

# VICTORIA FALLS HOTEL GUEST SELF SERVICE



**Esman Tapfuma Mudimu (R135724J)**

# VICTORIA FALLS HOTEL GUEST SELF SERVICE



**By**

**Esman Tapfuma Mudimu (R135724J)**

Submitted in partial fulfilment of the requirements for the degree of

**BSc Honours Information Systems**

Department of Computer Science and Information Systems

in the

Faculty of Science and Technology

at the

**Midlands State University**

**Gweru**

**May 2017**

Supervisor: **Mrs T. Mzikamwi**

## **ABSTRACT**

The purpose of the study was aimed at technologically bringing change to the current system in order to increase customer satisfaction and will work as a self-assistant to the guest. The system allows the guests to order and send food order instantly to the backend application from mobile device and also proving capability of providing digital receipts back to guest account. In addition, the application will permit the guests to browse and peruse each restaurant menus. This application was designed a solution to the problems which were being faced by the organization stated in chapter one of this documentation. For instance, the restaurant booking was completely done using paperwork and guests would book through phone calls or visit the guest service desk. Thus these problems arose the need for the development of this system. Furthermore, the planning phase provided a comprehensive feasibility study which objects on justifying the progression of the system development. Outcomes from the feasibility study were used as input in the gathering of the necessary information to develop the system. The fundamental objective of this application is to provide mobile services to in-house guests of the Victoria Falls Hotel who may need services in the comfort of their rooms. This is facilitated through making table bookings through their mobile phones and also requesting for room service by means of posting request to the main system. Security is ensured through username and password.

## **DECLARATION**

I, **Esman Tapfuma Mudimu**, hereby declare that I am the sole author of this dissertation under the supervision and guidance of Mr T. Mzikamwi. I authorize the **Midlands State University** to lend this dissertation to other institutions or individuals for the purpose of scholarly research.

Signature: ..... Date: .....

## **APPROVAL**

This dissertation, entitled “**Victoria Falls Hotel Guest Self Service System (Faculty of Science and Technology)**” by **Esman Tapfuma Mudimu** meets the regulations governing the award of the degree of **BSc Honours Information Systems** of the **Midlands State University**, and is approved for its contribution to knowledge and literary presentation.

Supervisor’s Signature: .....

**Date:** ...../...../.....

## **ACKNOWLEDGEMENTS**

It has been a great support from many angles to bring this manuscript to this date. I really appreciate the help and support granted to me throughout this project. It is quiet an obligation for me to thank the Victoria Falls Hotel employees for their gratuitous support, enthusiastically, intellectually and psychologically. Credit goes to Mr F. Chimba (Deputy General Manager), Mrs S. Dhliwayo (Human Resources Officer for the hotel), Dionne Mutsonziwa (Food and Beverages Manager), Sarah Musaidzi, Kelvin Moyo for all the overwhelming encouragements and suggestions in carrying out this project. Special thanks are accredited to Mr Tafadzwa Chikuse (IT Administrator), Mr T. Mzikamwi (Project Supervisor), Mr Paul Mupfiga (My Mentor) for their unwarranted creative and thoughtful support in the process of this documentation. Furthermore, assistance was offered in proofreading and binding of this project documentation. I would also like to thank my friends Talent Njanike, Charles Zvarimwa, Tabeth Shayamano for their unwavering support, love, care and advices in bring up this project. Special mention and thanks goes to my girlfriend Rumbidzai Maphosa for the financial support in many forms, love, reassurance, care and encouragements throughout the project. I also thank my family, fellow students for their advice, collaboration which made a great impact in my life. All being said. Many thanks and appreciation to the Almighty God who was and is always on my side and giving me strength to the completion of this documentation.

## **DEDICATION**

I dedicate this to my Parents and my Siblings.

# Table of Contents

ABSTRACT.....	i
DECLARATION .....	ii
APPROVAL .....	iii
ACKNOWLEDGEMENTS.....	iv
DEDICATION .....	v
CHAPTER ONE.....	x
<b>1.1 INTRODUCTION.....</b>	<b>1</b>
<b>1.2 BACKGROUND OF ORGANIZATION .....</b>	<b>1</b>
1.2.1 ORGANIZATIONAL STRUCTURE OF THE VICTORIAL FALLS HOTEL .....	2
1.2.2 VISION .....	3
1.2.3 MISSION STATEMENT .....	3
1.2.4 PROBLEM DEFINITION .....	3
<b>1.3 AIM .....</b>	<b>4</b>
<b>1.4 OBJECTIVES .....</b>	<b>4</b>
<b>1.5 HYPOTHESIS.....</b>	<b>5</b>
<b>1.6 JUSTIFICATION .....</b>	<b>6</b>
<b>1.7 CONCLUSION .....</b>	<b>6</b>
CHAPTER TWO: PLANNING PHASE.....	7
<b>2.1 INTRODUCTION.....</b>	<b>7</b>
<b>2.2 REASONS FOR BUILDING THE NEW SYSTEM .....</b>	<b>7</b>
<b>2.3 BUSINESS VALUE .....</b>	<b>8</b>
<b>2.4 FEASIBILITY STUDY .....</b>	<b>8</b>
2.4.1 TECHNICAL FEASIBILITY .....	9
2.4.2 TECHNICAL EXPERTISE.....	9
2.4.3 HARDWARE SPECIFICATIONS.....	9
2.4.4 SOFTWARE SPECIFICATIONS .....	9
<b>2.5 ECONOMIC FEASIBILITY.....</b>	<b>9</b>
2.5.1 COST BENEFIT ANALYSIS .....	10
2.5.2 THE NET PRESENT VALUE .....	12
2.5.3 ACCOUNTING RATE OF RETURN.....	13
2.5.4 THE PAYBACK PERIOD .....	14



<b>2.6 RISKS ANALYSIS .....</b>	<b>15</b>
<b>2. 7 WORK PLAN.....</b>	<b>15</b>
2.7.1 THE GANTT CHART.....	16
<b>2.8 CONCLUSION .....</b>	<b>16</b>
<b>CHAPTER 3: SYSTEM ANALYSIS.....</b>	<b>17</b>
<b>3.1 INTRODUCTION.....</b>	<b>17</b>
<b>3.2 INFORMATION GATHERING.....</b>	<b>17</b>
3.2.1 On Site Observation.....	17
3.2.2 INTERVIEWS .....	18
3.2.3 QUESTIONNAIRES .....	20
<b>3.3 ANALYSIS OF THE CURRENT SYSTEM .....</b>	<b>21</b>
3.3.1 DESCRIPTION OF THE CURRENT SYSTEM .....	21
3.3.2 DATA ANALYSIS.....	22
<b>3.4 PROCESS ANALYSIS.....</b>	<b>22</b>
3.4.1 ACTIVITY DIAGRAM OF THE CURRENT SYSTEM .....	22
3.4.2 CONTEXT DIAGRAM OF THE CURRENT SYSTEM .....	23
3.4.3 THE DATA FLOW DIAGRAM .....	25
<b>3.5 EVALUATION OF THE ALTERNATIVES.....</b>	<b>27</b>
3.5.1 OUTSOURCING.....	27
<b>3.5.2 IMPROVING THE CURRENT SYSTEM.....</b>	<b>27</b>
3.5.3 DEVELOPING A NEW SYSTEM .....	28
3.5.4 SUMMARY OF ALTERNATIVES.....	29
<b>3.6 REQUIREMENTS ANALYSIS .....</b>	<b>29</b>
3.6.1 FUNCTIONAL REQUIREMENTS .....	29
3.6.2 USE CASE DIAGRAM.....	29
3.6.3 NON-FUNCTIONAL REQUIREMENTS .....	30
<b>3.7 CONCLUSION .....</b>	<b>30</b>
<b>CHAPTER FOUR: DESIGN PHASE .....</b>	<b>31</b>
<b>4.1 INTRODUCTION.....</b>	<b>31</b>
<b>4.2 SYSTEM DESIGN.....</b>	<b>31</b>
4.2.1 DESCRIPTION OF THE PROPOSED SYSTEM .....	32
4.2.2 CONTEXT DIAGRM OF THE PROPOSED SYSTEM .....	33

4.2.3 THE DATA FLOW FOR THE PROPOSED SYSTEM.....	35
<b>4.3 ARCHITECTUARAL DESIGN.....</b>	<b>37</b>
<b>4.4 PHYSICAL DESIGN.....</b>	<b>39</b>
<b>4.5 DATABASE DESIGN .....</b>	<b>40</b>
4.5.1 DATABASE ARCHITECTURE.....	41
4.5.2 ENTITY RELATIONSHIP DIAGRAM.....	45
4.5.3 DATA DICTIONARY.....	47
<b>4.6 PROGRAM DESIGN .....</b>	<b>48</b>
4.6.2 PACKAGE DIAGRAM.....	49
<b>4.7 INTERFACE DESIGN.....</b>	<b>51</b>
4.7.1 MENU DESIGN .....	52
4.7.2 SUB MENUS.....	53
4.7.3 OUTPUT DESIGN .....	55
<b>4.8 PSEUDO CODE.....</b>	<b>57</b>
4.8.1 LOGIN CHECK.....	57
4.8.2 BOOKING .....	58
<b>4.9 SECURITY DESIGN.....</b>	<b>59</b>
4.9.1 PSEUDO FOR LOGIN PROGRESS .....	59
4.9.2 PHYSICAL SECURITY .....	59
4.9.3 NETWORK SECURITY .....	60
<b>4.10 CONCLUSION .....</b>	<b>61</b>
CHAPTER 5: IMPLEMENTATION PHASE.....	62
<b>5.1 INTRODUCTION.....</b>	<b>62</b>
<b>5.2 CODING .....</b>	<b>62</b>
5.2.1 PSEUDO CODE OF THE SYSTEM .....	62
<b>5.3 TESTING.....</b>	<b>63</b>
5.3.1 UNIT TESTING .....	64
5.3.2 BLACK BOX TESTING.....	64
5.3.3 WHITE BOX TESTING.....	65
5.3.4 MODULE TESTING.....	66
5.3.5 SUBSYSTEM TESTING .....	66
5.3.6 SYSTEM TESTING .....	67

5.3.7 ACCEPTANCE TESTING.....	67
5.3.8 ALPHA TESTING.....	67
5.3.9 BETA TESTING .....	67
5.3.10 TEST STRATEGIES .....	68
<b>5.4 INSTALLATION.....</b>	<b>70</b>
5.4.1 STEPS FOR SOFTWARE INSTALLATION.....	70
5.4.2 TRAINING .....	70
5.4.3 DATA MIGRATION.....	71
5.4.4 METHOD OF CONVERSION .....	72
<b>5.5 MAINTENANCE.....</b>	<b>75</b>
5.5.1 CORRECTIVE MAINTENANCE .....	76
5.5.2 ADAPTIVE MAINTENANCE .....	76
5.5.3 PERFECTIVE MAINTENANCE .....	77
<b>5.6 RECOMMENDATIONS FOR FUTURE/FURTHER DEVELOPMENT .....</b>	<b>77</b>
<b>5.7 CONCLUSION .....</b>	<b>78</b>
<b>REFERENCES LIST.....</b>	<b>79</b>

## List of Appendices

<b>APPENDICES</b> .....	<b>80</b>
<b>Appendices A: User Manual</b> .....	<b>81</b>
Creating User .....	81
Login Form .....	82
Home Page .....	82
Making Booking .....	83
Viewing Activities .....	84
Menu List .....	85
Housekeeping Services .....	86
Backend Panel .....	87
<b>APPENDIX B: QUESTIONNAIRE CHECKLIST</b> .....	<b>91</b>
<b>APPENDIX C: OBSERVATION SCORE SHEET</b> .....	<b>92</b>
<b>APPENDIX D: INTERVIEW CHECKLIST</b> .....	<b>93</b>

## Table of Figures

Figure 1. 1 The organography of The Victoria Falls Hotel .....	3
Figure 2. 1 Gantt Chart .....	16
Figure 3. 1 The Activity Diagram for the current System .....	23
Figure 3. 2 The Context Diagram for the current System.....	24
Figure 3. 3 The Data Flow Diagram for the current system .....	26
Figure 4. 1 Context diagram of the proposed system .....	34
Figure 4. 2 Proposed system's Data Flow Diagram .....	36
Figure 4. 3 Architectural Design for the proposed system .....	39
Figure 4. 4 Proposed System Physical Design.....	40
Figure 4. 5 Proposed system's Ansi-Sparc Database Architecture.....	42
Figure 4. 6 Enhanced Entity Diagram of Proposed System.....	46
Figure 4. 7 Proposed System Class Diagram.....	49
Figure 4. 8 Package Diagram.....	50
Figure 4. 9 The Proposed System Sequence Diagram .....	51
Figure 4. 10 Main Menu for Backend.....	52
Figure 4. 11 Home Page Menu .....	53
Figure 4. 12 : Menu design .....	54
Figure 4. 13 Guest Signup form.....	55
Figure 4. 14 Activities.....	56
Figure 4. 15 Book Now.....	57
Figure 4. 16 Testing Phases .....	64
Figure 4. 17 Black Box Testing on Creating New Room Category .....	65
Figure 4. 18 White Box Testing of Code on Android Studios.....	66
Figure 4. 19 Kaspersky Endpoint10 Security for Firewall and Network Management.....	69
Figure 4. 20 Data Migration.....	72
Figure 4. 21 System maintenance strategy .....	76

# **CHAPTER ONE: INTRODUCTION**

## **1.1 INTRODUCTION**

The **Guest Self Service System** for The Victoria Falls Hotel is a software application being designed for the Victoria Falls Hotel as a solution to the problems encountered during use of their current system as outlined in the problem definition of this chapter. The system will allow guest to request for room service either from housekeeping, guest services or food and beverage departments. It will also allow guest to view, select and make request for services using their mobile devices. Once a request has been made it will then appear on the screen of the staff end. In other words, the system will have a desktop interface and a mobile interface. The mobile interface will be used by guest to make their request while the desktop interface is where the staff will view and action guest request. The Guest Self Service System will also allow the guest to make table and restaurant bookings on their mobile devices as opposed to booking through phone calls. Guest is allowed to have an option to call for extraordinary requests which will come with a complementary charge for the room. Furthermore, the system will have a functionality which gives the guest the total amount of food items ordered upon selection, among other objectives outlined in the objectives section of this project. This main thrust of this chapter is give a brief understanding of the organization by observing its background, organizational structure. Furthermore, the problems identified and the system objectives are to be discussed in this chapter.

## **1.2 BACKGROUND OF ORGANIZATION**

The Victoria Falls Hotel was constructed in 1904 and became the primary guesthouse to be constructed in the Victoria Falls area. It exudes the novel expatriate Edwardian appeal but modern refurbishments provide visitors the modern relaxations an individual would expect from a luxurious hotel. The Victoria Falls Hotel is an intercontinental trademark prevailing in the world and providing quality and pleasing hospitality services. The environment itself around the Falls offers a myriad of undertakings suitable to both young and old, adventurous to enjoy. Victoria Falls hotel is perfectly situated within the town to enjoy all Victoria Falls offers at its optimum potential. The Hotel has been in operation for almost 111 years in and presumes to be existing, serving the same purpose in the forthcoming years as mentioned in their vision “Quality Service for all”. The Hotel is in partnership with two well-known companies which are African Sun Ltd

and Meikles Ltd. Thus these two companies have 50% share ownership. In addition, the hotel consists of 166 rooms and which offers the exceptional deluxe restaurant amenities. The Hotel has many departments and is exclusively managed by the general manager.

### **1.2.1 ORGANIZATIONAL STRUCTURE OF THE VICTORIAL FALLS HOTEL**

According to (Galbraith,1987; Greenberg, 2011) an organizational structure refers to the general configuration between individuals and groups regarding the allocation of tasks, responsibilities and authority within the organization. It can also be defined as how activities such as task allocation, coordination and supervision are directed towards the achievement of the organizational goals. The Victoria Falls Hotel's organizational structure follows the same concept as shall be illustrated on the Hotel Organography. It is designed according to the same flow in such a way that at the top there is the general manager followed by the deputy general manager. Managers of all departments follow and they report to the general manager or the deputy. Assistant managers are below the departmental managers and they run the department during the absence of the managers. Then the junior staff from all departments follows and they report to their departmental supervisors or managers. The diagram on the next page illustrates the Victoria Falls Hotel's organizational structure.

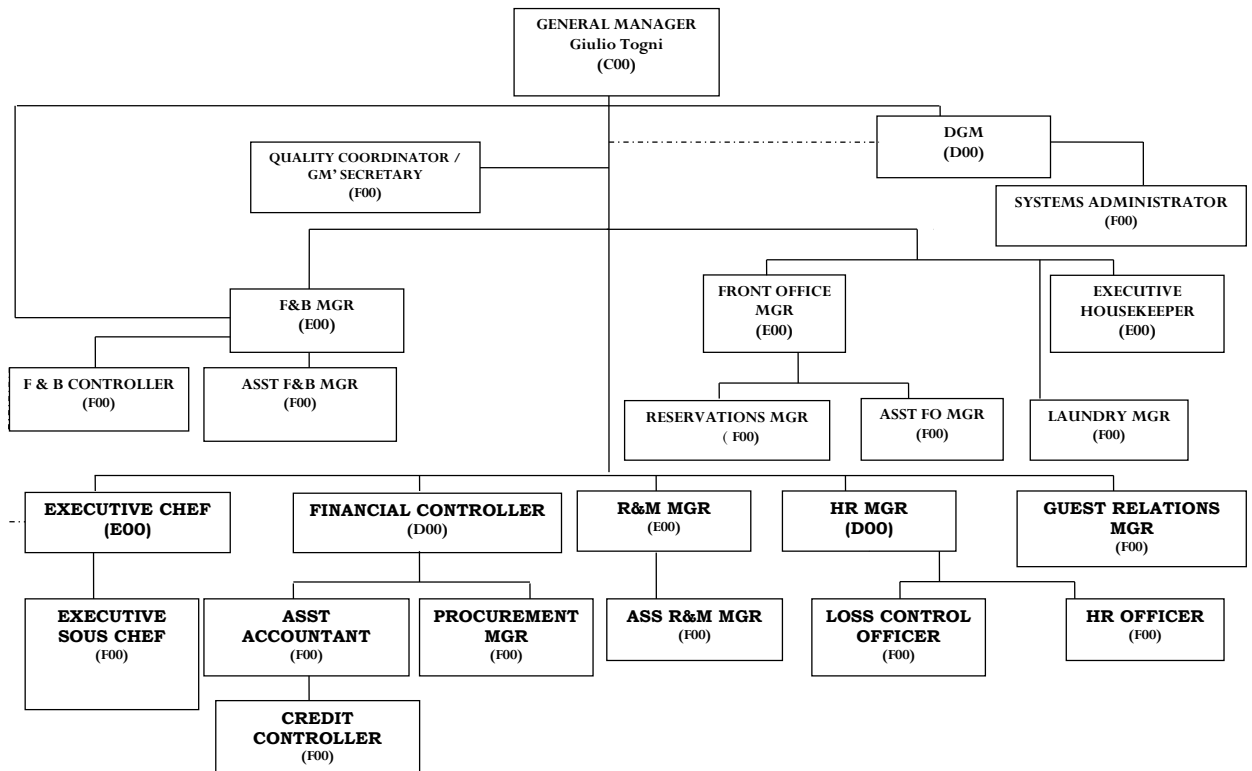


Figure 1. 1 The organography of The Victoria Falls Hotel

## 1.2.2 VISION

The Lifestyle Company creating unforgettable leisure experience

## 1.2.3 MISSION STATEMENT

“We exist to create wealth in a sustainable manner by anticipating and meeting the needs of our stakeholders, through the provision of seamless leisure services in our chosen markets”

## 1.2.4 PROBLEM DEFINITION

The Victoria Falls Hotel has been exceptionally effective and efficient in its production of services. This has led to its growth and expansion in terms of clientele in the tourism industry. The expansion of this organizational has led it to experience a number of challenges in maintaining its



commendable serving capacity due to the current processes they use to serve guests and to meet guest expectation. The following problems were noted from the investigations made.

- ❖ Slow customer services time during food ordering resulting in guest frustration
- ❖ There is wrong placement and undertaking of orders by waiters
- ❖ Guest are not aware of the total cost of the food they order; bills are issued when they finish eating to sign which may sometimes be a convenience when guest does not have enough cash to pay.
- ❖ Guests are usually unaware of what is served in the restaurants because no a dynamic platform for guest to peruse menus for the hotel restaurants
- ❖ Guest miss restaurant times and dates because there is no platform to note guests about restaurants open and service times and location
- ❖ There are only a few centralized work stations where waiters queue to punch orders from guests
- ❖ Brief description of the food items and sometimes guest will avoid ordering food due to lack of knowledge.
- ❖ Users frequently forget about orders done on the phone calls resulting in guest inconvenience.
- ❖ Language barriers experienced during phone call requests, and result in misinterpretations of what guests requested.

### **1.3 AIM OF THE STUDY**

This research project seeks to develop a Mobile Menu Book System and or web application for the Victoria Falls Hotel that is aimed at solving the above mentioned problems.

### **1.4 OBJECTIVES OF THE STUDY**

- ❖ Allow guests to order or request room services from their mobile device
- ❖ Facilitate restaurant booking on mobile device
- ❖ Request for housekeeping services
- ❖ Permits the guests to browse and peruse each restaurant menus
- ❖ Make a platform that enables the guest to view the restaurant opening and service times
- ❖ Capable to calculate the guest's total bill to confirm the order

- ❖ Produce reports for assessments.

## **1.5 HYPOTHESIS**

The following tools will be used in the development of the proposed system

### **Android Programming language**

- ❖ This language highly available and is a free software and that is easier to comprehend and make personalized applications. It is object oriented in nature and is also platform independent and secure according to its design using virtual machines.

### **MySQL Database**

- ❖ MySQL database management system is to be used because they are freely accessible on Google. They are best the best choice when the data to be represented is too complex and unrelated or any data with some relationships. It provides the data manipulation capabilities that can easily be used to insert, updated or delete data in the database
- ❖ Extremely protective: MySQL has solid data safekeeping strata that safeguard private data from hackers. Codes may be set to permit some or all users rights.
- ❖ MySQL is an open source system thus one can make advancements and modifications at any time.
- ❖ MySQL – a scalable and robust Relational Database System
- ❖ XAMPP – this is a local host server which will be used to test the application

### **PHP as Programming Language**

- ❖ PHP is freely accessible on the internet and can be easily downloaded on the internet at no cost. It used as a back end application that connect android to MySQL databases. It is a user friendly scripting language that is easy to understand and use.
- ❖ PHP is a server side scripting language which is user friendly, easy to install and compatible with most operating system
- ❖ HTML – Hypertext Markup Language, this the best for designing forms and layouts and also linking webpages together

- ❖ CSS – this Cascading Style Sheets which is the most vibrant in styling the user interfaces and providing a user friendly look of the application

## **1.6 JUSTIFICATION OF THE STUDY**

- ❖ The proposed system will reduce the customer service time and increase efficiency by instantly sending orders to the kitchen other than having to first be recorded in a booklet by the waiter and then being posted on shared work station to the kitchen.
- ❖ Increase in satisfaction as guest will now request for their orders in the comfort of their rooms at any time they need to.
- ❖ Reduction of guest complains and misunderstandings as experienced when wrong orders were made due to communication problems such as language and accent among other communication barriers.
- ❖ It also goes handy with the hotel objectives to “green” technologically.
- ❖ The system is user friendly due to dynamic graphical user interfaces in menu selections as compared to static ones being currently used.
- ❖ It is cost effective to the hotel since less human labor would be required to do the same job
- ❖ It improves serving of guest due to correct request being made as compared to biased ones
- ❖ More bookings would be done effectively without guests having to call or physical visit the desk for table reservations.
- ❖ The system will allow the guest to order food for themselves and mistakes are minimized

## **1.7 CONCLUSION**

This proposal phase serves as an introduction of the whole project. It briefly outlined the major goals of the research and how the solution is to be brought about. Further chapters in the system development lifecycle will contain the preliminary phase of the project since the major aspects such as the problem definition and the project’s main objectives have been done on this phase. This stage has managed to cover a brief background of the Victoria Falls Hotel and how the solution will benefit the hotel overall.

## **CHAPTER TWO: PLANNING PHASE**

### **2.1 INTRODUCTION**

According to Dennis and Wixom (2012), project planning forms the second stage of the project life cycle and it consist of the creation of a set of plans that serves as a guideline for the project team members as they progress through the execution and closure stages of the project. All the plans structured in this phase will assist project members to manage time, costs, change, quality, risks and other issues of concern. The above chapter gave emphasis on issues to do with current system functionality and operations and the various problems encountered in the implementation of the system. Also a brief description of the organization, its vision and mission statements were stated. However, this chapter is aimed at taking a closer analysis on the project's feasibility, its proposed value to the organization, resources such time, hardware and software needed to come up with the proposed system. Also, an estimation on the costs and benefits to be brought about by the new system are given a careful thought about.

### **2.2 REASONS FOR BUILDING THE NEW SYSTEM**

Every system ever developed in this world is goal oriented or goal driven in one way or the other, this entails that every system is developed with some backing reasons for it to be brought into use upon completion. However, the system under study is being developed basing on the reasons suggested below:

- ❖ Reduced customer service time: The proposed system will decrease the customer waiting time for service and increase efficiency by instantaneously sending orders to the kitchen or designated department other than having to first record in a booklet by the waiter and then being posted on shared work station to the kitchen.
- ❖ Increased customer satisfaction: Increase in gratification as guest will now request for room service or their orders in the comfort of their rooms at any time they feel like.
- ❖ Reduction in guest's complaints: Reduction of guest complains, queries and misunderstandings as experienced in times when wrong orders where being made due to communication problems such as language and accent among other communication barriers.

- ❖ Alignment with business objectives: the proposed system is aiding to the business objectives of computerizing most of its processes so as to gain the competitive advantage globally.

### **2.3 BUSINESS VALUE**

This is a term used contextually in the planning phase to include various forms of value that guarantees the health and the wellbeing of the project in the long run. It encompasses all forms of value of the project that are way beyond economic value. For instance, these could be values such as customer value, employee value, managerial value, societal value, economic value just to mention a few. The majority of these values cannot be directly converted or expressed in monetary value. The following list shows some of the business values to be brought about by the Guest Self Service System:

- ❖ Reduction of human labour costs: It is beneficial to the human resources management in the recruitment processes since less human labor would be required to do the same job.
- ❖ Increased market share: Bookings would be made effectively without guests having to call or physical visit the desk for table reservations and thus aiding to customer satisfaction.
- ❖ Increased customer loyalty: Guest coming from all over the world will always want to visit a hotel that is well versed with the technological facilities that will make do less since most of them would have come to take a break and rest, thus they would want to use something that is user friendly and they will always find comfort in it.

### **2.4 FEASIBILITY STUDY**

According to Hofstrand (2009) feasibility study aims to objectively and rationally uncover the strengths and weaknesses of an existing business or proposed venture, opportunities and threats present in the environment, the resources required to carry through, and ultimately the prospects for success. In its simplest terms, the two criteria to judge feasibility are cost required and value to be attained

### 2.4.1 TECHNICAL FEASIBILITY

This is aimed at assessing the details on how the project product will be delivered such as hardware, software and technical expertise needed. Technical feasibility can be thought of as the logistical or a tactical long term plan of how the project will finally deliver its final product.

### 2.4.2 TECHNICAL EXPERTISE

The system to be developed requires various skills and experience in programming languages such as PHP, Java scripting and android so as to come up user friendly interfaces. There will be need to have an understanding of how to integrate web interfaces into android compatible mode for the front end of the system. Thus this calls for the Information and technology department to be fully manned with highly skill workforce in order to come up with the proposed solution.

### 2.4.3 HARDWARE SPECIFICATIONS

Hardware Type	Minimum Recommended
Primary Memory	1GB
Hard Disk Drive	80GB
Processor Speed	1.67Ghz
DVD ROM	16x
Printer	HP LaserJet 2050

Table 2. 1 Hardware specifications

### 2.4.4 SOFTWARE SPECIFICATIONS

Software Type	Minimum Suggested
Operating System	Windows7 and above, IOS
Antivirus	Kaspersky End Point 10
Browser	Chrome, safari, Firefox, opera
Localhost	Xamp 6.1
Programing languages	Android, PHP, JavaScript

Table 2. 2 Software Specifications

## **2.5 ECONOMIC FEASIBILITY**

According to Duff (2011) economic feasibility refers to the cost and logical representation of the business project. Thus before embarking on a new project most businesses are bound to conduct a feasibility study which analyses business data to determine whether the total cost of the proposed new project will exceed the total benefits to be obtained from that project. The norm is that if the benefits exceed the total costs then it is considered worth undertaking the project and if the total costs exceeds total benefits then the project will be discontinued. The main costs involved are the operational, development and maintenance costs whilst the benefits may include tangible and intangible benefits.

### **2.5.1 COST BENEFIT ANALYSIS**

Dury (2011) postulated that the goal of the cost benefit analysis is to outline a clear representation of the total costs that would be incurred during the production of the system and the total benefits obtained from the use of the proposed system. A decision is only made to proceed if the cost benefit analysis' results exhibit that the benefits to obtained by the system will exceed the cost of production. Thus when the benefits are more than the costs incurred therefore the system development will be considered feasible to do. The total cost may be found by summing up the following cost elements:

**Development costs:** these consists of the aggregate costs incurred during the system production

**Operational costs:** these are the costs incurred as the system is in use including the training costs.

**Tangible benefits:** these consists of all the benefits expressed in monetary value that are realised from the system use

**Intangible benefits:** these are all the benefits that are impossible to express in monetary value such as efficiency, effectiveness and accuracy among other benefits

**Below is a table for the incomes and expenditures of the project**

Year	2016	2017	2018	2019	2020
<b>Paybacks</b>	<b>\$</b>	<b>\$</b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
Customer satisfaction	600	900	900	900	900
Reduced customer service time	900	1100	1100	1100	1100
Increase efficiency	900	1350	1350	1350	1350
Cheaper stationery expense	700	1000	1000	1000	1000
Lower cost in operation	1200	3300	3000	2500	2500
Enhanced decision-making and control	2000	3140	3140	3140	3140
<b>Accumulated Paybacks</b>	<b>6300</b>	<b>10790</b>	<b>10490</b>	<b>9990</b>	<b>8990</b>
<b>Development Costs</b>		<b>\$</b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
Software installations	50	0	0	0	0
Staff Training	500	0	0	0	0
Stationery	300	0	0	0	0
Software costs	600	0	0	0	0
Hardware costs	1200	0	0	0	0
Network Infrastructural costs	400	0	0	0	0
<b>Operational Expenses</b>	<b>3050</b>				
Maintenance	1000	500	500	50	500
Labour	500	400	400	400	400



Conservations and maintenance	1100	1100	900	800	800
Holdup	90	90	80	80	80
Other	90	90	90	90	90
<b>Total Operational expenses</b>	<b>2870</b>	<b>2180</b>	<b>1970</b>	<b>1420</b>	<b>1870</b>
<b>Total cost</b>	<b>6130</b>	<b>2180</b>	<b>1970</b>	<b>1420</b>	<b>1870</b>
<b>Net Benefits</b>	<b>470</b>	<b>8610</b>	<b>8520</b>	<b>8570</b>	<b>7120</b>

Table 2. 3 Cost benefit analysis expressed in monetary value

**2.5.2 THE NET PRESENT VALUE**

The Net Present Value is a capital appraisal technique that considered the time value of cash over a period of time. This approach is great as compared to other approaches which do not consider the decrease in monetary value as time progresses such as the Payback Period and Accounting Rate of Return. The Net Present Value is typically calculated over a period of time based on the interest, for instance, three years or five years. Suppose the NPV of the project is greater than zero, the project is considered to be beneficial and profitable to the organization and if it is less than zero then it is considered costly and not profitable to the organization to undertake over a specified period of time. The formula to calculate NPV is as follows.

**Formula:**

$$\text{Net Present Value} = \frac{\text{Total Benefits}}{(1+r)^*N}$$

r is the discount rate  
N = number of years

Below shows the calculation of the discounting factors for the five years.

- First =  $1 / (1+0.10)^1 = \underline{0.90909}$
- Second =  $1 / (1+0.10)^2 = \underline{0.82644}$
- Third =  $1 / (1+0.10)^3 = \underline{0.75131}$
- Fourth =  $1 / (1+0.10)^4 = \underline{0.68301}$

Fifth  $= 1 / (1 + 0.10)^5 = \underline{0.62092}$

10% was used as a discounting factor to calculate the cash flows

**Below is a table showing the Net Present Value the project**

*Table 2. 4 Payback Period Analysis*

Number of Years	Discount Factors (10%)	Cash flows	Present Values
0	1.0000	(10000)	(10000)
1	0.90909	470	427
2	0.82644	8610	7116
3	0.75131	8520	6401
4	0.68301	8570	5853
5	0.62092	7120	4421
<b>NPV</b>			<b>14218</b>

The above calculation of the Net Present Value has resulted in positive NPV which proves that the project is feasible to undertake, therefore a decision to continue with project is taken.

### **2.5.3 ACCOUNTING RATE OF RETURN**

The Return On Investment is also known as the Accounting Rate of Return and it provides a company to define the rate of profitability on a project being undertaken. It determines whether the project will result in positive financial benefits and in turn providing an assurance to proceed. The formulae to calculate return on investment is as below:

$$\text{Return On Investment} = \frac{(\text{Average Annual Profit}) \times 100}{\text{Capital Investment}}$$

$$\text{Average annual profit} = \frac{\text{Total profit}}{\text{Total years}}$$

Therefore;

$$\begin{aligned}\text{Annual average annual profit} &= (470+8610+8520+8570+7120)/5 \\ &= \$24218/5 \\ &= \underline{\$4844}\end{aligned}$$

$$\text{Total investment} = \$10000$$

$$\begin{aligned}\text{ROI} &= \frac{\underline{\$4844}}{\$10000} \times 100 \\ &= \underline{48\%}\end{aligned}$$

A satisfactory Return On Investment of 48% has been produced from the above calculations which is a confirmation that the project will cover the initial investment in a few years. Also this aids to the company's decision to carry on with embarking on the project.

#### **2.5.4 THE PAYBACK PERIOD**

The Payback period is the number of years or time frame necessary for the project to recoup its initial outlay or the money invested in the project. It determines whether to undertake the project or not. The shortest payback period is most favourable as compared to the longer period and is considered not risky if the payback period is short.

The table below shows the calculation of the payback period for the project:

Years	Cash Inflows	Balance
0	(10000)	(10000)
1	470	9530
2	8610	920
3	8520	

*Table 2. 5 Payback Period Analysis*

Year 1 =470

Year 2=8610

=9080

Therefore,  $920/8520 \times 12 = 1.296$

Pay back =2 years 1 month

From the above calculations the payback period is 2 years 1 month required to recover the initial outlay which is favorable considering the fact that the project if 5 years long.

## 2.6 RISKS ANALYSIS

Risk analysis is defined as the probability that something may divert from its desirable nature and the consequences it may result in. In this concept, all the negatives that may be encountered in the process of developing and maintaining the system are being referred to. The risk analysis will make it possible to pre-expect these risks and plans are proactively decided on to combat these risks before they occur.

## 2.7 WORK PLAN

The work plan gives a brief description of the time schedule which emphasizes on the time budget and the times allocated for each project. That is the whole project is subdivided into a number of smaller activities in which each activity is given its time period in which it is expected to be completed. Thus this concept is a bit tricky in the sense that if an activity is given a shorter period to complete then it will affect the project completion because these will be based on the estimations. The table below gives the time schedule that are have been allocated for each project and it is followed by the Gantt chart which further give a graphical picture of all the activities to be carried out in the project.

### Budget and Time Program

<b>TASK</b>	<b>BEGIN DATE</b>	<b>END DATE</b>	<b>LENGTH (WKS)</b>
Proposed	01/10/2016	07/10/2016	1
Planning	27/02/2017	04/03/2017	2
System Analysis	05/03/2017	12/03/2017	2
Design	13/03/2017	21/03/2017	3
Testing and implementation	22/03/2017	29/03/2017	2
Evaluation and maintenance	30/03/2017	07/03/2017	

Documentation	08/04/2017	15/04/2017	11
---------------	------------	------------	----

Table 2.5 Budget and Time Schedule

### 2.7.1 THE GANTT CHART

STAGE	1	2	3	4	5	6	7	8	9	10	11
Proposal Phase	■										
Planning Phase		■	■								
System analysis Phase			■	■	■						
Design Phase					■	■	■	■			
Testing and implementation									■	■	■
Evaluation and maintenance										■	■
Documentation Phase	■	■	■	■	■	■	■	■	■	■	■

Figure 2. 1 Gantt Chart

Key                      Single week ■

### 2.8 CONCLUSION

This feasibility study phase has managed to emphasize on the worthiness of the project so as to determine whether it is feasible to carry on with the project or to discontinue. This was done through a thorough analysis of the various project estimation techniques such as the Return on Investment, Payback Period, Net Present Value and the Cost Benefit Analysis. Basing on the results of these techniques a decision to continue with the project has been made. The succeeding chapter will focus on the research methodologies that will be used to gather the necessary information required to carry on with the business project. These research methodologies will be evaluated to grasp an understanding of each strengths and weaknesses.

## **CHAPTER 3: ANALYSIS PHASE**

### **3.1 INTRODUCTION**

Burback (1998) postulated that the systems analysis phase of the software development defines all the necessary requirements of the system, regardless of how these requirements will be accomplished. This phase gives a brief description of the problems that the system is trying to solve at a particular point in time. Thus the requirement document is produced as the deliverable result at the end of the project. This document clearly and precisely states what is to be built at the end of the project. This phase is going to discuss the methodologies that are used to gather the information that is required for this project to be a success. It is also aimed at giving a clear analysis of the current system through the use of a context diagram and the Data Flow Diagram. An evaluation of the available alternatives is also provided in this phase.

### **3.2 INFORMATION GATHERING**

Information is crucial in the development of every system in the software development projects. To make the research easy and come to a reality the employment of various fact finding approaches were done. The researcher exploited the use of interviews, on site observation and questionnaires. The main reason for using these research methodologies was to gather the necessary material in order to acquire a concrete background information of the current system that would assist in building the new system. The fact that all these methods come with their strengths and weaknesses, the researcher made a decision to use them all so that they back up each other in providing the required information. A closer look at these methodologies is done in the following segments clearly outlining their benefits and demerits are given in the following:

#### **3.2.1 On Site Observation**

Employees are observed as they work on their day to day activities without the conscience that they would be under the observation process. The results from the observation are recorded on a work book for further analysis and conclusion. The results of the observations would include the number of times the guest make phone calls to the guest services desk to confirm bookings for the restaurant and the opening times for all the restaurants for the hotel. Also the number of times the guest would call the guest services for the room services or housekeeping department for extra

services. These were recorded down for further analysis. These recordings would include the bookings done by the guest for the restaurant.

### **Advantages of Onsite Observations**

- It was less expensive since no extra cost of material were required.
- The researcher managed acquire data that was applicable to the context.
- The researcher managed to access first-hand information.
- There was no interference in the user normal work and therefore did not distract the users from their work.
- Provided some clear individual view of the actual operations of the system without any bias from the management or departmental personnel who sometimes tend to give false information.

### **Disadvantages of Onsite Observations**

- Difficult in observing staff during their work activities as this will would be easy for them to act differently the sooner they perceive they were exposed to observation. This would alter the results required and sometimes tend to lead to bias conclusions.
- Observations sometimes fail to expose the entire operations and feelings of the users.
- Observations results were prone to researcher prejudice.
- This process was not done on a daily routine to check operations. The fact that staff members tend to be exceptionally cautious about their behavior under observation, may prevent exposing their real life behaviors.

### **3.2.2 INTERVIEWS**

Interviews provide an unswerving and a more productive way of gathering and permits personal contact with the interviewees being asked some set of questions. They are very reliable and flexible means of data gathering and evaluation. A set stage for the interview to commence is required before the start of the interview. The questions to be asked are supposed to be set in a

way that is not vague so as not to confuse the participants. In other words, they should be short and precise to avoid misunderstandings and evaluations.

A sample size of about 20% of the employees was decided upon in order to carry out the interview. About 9 members of the staff available were interviewed to provide the information. The Guest Services Manager, Food and Beverages Manager and some other workers at the Victoria Falls Hotel underwent an interview. They expressed their mixed sentiments and views pertaining to the existing system functionality and recorded. An in depth understanding of the existing system was made possible through the interviews leading to success of the investigations.

### **Advantages**

- This facilitated the researcher to obtain instant and unswerving responses from the interviewee through the of this method.
- The contributors felt free and managed demand even for further enquiries, clarifications or explanations
- It outlines exactly the real operations of the system in use currently without too much bias
- Interviews made it possible to monitor progress and the superiority of a principal data and some informs to the field crews were notable
- The candidate's replies to questions were instant and the dialogs guaranteed that the candidate answered most of the questions.

### **Disadvantages**

- This method wasted time resources as the researcher had to postpone whenever employees would serve clients to resume later.
- The respondents felt exposed by some of the requirements of the questions.
- The interviews left the staff in fear as they assumed the information they exposed put their jobs at risk.
- The research method costs were unbearable due to travelling costs involved.



- Some respondents exaggerated the information which led to biased conclusions particularly where adverse responses were to be supplied as they feared threat to their jobs.

### **3.2.3 QUESTIONNAIRES**

According to Lucy (1997), a questionnaire is a set of well-structured questions that are prepared so that they will be distributed to a sample of choice to answer these questions to provide the necessary information required by the research personnel. There was immense use of questionnaires given out all around the enterprise. The questionnaires were circulated among managers and staff of the existing system, enquiring them to list their challenges and endorsements about the projected system.

#### **Advantages**

- Respondents would have abundance of time to respond to questions asked as they were not expected to reply straightaway, this guaranteed that precise facts would be given.
- Sensitive topics which participants felt uneasy to speak about during interviews were unveiled through questionnaires.
- They were easy to manage and data was gathered in a standardized way.
- The questionnaires were cost-effective equated to interviews.
- It was permissible for unnamed contribution and produced exact material.

#### **Disadvantages**

- Misinterpretations caused some questions to be answered wrong and some were left unrequited as they seemed vague to the respondent.
- The method lacked personal touch amongst the investigator and the respondent, this was due to discrepancies in question interpretations which compromised the weight of the data given.
- Some respondents failed to submit back the questionnaires there by compromising sample size.
- It was impossible to explain any points due to standardization of questions.
- There was no probing or clarification for supplementary information

### **3.3 ANALYSIS OF THE CURRENT SYSTEM**

An overview and thorough analysis of the current system's operations are being given here. The weaknesses of the current system are identified and also a proposal solution to the problems being experienced is to be given in this stage. In summary form the system being used currently is entirely manual in nature. That is all guest after being checked into the system they have to request for other services over the phone. Some of the information are given during the room induction but the information will not be as explicit as most guest would be too tired to listen to lots of information on arrival. Thus they tend to forget most of the vital information about their whereabouts on the hotel. Furthermore, some of this information would be printed on the papers which obviously goes parallel to the organization's goals of "going green" as far as technology is concerned. The booking system for the restaurants is also manual as the guest would either call or physically visit the Guest services desk to confirm the bookings and to ask about the restaurant opening times and closing times. The guest would also call the housekeeping personnel should they need extra service and also call room service for the room services. The proposed solution will clearly show how the problems with the current system will be rectified. This will be achieved through the focus on the following aspects.

#### **3.3.1 DESCRIPTION OF THE CURRENT SYSTEM**

The current system is heavily depended on phone calls by guests from their rooms to the designated department. They also rely on physical visits to the Reception Desk and the Guest Services Desk. This is likely to cause some frustrations to the guest who may be tired to access services and information through this medium. This telephone communication is entirely the main form of exchanging information and requesting for internal services. This manual phone system is very hostile to the users as they sometimes do not get quick response when the hotel is busy and track that for staff to recognize that a particular guest from a certain room was trying to call. Sometimes phone calls may result in misinterpretations and misunderstandings resulting to misallocation of requested resources which may be regarded as unprofessional ways of handling guest requests. All these issues evoked the concern of the researcher to consider the development of the Victoria Falls Hotel Guest Self Service Application System to solve these problems.

### **3.3.2 DATA ANALYSIS**

According to Binder and Roberts (2009) data analysis is the process of developing answers to questions through the examination and interpretation of data. In other words it refers to the science of scrutinizing, converting, coupled with modelling facts. The aim idea is that of ascertaining the valuable material, proposing inferences which is supportive to policymaking. It consists of several aspects and methodologies, encircling varied procedures under a range of designations, in diverse industry, science, and social science spheres.

### **3.4 PROCESS ANALYSIS**

Hughes and Cottrell (2009) postulated process analysis as the advanced procedures involved in a way to attain a series of unlike proceedings to transpire in a particular manner. Process analysis may come in binary forms which embraces informational and directional analysis. The difference between the two is that, directional process analysis is known as a stand point view analysis which emphasizes how a process occurs whereas informational process analysis refers to a reminiscent procedural examination aimed to clarify the notion of exactly how something is fully accomplished.

#### **3.4.1 ACTIVITY DIAGRAM OF THE CURRENT SYSTEM**

As proposed by Kendall and Kendall (2005), an activity diagram can be viewed as a graphical presentation that simulates computational and organizational processes and stepwise activities that supports the iterations, concurrency and choice. The activity diagram depicts the organization's overall flow control. It encompasses the activities, their state and conversions between these two. Grounding on Felicci (2009), an activity diagram provides a description of the following aspects:

- 1) Events essential for an operation to be accomplished
- 2) How activities are harmonized to provide a service
- 3) Exactly how events in a single use case may be related to one another
- 4) Manner in which a group of single use case harmonize to produce a work flow in an organization

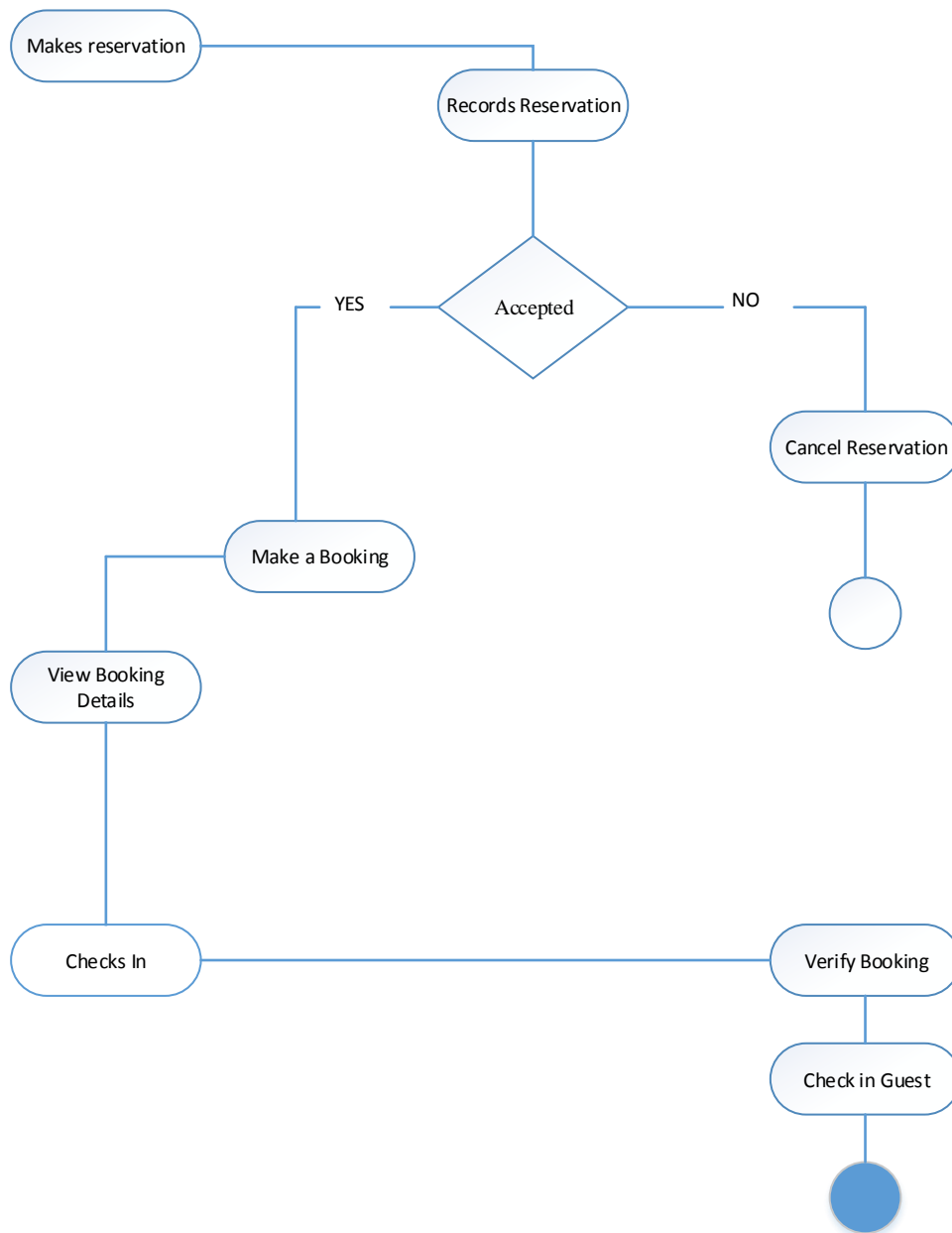


Figure 3. 1 The Activity Diagram for the current System

### 3.4.2 CONTEXT DIAGRAM OF THE CURRENT SYSTEM

According to Kendall (2011), a context diagram depicts the relationships and interactions between the system and the system users. The diagram is a representation of the data sources and the data links. The context diagram depicts clearly the system's collaborations about the rest of the exterior environment, modeling exactly the bases in which data may stream crossways within the system's

borders. Thus the illustration below illustrates the whole system as a distinct process linked with its interior and outside environment.

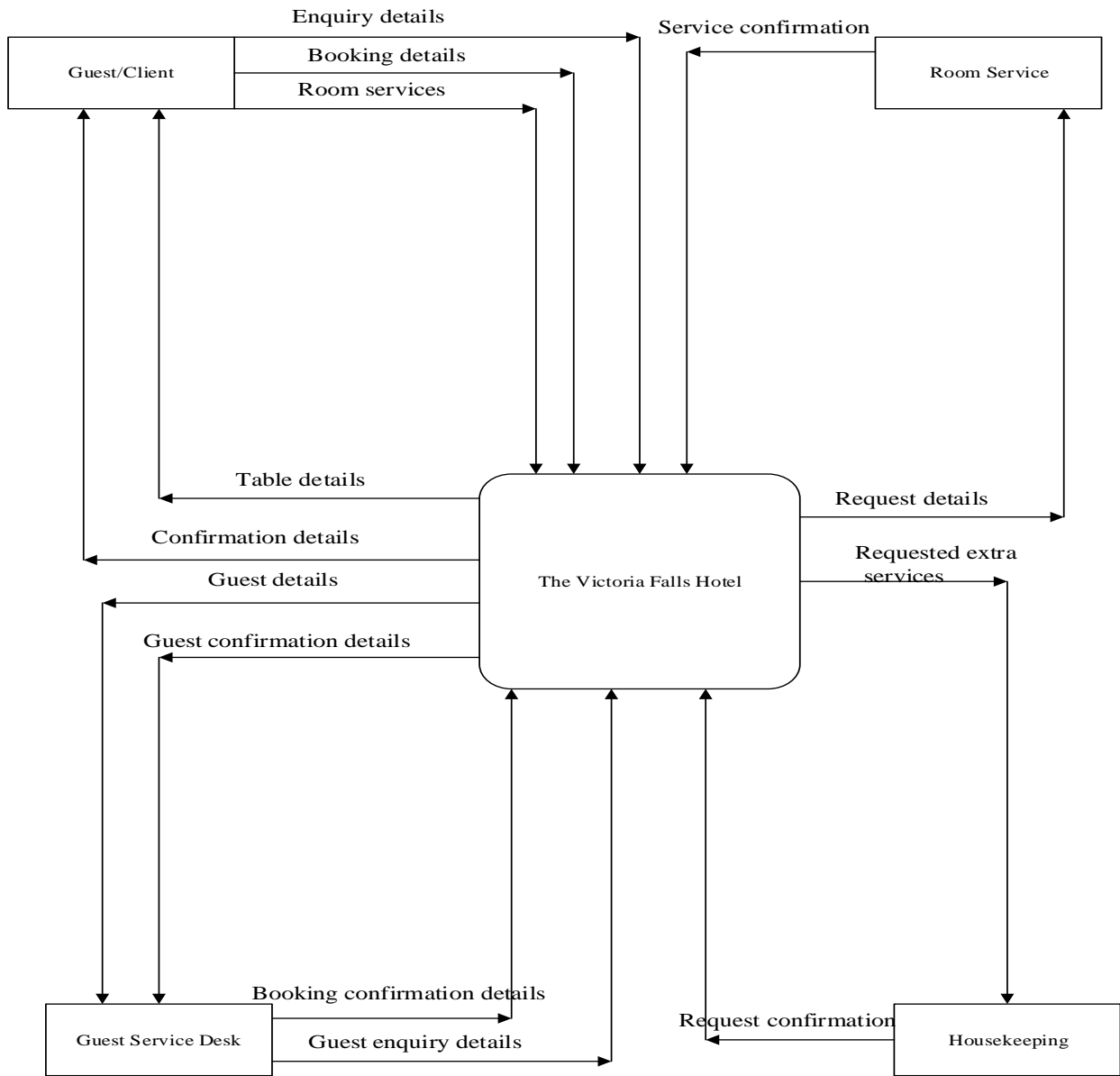
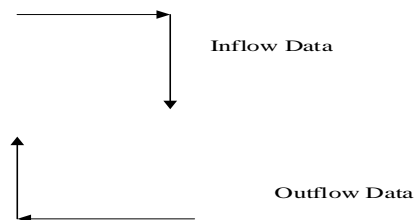


Figure 3. 2 The Context Diagram for the current System

## KEY



### **3.4.3 THE DATA FLOW DIAGRAM**

Agreeing to Whitten (2003), A DFD is an information molding mechanism which elucidates a perfect demonstration about utilities found in the existing system graphically. The approach starts with a comprehensive portrait of the organization and endures by examining the serviceable areas of interest. It produces a perfect indication about the existing system which conveys a better appreciation of the methods and roles of the present system. Data Flow Diagrams displays facts, processes, outputs and inputs. Unfortunately, DFDs do not display some material about the scheduling of procedures. Procedures may be performed simultaneously. Regrettably information flow diagrams fail to disclose that data. Further down is the diagram of the DFD for the existing system:

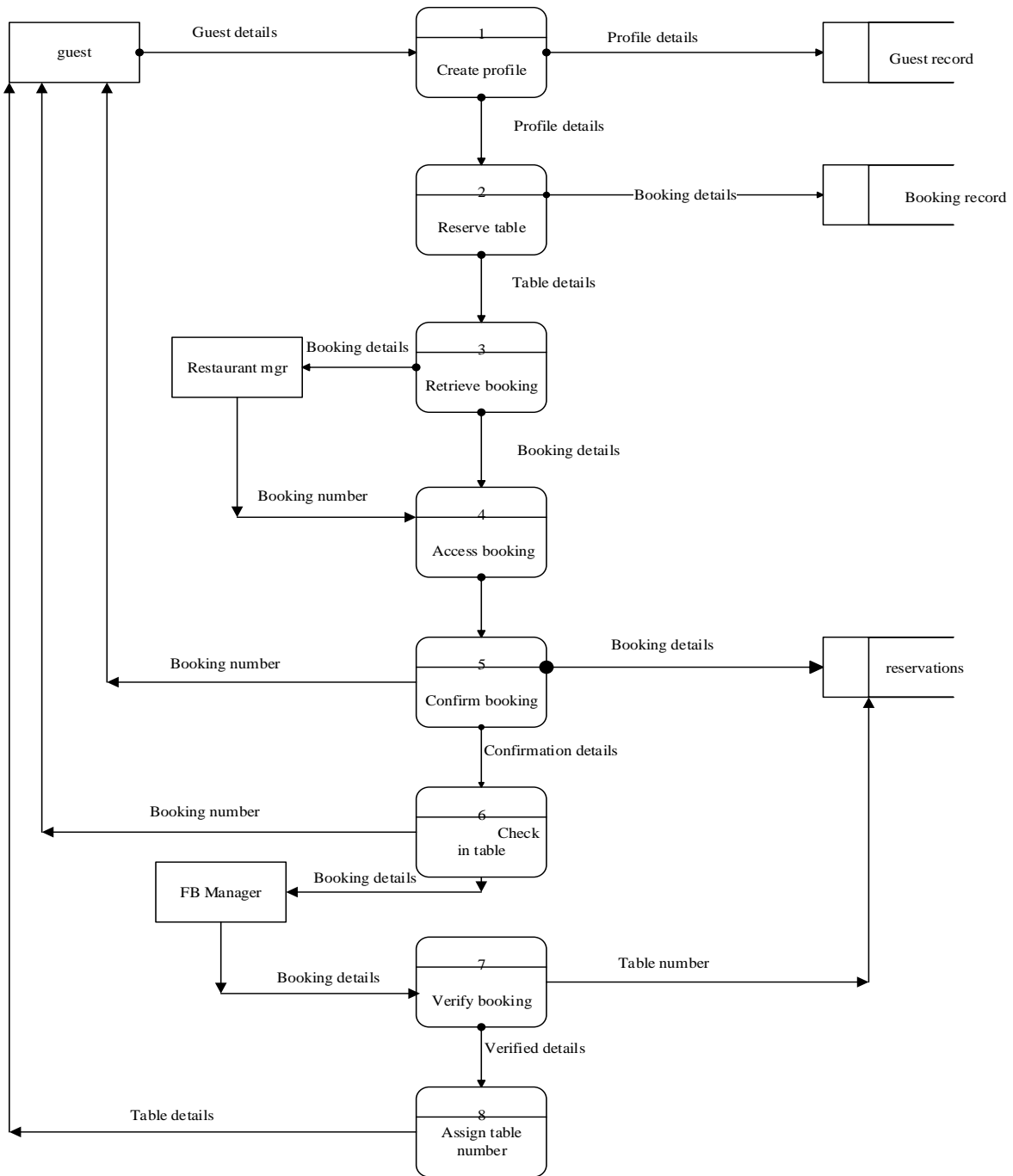


Figure 3. 3 The Data Flow Diagram for the current system

### 3.4.4 THE WEAKNESSES OF THE CURRENT SYSTEM

The results of the system’s examination above show that, the Victoria Falls Hotel makes massive phone calls which waste resources in terms of bandwidth. It is also using enormous volumes of

form-filling which waste stationery and prone to challenges of updating data on papers. Difficulties of extracting hard copied forms for forthcoming reference and appraisals are common. The following shortfalls were noted from the investigations made:

- ❖ Slow customer services time during food ordering
- ❖ Wrong placement and undertaking of orders by waiter
- ❖ Guest are not aware of the total cost of the food they order; bills are issued when they finish eating to sign.
- ❖ No platform for guest to peruse menus for the hotel restaurants
- ❖ No platform to note guests about restaurants open and service times and location
- ❖ There are only a few centralized work stations where waiters queue to punch orders from guests

### **3.5 EVALUATION OF THE ALTERNATIVES**

In a bid to develop the projected system, the researcher managed to make a choice amongst three alternatives which are outsourcing, existing system improvements and developing a new system. Amongst these alternatives it has been decided that building a new system would be a brilliant idea owing to the following reasons.

#### **3.5.1 OUTSOURCING**

Brian (1996), proposed that outsourcing is contracting an external software development company to create and maintain that software for the company. This substitute was a dismal failure as the software vendors tend to be quite expensive when it comes to the money paid for it, coupled with the setting up and upkeep. Furthermore, the software dealers failed to warranty continued upkeep of the software after the employment. The available solutions failed to meet exactly the eminent challenges unveiled by the existing system. In addition, retailers may not compromise on the actual code of their product, which means that the system will not be subject to any alterations or improvements which may meet the user requirements. There is also too much reliance on the supplier.

#### **3.5.2 IMPROVING THE CURRENT SYSTEM**



Advancement of the present system may fail to successfully solve the above challenges. Motives for discarding this alternate idea are:

- This was not an intelligent solution to the problems of the current system as it would remain manual.
- Data storage may be at risk as all records would still be recorded manually and more exposed to theft
- The system will remain manual which may attract data corruption due to human error.
- Very limited data security of the records as they are reserved on paper.
- There are high chances of data redundancy and duplication especially when it comes to data manipulation which is subject confusion and errors.

### **3.5.3 DEVELOPING A NEW SYSTEM**

The Victoria falls hotel can choose to have the application developed by the in-house personnel. This procedure is normally referred to as in sourcing as proposed by Castro and Mylopoulos (2002). The hotel may take advantage of its own systems developers with assistance of the systems analysts to develop this application. It is to the hotel staff's advantage as their technical skills may be improved through this work. The fact that the hotel personnel have adequate knowledge about the hotel systems and functional areas can make it easier to adhere to the principles of the business alignment and business strategies. This allows business goals to be achieved effectively. In-house development is subjected to initial high development costs which may however gradually decrease as the project goes. This alternative is highly favored since the weaknesses of the present system are well pronounced and can be fully addressed remarkably.

In-house development can produce deliverables which are highly tailor made specifically to cater the problems of the current system other than the other alternatives. The system's ability to adhere to the organizational objectives of providing high world class services to the guest will be a great advantage. The initial development of the new system may seem expensive but in the long run it will be cheaper as maintenance and upgrades and support will be entirely done by the hotel systems support personnel. There will be no service provider dependency and the system will work anytime and should problems arise, support systems personnel will know what to do. The system may be fairly secured making it difficult to hacking and malware attacks due to its tailor made features.

### **3.5.4 SUMMARY OF ALTERNATIVES**

Outsourcing and improving the existing system have proved to be very expensive. Suppose a choice was made to improve the current system this would only have increased more costs and the problems would remain unattended to. Thus both alternatives will still have to incur high sums of money for upkeep forever.

### **3.6 REQUIREMENTS ANALYSIS**

According to Brinkman (2008), the Requirements Analysis refers to the capability of a system to provide the properties of the functional and non-functional abilities. The main purpose of this analysis is to demonstrate the necessary system functionalities which are aimed at meeting the user specifications. The requirements analysis is basically grouped in two categories, which functional and non-functional requirements.

#### **3.6.1 FUNCTIONAL REQUIREMENTS**

The common functionality of the system is grouped into sets of inputs, outputs and the system behavior as suggested by Black (2004). Furthermore, the system must provision that the system functionality's nonexistence is synonymous to the system being redundant. The system function specification may include:

- 1) System should be highly secured with authentication through username and password to prevent unauthorized access
- 2) Provide current information in order to provide timely reports for the management to make informed decisions.
- 3) Concurrence and undependability for users to have access simultaneously
- 4) Quick access to require information

#### **3.6.2 USE CASE DIAGRAM**

According to Whitten (2003), the use case is more or less a condition when the system is supposed to satisfy some user's expectations. The use case is known to have an arrangement of phases that comprise of a collaboration amongst the employers and the system. The whole set of use cases states diverse means of system usage, and this explains behaviours essential for the system with the exception of dealing with the interior organization of the system.

### **3.6.3 NON-FUNCTIONAL REQUIREMENTS**

These are the system properties and constraints that assist to define the overall system in terms of system performance, response time, the ability to use it and its security. The following features may conclude the non-functional requirements of the system:

- 1) User friendly and easy to understand and master
- 2) Provide easy input and retrieval of data.
- 3) Highly interactive and simple user interfaces should be present
- 4) Should be accessed through user authentications such as username and password

### **3.7 CONCLUSION**

The whole chapter has provided an in depth overview of the System Analysis stage where a thorough analysis and valuation of alternatives available to solve the problem has been done. A conclusion that the Victoria Falls Hotel Guest Self Service System is to be made has been made as the best alternative to solve the problem. Also various data gathering approaches were used to collect material necessary concerning the existing system in order to have an in depth understanding of the challenges encountered as the existing system is used. The following chapter will concentrate on converting the written objectives into functionality, hence chapter also referred to as the Design Phase. The chapter is spearheaded on only designing the new system.

## **CHAPTER FOUR: DESIGN PHASE**

### **4.1 INTRODUCTION**

The objective of this stage is explaining in detail the manner in which this system is going to be brought to functionality. The physical design of this system is going to be looked at after the analysis of the logical, physical, architectural requirements, database, interface and all the necessary program plans. All necessary emphasis about the design structure of the proposed system will be done in this phase. This phase is expected to produce the technical design as the major deliverable and the team concerned to work on this is the development staff. This is also the conversion stage where the system design demarcates the changeover from requirements report for the business to the technical design document. Dennis, Wixom and Roth (2012) postulated that the design stage is mainly composed of making a decision about how the tasks and procedures will be performed by the application system. It is also where a best choice about the user interfaces is decided upon for easy user interaction and is coupled with form designing for user data input among others. The perfect hardware and software pieces, error finding tools and all the necessary designing tests are done in this stage. Furthermore, Kendall (2005) views this stage as the chance to work on the higher-grade look, feel and functionality of the mobile system as opposed to focusing much on the client business side.

### **4.2 SYSTEM DESIGN**

Based on Cheddie (2006) system design includes the articulation and illustration of some general system functionalities that are expected of the system under development, clearly pin pointing exactly the manner in which the system would work. The characteristics of an effectively designed system are grouped into five categories as each explained below.

#### **1. EFFICIENCY**

By definition, efficiency refers to the capability to produce the output expected within the least possible effort, Aggarwal (2007). The major objective in this case is to make the system be able to accomplish various functionalities within a minimum possible time frame. The system deployment should positively benefit the organization on the basis of expenditure reduction and increase in profits. As the system is implemented, the user contribution is of great magnitude as they are expected to operate on the system as effectively as possible.

## 2. EFFECTIVENESS

In agreement to Sommerville (2007), the ability of the system to output the acceptable outcomes against the inputs used is referred to as its effectiveness. Thus effectiveness is mainly concerned about making the right application.

## 3. RELIABILITY

Conterrell (2008) argued that reliability is the capability of a system to perform all the functionalities as expected in a real time environment in an error free manner. This entails that the system should have a capability to restore its important information whenever there is an unexpected system shutdown or any errors which would have prevailed. The application is expected to maintain its consistency by means of rolling back to either its old consistent state or its new consistent state. By so doing, the system is expected to provide as accurate data as possible.

## 4. MANTAINABILITY

A good system should be permissible of system modifications and it should be flexible and upgradable so that some alterations can be done on it without causing damages to the whole system

## 5. SECURITY

Security is mainly concerned with the issue of preventing all the unauthorized user access to the system information. That is the system should have some form of control in terms of access through user access control levels. The major areas of concern are the network, physical, database and software security. An examination of these security features would be done in detail in the security and design area in this stage.

### **4.2.1 DESCRIPTION OF THE PROPOSED SYSTEM**

The Victoria Falls Hotel Guest Self Service System serves as a great pioneering innovation which is aimed at technologically bringing change to the current system in order to increase customer satisfaction and will work as a self-assistant to the guest. Below is a list of the system objectives:

- ❖ Allow guests to order and send food order instantly to the kitchen monitor screen from mobile device

- ❖ Capable of providing digital receipts back to guest account
- ❖ Permits the guests to browse and peruse each restaurant menus
- ❖ Make a platform that enables the guest to view the restaurant opening and service times
- ❖ Capable to calculate the guest's total bill to confirm the order
- ❖ Provide the ability to give a brief description of the menu items upon clicking.
- ❖ Request for housekeeping services
- ❖ Produce reports at the end of the day after shift for assessments.
- ❖ table booking and reservation

#### **4.2.2 CONTEXT DIAGRM OF THE PROPOSED SYSTEM**

According to Kendall (2011), the context diagram portrays the associations and communications between the system and the users. The diagram is a demonstration of the data sources and the data links. The context diagram portrays clearly the system's collaborations about the rest of the exterior environment, modeling exactly the bases in which data may stream crossways within the system's borders. Thus the illustration below illustrates the whole system as a distinct process linked with its interior and outside environment.

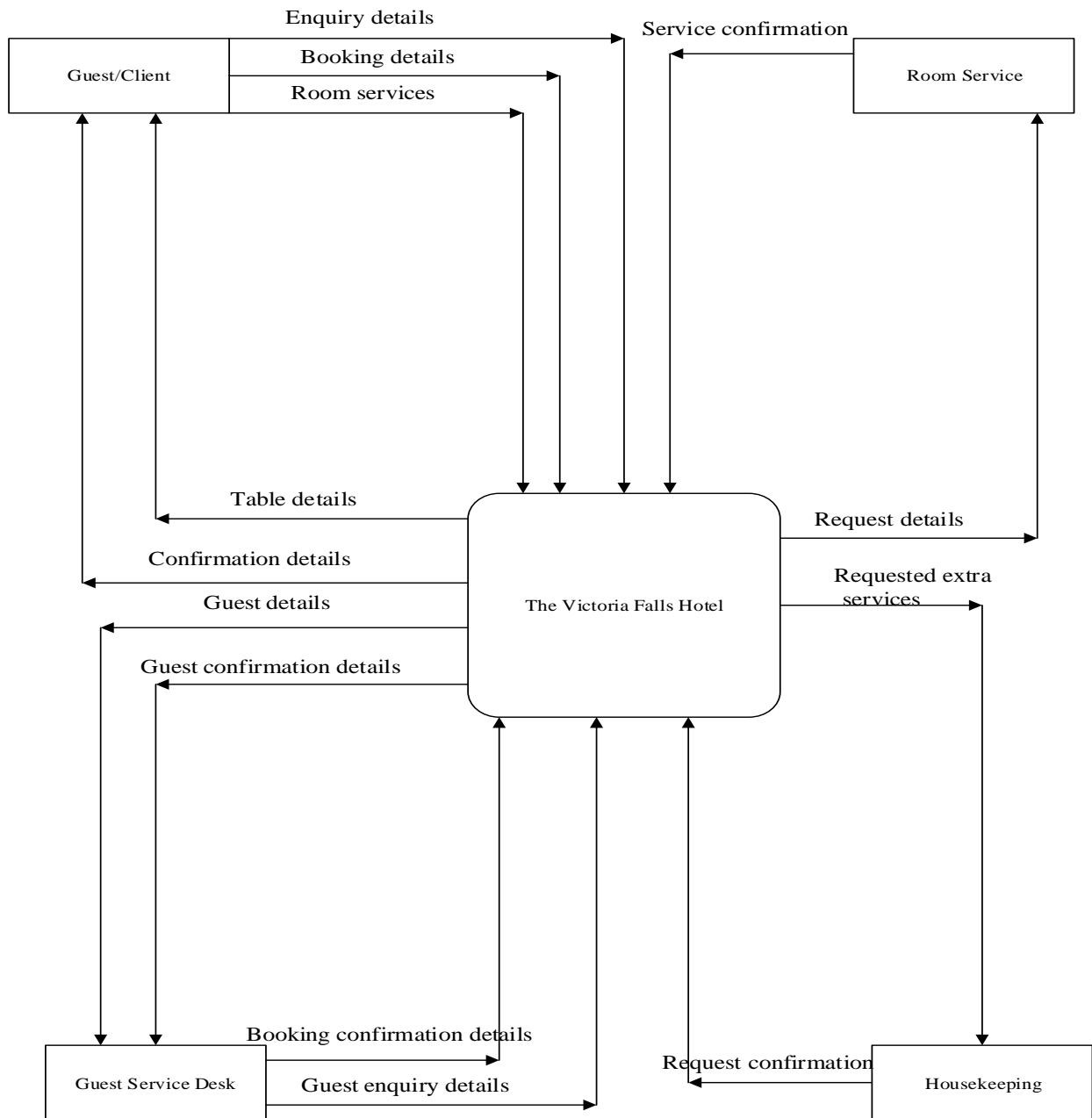
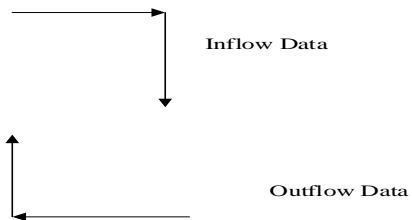


Figure 4. 1 Context diagram of the proposed system

## KEY



### **4.2.3 THE DATA FLOW FOR THE PROPOSED SYSTEM**

George and Hoffer (2009) stated that a DFD is an information molding mechanism which interprets a perfect demonstration about utilities found in the existing system graphically. The approach starts with a comprehensive portrait of the organization and endures by examining the serviceable areas of interest. The diagram on the next page is a pictorial representation of the data flow diagram of the proposed system.



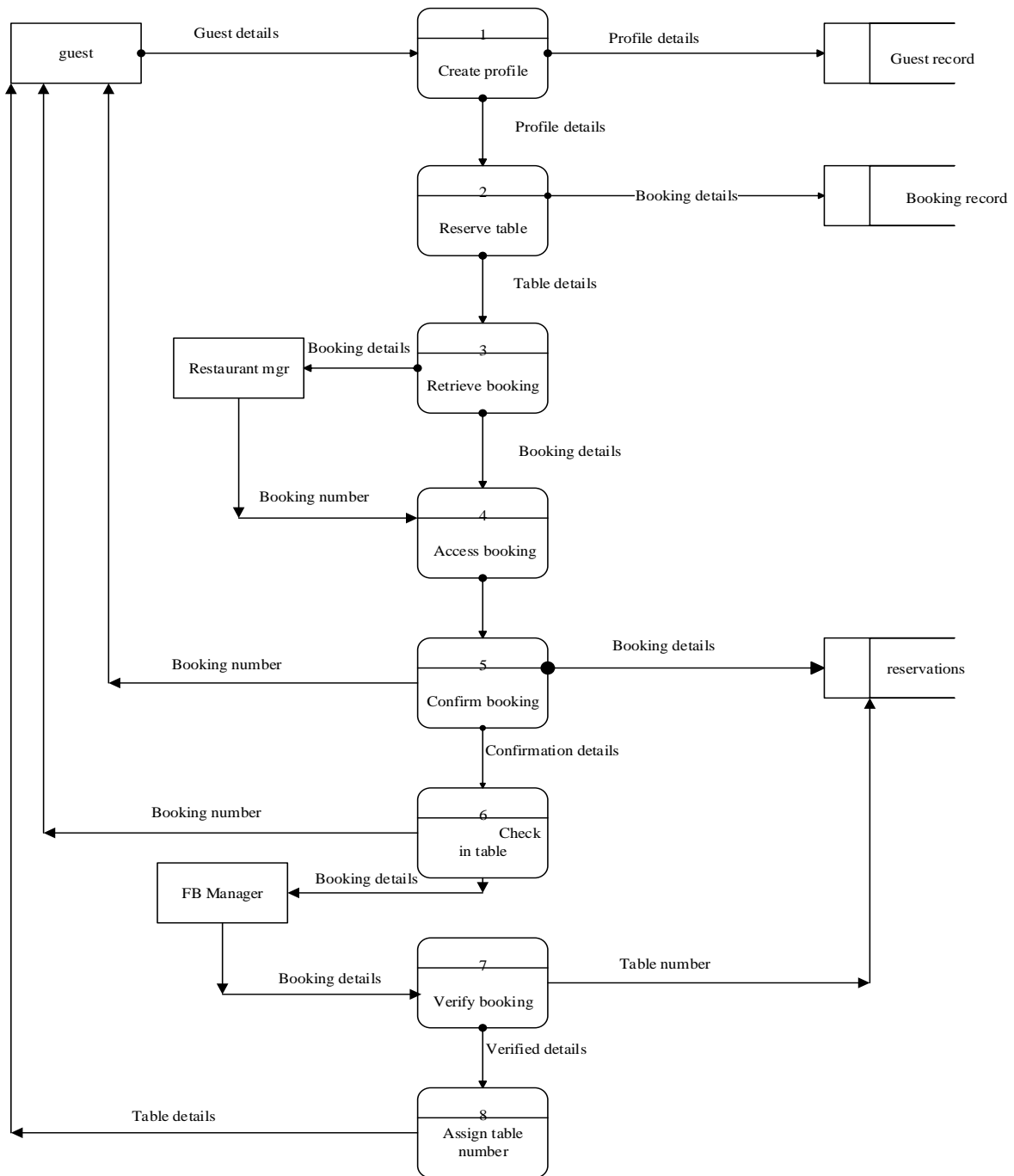
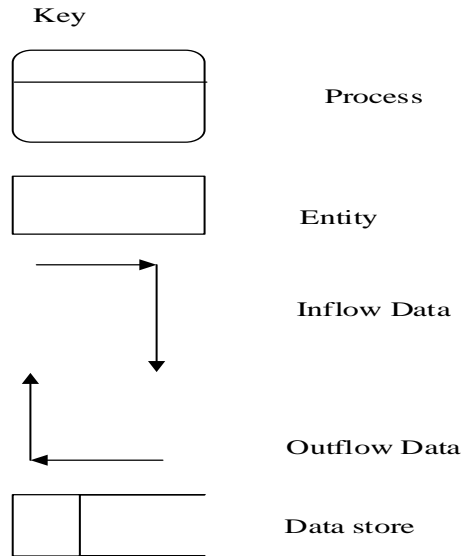


Figure 4. 2 Proposed system's Data Flow Diagram



### 4.3 ARCHITECTUARAL DESIGN

This design serves to be a changeover from the logical model to a particular technical model. The hardware and software on which the application will execute on is part of this architectural design. In this case the application to be developed will be the client server architectural aspect. Summerville (2001) accredited that the client server architecture makes use of a central networked computer which stores and provides serves to other client computers. Clients are other computers on the same network requesting services and resources from that central computer which is often called a server machine. The technic which controls which user accesses what information is monitored by some pre-defined user access rights. The architecture will be based on the following aspects.

#### 1. Mobile Device

These are mobile devices that would be networked to the central computer server in order to access resources. The mobile devices are networked in such a way that they do not have direct access to the database. That is only the systems administrator have direct access to the database and they would be the only ones who can manipulate the data in the database. Thus thy can manipulate data on the central server anyhow.

#### 2. Central Server

All the data belonging to the Victoria Falls Hotel resides in the Central Server. This server handles all the requests made by the client computers effectively. It is the android app's client

side that makes request on behalf of the clients from the client computers which are networked to the server. There is only a limited access to the server due to user authorization.

### 3. API Manager

This is composed of all the protocols that are necessary to provide security features as the application may be used on the world wide web.

### 4. Back End Side

This is the platform where the systems administrators and the management will operate in, where they are able to make changes to the system application such as previewing restaurant bookings and other requests made.

### 5. Fortigate Firewall

This will take guard of all the unauthorized access to the system such as hackers and malware among others. In other way this is a device that is designed to monitor all the traffic that passes in and out of the network and restrict unwelcomed access.

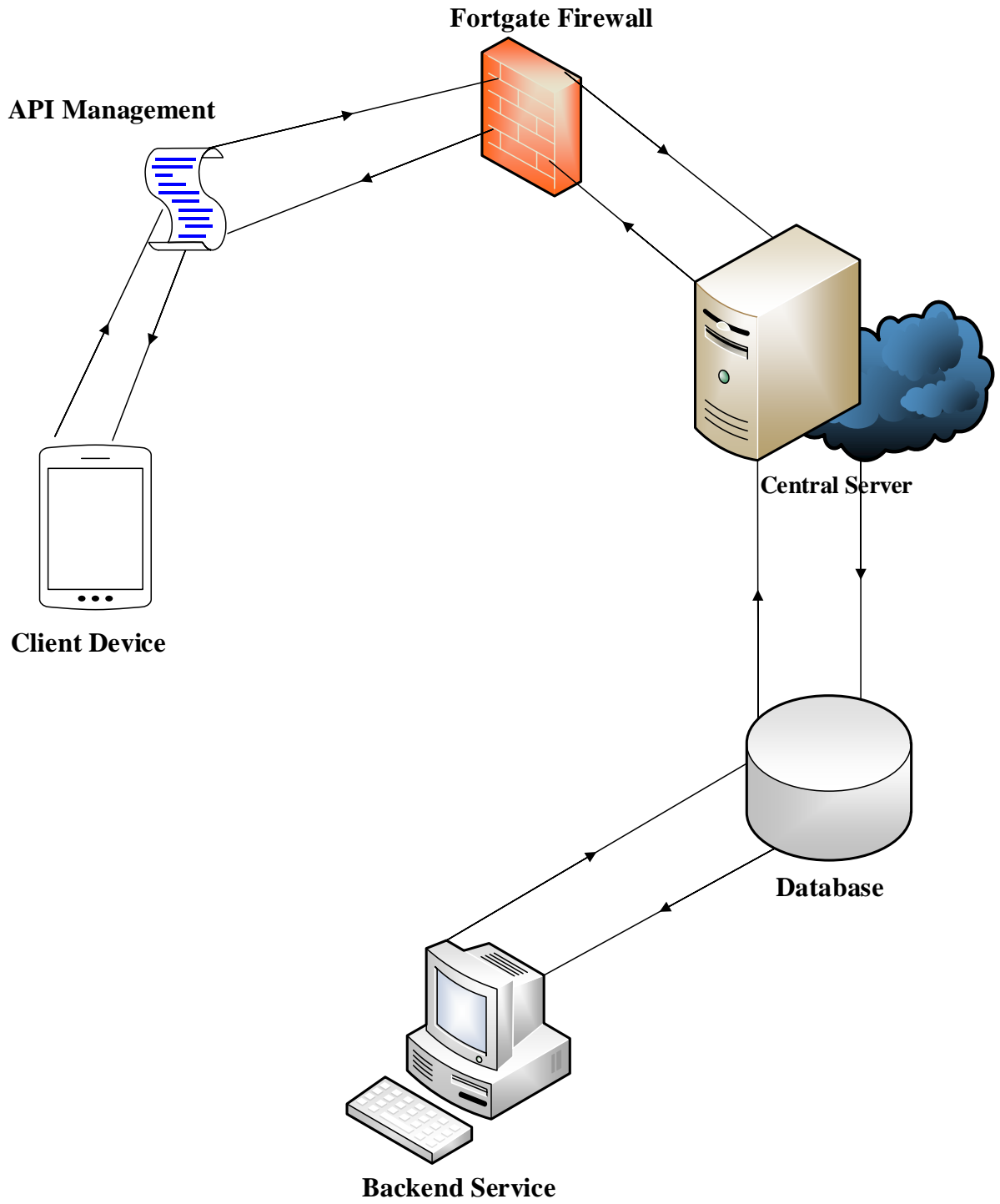
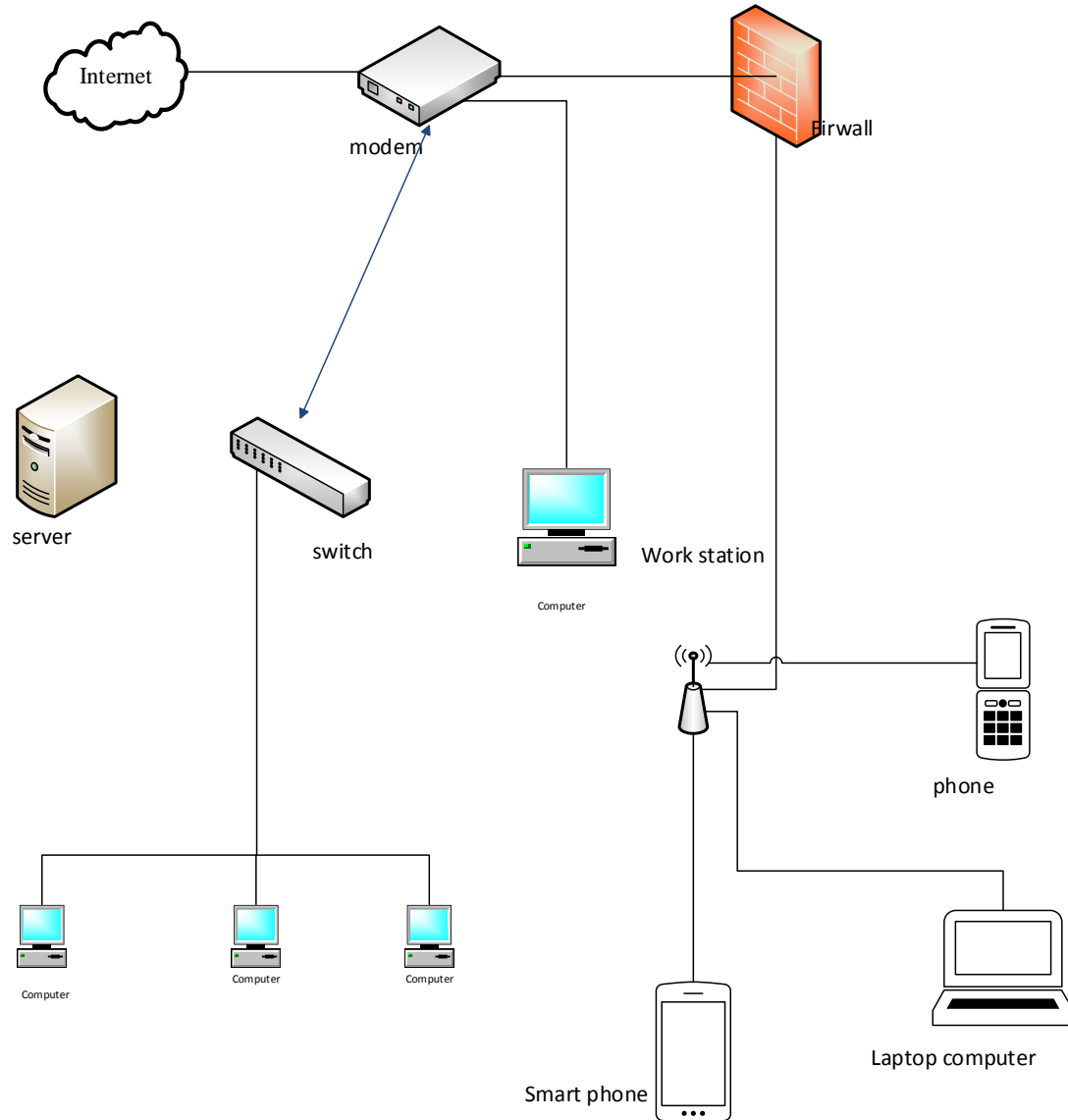


Figure 4. 3 Architectural Design for the proposed system

#### 4.4 PHYSICAL DESIGN

This part concentrates on the coordination between hardware and software components. It tries to outline the nature in which the various code aspects are distributed within the platform and the overall run-time system environment. According to Hoffer and George (2009), the physical design put emphasis on the technicality of the projected system which is mainly the conversion of the logical model into the exact technical design.



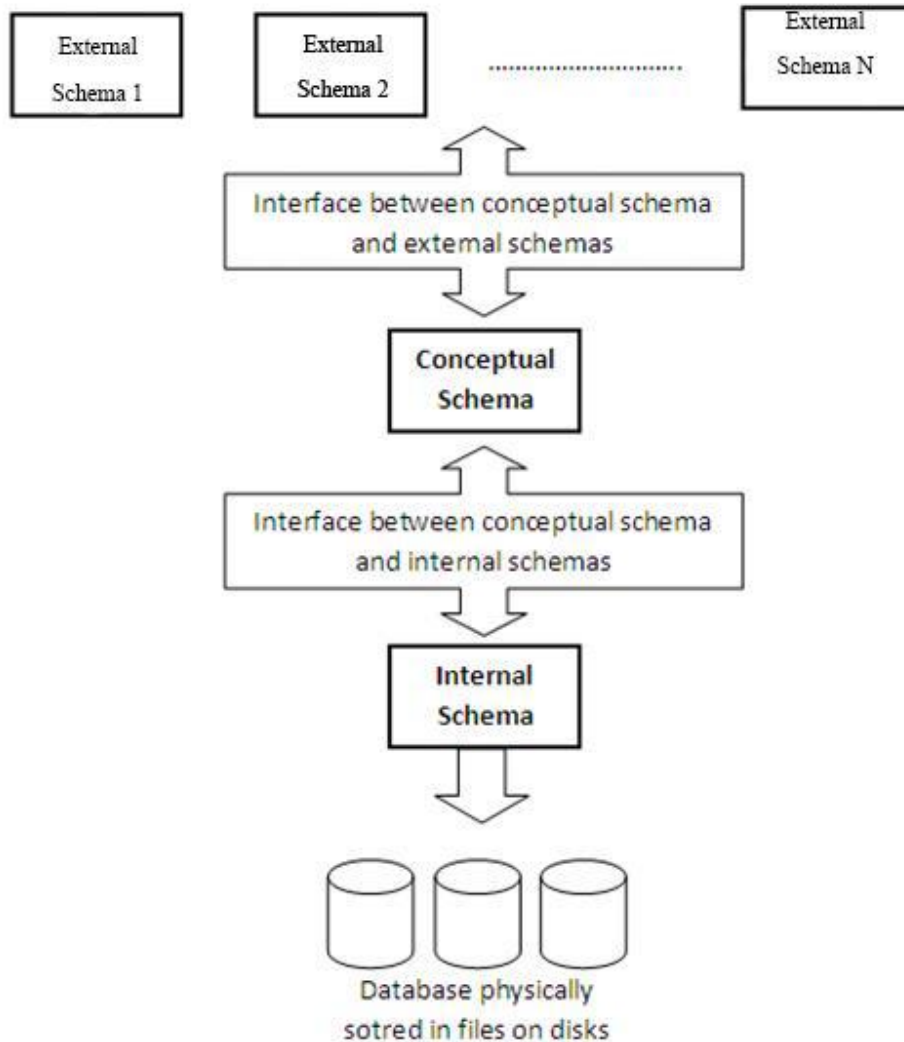
*Figure 4. 4 Proposed System Physical Design*

#### 4.5 DATABASE DESIGN

Information is the most vital component of every organization and requires an intelligent way of keeping the information safely. This is where the database design will come in, which is the technique of creating the physical and logical structure of tuples which would be enough to store all of the organizational data for easy retrieval and manipulation as proposed by Sommerville (2001). For a database to be reliable, it will need to have the four components which are atomicity, consistency, isolation and durability. If a database meets these four components, then it will guarantee its reliability

#### **4.5.1 DATABASE ARCHITECTURE**

The logical representation of a database is often referred to as the Database Architecture. According to Kendall (2011), the database schema has got different user access levels. Basically, the database is made up of three different layers, namely the external, conceptual and internal layers which are equally important. An illustration of the of the database architecture is shown in the next page.



*Figure 4. 5 Proposed system's Ansi-Sparc Database Architecture*

### 1. EXTERNAL SCHEMA

This is the generalization level found in the physical design of the database. The main task of the external schema is to simplify the interaction of users with the database. This is achieved by creating an interface between the database and the user. The major concern is the user needs which are used to make the user view in order to simplify the interaction between the user and database as suggested by Summer (2003). In this case, users are only

entitled to data that is only relevant to them through the use of tables, menus and reports among others.

#### 1. CONCEPTUAL SCHEMA

This view is also commonly known as the community view which gives a description of all the information kept in the database and its relationships between the data. The name, Community view comes about as a result of the data types, queries and field names which define the data kept. The conceptual level is composed of queries in relation to the tables and data.

#### 2. INTERNAL SCHEMA

This refers to the most bottom part of the database which defines the nature in which data is exactly stored within the central server. It gives a brief outline of how data is actually stored in the computer database. A database consists of some physical attributes and it is at this level at which they are well-defined. These are indexing, placement, compression and encryption strategies. This internal structure is linked to the actual database where data is actually kept. The proposed system is going to use the MySQL database software in order to achieve the database requirements.

**Table 4.1 Booking Table**

The table below shows the attributes and data types in the booking table as it appears in the database

<b>Field Type</b>	<b>Data Type</b>
bookID	int(6)
nationalID	varchar(20)
guestName	varchar(20)
guestSurname	varcha(20)
restaurantName	varchar(30)



NumberOfPeople	int(6)
date	datetime

*Table 4. 1 Booking Table*

**Table 4.2: Housekeeping**

The table below shows the attributes and data types in the user table as it appears in the database

<b>Attribute</b>	<b>Type</b>
serviceID	int(6)
roomNumber	int(6)
serviceRequest	varchar(20)
serviceDescription	varchar(200)
date	datetime

*Table 4. 2 Housekeeping*

**Table 4.3: Restaurants Table**

The table below shows the attributes and data types in the restaurant table as it appears in the database

<b>Attribute</b>	<b>Type</b>
restaurantID	int(6)
restaurantName	varchar(20)
restaurantDescription	varchar(200)
availableTables	int(6)

*Table 4. 3 Restaurants Table*

**Table 4.4: Room Service Table**

<b>Attribute</b>	<b>Type</b>
serviceID	int(6)
roomNumber	int(6)
itemRequested	varchar(400m)
totalAmount	float
paymentMethod	varchar(20)
dateTime	datetime

*Table 4. 4 Room Service Table*

**Table 4.5: Users Table**

The following table shows the structure of the users table

<b>Attributes</b>	<b>Type</b>
userID	int(6)
roomNumber	int(6)
name	varchar(20)
email	varchar(20)
password	varchar(20)

*Table 4. 5 Users Table*

#### **4.5.2 ENTITY RELATIONSHIP DIAGRAM**

This refers to a pictorial demonstration of data requirements for a database. It makes use of all the elements of the database and puts the elements in a line format. There are five important components of the Entity Relationship Diagram abbreviated as (ERD) which are any entity, attributes, primary key, relationships and cardinality. According to Rob and Coronel (2001), these

parts are used to create the ERD and the diagram will act like the blue print of a building where you simply take the parts of the diagram and turn them into parts of a database.

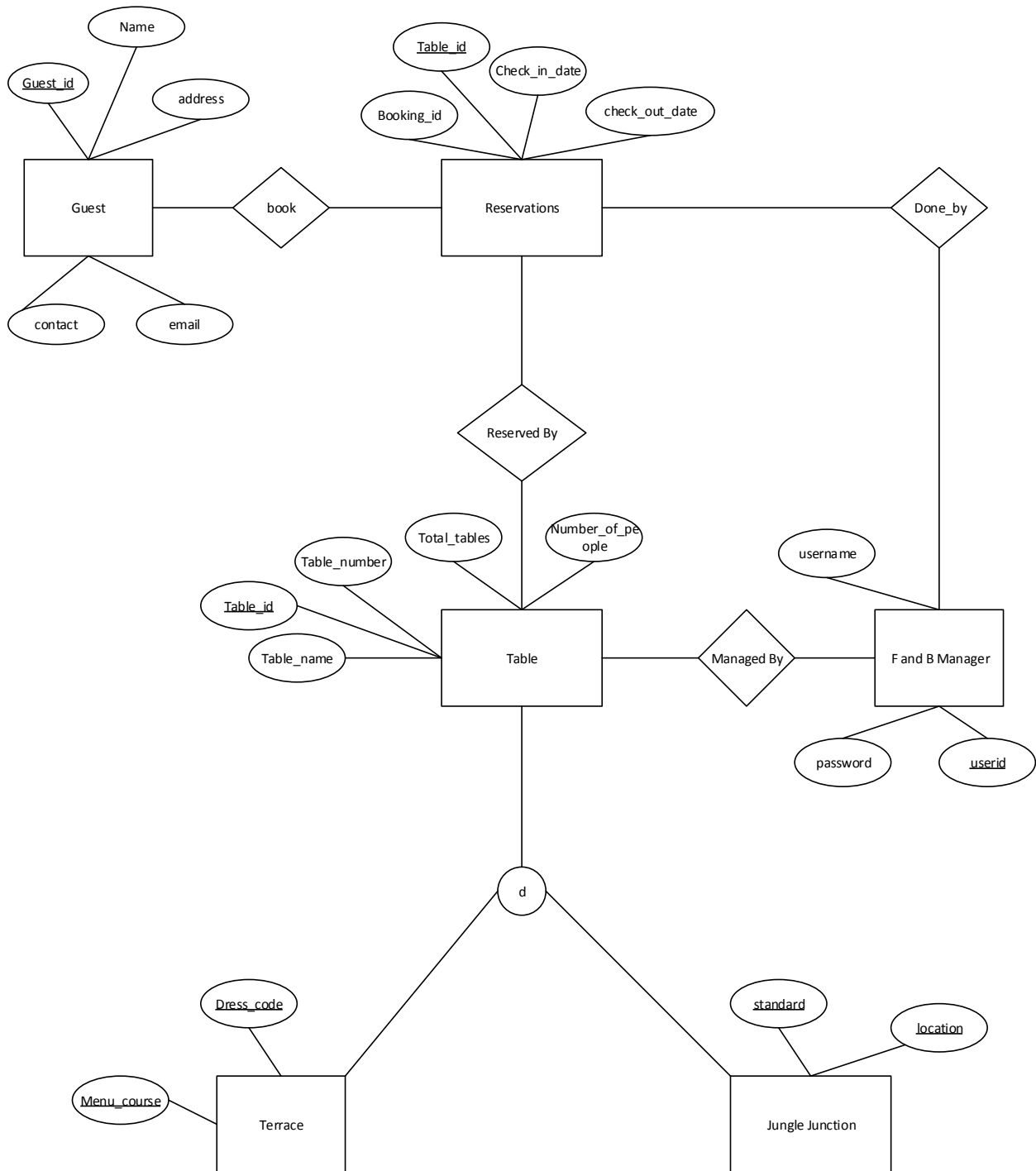
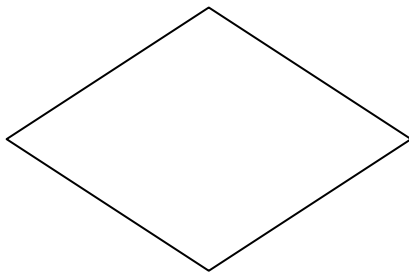


Figure 4. 6 Enhanced Entity Diagram of Proposed System

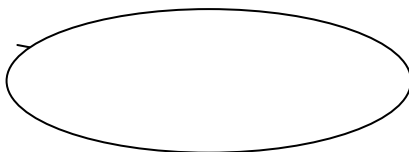
## Key



Entity



Relationship



Attribute

### 4.5.3 DATA DICTIONARY

According to Vangie Beal (XXX), Data Dictionary is a file that delimits the general structure, organization and nature of the database system. It is normally composed of a list of all the necessary files that make up a database, the amount of records found in individual files and the naming of variables and data types of every single field. The data dictionary may extend to have

some information about the roles and privileges granted for every database user and some information concerning the integrity constraints of the database.

## **4.6 PROGRAM DESIGN**

Schmidt (2003) argued that it is much more reasonable to make great use of UML package diagrams with the idea of reducing the complication encountered when trying to illustrate the logically related elements of a software. Packages are simply containers of some logically related data files which can be best described using diagrams. Program design briefly expresses how the components of a software to be designed coordinates with each other as classes in packages.

### **4.6.1 CLASS DIAGRAM**

It is diagrammatic demonstration that models a database objects that are sharing similar set of attributes and methods. These simple data attributes and methods are the ones which are joined together to form a class. According to Summer (2001), the class diagrams also depicts how these classes interact with each other. Other authors like Sommerville (2001) also argues that class diagrams are static in form since they only depict the interactions between the classes and interfaces at the expense of explaining what transpires when the interaction actually takes place. Some associations are used to reflect the connections. On the diagram, it is vital to make sure that aggregations and generalizations will reflect composition and inheritance, features of classes that are predominant in these class diagrams.

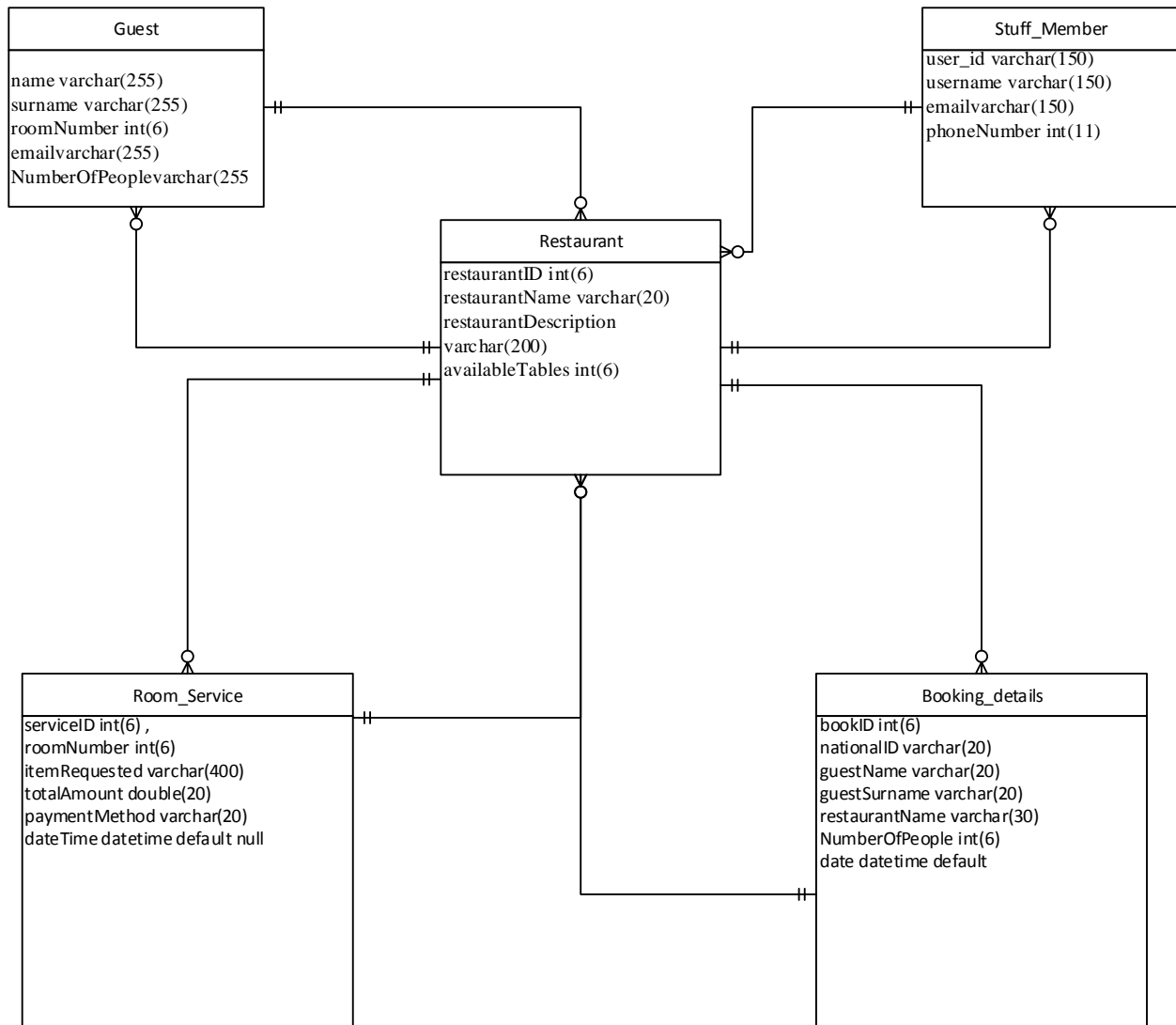


Figure 4. 7 Proposed System Class Diagram

#### 4.6.2 PACKAGE DIAGRAM

Agreeing with Stephens (2015), it is just an explanation of how the proposed software modules interacts as a group of classes in a packages. Packages are simply a collection of some logically organized files which can best be described using diagrams. Thus these UML diagrams are exploited to reduce the complications associated in illustrating these logical data elements.

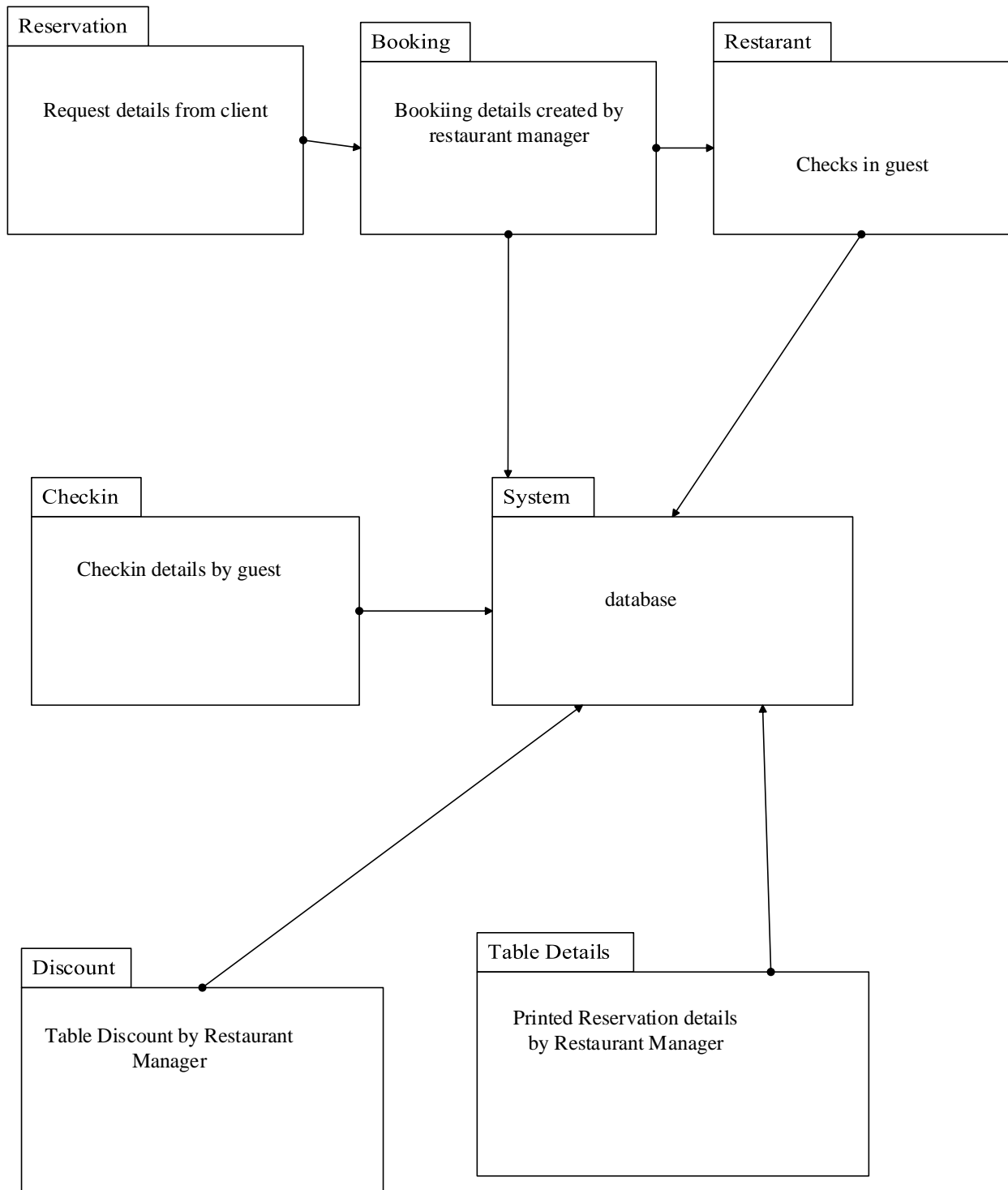


Figure 4. 8 Package Diagram

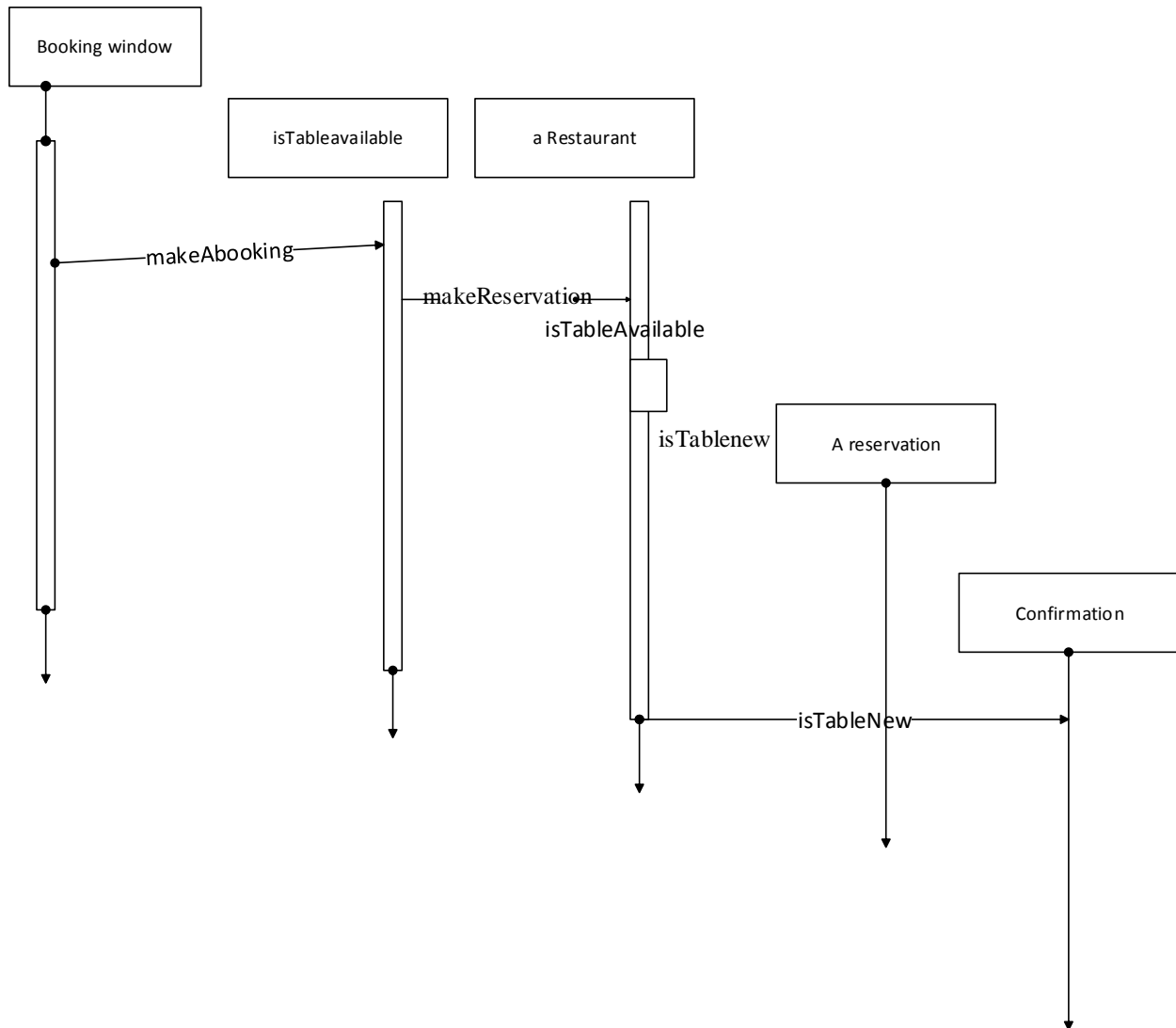


Figure 4. 9 The Proposed System Sequence Diagram

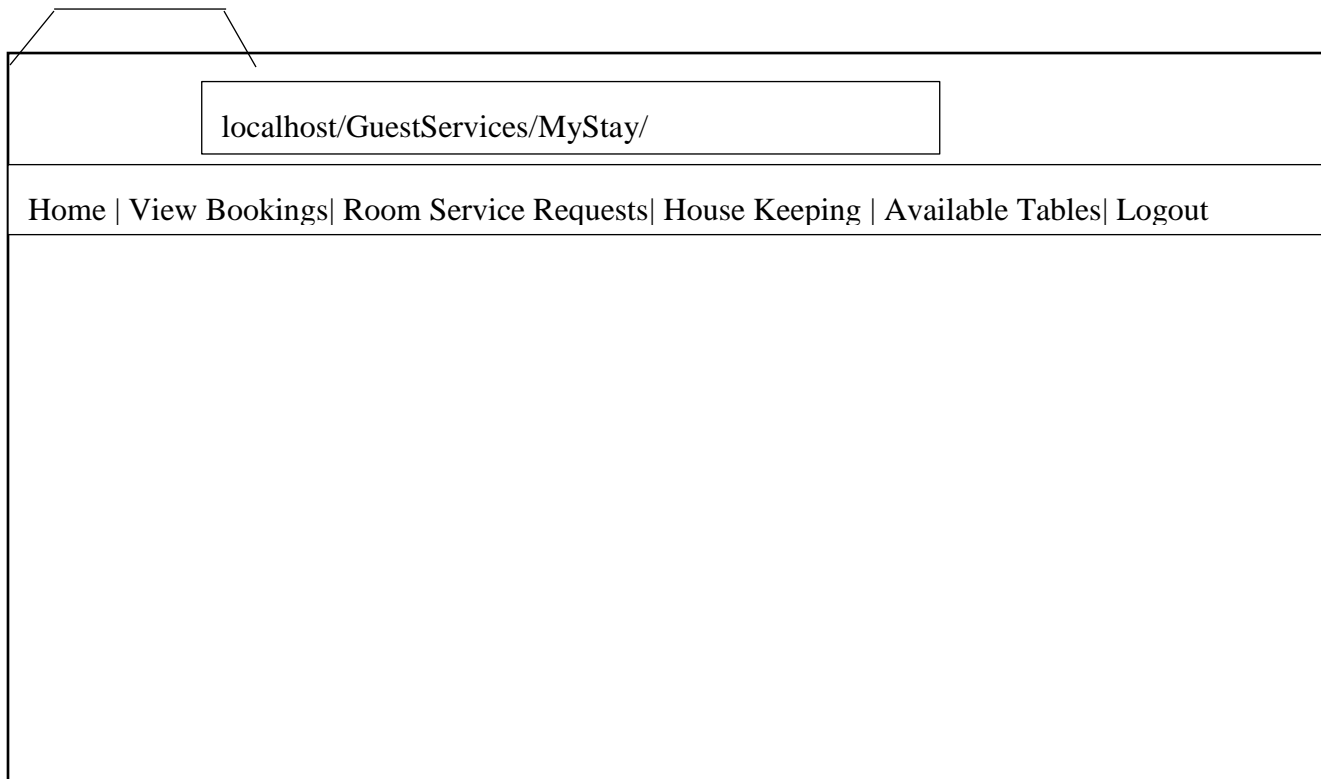
#### 4.7 INTERFACE DESIGN

System interfaces are a magnificent way of the user to interact with the system whereby the user makes use of icons, buttons and other interfacing tools to manipulate the system. Thus McCormick and Sanders (1997) defines interface design as the process of developing a single or various methods and / or modules inside a system to enhance communication. The best interfaces are the ones that enables the user to easily navigate through the system. The interface design involves mainly the input and output design.



#### 4.7.1 MENU DESIGN

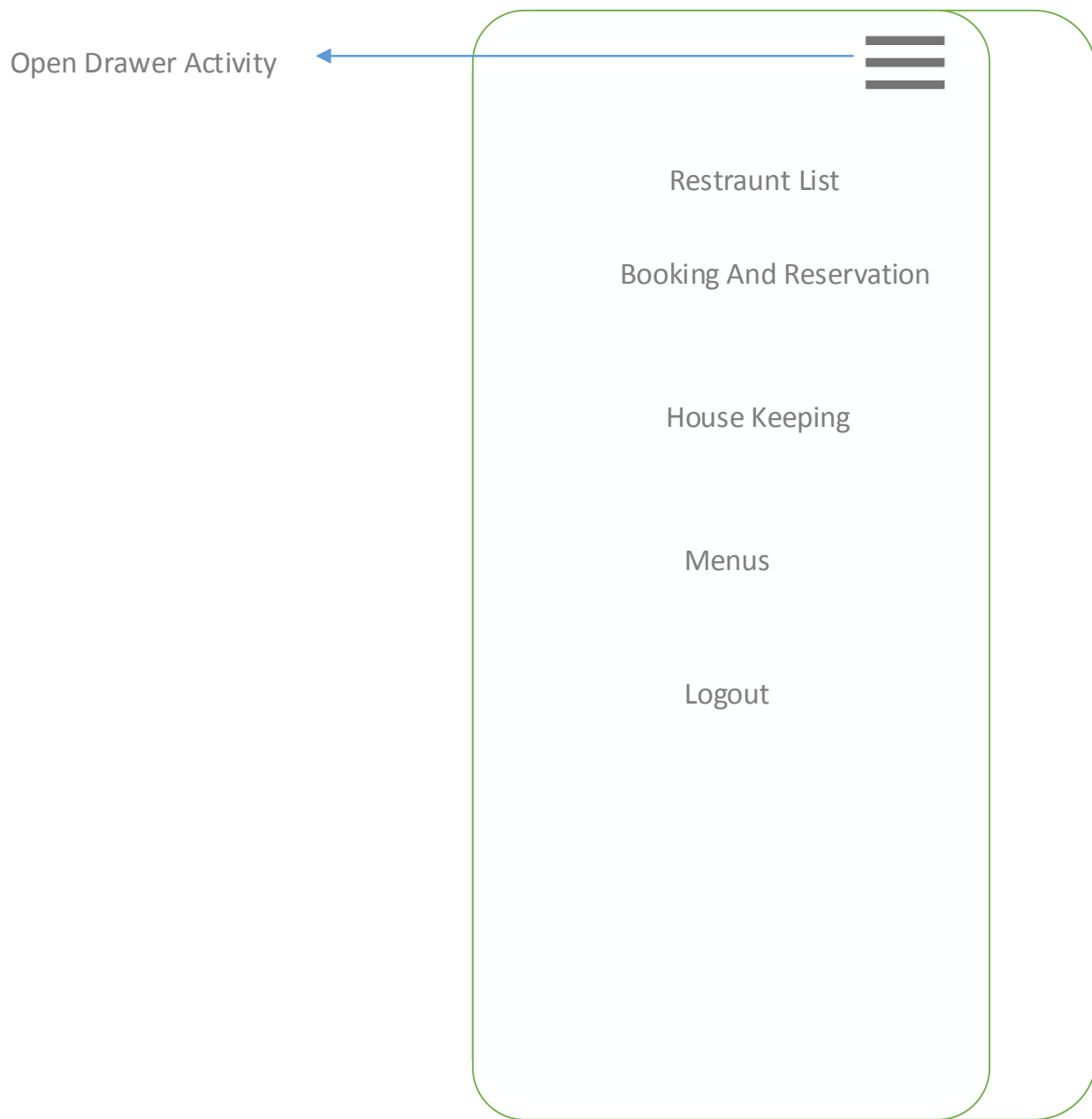
The illustration below is the administrator backend interface meant for the administrator to manage all the products and services offered by the hotel's main application. It will contain various menus for easy navigation into the system. As shown on the menu panel, the administrator can view bookings, tables, change the password and make some necessary configurations.



*Figure 4. 10 Main Menu for Backend*

#### 4.7.1 MENU DESIGN

The illustration below is the main frontend menu of the projected system. This shows the main features of the application on the user end such as the menus and options available to interact with the system. The menus will be populated on a drawer activity to facilitate easy navigation whilst the user uses the system.

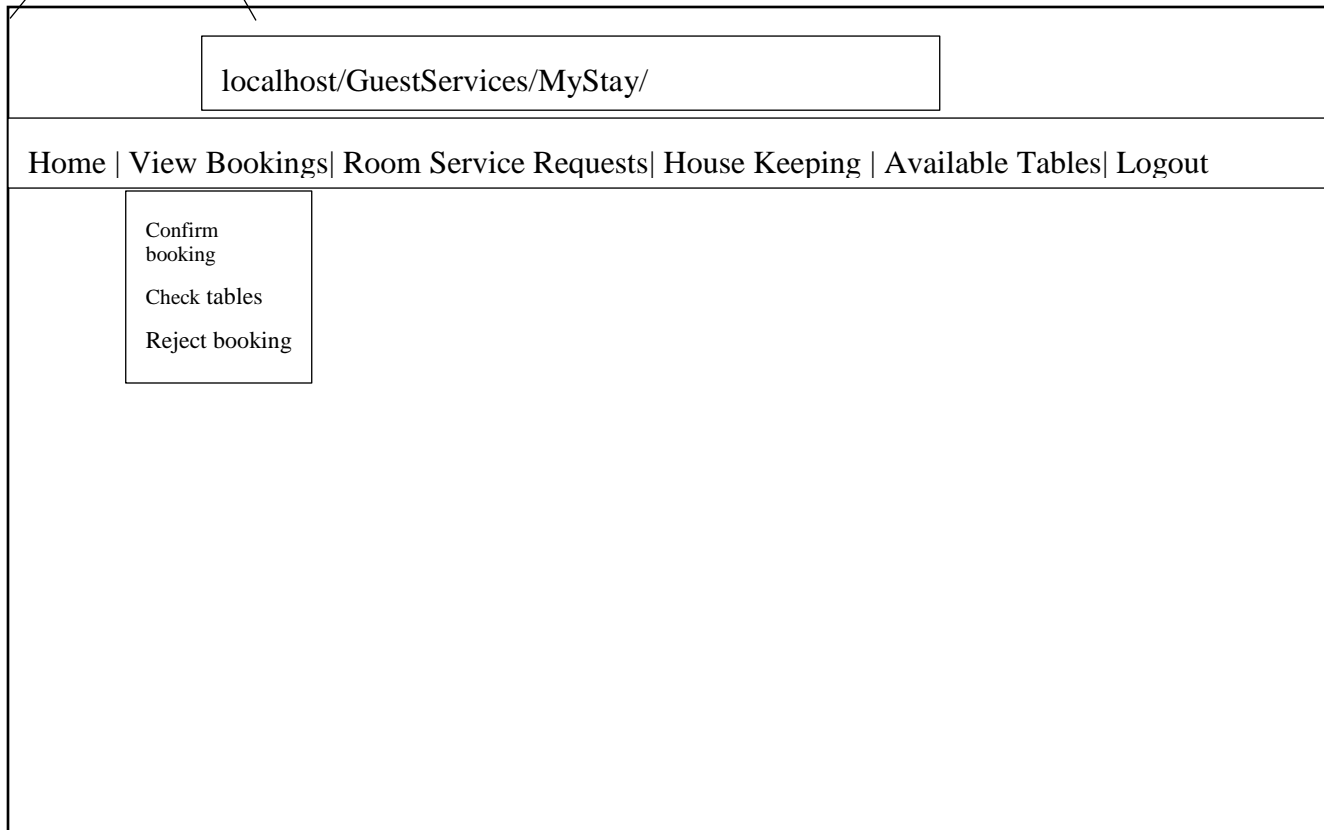


*Figure 4. 11 Home Page Menu*

#### **4.7.2 SUB MENUS**

The diagram below shows the main page or activity with some sub menus available for each menu item of the proposed system backend. This will involve the main features of the system such as navigation menus to navigate through the application such as options like bookings, tables, change the password and make some necessary configurations.


Figure 4. 12 : Menu design



#### 4.7.2 INPUT DESIGN

This phase focuses on the design of the proposed system's input forms where the users are expected to fill in their details. On this note the user registration form will be used to demonstrate the input design as shown below.

THE VICTORIA FALLS HOTEL



Sign Up

Room Number

Name

ID/Passport Number

Password

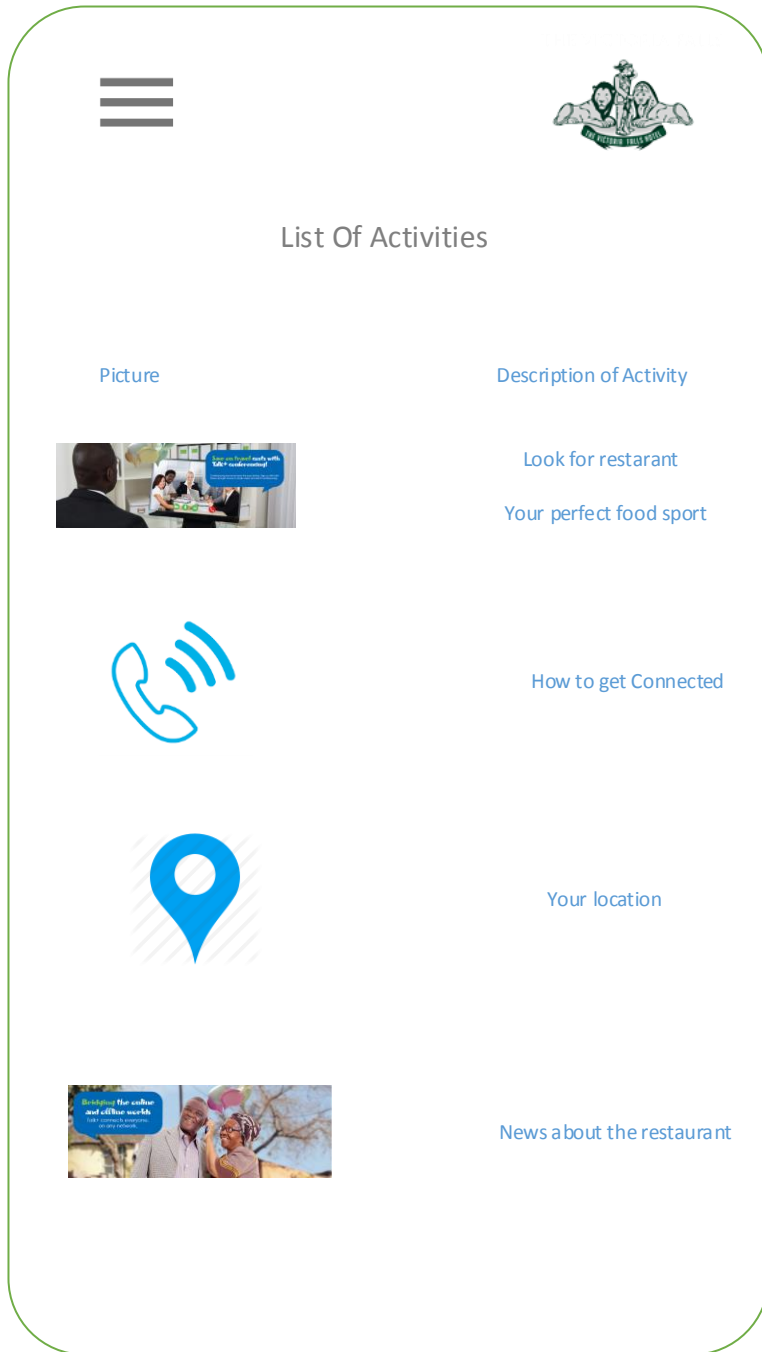
OK

All Rights Reserved @2017

*Figure 4. 13 Guest Signup form*

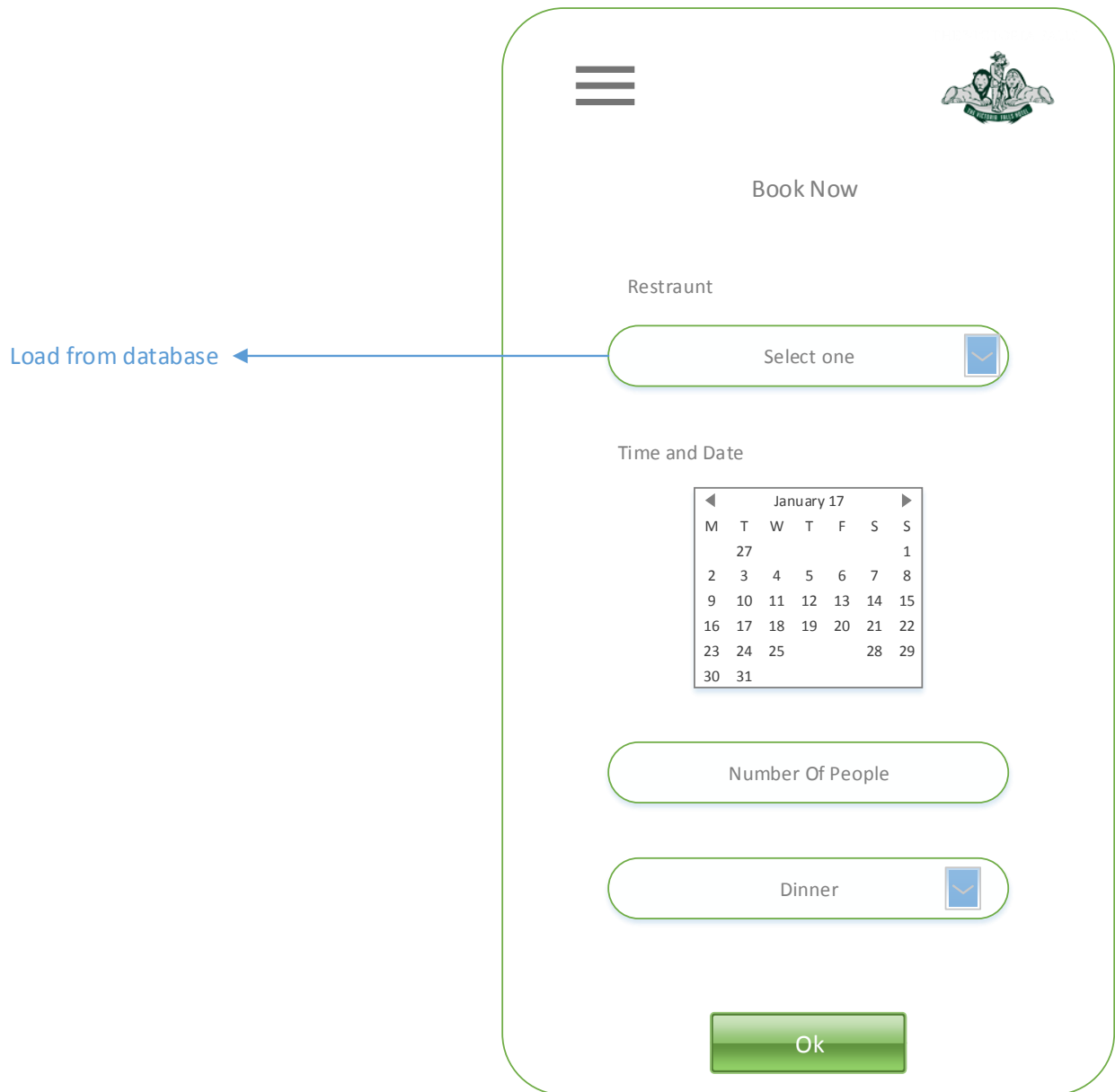
#### **4.7.3 OUTPUT DESIGN**

Pressman (2005) proposed that it is the manner in which processed information is delivered to users of the system. In this manner the system's effectiveness is measured.



*Figure 4. 14 Activities*

Book Now will display a form where the guest would be allowed to fill their details in order to book their preferred table. The form is as shown below



*Figure 4. 15 Book Now*

## 4.8 PSEUDO CODE

### 4.8.1 LOGIN CHECK

The following checks to assess if the user has logged into the system with the correct credentials and also to check whether they are permitted access to the request they may make before the page is loaded.

*if guest is not signed in*

*pass on to login*

*test if inserted guestname and pinNumber exist*

*if not be present, reload and display errors*

*else test if user is certified to view page*

*reload page*

## **4.8.2 BOOKING**

The snippet below will manage the way in which commissions are calculated and delivered to the administrator.

*If booking finishes job*

*Mark 'approved', 'rejected'*

*superior logs in and assess booking list*

*If approved is ticked, mark 'approved' as 1*

*If reject, mark 'rejected' as 1*

*If pending, mark 'pending' as 1*

## **4.9 SECURITY DESIGN**

Unauthorized access to the system is commonly a threat to every system and that has raised concerns to security issues. Thus the employment and usage of the system has made the succeeding considerations on security aspects

### **4.9.1 PSEUDO FOR LOGIN PROGRESS**

Check if DBA passcode is submitted .

*YES: status = OK*

*NO: Has object security been assigned?*

*YES: Has DBL security been assigned?*

*YES: Has DBL password been entered?*

*YES: Are DBL privileges consistent with requested access?*

*YES: status = OK*

*YES: Are object privileges consistent with requested access?*

*YES: status = OK*

*NO: status = error*

*NO: status = error*

*NO: status = OK*

### **4.9.2 PHYSICAL SECURITY**

Physical damage may consist of fire outbreak in the computer environment, water or flood damage and some materials such as radioactive to mention just a few. Strong software security may influence the hacker to choose to physically break into the premises for the purposes of damaging the organizational systems or still some backup drives containing confidential material. It has become a company's norm to do some backups in separate hard disk drives every day and store then on separate premises as the systems are to make sure that should anything happens on the



premises where the actual system is located they will be a fall back means. In physical security, the pot of core is the back storage in which the organizational information is stored. The following measures would be put in place to avoid the physical damage.

- 1) The physical backup storages such as hard disk drives should be kept in a more secure place especially on separate premises which can only be accessed by the security administrator.
- 2) The backup storages should be kept in a room secured with a lock and the room should be well conducive to avoid damages due to either very high or very low temperatures.
- 3) Deployment of some gas suppression technologies would be necessary in cases of fire outbreaks which would be installed in the rooms with the backup hard drives. This would be done in order to set up the fires alarms which upon fire outbreak may intrigue the gas suppression to put out the fire.
- 4) In order to prevent the radioactive effect on the physical external storage the safe containing these disk drives may be quoted with copper to avoid the damage on our drives.
- 5) Finally, to monitor the safety of the organizational data from theft it is important to put in place the Closed Circuit Television on the premises.

### **4.9.3 NETWORK SECURITY**

Data transfers done on organizational level or internally and at inter organizational level or externally over networks is usually too risky. These risks are made available as data is transmitted through many different routers and over public networks which are unprotected which may interfere with data being transmitted. This will cause the hackers to simply intercept or hijack the data packets as they are being transmitted over the network and cause many attacks. However, several measures are put in place to avoid this from happening.

#### **Firewalls**

The Victoria Falls Hotel makes use of the technology from Fortnet called the Fortigate firewall. This technology permits a controlled and audited access to some services between networks. The firewall may either permit, deny or redirect the flow of information across the network. Thus monitoring what passes in and out of the network. The firewall has a feature known as the ‘address

translation' which support the anonymity for interior network hosts. This reduces the vulnerability of attacks on the interior network.

### **Security Filters**

These are installed mainly between two individually separated systems for the purposes of managing and controlling the movement of confidential information which would be obtainable for communication across an interface. This feature can avoid data from leaving a classified or delicate network and may be called an output filter. On the other hand, input filters are used to minimize the input from a potential highly risk environment to a delicate network.

### **4.10 CONCLUSION**

This chapter has managed to expose exactly how the proposed system will operate. This has been done through different pictorial means which describes the system more than words alone would do. The UML diagrams were used to give an explicit description about the main components such as inputs, processes and output of the proposed system. The interaction between some system components that makes up the system has been eluded clearly. The following phase is Chapter 5 which commonly referred to as the Implementation Phase which focuses on the transformation of the design to a model that effectively satisfy the user needs, requirements and expectations.

## **CHAPTER 5: IMPLEMENTATION PHASE**

### **5.1 INTRODUCTION**

Gruhn and Cheddie (2006) postulated that implementation is mainly focused on converting the proposed system design into the actual working system. The main objective of the implementation phase is to compare the system developed against the system objectives put across in Chapter 1, the introduction of this documentation. According to Summer (2003), the fundamentals of this phase is the installation and deployment of the developed system in the target work area and all the necessary supporting undertakings such as user training. The phase emphasizes the coding strategies, functionality and testing among others. The system will undergo some various explicitly testing for conformity with the users' requirements before its deliverance to the users. One more important task to be done is the vigorous training of users to ensure the smooth flow of operations whilst the new system is in use. This stage is also called the changeover stage or the conversion phase where the current system is discarded in favor of the new system as proposed by Hughes and Cotterell (2006)

### **5.2 CODING**

Summerville (2001) argued that coding is mainly concerned about changing the program logic to some instructions that a computer can execute. The Android Studios programming environment has been used to develop the system in Java and XML, PHP and MySQL. The first pot of core to be developed was the system database which was developed in myPHPAdmin in Xampp. This was used as a database management system.

#### **5.2.1 PSEUDO CODE OF THE SYSTEM**

According to Duffey (2011) a plain statement that simply shows an overview of how a particular system operates is referred to as its pseudo code. In most cases, this may be in the form of some plain statements in English without reference to any known language. The code below exemplifies the pseudo code of the system:

*begin*

*choose username and pin*

*Do*

*If (username and pin) valid Then*

*Log in*

*Else*

*Wrong (username or pin) Try again.*

*End if*

*While trials is less than 4 times*

*Close connection*

*If (username == admin) AND (password == admin) Then*

*Enable Administrator Main Menu*

*Executive main menu = disable*

*Else*

*Administrator of Main Menu = disable*

*Executive of main menu = enable End If Show Main Page*

*Stop*

***Login Pseudo Code***

### **5.3 TESTING**

System testing is done for the purposes of checking a complete system integration and evaluation and its compliance with the documented user requirements. It is the documented system objectives in which the new system's output is compared against. Black (2002) postulated that system testing is done in order produce the deliverables that tally with the user's expectations. The attributes below are found as part of the Testing:

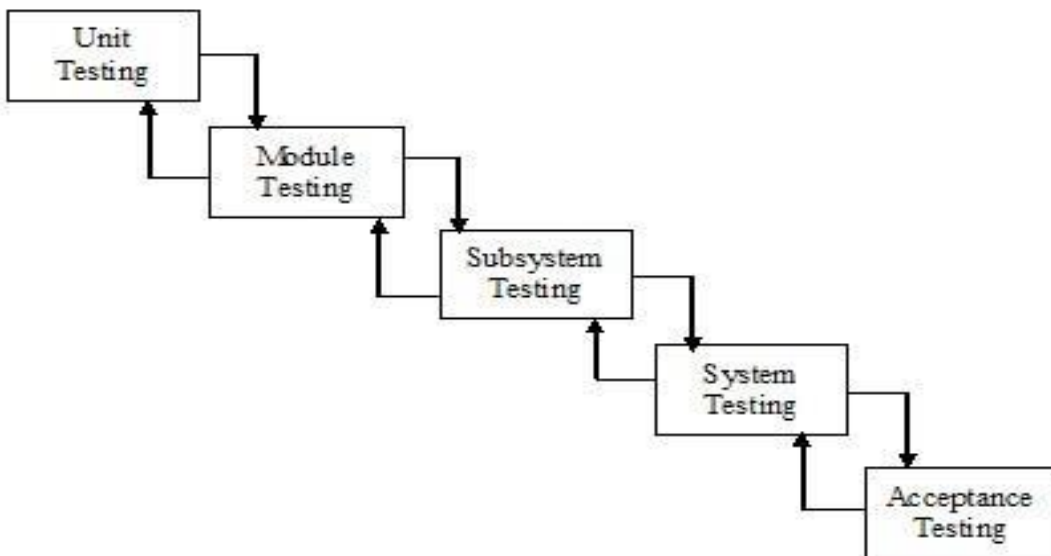
**a) Security control checks**

**b) Reduced unauthorized data usage**

**c) Test the system's capability to perform the general database functionalities such as permitting sanctioned users to add, delete and edit**

records.

Summerville (2001) argued that testing is a series of processes that goes through a series of five phases of testing which may involve the unit testing, subsystem module, system testing, acceptance testing. The five phases can be illustrated on the below diagram:



*Figure 4. 16 Testing Phases*

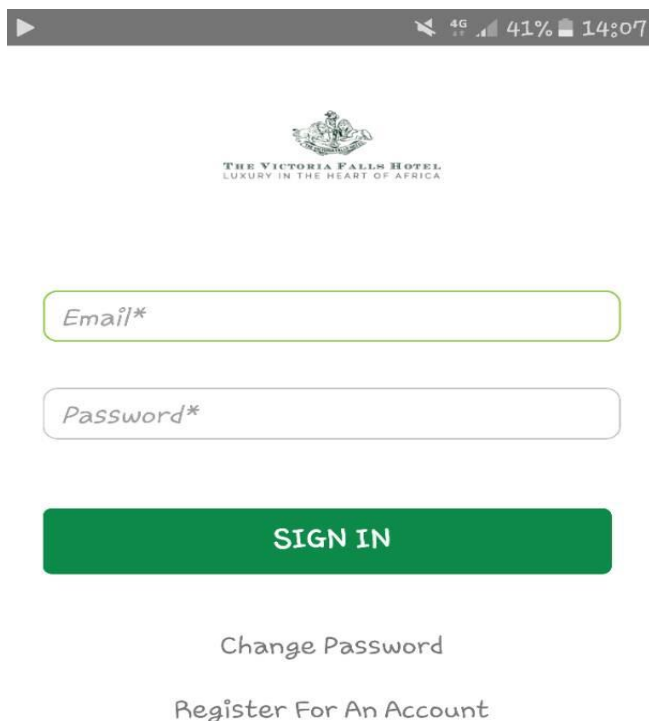
### **5.3.1 UNIT TESTING**

This refers to the testing of the system using some individual parts of the system before it can be integrated into the system as a whole. This means that the components of the system are tested individually apart from the others as suggested by Bentley (2004). Techniques known as the black box and the white box are used to perform the unit testing.

### **5.3.2 BLACK BOX TESTING**

Summerville (2001) argues that when the white box technique is in use only the known system elements such as the inputs and the outputs are examined without the knowledge of the other internal operations. It implies the checking of documents such as the reports to check if they correspond to the user requirements and expectations. This is made possible when the inputs are known. When using black box technique, the input processing is encapsulated from the rest of the world and only the output of the processed output is made known to the world which would be different from the inputs hence the term black box. The users will not have a know-how of what

will be taking place in the system thus the black box gives a blind view to the world about the system contents although what happens in the black box can be viewed again as the output comes.



4G 41% 14:07

THE VICTORIA FALLS HOTEL  
LUXURY IN THE HEART OF AFRICA

Email\*

Password\*

**SIGN IN**

[Change Password](#)

[Register For An Account](#)

*Figure 4. 17 Black Box Testing on Creating New Room Category*

### **5.3.3 WHITE BOX TESTING**

Black (2002) postulated that the white box technique concentrates on the interior detail of the component being tested pertaining to how the component actually works. This is actually a more improved way of testing a system compared to the black box since it reveals all the errors that are not shown by the black box. This is because a system unit may provide the required output but may never show the bugs when the black box is being used.

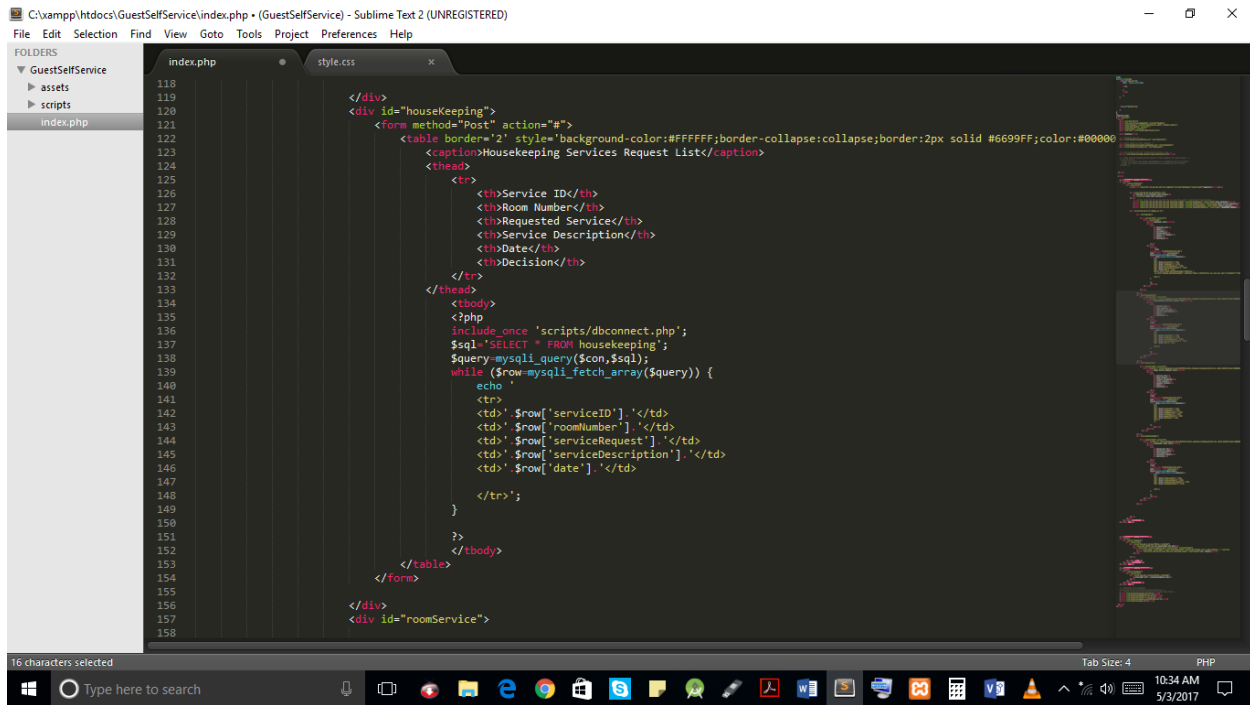


Figure 4. 18 White Box Testing of Code on Android Studios

### 5.3.4 MODULE TESTING

This mode of testing makes use of some different system units inherent in a single module. These different units are combined together to test on the whole module's functionality. Turner and White (2012) defined module testing as a means of testing a complete code as it is produced by the compiler when built from the source. Jackson and Burd (2012) proposed that the objective of module testing is mainly to analyze if the individual units that are meant to collaborate to form a module are functional without errors. Thus module testing comes from the unit testing.

### 5.3.5 SUBSYSTEM TESTING

This is a collection of all the individual modules that are buddle together to form up a subsystem that can be tested. According to Shelly and Rosenblatt (2012) subsystem safeguards on the detection of some mismatch between interfaces and permits thorough testing of system interfaces in programs inherent in the system as whole.

### **5.3.6 SYSTEM TESTING**

Black (2002) suggested that system testing is formed as result of module testing. This is where all the system individual programs for the whole application are fully tested to ensure effectiveness and efficiency. The developed system functionalities are tested against the stated objectives defined in the introduction phase of this documentation. In system testing, the fundamental system functions including security and appropriate output generation are put into consideration whilst the system is in use for the first time. Furthermore, factors such as compatibility between hardware and software are considered in this phase as well and also the way in which the system may adapt to the environment as postulated by Sommerville (2001).

### **5.3.7 ACCEPTANCE TESTING**

If the system is accepted, then it will completion of the testing process since it is largest stage of the testing process. According to Aggarwal and Singh (2007) the acceptance testing is performed by the system users to confirm on system's conformity to the agreed user requirements mentioned in the objectives. at this point the system is fed with the actual data from the user other than with the imitated information for processing. This acceptance process calls for a continuous exercise till the point where the users are satisfied with the system so that they come to an agreement with the systems. The major purpose of the acceptance testing is to analyze the user acceptance of the system as whole. It has two categories which are alpha and beta testing.

### **5.3.8 ALPHA TESTING**

According to Kaner, Falk and Nguyen (1999), Alpha Testing refers to the test carried out mostly in laboratories using simulated input data and the system environment on new systems before the actual test by users. Alpha testing consists of a set of various undertakings that ensures the employment of a particular function within a software package are successfully performed. Its fundamental purpose is to analyze system omissions and bugs concerning the design descriptions which would not have been fulfilled in the system development whilst indicated in the design phase.

### **5.3.9 BETA TESTING**

The definition proposed by Binder (1999) states that, Beta Testing refers to tests conducted succeeding the alpha testing and these tests are performed before the actual system launch is carried out in the real world environment using the actual data together with users' feedback



concerning each element of the new system being tested. The major objective of beta testing is to check on validation of data supplied to the system. This testing method prepares the user for a read to use deliverable. Boris (1990) argued that the beta testing method may be described as having fewer errors and bugs in comparison to alpha testing. Normally, the feedback gathered in beta testing is regarded vital for implementation of system's future versions.

### **5.3.10 TEST STRATEGIES**

This describes all the various approaches deployed in testing. Morris and Rob (2011) suggested that test strategies highlight all the fundamental aspects concerning the testing process including testing objectives, methods used, aggregated resources and the time effort essential for the project and the environment for the testing.

#### **a.) Validation**

Validation aims at checking and measuring the correctness, effectiveness, completeness of the system during the implementation and testing if the outcome is as intended as proposed by Rosenblatt (2012). Validation uses some simple checks such as simply testing to see if the database can be saved with null values. This can be shown on the following screenshot

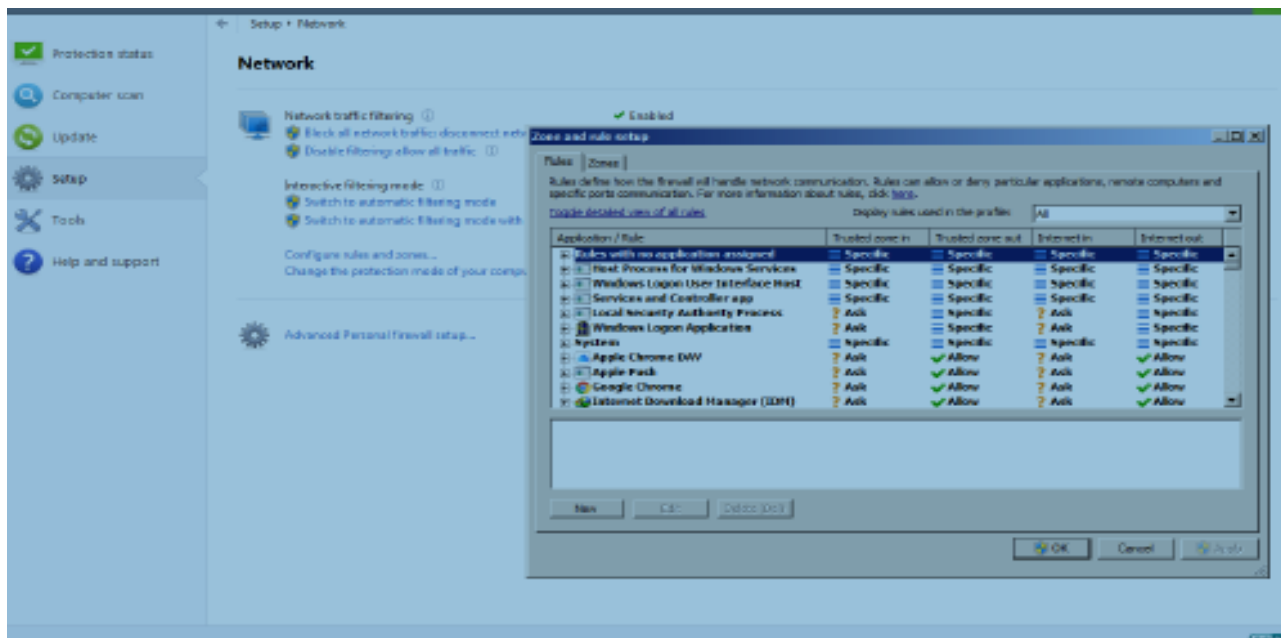
*Fig 5.4: Input Validation*

b.) Whitten et al (1996) proposed that verification refers to all the processes that are carried out in relation to the new system ensuring accuracy, correctness and the appropriateness of the system developed. The verification process was done on the Victoria Falls Hotel Guest Self Service System as an assessment to check on whether it met with the user specifications and requirements. Most systems may be seemingly working as according what it is intended to do but verification may reveal some of the aspects that may not be tallying with the stated objectives hence the importance of the verification process. Furthermore, the internal operations' full functionality was tested using the white box process.

### c.) Security Testing

Security is the most fundamental aspect of every system ever developed. According to Stephens (2015) security testing involves all procedures intended to show the risks and vulnerabilities inherent in the system which may alter the system's integrity thereby tempering with data and ways of protecting and maintaining the system during its use. The major components of the security checks include authorization, authentication, integrity, confidentiality, non-redundancy and system availability. These components pertaining to security are performed and employed through some software and hardware measures. The system hardware may be provided for security physically through keeping the system in a locked environment using some physical locks. On the other hand, the software security measures that can be used may involve restriction of access to the system information by unauthorized users using means such as user access levels and passwords among others.

Figure 4. 19 Kaspersky Endpoint10 Security for Firewall and Network Management



## **5.4 INSTALLATION**

Perry (1998) postulated that installation refers simply to all the undertakings that are necessary to make any application all set for its final execution. Furthermore, it includes the setting up of the software program that are necessary to bring the system to full functionality.

### **5.4.1 STEPS FOR SOFTWARE INSTALLATION**

- 1) Install Java Development Kit
- 2) Install Java Runtime Environment
- 3) Install Xamp
- 4) Install MySQL
- 5) Install Android Studios
- 6) Install Note++
- 7) Connect the Database to the main server
- 8) Transfer the APK file from the Android Studio and upload to Google Play Store.

### **5.4.2 TRAINING**

Training refers to all the necessary methods that are meant to educate the users to use the new system appropriately and accurately as proposed by Summerville (2007). User training is most fundamental for any newly developed system or just when it is the users' first time to encounter with the system for familiarization purposes. On this system, they are basically three users who would be trained to use the system.

- 1) End Users (Guest)

These are the users, in our case the guest who will directly download the application from Google Play Store or App Store. They would be presentation in the form of a slide show on how the users may navigate the system as they use it. Moreover, they will be taught on how they make their table bookings and also how to make request from their respective rooms.

- 2) Guest services

These users will be trained to operate the system backend and how to capture the guest details upon bookings and room service requests to the key system. Furthermore, they will be taught on

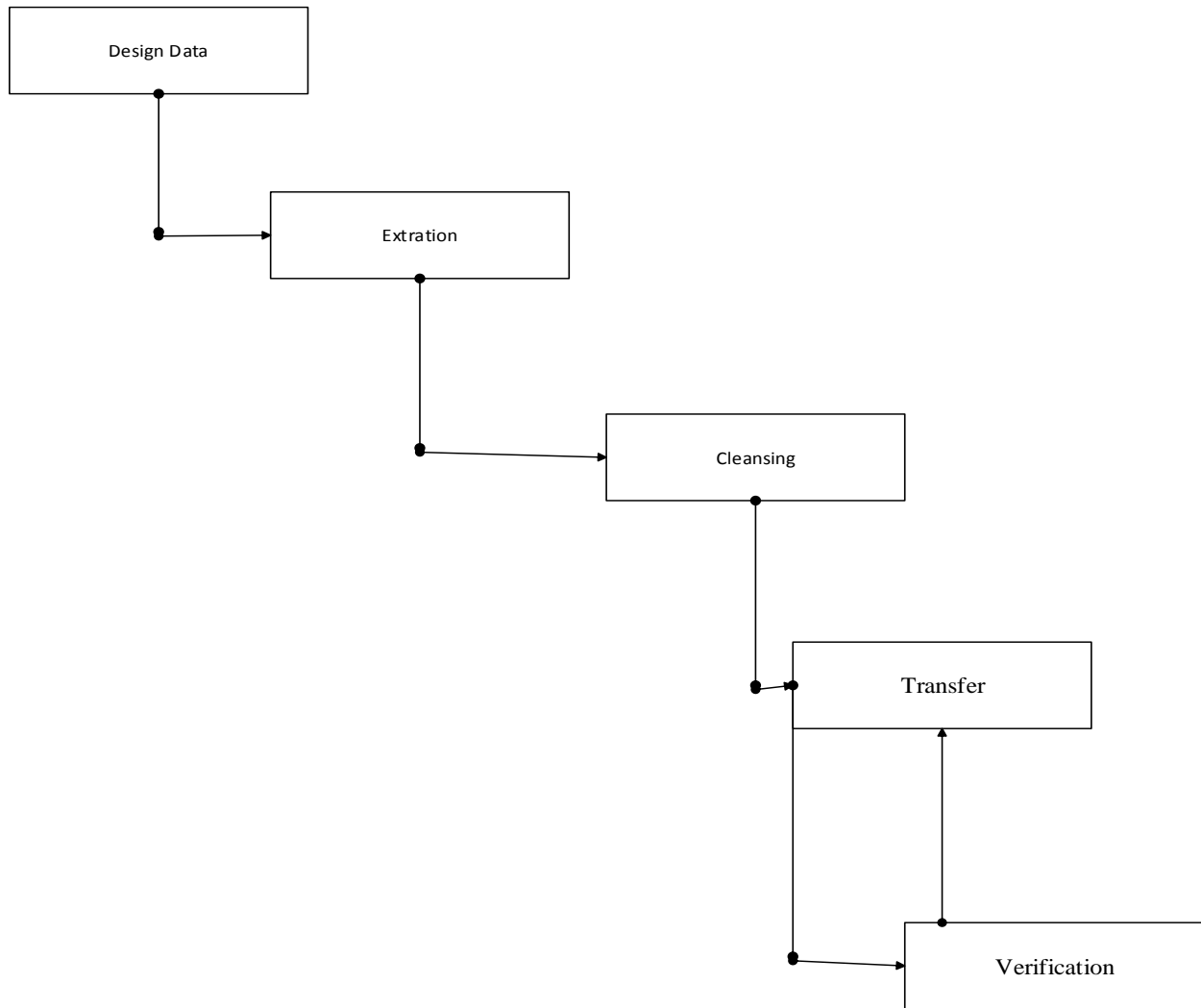
how to generate reports meant for statistical analysis. Training on how to update information such as uploading new images and promotions on restaurant menus is done.

### 3) System Administrator

This group of users will be in outright control of the new system although with the supervision of the financial director. Their aim is to manage and maintain the system whilst in use and monitor the system users together with updating the front end part of the android application.

#### **5.4.3 DATA MIGRATION**

Summerville (2007) defined Data Migration as the act of extracting and transmuting data from a certain presentation to a different presentation such as from paper to computer system or other storage media. Data migration may be mostly done during some system consolidations, upgrades and updated implementations. The system which was previously in use was entirely paper work with difficulties in tracking records and other records being forgotten to put to book and some guest would even fail to make their table bookings. All room service request were done through phone calls and which mostly inconvenienced as their calls would go unanswered. All hard copied data would be manually entered into the system at the end of every shift which frustrated the users. This system will now be able to allow the users and guest to do a onetime job after data migration. The following is an illustration of data migration phases:



*Figure 4. 20 Data Migration*

#### **5.4.4 METHOD OF CONVERSION**

According to Eason (1988) method of conversion is defined as all the processes involved in converting the system from old to its newly established system is the old one would be rendered as absolute. Basically, four methods are used to change the system from old to current as postulated by Pressman (2005). The following methods were used and their advantages over each explained.

- a) Pilot conversion
- b) Parallel conversion
- c) Phase conversion
- d) Direct conversion

#### **5.4.4.1 DIRECT CHANGEOVER**

Direct changeover is also commonly known as the cutoff conversion. Eason (1988) argued that the conversion process directly converts the old system to new once the new system is put online. This process directly shuts down the old system once the new system has been deployed. The organization will benefit greatly from the lower conversion and implementation costs it bears.

##### **ADVANTAGES**

The fact that only one system will be used at a time lowers down the maintenance. Users are only trained to use the new system other than for the whole period of changeover transition. Also there are no updates made to the user documentation since the employment period is made short. The dates set aside for the changeover session are made known in advance to all participants.

##### **DISADVANTAGES**

It becomes more complicated to revert back to the old system when the old system proves not to satisfy the stakeholders. When errors manifest during the use of the new system then it may be difficult to operate the system. Validations and system completeness of the new system may be impossible to prove in the short run. These can only be proved in the long run of the system. There are chances of deploying the system prematurely.

#### **5.4.4.2 PARALLEL CONVERSION**

This conversion process requires a simultaneous use of the old system and the new system. Parallel conversion implies the concurrent running of these two systems for comparison purposes to check on cost and risk inherent in these two systems and then make a choice later. According to Cheddie and Gruhn (2006), parallel conversion is considered to bring high cost to the organization since both different systems are run concurrently to achieve the same goals. The systems work on same activities and then the results are equated. If results of the new system are found satisfactory then the old system is discarded. This process is highly necessary when there are high chances of the new system to fail.

##### **ADVANTAGES**

The risk of failure is reduced due to the availability of the alternative. If the new system fails, the organization will still operate on the old system. There is increased quality brought about by the new system since the new system results are always compared to the old one's results.

## **DISADVANTAGES**

There is unbearable cost inherent in this approach since two system producing the same results are run simultaneously. Duplication of work is common since two systems will require the same inputs

### **5.4.4.3 PHASED CONVERSION**

This approach is mainly practical in instances where the system is generally sub-divided into clearly defined modules as suggested by Brabstone and Miller (2005). The conversion method is commonly referred to as the modular conversion as in consist of altering a part of the system and the major part of the system remains the same. Resources are focused on an individual module and this implies that challenges are confined to the new segment. Jackson and Burd (2012 argued that this strategy may result in problems in cases where some other interfaces for particular modules share common data elements. This challenges may arise due to some compatibility issues. The whole system is converted fully only after several module instances are installed. The module conversions are done one after the other.

## **ADVANTAGES**

The implementation of this approach on one module reduces the risk of failure. The costs involved are also minimized. It makes easier to train the users since they can easily become familiar with the new system as it is deployed in phases.

## **DISADVANTAGES**

As every module is implemented individually, it becomes complicated to revert back to the old system. It comes confusing to the users as they will have to copy up with every module and moving from one phase to the other may affect their understanding capacity. The project is prolonged as the process involves many updates to the user documentation as compare to the direct changeover.

### **5.4.4.4 PILOT CONVERSION**

Jackson, Burd and Satzinger (2012) proposed that the pilot conversion approach is employed on a small sample size of the organization as the old system will still be running on most parts of the organization. This approach is more practical when the organization has more than one independent departments. In this case risks are made local to one department than the rest of the organization

## **ADVANTAGES**

Risk is localized to the sample site, that is suppose the system fails, the overall organization will not be affect. Resources are concentrated to one location at this calls for efficient use of resources. Costs are reduced since it will only be one part of the system simultaneously running both systems.

## **DISADVANTAGES**

This approach comes with interfaces problems since it may be sharing data resources with other departments. Furthermore, it may be a great challenge to identify the perfect sample site when there is a complicated integration between departments

### **5.4.5 FACTORS AFFECTING SELECTION OF METHOD CHANGEOVER**

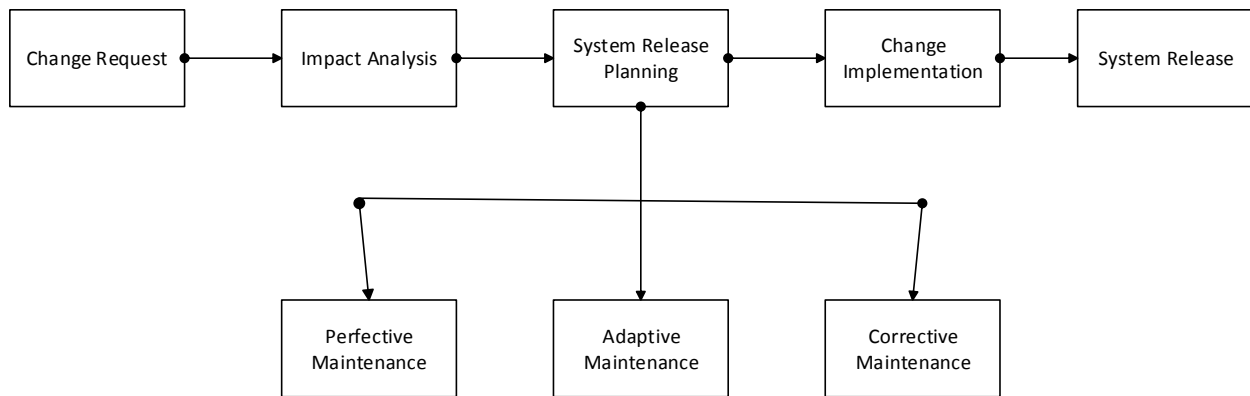
According to Duff (2011), the factors that affect conversion are generally all the considerations made in coming up with a decision on choosing the method to use in the conversion. The factors on the list below should be considered when making a decision:

- a) Time required
- b) User resistance likely to occur
- c) System complexity available
- d) Implementation costs
- e) Computer literacy of users

## **5.5 MAINTENANCE**

Pressman (2005) argues that the maintenance sums up all the required approaches to cost free support for the system use in order to sustain it in the evolving environment. It involves taking all the necessary action to minimize errors and bugs that may affect the general system functionality as postulated by Gruhn (2006). Particularly, these errors would be a result of the systems bugs that would not be revealed during the time of testing upon delivery. Black (2014) argues that maintenance is an ongoing task to be done in the entire project and the system life cycle. It is carried out first in the pre-delivery stage and then on the post-delivery. Suppose there are changes would be made, identical maintenance would be effected to the system documentation as well. The following diagram describes the system maintenance strategy.





*Figure 4. 21 System maintenance strategy*

System maintenance is vital to all system due to the reasons that follows:

- a) The world of technology keeps changing and requires massive maintenance of every system to cater for those changes.
- b) Suppose an organization wishes to change its operations, these changes may have an effect to the system and maintenance may be necessary to suit the changes in operations.
- c) Some changes in system hardware and software may require maintenance for compatibility issues.

Maintenance is categorized into three phases namely, adaptive, perfective and corrective maintenance as postulated by Stephens (2015)

### **5.5.1 CORRECTIVE MAINTENANCE**

This involves altering the system so that in tallies with user expectations and requirements. These alterations may be in the form of design, coding and the employment of the system. Corrections would be needed in these areas as proposed by Hughes and Cottrell (1996). Normally, errors may reveal themselves soon after installation and these would require quick maintenance in order to stop the interruptions that may come across. Generally, corrective maintenance aims at correcting errors as opposed to adding other things.

### **5.5.2 ADAPTIVE MAINTENANCE**

This approach involves making some changes to the system in order to satisfy the user expectations. It calls for the modification of the system whether the system is producing acceptable results. The changes may be as a result of the changes that would be available due to system

environment. Lehman's first Law of Software Evolution suggested that any system should be continually adapted so that it will not lose its value. According to Eppingner (2008) those changes may result in changes on the system suggested parameters, thus constant checks are required to harmonize and implement some new function based on the user needs and expectations. Roth and Denis (2012) proposed that adaptive maintenance is subdivided into two components caused by some changes in technologies.

### **5.5.3 PERFECTIVE MAINTENANCE**

According Shelly and Rosenblatt (2012) perfect maintenance develops an improved version of the current system. It is comprised of elements such as adjusting functions, implanting, extending and removing clauses. It also involves refining performances, re-documentation and ease of use. This is done to meet up with the new requirements. This maintenance strategy is meant to correct errors and bugs not revealed during installations.

### **5.6 RECOMMENDATIONS FOR FUTURE/FURTHER DEVELOPMENT**

The Victoria Falls Hotel is recommended that the hotel would install the system and put it to use for its bookings and services for the guests. In addition to that, the recommendations which follow below where suggested during the use of the system.

- a) The system should always be password protected for both the user and the clients for security reasons.
- b) All system users are required to notify the IT Administrator about all unexpected happenings encountered when using the system so that the problem may be attended quickly.
- c) All reports generated by the system must be analyzed by the concerned managers for validity checkups
- d) Antivirus software should be installed on all workstations where the system is deployed. This is done to reduce the systems' vulnerability to threats that may be caused by virus or prevent denial of service attacks.
- e) The guests are encouraged to download the application on the Google Play Store or App Store and use it within the hotel.

## **5.7 CONCLUSION**

The Victoria Falls Hotel Guest Self Service application was tested in order to check its capacity to meet up with the documented objectives and user requirements. These tests proved that system was effectively and successfully implemented as per expectations. In addition, the system users were effectively trained on all aspects of the system functions and also how to orient the guest about the application's capability. Nevertheless, the application system will further require maintenance in its working environment which is ever-changing and the maintenance will succeed the installation. All work being done as above; the project is considered a success.

## REFERENCES LIST

- Duffy, K.P, (2011) Structured Systems Analysis and Design: Soget: Wright State.
- Graham, N and Portny, E. S. (2011) Project Management for Dummies: Southern Gate: John Wiley and Sons Pvt Ltd.
- Kendall, E. and Kendall, J. (2011), System analysis and design 8th Edition: Delhi. Prentice
- Shelly, G. and Rosenblatt, H. J. (2012). Systems Analysis and Design: 10th Edition, Canada : Nelson
- Stephens, R. (2015), Beginning Software Engineering: Indianapolis: John Wiley & Sons, Inc
- Sommerville, I. (2008), Software Engineering: London: Pearson Education
- Wang, S. and Wang, H. (2012), Information Systems Analysis and Design: Florida Universal Publishers.
- Black, J. (2014), The power of Knowledge: How Information and Technology made the modern world: Yale University Press: London
- Cornell and Crocket (2008), Principles of database. United Kingdom: Prentice Hall.
- Hughes, J. and Cottrell (2009) Software Project Management, 5th Ed: USA, McGraw-Hill Higher Education
- Aggarwal, K.K. and Singh, Y. (2007) Software Engineering 3rd Edition: Dehli : New age International publishers
- Barnes, J., Seamor, S. and Xu, M. (2001) Systems and Project Management, Viva Books Private limited: India
- Bentley and Whitten, (2007) System Analysis and Design, McGraw-Hill Company
- Berthold, M. and Land, D.J (2007) Intelligent Data Analysis: An Introduction, 2nd Ed, SpingerVerlag Berlin Heidelberg: New York

Besley, S. and Brigham, E. (2005) Essentials of managerial finance, Thomson

Corporation: Mason

Capon, C. (2000) Understanding Organizational Context, Pearson Educated limited: Britain

Chavas, J.P. (2004) Risk analysis in theory and practice, Elsevier Academic Press: London

Collis, J.W. (1998) The Seven Fatal Management Sins: Understanding and Avoiding Managerial Malpractice, CRC Press LLC: Boca Raton

Craig, R.D. & Jaskiel, S.P. (2002) Systematic Software Testing: Artech House Publishers: Norwood

Daft, R.L. (2008) The New Era of Management, 2nd (International Student) Ed: Thomson South Western: Mason

Dufresne, S. (2008) A Hierarchical Modelling Methodology for the Definition and Selection of ProQuest LLC: Ann Arbor

Fujita, H. & Zualkernan, I. (2008) New Trends in Software Methodologies, Tools and Techniques, IOS Press: Amsterdam APPENDICES

## Appendices A: User Manual

The Victoria Falls Hotel is simply a mobile solution that makes the stay of guests at the Victoria Falls Hotel very simply and less tiresome. It is an application that enables the guest to perform their restaurant booking and room services requests on their mobile phones at the comfort of their rooms. It will also assist the guest to explore the hotel services and some activities they engage in around the hotel which would have otherwise required a strong orientation during arrival. The screenshots which follows provides a sample of how the guest may use the application.

### Creating User

This is the screen which appears the first time the guest has installed the application in order to create an account to use the application. The users are required to fill in the details and their preferred password which can be change based on their wish later.



*Room Number\**

*Name\**

*Email\**

*ID\**

*Password\**

**OK**

## Login Form

Once users have created their accounts they can now login using their room numbers as usernames and their passwords. These passwords are known to them only for security purposes. The following screenshot is the login panel.



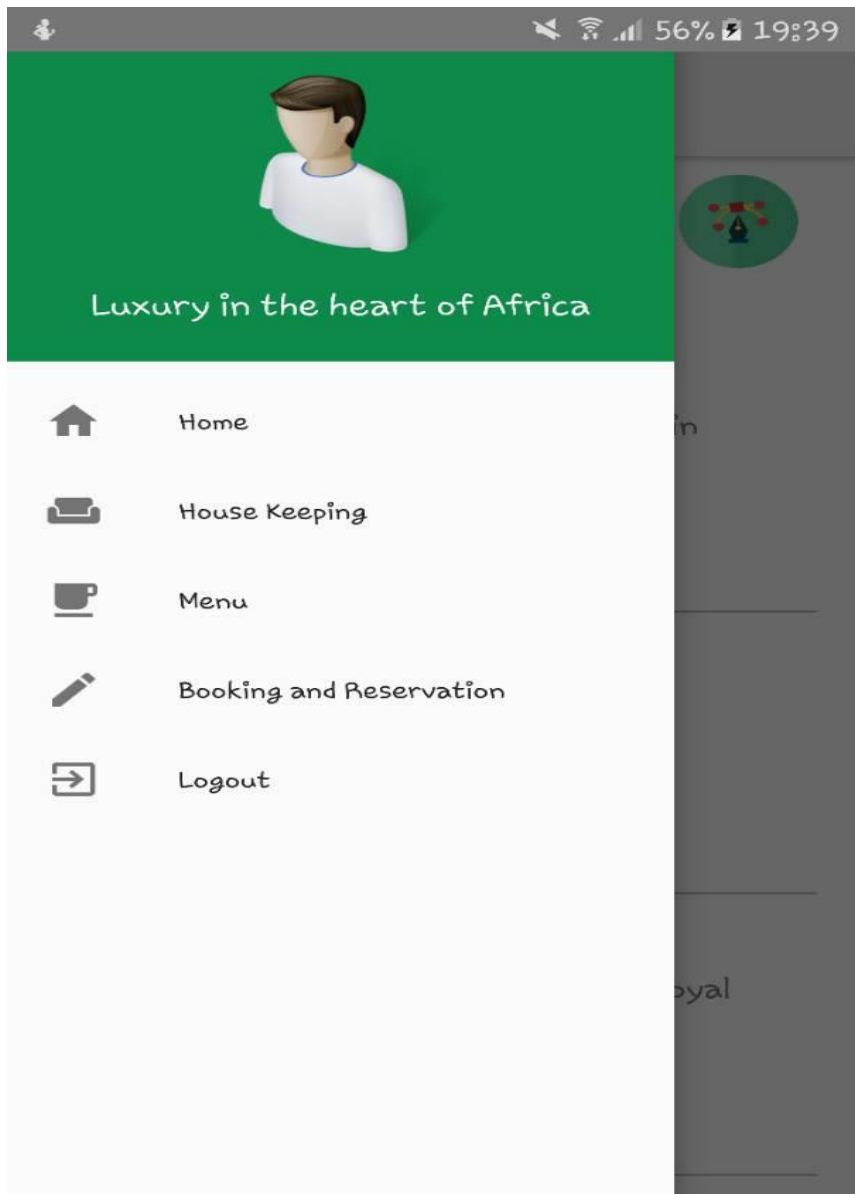
**SIGN IN**

[Change Password](#)

[Register For An Account](#)

## Home Page

The home page consists of a menu drawer where the user navigates the application to choose their preferred service on the application. The following screenshot depicts what the user will encounter upon logging in.



### **Making Booking**

The user can select booking and reservation when intending to make a booking from a restaurant. Fields should be all filled specifying the restaurant they would wish to eat from and choices for restaurant are selected from a spinner. They will then submit their booking and waits for the response of either they may have a reservation or a message that the restaurant will be fully booked.



*Booking and Reservation*



Book Now

Restraunt



Number of People (Max 20)



BOOK

**Viewing Activities**

Guest may also view activities that they may do around the hotel during their stay. The activities may be viewed as follows.

# Activities



Here is a list



Steam Train



ZipLine



Zambezi Royal



## Menu List

There is also a list of each hotel’s menus on which the guest may have an idea of where they can have their booking or just to request for room service. Thus they can either choose to request from the room or go physically to eat in the restaurant. The menu list is as below

*Food and Beverage*



*Good food for perfect people*



Zita 1



Zita 2



Zita 3

**Housekeeping Services**

Guest may also request housekeeping services using the same application. These services may include requesting the room to be cleaned or just to request for extra blankets or to have their laundry taken to the laundry room. The below screenshot shows how they can request for housekeeping service.

# House Keeping



## Request

Service



Other\*

Number\*

REQUEST

### Backend Panel.

The manager or the assigned staff will action on all those requests using a desktop web application which interacts with the mobile application. The assigned staff may view all bookings, books or reject a booking depending on availability of the tables, room service requests and housekeeping

requests. The screenshot below shows the backend interface when room service requests are viewed

Welcome To The Victoria Falls Hotel

# Guest Self Service

[View Bookings](#) [Room Service Requests](#) [House Keeping](#) [Available Tables](#)

Room Service Request List

Service ID	Room Number	Item(s) Requested	Total Amount	Payment Method	Date	Decision
1	25	2 Drinks, 3 Chicken burgers, 1 Spackling water	20	Cash	2017-05-01 08:18:11	
2	45	2 Amarula bottles, 3 Plates rice and crocktail	30	Card	2017-05-01 04:07:16	

Thank You For Downloading the App

The following screenshot shows requested housekeeping service

Welcome To The Victoria Falls Hotel

# Guest Self Service

[View Bookings](#) [Room Service Requests](#) [House Keeping](#) [Available Tables](#)

Service ID	Room Number	Requested Service	Service Description	Date	Decision
1	25	Blankets	Kindly requesting additional 2 blankets as asap. It is very cold in this room. Thank	2017-04-10 04:10:16	
2	30	Room Cleaning	Kindly requesting room to be cleaned in 30 mins time. Thanks	2017-05-01 02:15:10	

Thank You For Downloading the App

Type here to search

1:21 AM  
5/4/2017

The following screenshot shows requested available tables for each restaurant

Welcome To The Victoria Falls Hotel

# Guest Self Service

[View Bookings](#) [Room Service Requests](#) [House Keeping](#) [Available Tables](#)

Available Table List

Restaurant ID	Restaurant Name	Description	Available Tables	Decision
1	Jungle Junction		20	
2	Living Stone		25	
3	Stanelys' Terrace		24	

Thank You For Downloading the App

Type here to search

1:26 AM 5/4/2017

**APPENDIX B: QUESTIONNAIRE CHECKLIST**

**Signature**\_\_\_\_\_

**QUESTIONNAIRE**

**NOTE: MAY YOU PLEASE ANSWER ALL QUESTIONS. TICK ONE BOX WHERE APPROPRIATE.**

- |   | <i>Yes</i>               | <i>No</i>                |
|---|--------------------------|--------------------------|
| a. Are you happy with the system you are using?   | <input type="checkbox"/> | <input type="checkbox"/> |
| b. In your opinion, do you think paperwork is error free?                                   | <input type="checkbox"/> | <input type="checkbox"/> |
| c. Do you face any challenges with phone calls made by guest for service?                   | <input type="checkbox"/> | <input type="checkbox"/> |
| d. Do you keep track of all phone call bookings during handovers?                           | <input type="checkbox"/> | <input type="checkbox"/> |
| e. Are you satisfied with guest visiting the desk or reception or making calls for service? |                          |                          |

Why?\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- f. What is your opinion in bringing a new mobile application system where guest can do all their bookings for restaurants or request for any service they normally call for?\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- g. What can be the benefits of introducing this mobile application in your opinion?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- h. What are any suggestions and recommendations?



---

---

**APPENDIX C: OBSERVATION SCORE SHEET**

**Observer** \_\_\_\_\_

**Department** \_\_\_\_\_

**Date** \_\_\_\_\_

**Observation**

---

---

---

---

---

**Conclusion**

---

---

---

---

## APPENDIX D: INTERVIEW CHECKLIST

### Interview Details

- a. Interviewer Name \_\_\_\_\_
- b. Interviewer Position \_\_\_\_\_
- c. Interviewer Department \_\_\_\_\_

### Interview Questions

- a. How long were you working for this company? \_\_\_\_\_
  
- b. What conclusions can you have about this paperwork system on guest services?  
\_\_\_\_\_  
\_\_\_\_\_  
What are the common challenges faced when using this system?  
\_\_\_\_\_  
\_\_\_\_\_
- c. Are there times where guest may call and found no response due to busy schedules?  
\_\_\_\_\_  
\_\_\_\_\_
- d. Do you feel most staff members are satisfied with the current system?  
\_\_\_\_\_  
\_\_\_\_\_
- e. What are your suggestions towards improving the current system?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- f. Do you image the mobile application solving the problem currently faced by the current system? Why?

---

---

---

g. How do you think the staff members would react to the mobile application?

---

---

---

h. Do you think the mobile application will be a perfect solution to the challenges?

---

---

Any recommendations or comments?

---

---

---