

ONLINE TRANSACTION PROCESSING SYSTEM

CASE STUDY: UMEME

By

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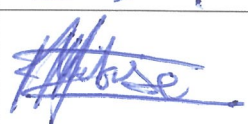
A Project Report Submitted to the school of computer studies in Partial Fulfillment of the
Requirements for the Award of the Degree of Bachelor of Information Technology of
Kampala International University

Supervisor

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Declaration

We do hereby declare that this project report is original and has not been published and/or submitted for any other degree award to any other university before.

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Dedication

This report is dedicated to our parents who have contributed financially, spiritually and emotionally to ensure that this project is a success.

Acknowledgement

We would like to acknowledge the contribution of our project supervisor Mr: Kampororo Ezra

Towards the success of this project .We also thank him for the guidance and supervision right from concept initiation to report compilation.

We would like to extend our sincere appreciation to the management and administration of the Faculty of Computer studies for their support through the course of the project.

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List of Abbreviations

CC&B	Customer Care and Billing System.
EC	Electronic commerce
GUI	Graphical User Interface.
GSM	Global System for Mobile.
LCEC	Web Based Customer Care and Billing System.
PHP	Hyper Text Preprocessor.
SMS	Short Message `Service.
UEDCL	Uganda Electricity Distribution Company.

CHAPTER 1

1.0 Introduction

1.1 Background

“To be the leading East African electricity distribution Company by 2010 by any measure”, is the vision for *Umeme Limited*. *Umeme Limited* became *Uganda Electricity Distribution Company Limited*’s (UEDCL) energy partner on 1st March 2005 and was subcontracted by UEDCL to manage, run, and maintain all aspects of electricity distribution in Uganda [1]. The company is owned 100% by a highly respected company in the international power industry called *Globleq*. *Umeme* is operating under a twenty year concession as a new energy partner. The headquarters are located at *Rwenzori House Lumumba Avenue* with branches all over the country.

Currently *Umeme Limited* is using manual systems such as desk face to face systems, however the systems are characterized with weaknesses such as inaccurate customer records, long queues, late delivery of bills which has led to increased time wastage for customers and customer dissatisfaction, The payment system that *Umeme* currently uses has no electronic commerce capabilities and all the payments are made at their (*Umeme*) offices or in banks. Every purchase for example; electric poles, meter boxes is made at their stores and offices in addition to that, all the complaints, comments and compliments are physically sent to their offices, save for the inquiries that can be communicated over telephone or electronic mail.

Umeme Limited has a website [2] which also lacks the electronic payment facility.

This has necessitated the development of a module that will be incorporated into the existing website to enable electronic commerce transactions for *Umeme*. This will help to propel the company to greater heights.

The online module to be developed will include a web based customer care and billing system that enables electricity customers to pay their bills online, view their payment statement, online billing and viewing account balance leading to customer convenience and flexibility, the

administrator will be able to enter customer details, add new administrators, edit rates and customer information, bill different customers, view payments that have been made plus viewing details of complaints, compliments and queries that have been posted by the different customers.

1.2 Problem Statement

Electronic payments, Web based customer care and billing systems have contributed tremendously to the development and success of various organizations all over the globe.

The system that Umeme is currently using has no electronic commerce capabilities and web based customer care and billing system, this is clearly evidenced on its website plus its business processes and practices. All the payments, complaints, comments and compliments are made at their offices, stores and outlets. The system Umeme Limited is running in various offices is on local networks for example; customer care, bill payments are being done at the various Umeme outlets, and main offices all over Uganda.

This has led to poor customer services, inaccurate bills, congestion at the offices and banks as a result of the customers who flock the offices in need to clear their bills and post in their queries, compliments, complaints such as power cut off, faulty electricity meters. However, there is a need to come up with a module for online transactions to solve the above problems.

1.3 Objectives

1.3.1 Objective of the Study

To develop an online business transaction component for the management of customer transactions for Umeme to be incorporated into the existing website.

1.3.2 Specific Objectives

The specific objectives of the study were:

- i. To investigate the business processes in Umeme Limited and come up with user requirements.
- ii. To design a system based on user requirements that will automate the business processes of bills payment, billing and customer care processes.
- iii. To implement a system that suits the design talked about in objective two above.
- iv. To test and validate the developed system.

1.4 Scope

This study was carried out at Umeme headquarters at Rwenzori House, Lugogo industrial area, Bugolobi Main branches and Entebbe. It catered for the unanswered needs of the customers of Umeme that is to say sending and receiving feedback for their queries, complaints and complements, plus enabling online bills payment.

1.5 Significance of the Study

Through this system the company is expected to gain competitive advantage over other energy suppliers by advertising its business operations, products and services on the online transaction process module and responding to customer account related issues.

The system is expected to be adopted by Umeme limited with a view of improving customer service and the payments of electricity bills efficiently and conveniently, thus reducing congestion at the offices and banks.

This will also provide clients with up-to-date information about company services and at the same time provide Umeme with information on customer behaviour.

CHAPTER 2

Literature Review

2.1 Introduction

Until recently many researchers have shown interest in the field of web based customer care and billing systems and the resulting business advantages. They have carried out numerous interviews and business observations to exploit the advantage of the use of web based customer care and billing system in day to day businesses, it is hardly surprising that the relationship between web based customer care and billing system and business has attracted considerable attention in recent years. The findings and suggestions of many other researchers are reviewed here.

2.2 Electronic Commerce

Much electronic commerce (EC) is defined as the buying and selling of products and services over the internet, but there are many more aspects. From its inception, electronic commerce had included the handling of purchase transactions and funds transfer over computer networks. It has now grown to include the buying and selling of new commodities such as electronic information [3].

2.3 Umeme's Current System

It is only inquiries that can be communicated over telephone or electronic mail, this call for the idea of embracing electronic commerce for Umeme, so as to achieve success like other prosperous companies who conduct business online.

It is believed that all companies and business firms across the globe have reaped big from doing business online.

It is reported that more American consumers forego crowded malls for the convenience of online shopping, it forecasted internet related sales to jump from 19.1% to \$174.5 Billion in 2007[4].

It was further reported that \$500 million was saved in supporting costs owing to \$20 million investment for internet based customer service systems [5].

Currently there are 67 Fortune 1000 companies that have E-commerce revenues greater than \$10 million. The five largest Internet retailers are Amazon, Staples, Office Depot, Dell, and Hewlett Packard. This indicates that the top categories of products sold on the Internet are books, music, office supplies, computers, and other consumer electronics. A list of Fortune 1000 companies ranked by Electronic Commerce revenues can be found on [6]

According to a report by the National Retail Federation and [7], \$259 billion of online sales including travel were expected in 2007 in USA, an 18% increase from the previous year.

2.4 Existing Web Based Customer Care and Billing Systems

2.4.1 LECL

LECL is a web based customer care and billing system for electricity customers. The system has *various functionalities and capabilities such as self log in, online registration, electricity bill payment, billing information, customer service that is connection service, disconnection service and change of billing address, rate comparison and payment options and reading your meter online.*

With this system a customer can log in online and is directed on how to read the electric meter, enters the units of electricity consumed. He or she selects the mode of payment that is debit card, credit card, or phone and the system automatically deducts the amount for the electricity units consumed or service delivered. Finally the consumer receives a confirmation message that reads, "Your transaction has been completed successfully" [8].

2.4.2 M-Utility Management and Billing System

This is an innovative mobile management and billing system consisting of system utilities with a *single chip embedded system*, a *global system for Mobiles (GSM)* wireless network and the billing server. The electricity and water consumptions are measured and calculated by the embedded system. At the end of each billing period the embedded system is programmed to report consumptions to the billing server which generates consumers' bills, updates consumers' profiles in the database, and sends the amounts due to the consumer as an SMS message. If a consumer does not comply with the utility regulations for example payment delay, the billing server can automatically connect or disconnect the consumer's utility supplies. Furthermore, the system can respond to enquiry SMS messages sent by consumers regarding their consumption. It has a web interface, which enables consumers and the utility authority to access the system via the internet[9].

2.4.3 CC&B

Eskom's distribution Group, a South African electricity firm is currently using a web based *customer care and billing system known as (CC&B)* [10]. *CC&B* is the software solution used to manage its customer's electricity accounts and to store and manage customer information such as names, addresses and telephone numbers. CC&B was chosen as the preferred software products because it best met the specification for a world-class billing and customer information. The customer types in their account number and password and can view billing information and edit their personal details. With this system, the bill can be faxed or e-mailed to the customer.

The CC&B system holds data about the customers, their accounts, their contracts with Eskom, and the place where the service is provided for example electrical installation. This data contains demographic, geographic, and financial information about Eskom's customers and their properties.

The CC&B system provides highly automated processes that ensure accurate and control focused delivery processes supporting customer service. Further more, the system provides flexibility, ease of use, and enhanced control of the system internally. This is reflected in continued accurate bills while the enhanced efficiency and flexibility in the long term benefits flowing indirectly to

the consumer.

When using this system, a customer logs in using Eskom's account number, password and then enters his or her prepaid meter number and the password to view consumption and meter reading history, bill history, making an online payment. Other services offered include; accounts, payments, meters, and electricity supply problems, status of service request, disconnections and credit extension application and termination of service [10]

2.5 Need for Electronic Commerce and Web Based Customer Care and Billing Systems

EC can offer your company both short and long term benefits, not only can it open new markets enabling you to reach new customers but it can also make it easier and fast for you to do business with your existing customer base, moving business practices such as ordering, invoicing and customer support to network based systems can also reduce the paperwork involved in business to business transactions, when more of your business is digital you can focus on meeting your customer needs, tracking customer satisfaction, requesting more customer feedback and presenting custom solutions for your clientele are some of the opportunities that can stem from EC and web based customer care and billing systems [3]

2.6 Making Payments Online

With a wide variety of payment mechanisms in place or proposed, this is perhaps the most fluid and fast changing part of electronic commerce, consumers can use credit cards, electronic cheques, digital cash, micro cash and prepaid systems. Some businesses have long been users of Electronic Data interchange (EDI) but setup costs have made it prohibitive for small businesses systems [3]. For other payment systems, there are various reasons why they have not been successful, for example the adoption of digital cash has been slow because of communications overhead between the merchant and the bank, huge databases of coin records, difficulty to scale and need for synchronization between bank servers. When it comes to credit cards, the disadvantages include: blowing your budget, they encourage people to spend money that they

don't have. High interest rates and increased debt, credit card fraud are the other disadvantages.

With the module that is to be developed for Umeme, we propose to use **prepaid payment systems**. With prepaid systems, the payer has already deposited money before the payment transaction is initiated. With the value storage card, the issuer of the card is the only one to accept payments with the card. Typical examples of value storage cards are telephone cards. When it comes to EC, value storage cards can function as wallets for electronic cash [11]

The module will use value storage cards for payments. These cards of different monetary value will be bought at any Umeme offices and in the event of payment, deductions will be made to the original value after a voucher number has been entered and the balance will be displayed.

CHAPTER 3

Methodology

3.1 Introduction

The chapter discusses the approach used in the development of the module for an online business transaction process. The method used was prototyping, however aspects from other methodologies such as spiral and water fall among others were used.

3.1.1 Tools Used in System Development

Prototyping

Prototyping was applied because of the following reasons; it reduces development time and costs, developers receive quantifiable user feedback and exposes them to potential future system enhancements. It also encourages innovation, flexible designs and provides quick implementation of an incomplete but functional application.

However, different aspects were borrowed, for example the aspect of documentation was borrowed from waterfall model. This model calls for development of the system following a linear format.

From the spiral model, the aspect of developing individual application programs such as databases, interfaces among others was borrowed.

3.2 Methods Used for Data Collection

This section describes the methods used during data collection at Umeme headquarters, Rwenzori House, Lugogo industrial area, Bugolobi branch offices and Entebbe.

3.2.1 Interviews

Interviews helped us to gather data that was of great value in developing the online business transaction process, through an interview held on Nov 12th, 2009 with Mr. Bukenya Moses the system administrator in the Information Technology Department, we were able to identify the

methods of billing systems in place, problems facing the current billing systems and customer care services available.

3.2.2 Questionnaires

Through the questionnaires exploration, we were able to describe how the current billing processes and customer care systems of Umeme operate. This was done with intension of determining functional and non-functional requirements.

3.2.3 Internet Research

Through Internet exploration, we were able to describe how the billing processes and customer systems operate.

3.3 System Design

Interpretation and evaluation of the information gathered was undertaken to properly evaluate whether the information gathered suit the system design requirements. This was done to determine the processes and procedures which we employed in the design stage of our project. The tools we used during this stage included relational tables, Data Flow Diagrams and Enhanced Entity Relationship Diagrams.

3.4 System Implementation

This was implemented using data flow diagrams, relational tables connected to the database using PHP, The graphical user interfaces (GUI) were developed using PHP scripts embedded into HTML tags. MYSQL was used to develop the database as well as connecting the interfaces to the database. We used JavaScript for validation

3.4.1 Unit Testing

We tested different units of the module that is to say the database, online billing, online payment, independently and we integrated them into one complete module .This was done to determine the correctness and accuracy of the different units within the module.

3.4.2 System Testing

A number of people most especially students were selected to test the module's interfaces and to comment on the usability of the module. For example in the premise number field, some users instead of using numbers, used characters which could not be keyed in. Others left some fields null and incorrectly wrote their account numbers and meter numbers thus generating error messages. We managed to solve this by validating the different fields so that numbers or characters could only be keyed in the fields where they are meant to be filled; validation was further implemented to ensure that the relevant fields were not left blank.

CHAPTER 4

System Study, Analysis and Design

4.1 Introduction

This section gives a detailed description of user requirements specifications, limitations of the current system, system analysis, end users, and the system architecture

The billing and payment systems that are currently in use are manual, the clerks or administrators at Umeme read the bills for the different customer, the power bills are printed and issued out to the different consumers, the consumers then go to the specified banks and umeme branches to pay the bills manually.

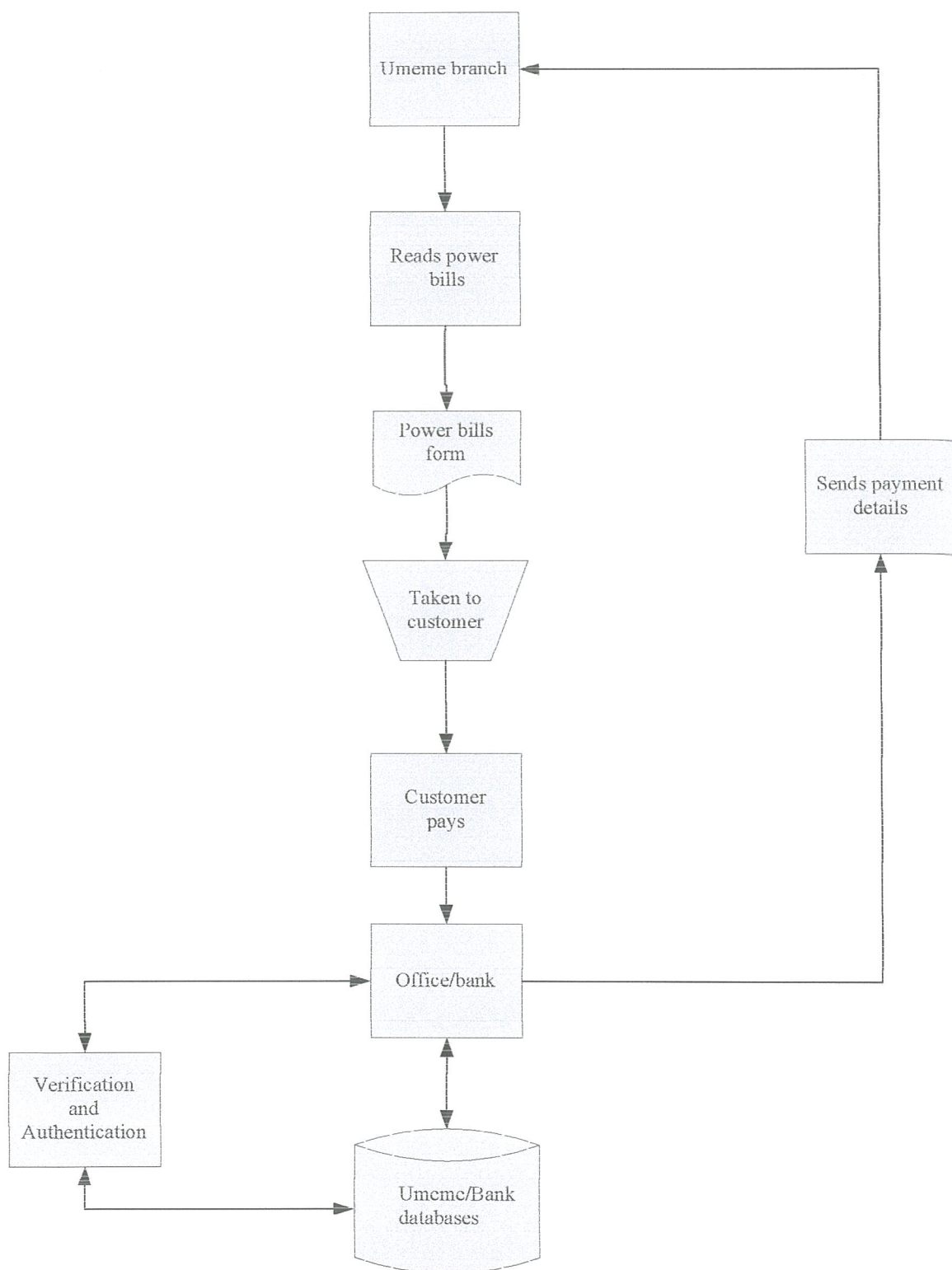


Figure 1 shows the manual billing and payment flowchart

4.2 System Study

During the study phase we grouped the requirements of the online business transaction process into user requirements, functional and non functional requirements, and system hardware requirements and then we identified the users involved.

The following is the data that we collected during the project research:

Through an interview held with Mr. Balaba, the project manager of Umeme on 1st Dec 2009, we were able to identify the methods of billing systems in place as elaborated below;

Umeme was using manual billing systems which involved personnel manually entering customer details such as customer name, premise number, amount that is being paid. The customer is issued with a receipt acknowledging the payment transacted. For example when paying the bill, the customer is advised to come along with a bill showing the account number and any other relevant information. All payments must be done at the cashier's desk or at the bank and a receipt is issued to the customer. The customer is advised to check if the amount paid corresponds with what appears on the receipt.

4.2.1 The Customer Billing Process

When the meter readings are submitted to Umeme, the system deducts the customer's previous reading from the current one so as to come up with the number of units consumed within that period.

Meter reading		Date
Previous reading	X	03 rd Dec 2009
Current reading	Y	04 th Jan 2008
Units consumed over a period	$Z=(Y-X)$	

Table 1: How to calculate units of electricity consumed

Therefore, units (Z) that are billed according to the tariff setting being used at that time. The date

on the bill represents the day the bill was issued by Umeme. All charges relate to the previous month's electricity consumption.

The charges of the month are then added to the balance brought forward from the previous month if not settled prior to the billing date. Any payments made within the period in question or any adjustments are subtracted from the total bill to get the amount owed by the customer up to then.

Estimated bills.

This results as no reading has been submitted, when the submitted readings are not within the consumption range in the system, when there is no meter at site etc. Estimates are arrived at using a smoothing algorithm in the system.

Zero Bills result when

- No reading is submitted.
- When the reading is not within the consumption range and the supervisor does not want the customer to be estimated and when the customer is disconnected.

Negative charges appear on a bill when the current reading is less than the previous for a number of reasons. The previous reading could have been an estimate.

Therefore, a bill may appear huge for any of the above reasons (in the previous month). For example; zero charges, under estimated reading, in the previous month. However, where there are any of these problems and they are brought to the attention of the office, corrective actions are taken on that account.

Once bills have been produced, staff members of Yellow Pages Express deliver them to customers.

Problems with the Manual Billing Systems

- Sometimes inaccurate meter readings are made.
- There is increase in poor estimations of bills.
- Increase in billing delays leading to late delivery of bills.
- Few customer meters are read thus leading to loss of revenue since some customers are not billed.

- Delay in power extensions to remote areas

4.2.2 The Customer Care Systems

These systems operate in such a way that a customer raises a complaint in person or in writing and they are categorized into commercial and technical. All complaints are addressed to the customer care officer in each district office, or any other officer designated to handle complaints which can be raised at the nearest Umeme office.

Complaints reported are recorded in a customer complaints proforma which contains; date of complaint, name of customer, location, account and telephone number, meter number, description of the complaint, signature of authorized officer and that of the complainant. The customer is given a copy of the proforma which is directed to Umeme staff for resolution. Umeme tries to resolve complaints immediately. For example; knowing the bill, whether a receipt is posted or not and in such instances a customer is given either a statement or a copy of the bill.

The second manual system involves customers raising their complaints through a customer helpline. They make a phone call to 185 whereby an authorized customer care officer listens and records their complaints so they can be attended to. The customer care officer requests for the name of the area, plot number a description of the complaint or inquiry. [12].

We also interviewed some residents of Ntinda and we able to find out the problems of manual customer care systems, these include;

- This system is very slow where by customer complaints and inquiries take a long time to be addressed to the bureaucratic system.
- There is redundancy of data due to large volumes of paper work leading to inconsistency of data.
- Few customers are attended to due to the long queue of customers being attended to by one customer care officer at a time.
- The risk of errors is high due to many customer complaints and inquiries handled at a time.

4.2.3 Computerized Billing Systems

Umeme uses a hand held computerized meter reading systems where by the authorized personnel enters a customer's meter number, premise number and the units of electricity consumed. The meter reading collected is entered into a billing system and the customer bill is printed.

Benefits of using computerized Billing Systems

It was noted that while using these computerized billing systems, the following were benefits;

- There is accuracy of meter readings leading to more accurate bills.
- There is a reduction in bill estimations.
- Furthermore there are timely customer bills due to reduction in billing delays.
- More customer meters are read leading increase in revenue.

4.3 System analysis and Requirement Specification

This section specifies the functional and non functional requirements, system and hardware requirements and software attributes.

4.3.1 User Requirements

- The system should be able to help an administrator login.
- The system should be able to help a user make online payments to the company.
- The system should be able to help administrators register customers who have newly registered for the company's services.
- The system should be able to help the users with administrative rights edit client details.

4.3.2 Functional Requirements

- The system should be able to help an administrator login.
- The system should be able to help a user make online payments to the company.
- The system should be able to help administrators register customers who have newly registered for the company's services.

- The system should be able to help the users with administrative rights edit client details.
- The system should be able to generate user account profile.
- The system should be able to provide billing information.
- The system should be able to allow users forward their compliments, queries and complaints.
- The system should be able to help administrators edit billing information wherever there is a change in the rates.

4.3.3 Non Functional Requirements

- The system should be able to validate form entries like meter numbers and premise numbers, account numbers, voucher numbers, and voucher serials.
- The response time of the system should always be less than 5 seconds.
- The system will be developed using **PHP** / **MySQL** to allow interactivity between the user and the database.
- The system should not disclose any information about customers, it's only those with administrative privileges or rights to login in the system who can view there details.

4.3.4 Software System Attributes

- **Correctness**- The system should satisfy requirement specifications by fulfilling the user's objectives.
- **Efficiency** - The system should use minimum amount of computing resources and a simple code required to perform function.
- **Flexibility** - The system should be easy to be modified by an operational program.
- **Portability**- The system should be able to run on different platforms for example Windows XP and Linux.
- **Reusability** - The system should be able to be reused in another application.
- **Testability**-The system be able to be tested to ensure that it performs as intended.
- **Usability** -The system should be user friendly in such a way that it is easy to operate, learn, prepare input, and interpret output.
- **Reliability** - The system should be able to perform with minimum errors.

- Acceptability-The system should easily be accepted by the general users.
- Interoperability- The system should be compatible with other systems

4.4 System Design

This section gives general description of the proposed module to be developed. The customers are able to log into the system where they can view their bills and make payments as well as send complaints, queries and compliments.

4.4.1 Users Involved in the System and their Responsibility

Customers

These should be able view their consumption statement, make payments online, send queries, complaints, and compliments as well as online billing.

Customer Care Officers

These are responsible for responding to customer requests, updating customer profiles, service information, responding to any inquiries, compliments and complaints from the customers and have some rights and privileges to perform those tasks.

Administrators

This is a special category of users that have exclusive rights and privileges to the system where by they are able to update customer profiles, customer care officer profiles, authenticating of user access to database.

These are also responsible for responding to customer inquiries, complaints and compliments

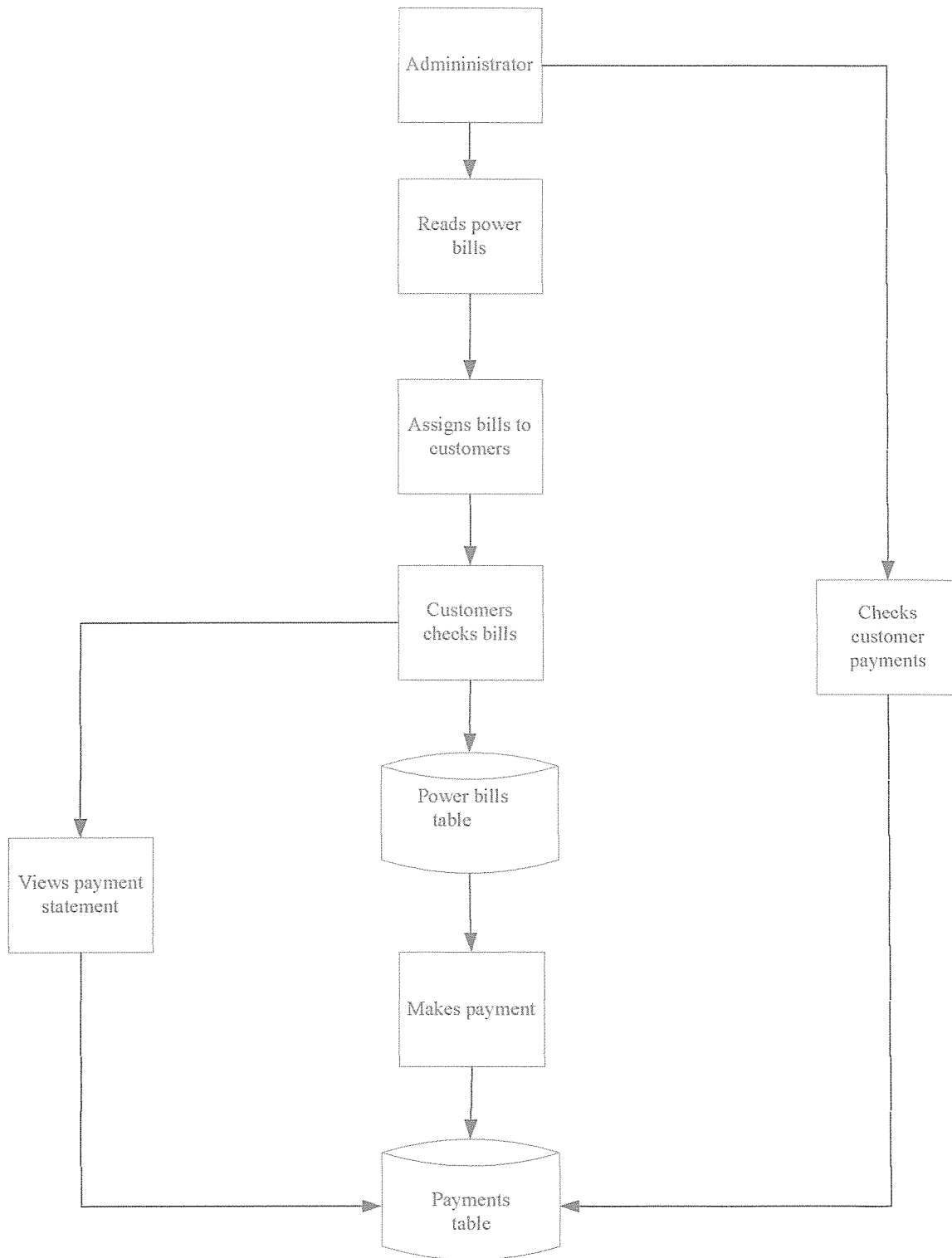


Figure 2 shows online billing and payment flowchart

4.4.2 Hardware and Software Requirements

- Windows 95 and a later version of windows or Linux 133 MHz Intel Pentium CPU or above; 32 and 48 MB RAM for Windows 95 and 98, NT, 2000, respectively - 128 MB recommended; 2 GB Hard drive and above for each with an exception of windows 2000 and XP which may require more space 20 GB and above.
- Full access to the Internet.
- A web server such as Easy PHP, Apache Friends or xampp.
- A Web browser, either Netscape (version 6.0 or higher), Microsoft Explorer (Version 5.0 or higher), Flock. Or Mozilla.
- Database Management System - My SQL

4.5 System Architecture

This gives a high view of the system, main components, user interfaces, system process management and data storage that were built independently and then integrated to form a complete module as shown below;

Our module for an online transaction process is composed of a front end (Graphical User interfaces) connected to the back end (Data base) through system process management.

System security is implemented by entering User-name and password.

After a query has been executed, a confirmation message is displayed acknowledging that the query has been successful.

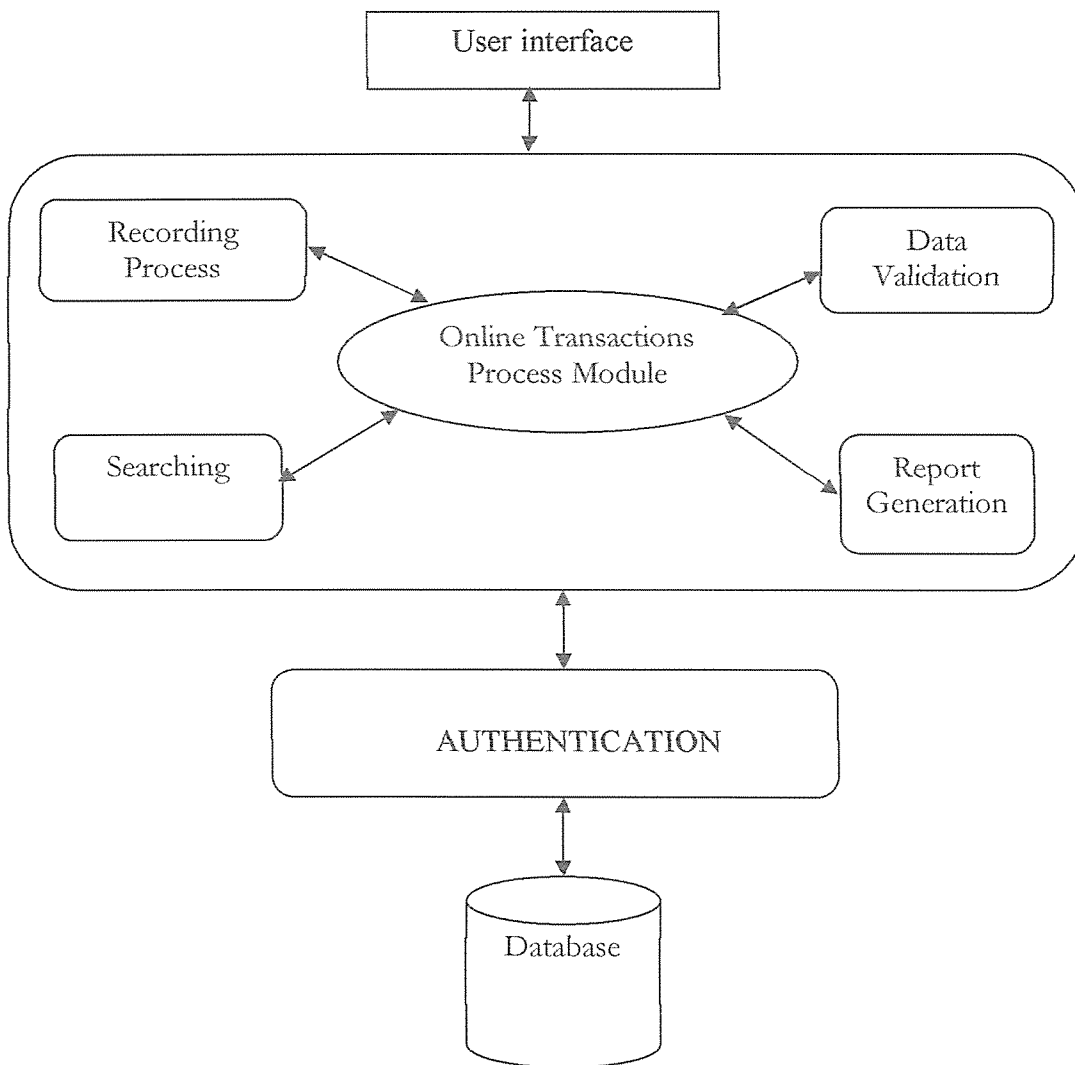


Figure 3 shows the architectural design of the system

4.5.1 Context Level Diagram

- From Figure 2, the Umeme administrators log into the system and can update and manage the system.
- The customer makes payment of bills and can view payment information.
- The administrator can add another user and edit his or her profile.
- The administrator sets and edits power rates.
- The administrator views client payments and help requests.

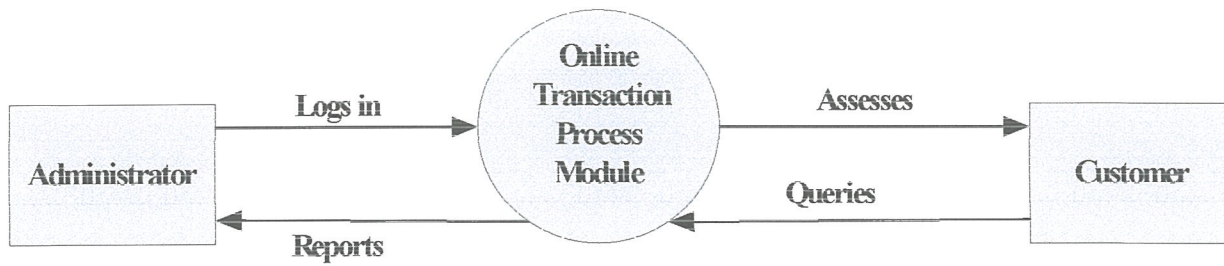


Figure 4 shows the level 0 context level diagram

4.5.2 Data Flow Diagrams

These diagrams provide an overview of the major functional business processes.

- From figure 5 the administrator logs into the system, in addition to that, the administrator can edit his or her profile.
- The administrator feeds in information about clients and can also edit the power rates too.
- The administrator can search for different customer details using account number, premise number or meter number.
- The administrator can view payments that have been made by different customers, in addition he or she can view the help details posted by the different customers
- The customer can view online billing information to know how much power he has consumed for a given period.
- The customer can make payments for the power consumed and later view his consumption statement.
- The customer can send help details that is to say queries, complaints or compliments.

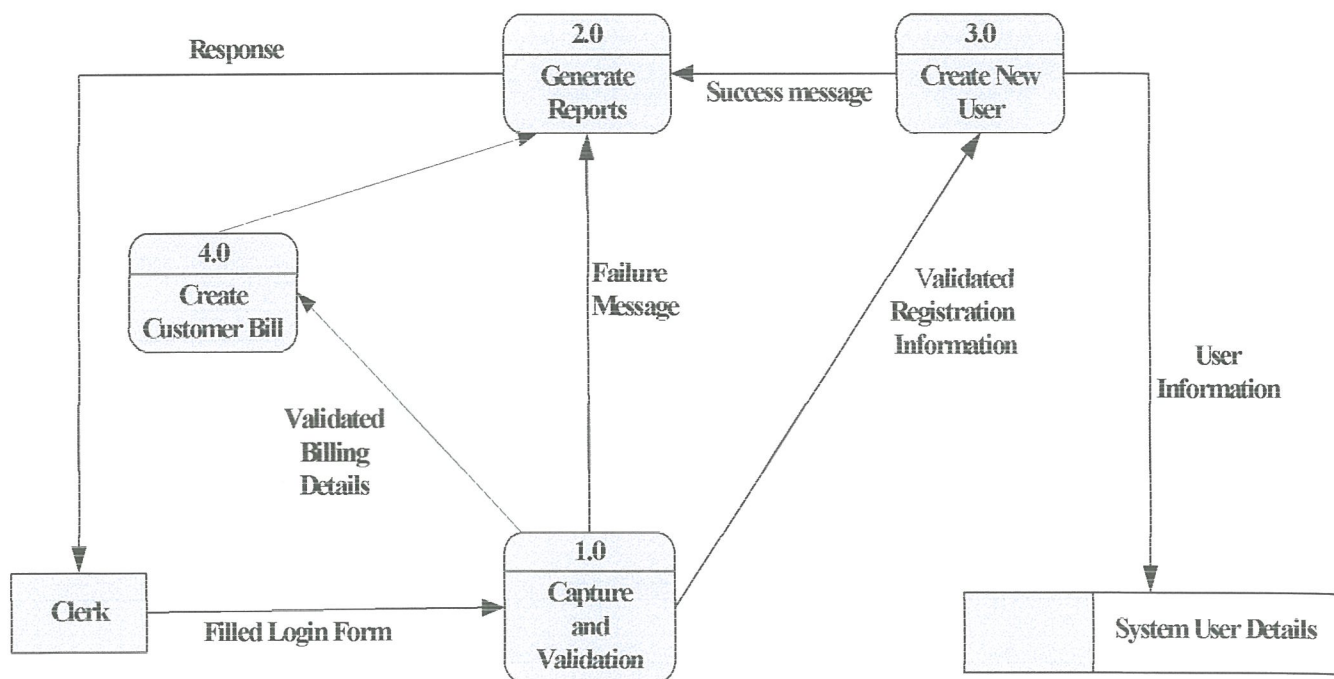


Figure 5 shows summarized Data Flow diagram for the clerks

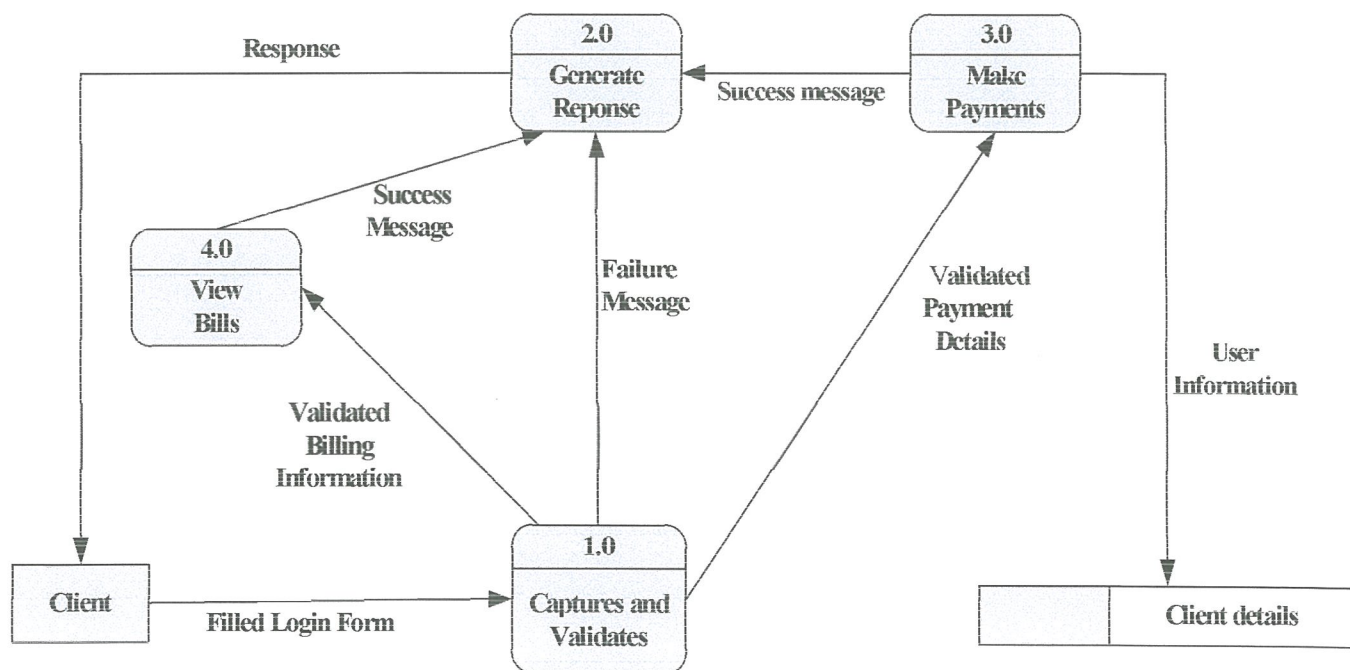


Figure 6 shows summarized Data Flow diagram for the customers

4.5.3 Entity Relationship Diagrams

This is used to represent the graphical relationship among entities.

The administrator enters and edits power rates, registers new client/customers and takes readings.

The client/customer makes payment using a voucher, he/she can also request for help inform of complaints or queries.

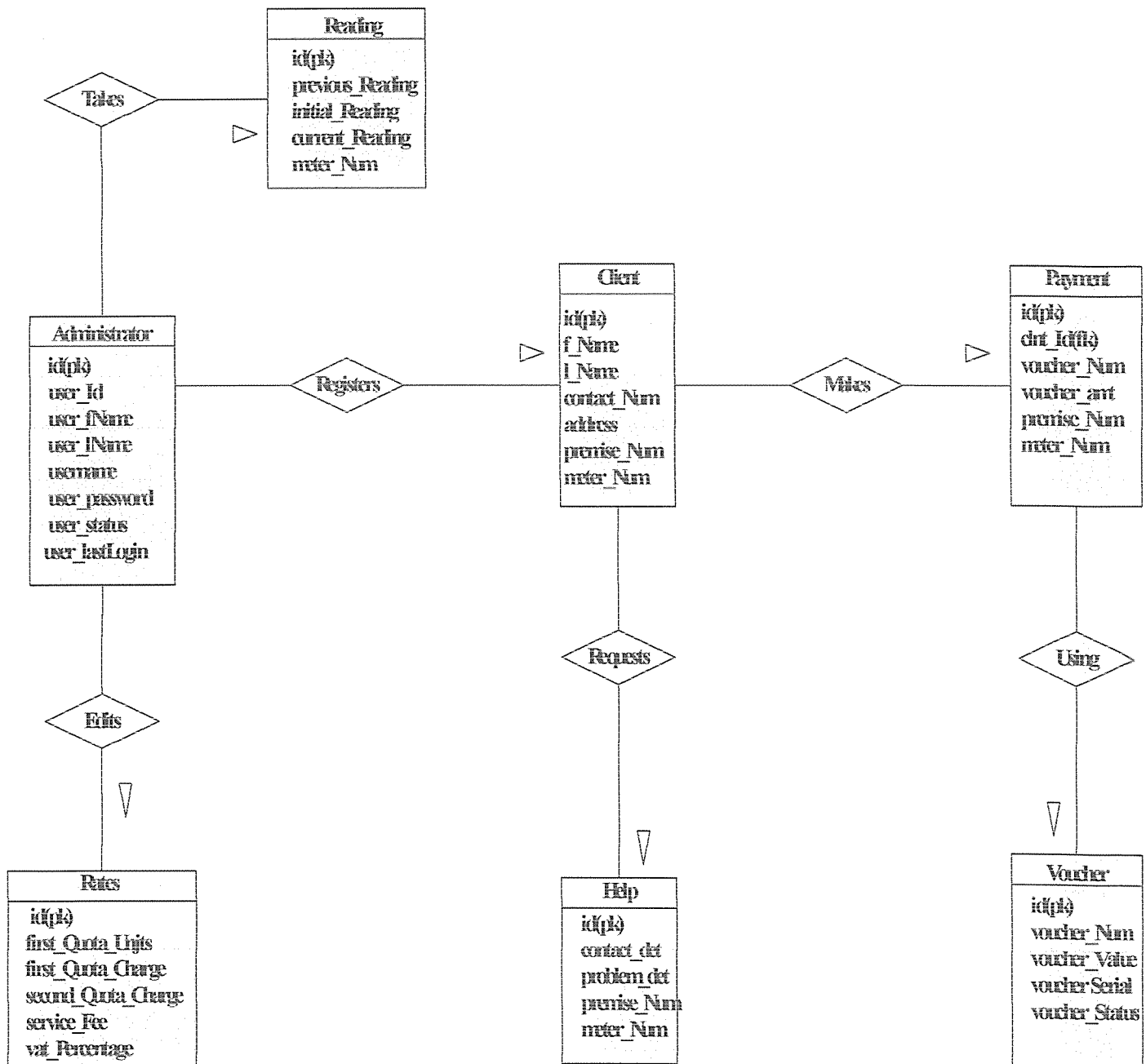
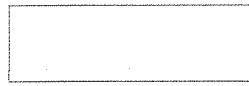
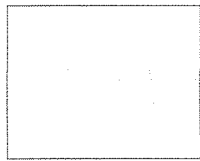


Figure 7 shows the Entity Relationship Diagram

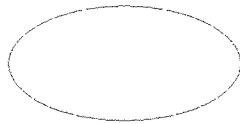
KEY



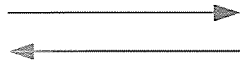
Entity



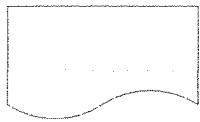
Program



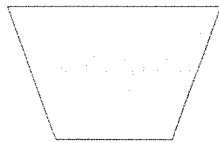
Process



Data flow



Document



Manual operation



Database



Decision



Data store

4.5.4 Data Dictionary

This section contains different tables, entities, attributes and data types

Customer table

localhost / localhost / umemeproject / customer | phpMyAdmin 2.9.1 - Microsoft Internet Explorer

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phpMyAdmin

Database
umemeproject (8)

umemeproject (8)

- customer
- customerpayment
- help (InnoDB free: 3072 KB (3 Rows))
- login
- rates
- readings
- systemusers
- vouchers

Field	Type	Collation	Attributes	Null	Default	Extra	Action
<input type="checkbox"/> Id	varchar(12)	latin1_swedish_ci		No			
<input type="checkbox"/> ClientFname	text	latin1_swedish_ci		No			
<input type="checkbox"/> ClientLname	text	latin1_swedish_ci		No			
<input type="checkbox"/> ClientContactNo	varchar(10)	latin1_swedish_ci		No			
<input type="checkbox"/> ClientAddress	varchar(15)	latin1_swedish_ci		No			
<input type="checkbox"/> ClientPremiseNo	varchar(10)	latin1_swedish_ci		No			
<input type="checkbox"/> ClientAccountNo	varchar(15)	latin1_swedish_ci		No			
<input type="checkbox"/> MeterNo	varchar(20)	latin1_swedish_ci		No			
<input type="checkbox"/> CreatedOn	date			No			
<input type="checkbox"/> CreatedBy	text	latin1_swedish_ci		No			
<input type="checkbox"/> ModifiedOn	date			No			
<input type="checkbox"/> ModifiedBy	text	latin1_swedish_ci		No			

Check All / Uncheck All With selected.

Print view Relation view Propose table structure

Add 1 field(s) At End of Table At Beginning of Table After Id Go

Indexes: 0					Space usage		Row Statistics	
Keyname	Type	Cardinality	Action	Field	Type	Usage	Statements	Value
PRIMARY	PRIMARY	3		Id	Data	16,384 Bytes	Format	Compact
Create an index on 1 columns Go					Index	0 Bytes	Collation	latin1_swedish_ci
					Total	16,384 Bytes	Creation	Feb 01, 2010 at 01:58 AM

http://localhost/phpmyadmin/tbl_properties_structure.php?db=umemeproject&token=ec5b539a653ad0fcd413d5c38d8a02350&table=customer

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Customer payment table

localhost / localhost / umemeproject / customerpayment | phpMyAdmin 2.8.1 - Microsoft Internet Explorer

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











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Server: localhost Database: umemeproject Table: customerpayment "InnoDB free: 3072 kB"



Browse Structure SQL Search Insert Export Import Operations Empty Drop

Field	Type	Collation	Attributes	Null	Default	Extra	Action
<input type="checkbox"/> Id	varchar(15)	latin1_swedish_ci		No			     
<input type="checkbox"/> ClientId	varchar(15)	latin1_swedish_ci		No			     
<input type="checkbox"/> MeterNo	varchar(15)	latin1_swedish_ci		No			     
<input type="checkbox"/> PremiseNo	varchar(15)	latin1_swedish_ci		No			     
<input type="checkbox"/> VoucherNo	varchar(18)	latin1_swedish_ci		No			     
<input type="checkbox"/> VoucherAmount	varchar(10)	latin1_swedish_ci		No			     
<input type="checkbox"/> CreatedOn	date			No			     

InnoDB free: 3072 kB (3 Rows) Check All / Uncheck All With selected:      

Print view Relation view Propose table structure

Add 1 field(s) At End of Table At Beginning of Table After Id Go

Indexes: 0					Space usage		Row Statistics	
Keyname	Type	Cardinality	Action	Field	Type	Usage	Statements	Value
PRIMARY	PRIMARY	3	 	Id	Data	16,384 Bytes	Format	Compact
Create an index on 1 columns Go					Index	0 Bytes	Collation	latin1_swedish_ci
					Total	16,384 Bytes	Creation	Feb 01, 2010 at 01:58 AM

Open new phpMyAdmin window

http://localhost/phpmyadmin/tbl_properties_structure.php?db=umemeproject&token=ec5b539a653adbfcd413d5c38d8a02358&table=customerp

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Help table

localhost / localhost / umemeproject / help | phpMyAdmin 2.8.1 - Microsoft Internet Explorer

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phpMyAdmin

Database
umemeproject (8)

umemeproject (8)

- customer
- customerpayment
- help
- login
- rat (InnoDB free: 3072 kB (0 Rows))
- readings
- systemusers
- vouchers

Server: localhost ▶ Database: umemeproject ▶ Table: help "InnoDB free: 3072 kB"

Browse Structure SQL Search Insert Export Import Operations Empty Drop

Field	Type	Collation	Attributes	Null	Default	Extra	Action
<input type="checkbox"/> Id	varchar(15)	latin1_swedish_ci		No			
<input type="checkbox"/> PremiseNo	varchar(15)	latin1_swedish_ci		No			
<input type="checkbox"/> MeterNo	varchar(18)	latin1_swedish_ci		No			
<input type="checkbox"/> ContactDate	date			No			
<input type="checkbox"/> ProblemDate	date			No			
<input type="checkbox"/> CreatedOn	date			No			

↑ Check All / Uncheck All With selected:

Print view Relation view Propose table structure

Add 1 field(s) At End of Table At Beginning of Table After Id Go

Indexes: 0					Space usage		Row Statistics	
Keyname	Type	Cardinality	Action	Field	Type	Usage	Statements	Value
PRIMARY	PRIMARY	0		Id	Data	16,384 Bytes	Format	Compact
Create an index on 1 columns Go					Index	0 Bytes	Collation	latin1_swedish_ci
					Total	16,384 Bytes	Creation	Feb 01, 2010 at 01:58 AM

Open new phpMyAdmin window

http://localhost/phpmyadmin/tbl_properties_structure.php?db=umemeproject&token=ec5b539a653adbfcd413d5c38d8a0235&table=help

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Rates table

localhost / localhost / umemeproject / rates : phpMyAdmin 2.8.1 - Microsoft Internet Explorer

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



























































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Server: localhost Database: umemeproject Table: rates "InnoDB free: 3072 kB"



Browse Structure SQL Search Insert Export Import Operations Empty Drop

Field	Type	Collation	Attributes	Null	Default	Extra	Action
<input type="checkbox"/> Id	varchar(15)	latin1_swedish_ci		No			     
<input type="checkbox"/> FirstQoutaUnits	varchar(15)	latin1_swedish_ci		No			     
<input type="checkbox"/> FirstQoutachrg	varchar(15)	latin1_swedish_ci		No			     
<input type="checkbox"/> SecondQoutachrg	varchar(15)	latin1_swedish_ci		No			     
<input type="checkbox"/> ServiceFee	varchar(10)	latin1_swedish_ci		No			     
<input type="checkbox"/> VatPercentage	varchar(10)	latin1_swedish_ci		Yes	NULL		     
<input type="checkbox"/> CreatedOn	date			No			     
<input type="checkbox"/> CreatedBy	varchar(15)	latin1_swedish_ci		No			     
<input type="checkbox"/> ModifiedOn	date			Yes	NULL		     
<input type="checkbox"/> ModifiedBy	text	latin1_swedish_ci		Yes	NULL		     

Check All / Uncheck All With selected:      

Print view Relation view Propose table structure

Add 1 field(s) At End of Table At Beginning of Table After Id Go

Indexes: 0					Space usage		Row Statistics	
Keyname	Type	Cardinality	Action	Field	Type	Usage	Statements	Value
PRIMARY	PRIMARY	2	 	Id	Data	16,384 Bytes	Format	Compact
Create an index on 1 columns Go					Index	0 Bytes	Collation	latin1_swedish_ci
					Total	16,384 Bytes	Creation	Feb 01, 2010 at 01:58 AM

http://localhost/phpmyadmin/tbl_properties_structure.php?db=umemeproject&token=ec5b539a653adbfc4113d5c38d8a02356&table=rates

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Readings table

localhost / localhost / unemeproject / readings | phpMyAdmin 2.8.1 - Microsoft Internet Explorer

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Server: localhost Database: unemeproject Table: readings "InnoDB free: 3072 kB"



Browse Structure SQL Search Insert Export Import Operations Empty Drop

Field	Type	Collation	Attributes	Null	Default	Extra	Action
<input type="checkbox"/> Id	varchar(15)	latin1_swedish_ci		No			     
<input type="checkbox"/> PreviousReading	varchar(15)	latin1_swedish_ci		No			     
<input type="checkbox"/> InitialReadingDate	date			Yes	NULL		     
<input type="checkbox"/> CurrentReading	varchar(15)	latin1_swedish_ci		No			     
<input type="checkbox"/> MeterNo	varchar(18)	latin1_swedish_ci		No			     
<input type="checkbox"/> CreatedOn	date			No			     
<input type="checkbox"/> CreatedBy	varchar(15)	latin1_swedish_ci		No			     
<input type="checkbox"/> ModifiedOn	date			Yes	NULL		     
<input type="checkbox"/> ModifiedBy	varchar(15)	latin1_swedish_ci		Yes	NULL		     

Check All / Uncheck All With selected:      

Print view Relation view Propose table structure

Add 1 field(s) At End of Table At Beginning of Table After Id Go

Indexes: 0					Space usage		Row Statistics	
Keyname	Type	Cardinality	Action	Field	Type	Usage	Statements	Value
PRIMARY	PRIMARY	0	 	Id	Data	16,384 Bytes	Format	Compact
Create an index on 1 columns Go					Index	0 Bytes	Collation	latin1_swedish_ci
					Total	16,384 Bytes	Creation	Feb 01, 2010 at 01:58 AM

http://localhost/phpmyadmin/tbl_properties_structure.php?db=unemeproject&token=ec5b539a653adbfcd113d5c38d8a0235&table=readings

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Vouchers table

localhost / localhost / umemeproject / vouchers phpMyAdmin 2.8.1 - Microsoft Internet Explorer

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Server: localhost Database: umemeproject Table: vouchers "InnoDB free: 3072 kB"



Browse Structure SQL Search Insert Export Import Operations Empty Drop

Field	Type	Collation	Attributes	Null	Default	Extra	Action
<input type="checkbox"/> Id	varchar(15)	latin1_swedish_ci		No			     
<input type="checkbox"/> VoucherNo	varchar(15)	latin1_swedish_ci		No			     
<input type="checkbox"/> VoucherValue	varchar(10)	latin1_swedish_ci		No			     
<input type="checkbox"/> VoucherSerial	varchar(18)	latin1_swedish_ci		No			     
<input type="checkbox"/> VoucherStatus	varchar(15)	latin1_swedish_ci		No			     
<input type="checkbox"/> CreatedOn	date			No			     
<input type="checkbox"/> CreatedBy	varchar(15)	latin1_swedish_ci		No			     
<input type="checkbox"/> ModifiedOn	date			Yes	NULL		     
<input type="checkbox"/> ModifiedBy	varchar(15)	latin1_swedish_ci		Yes	NULL		     

Check All / Uncheck All With selected:      

Print view Relation view Propose table structure

InnoDB free: 3072 kB (0 Rows) Add 1 field(s) At End of Table At Beginning of Table After Id Go

Indexes: 0					Space usage		Row Statistics	
Keyname	Type	Cardinality	Action	Field	Type	Usage	Statements	Value
PRIMARY	PRIMARY	0	 	Id	Data	16,384 Bytes	Format	Compact
Create an index on 1 columns Go					Index	0 Bytes	Collation	latin1_swedish_ci
					Total	16,384 Bytes	Creation	Feb 01, 2010 at 01:58 AM

http://localhost/phpmyadmin/tbl_properties_structure.php?db=umemeproject&token=ec5b539a6533dc0fcd413d5c38d8a0235&table=vouchers

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System Users' table

localhost / localhost / umemeproject / systemusers | phpMyAdmin 2.8.1 - Microsoft Internet Explorer

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phpMyAdmin

Database
umemeproject (6)

umemeproject (6)



- customer
- customerpayment
- help
- login
- rates
- readings
- systemusers
- vouchers

Field	Type	Collation	Attributes	Null	Default	Extra	Action
<input type="checkbox"/> Id	varchar(15)	latin1_swedish_ci		No			     
<input type="checkbox"/> SysUserId	varchar(15)	latin1_swedish_ci		No			     
<input type="checkbox"/> SysUserName	text	latin1_swedish_ci		No			     
<input type="checkbox"/> SysUserFname	text	latin1_swedish_ci		No			     
<input type="checkbox"/> SysUsername	varchar(10)	latin1_swedish_ci		No			     
<input type="checkbox"/> SysUserPassword	varchar(10)	latin1_swedish_ci		No			     
<input type="checkbox"/> SysUserStatus	text	latin1_swedish_ci		Yes	NULL		     
<input type="checkbox"/> SysUserLastLogin	time			No			     
<input type="checkbox"/> CreatedOn	date			No			     
<input type="checkbox"/> CreatedBy	varchar(15)	latin1_swedish_ci		No			     
<input type="checkbox"/> ModifiedON	date			Yes	NULL		     
<input type="checkbox"/> ModifiedBy	varchar(15)	latin1_swedish_ci		Yes	NULL		     

Check All / Uncheck All With selected:      

InnoDB free: 3072 kb (0 Rows) Print view Relation view Propose table structure

Add 1 field(s) At End of Table At Beginning of Table After Id Go

Indexes: 0					Space usage		Row Statistics	
Keyname	Type	Cardinality	Action	Field	Type	Usage	Statements	Value
PRIMARY	PRIMARY	0	 	Id	Data	16,384 Bytes	Format	Compact
Create an index on 1 columns Go					Index	0 Bytes	Collation	latin1_swedish_ci
					Total	16,384 Bytes	Creation	Feb 01, 2010 at 01:58 AM

http://localhost/phpmyadmin/tbl_properties_structure.php?db=umemeproject&token=ec5b539a653adbfcd413d5c38d8a0239&table=systemuse

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Figure 8 shows Login table

Server: localhost ▶ Database: umemeproject ▶ Table: login "InnoDB free: 3072 kB"

[Browse](#)
[Structure](#)
[SQL](#)
[Search](#)
[Insert](#)
[Export](#)
[Import](#)
[Operations](#)
[Empty](#)
[Drop](#)

Field	Type	Collation	Attributes	Null	Default	Extra	Action
<input type="checkbox"/> Username	varchar(20)	latin1_swedish_ci		No			
<input type="checkbox"/> Password	varchar(10)	latin1_swedish_ci		No			

[Check All](#) / [Uncheck All](#) With selected:

[Print view](#)
[Relation view](#)
[Propose table structure](#)

[Add](#) field(s)
 ☒ At End of Table
 ☐ At Beginning of Table
 ☐ After Username
 [Go](#)

Indexes: 0				Space usage		Row Statistics	
Keyname	Type	Cardinality	Action	Field	Type	Usage	Statements
PRIMARY	PRIMARY	18		Username	Data	16,384 Bytes	Format
				Password	Index	0 Bytes	Collation
							Value
							Compact
							latin1_swedish_ci
							Creation
							Feb 01, 2010 at 01:58 AM

Create an index on column(s) [Go](#)

Open new phpMyAdmin window

[http://localhost/phpmyadmin/tbl_properties_structure.php?db=umemeproject&token=4ed1e04212191abccf923eca11e395962&table=login](#)

start from C: umemeproject - finish... localhost / localhost / ...

Local intranet 1:10:44

CHAPTER 5

System Implementation and Results

5.1 Introduction

This chapter explains the results achieved after the implementation of the system design as shown in Chapter four. Discussed below are the results of the system.

5.2 Implementation

The system was implemented using data flow diagrams, rationale tables connected to the database using PHP. The graphical user interfaces (GUI) were developed using PHP scripts embedded into HTML tags. MYSQL was used to develop the database as well as connecting the interfaces to the database. We used JavaScript for validation.

5.3 Results

The following were the results after the implementation of the module for an online business transaction process for Umeme. The system administrator logs in using a username and password thus enhancing authentication and security. He or she uses the module to update electricity units consumed, edit account information and power rates, view payments and details of those with complaints, comments and compliments. The customer is able to view online billing information, make bill payments and view the payment statement plus posting in complaints, queries and compliments.

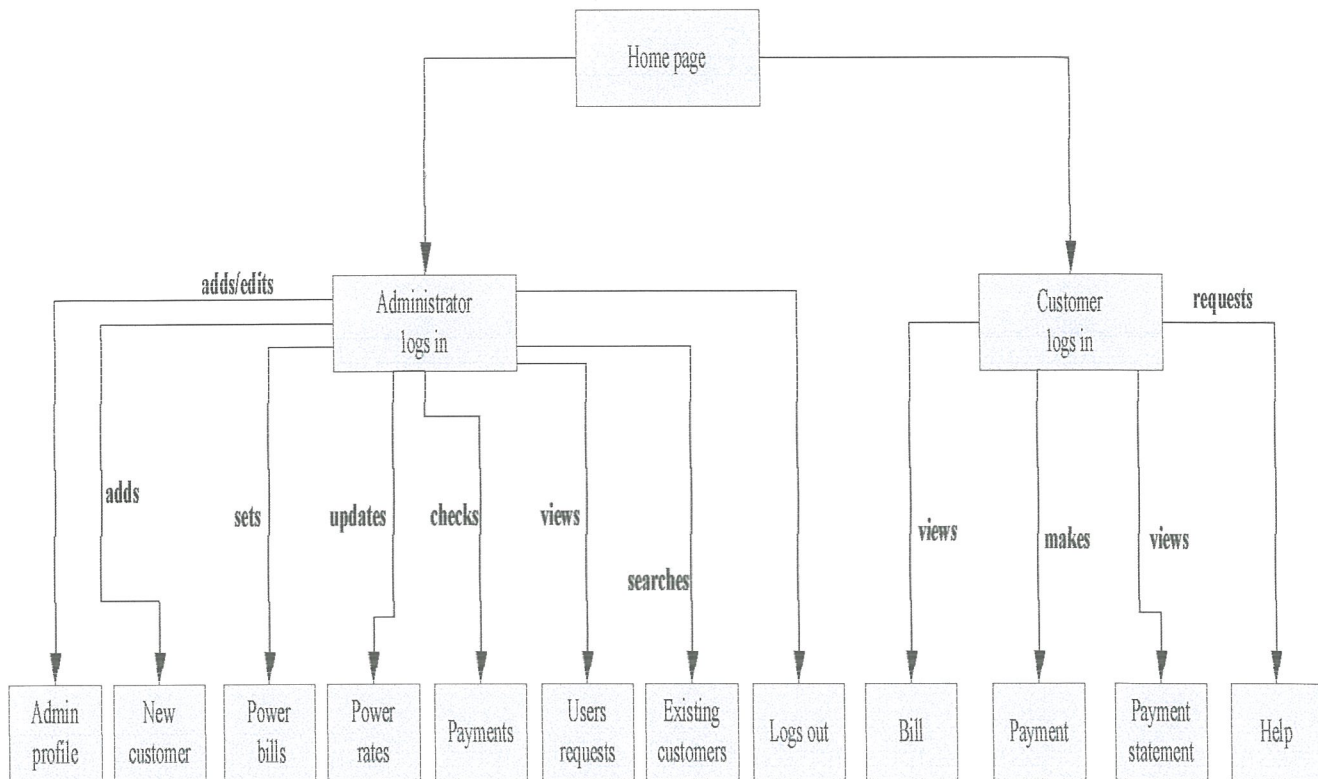


Figure 9 shows an Overview of the Module

5.3.1 System Interfaces

The user interfaces are made up of forms and hyperlinks, which enable an authorized user to link to other pages, they are created using HTML, CSS and PHP.

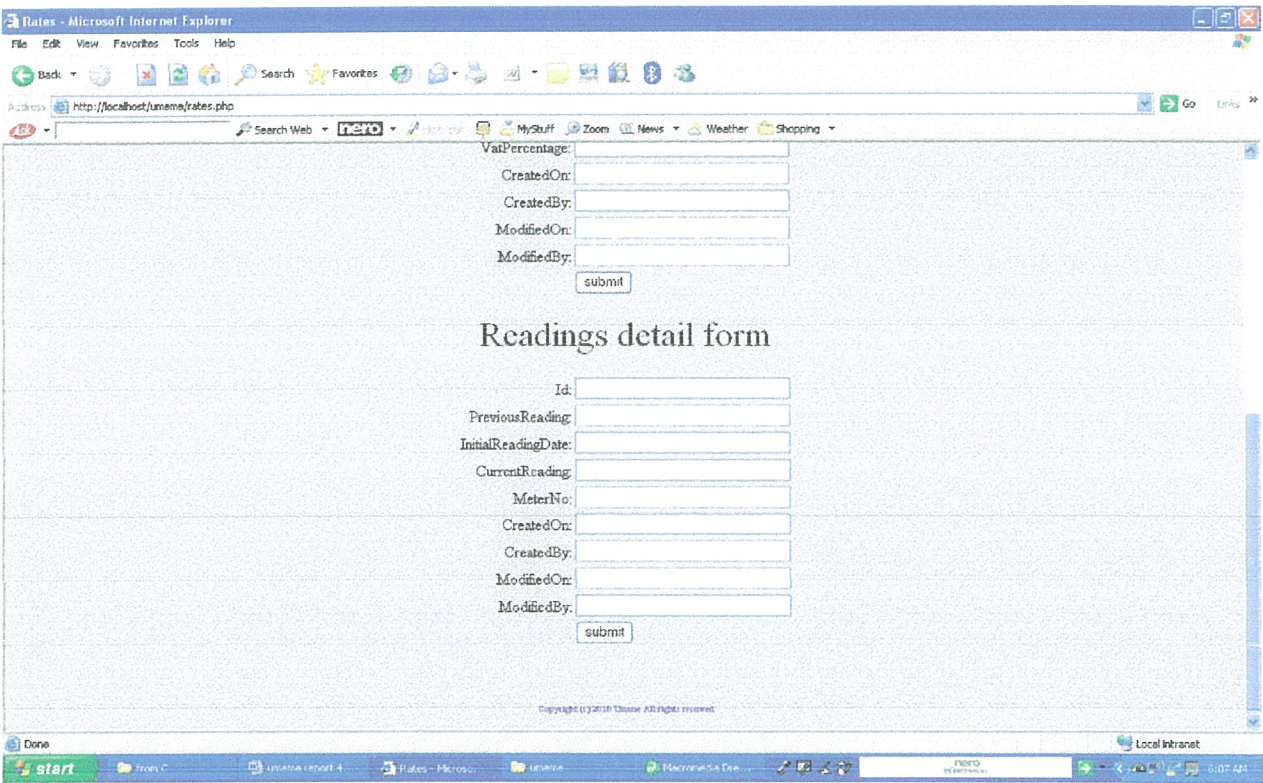
Homepage

The home page has a login form where the administrator can login, the customers are able to use this interface to make payments, view payment statements and online billing. Details are found in Figure 9.



Online billing form

The customers are able to view their bills. Details are found in Figure 10.



Online payment form.

The customers are able to make payments using value storage voucher cards. Details are in Figure 11.

The screenshot shows a web browser window titled 'Untitled Document - Microsoft Internet Explorer'. The address bar displays 'http://localhost/uneme/makepayment.php'. The page content includes a 'Make payment form' with the following fields: Id, ClientId, MeterNo, PremiseNo, VoucherNo, VoucherAmount, and CreatedOn. A 'submit' button is located below the 'CreatedOn' field. A 'Back' button is visible on the left. At the bottom of the page, there is a green banner with the text 'Online Transaction Process Module' and the 'UMEME' logo. The Windows taskbar at the bottom shows the 'start' button, several open applications, and the system clock indicating 1:50 AM on 1/20/2007.

Make payment form

★ Back

Id:

ClientId:

MeterNo:

PremiseNo:

VoucherNo:

VoucherAmount:

CreatedOn:

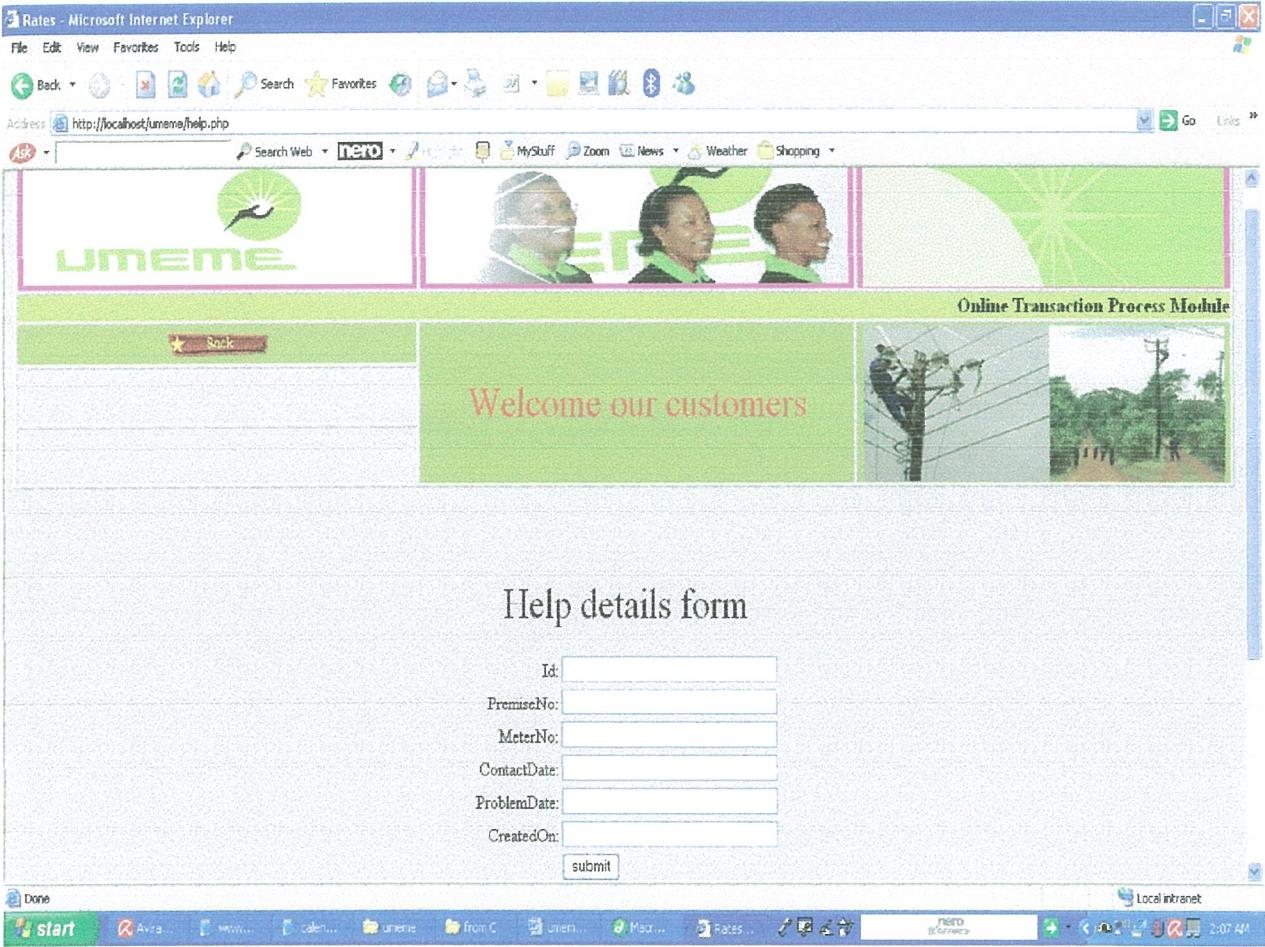
submit

Online Transaction Process Module

UMEME

Online help form.

With this interface, the customers are able to post in their queries, complaints and compliments. Details are found in Figure 12.



System search form

The administrator is able to such for client details using the meter number, account number or premise number, Details are found in Figure 13.

The screenshot shows a web browser window with the address `http://localhost/umeme/cust_data.php`. The page features the UMEME logo and a banner image of three people. Below the banner, there are two sections: "Customer Details" and "Payments For the Customer".

Customer Details

Id	ClientName	ClientLname	ClientContactNo	ClientAddress	ClientPremiseNo	ClientAccountNo	MeterNo	CreatedOn	CreatedBy	ModifiedOn	ModifiedBy
001	Tumuhimbise	Ronald	0772389728	256	75	01283083973	3526546567	2009-12-03	Ronnie	2010-01-05	Ronnie
003	sebakwiye	Biev	0774647155	Kigali	PU09	090800880357	B0908798	2010-02-02	Biev	2010-03-01	Boda
ID000001	Mukandahiro	Leniah	0777700765	Kiwafi	P00001	Acc0001-222-987	02848736837	2010-01-14	Bienvenue	2010-01-14	Bienvenue

Payments For the Customer

Id	ClientId	MeterNo	PremiseNo	VoucherNo	VoucherAmount	CreatedOn
002	Bienv	2335544	Makundye	5465774776	150000	2010-01-02
004	ko009	09088	008987	0008083	300000	2010-10-01
ID00002	C00002	6346473647	646464744	6767-3433-423	10000	2010-01-14

Client details form.

This has the client details form where the administrator can feed in the various details concerning the customer. Details are found in Figure 14.

The screenshot shows a web browser window titled 'System users - Microsoft Internet Explorer'. The address bar displays 'http://localhost/lanema/systemusers.php'. The page content is titled 'System users detail form' and contains a series of input fields for user details:

- Id:
- SysUserId:
- SysUserName:
- SysUserLname:
- SysUsername:
- SysUserPassword:
- SysUserStatus:
- SysUserLastLogin:
- CreatedOn:
- CreatedBy:
- ModifiedOn:
- ModifiedBy:

A 'submit' button is located below the 'ModifiedBy' field. At the bottom of the page, there is a green bar with the text 'Copyright (c) 2010 Lanema All rights reserved.' The browser's taskbar at the bottom shows the 'start' button, several open applications, and the system clock displaying '1:17 AM'.

System rates form.

This has the power rates which can be edited in case of any change. Details are found in Figure 15.

The screenshot shows a web browser window titled 'Rates - Microsoft Internet Explorer' with the address bar displaying 'http://localhost/umeme/rates.php'. The page features a green header with the 'UMEME' logo and a navigation bar with links for 'Help', 'Vouchers', and 'SystemUsers'. The main content area is titled 'Rates Detail form' and contains a vertical list of input fields for editing system rates. The fields are: 'Id:', 'FirstQoutaUnits:', 'FirstQoutachg:', 'SecondQoutachg:', 'ServiceFee:', 'ValPercentage:', 'CreatedOn:', 'CreatedBy:', 'ModifiedOn:', and 'ModifiedBy:'. A 'submit' button is located at the bottom of the form. The Windows taskbar at the bottom shows the 'start' button and several open applications, including 'Avira...', 'HWMon...', 'calen...', 'umeme', 'from c...', 'umem...', 'Macr...', and 'Rates...'. The system clock indicates the time is 2:10 AM.

Online Transaction Process Module		
Help	Vouchers	SystemUsers
<h3>Rates Detail form</h3>		
Id: <input type="text"/>		
FirstQoutaUnits: <input type="text"/>		
FirstQoutachg: <input type="text"/>		
SecondQoutachg: <input type="text"/>		
ServiceFee: <input type="text"/>		
ValPercentage: <input type="text"/>		
CreatedOn: <input type="text"/>		
CreatedBy: <input type="text"/>		
ModifiedOn: <input type="text"/>		
ModifiedBy: <input type="text"/>		
<input type="submit" value="submit"/>		

Power readings form.

This interface can be used to take readings of power consumed. Details are found in Figure 16.

Readings detail form

Id:

PreviousReading:

InitialReadingDate:

CurrentReading:

MeterNo:

CreatedOn:

CreatedBy:

ModifiedOn:

ModifiedBy:

submit

Copyright (c) 2010 Unime Allrights reserved

Done

Local intranet

start

Avra...

HW...

calen...

uneme

from C

unem...

Macr...

Rates...

hero

2:11 AM

Add new user form.

The new administrator form allows adding details of another administrator. Details are found in Figure 17.

The screenshot shows a Microsoft Internet Explorer window titled 'System users - Microsoft Internet Explorer'. The address bar displays 'http://localhost/jumena/systemusers.php'. The browser's menu bar includes 'File', 'Edit', 'View', 'Favorites', 'Tools', and 'Help'. The toolbar contains various icons for search, favorites, and other browser functions. The main content area features a header with a navigation menu on the left containing 'Rates' and 'Help', a central image of two people in a meeting, and a calendar on the right showing dates from 7 to 28. Below the header, the title 'System users detail form' is centered. The form consists of several input fields for user details: 'Id:', 'SysUserId:', 'SysUserName:', 'SysUserLname:', 'SysUsername:', 'SysUserPassword:', 'SysUserStatus:', 'SysUserLastLogin:', 'CreatedOn:', 'CreatedBy:', 'ModifiedOn:', and 'ModifiedBy:'. A 'submit' button is located at the bottom of the form. The Windows taskbar at the bottom shows the 'start' button, several open applications, and the system clock indicating '2:18 AM' on '2/18/2006'.

7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28						

System users detail form

Id:

SysUserId:

SysUserName:

SysUserLname:

SysUsername:

SysUserPassword:

SysUserStatus:

SysUserLastLogin:

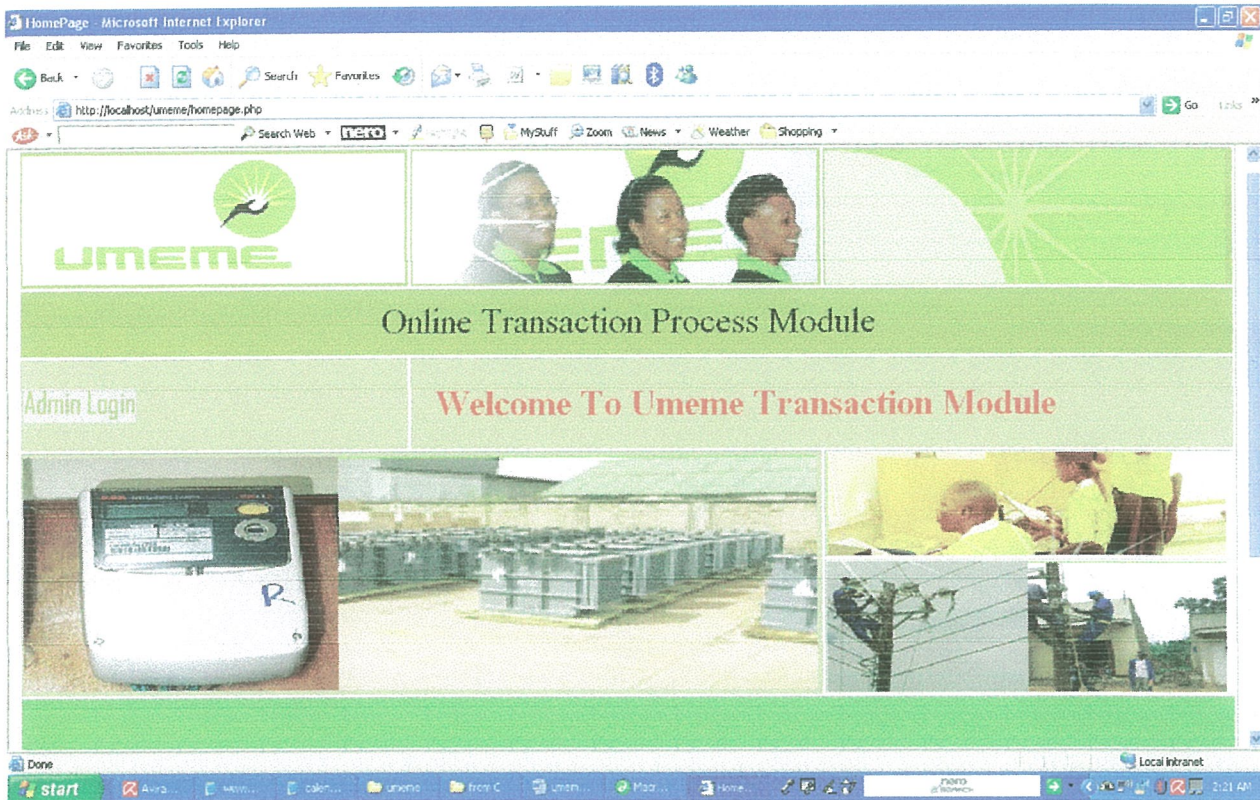
CreatedOn:

CreatedBy:

ModifiedOn:

ModifiedBy:

Figure 10: Home Page/ Admin Login



This admin login page allows an administrator to be logged into the system, this enables him or her access information about the existing system and this admin must have acquired an account or registered into the system to be able to use it.

Figure 11: Online Billing Form

Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites Home

Address http://localhost/umeme/rndreadings.php

Search Web

UMEME

Online Transaction Process Module

Online Billing Form

Id:

PreviousReading:

InitialReadingDate:

CurrentReading:

MeterNo:

CreatedOn:

CreatedBy:

ModifiedOn:

ModifiedBy:

submit

Back

Done

start

Local Intranet

The online billing form helps the customer to see their meter number readings that is to say the previous and current reading forms sothat he can be able to make the payments online.

5.4Testing and Validation

The module was tested for errors and then we validated the performance of the module against existing manual systems and desk systems. The testing was categorized into two namely:

5.4.1 Unit Testing

The tested different units of the module that is to say the database, online billing, online payment, independently and we integrated them into one complete module .This was done to determine the correctness and accuracy of the different units within the module.

5.4.2 System Testing

A number of people most especially students were selected to test the module's interfaces and to comment on the usability of the module. For example in the premise number field, some users instead of using numbers, used characters which could not be keyed in. Others left some fields null and incorrectly wrote their account numbers and meter numbers thus generating error messages. We managed to solve this by validating the different fields so that numbers or characters could only be filled in the fields where they are meant to be filled, validation was further implemented to ensure that the relevant fields were not left blank

5.5 System Achievements

- Creation of a database for the entire system.
- Send data into the database.
- Retrieve data from the database.
- Create reports in real time.
- Online billing and payment of bills using value storage voucher cards.
- Customer care abilities.

5.6 Limitations in the Project

- During the time of system implementation, our computer laboratories were inaccessible because of the high number of students using them.
- The examination time table was an inconvenience in such away that we had to prepare for exams as well as doing the implementation of the module.
- We were constrained by financial resources since we had to correct errors every now and then in order to meet the project deliverables.

CHAPTER 6

Conclusions and Recommendations

6.1 Conclusion

In general our project of the business transaction process for Umeme will enable customers make payments online using value storage voucher cards, view their consumption statement, send inquiries, complaints and compliments.

The system administrator is able to view and edit customer profiles, update billing information, and assign privileges to the users.

This module is expected to be incorporated into the existing Umeme website with a view of improving customer services, payment of electricity bills efficiently and billing with lots of convenience.

Through the use of this module the organization is expected to gain competitive advantage by advertising its business operations, products and services while responding to customer related issues.

6.2 Recommendations

We recommend this module for an online business transaction process for Umeme because of its, authentication, data integrity, data consistency, accuracy and correctness. It should be taken up by Umeme with the intention to propel the company to greater heights and offer customer satisfaction.

For further research we call upon other researchers and scholars, to take interest on the customer care functionality for example generation of online customer feedback and online billing. This is because we feel we have not completely covered much of the functionalities due to limited time. We recommend that other developers may create an alert system or module on customer mobile phones. This will enable them to be reminded of bill payments towards the end of the month.

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APPENDIX

Appendix A

Questionnaire

KAMPALA INTERNATIONAL UNIVERSITY

FACULTY OF COMPUTER STUDIES

TOPIC: ASSESSMENT OF CURRENT SYSTEM AT UMEME LIMITED

We are third year students of Kampala International University offering a Bachelors degree in Information Technology. Our main purpose for this study is to collect information on the current bills payment system to establish the stakeholders' attitude towards the entire system.

The information gathered will contribute to the implementation of our third year final projects which leads to partial fulfilment of a Bachelors Degree in Information Technology of Kampala International University.

Fill in the blank spaces where there is dash or use the provided codes to fill in the box on the extreme end of each of question

1. How do you find the current system?

Good ☐

Fair ☐

Poor ☐

2. Should the current website be updated?

Yes ☐

No ☐

3. If yes what should the developed online system handle?

☐ Inquiries

☐ Compliments

☐ Bills Payments

☐ Complaints

☐ Others (specify)

.....

.....

.....

4. How would you like the developed system to help you?

.....

.....