Del. Location	Status	I/No	I tem Name	Qty	Unit	Reason	FAR No
MGPR/1	2018-02-01 08:00	Marketing	upekshaw	Non Returna	Brandix Appare	MGPR Pending Confirm	1	Pigment Print Sample Packa	1.00	NOS	Sample Transfer	
MGPR/10	2018-02-14 10:15	Production	sunethp	Returnable	MAS Holdings, C	MGPR Confirmed	1	Digital Sublimation Bulk Print	1.00	NOS	Bulk Fabric Transfe	
MGPR/11	2018-02-15 10:30	Procument	ruviniw	Non Returna	Uniken Lanka L	MGPR Redo	1	500ml Distilled Water Bottle	1.00	NOS	Return To Supplier	
MGPR/12	2018-02-16 10:45	Maintenance	Lalithw	Returnable	DataCore Tech	MGPR Cancel	1	Computer Dell	1.00	NOS	Maintenance	A/CAT2/0
MGPR/2	2018-02-02 08:15	Marketing	upekshaw	Returnable	Hirdaramani Ga	MGP Created	1	Pattern Board	1.00	NOS	Sample Transfer	
MGPR/3	2018-02-05 08:30	Production	sunethp	Non Returna	Hirdaramani Ga	MGP Created	1	Water Based Bulk Print	1.00	NOS	Bulk Fabric Transfe	
MGPR/4	2018-02-06 08:45	Procument	ruviniw	Returnable	Chemnex Plc,	MGP Created	1	100ml Ethanol Bottle	1.00	NOS	Return To Supplier	
MGPR/5	2018-02-07 09:00	Maintenance	Lalithw	Non Returna	Coolline Ac Ce	MGP Created	1	National Air Condition Machin	1.00	NOS	Maintenance	A/CAT1/0
MGPR/6	2018-02-08 09:15	Marketing	upekshaw	Returnable	Brandix Intima	MGP Created	1	Rubber Print Sample Packag	1.00	NOS	Sample Transfer	
MGPR/7	2018-02-09 09:30	Production	sunethp	Non Returna	MAS Intimates,	MGP Created						

- Material Gate Pass List - Summary

Antler Group

Material Gate Pass List - Summary

Date Period From : 2018-01-01 To: 2018-03-20

Print Date : 2018-03-22

GP No	GP Date & Time	Department	Request By	GPR No	Type	Del. Location	Con. Person	Issued From	Print Loc.	Remarks	Status
MGP/1	2018-02-02 08:15	Marketing	upekshaw	MGPR/2	Returnable	Hirdaramani Garments, Katunayake	Priyan Perera	Antler JM 1	Guard Room J	Pattern Boards	MGP Pending Ap
MGP/2	2018-02-05 08:30	Production	sunethp	MGPR/3	Non Retur	Hirdaramani Garments, Maharagama	Natasha Fernand	Antler JM 2	Guard Room J		MGP Pending Ap
MGP/3	2018-02-06 08:45	Procument	ruvinlw	MGPR/4	Returnable	Chemanex Plc, Colombo	Ranga Premarat	Antler HO	Guard Room H		MGP Approved
MGP/4	2018-02-07 09:00	Maintenance	Lalithw	MGPR/5	Non Retur	Coolline Ac.Center, Sri Jayawardanepura Kotte	Jagath Rajapaks	Antler JM 1	Guard Room J		MGP Redo
MGP/5	2018-02-08 09:15	Marketing	upekshaw	MGPR/6	Returnable	Brandix Intimate Apparel, Katunayake	Jayantha Senevi	Antler JM 2	Guard Room J		MGP Cancel
MGP/6	2018-02-09 09:30	Production	sunethp	MGPR/7	Non Retur	MAS Intimates, Pahalalugama	Kanishka Rathna	Antler HO	Guard Room H		MGP Printed
MGP/7	2018-02-12 09:45	Procument	ruvinlw	MGPR/8	Returnable	Glorchem Enterprise, Colombo	Savini Pathirage	Antler JM 1	Guard Room J		MGP In
MGP/8	2018-02-13 10:00	Maintenance	Lalithw	MGPR/9	Non Retur	DataCore Technologies (Pvt) Ltd, Colombo	Chinthaka Amaras	Antler JM 2	Guard Room J		MGP Out

- Material Gate Pass List - Detail

Antler Group

Material Gate Pass List - Detailed

Date Period From : 2018-01-01 To: 2018-03-20

Print Date : 2018-03-23

GP No	GP Date & Time	Department	Request By	GPR No	Type	Del. Location	Status	I/No	Item Name	Qty	Unit	Reason	FAR No
MGP/1	2018-02-02 08:15	Marketing	upekshaw	MGPR/2	Returnable	Hirdaramani Garm	MGP Pending Approve	1	Pattern Board	1.00	NOS	Sample Transfer	
MGP/2	2018-02-05 08:30	Production	sunethp	MGPR/3	Non Returna	Hirdaramani Garm	MGP Pending Approve	1	Water Based Bulk Print	1.00	NOS	Bulk Fabric Transfe	
MGP/3	2018-02-06 08:45	Procument	ruvinlw	MGPR/4	Returnable	Chemanex Plc, C	MGP Approved	1	100ml Ethanol Bottle	1.00	NOS	Return To Supplier	
MGP/4	2018-02-07 09:00	Maintenance	Lalithw	MGPR/5	Non Returna	Coolline Ac.Center	MGP Redo	1	National Air Condition Mach	1.00	NOS	Maintenance	A/CAT1/0
MGP/5	2018-02-08 09:15	Marketing	upekshaw	MGPR/6	Returnable	Brandix Intimate	MGP Cancel	1	Rubber Print Sample Pack	1.00	NOS	Sample Transfer	
MGP/6	2018-02-09 09:30	Production	sunethp	MGPR/7	Non Returna	MAS Intimates, P	MGP Printed	1	Sublimation Bulk Print	1.00	NOS	Bulk Fabric Transfe	
MGP/7	2018-02-12 09:45	Procument	ruvinlw	MGPR/8	Returnable	Glorchem Enterp	MGP In	1	1ml Mercury Bottle	1.00	NOS	Return To Supplier	
MGP/8	2018-02-13 10:00	Maintenance	Lalithw	MGPR/9	Non Returna	DataCore Techn	MGP Out	1	Laptop Note Book	1.00	NOS	Maintenance	A/CAT2/0

➤ Employee Gate Pass Management Reports

- Employee Gate Pass Request List - Summary

Antler Group

Employee Gate Pass Request List Summary

Date Period From : 2018-01-01 To: 2018-03-20

Print Date : 2018-03-22

Req. No	Req. Date & Time	EPF No & Name	Department	Type	Reason	Status
EGPR/1	2018-02-20 08:30	6 Hasanthi Dedyagala	HR	Eraly Departu	Personal	EGPR Pending Confirm
EGPR/2	2018-02-21 08:45	6 Hasanthi Dedyagala	HR	Official	Visit to Bank	EGPR Confirmed
EGPR/3	2018-02-22 09:00	7 Anoma Kumarasinghe	Sample	Eraly Departu	Personal	EGPR Cancel
EGPR/4	2018-02-23 09:15	8 Saumya Jagathilaka	Administration	Official	Visit to Bank	EGP Created
EGPR/5	2018-02-26 09:30	6 Hasanthi Dedyagala	HR	Eraly Departu	Personal	EGP Created
EGPR/6	2018-02-27 09:45	7 Anoma Kumarasinghe	Sample	Official	Visit to Bank	EGP Created
EGPR/7	2018-02-28 10:00	8 Saumya Jagathilaka	Administration	Eraly Departu	Personal	EGP Created
EGPR/8	2018-02-28 10:15	8 Saumya Jagathilaka	Administration	Official	Visit to Bank	EGP Created

- Employee Gate Pass Request List - Detail

Antler Group

Employee Gate Pass Request List - Detailed

Date Period From : 2018-01-01 To: 2018-03-20

Print Date : 2018-03-23

Req. No	Req. Date & Time	EPF No & Name	Department	Req. By	Type	D/Time	A/Time	Dur.	Reason	Remarks	Confirmed By	Status
EGPR/1	2018-02-20 08:30	6 Hasanthi Dedyagala	HR	hasanthid	Eraly Departu	15:30			Personal			EGPR Pending Conti
EGPR/2	2018-02-21 08:45	6 Hasanthi Dedyagala	HR	hasanthid	Official	13:00	12:30	30	Visit to Bank			EGPR Confirmed
EGPR/3	2018-02-22 09:00	7 Anoma Kumarasinghe	Sample	anomak	Eraly Departu	16:00			Personal			EGPR Cancel
EGPR/4	2018-02-23 09:15	8 Saumya Jagathilaka	Administration	saumyaj	Official	13:00	12:30	30	Visit to Bank			EGP Created
EGPR/5	2018-02-26 09:30	6 Hasanthi Dedyagala	HR	hasanthid	Eraly Departu	15:30			Personal			EGP Created
EGPR/6	2018-02-27 09:45	7 Anoma Kumarasinghe	Sample	anomak	Official	13:00	12:30	30	Visit to Bank			EGP Created
EGPR/7	2018-02-28 10:00	8 Saumya Jagathilaka	Administration	saumyaj	Eraly Departu	16:00			Personal			EGP Created
EGPR/8	2018-02-28 10:15	8 Saumya Jagathilaka	Administration	saumyaj	Official	13:00	12:30	30	Visit to Bank			EGP Created



- Employee Gate Pass List - Summary

Antler Group

Employee Gate Pass List - Summary

Date Period From : 2018-01-01 To: 2018-03-20

Print Date : 2018-03-22

GP No	GP Date & Time	EPF No & Name	Department	Type	Reason	Req. No	Status
EGP/1	2018-02-23 09:15	8 Saumya Jagathilaka	Administration	Official	Visit to Bank	EGPR/4	EGP Created
EGP/2	2018-02-26 09:30	6 Hasanthi Dedyagala	HR	Eraly Departu	Personal	EGPR/5	EGP Printed
EGP/3	2018-02-27 09:45	7 Anoma Kumarasinghe	Sample	Official	Visit to Bank	EGPR/6	EGP Out
EGP/4	2018-02-28 10:00	8 Saumya Jagathilaka	Administration	Eraly Departu	Personal	EGPR/7	EGP In
EGP/5	2018-02-28 10:15	8 Saumya Jagathilaka	Administration	Official	Visit to Bank	EGPR/8	EGP In

- Employee Gate Pass List Detail

Antler Group

Employee Gate Pass List - Detailed

Date Period From : 2018-01-01 To: 2018-03-20

Print Date : 2018-03-23

Req. No	Req. Date & Time	EPF No & Name	Department	Req. By	Req. No	Type	D/Time	A/Time	Dur.	Reason	Print Location	Remarks	Confirmed By	Status
EGP/1	2018-02-23 09:15	8 Saumya Jagathilaka	Administration	saumyaj	EGPR/4	Official	13:00	12:30	30	Visit to Bank	Guard Room HO			EGP Created
EGP/2	2018-02-26 09:30	6 Hasanthi Dedyagala	HR	hasanthid	EGPR/5	Eraly Departu	15:30			Personal	Guard Room JM1			EGP Printed
EGP/3	2018-02-27 09:45	7 Anoma Kumarasinghe	Sample	anomak	EGPR/6	Official	13:00	12:30	30	Visit to Bank	Guard Room JM2			EGP Out
EGP/4	2018-02-28 10:00	8 Saumya Jagathilaka	Administration	saumyaj	EGPR/7	Eraly Departu	16:00			Personal	Guard Room HO			EGP In
EGP/5	2018-02-28 10:15	8 Saumya Jagathilaka	Administration	saumyaj	EGPR/8	Official	13:00	12:30	30	Visit to Bank	Guard Room JM1			EGP In

## ➤ Visitor Gate Pass Management Reports

- Visitor's Gate Pass List

Antler Group

Visitors Gate Pass List

Date Period From : 2018-01-01 To: 2018-03-20

Print Date : 2018-03-22

Req. No	Req. Date/Time	Visit Location	Visitor's Name	Visitor's Company	Cont. Person	Reason	Req. By	Department	GP No	Status
VGPR/5	2018-03-08 09:00	Guard Room JM1	Asanthi Weerasignhe	National Savings Bank - C	10	Official	dilshanis	Finance	VGP/1	VGP Created
VGPR/6	2018-03-09 09:15	Guard Room JM2	Suren Fernando	EY Office, Colombo	11	Official	chandanas	Administration	VGP/2	VGP Printed
VGPR/7	2018-03-12 09:30	Guard Room HO	Gayani Abesinghe	DataCore Technologies (	9	Official	pasanj	IT	VGP/3	VGP In
VGPR/8	2018-03-13 09:45	Guard Room JM1	Malsha Kumarage	Commercial Bank, Col	10	Official	dilshanis	Finance	VGP/4	VGP Out

- Visitor's Room Log List

Antler Group

Visitor's Log Record

Date Period From : 2018-01-01 To: 2018-03-20

Print Date : 2018-03-23

Log No	Log Date	Visit Location	Visitor's Name	Visitor's Company	Cont. Person	Department	Avl. Time	Dep. Time	Created By	Status
1	2018-03-14	Antler HO	Akila Jayathunga	Sampath Bank, Colombo	Dinesh Ranasinghe	IT	08:30:		admin	VRL Created
2	2018-03-15	Antler HO	Amani Dharmaraja	Seylan Bank, Colombo	Manushi Herath	IT	09:30:	09:45:	manushih	VRL Departure

## AppendixB : User Evaluation Tools and Presentation of Data

### User Survey for Gate Pass Management System Evaluation

Designation: .....

Department: .....

1. How often do you use Gate Pass Management System?

Very Often       Sometimes       Rarely       Never

2. What is your biggest concerned module in Gate Pass Management System?

Material       Employee       Visitors

3. What percentage will you give to

	25%	50%	75%	100%
a. Material Gate Pass Management System	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Employee Gate Pass Management System	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Visitor Gate Pass Management System	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. Has the Gate Pass Management System improved your performance?

Yes       No

5. Are you confident and dependent on new Gate Pass Management System?

Yes       No

6. Do you think that still there is a need of manual gate pass process even though automated Gate Pass Management System available?

Yes       No

7. Up to what percentage does Gate Pass Management System support for your day-today gate pass processes?

<50%       50%       >50%

8. How many system experts do your department have at the moment?

Less Than 5     More Than 5     More Than 10

9. Are you or your team capable to handle Gate Pass Management System?

Yes     No

10. Up to what percentage you trust that the newly implemented Gate Pass Management System that will not destruct your gate pass process and information?

<50%     50%     >50%

11. User's complete satisfaction is important to a system. So, are you satisfied with the services and the processes provided by the Gate Pass Management System?

Yes     No

12. Overall how confident and satisfied are you with the new system?

100% -75%     75% -50%     50% -25%     25%>

*Thank you for participating for this survey by spending your valuable time.*

Figure B.1 Questionnaires Survey Form

## Presentation of Data

Name	Type	Value	Measures
ID	Numeric	None	Ordinal
User Type	Numeric	{1-Request User, 2 - Creation User, 3- Confirm/Approval User, 4 - InOutPro User, 5 - Monitor & Evaluation User}	Nominal
Module Concern	Numeric	{1 -Material, 2 -Employee, 3 -Visitor, 4-All}	Nominal
Manual Process Vs System	Numeric	{1-System, Manual Process, Both}	Nominal
System Satisfaction	Numeric	{1-Satisfied,2-Dissatisfied}	Nominal

Table B-1 Variable View for User Evaluation

ID	User Type	Module Concern	Manual Process Vs System	System Satisfaction
1	1	1	1	1
2	1	1	1	1
3	1	1	1	1
4	1	1	1	1
5	1	2	1	1
6	1	2	2	1
7	1	2	2	1
8	1	2	2	1
9	1	2	3	2
10	1	3	3	2
11	2	1	1	1
12	2	1	1	1
13	2	1	1	1
14	2	2	1	2
15	2	2	2	2
16	3	1	1	1
17	3	4	1	1
18	3	4	1	1
19	3	4	1	1
20	3	4	1	2
21	4	1	1	1
22	4	3	2	1
23	4	3	3	2
24	5	4	1	1
25	5	4	1	1

Table B-2 Data View for User Evaluation

# Appendix C : Test Plan

ID	Task	Task Name	Status	Yr	Duration	Start	Finish	Mar '17	May '17	Jun 1 '17	Jul 31 '17	Sep 1 '17	Oct 2 '17	Dec '17	Jan 1 '18
1	Testing		No		18 days	Mon 18-01-15	Wed 18-02-07	S	S	S	S	S	S	S	S
2	Black Box Testing		No		2 days	Mon 18-01-15	Tue 18-01-16								
3	White Box Testing		No		2 days	Wed 18-01-17	Thu 18-01-18								
4	Unit Testing		No		2 days	Fri 18-01-19	Sat 18-01-20								
5	Integration Testing		No		2 days	Sun 18-01-21	Mon 18-01-22								
6	Interface Testing		No		2 days	Tue 18-01-23	Wed 18-01-24								
7	Performance Testing		No		2 days	Thu 18-01-25	Fri 18-01-26								
8	Final Testing		No		2 days	Sat 18-01-27	Sun 18-01-28								
9	Alpha Testing		No		2 days	Mon 18-01-29	Tue 18-01-30								
10	Stress Testing		No		2 days	Wed 18-01-31	Thu 18-02-01								

Project: Project1 Date: Sat 18-01-13	Task		External Milestone		Manual Summary Rollup	
	Split		Inactive Task		Manual Summary	
	Milestone		Inactive Milestone		Start-only	
	Summary		Inactive Summary		Finish-only	
	Project Summary		Manual Task		Deadline	
External Tasks		Duration-only		Progress		

Page 1

Figure C.1 Test Plan

## AppendixD : Test Cases

Case ID	Test Case	Expected Result	Actual Result
			(APE - As per Expected
<b>Material Gate Pass Management System</b>			
CS1	User Permission Validation User Interface wise for Material Gate Pass Management	User should have requested user permissions	APE
CS2	Material Gate Pass Request Input Validation	Material Gate Pass Request must be save successfully	APE
CS3	Material Gate Pass Request Confirmation Validation	Saved Material Gate Pass Request must be Confirm , Redo or Cancel successfully	APE
CS4	Material Gate Pass Creation Input Validation	Material Gate Pass must be save successfully	APE
CS5	Material Gate Pass Approval Validation	Saved Material Gate Pass must be Confirm , Redo or Cancel successfully	APE
CS6	Material Gate Pass Print, In & Out Validation	Approved Material Gate Pass must be Print, In & Out mark successfully	APE
<b>Employee Gate Pass Management System</b>			
CS7	User Permission Validation User Interface wise for Employee Gate Pass Management	User should have requested user permissions	APE
CS8	Employee Gate Pass Request Input Validation	Employee Gate Pass Request must be save successfully	APE
CS9	Employee Gate Pass Request Confirmation Validation	Saved Employee Gate Pass Request must be Confirm , Redo or Cancel successfully	APE
CS10	Employee Gate Pass Creation Input Validation	Employee Gate Pass must be save successfully	APE
CS12	Employee Gate Pass Print, In & Out Validation	Employee Gate Pass must be Print, In & Out mark successfully	APE

### Visitors Gate Pass Management System

CS13	User Permission Validation User Interface wise for Visitors Gate Pass Management	User should have requested user permissions	APE
CS14	Visitors Gate Pass Request Input Validation	Visitors Gate Pass Request must be save successfully	APE
CS15	Visitors Gate Pass Request Confirmation and convert to Visitors Gate Pass Validation	Saved Visitors Gate Pass Request must be Confirm , Redo or Cancel successfully and convert to Visitors Gate Pass	APE
CS17	Visitors Gate Pass Print, In & Out Validation	Visitors Gate Pass must be Print, In & Out mark successfully	APE
CS18	Visitors Room Log Validation	Visitors Room Log must be save and update successfully	APE

### User Authentication

CS19	User Registration Validation	User Should register to the system	APE
CS20	User Permission Allocation Validation	Registered User should have requested user permissions	APE
CS21	User login Validation	Registered user, User Name and Password should be valid	APE



### Non-Functional Testing

CS22	System Performance Testing	Gate Pass Management system should be able to perform all functions smoothly whole time, without any failures.	APE
CS23	Security Testing	Gate Pass Management system should have proper user role configuration mechanism, which will define the scope of each user within the system to make sure each and every process is well secured	APE
CS24	Reliability Testing of the System	Gate Pass Management System should be able to perform user required functions without any deviations, which will increase the effectiveness of gate pass management process	APE
CS25	Maintainability Testing	Gate Pass Management System should be able to function smoothly with less maintenance. If there is any requirement for a maintenance, it should be able to perform within a short time period	APE
CS26	Transferability Testing	Gate Pass Management System should be able to integrate with currently available systems. Also, it should be able to adopt to technological updates	APE
CS27	Usability Testing	Gate Pass Management System should have user friendly functions which helps user to learn and adopt to the system easily.	APE
CS28	Metrics and Measurements Testing	Gate Pass Management System should possess improved and specific analytical methods to analyze the information of any function and should be able to generate user required output within a short time frame.	APE

Table D-1 Test Cases

## Appendix E : Use Case Narratives

Use-case Name:	Make Material Gate Pass Request (MGPR)	Use-Case Type Business Requirements:
Use-Case Id	01	
Priority:	High	
Source:	Requirement Specification Document	
Preconditions	None	
Primary and other Participating Actor:	Requestor	
Trigger	None	
Typical flow of Events	Make a request through MGPR form for the material movement between the factory locations or from a factory location to a different location.	
Alternative Courses	None	
Post conditions	The MGPR will be send for confirmation	

Table E-1 Use Case Narrative for Make Material Gate Pass Request

Use-case Name:	Confirm or Redo or Cancel Material Gate Pass Request (MGPR)	Use-Case Type Business Requirements:
Use-Case Id	02	
Priority:	High	
Source:	Requirement Specification Document	
Preconditions	MGPR should be available	
Primary and other Participating Actor:	Request confirm Person , Requestor	
Trigger	None	
Typical flow of Events	<p>The request will be confirmed by an authorized person.</p> <p>If Redo, then requestor can amend the previous MGPR and can resubmit for confirmation.</p> <p>If the request is not aligned with the requirements of authorized person, he/she is allowed to cancel or inform requestor to resubmit.</p>	
Alternative Courses	None	
Post conditions	The confirmed MGPR will be send for creation of Material Gate Pass (MGP)	

Table E-2 Use Case Narrative for Confirm or Redo or Cancel Material Gate Pass Request (MGPR)

Use-case Name:	Create Material Gate Pass (MGP)	Use-Case Type  Business Requirements:
Use-Case Id	03	
Priority:	High	
Source:	Requirement Specification Document	
Preconditions	Confirmed MGPR should be available	
Primary and other Participating Actor:	Creator	
Trigger	None	
Typical flow of Events	Creation of MGP by Finance Division based on the approved request.  Finance division can create a gate pass without a request when the requirement comes from top management.	
Alternative Courses	None	
Post conditions	The MGP will be send for approval	

Table E-3 Use Case Narrative for Create Material Gate Pass (MGP)

Use-case Name:	Approve or Redo or Cancel Material Gate Pass (MGP)	Use-Case Type Business Requirements:
Use-Case Id	04	
Priority:	High	
Source:	Requirement Specification Document	
Preconditions	MGP should be available	
Primary and other Participating Actor:	Approve Person, Creator	
Trigger	None	
Typical flow of Events	<p>MGP will be approved by appointed heads of Finance.</p> <p>They have the authority to cancel the gate pass or inform creator of gate pass to redo the creation.</p> <p>If Finance Division wants to cancel an approved MGP during the dispatch process, due to a special reason, they have the authority to cancel the MGP.</p>	
Alternative Courses	None	
Post conditions	The approved MGP will be send for print process	

Table E-4 Use Case Narrative for Approve or Redo or Cancel Material Gate Pass (MGP)

Use-case Name:	Print Material Gate Pass (MGP)	Use-Case Type  Business Requirements:
Use-Case Id	05	
Priority:	High	
Source:	Requirement Specification Document	
Preconditions	Approved MGP should be available	
Primary and other Participating Actor:	Security Person	
Trigger	None	
Typical flow of Events	The gate pass is printed by Security personnel and a signed copy will send with the material.  Re-print of MGP is allowed for special incidents.	
Alternative Courses	None	
Post conditions	The printed MGP will be send for dispatch process	

Table E-5 Use Case Narrative for Print Material Gate Pass (MGP)

Use-case Name:	Dispatch and Return Acceptance of Material Gate Pass (MGP)	Use-Case Type Business Requirements:
Use-Case Id	06	
Priority:	High	
Source:	Requirement Specification Document	
Preconditions	Printed MGP should be available	
Primary and other Participating Actor:	Security Person	
Trigger	None	
Typical flow of Events	Security personnel will update once the material is dispatched from the organization.  Dispatched material which is returnable will be accepted.	
Alternative Courses	None	
Post conditions	None	

Table E-6 Use Case Narrative for Dispatch and Return Acceptance of Material Gate Pass (MGP)

## 1. Employee Gate Pass Management

Use-case Name:	Make Employee Gate Pass Request (EGPR)	Use-Case Type Business Requirements:
Use-Case Id	01	
Priority:	High	
Source:	Requirement Specification Document	
Preconditions	None	
Primary and other Participating Actor:	Employee	
Trigger	None	
Typical flow of Events	Employees, who have ESS (Employee Self Service) facility, can make a request to go outside during the working hours or to departure early through Employee Gate Pass Request Form (EGPR).	
Alternative Courses	None	
Post conditions	The EGPR will be send for approval	

Table E-7 Use Case Narrative for Make Employee Gate Pass Request (EGPR)



Use-case Name:	Make Employee Gate Pass Request (EGPR) on behalf of Employee	Use-Case Type Business Requirements:
Use-Case Id	02	
Priority:	High	
Source:	Requirement Specification Document	
Preconditions	None	
Primary and other Participating Actor:	HR (Human Resource) Person	
Trigger	None	
Typical flow of Events	<p>Employees, who don't have the ESS facility, have to request to go outside during the working hours or to departure early through Human Resource (HR) department.</p> <p>HR department will generate an EGPR on behalf of the employee and send the completed EGPR to the authorized person of the employee for the approval.</p>	
Alternative Courses	None	
Post conditions	The EGPR will be send for approval	

Table E-8 Use Case Narrative for Make Employee Gate Pass Request (EGPR) on behalf of Employee

Use-case Name:	Approve or Cancel Employee Gate Pass Request (EGPR)	Use-Case Type Business Requirements:
Use-Case Id	03	
Priority:	High	
Source:	Requirement Specification Document	
Preconditions	EGPR should be available	
Primary and other Participating Actor:	Request Approval Person	
Trigger	None	
Typical flow of Events	Request will be reviewed and approved by an authorized person. If the request is not aligned with the requirements of authorized person, he/she is allowed to cancel the request.	
Alternative Courses	None	
Post conditions	The approved EGPR will be send for creation of Employee Gate Pass (EGP)	

Table E-9 Use Case Narrative for Approve or Cancel Employee Gate Pass Request (EGPR)

Use-case Name:	Create Employee Gate Pass (EGP)	Use-Case Type  Business Requirements:
Use-Case Id	04	
Priority:	High	
Source:	Requirement Specification Document	
Preconditions	Approved EGPR should be available	
Primary and other Participating Actor:	HR Person	
Trigger	None	
Typical flow of Events	Creation of Gate Pass based on the approved request	
Alternative Courses	None	
Post conditions	The approved EGP will be send for print process	

Table E-10 Use Case Narrative for Create Employee Gate Pass (EGP)

Use-case Name:	Print Employee Gate Pass (EGP)	Use-Case Type  Business Requirements:
Use-Case Id	05	
Priority:	High	
Source:	Requirement Specification Document	
Preconditions	Approved EGP should be available	
Primary and other Participating Actor:	Security Person	
Trigger	None	
Typical flow of Events	EGP will be printed and issued by the security desk. Re-print of EGP is allowed for special incidents.	
Alternative Courses	None	
Post conditions	The printed EGP will be send for departure process	

Table E-11 Use Case Narrative for Print Employee Gate Pass (EGP)

Use-case Name:	Departure and Return Acceptance of Employee	Use-Case Type Business Requirements:
Use-Case Id	06	
Priority:	High	
Source:	Requirement Specification Document	
Preconditions	Printed EGP should be available	
Primary and other Participating Actor:	Security Person	
Trigger	None	
Typical flow of Events	<p>Departure is marked on the EGP.</p> <p>Employee, who did departure with a returnable gate pass, will be accepted when they return to the organization. Security desk will update once the employee returned.</p>	
Alternative Courses	None	
Post conditions	None	

Table E-12 Use Case Narrative for Departure and Return Acceptance of Employee

## 2. Visitors Gate Pass Management

Use-case Name:	Make Visitors Gate Pass Request (VGPR)	Use-Case Type  Business Requirements:
Use-Case Id	01	
Priority:	High	
Source:	Requirement Specification Document	
Preconditions	None	
Primary and other Participating Actor:	Employee	
Trigger	None	
Typical flow of Events	Employee from respective division would beforehand put a request through Visitor Gate Pass Request form (VGPR) for the attendance of visitor(s) who comes with prior notice.	
Alternative Courses	None	
Post conditions	The VGPR will be send for confirmation	

Table E-13 Use Case Narrative for Make Visitors Gate Pass Request (VGPR)

Use-case Name:	Confirm or Redo or Cancel Visitors Gate Pass Request (VGPR)	Use-Case Type Business Requirements:
Use-Case Id	02	
Priority:	High	
Source:	Requirement Specification Document	
Preconditions	VGPR should be available	
Primary and other Participating Actor:	Request confirm Person, Requestor	
Trigger	None	
Typical flow of Events	<p>The request will be confirmed by an authorized person and it will convert to a Visitor Gate Pass (VGP).</p> <p>If Redo, then the requester can amend the VGPR and can resubmit for approval.</p> <p>If the request is not aligned with the requirements of authorized person, he/she is allowed to cancel or inform requestor to resubmit.</p>	
Alternative Courses	None	
Post conditions	The VGP will be send for print process	

Table E-14 Use Case Narrative for Confirm or Redo or Cancel Visitors Gate Pass Request (VGPR)

Use-case Name:	Print Visitors Gate Pass (VGP)	Use-Case Type  Business Requirements:
Use-Case Id	03	
Priority:	High	
Source:	Requirement Specification Document	
Preconditions	VGP should be available	
Primary and other Participating Actor:	Security Person	
Trigger	None	
Typical flow of Events	<p>When visitor arrives at the gate, the security desk will acquire the information from the visitor and will cross check with the details entered in the system. After conforming, the security desk will issue a printed VGP for the visitor.</p> <p>Re-print of VGP is allowed for special incidents.</p>	
Alternative Courses	None	
Post conditions	The printed MGP will be send for dispatch process	

Table E-15 Use Case Narrative for Print Visitors Gate Pass (VGP)



Use-case Name:	Departure of Visitor	Use-Case Type  Business Requirements:
Use-Case Id	04	
Priority:	High	
Source:	Requirement Specification Document	
Preconditions	Printed VGP should be available	
Primary and other Participating Actor:	Security Person	
Trigger	None	
Typical flow of Events	After visiting the respective employee, visitor will take the belongings from the security desk will report at the gate for exit. Security desk will update accordingly after the visitor signed off the gate pass.	
Alternative Courses	None	
Post conditions	None	

Table E-16 Use Case Narrative for Departure of Visitor

Use-case Name:	Maintained Visitors' Room Log (VRL) form	Use-Case Type Business Requirements:
Use-Case Id	05	
Priority:	High	
Source:	Requirement Specification Document	
Preconditions	None	
Primary and other Participating Actor:	Security Person	
Trigger	None	
Typical flow of Events	<p>Visitors who come without prior notice, will inform security desk about the person he/she needs to meet. Security desk informs the responsible employee and verify the details of visitor through tele-communication.</p> <p>Once the visitor is verified, security desk informs employee to meet the visitor at the visitors' room. The required records will be maintained in the Visitors' Room Log (VRL) form.</p> <p>If the visitor needs to visit the organization premises, then security desk asks relevant employee to generate VGP as per above procedure.</p>	
Alternative Courses	None	
Post conditions	None	

Table E-17 Use Case Narrative for Maintained Visitors' Room Log (VRL) form

### 3. User Role Configuration

Use-case Name:	Create System User and Permission Allocation	Use-Case Type Business Requirements:
Use-Case Id	01	
Priority:	High	
Source:	Requirement Specification Document	
Preconditions	None	
Primary and other Participating Actor:	System Administrator	
Trigger	None	
Typical flow of Events	Create system users and allocate user permissions based on the approved user creation request	
Alternative Courses	None	
Post conditions	None	

Table E-18 Use Case Narrative for Create System User and Permission Allocation

Use-case Name:	Login	Use-Case Type  Business Requirements:
Use-Case Id	02	
Priority:	High	
Source:	Requirement Specification Document	
Preconditions	System should be available	
Primary and other Participating Actor:	System User	
Trigger	None	
Typical flow of Events	<p>User can login into the system when provide correct user name and password.</p> <p>If the user login was successful user will be able to use the provided facilities for his/her needs.</p>	
Alternative Courses	None	
Post conditions	None	

Table E-19 Use Case Narrative for System Login

## Appendix F : Extended Entity-Relationship (ER) Diagram

Gate Pass Management System -  
Entity Relationship Diagram

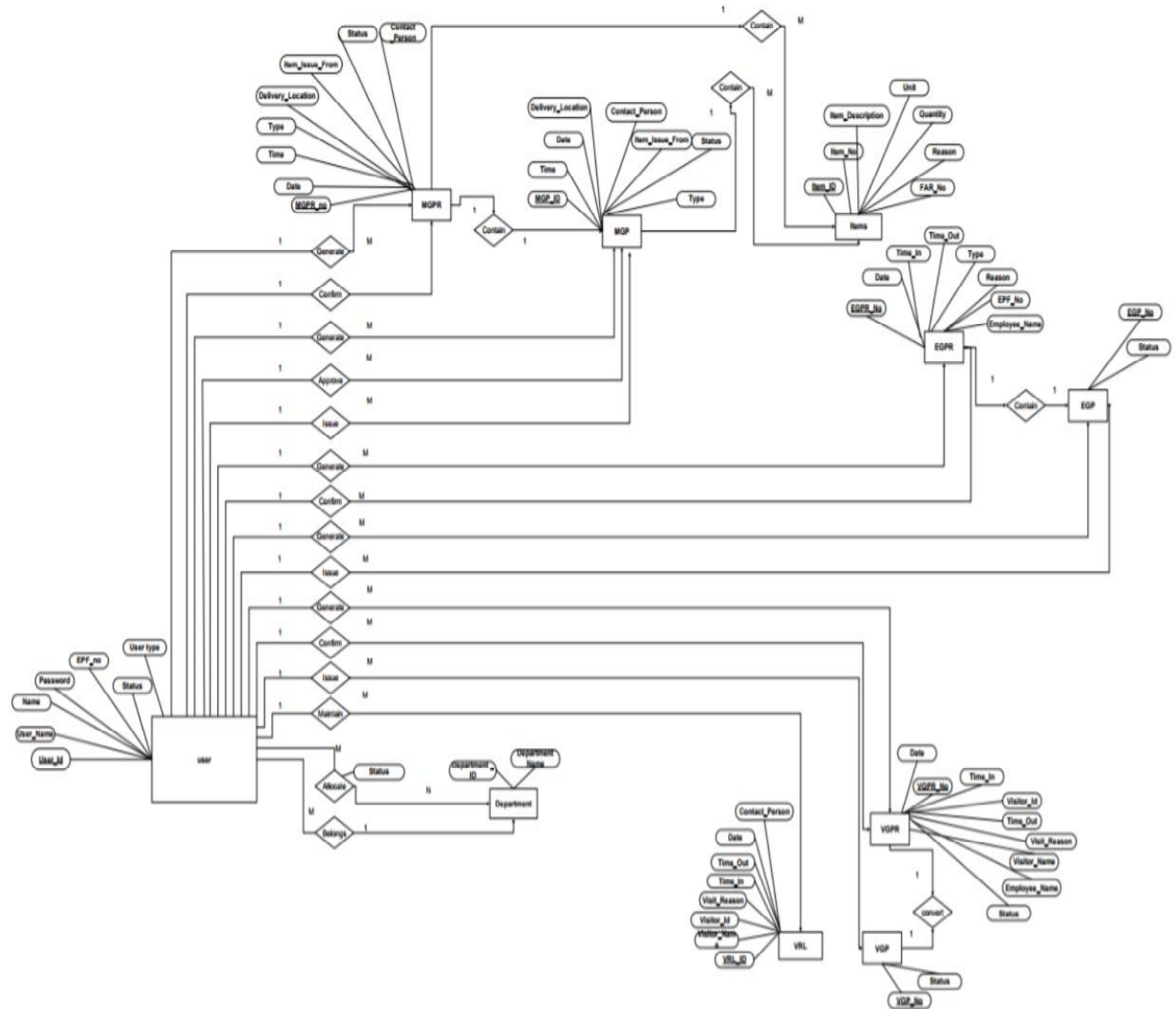


Figure F.1 Extended Entity-Relationship Diagram for Gate Pass Management System