



# **Online Hotel Management System for Trevene Hotel Group**

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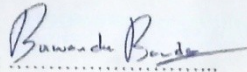
**BIT**



**This dissertation is submitted in partial fulfilment of the requirement of the  
Degree of Bachelor of Information Technology (external) of the University of  
Colombo School of Computing**

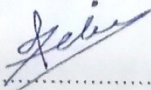
## DECLARATION

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# ABSTRACT

Trevene Hotel is one of the famous Hotel in Srilanka and it is situated in Nuwara-eliya district. This Hotel is used by many Guests because it is the main hotel in Nuwaraeliya Town. The Hotel Group does not have proper computer based system to handle Reservations, Rooms, Bills, Payments, Guest management, Reports..etc.

The introducing system, Web based Hotel Management System which has implemented for Trevene Hotel will automate the major operations of the hotel. The Reservation System is to keep track in room and hall reservation and check availability. The Room Management System is for manage all room types room services. The Inventory Control System will keep track in all inventories of the hotel and guest details will handled by guest management.

Web based Hotel Management System is to simplify the day to day processes of the hotel. The system will be able to handle many services to take care of all customers in a quick manner. As a solution to the large amount of file handling happening at the hotel, this software will be used to overcome those drawbacks. As a result of above mentioned facts the proposed system is more efficient, reliable and time saving than the current manual system

The methodology used for development of the system is Rational Unified Process (RUP) and it allows the use of Object Oriented System Development employing Unified Modelling Language (UML) for system designing. Hypertext Pre-processor (PHP) which is a powerful server-side scripting language is used to build the System. Hyper Text Mark-up language (HTML) and Java Scripts are using to handle client side and MYSQL is using as the Database Management system. Apache is using as the web server.

Hence the company decides to switch effective IT solution to solve their mentioned problems. The owner's personal request motivated me to develop this project.

# ACKNOWLEDGEMENT

I would like to take this opportunity to thank all those who contributed towards the success of this project.

First and foremost I extend my heartiest gratitude to the University of Colombo School of computing for giving us this valuable degree program to enhance our knowledge in this field and for their guidance from the beginning.

Very special thanks goes to my project supervisor, Mr. Shirley Ishantha Nanayakkara. He improved my confidence when I doubted myself, and brought out the good idea in me. Without his support this project would not be possible.

Next, I must thank the Hotel manager and the staff at Trevene Hotel for their assistance and encouragement.

I must convey my gratitude to Mr. Shamri Ahafurdeene and all the staff members at Esoft computer studies (pvt) Ltd, Kandy for giving me their valuable support throughout the academic years.

I am also grateful to my dear parents for their faith and hope towards me right along and for having stand beside me, giving all the support to pursue my degree program, without their backing I would not have been able to succeed in this project.

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# LIST OF ACRONYMS

<b>1NF</b>	-	First Normal Form
<b>2NF</b>	-	Second Normal Form
<b>3NF</b>	-	Third Normal Form
<b>CD ROM</b>	-	Compact Disc Read Only Memory
<b>CSS</b>	-	Cascading Style Sheet
<b>EPI</b>	-	Employee Personal Information
<b>FK</b>	-	Foreign Key
<b>HTML</b>	-	Hypertext Mark-up Language
<b>OOAD</b>	-	Object Oriented Analysis and Design
<b>PDF</b>	-	Portable Document Format
<b>PHP</b>	-	PHP: Hypertext Pre-processor
<b>PK</b>	-	Primary Key
<b>RAD</b>	-	Rapid Application Development
<b>RUP</b>	-	Rational Unified Process
<b>SQL</b>	-	Structured Query Language
<b>UML</b>	-	Unified Modelling Language

# CHAPTER 01-INTRODUCTION

## 1.1 INTRODUCTION

The system is developing for the Trevene hotel which is situated One kilometer apart from the Nuwara-eliya town. It was started about 2005. Now it has become to one of the famous Hotel in NuwaraEliya with thirty employees. Many local and foreign Guests come to this Hotel per day because it is the only one four star hotel Group in Nuwareliya. From the started date up to now Hotel management procedures has done manually without using the help of an automated system.

## 1.2 MOTIVATION FOR THE PROJECT

- This is one of the finest hotel group in Nuwara-Eliya District and currently they are using a manual system for their management activities. So the proposed web based Hotel Management system will be more competent and helpful than the manual system.
- They have four hotels in Nuwara eliya District and Currently all the hotels follow a manual system for all their Reservations handling, account handling and Tour handling. By the proposed system the hotel will be able to carry out all the above mentioned things via Online.
- According to the current system all the room details such as rooms availability, prices, features etc.. Processed by manually. Whereas the proposed system will be able to do that online.
- In the present system details of guest, Invoices and Reports are entered manually. The proposed system provides the ability to enter guest details and generate Reports, Invoices Online.
- The Project satisfied requirement of the guidelines published by the UCSC and it is great opportunity to try out the technologies and my knowledge that I have gained through BIT program

### 1.3 OBJECTIVES AND SCOPE

The proposed system converts the existing manual Hotel management system into a web-based system. Staff members can log in to the system separately and can handle booking, update room's details, generate invoices, reports and manage guest details. A guest can check room's details by login to the system and she/he can make a reservation according to the choices. Invoice also can be generated via online.

- Separate user login

Each user has a separate login to the system with a username and password with limited access according to the given privileges

- Web based system Minimize the stationery cost and effort of staff.

This system provides the facility to enter the information directly to the web without using any stationery and staff can easily handle the system without much effort.

- Provide accurate report with in short time.

The system provides report according to the requirements of the authorized users. Such as daily, weekly, monthly, reports and these reports are strongly helpful in decision making.

- Repetition of details is avoided.

- Guest can make a reservation via online.

- Check availability

Guest can check whether a room available or not.

- Add a new room to the system

Can add the new room to the system and enter the new room details.

- User can delete the room details from the system.

- User can set room's rate to hotel room in system.

## 1.4 STRUCTURE OF THE DISSERTATION

The dissertation structure consists of six main chapters as follows

### Chapter 01: Introduction

The introduction chapter briefly describes the background, objectives, scope and the motivate of the project.

### Chapter 02: Analysis

The analysis section contains the fact gathering techniques, analysis of the current manual system, drawbacks of the current system and collected functional and non-functional requirements.

### Chapter 03: Design

The work done in the analysis chapter is used to design the system to satisfy the client's requirements. This phase includes models used, diagrams and the designed user interfaces.

### Chapter 04: Implementation

The implementation chapter consists of all major codes, software and hardware environment used for the system implementation.

### Chapter 05: Evaluation

The test plans and test cases used were demonstrated in this chapter.

### Chapter 06: Conclusion

This is the final chapter of the dissertation and it will further evaluate the system. It also includes the ideas to the future enhancement of the system.

# CHAPTER 02-ANALYSIS

## 2.1 FACT GATHERING

Fact finding techniques play an important role in system development by representing the user requirements. The developer should have the ability to gather functional and non-functional requirements of the user's in order to increase the effectiveness of the system.

To develop the web based Hotel Management System most appropriate workers were selected from the staff to discover their requirements.

As the main requirement gathering technique, interviewing and studying the manual system documentation were used. Questionnaires and referring similar systems were also used to gather details. Questions were prepared for the staff and Guests before every interviewing session. Guests were selected randomly. Some of the interviews with the staff were face to face and some were over the phone. Manual report, Invoices, Guest Details Reports, Room Details Reports,Reservation details etc. were also helpful to collect more facts.

## 2.2 ANALYSING THE CURRENT MANUAL SYSTEM

According to the fact finding technique current Hotel management system has been divided into main two logical sub systems. The divided sub systems are as follows

1. Reservation management system
2. Guest details management system
3. Payment management system
4. Rooms management system
5. Reports management system
6. Inventory management system

In existing system all the booking of rooms in a hotel are done manually, so it was more time taking for an executive and guest to book, search rooms and collect payment in hotel.

Another major disadvantage is that to preparing the list of all the rooms available in the hotel will take more time. Currently it is doing as a one day process for verifying records.

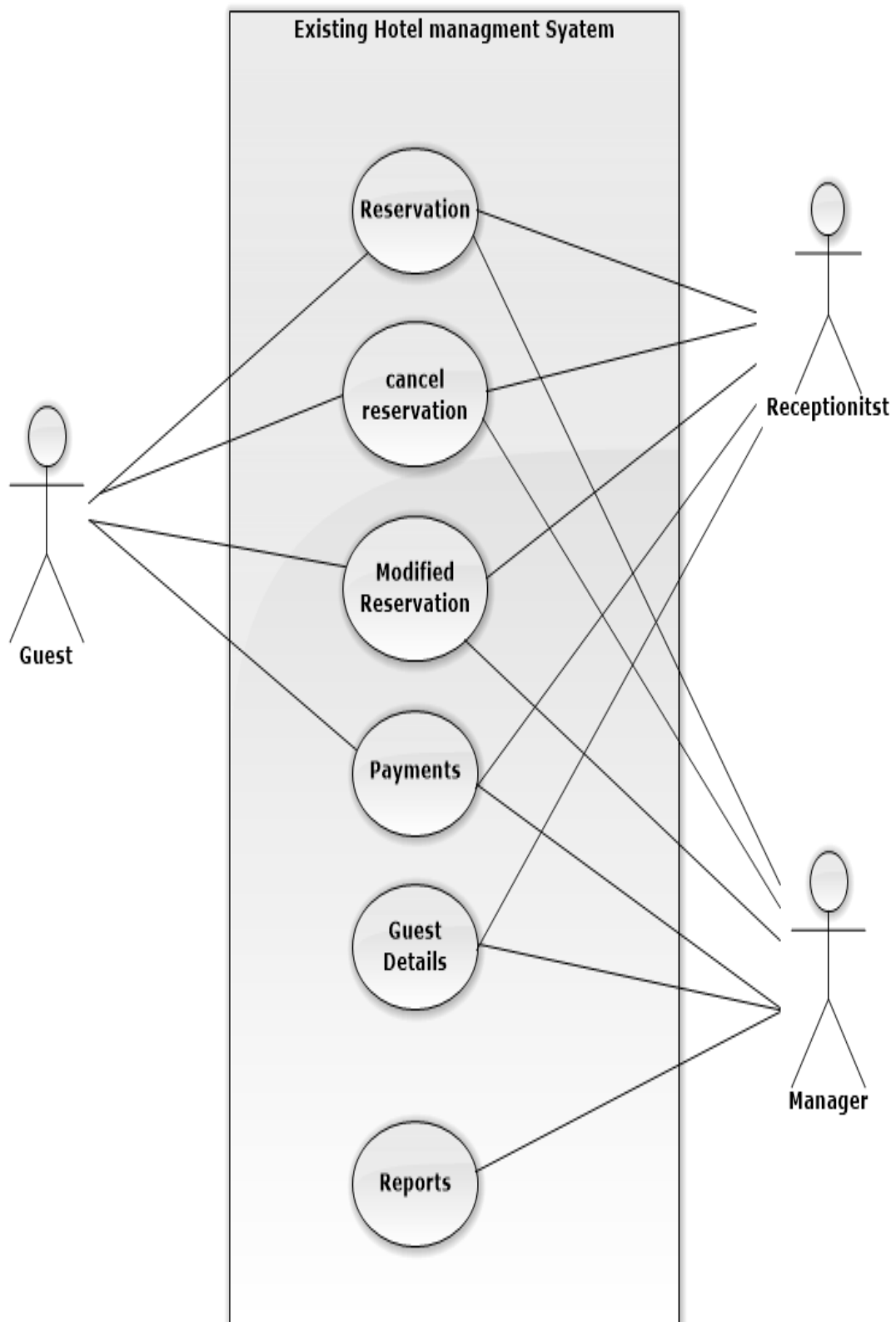
Booking is done through phone calls or through visit to the hotel booking office. The guest's personal details such as Name, Age, Nationality, and Duration of stay, are input during booking. The booking office orders for preparation of the guest's room before his/ her check in date. The documents are transferred manually to the Administrative department for compilation of the guest's file. On the reporting date the file is transferred to the reception. On checking in the guest is given the key to his allocated room, he also specify if he needs room service.

The receptionist hands over the guest's file to the Cashier on the next table. Here the guest pays accommodation and meals fee. The guest's file is updated on daily basis of his expenditure costs. The accounts department generates the bills on daily basis and delivered to the guests in their rooms at dusk by the service maids. The guest pays at the accounts desk, where the receipts are generated.

For a one meal customer the bill is generated immediately after ordering and he pays at the cashier desk before leaving.

During checking out of guests, their expenditure outlines are generated a day before check outdate. The guests receive their outlines at the accounts desk as they check out, where they pay for bills balances if any.

Figure 2.1 shows the use case diagram of the current manual system.



**Figure 2.1** Existing Hotel Management System



## 2.3 DRAWBACKS OF THE CURRENT SYSTEM

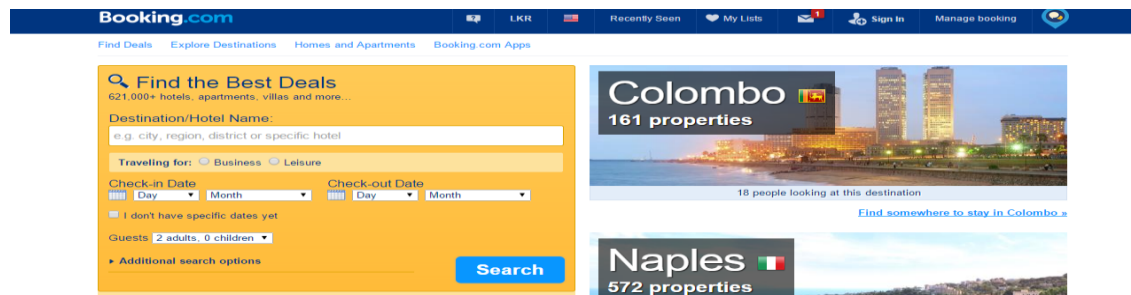
1. Because all the recordings are done manually stationary cost is high
2. Data repetition can take place
3. The workload for the hotel staff is high
4. Sometimes the records can be destroyed
5. Ample space is needed to store the recordings
6. Much time is required to find a particular detail from the documents
7. Mostly data is kept on registers and these are stored in filing cabinets and this consumes a lot of space
8. Retrieval of data is very slow as it has to be searched it has to be searched in lots of books and this waste lots of time.
9. Data is not always reliable as it is hand written and some human errors might have occurred example wrong telephone number ect
10. Complains from guests:

Due to poor management of documents encouraged by the manual system, several cases were reported where guests complained of overcharging, charging of services not used by the guests.
11. Poor communication:

Due to poor communication between the departments, guests are often served with services they didn't order.
12. Difficulty in data analysis:

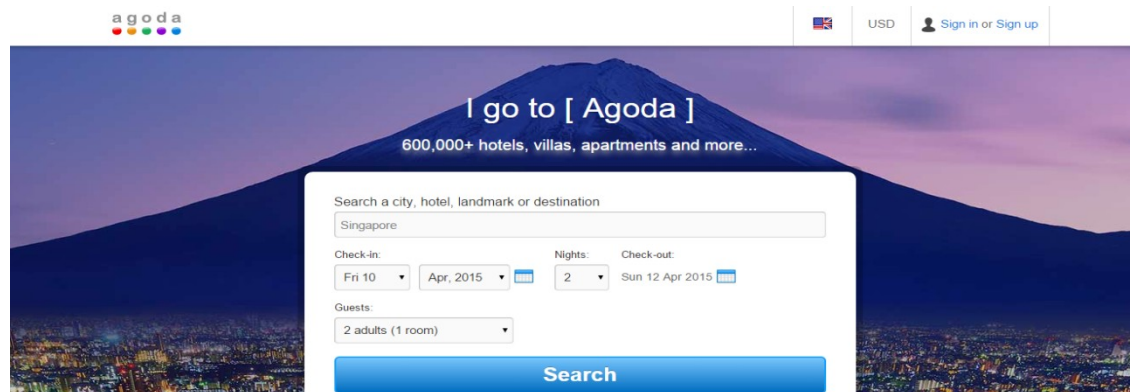
The accountants usually found it difficult to analyze the guests' data during generation of expenditure bills due to missing of some records.

## 2.4 LITERATURE REVIEW AND SIMILAR SYSTEMS



Booking.com B.V., part of the Priceline Group (Nasdaq: PCLN), owns and operates Booking.com™, the world leader in booking accommodations online. Each day, over 800,000 room nights are reserved on Booking.com. The Booking.com website and apps attract visitors from both the leisure and business sectors worldwide.

Established in 1996, Booking.com B.V. guarantees the best prices for any type of property, from small, family-run bed and breakfasts to executive apartments and five-star luxury suites. Independent accommodations are also specifically a focus of Villas.com, a sister site recently launched by Booking.com. Truly international, Booking.com is available in more than 40 languages, and offers over 621,301 properties in 212 countries.[1]



Agoda (www.agoda.com) is one of the fastest-growing online hotel platforms worldwide, listing hundreds of thousands of hotels and providing services in 38 different languages. Agoda Company Pte. Ltd., the company behind Agoda.com, was established in 2005 by two veterans of the online travel business and in 2007 was acquired by Priceline Group, the largest seller of rooms online. Priceline Group is publicly traded on NASDAQ (Nasdaq: PCLN) and is a part of the S&P 500.[2]

## 2.5 FUNCTIONAL REQUIREMENTS

*Functional requirements* These are statements of services the system should provide, how the system should react to particular inputs and how the system should behave in particular situations. [11]

### **Web based hotel Management System**

- Staff and Guests should have separate privileges to log in to the system.
- The system will provide reports according to the requirements of the authorized person
- Guests should have the ability to get prints about their reserved Details.
- Also system will facilitate to cancel the reservations
- Make Reservations
- Ability to book rooms for walk-in customers
- Search Rooms
- Add Payment
- Issue Bills
- Manage Guest (Add, Update Guest)
- Manage Room Details (Add, Update, Delete)
- Manage Staff (Add, Update, Delete, View)
- Manage Inventory (Add, Edit, Delete)
- Set Rates
- Manage Users (Add, Update, Delete)
- E-mail notifications

## 2.6 NON-FUNCTIONAL REQUIREMENTS

*Non-functional requirements* These are constraints on the services or functions offered

by the system. They include timing constraints, constraints on the development process and standards. Non-functional requirements often apply to the system as a whole. They do not usually just apply to individual system features or services.[11]

### **Reusability and Maintainability**

The system should be implemented in a way to utilize reusability and maintainability of both the design and code. In future alternate functions and requirements should be added to the system without major impacts on design.

### **Security**

System shall not disclose any sensitive data to any unauthorized third party relating to ordering of products and customer personal information.

### **User friendliness**

User friendliness is another key factor to success. User interfaces should be designed in such

a way that is easy and logical navigation through the system, consistent look and feel and should motivate to use. Provide help facility for the users is important to enhance the user friendliness.

### **Safety**

There are several user levels in hotel management system, Access to the various subsystems will be protected by a user log in screen that requires a user name and password. This gives different views and accessible functions of user levels through the system. Maintaining backups ensure the system database security. System can be restored in any case of emergency

# CHAPTER 03-DESIGN

Software design is an iterative process through which requirements are translated into a “blueprint” for constructing the software. Initially, the blueprint depicts a holistic view of software. That is, the design is represented at a high level of abstraction—a level that can be directly traced to the specific system objective and more detailed data, functional, and behavioural requirements. As design iterations occur, subsequent refinement leads to design representations at much lower levels of abstraction [12]

## 3.1 PROCESS MODEL

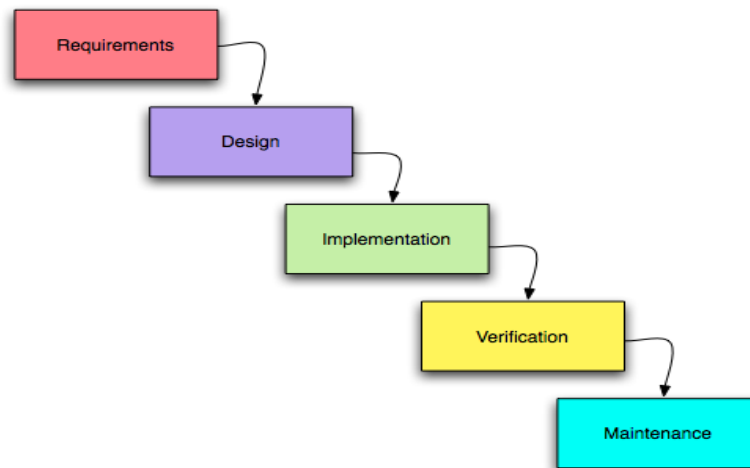
A software process model is a simplified description of a software process that presents one view of that process. Process models may include activities that are part of the software process, software products and the roles of people involved in software engineering.[11]

Rational Unified Process (RUP) was selected as the process model for this project. RUP and some alternative solutions are discussed below.

### 3.1.1 Waterfall Model

The **waterfall model** is a sequential design process, often used in software development processes, in which progress is seen as flowing steadily downwards (like a waterfall) through the phases of Conception, Initiation, Analysis, Design, Construction, Testing, Production/Implementation and Maintenance. Waterfall model maintains that one should move to a phase only when it's preceding phase is completed and perfected. However, there are various modified waterfall models that may include slight or major variations on this process.[3]

Figure 3.1 shows the Water Fall Model



**Figure 3.1** Waterfall Model

### 3.1.2 Prototyping Model

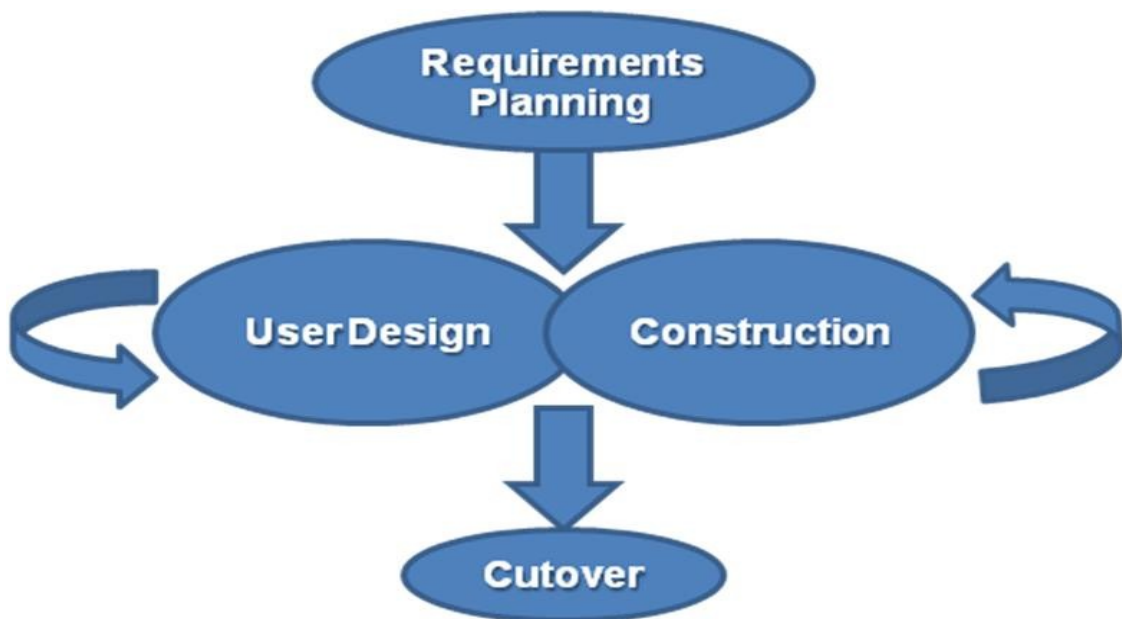
**Software prototyping** refers to the activity of creating prototypes of software applications. A prototype typically simulates only a few aspects of, and may be completely different from, the final product. The original purpose of a prototype is to allow users of the software to evaluate developers' proposals for the design of the eventual product by actually trying them out, rather than having to interpret and evaluate the design based on descriptions. Prototyping can also be used by end users to describe and prove requirements that developers have not considered, and that can be a key factor in the commercial relationship between developers and their clients.[4]

### 3.1.3 Rapid Application Development (RAD)

**Rapid application development (RAD)** is a software development methodology that uses minimal planning in favour of rapid prototyping. The "planning" of software developed using RAD is interleaved with writing the software itself. The lack of extensive pre-planning generally allows software to be written much faster, and makes it easier to change requirements. In rapid application development, structured techniques and prototyping are especially used to define users' requirements and to design the final system. The development process starts with the development of preliminary data models and business process models using structured techniques. In the next stage, requirements are verified using prototyping, eventually to refine the

data and process models. These stages are repeated iteratively; further development results in "a combined business requirements and technical design statement to be used for constructing new systems".[5]

Figure 3.2 shows the Rapid application development.



**Figure 3.2** Rapid application development

## 3.2 METHODOLOGY FOR THE PROPOSED SYSTEM

### 3.2.1 Rational unified process (RUP)

The **Rational Unified Process (RUP)** is an iterative software development process framework. RUP is not a single concrete prescriptive process, but rather an adaptable process framework, intended to be tailored by the development organizations and software project teams that will select the elements of the process that are appropriate for their needs. RUP is based on a set of building blocks, or content elements, describing what is to be produced, the necessary skills required and the step-by-step explanation describing how specific development goals are to be achieved. RUP has determined a project life cycle consisting of four phases.[6]

## Inception Phase

The primary objective is to scope the system adequately as a basis for validating initial costing and budgets. In this phase the business case which includes business context, success factors and financial forecast is established. To complement the business case, a basic use case model, project plan, initial risk assessment and project description core are generated

## Elaboration Phase

The primary objective is to mitigate the key risk items identified by analysis up to the end of this phase. The elaboration phase is where the project starts to take shape. In this phase the problem domain analysis is made and the architecture of the project gets its basic form.

## Construction Phase

The primary objective is to build the software system. In this phase, the main focus is on the development of components and other features of the system. This is the phase when the bulk of the coding takes place.

## Transition Phase

The primary objective is to 'transit' the system from development into production, making it available to and understood by the end user.

Figure 3.3 shows the Rational Unified Process

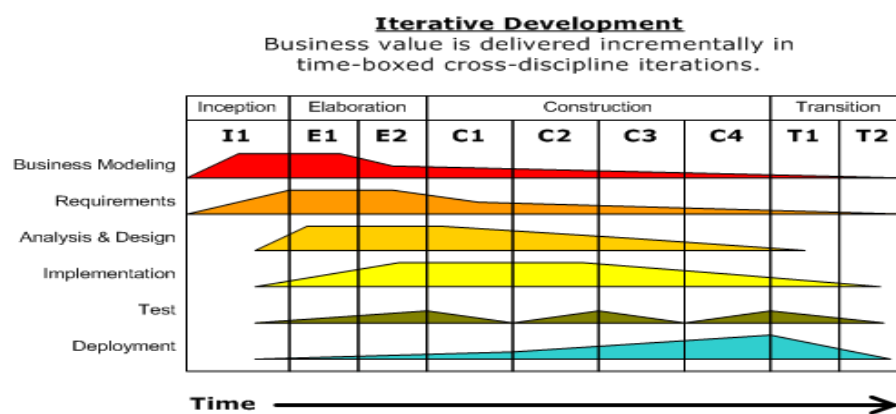


Figure 3.3 Rational Unified Process



### 3.2.2 Reason for choosing RUP

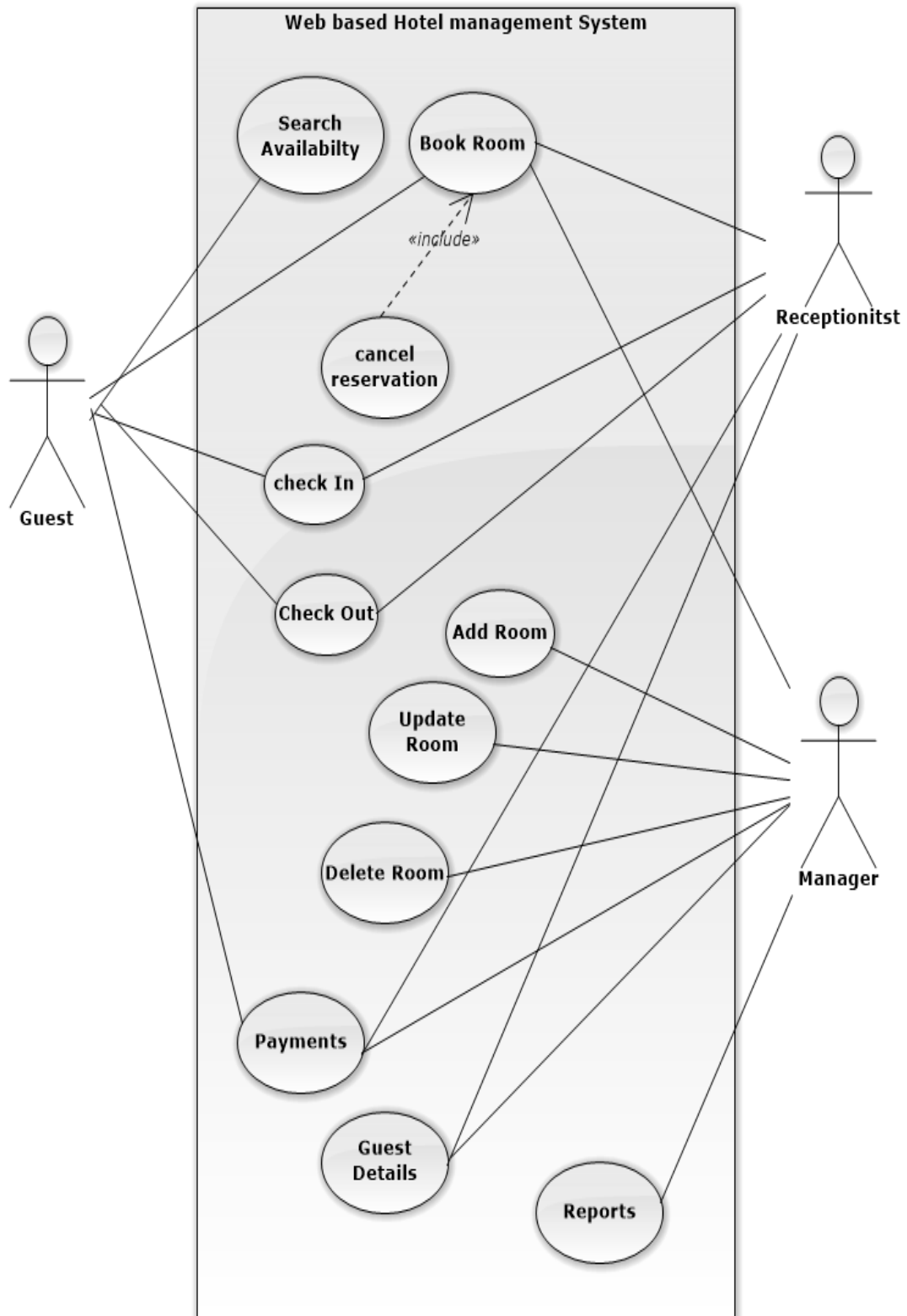
- RUP organizes system into phases to ensure each process has better executable iterations.
- RUP typically helps to resolve project risks associated with the client's evolving requirements.
- RUP gives the opportunity to reuse processes to address common problems. So the development time required is less due to reuse of components.

## 3.3 SYSTEM DESIGN

System design is the logical organisation of the software. It is provide static and dynamic behaviours of the system. Object oriented design technique was chosen for design. For notations UML was used and SoftwareIdeasModeler.5.11 was used as a tool for that.

A **use case** is a description of a system's behavior from a user's standpoint. For system developers, the use case is a valuable tool: It's a tried-and-true technique for gathering system requirements from a user's point of view. Obtaining information from the user's point of view is important if the goal is to build a system that real people (and not just computerphiles) can use. [11]

Figure 3.4 shows the High Level Use case Diagram for the Web based Hotel Management System



**Figure 3.4** High Level Use case Diagram for the Web based Hotel Management System

Figure 3.5 shows Use Case Diagram for the Login

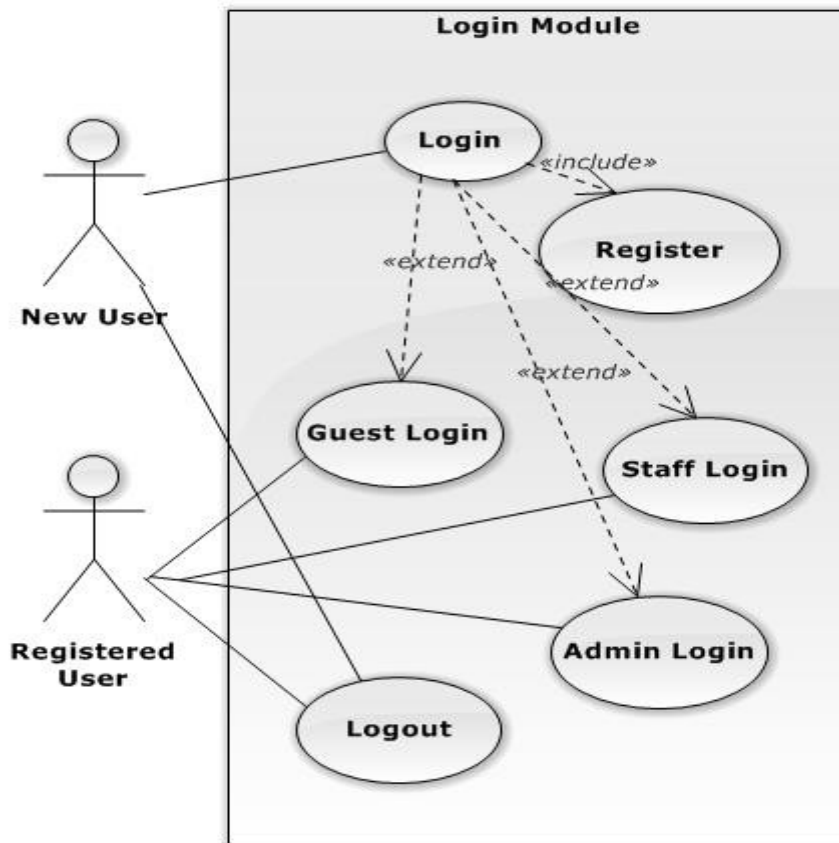
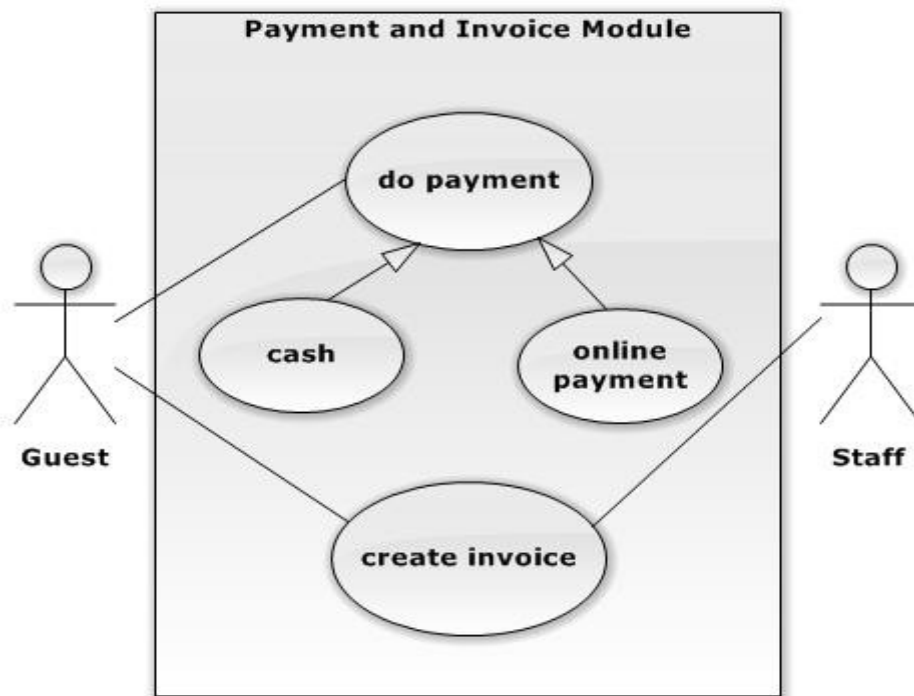


Figure 3.5 Use case Diagram for the Login

<b>Use Case</b>	Login
<b>Actors</b>	New User, Registered user
<b>Description</b>	New User, Registered User enters his/her user name and the password to login to the system.
<b>Pre-Conditions</b>	New User, Registered User are not already logged in.
<b>Flow Of Events</b>	<ul style="list-style-type: none"> <li>• User enters user name and the password to the login form.</li> <li>• User submits the form.</li> <li>• System verifies entered details.</li> <li>• System logs in the Authorized user and redirects him/her to the home page.</li> </ul>
<b>Post-Condition</b>	System redirects the authorized user to the home page.

Table 3.1 Use Case Description for Login use case

Figure 3.6 shows Use case Diagram for the Payment and Invoice Module



**Figure 3.6** Use case Diagram for the Payment and Invoice Module

<b>Use Case</b>	Payment and Invoice
<b>Actors</b>	Guest, Staff
<b>Description</b>	
Guest can do the payment and staff can take the payment from the guest. Guest and staff can generate the Invoice.	
<b>Pre-Conditions</b>	
Guest Should Choose the payment Method.	
<b>Flow Of Events</b>	
<ul style="list-style-type: none"> <li>• Choose the payment method.</li> <li>• Enter the payment Details</li> <li>• Do the Payment.</li> <li>• Generate the Invoice.</li> </ul>	
<b>Post-Condition</b>	
Guest can do the payment successfully and generate Invoice according to Payment.	

**Table 3.2** Use Case Description for Payment and Invoice use case

<b>Use Case</b>	Registration
<b>Actors</b>	Guest,Staff
<b>Description</b>	
Guest and Staff can register to the system.	
<b>Pre-Conditions</b>	
Staff and Guest should enter details according to their privileges.	
<b>Flow Of Events</b>	
<ul style="list-style-type: none"> <li>• Add Personal Details</li> <li>• Add Username</li> <li>• Add Password</li> <li>• Submit the form.</li> </ul>	
<b>Post-Condition</b>	
Staff and guest can login to the system according to their privileges.	

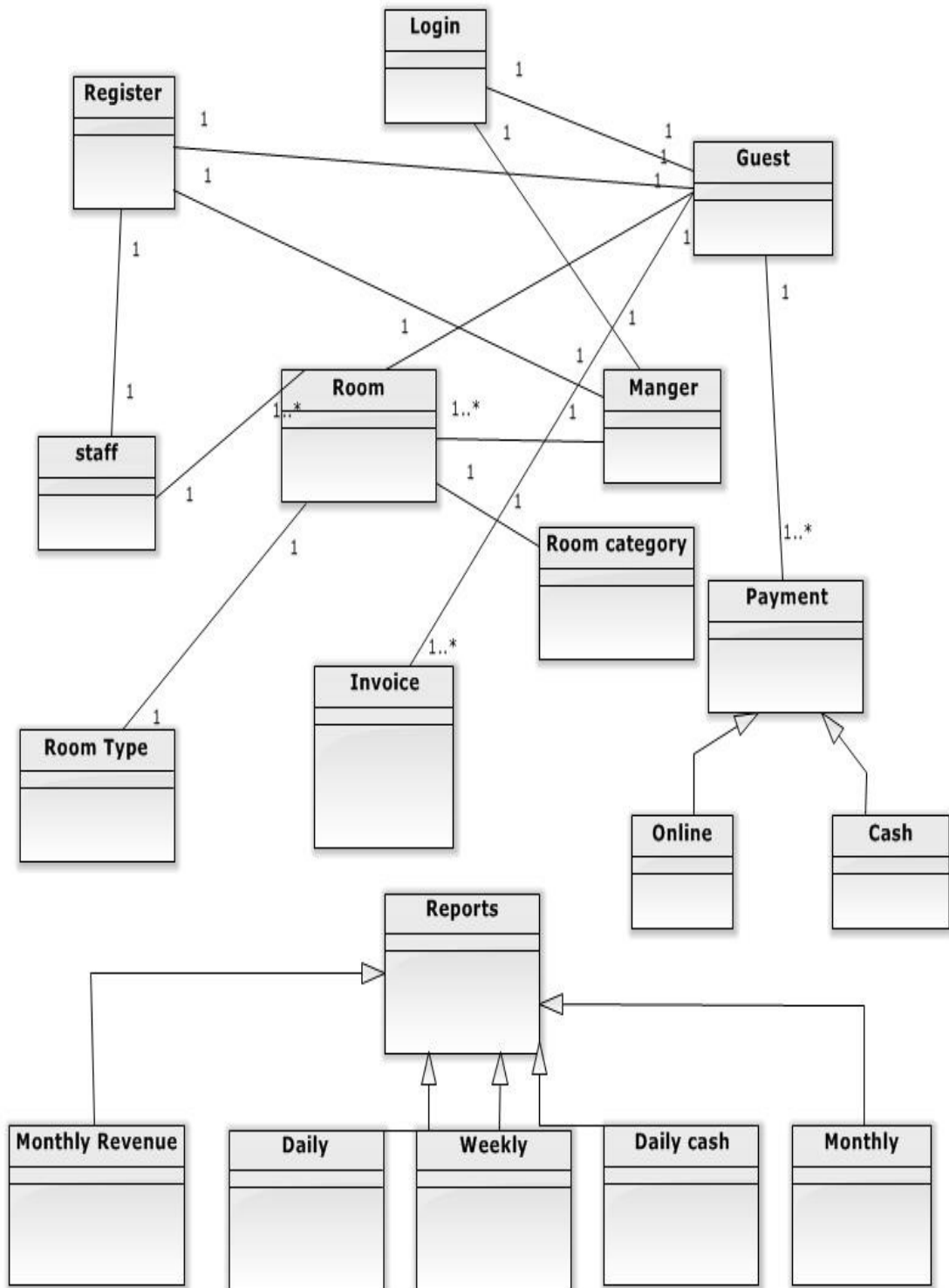
**Table 3.3** Use Case Description for Registration use case

### 3.4 CLASS DIAGRAM FOR THE PROPOSED SYSTEM

In software engineering, a **class diagram** in the Unified Modeling Language (UML) is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations (or methods), and the relationships among the classes. In the design of a system, a number of classes are identified and grouped together in a class diagram which helps to determine the static relations between those objects.

[7]

Figure 3.7 shows the Main Class Diagram of the Proposed System



**Figure 3.7** Main Class Diagram of the Proposed System

## 3.5 DATABASE DESIGN

In software engineering, a **class diagram** in the Unified Modelling Language (UML) is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations (or methods), and the relationships among the classes. In the design of a system, a number of classes are identified and grouped together in a class diagram which helps to determine the static relations between those objects.[8]

### 3.5.1 Database Normalization

Normalization is the process of efficiently organizing data in a database. There are two goals of the normalization process: eliminating redundant data (for example, storing the same data in more than one table) and ensuring data dependencies make sense (only storing related data in a table). Both of these are worthy goals as they reduce the amount of space a database consumes and ensure that data is logically stored.  
[9]

#### **First Normal Form (1NF)**

First normal form (1NF) sets the very basic rules for an organized database:

- Eliminate duplicative columns from the same table.
- Create separate tables for each group of related data and identify each row with a unique column or set of columns (the primary key).

#### **Second Normal Form (2NF)**

Second normal form (2NF) further addresses the concept of removing duplicative data:

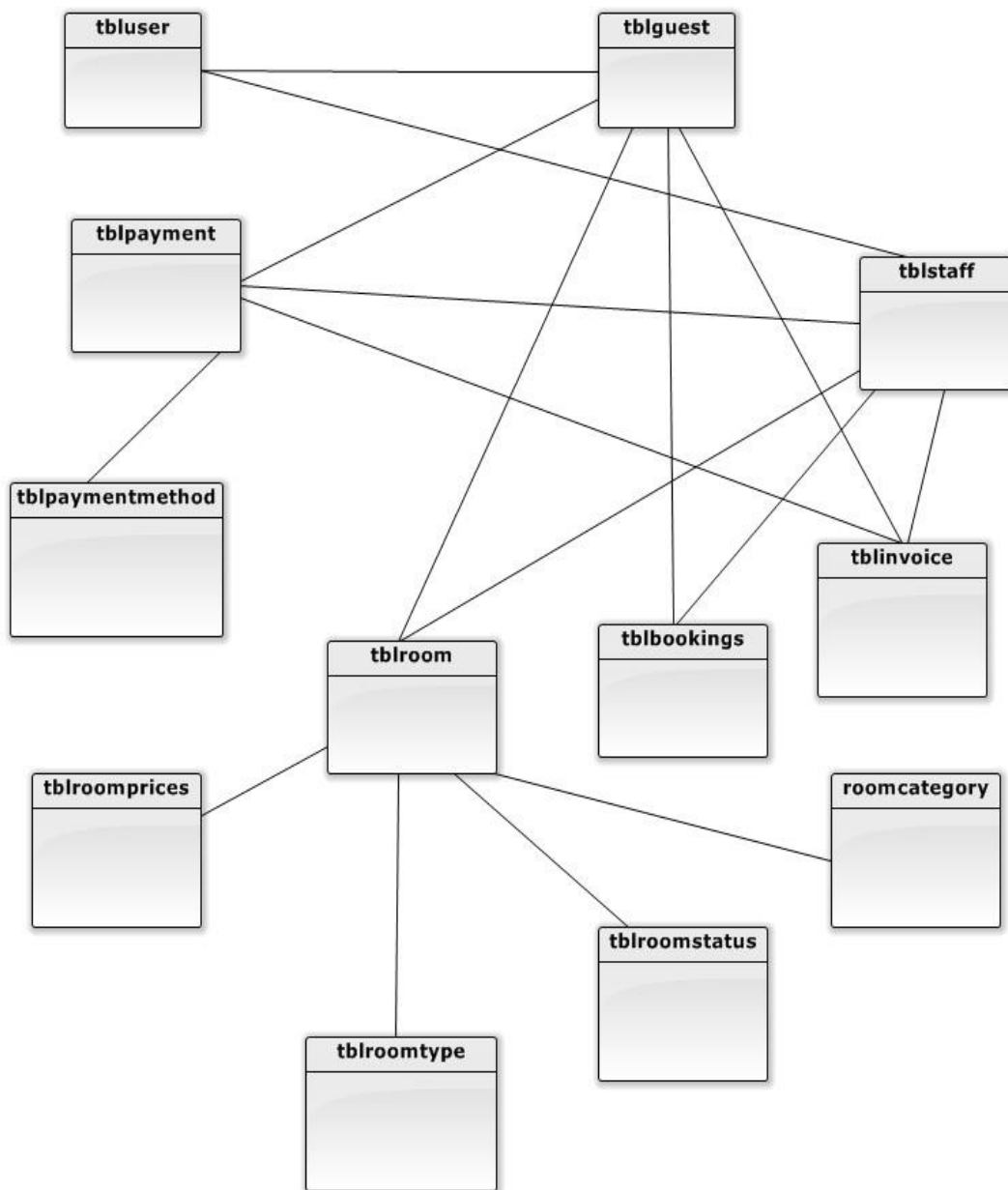
- Meet all the requirements of the first normal form.
- Remove subsets of data that apply to multiple rows of a table and place them in separate tables.
- Create relationships between these new tables and their predecessors through the use of foreign keys.[WWW9]

### Third Normal Form (3NF)

Third normal form (3NF) goes one large step further:

- Meet all the requirements of the second normal form.
- Remove columns that are not dependent upon the primary key.

Database of the Web based Hotel Management System is illustrated in figure 3.8



**Figure 3.8** Database design of the Proposed System

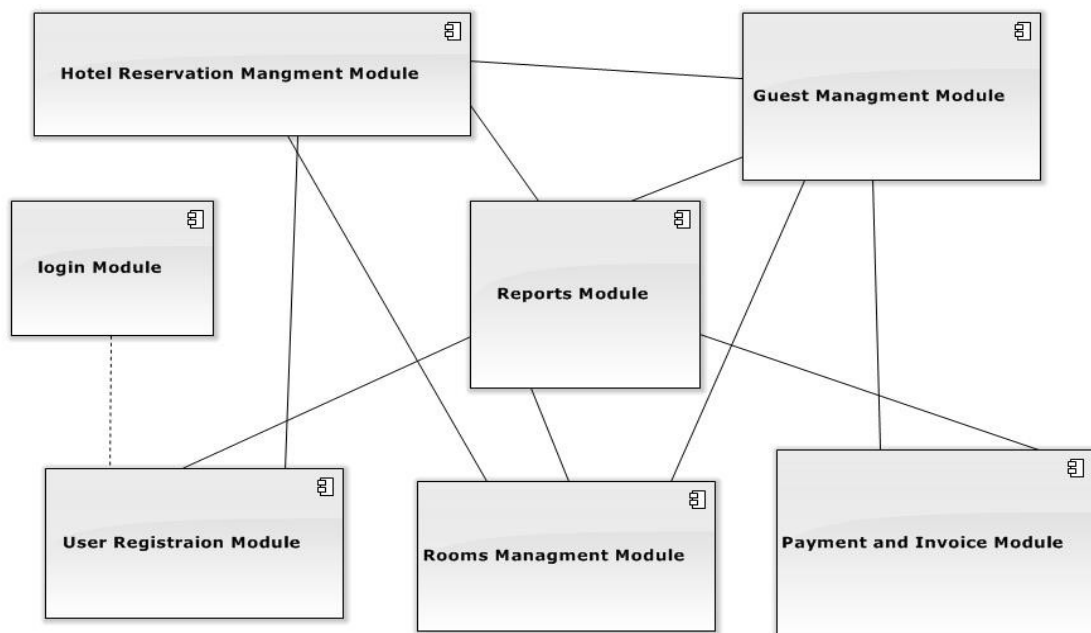


### 3.6 ARCHITECTURAL DESIGN

A software component is a modular part of a system. Because it's the software implementation of one or more classes, a component resides in a computer, not in the mind of an analyst. A component provides interfaces to other components. A component, by contrast, defines a system's functionality. Just as a component is the implementation of one or more classes, an artifact (if it's executable) is the implementation of a component. [11]

The below figure 3.9 shows a simple illustration about how the modules of the System Interact with each other.

Figure 3.9 shows the Modules in the System



**Figure 3.9** Modules in the System

The following modules were identified in the Web based Hotel Management System

- Hotel Reservation Management Module
- Guest Management Module
- Login Module
- Reports Module
- Room Management Module
- Registration Module

- Payment and Invoice Module

### 3.7 USER INTERFACES DESIGNING

User interfaces are an essential part of an information system which helps the user to interact with the computer. In the website, when a user visits one page he/she will be able to visit all the other main pages through the navigation menu. The user interface is achieved using client side validation and server side validation. Almost all the user inputs are done through HTML forms. All the input fields, in all the forms will be validated appropriately in the client side, using JavaScript. When we focus on the usability of the interfaces it is important to see how effective and efficient the interface is while the user is using it.

#### Web based Hotel Management System

##### Home Page

. After successfully logged in the user will be redirected to the Home Page as shown in the Figure 3.10

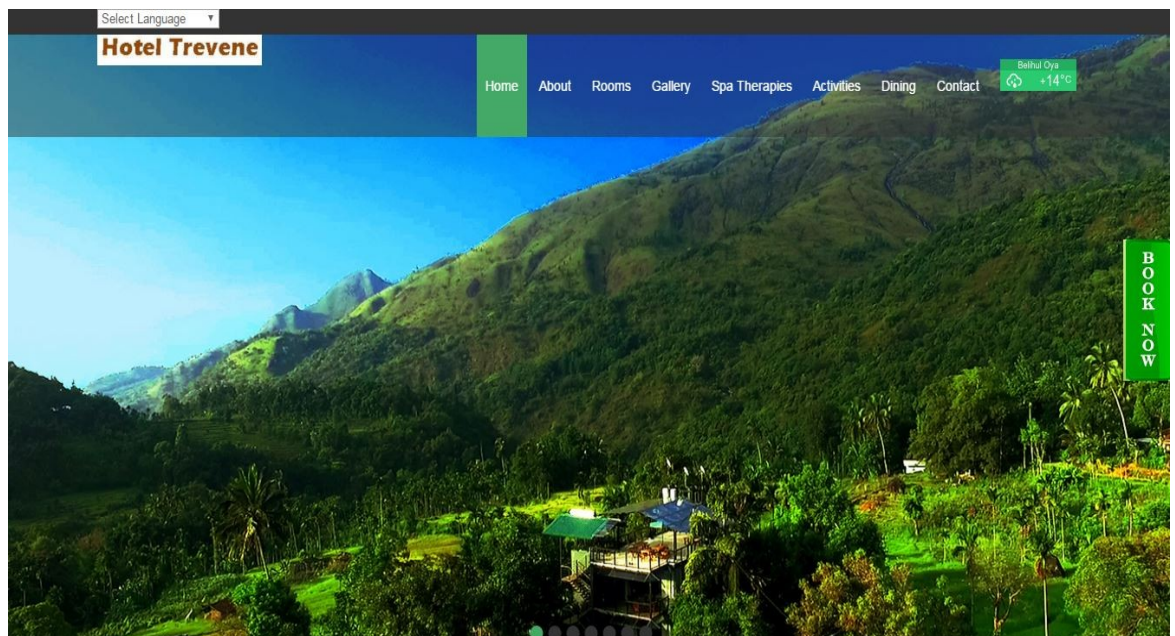


Figure 3.10 Home Page

## About us

Figure 3.11 shows the About Us Page

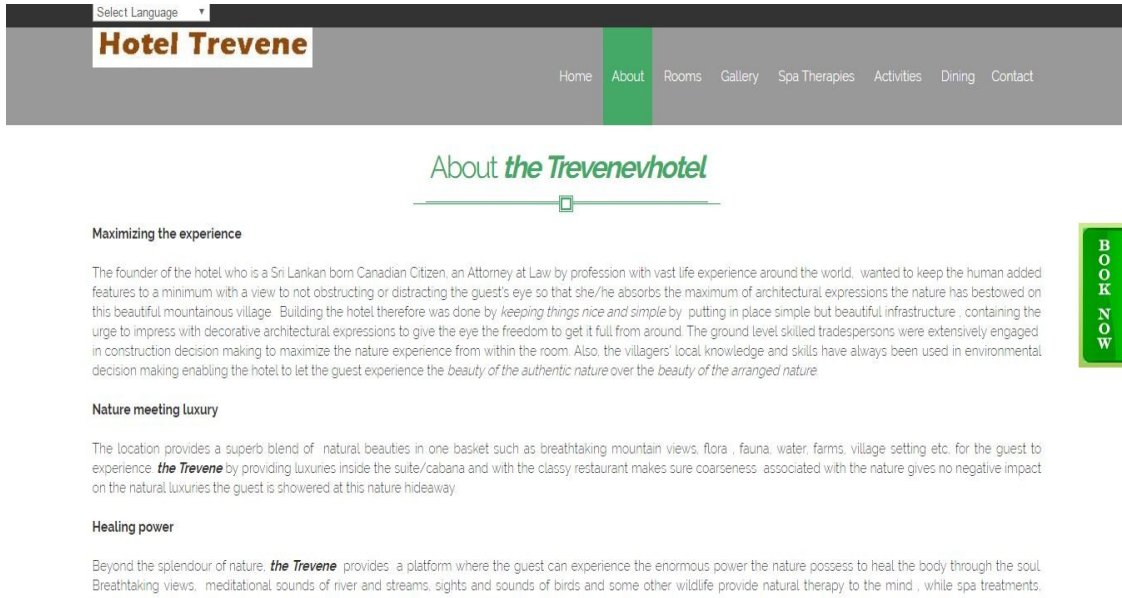


Figure 3.11 About Us Page

## Login page

Figure 3.12 shows the Login Page

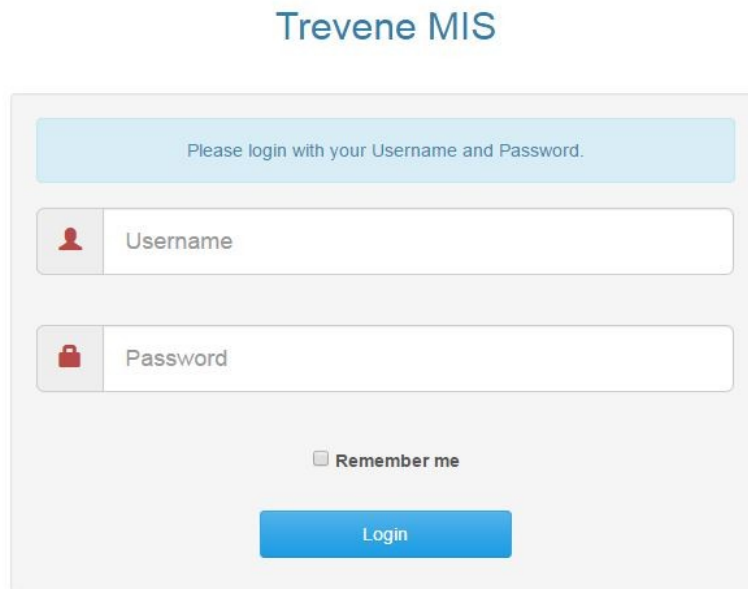


Figure 3.12 Login page

A Login page should have submitted by the Admin. The details in the all applied applications will be entered to this form. Then by clicking on the “Login” button redirect to the home page.

### Create New User Page

Figure 3.13 shows the Create New User Page

The screenshot shows a web browser window titled "Add New User Accounts". The form contains the following fields:

- Employee Name & NIC No/Passport No \***: A dropdown menu with "--Select Here--" as the selected option.
- User Name \***: A text input field.
- Password \***: A text input field.
- Confirm Password \***: A text input field.
- Role \***: A dropdown menu with "--Select Here--" as the selected option.
- Status \***: A dropdown menu with "Enabled" as the selected option.

At the bottom of the form is a blue button labeled "Add New User".

**Figure 3.13** Create New User Page

A Create New User page should have submitted by the Admin. The details in the all applied applications will be entered to this form. Then by clicking on the “Add New User” button the details can be stored for further examination of the Admin. To remove the entered data “clear” button can be clicked.

## Room Detail Page

Figure 3.14 shows the Room Details Page

☆Add New Room Details

Room Type \* :  
--Select Here--

Room Name \* :  
--Select Here--

Room Description \* :

No Of Rooms \* :

Room Dimension \* :

**Figure 3.14** Room Details Page

A Room Details page should have submitted by the Admin. The details in the all applied applications will be entered to this form. Then by clicking on the “Save” button the details can be stored in the Database. To remove the entered data “clear” button can be clicked.

## Rooms Rate Page

Figure 3.15 shows the Rooms Rate Page

☆Edit Room Rates

Room Type \* :  
Eco Cabanas

Room Name \* :  
Riverside Eco Cabana

No	Month	BB (LKR)	HB (LKR)	FB (LKR)	BB (USD)	HB (USD)	FB (USD)
1	January	22000.00	27000.00	32000.00	150.00	185.00	220.00
2	February	22000.00	27000.00	32000.00	150.00	185.00	220.00
3	March	22000.00	27000.00	32000.00	150.00	185.00	220.00

**Figure 3.15** Rooms Rate Page

## Room Allotment Page

Figure 3.16 shows the Rooms Allotment Page

The screenshot shows a web form titled "☆Add New Bloking" with a close button (X) in the top right corner. The form is organized into several sections:

- Check in \* :** A text input field.
- Check Out \* :** A text input field.
- Adults \* :** A dropdown menu with "Select" as the current option.
- Children below 4 \* :** A dropdown menu with "Select" as the current option.
- Children 4-11 \* :** A dropdown menu with "Select" as the current option.
- Children 12-18 \* :** A dropdown menu with "Select" as the current option.
- Passport \* :** A dropdown menu with "--Select Here--" as the current option.
- Click to Check Available Rooms**: A blue button labeled "Check Availability".
- Room \* :** A dropdown menu with "--Select Here--" as the current option.
- Room Rates \* :** A dropdown menu with "Bed & Breakfast" as the current option.
- Excursions**: A row of seven checkboxes with labels: "Worlds End and Horton Plains", "Adams Peak", "Udawalawa Elephant Safari", "Scenic Train Ride", "Ha Gala (Rabbit Rock)", "Village Tour (Pahantudawa Falls/Pottery Industry/Blacksmith Shop)", "Ella Tour", and "Air Port Pick up".
- First Name \* :** A text input field.
- Last Name \* :** A text input field.
- Email \* :** A text input field.

**Figure 3.16** Allotment Page

A Allotment page should have submitted by the Admin. The details in the all applied applications will be entered to this form. Then by clicking on the “Submit” button the Page redirect to enter room allotment page .

## Edit Rooms Page

Figure 3.17 shows the Edit Rooms Page

Room Type	Room Name	Description	No Of Rooms	Status	Edit
Eco Cabanas	Riverside Eco Cabana	Riverside Eco cabanas are the splendid escape for a relaxing vacation, with the touch of tradition and luxury combined. The two storied cabanas with 380 sq.ft. provide an open sitting area downstairs. The water supply in the room consists of natural spring water, flowing from a fountain in the hotel premises. Rooms consist of open wooden decks facing the river. Located beside the river, it is an inviting sight to refresh oneself in the natural waters and experience the natural beauty of the surroundings.	2	Active	<input checked="" type="checkbox"/> <a href="#">Edit details</a>
Eco Cabanas	Riverside Family Eco Cabana	Riverside family eco cabana is the splendid escape for a relaxing vacation, with the touch of tradition and luxury combined. The two storied cabana with 380 sq.ft, include a separate bedroom downstairs ideal for families with the welcoming breeze and the music of the flowing river. The water supply in the room consists of natural spring water, flowing from a fountain in the hotel premises. It is an inviting sight to refresh oneself in the natural waters and experience the natural beauty of the surroundings.	1	Active	<input checked="" type="checkbox"/> <a href="#">Edit details</a>
Luxury Double Room	Luxury Double Room	Luxury Double Room is the splendid escape for a relaxing vacation, for a luxury holiday experience with nature surrounding. The cabana with 380 sq.ft, include an open deck, sitting area downstairs, private river side garden facing rocks and river, and private river area with the welcoming breeze and the music of the flowing river. The water supply in the room consists of natural spring water, flowing from a fountain in the hotel premises. It is an inviting sight to refresh oneself in the natural waters and experience the natural beauty in the surroundings. Superior rooms are ideal for honeymooners and couples celebrating anniversaries	2	Active	<input checked="" type="checkbox"/> <a href="#">Edit details</a>

**Figure 3.17** Edit Rooms Page

A Edit Rooms page should have submitted by the Admin. The details in the all applied applications will be entered to this form. Then by clicking on the “Edit” button redirect to edit rooms details page.

# CHAPTER 04 – IMPLEMENTATION

## 4.1 Introduction

Hotel Management is one of the leading aspects in both government and private sectors. During the implementation in Web based Hotel Management system, requirements gathered in the previous stages should be necessarily fulfilled, because they are responsible to the customer satisfaction.

This is the stage where every system gets its real life practice behaviour according to its design. The main goal of the implementing Web based Hotel Management system is to enhance the communication and relationship between the guests and the staff. It is achieved by using modern software's and tools.

## 4.2 Implementation Environment

Implementation environment can be categorized into two parts as software environment and hardware environment.

### 4.2.1 Software environment

The following languages were used for the system development

- PHP (Hypertext Preprocessor) as the main language
- HTML (Hyper Text Markup)
- CSS (Cascading Style Sheets)
- Java script

The used development tools were as follows:

- XAMPP 1.8.0 ,Including
  - Apache server 2.4.2
  - MySQL 5.5.25
  - PHP 5.4.4
- Macromedia Dreamweaver CS3
- Adobe Photoshop CS3



- Windows7
- Firefox and Google chrome

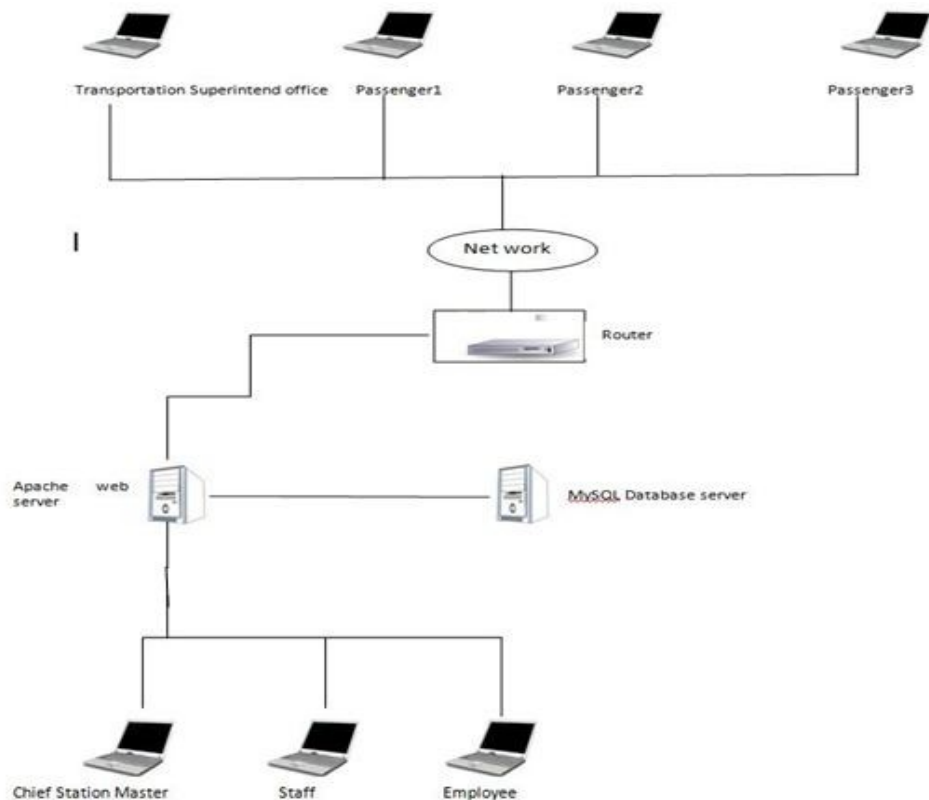
#### 4.2.2 Hardware environment

Minimum requirements needed for a computer to carry out this implementation were

- Intel® Core™ 2 Duo CPU 2.2GHz
- 2 GB RAM
- 500 GB Hard disk

The actual implementation of the system will be made on a server and clients will be accessing the service implemented on the server through an Internet connection using a compatible browser.

Figure 3.17 shows the Network Diagram for Web based Hotel Management System



**Figure 4.1** Network Diagram for Web based Hotel Management System

## 4.3 CODES OF THE MAIN MODULES

### Database Access

```
<?php
// This class used for database connection
class dbcon
{
    function getcon()
    {
        $con = mysql_connect("localhost","root","") or die("DB Connection error
".mysql_error());

        $db = mysql_select_db("dbhotel",$con) or die("DB error ".mysql_error());

        return $con;
    }
}
?>
```

### Login

```
<?php
// Username and password validation
session_start();
require_once("dbcon.php");

if(isset($_GET["vtype"]))
{
    $type = $_GET["vtype"];
    if($type=="login")
        loginvalidate();
}
function loginvalidate()
{
```

```

$username = $_POST["txtuser"];
$password = $_POST["txtpass"];

$_SESSION["values"]["uname"] = $username;

if($username=="")
    header("location:index.php?error=1"); //Setting error messages
else if($password=="")
    header("location:index.php?error=2");
else
{
    unset($_SESSION["values"]["uname"]);
    $sql = "SELECT * FROM users WHERE Username='$username'";
    $obj = new dbcon();
    $con = $obj->getcon();

    $result = mysql_query($sql,$con) or die("SQL Error ".mysql_error());

    $nor = mysql_num_rows($result);
    if($nor>0)
    {
        $rec = mysql_fetch_assoc($result);

        if($rec["pword"] == md5($password)) //// This will mach records for the
entered username
        {
            if($rec["status"]=="1")
            {
                $_SESSION["users"]["uname"] = $username;
                $_SESSION["users"]["ltime"] = time()+19800;
                $_SESSION["users"]["latime"] = time()+19800;

                $_SESSION["users"]["utype"] = $rec["User_type"];
                if($rec["User_type"]=="1"){
                    header("location:Adminhome.php");
                    mysql_query("UPDATE users SET UStatus = 'online'

```

```

WHERE userName = '$uname"); // No errors
    }
    elseif($rec["User_type"]=="2")
    {
    header("location:hotelhome.php"); // No errors
    mysql_query("UPDATE users SET UStatus = 'online'
WHERE userName = '$uname");
    }
    elseif($rec["User_type"]=="3")
    {
    header("location:Staff.php"); // No errors
    mysql_query("UPDATE users SET UStatus = 'online'
WHERE userName = '$uname");
    }
    }
    else
    {
        header("location:index.php?error=4");
    }
}
else
{
    header("location:index.php?error=3");
}
}
else
{
    header("location:index.php?error=3");
}
}
}
?>

```

## Logout

```
<?php
session_start();
unset($_SESSION["users"]);
session_destroy(); //destroy the created session
header("Location:index.php?msg=succ");

?>
```

## Save data

```
require_once("dbcon.php");

$obj = new dbcon();
$con = $obj->getcon();

$name=$_POST['uname'];
$dobirth=$_POST['date'];
$gender=$_POST['gender'];
$nic=$_POST['nic'];
$address=$_POST['Address'];
$telephone=$_POST['contact'];
$empstatus=$_POST['new'];
$nationality=$_POST['na'];
$religion=$_POST['re'];
$married=$_POST['mar'];

$sql_acc = "INSERT INTO guest(name,
                                dobirth,
                                gender,
```

married,  
nic,  
address,  
telephone,  
empstatus,  
nation,  
rel

```
    ) VALUES('$name',  
'$dobirth',  
'$gender',  
'$married  
'$nic',  
'$address',  
'$telephone',  
        '$empstatus',  
        '$nationality',  
        '$religion');  
$res = mysql_query($sql_acc,$con) or die("SQL Error ".mysql_error());  
  
if($res>0)  
    header("Location:guest.php?msg=succ");  
else  
    header("Location:guest.php?msg=fail");  
  
?>
```

# CHAPTER 05 – EVALUATION

## 5.1 Introduction

Software testing is an investigation conducted to provide stakeholders with information about the quality of the product or service under test. Software testing can also provide an objective, independent view of the software to allow the business to appreciate and understand the risks of software implementation. Test techniques include, but are not limited to, the process of executing a program or application with the intent of finding software bugs (errors or other defects). A primary purpose of testing is to detect software failures so that defects may be discovered and corrected. The scope of software testing often includes examination of code as well as execution of that code in various environments and conditions as well as examining the aspects of code: does it do what it is supposed to do and do what it needs to do.[10]

## 5.2 Test plan

The testing was done under several stages such as, unit testing, integration testing, white box testing, black box testing, interface testing, system testing and finally acceptance testing.

First, a test plan was designed to carry out the testing procedure. According to the designed procedure initially unit testing was done testing specific sections of code. Next, integration testing was done in order to find out the problems in the system that can occur through component integration. Integration testing ensures that all integrated components are working together for the required outcome.

After the unit testing and integration testing interface testing was carried out to test the interfaces of the components of the system. Components are expressed by the interfaces of the system and therefore these components should be tested together to identify the errors that can be generated.

Then defect testing was carried out. The purpose of this testing is to check the performance and reliability of the system.

Finally, system testing was carried out to test the system with the help of integration and acceptance testing. The system testing ensures about the standard level of the system.

## 5.3 Test Cases

### 5.3.1 Login

Table 5.1 shows the Log in module test results

No	Test Case	Expected Output	Actual Output	Status
1	Check whether the login details are valid	Display login success/error	Display login success/error	pass
2	Check whether the user name and date is displayed	Show user name and date in the home page	Show user name and date in the home page	pass
3	Check logout status	Success fully logout and show message	Success fully logout and show message	pass

**Table 5.1:** Log in module test results



### 5.3.2 Hotel Reservation Management Module.

Table 5.2 shows the Hotel Reservation Management Module Test Results

No	Test Case	Expected Output	Actual Output	Status
1	Check whether the all required fields are entered to Hotel Reservation Management form	If not when click the “submit” button display error message	If not when click the “submit” button display error message	Pass
2	Check NIC number filed	Display error message if NIC number is Invalid	Display error message if NIC number is Invalid	Pass
3	Check contact number Filed	Display error message if number is invalid	Display error message if number is invalid	Pass
4	Check whether the string value is entered to the name field	Display error message	Display error message	Pass
5	Check whether the all required fields are entered to Booking form	If not display error message when click the “submit” button	If not display error message when click the “ssubmit” button	Pass
6	Check if the “Amount” is in the correct format	If not display error message	If not display error message	Pass

7	Check whether the booking Id is displayed	Display booking Id	Display booking Id	Pass
8	Check whether the all required fields are entered to the Payment form	If not display error message when click the “submit” button	If not display error message when click the “submit” button	Pass
9	When click the booking Id display guest name automatically	Display Guest name	Display guest name	Pass
10	Check whether the Guest name is displayed	Display guest name	Display guest name	Pass
11	Check whether the all required fields are entered to the Room form	If not display error message when click the “submit” button	If not display error message when click the “submit” button	Pass
12	Check whether the room Id is displayed	Display room Id	Display room Id	Pass
13	Check the room field is validated	Display error message	Display error message	Pass
14	Check the room category field is validated	Display error message	Display error message	Pass
15	Check the submit button	Display message Successfully	Display message Successfully	Pass

		save the entered records	save the entered records	
16	Check the update button	Display message Successfully update the entered records	Display message Successfully update the entered records	Pass
17	Check the delete button	Display message Do you want to delete entered records yes/no	Display message Do you want to delete entered records yes/no	Pass
18	Check the clear button	Clear the entered records	Clear the entered records	Pass

**Table 5.2** Hotel Reservation Management Module Test Results

# CHAPTER 06 – CONCLUSION

## 6.1 INTRODUCTION

The system is developing for the Trevene hotel which is situated in Nuwara-eliya town. It was started about 2005. Now it has become to one of the famous Hotel in Nuwara Eliya with thirty employees. Many local and foreign Guests come to this Hotel per day because it is the only one four star hotel Group in Nuwareliya. From the started date up to now Hotel management procedures has done manually without using the help of an automated system.

My relative brother worked in this hotel for past 2 years. As a result I had the opportunity to get a clear idea about the procedures and the problems involved with the hotel. These issues pointed out the need of new technology for the station to enhance its efficiency and customer attraction. This was the initiation of this project and it helped me to choose this as my final year project.

The system was developed in RUP methodology and Object Oriented modeling was used to implement the system. Furthermore, web technologies such as PHP, Java script and CSS were used to implement the system.

## 6.2 Lessons Learnt

The most important part in doing this project was the lessons I learnt while the building of this system.

It gave me a life time opportunity to understand about my strength and capabilities. It was really a challenge to use the knowledge gained during the degree in the practical world. First I created a time schedule to carry out the project and it showed me the importance of time management for every activities.

The implementation phase was the hardest part of the project but I enjoyed it very much. It allowed me to use programming languages such as PHP, Java script and CSS in practical world. My project needed lot of interviews with the staff and the Guests. As a result I was able to build up my inter personal and communication skills.

Writing the dissertation was another challenge for me. I took a great effort to done it according to the standard level and it improved my writing skills.

Though the project was hard I am really happy and satisfy about the final outcome. This project made me understand the importance of the BIT final year project.

## 6.3 Future Enhancements

The developed system was able to meet all the functional and non functional requirements. Few more aspects can be included in to the system as future enhancements as follows

- The Hotel Management they are also doing Travel and Tour Company linking with the hotel. Currently, these procedures are done manually. Developing an automated system will improve the efficiency and tour handling in this field while providing a better customer service.
- This developed system does not include Human Resource Management activities of the Staff. This particular part of work is done by the Hotel clerical Staff. A new function can be implemented to the developed system to carry out this task also from web based system.
- This developed system does not include restaurant activities and Inventory. This particular part of work is done by the Hotel clerical Staff. A new function can be implemented to the developed system to carry out this task also.

# REFERENCES

- [1] about booking.com  
Available: <http://www.booking.com>  
[Accessed – April 04, 2017]
- [2] about Agoda.com  
Available: <http://www.agoda.com>  
[Accessed – April 03, 2017]
- [3] waterfall model  
Available:[http://en.wikipedia.org/wiki/Waterfall\\_model](http://en.wikipedia.org/wiki/Waterfall_model)  
[Accessed – April 03, 2017]
- [4] Software\_prototyping  
Available: [http://en.wikipedia.org/wiki/Software\\_prototyping](http://en.wikipedia.org/wiki/Software_prototyping)  
[Accessed – April 04, 2017]
- [5] Rapid\_application\_development  
Available: [http://en.wikipedia.org/wiki/Rapid\\_application\\_development](http://en.wikipedia.org/wiki/Rapid_application_development)  
[Accessed – April 23, 2017]
- [6]IBM\_Rational\_Unified\_Process  
Available: [http://en.wikipedia.org/wiki/IBM\\_Rational\\_Unified\\_Process](http://en.wikipedia.org/wiki/IBM_Rational_Unified_Process)  
[Accessed – May 24, 2017]
- [7] Class\_diagram  
Available: [http://en.wikipedia.org/wiki/Class\\_diagram](http://en.wikipedia.org/wiki/Class_diagram)  
[Accessed – May 26, 2017]
- [8]Database\_design  
Available: [http://en.wikipedia.org/wiki/Database\\_design](http://en.wikipedia.org/wiki/Database_design)  
[Accessed – May 26, 2017]
- [9]Databases normalization  
Available: <http://databases.about.com/od/specificproducts/a/normalization.htm>  
[Accessed – May 26, 2017]
- [10] Software\_testing  
Available: [http://en.wikipedia.org/wiki/Software\\_testing](http://en.wikipedia.org/wiki/Software_testing)  
[Accessed –June 06, 2017]

- [11] I.Sommerville, *Software Engineering*, 8th edition:Addison-Wesley, 2007.
- [12 P. Roger S, *Software Engineering*, 5th edition:Thomas Casson, 2001.

# APPENDIX-A

## SYSTEM DOCUMENTATION

This section of document will provide information and instructions on how to install Web based Hotel Management System. Also, this document will be used if any changes have to be made to the system.

Prior to installation of the Web based Hotel Management System, there have to be some prerequisite requirements. Minimum hardware and software requirements are listed below.

### Hardware Requirements

#### Resource Recommended Minimum Hardware Requirements

- **Processor** -3.0 GHz or greater
- **Memory** -1GB
- **Available Hard Disk Space**-320 GB
- **Display**-1024 X 768, High Colour 16-bit display
- **Internet** 512kbps bandwidth
- **Printer**

### Software Requirements

#### Resource Recommended Minimum Software Requirements

- **Operating System** Windows XP or higher
- **XAMPP 1.8.0 ,Including**
  - Apache server 2.4.2
  - MySQL 5.5.25
  - PHP 5.4.4
  
- **Macromedia DreamweaverCS3 or any**
- **interface designing tool**
- **Adobe Photoshop CS3**
- **Web Browser** Firefox, Google Chrome with a PDF plugging



## Setting Up Web based Hotel Management System

The steps of the pre installation process are as following. If any of these steps have been fulfilled prior to installation they can be ignored.

1. Install XAMPP Apache Distribution to your C:/ drive in Windows Operating system.
2. Install other given software's as required.

## Database Installation

(Please replace X with your CD-ROM drive letter)

- Open the web browser and type URL <http://localhost/> or <http://127.0.0.1/> and press enter.
- Select the tool phpMyAdmin from the left side panel.
- Next, create a database name trevene.
- Now, select the database you created and click on the “Import” tag in phpMyAdmin.
- Select “Choose file” button next to the option “Location of the text file” in the “File to import” section.
- Browse your CD-ROM and select dbhotel.sql (path: X:/HRMandOTRS/database/dbhrmotrs.sql).
- Finally click “Go” button at the bottom of phpMyAdmin interface.

## Web Application Installation

(Please replace X with your CD-ROM drive letter)

- Borrow the CD-ROM and locate / webhotel /auslinkhotel/ and copy the entire folder “trevenehotel”.
- Next, go to where you have installed XAMPP i.e. to the C:\ drive and locate and open “htdocs” folder inside “xampp” folder (now you are in C:\xampp\htdocs\). Now paste “trevenehotel” folder to htdocs directory.
- Finally open your web browser and go to the URL <http://localhost/trevenehotel/> to browse to the home page.

# APPENDIX-B

## DESIGN DOCUMENTATION

Figure B.1 shows Hotel Reservation Management module

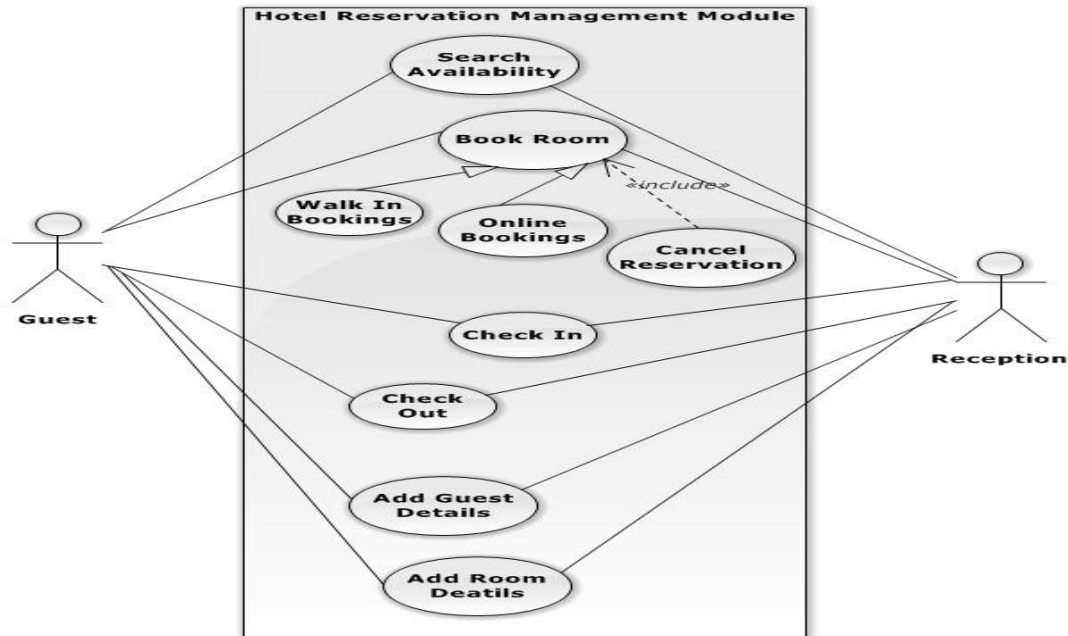
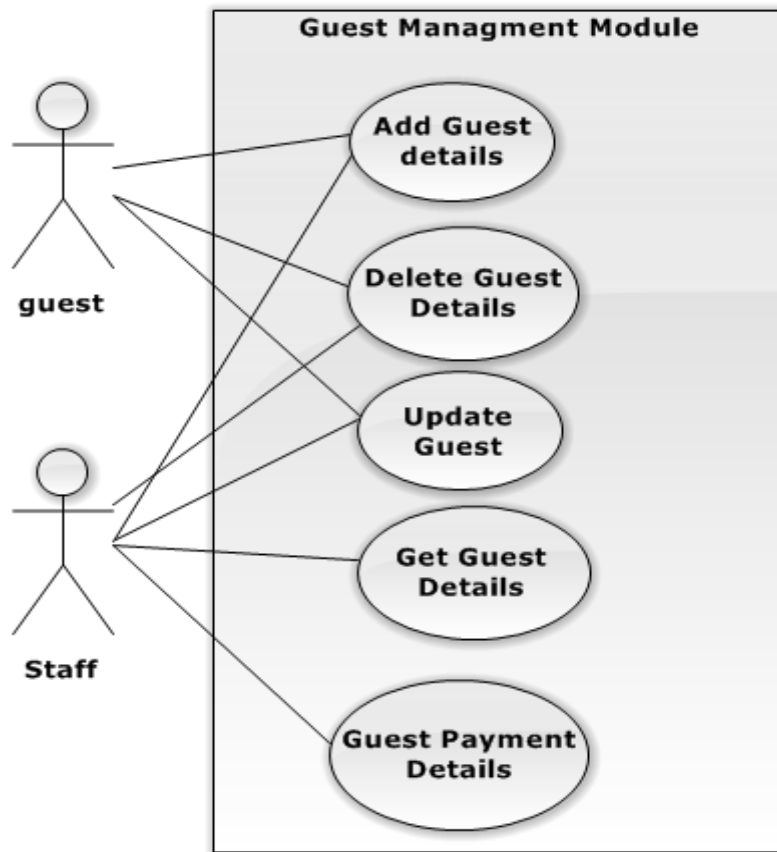


Figure B.1: Hotel Reservation Management module

<b>Use Case</b>	Hotel Reservation Management
<b>Actors</b>	Guest, Reception
<b>Description</b>	Guest can search availability of a room .Guest and staff can book a room and cancel the booking..
<b>Pre-Conditions</b>	User should be login to the System.
<b>Flow Of Events</b>	<ul style="list-style-type: none"> <li>• User can search availability of a room.</li> <li>• Add booking Details</li> <li>• Check In</li> <li>• Check out</li> <li>• Book a room</li> </ul>
<b>Post-Condition</b>	Guest can pay the payment for Booking.

Table B.1: Use Case Description for Hotel Reservation Management use case

Figure B.2 shows Guest Management Module

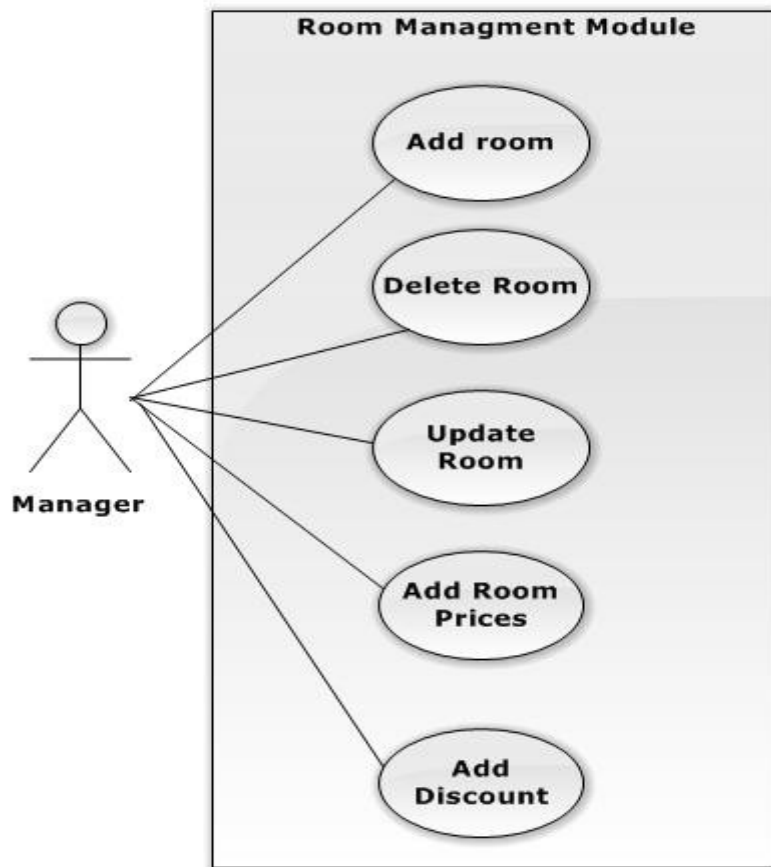


**Figure B.2:** Guest Management Module

<b>Use Case</b>	Guest Management
<b>Actors</b>	Staff,Guest
<b>Description</b>	
The staff is able to add personal Details and Guest Payment Details.	
<b>Pre-Conditions</b>	
<ul style="list-style-type: none"> <li>• The Guest should Registered and booked the room.</li> </ul>	
<b>Flow Of Events</b>	
<ul style="list-style-type: none"> <li>• Add Guest Details.</li> <li>• Delete, Update Guest Details.</li> <li>• Get Guest Details</li> <li>• Enter Guest payment Details</li> </ul>	
<b>Post-Condition</b>	
Staff can get a Reports and can give Invoice to guest..	

**Table B.2:** Use Case Description for Guest Management Module use case

Figure B.3 shows Room Management module



**Figure B.3:** Room Management module

<b>Use Case</b>	Room Management
<b>Actors</b>	Manager
<b>Description</b>	Manager will be able to add room details, update, delete and add Prices.
<b>Pre-Conditions</b>	Manager Should login to the System.
<b>Flow Of Events</b>	<ul style="list-style-type: none"> <li>• Add Room Details</li> <li>• Delete and Update Room Details.</li> <li>• Add Room Prices</li> <li>• Add Discount</li> </ul>
<b>Post-Condition</b>	Guest Can Book Newly added Room Or Updated Room.

**Table B.3:** Use Case Description for Room Management use case

Figure B.4 shows Report Module

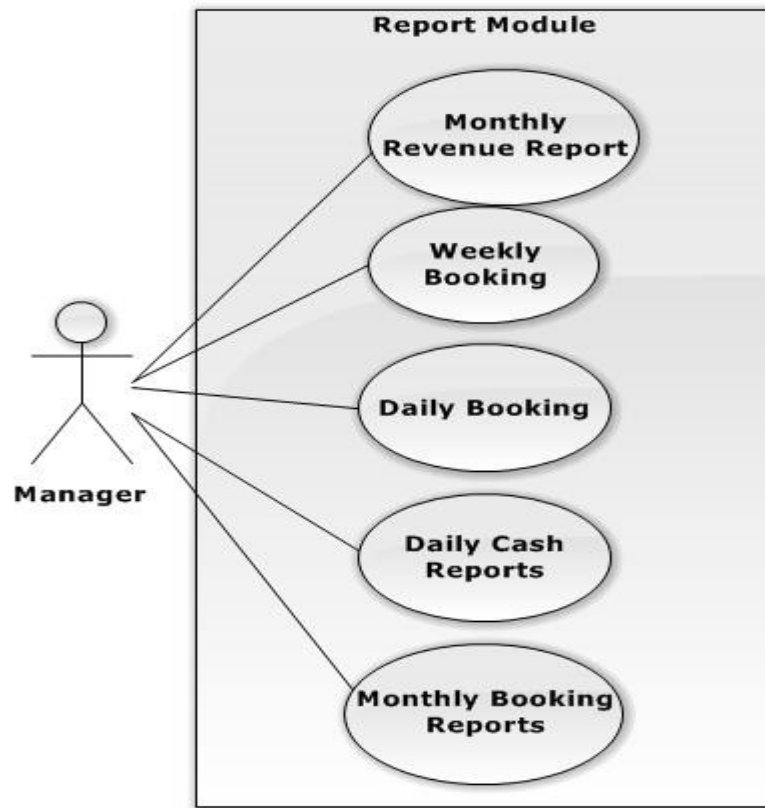
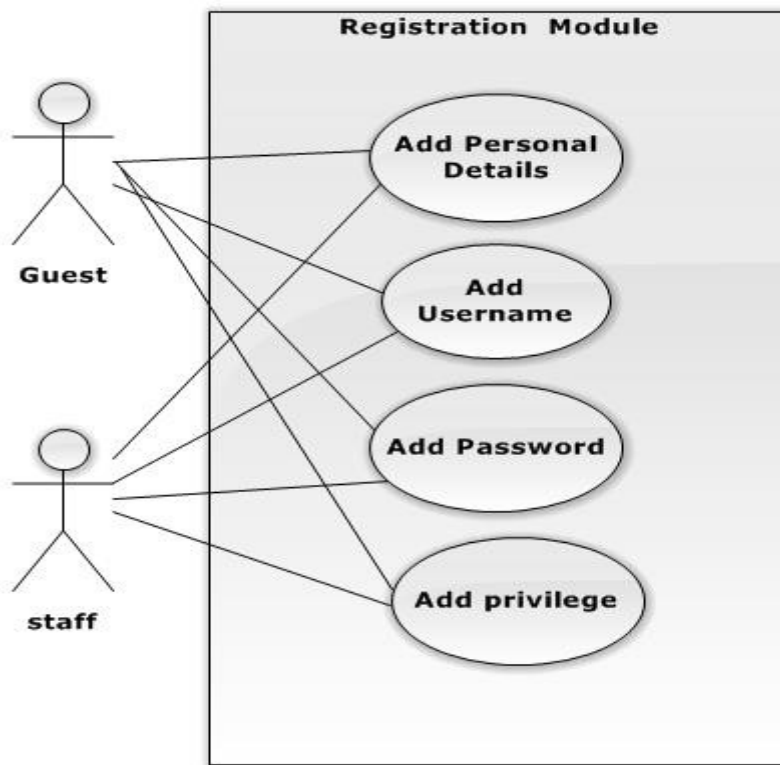


Figure B.4: Report Module

<b>Use Case</b>	Report
<b>Actors</b>	Manager
<b>Description</b>	Manager can generate Reports according their need.
<b>Pre-Conditions</b>	Manager should log into the system
<b>Flow Of Events</b>	<ul style="list-style-type: none"> <li>• Select the need report.</li> <li>• Generate report..</li> </ul>
<b>Post-Condition</b>	Manager can get a various decision according to the generated reports.

Table B.4: Use Case Description for Report use case

Figure B.5 shows Registration Module



**Figure B.5:** Registration Module

<b>Use Case</b>	Registration
<b>Actors</b>	Guest,Staff
<b>Description</b>	
Guest and Staff can register to the system.	
<b>Pre-Conditions</b>	
Staff and Guest should enter details according to their privileges.	
<b>Flow Of Events</b>	
<ul style="list-style-type: none"> <li>• Add Personal Details</li> <li>• Add Username</li> <li>• Add Password</li> <li>• Submit the form.</li> </ul>	
<b>Post-Condition</b>	
Staff and guest can login to the system according to their privileges.	

**Table B.5** Use Case Description for Registration use case

Figure B.6 shows Classes with attributes and methods

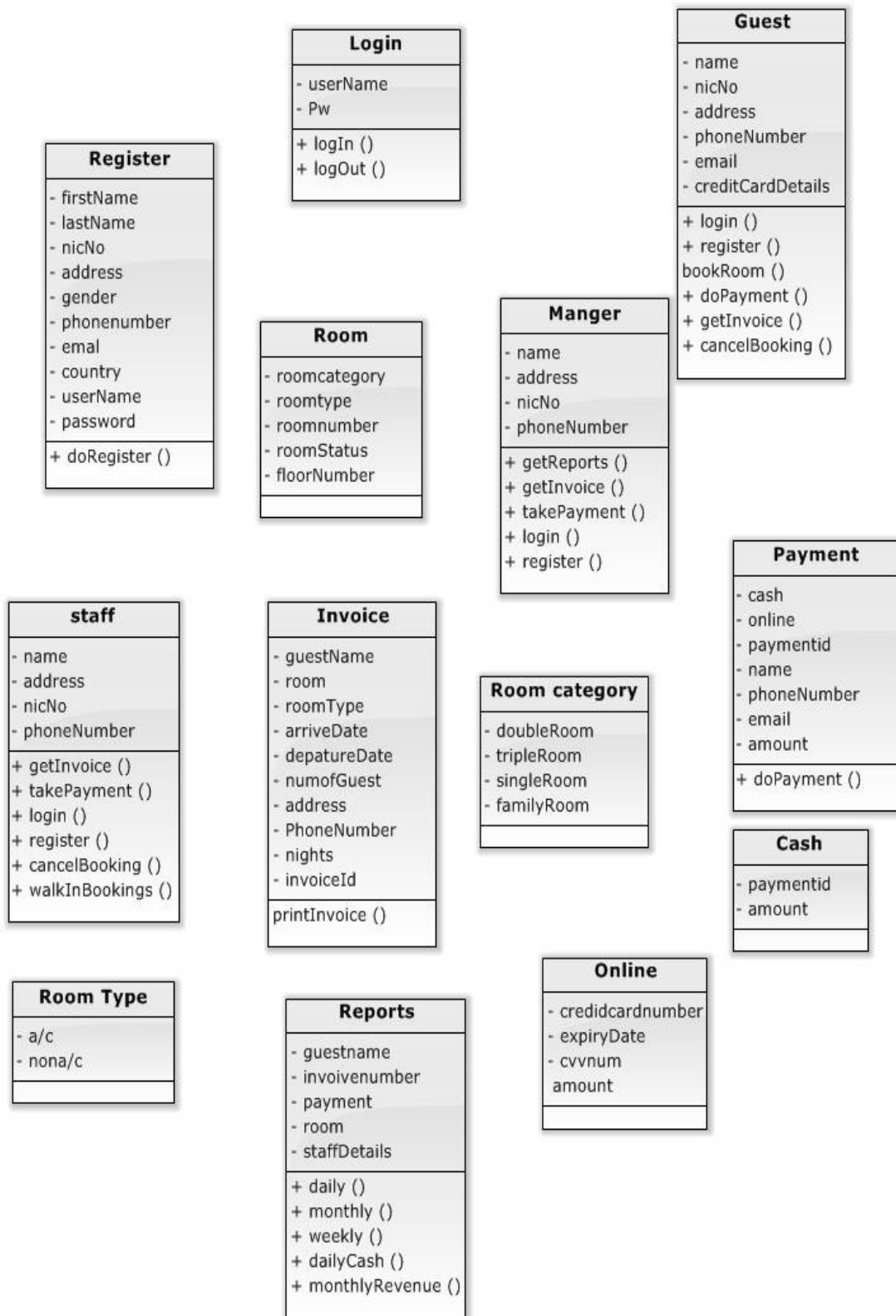


Figure B.6: Classes with attributes and methods

# APPENDIX- C

## USER DOCUMENTATION

The web based online hotel management system for the Trevene Hotel has many functions and features to increase the efficiency and Guest attraction. The user documentation provides a guideline to how to use the website for Guests and the staff.

### Home Page

. After successfully logged in the user will be redirected to the Home Page as shown in the Figure C.12

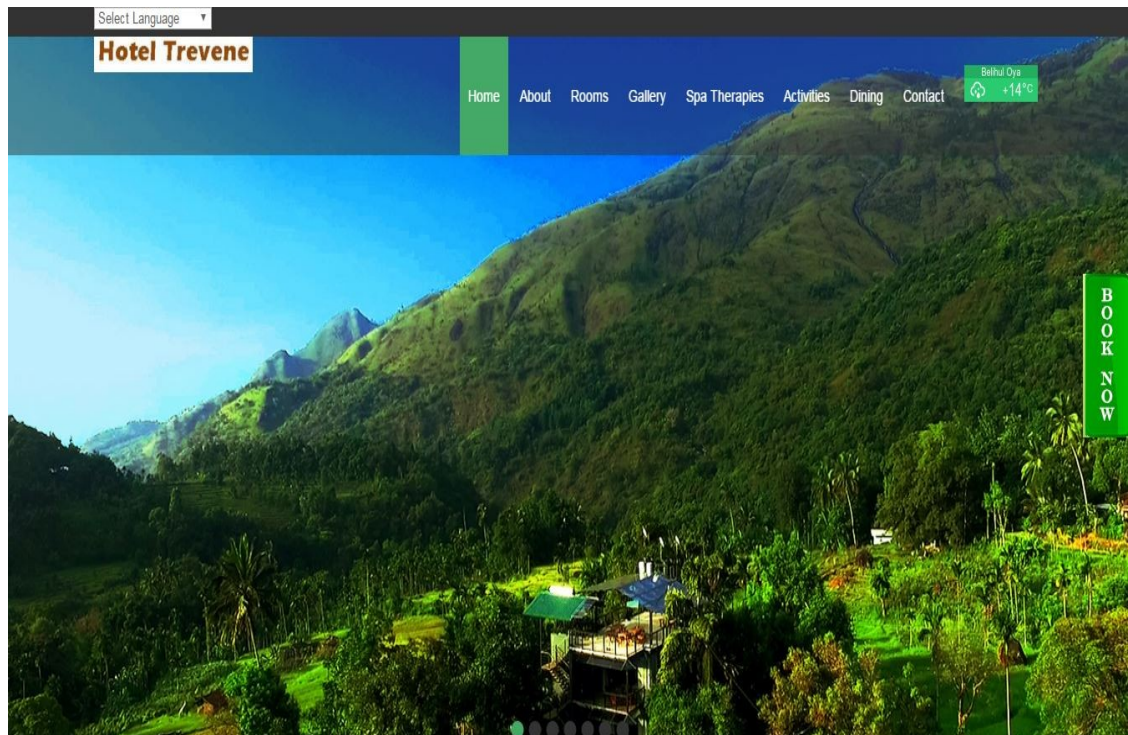
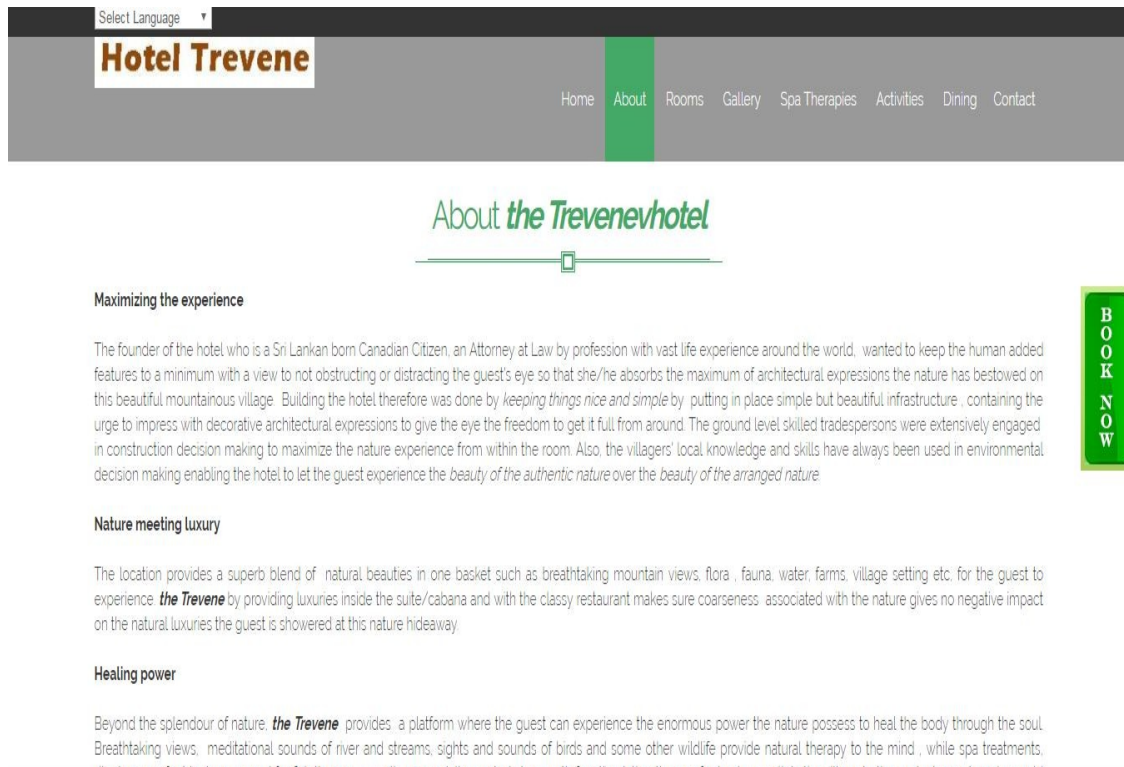


Figure C.1 Home Page



## About us

Following figure C.2 shows the About Us Page



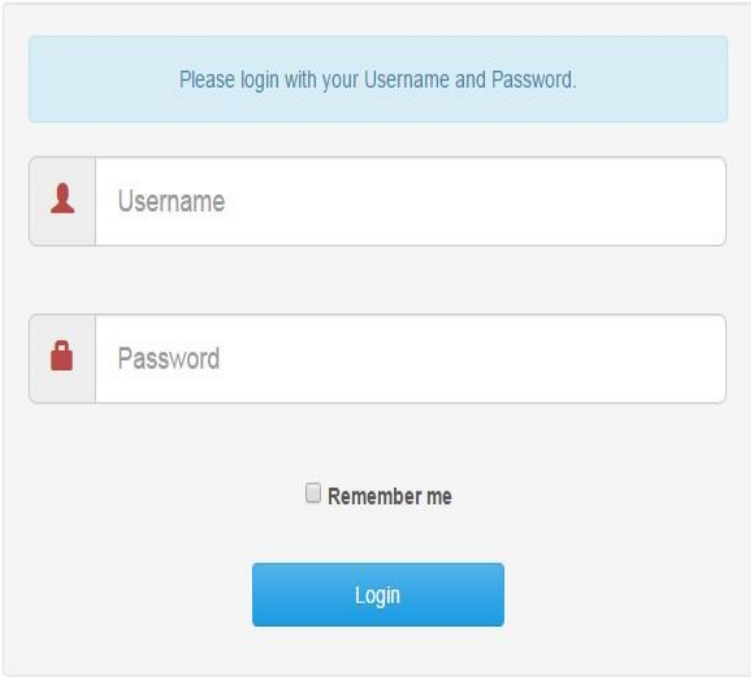
**Figure C.2** About Us Page

## Login page

Authorized users from the Admin and Staff can login to the Web based hotel management system by entering the correct user name and the password

Following figure C.3 shows the Login page

## Trevene MIS



Please login with your Username and Password.

Username

Password

Remember me

Login

**Figure C.3** Login page

A Login page should have submitted by the Admin or Staff. The details in the all applied applications will be entered to this form. Then by clicking on the “Login” button redirect to the home page, clicking on the “Login” button redirect to the Admin Home Form

## Admin Home Page

Following figure C.4 shows the Admin Home Page



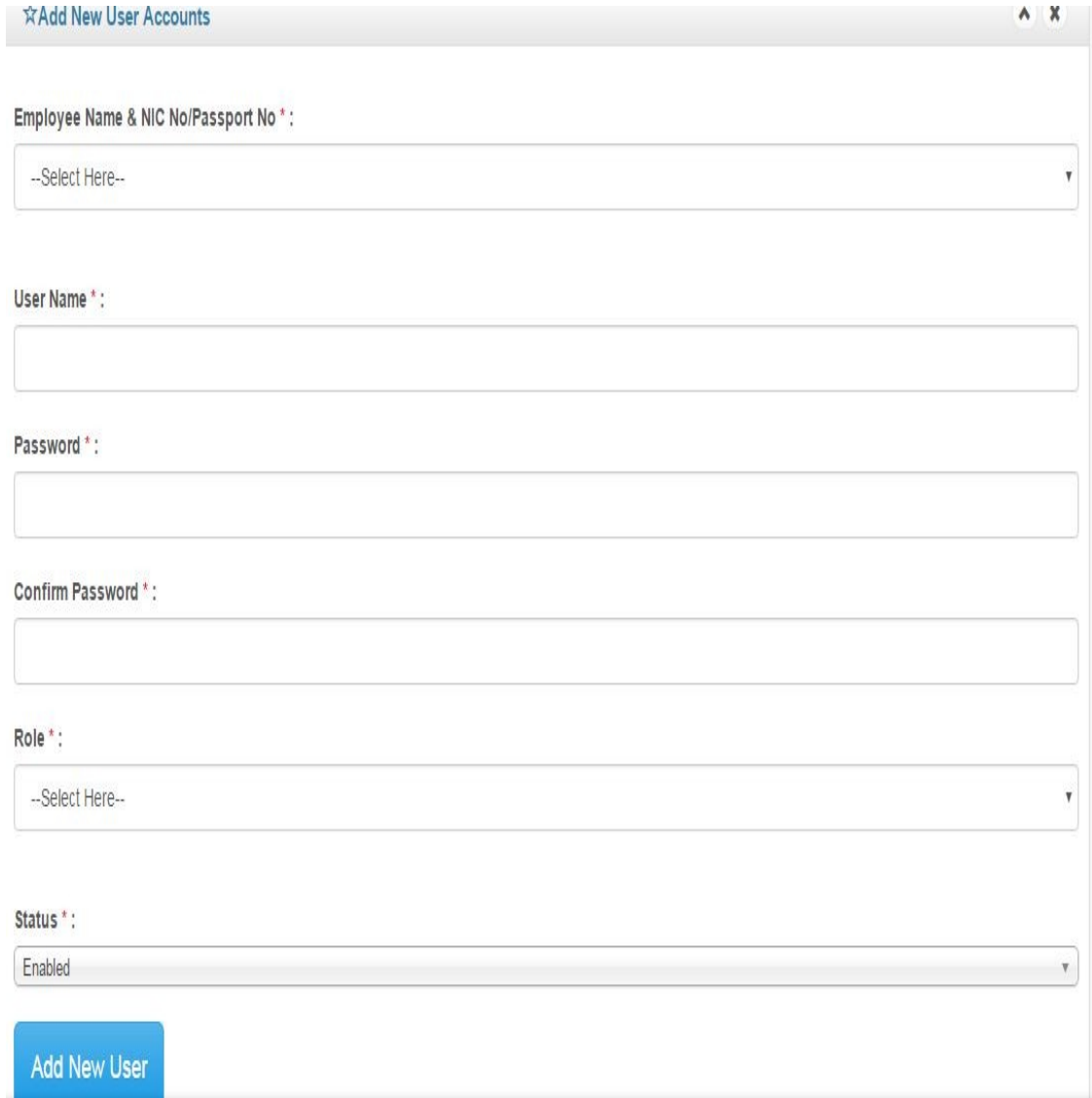
© TREVENE - 2016

**Figure C.4** Admin Home Page

Admin home page should have submitted by the Admin. The details in the all applied applications will be entered to this form. Then by clicking on the “Save” button the details can be stored in the Database. To remove the entered data “clear” button can be clicked

## Add User Page

Following figure C.5 shows the Add User Page



The screenshot shows a web browser window titled "Add New User Accounts". The form contains the following fields:

- Employee Name & NIC No/Passport No \***: A dropdown menu with "--Select Here--" as the selected option.
- User Name \***: A text input field.
- Password \***: A text input field.
- Confirm Password \***: A text input field.
- Role \***: A dropdown menu with "--Select Here--" as the selected option.
- Status \***: A dropdown menu with "Enabled" as the selected option.

At the bottom left of the form is a blue button labeled "Add New User".

**Figure C.5** Add User Page

Add User Details page should have submitted by the Admin. The details in the all applied applications will be entered to this form. Then by clicking on the “Add New User” button the details can be stored in the Database. To remove the entered data “clear” button can be clicked.

**Delete a record**

A record can be deleted by clicking the “Delete” button. A message box will appear asking “Are you sure you want to delete the record? – Yes/No”. Click on “Yes” to delete the record or click on “No” to exist without deleting it.

**Update a record**

Existing record can be updated by clicking the “update” button after the addition of details.

**Clear a record**

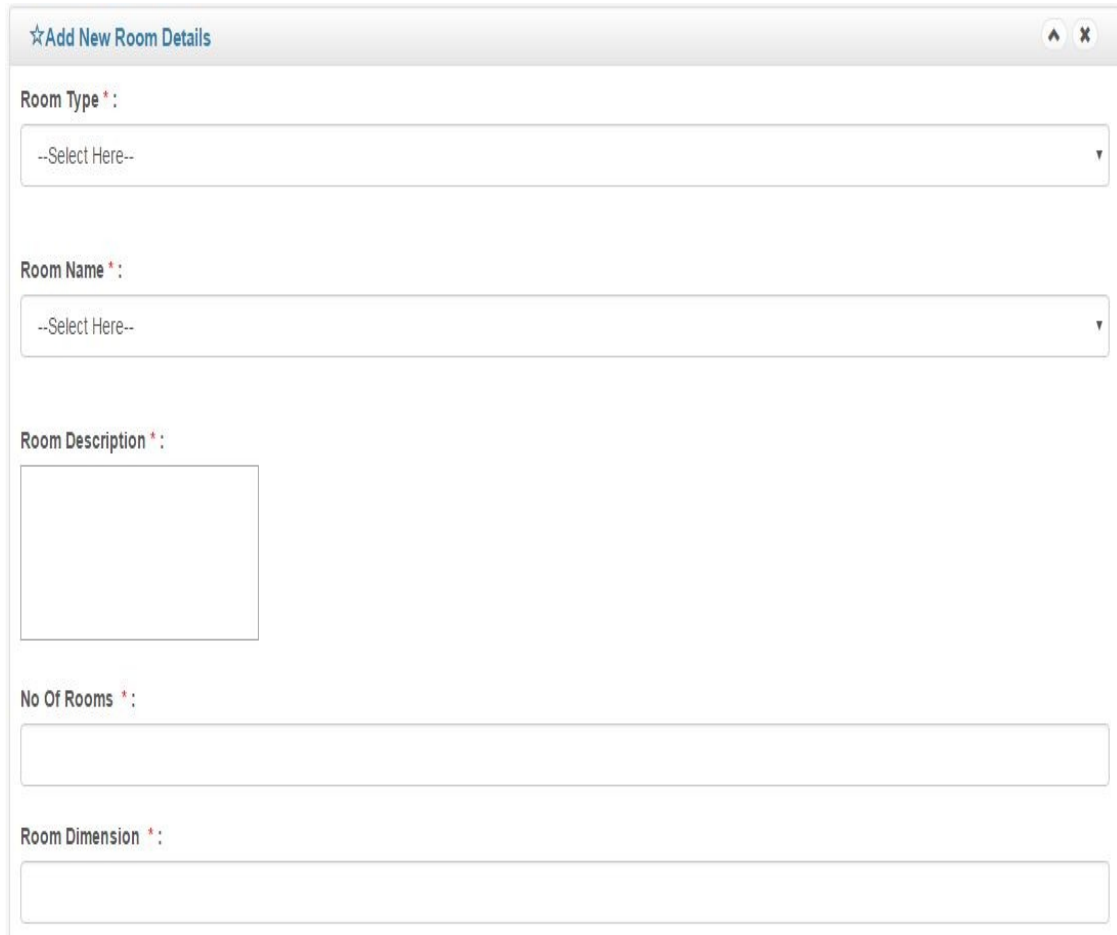
Text boxes and the other entered details in the form can be removed by clicking on the “Clear” button.

**Save a record**

Entered details can be added in to the database by clicking the “Save” button.

## Add Rooms Details

Following figure C.6 shows the Add Rooms Page



The screenshot shows a web form titled "Add New Room Details" with a star icon and window control buttons. The form contains the following fields:

- Room Type \***: A dropdown menu with "--Select Here--" and a downward arrow.
- Room Name \***: A dropdown menu with "--Select Here--" and a downward arrow.
- Room Description \***: A text area.
- No Of Rooms \***: A text input field.
- Room Dimension \***: A text input field.

**Figure C.6** Add Rooms Page

Add Room Details page should have submitted by the Admin. The details in the all applied applications will be entered to this form. Then by clicking on the “Add” button the details can be stored in the Database. To remove the entered data “clear” button can be clicked.

**Delete a record**

A record can be deleted by clicking the “Delete” button. A message box will appear asking “Are you sure you want to delete the record? – Yes/No”. Click on “Yes” to delete the record or click on “No” to exist without deleting it.

**Update a record**

Existing record can be updated by clicking the “update” button after the addition of details.

**Clear a record**

Text boxes and the other entered details in the form can be removed by clicking on the “Clear” button.

**Save a record**

Entered details can be added in to the database by clicking the “Save” button

## Add Rooms Rates Page

Following figure C.7 shows the Rooms Rates Page

No	Month	BB (LKR)	HB (LKR)	FB (LKR)	BB (USD)	HB (USD)	FB (USD)
1	January	22000.00	27000.00	32000.00	150.00	185.00	220.00
2	February	22000.00	27000.00	32000.00	150.00	185.00	220.00
3	March	22000.00	27000.00	32000.00	150.00	185.00	220.00

**Figure C.7** Rooms Rates Page

A Rooms Rates page should have submitted by the Admin. The details in the all applied applications will be entered to this form. Then by clicking on the “Add” button the details can be stored in the Database.



## Rooms Allotment Page

Following figure C.8 shows the Allotment Page

The screenshot shows a web form titled "☆Add New Booking" with the following fields and controls:

- Check in \***: Text input field.
- Check Out \***: Text input field.
- Adults \***: Dropdown menu with "Select" as the current value.
- Children below 4 \***: Dropdown menu with "Select" as the current value.
- Children 4-11 \***: Dropdown menu with "Select" as the current value.
- Children 12-18 \***: Dropdown menu with "Select" as the current value.
- Passport \***: Dropdown menu with "--Select Here--" as the current value.
- Click to Check Available Rooms**: Text label above a blue **Check Availability** button.
- Room \***: Dropdown menu with "--Select Here--" as the current value.
- Room Rates \***: Dropdown menu with "Bed & Breakfast" as the current value.
- Excursions**: A row of checkboxes for "Worlds End and Horton Plains", "Adams Peak", "Udawalawa Elephant Safari", and "Scenic Train Ride".
- Excursions**: A second row of checkboxes for "Ha Gala (Rabbit Rock)", "Village Tour (Pahantudawa Falls/Pottery Industry/Blacksmith Shop)", "Ella Tour", and "Air Port Pick up".
- First Name \***: Text input field.
- Last Name \***: Text input field.
- Email \***: Text input field.

**Figure C.8** Allotment Page

A Rooms Allotment page should have submitted by the Admin. The details in the all applied applications will be entered to this form. Then by clicking on the “Add Availability” button page goes to next page.

## Edit Rooms Details

Following figure C.9 shows the Edit Room Details Page

Room Type	Room Name	Description	No Of Rooms	Status	Edit
Eco Cabanas	Riverside Eco Cabana	Riverside Eco cabanas are the splendid escape for a relaxing vacation, with the touch of tradition and luxury combined. The two storied cabanas with 380 sq.ft. provide an open sitting area downstairs. The water supply in the room consists of natural spring water, flowing from a fountain in the hotel premises. Rooms consist of open wooden decks facing the river. Located beside the river, it is an inviting sight to refresh oneself in the natural waters and experience the natural beauty of the surroundings.	2	Active	<a href="#">Edit details</a>
Eco Cabanas	Riverside Family Eco Cabana	Riverside family eco cabana is the splendid escape for a relaxing vacation, with the touch of tradition and luxury combined. The two storied cabana with 380 sq.ft. include a separate bedroom downstairs ideal for families with the welcoming breeze and the music of the flowing river. The water supply in the room consists of natural spring water, flowing from a fountain in the hotel premises. It is an inviting sight to refresh oneself in the natural waters and experience the natural beauty of the surroundings.	1	Active	<a href="#">Edit details</a>
Luxury Double Room	Luxury Double Room	Luxury Double Room is the splendid escape for a relaxing vacation, for a luxury holiday experience with nature surrounding. The cabana with 380 sq.ft. include an open deck, sitting area downstairs, private river side garden facing rocks and river, and private river area with the welcoming breeze and the music of the flowing river. The water supply in the room consists of natural spring water, flowing from a fountain in the hotel premises. It is an inviting sight to refresh oneself in the natural waters and experience the natural beauty in the surroundings. Superior rooms are ideal for honeymooners and couples celebrating anniversaries	2	Active	<a href="#">Edit details</a>

**Figure C.9** Edit Room Details Page

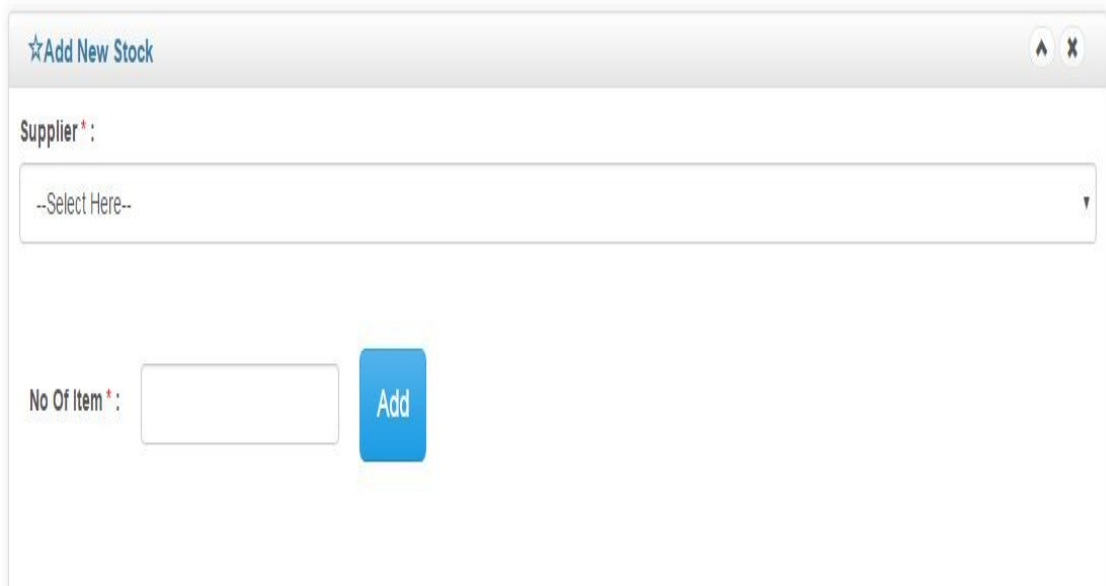
A Edit Room details page should have submitted by the Admin. The details in the all applied applications will be entered to this form. Then by clicking on the “Edit” button the details page redirect to Edit Page..

### Delete a record

A record can be deleted by clicking the “remove” button. A message box will appear asking “Are you sure you want to delete the record? – Yes/No”. Click on “Yes” to delete the record or click on “No” to exist without deleting it.

## Add New Stock

Following figure C.10 shows the Add New Stock Page



☆Add New Stock


Supplier \* :  
--Select Here--

No Of Item \* :

**Figure C.10** Add New Stock Page

## Add Products

Following figure C.11 shows the Add Products Page



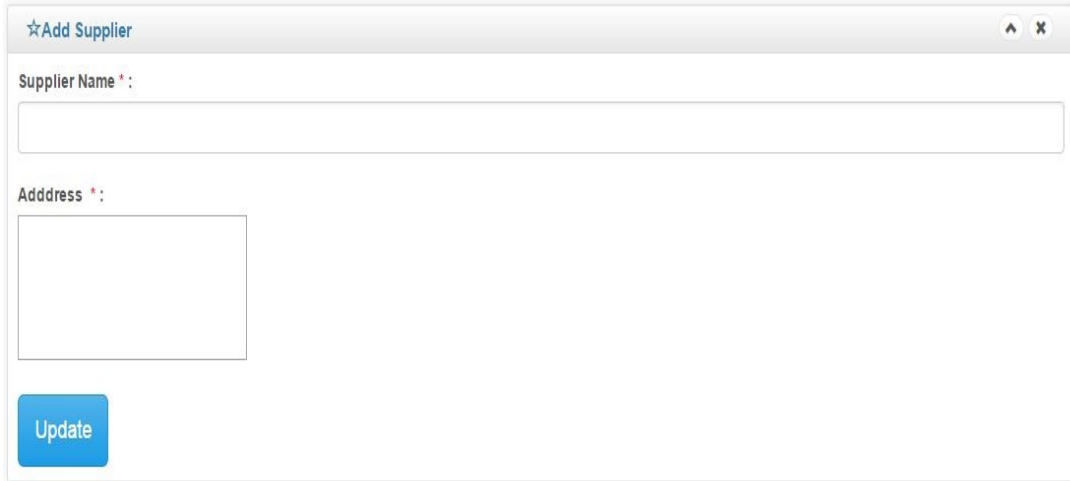
☆Add Products

Product Name \* :

**Figure C.11** Add Products Page

## Add Supplier

Following figure C.12 shows the Add Supplier Page



☆Add Supplier

Supplier Name \* :

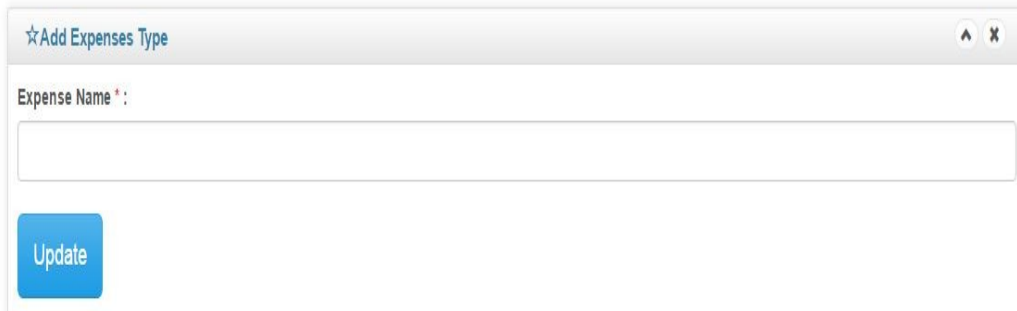
Address \* :

Update

**Figure C.12** Add Supplier Page

## Add Expenses

Following figure C.12 shows the Add Expenses Page



☆Add Expenses Type

Expense Name \* :

Update

**Figure C.13** Add Expenses Page

# APPENDIX- D

## MANAGEMENT REPORTS

Following figure D.1 shows the Customer Invoice

### Hotel Receipt

Nuwara Eliya

---

**Invoice No :** #0006 - 012 **Date :** 01/12/2016  
**Name of Guest :** Harshaka Lakmal  
**Arrival :** 2016-12-12 **Dept :** 2016-12-14 **Day(s) :** 2

Description	Rm. No	Days	Rs(LKR)	Cts
Riverside Eco Cabana - Eco Cabanas	11(14)	2	27000	0
Worlds End and Horton Plains, Adams Peak			28000	0
Total :			82000	0
As At Date (01/12/2016) :			0	0
Amount :			28000	0
Balance :			54000	0

.....  
 Manager Signature

.....  
 Guest Signature

**Figure D.1:** Customer Invoice

Following figure D.2 shows Monthly Booking Income Report

Home / Booking Management / Reports / Monthly Booking Income

Monthly Booking Income [Export to Excel](#)

10 records per page Search:

No	Reservation	Total Cost	Paid Amount	Balance Amount
1	Web Site	366483.83	349629.05	16854.78
2	Direct	58000.00	50000.00	108000.00
3	Dealer	82000.00	28000.00	82000.00

Showing 1 to 3 of 3 entries

**Figure D.2:** Monthly Booking Income Report

Following figure D.3 shows Monthly Booking Report

Booking No	Request Date	Check In	Check Out	No Of Days	Room Type	Room Name	Adults	Children Under 4	Children Under 4-11	Children Over 12-18	Currency
3	2016-12-01	2016-12-01	2016-12-03	2	Modern Suites	Modern Suites	2	0	0	0	LKR
4	2016-12-01	2016-12-02	2016-12-03	1	Modern Suites	Modern Suites	1	0	0	0	USD
5	2016-12-01	2016-12-01	2016-12-03	2	Eco Cabanas	Riverside Eco Cabana	0	2	1	1	LKR
6	2016-12-01	2016-12-21	2016-12-23	2	Eco Cabanas	Riverside Eco Cabana	2	1	0	0	LKR
7	2016-12-01	2016-12-20	2016-12-23	3	Eco Cabanas	Riverside Eco Cabana	1	0	1	1	LKR

**Figure D.3:** Monthly Booking Report

Following figure D.4 shows Stock Expenses Invoice

Stock No & Supplier\* :

1 ABC (pvt) lt

Total Purchased Amount : 18900.00

**Paid Amount Details**

Receipt No	Payment Method	Bank	Branch	Cheque No	Cheque Date	Amount
2	Cheque	7038	110	123456789	2016-11-30	5000.00
3	Cash	0	0		0000-00-00	8000.00
Receipt No	Payment Method	Bank	Branch	Cheque No	Cheque Date	Amount

**Paid Amount : 13000**  
**Balance Amount : 5900**

**Figure D.4:** Stock Expenses Invoice

# APPENDIX -E

## TEST RESULTS

### Guest Management module

Following figure E.1 shows Guest Management module

No	Test Case	Expected Output	Actual Output	Status
1	Check whether the all required fields are entered to the Guest Management form	If not when click the submit button display error message	If not when click the submit button display error message	Pass
2	Check whether the string value is entered to the name field	Display error message	Display error message	Pass
3	Check if the Address is in correct format	If not display error message	If not display error message	Pass
4	Check if the loan Phone is displayed	If not display error message	If not display error message	Pass
5	Check	If not display	If not display	Pass



	whether the Nic no are added.	error message	error message	
6	Check the apply button	Display message Successfully Applied	Display message Successfully Applied	Pass
7	Check the clear button	Clear the loan records	Clear the loan records	Pass

Table E. 1: Guest Management module

## Room Management Module

Following figure E.2 shows Room Management Module

No	Test Case	Expected Output	Actual Output	Status
1	Check whether the all required fields are entered to the Room Management Form	If not when click submit button Display error message	If not when click submit button Display error message	Pass
2	Check whether the room id is display	Display room id	Display room id	Pass
3	Check whether the room category is	Display room category	Display room category	Pass

	display			
4	Check the date in correct format	If not Display error message	If not Display error message	Pass
5	Check the save button	Display message successfully save	Display message successfully save	Pass
6	Check the clear button	Clear the records	Clear the records	Pass

Table E. 2: Room Management Module

## Registration Module

Following figure E.3 shows Registration Module

No	Test Case	Expected Output	Actual Output	Status
1	Check whether the all required fields are entered to the Registration Form	If not when click submit button Display error message	If not when click submit button Display error message	Pass
2	Check whether the string value is entered to the description field	If not Display error message	If not Display error message	Pass
3	Check whether the	If not Display error message	If not Display error message	Pass

	name is entered to the field			
4	Check whether the Nic No is entered to the field	If not Display error message	If not Display error message	Pass
5	Check whether the Username is entered to the field	If not Display error message	If not Display error message	Pass
6	Check whether the Pw is entered to the field	If not Display error message	If not Display error message	Pass
7	Check the save button	Display message successfully save	Display message successfully save	Pass
8	Check the clear button	Clear the records	Clear the records	Pass

Table E. 3 Registration Module

### Payment and Invoice module

Following figure E.4 shows Payment and Invoice module

No	Test case	Expected Output	Actual Output	Status
1	Check whether the	If not when click submit	If not when click submit	Pass

	all required fields are entered to the Payment and Invoice Form	button Display error message	button Display error message	
2	Check whether the checkIn Date and Checkout Date fields are in correct	Display error message	Display error message	Pass
3	Check whether the choose value in amount field are correct	Display error message	Display error message	Pass
4	Check Generate Button	Successfully Generate the Invoice	Successfully Generate the Invoice	Pass
5	Check the clear button	Display error message	Display error message	Pass

Table E. 4 Payment and Invoice module

## Report Module

Following figure E.5 shows Report Module

No	Test Case	Expected Output	Actual Output	Status
1	Check whether the all required fields are entered to Report form	If not when click"submit" button display error message	If not when click"submit" button display error message	Pass
2	Check whether the Report name is displayed	Display Report name	Display Report name	pass
3	Check if the date is in the correct format	If not display error message	If not display error message	pass
4	Check "No days" field in Integer value	If not display error message	If not display error message	pass
5	Check whether the value in the "No Days" field is correct	If not display error message	If not display error message	pass
6	Check the Get button	Display message "successfully Generate the Report"	Display message "successfully Generate the Report"	pass
7	Check the Clear button	Clear the details	Clear the details	pass

Table E. 5 Report Module

# APPENDIX-F

## CODE LISTING

### HTML code

```
<!--Create Login Form -->
<form name="form1" method="post" action="validate.php?vtype=login">
  <fieldset id="f1">
    <legend>Please Login</legend>
    <p></p>
    <p>
      <label for="uname">Username</label>
      <input id="txtuser" name="txtuser" /></br>

      <label for="pword"><br />

      Password</label>
      <input type="password" id="txtpass" name="txtpass" />

    </p>
    <p>
      <input type="submit" name="but1" id="butsave" value="Log in&gt;&gt;" />
      <input type="reset" name="but2" id="butsave" value="Cancel" />
    </p>
```

## Java Script Validation

```
// JavaScript Document

function validate()
{
    var name = document.getElementById("name").value;
    var date = document.getElementById("date").value;
    var nic = document.getElementById("nic").value;
    var add = document.getElementById("Address").value;
    var contact = document.getElementById("contact").value;

    var namerule = /^[a-zA-Z\s\.\,]+$/;
    if(!name.match(namerule))
    {
        alert("Please enter the name");
        document.getElementById("name").value = "";
        document.getElementById("name").focus();
        return false;
    }

    var nicrule = /^[d]{9}[VvXx]/;
    if(!nic.match(nicrule))
    {
        alert("Please enter a correct NIC No");
        document.getElementById("nic").value = "";
        document.getElementById("nic").focus();
        return false;
    }

    var daterule = /^[a-zA-Z\d#\V\-\,\.\s]+$/;
```

```

if(!date.match(daterule))
{
    alert("Please enter a Correct Date");
    document.getElementById("date").value = "";
    document.getElementById("date").focus();
    return false;
}

var telrule =/^d{10}$/;

if(!contact.match(telrule))
{
    alert("Please enter a correct Telephone No");
    document.getElementById("contact").focus();
    return false;
}

var addrule = /^[a-zA-Z\d#\-\,\.\s]+$/;
if(!add.match(addrule))
{
    alert("Please enter a correct Address");
    document.getElementById("Address").value = "";
    document.getElementById("Address").focus();
    return false;
}

}

```



## Save data

```
<?php
require_once("dbcon.php");

$obj = new dbcon();
$con = $obj->getcon();

$name=$_POST['uname'];
$date=$_POST['date'];
$des=$_POST['Des'];
$nic=$_POST['nic'];
$amount=$_POST['amount'];

$sql_acc = "INSERT INTO Guest(name,
                                cdate,
                                des,
                                nic,
                                amount
                                ) VALUES('$name',
                                '$cdate',
                                '$des',
                                '$nic',
                                '$amount');";

$res = mysql_query($sql_acc,$con) or die("SQL Error ".mysql_error());

if($res>0)
    header("Location:guest.php?msg=succ");
else
    header("Location:guest.php?msg=fail");

?>
```

# APPENDIX-G

## CLIENT CERTIFICATE

Following figure G.1 shows the client certification for the project

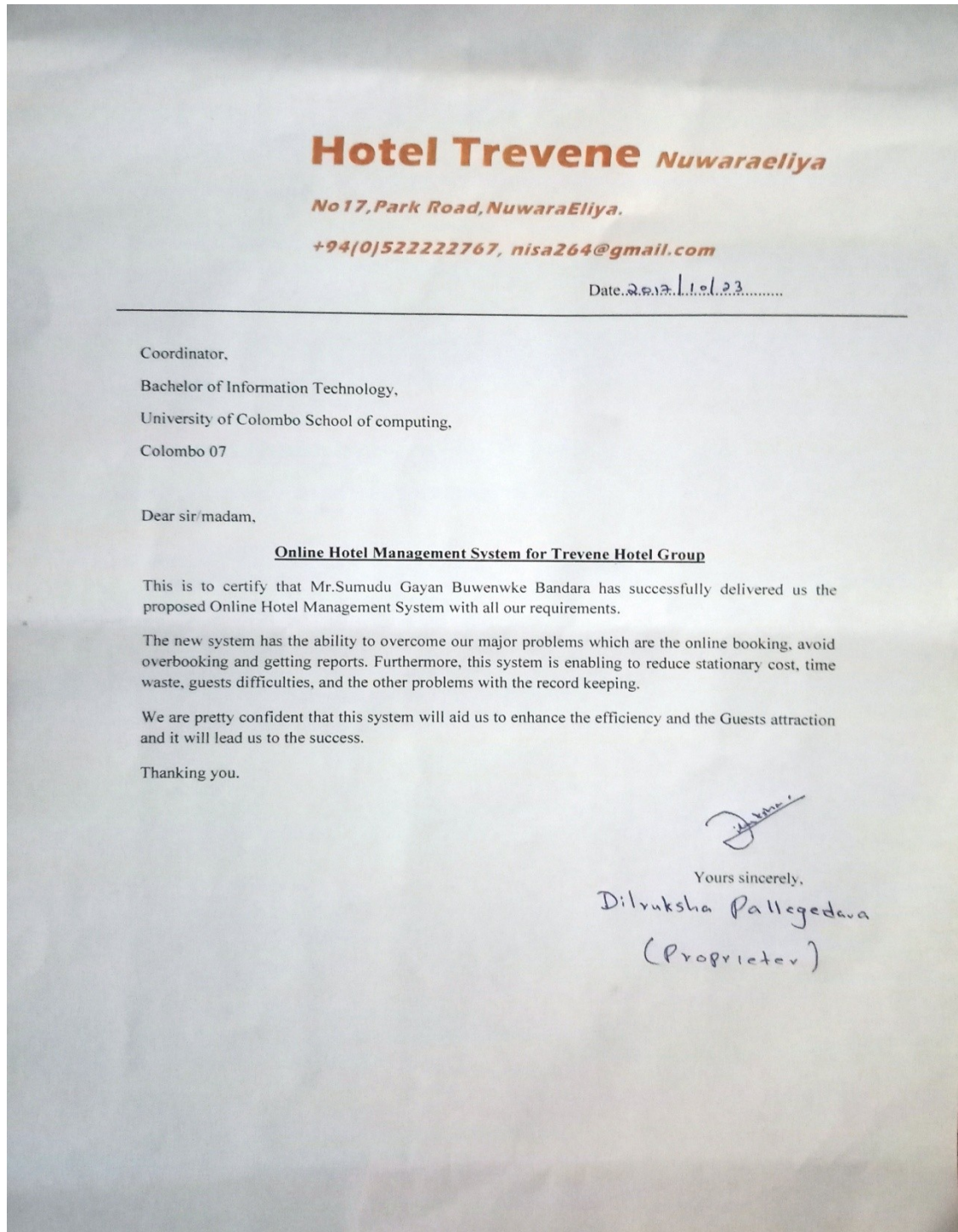


Figure G. 1 : Client certificate

# GLOSSARY

**Apache-** is the most popular web server on the Internet

**Black-box testing-** is a method of software testing that examines the functionality of an application

**Cascading Style Sheets (CSS)-** is a style sheet language used for describing the presentation semantics of a document written in a markup language

**Database-** is an organized collection of data

**Internet-** is a global network connecting millions of computers

**JavaScript-** is the scripting language of the Web

**PHP Hyper-text Pre-processor(PHP)-**Server-side HTML embedded scripting language

**Rational Unified Process(RUP)-** is an iterative software development process framework created by the Rational Software Corporation

**Unified Modeling Language (UML)-** is an industry standard modeling language with a rich graphical notation, and comprehensive set of diagrams

**Web browser -** is a software application for retrieving, presenting and traversing information resources on the World Wide Web

**White box testing -**is verification technique software engineers can use to examine if their code works as expected

**XHTML (Extensible HyperText Markup Language)-** is a family of XML markup languages that mirror or extend versions of the widely used Hypertext Markup Language , the language in which web pages are written

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