

**DESIGN AND IMPLEMENTATION OF CATEGORIZED
STUDENT RESULT MANAGEMENT INFORMATION
SYSTEM**

CASE STUDY: MBARARA UNIVERSITY

BY

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**A graduation report submitted as a partial fulfillment for the award of a
bachelor's degree in computer science of Kampala International University.**

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DECLARATION

I AHUMUZA DORIS here by declare that this graduation project is my original work and has never been submitted to any university or institution for an academic award. Any resemblance to any other project is therefore a fluke of ideas.

Signature.....

AHUMUZA DORIS

Date 10./07./2011.....

APPROVAL

This is to certify that this project entitled “design and implementation of categorized student result management information system” submitted in partial fulfillment of degree in computer science of Kampala international university by Ahumuza Doris is under my supervision and guidance and is now ready to be submitted to the school of computer studies with my approval.

Signature.....

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Date 10/7/2015

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CHAPTER ONE

1.0 Background

Mbarara University lies on the banks of the scenic Rwizi River in Mbarara Municipality. Mbarara University of science and Technology, the second public university in Uganda was started in 1989 to cope with the increasing demand for trained and skilled personnel in science and technology. Since its inception, the University has passed out 1,319 students graduating in various disciplines including health sciences, teaching and development. The courses taught are in line with government policies on increasing human resource in areas of science and technology. The three faculties of Medicine, science and development studies have all been pivotal in training health workers, teachers and development workers whose contributions have been commended by the community. It is situated in southwestern Uganda in Mbarara municipality about 286 kilometers from Kampala along Mbarara-Kabale highway.

1.1 Statement of the problem:

Currently Mbarara University has an increasing number of students from all over the world due to its recognition for best practices in outreach and community relations from Association of Commonwealth Universities. With this pitch in student number File processing System along side with a Manual System in keeping records and grading student marks is becoming unreliable. time consuming, space consuming, inconsistent, hard to update student files and more so insecure. Generation of regular reports is so hard because a big number of files have to be revisited every time a report needs to be generated. As a higher institution the university needs to keep track of student papers and their marks at the end know the class of degree to award the student. Therefore this causes a lot of challenge to the university management. Data security is also another issue since most of this paper work is prone to being stolen from shelves and being destroyed by insects as time passes by. Data redundancy and inconsistency also arise because of file repeating of student data.

1.2 General Objective:

To Design and implement a categorized student result management information system.

1.3 Specific Objectives:

To collect data and analyze problems in the existing system.

To Model and design a students result information management system for mbarara university.

To develop a system capable of capturing and retrieving student information at Mbarara University.

To implement a students result management information system for mbarara university.

1.4 Research Questions:

The study was guided by the following questions.

What information system is currently used in keeping information regarding to student results?

What are the some of the problems you're encountering in the existing system?

How do you enter/input data in the system?

How long does it take to search for a specific record?

What kind of system do you use to keep information about students and grading their results?

1.5 Scope of the project

Mbarara University was considered as a primary focus for this project in order to give a clear view of the impact of designing and implementing of a categorized student result management information system which will cover over twenty thousand students. A system was basically be designed to capture students' details, coursework details, instructor details, fees payments, assignments, examination details, grading results and generation of reports. The system will store all the data in a secure database accessed by only the authorized persons. The system will also offer search facilities to ease updating of records and generate real time report as requested by students and staff.

1.6 Significance of the study:

The significance of the study was to find out the problems that are faced by the university due to the existing system and the means to provide possible solutions to these problems.

In addition, the project designer will also gain more experience in the field of software development.

The designed system will be important to the Mbarara University through reducing the problem of data redundancy. This is to be done by eliminating the duplication of files, records hence saving time and space.

This study is very important to the university in that its future students will use it for academic purpose and make their study a bit easier.

The software package developed will be able to update the database and print out the required report basing on the client needs.

It is important to me as a person pursuing the course in computer science in that it will enables me to get a degree in bachelor of computer science.

Justification:

This study was carried out mainly to aid in solving main problems of;

Poor data processing

This delays in issuing reports, grading results and it takes too much time to get the required record due to poor file arrangement at Mbarara University.

Insecurity of data

The system will restrict unauthorized persons from accessing confidential information and altering student grades.

Duplication of data

This system will aid in record keeping since a database of all student against their departments will be provided.

The new system will enable the automation of the activities of record management thus elimination of inaccurate information.

The system will create flexibility in generating reports whenever needed.

It will also enable easier backup of important information.

Data consistency will be achieved since the data will be stored in a centralized place.

It will also give way to other software developers to carry out more innovation regarding the same problem.

Also future researchers will benefit from this work as it may form a basis for their related studies in form of pertinent literature

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction.

This chapter mainly reviews other writer's articles about all the areas concerned with computer databases, information system, Data flow Diagrams, Manual System, System Architectures, Report Generation and information Technology in general.

Successful computerizations of management systems like database systems have the following advantages;

It Fast and very easy access to relevant information.

Fewer paper record congesting the administrators department.

Enhanced decision making through provision of relevant timely information.

This chapter explains the concept and the magnitude of information technology, information system and the components of a system. It also addresses the structure of Database System, Database Management System, File Processing and Manual System with their effects in the processes of data resource management as viewed by different authors.

2.2 Information Technology (IT).

Information technology is defined by the Information Technology Association of America (ITAA), as "the study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware." IT deals with the use of electronic computers and computer software to convert, store, protect, process, transmit, and securely retrieve information.

Information Technology is also a general term which describes any technology that helps to produce, manipulate, store, communicate or disseminate information (Adelman, 2000).

2.3 A system

A system is a group of interrelated components working together towards a common goal by accepting inputs and producing outputs in an organized transformation process (O'Brien, 2000, p8).

Components of a system

I. Input.

It involves capturing and assembling elements that enter the system to be processed. For example, raw materials data and human effort must be secured and organized for processing.

II. Processing.

It involves transformation processes that convert input into output. For example, it can be manufacturing process or mathematical calculations.

III. Output.

It involves transferring elements that have been produced by a transformation process to their ultimate destination. For example, finished products, human services, and management information must be transmitted to human users (O'Brien, 2000, p 8).

2.4 An information system (IS).

It can be defined technically as a set of interrelated components that collect (or retrieve), process, store, and distribute information to support decision making, coordination, and control in an organization.

In addition information systems may also help managers and workers to analyze problems, visualize complex subjects, and create new products (O'Brien, 1997, Pg 7).

Role of information systems in an organization

Helps managers to plan and make decisions to enable them to effectively control the organization

Enables organizations in utilizing resources optimally

Enables members to utilize time effectively.

Acts as a communication tool within the organization and outside organization's environment.

Helps an organization to produce products and services that are of high quality through avoiding errors and mistakes.

Organizations can keep up with competition and conduct business globally, that is, through the internet.

2.5 File Processing and Manual system.

In a manual system (MS), the data files are decentralized where by each department has a separate file or files to support its operations and all records are stored on paperwork in form of memos, reports and transactions (McFadden, Hoffer, 1993).

In File processing system (FPS), each computer application is designed with its own set of files and data are organized, stored, and processed in independent files which often duplicate the data that is already stored in other files (O'Brien, 1995, p 119).

Although the system works, it has a number of disadvantages that limit its efficiency and effectiveness to the company. These are;

Managers cannot easily obtain the summary of information that is required for decision making.

Duplication of data is often exists, which resulting into storing the same data in different programs. This results into wasted space and potentially different formats for the same item (O'Brien, 1995, p 119).

The system cannot easily provide answers to complex operational questions For example, answering the question, "What invoices are outstanding for order number 123 from customer

ABC?” would probably require some research on the part of the order department (McFadden, Hoffer, 1993).

Data dependence.

In FPS, programs and their associated data files are dependent on each other. This means that changes in the format and structure of data in a file requires that changes to be made to all of the programs that use that file. Thus this program maintenance effort is a major burden of file processing systems as it is difficult to do it properly and it results into inconsistency in the data files (Turban, 2001).

Separation and isolation of data.

File organization also leads to difficulty in accessing data from different application. When applications are uniquely designed and implemented, data files are likely to be organized differently, stored in different format and often physically inaccessible to other applications (Turban, 2001).

Limited data sharing.

Since each application has its private file, users have little opportunity to share the data outside of their own application (McFadden, Hoffer, 1993).

Poor enforcement of standards.

Every organization requires standard procedures that it may operate effectively. Within information systems, standards are required for data names, formats, and access restrictions. Unfortunately, data standards are difficult to make known and enforce in a file processing system, mainly because the responsibility for the system design and operation is decentralized. In addition, there is inflexible whereby users cannot request data in a new format without writing for new application programs (McFadden, Hoffer, 1993).

2.6 A database (DB)

A database is a collection of data organized to serve many applications efficiently by centralizing data in one location and minimizing data redundant rather than storing data in separate files for each application (Zwass, 1998)

A database is managed by a database management system that provides assistance in managing database in order to be shared by many users. With the database approach, a single database can serve a number of applications.

2.6.1 Advantages of Database.

Sharing of data.

A DB belongs to the entire organization and can be shared by all authorized users. In this way, more users share more of the data (Summer, 1989, p207).

Reduce data redundancies.

In a file management, some of the same data fields are repeated in different files. In a database, the information appears just once and the same information is available to different users. Moreover, a reduced data redundancy reduces the expenditure on storage media and hardware as the data is more concise (Laudon, 1995, p196).

Consistency of Data.

By eliminating data redundancy, it greatly reduces the opportunities of data inconsistency. This is because; in the database approach each record is stored once in order to avoid the consistency of data (McFadden, Hoffer, 1993).

Reduced program maintenance.

In database, new data item types can be added, data formats are changed, new storage devices or access methods are introduced and so on without modifying the application programs. Whereas in traditional file based system, these changes require modifying the application programs that access the data (McFadden, Hoffer, 1993).

Improved data integrity.

Reduced data redundancy increases the chances of data integrity, data that is accuracy, and the consistence in data. This is because; each updating change is made in only one place (Hutchinson, Sawyer, 2000).

2.6.2 Disadvantages of Database approach.

New specialized personnel. Frequently organizations that adopt the database approach are required to purchase a database management system (DBMS) which requires hiring of trained individuals to maintain the new database software, develop, and enforce new programming standards.

Need for explicit backup.

To ensure that data are accurate and available whenever it is needed, either a database management software or additional procedures have to be provided for essential capabilities. (McFadden, Hoffer, 1993, p28).

VI. Interference with shared data.

The concurrent access of shared data against several application programs can lead to some problems. First, when two concurrent users both want to change the same related data, inaccurate results can occur if access to the data is not properly synchronized. Second, when data are used exclusively for updating, different users can obtain control of different segments of the database and look up any use of the data (so-called deadlock). DBMS must be designed to prevent or detect such interferences in a way that is transparent to the user (McFadden, Hoffer, 1993, p28).

VII. Security problems.

A database must have sufficient controls to ensure that data are made available to only authorized users and that the adding, deleting and updating in the database are accomplished only by these users. Security considerations should include means of controlling physical access to terminals, tapes and other devices. Security considerations should also include the non-computerized procedures associated with the database such as forms to control the updating or deleting of records and procedures for storing source documents (Summer, 1989, p210)

2.7 Database management systems (DBMS)

Database management systems are programs that are written to store, update, and retrieve information from a database. There are many databases available in the market and the most popular ones are the Ms Access, Oracle and SQL Server (www.management-hub.com)

A database management system provides the ability for many different users to share data and process resources. But as there can be many different users with different database needs, the question at this juncture is: How can a single unified database meet the different requirement of so many users? A DBMS minimizes these problems by providing two views of the database data: a physical view and a logical view.

The physical view.

This deals with the actual physical arrangement and location of data in the direct access storage devices (DASDs). Database specialists use the physical view to make efficient use of storage and processing resources. Users however, may wish to see data differently from how they are stored and they do not need to know all the technical details of physical storage. After all, a business user is primarily interested in using the information not on how it is stored.

The logical view/user's view.

In this, a database program represents data in a format that is meaningful to a user and the software programs that process this data. The logical view tells the user in user terms on what is in the database. The importance of a DBMS is that, while there is only one physical view of the data, there can be an endless number of different logical views which allows users to see database information in a more business-related way rather than from a technical processing viewpoint. Thus the logical view refers to the way user views data, and the physical view refer to the way the data are physically stored and processed (Codd, 1970).

2.7.1 Components of a Data Base management System

(Silberschatz et al 1988) says that a database management system is built using:-

People who operate the system

Data processing to the needed speed for information sorting and classifying

Data communication required to keep the information flowing between the different parts of the system and the people using the system.

Information storage and retrieval required to store the information in a proper format and make sure information can be retrieved whenever needed.

Systems planning required to integrate the people, data processing, data communications, information storage and retrieval and user of the system into a useful and well organized management system.

Database administrator (DA).

Is a person who knows, manages, and makes decisions regarding an organizations database. The DA is responsible for all operations involving the DB. Standards, documentation, testing, backup and recovery techniques and procedures are important to facilitate what a data administrator do. (Anderson, 2000).

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction.

Methodology refers to the techniques that will be used by the researchers to gather the data for facilitating the design and development of the new system.

This requires a lot of diversification in terms of methods in order to acquire the maximum achievable report from the research and use the information to arrive at the desired goal.

This chapter is organized in five sections which includes; Research design, Project area, Population description, Sampling procedures and Data collection methods.

3.2 Research Design.

The research was conducted at Mbarara University as my case study. In this chapter we also did systems analysis and investigation of the system being used in the old Mbarara University, and look at data collection methods to be used in overcoming the stated problem, the tools which will be used by the researchers to do data collection, and the requirements of the system to be designed.

3.3 Project Area.

Mbarara University lies on the banks of the scenic Rwizi River in Mbarara Municipality. Rwizi a tributary of Lake Victoria with its sky blue waters snakes through the famous hills of southwestern Uganda's grazing lands to Mburu National Park. The Rwizi provides a cool and serene atmosphere to its surroundings. The focus is to give the department of record keeping as the right place for receiving appropriate data concerning the keeping of data about students and their results.

3.4 Population Description

The current staff strength of Mbarara University is approximately 2 thousand students of whom approximately 75% are Ugandans. The study will target users of the current system, and staff members or administrators for the purpose of generating the required information.

3.5 Sampling Procedures

Simple random sampling technique was used to select representatives from both the users of the system and administrators members, who would provide the required information about the existing system.

3.6 Data Collection Methods.

In gathering data for determining the requirements of the new system, the researchers used the following data collection methods.

3.6.1 Interviews

The researchers used interviews as a fact-finding technique to collect information at Mbarara University. This is where the administrators and the users of the system will be interviewed through face-face interaction and the result will be recorded on paper as documentation. The technique was used because; it provides in depth data which would be difficult to get using a questionnaire and it gives the interviewees an opportunity to put forward their opinion and suggestions. The technique would be also less costly and easy to conduct.

3.6.2 Observations

Using this method, the researcher was able to observe important points that would not be revealed by the respondents in interview. This method re-approved the validity of the data collected through interview that could not provide a clear explanation by the respondents. The method was used because, it provide the first hand information through whereby a researcher had to observe himself on how the data was stored in the current system.

3.6.3 Questionnaires

Using this method, researchers had to send some printed document to the company which will contain standardized questions that will be answered by the users of the current system and some of the administrator members.

Open and close ended questionnaires were prepared to allow the respondents to fill the questions and express themselves. This method was used because, it enables the respondents to answer the questions in their free time and it gives an opportunity to get accurate information since it will be designed in less tense environment.

3.7 Development tools

Hardware	Requirements
Computer	Compatible Pentium IV
Memory (RAM)	12 GB recommended. Additional memory may be required depending on operating system requirements.
Hard disk	40 GB recommended.
Monitor	VGA with the resolution of 800X600.
Input device	PS/2 mouse and keyboard.
CD-ROM	256X
Other output device	Laser jet printer.
Processor speed	1000GH recommended
Generator	Any compatible
Ups power stabilizer	600w capacity
Scanner	Any compatible

Table above shows the minimum hardware requirements.

3.7.1 Software requirements.

This describes the software that is to be used for development and installation of the system. In this case the researcher identified the followings;

Operating system (OS) such as window xp, window 98, vista etc.

Visual Basic.

Mysql

Anti-virus software.

CHAPTER FOUR

SYSTEM ANALYSIS AND DESIGN

4.0 Introduction

MBARARA UNIVERSITY OF SCIENCE AND TECHNOLOGY was initially supported by a record keeping system, which comprised of both the manual and the traditional file management system which acted as the back bone of the institution's data storage. The traditional file management system (TFMS) creates, manipulates and retrieves files one at a time. Each file is used independently to produce separate reports whereas the manual file system uses the traditional paper files for record keeping.

4.1 Shortcoming of the existing system

1) Data redundancy:

The project designer noted the duplication of data in several places, which happens the data retrieval and update process.

2) Difficult to enforce security measures, anybody in the institution can access the files used in the manual system. Ms Word and Ms Access don't provide the best security options for numerous data.

3) **Tedious to update:** The project designers discovered that it took the secretary several hours just to update records that could have taken thirty minutes in case an effective database information system was in place.

4.2 System Analysis

System Analysis is a problem solving technique. It decomposes a system into smaller parts for the purpose of studying how those components parts will work. The key issue in the requirements analysis phase is "what" not "how" requirement; analysis phase, answers the question. What do users need and want form a new system. Functional and Nonfunctional requirements are needed to meet the objectives. The functional requirements are the activities and services the system must provide.

Nonfunctional requirement is a description of other features, characteristics and constraints that define a satisfactory system.

1. The users will be trained on how to work on the system.
2. The system will reduce on costs like schools, losses and enforce tight security on the records.
3. Updating of the database will be faster and more effective.
4. The organizations information flow will be done automatically thus decision making will be fast.
5. Backups of the database can be easily made.

4.2.1 Current or Existing system

MBARARA UNIVERSITY OF SCIENCE AND TECHNOLOGY uses both the manual and traditional file management system for data storage, which has led to poor data processing and management. Shortcomings such as poor record keeping controlled redundancy of data, inconsistency of data, system inflexibility, and limited data sharing, poor enforcement of standards, low programmer productivity, excessive data maintenance, and difficulties which have led to difficulties in accessing employee details whenever needed.

The project designer was assigned to develop an employee information management system for government agency, precisely a database management information system in order to solve the existing problem of poor data management on major employee records, Asset and organizational customer records.

4.2.1.1 Features of the current system

Unlike the current system, the new system will upgrade on:

1. Performance effectiveness: the system will able to perform all the desired tasks, has got well designed display screens.
2. Performance efficiency: this is all about the response time.
3. Ease of use: the new system will be user friendly.
4. Flexibility: the new system will be able to work with other software programs.

4.2.1.1 Feasibility study of the current system

This study was to establish the practicability of the proposed information system. The study was based, mainly, on cost benefit analysis in relation to the volume of work and information needed. The obligation of the research team to see the project through was another criterion. The study was carried out to determine whether the system would economically benefit the organization and analyze the requirements, which included,

- 1) Cost of developing the system
- 2) The time frame for completion
- 3) Requirements cost
- 4) Personnel remunerations
- 5) Hardware costs
- 6) Software costs
- 7) User training costs.

It was also aimed at determining whether the proposed system will be able to perform the required functions within the organization in relationship to the current personnel, the existing environment and the available methods and procedures, whether system will be used if implemented or the extent of its effect on the personnel against employment positions.

The study also aimed at determining whether the existing resources, equipment, procedure, software technology and the skills are sufficient for the implementation of this system.

The project designer believes that a system is considered feasible if it's manageable. Under this project the following feasibility aspects were put into consideration.

- 1) Technical feasibility
- 2) Economic feasibility
- 3) Operational feasibility

4.3 Technical feasibility

Technical feasibility determines whether the project activities can be accomplished with the current equipment, existing software and available personnel? If new technology is required,

what is the likelihood that it can be developed? The employee Database information system project, called for the purchase of new hardware and software.

The hardware requirements for the system include;

Memory capacity 256MB RAM

Hard disk 40GB

Pentium 4 processor supporting front side bus (FSB) speeds up to 533/400MHZ

LCD monitor 17 inch

UPS

The Software requirements describe the software that is used for the design of the system and also the software packages that are involved.

The project designer affirms that the database information system will operate using the following.

Visual basic 2005.

MySQL

Windows XP platform

4.3.1 Economic feasibility

Economic feasibility was meant to determine whether there are sufficient benefits to make the costs acceptable? The project designer discovered that there are sufficient tangible and non-tangible benefits in creating this database information system.

TABLE1 Economic feasibility

Item	Quantity	Unit cost	Amount
Box files	20	80000	1600000
Papers	10	75000	750000
Staff	10	200000	2000000
Total	40		4350000

4.3.2 Operational feasibility

System users

The users are very important in a computer system that is to say an information system is no better than its users. The project designer endeavored to ensure that the proposed information system doesn't receive resistance from the users. Once an employee information system management system is developed and fully functional, a positive response is highly expected from the users. The users are acquainted with the fundamentals of Ms SQL and Visual basic 2005. The users also have an earnest desire to acquire more database skills, which have rendered an employee information management system success.

4.4 Feasibility study of the new system

The study developed a student result categorized management system for the university, precisely a database management information system in order to solve the existing problem of poor data management on student results, fees and staff salary. Under this the following feasibility aspects were also put into consideration.

- 1) Technical feasibility
- 2) Economic feasibility
- 3) Operation feasibility

Technical feasibility determines whether the activities can be accomplished with in the, existing software and available personnel? If new technology is required, what is the likelihood that it can be developed? The employee database information system project was called for the purchase of new hardware and software.

Economic feasibility was meant to determine whether there are sufficient benefits to make the costs acceptable? The project designer discovered that there are sufficient tangible and non-tangible benefits in creating this database information system.

Table2 requirements for database

Item	Quantity	Item cost	Amount
Computers	3	1000000	3000000
Printer	1	1200000	1200000
Staff	3	200000	600000
Papers	4	7500	30000
Total			5100000

The Operational feasibility, here users are very important in a computer system that is to say an information system is now better than its users. The project ensures that the proposed information system doesn't receive resistance from the users. When an employee information database system was developed, a positive response was highly received from the users. The users are now experts in the fundamentals of SQL sever and Visual basic 2005. The users also have an earnest desire to acquire more database skills, which have rendered the student result categorized management system a success.

4.5 Design of the new system

This is concerned with system construction, using the identified requirements, for the system to perform the required functions. It looks at the data requirements, software construction and the design of the interface, database and coding.

4.5.1 Conceptual Design

The conceptual database design describes how the data elements in the database are to be grouped. The design process identified relationships among data elements and the most efficient way of grouping data elements together to meet information requirements. The process also identifies redundant data elements and the groupings of data elements required for specific application programs. Groups of data are organized, refined, and streamlined until an overall logical view of the relationships among all the data elements in the database emerges.

Database designers document the conceptual data model with an entity-relationship diagram. The boxes represent and the diamonds represent relationships. The 1 or M on either side of the

diamond represents the relationship among entities as either one-to-one, one-to-many, or many-to-many.

4.5.2 Logical Design

Logical design requires a detailed description of the business information needs of the actual end users of the database. Ideally, databases will be part of an overall organizational data planning effort.

It is also a process of constructing a model of the information used in an enterprise, based on the specific data model for example relational relationship but independent of a particular DBMS and other physical consideration.

4.5.3 Physical Design

This refers to the process of product description of implementation of the database on the secondary storage.

The description of storage structures and access to the data are clearly outlined at this level. The physical design shows how the database is actually arranged on direct access storage device.

4.6 Entity Relationship Model (ER Diagram)

Entity relationship analysis is of the conceptual modeling methods used to identify relationship between different entities within the system to avoid duplication of documents, according to Hutchinson, 2000, [10]. A relationship is a meaningful association or linkage and according to the system for MBARARA UNIVERSITY OF SCIENCE AND TECHNOLOGY we had four forms which were linked into one to one and many to many

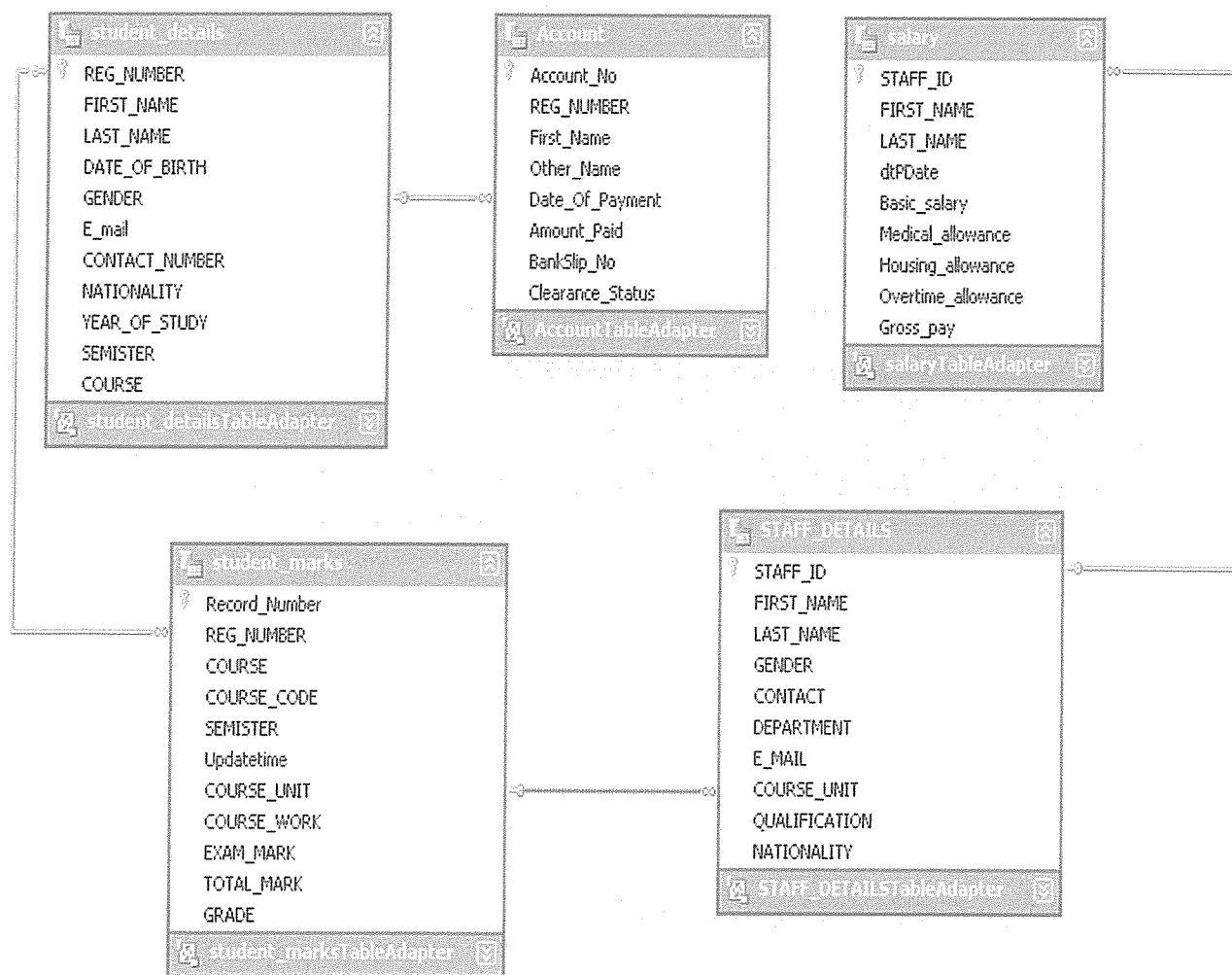


Fig.2 above shows Entity Relationship Model (ER Diagram

4.7 Data Structures

4.7.1 Table3 STUDENT DETAIL Table

Field	Data type	Width	Constant	Description
STUDENT_ID	varchar	20	Primary key	Employee identification key
FIRST_NAME	varchar	20	null	First name
LAST_NAME	varchar	20	Null	Last name
DATE_OF_BIRTH	datetime		Null	DateHired
GENDER	varchar	20	Null	Gender
ADDRESS	varchar	20	Null	Address
CONTACT_NUMBER	Bigint	20	Null	Nationality
NATIONALITY	varchar	20	Null	Nationality
YEAR_OF_STUDY	varchar		Null	Year of study
SEMESTER	varchar	20	Null	Semester
COURSE	varchar	20	Null	course

4.7.2 Table4 FEES PAYMENT TABLE

Field	Data type	Width	Constraint	Description
Asset_No	Char	20	Primary key	Asset Identification number
REG_NUMBER	Char	20	Not null	Foreign key
First_Name	Varchar	20	null	First Name
Other_Name	Varchar	20	null	Other Name
Date_Of_Payment	datetime		null	Date Of Payment
Amount_Paid	Money		null	Amount Paid
BankSlip_No	Money		null	Bank Slip Number
Clearance_Status	Money		null	Clearance Status

4.7.3 Table5 MARKS DETAIL TABLE

FIELD	Data type	Width	Constraint	Description
<u>REG_NUMBER</u>	varchar	20	Primary key	Asset Identification number
COURSE	varchar	20	null	Course
COURSE_CODE	varchar	20	null	Course code
SEMESTER	datetime	Date time	null	Semester
UPDATETIME	money	20	null	Update time
COURSE_UNIT	varchar	20	null	Course unit
COURSE_WORK	int	20	null	Course work
EXAM_MARK	int	20	null	Exam mark
TOTAL_MARK	int	20	null	Total mark
GRADE	varchar	20	null	Grade

4.7.4 Table6 SALARY PAYMENT TABLE

Field	Data type	Width	Constant	Description
<u>STAFF_ID</u>	varchar	20	Primary key	Staff id
FIRST_NAME	varchar	20	Not null	First name
LAST_NAME	varchar	20	Not null	Last name
dtPDate	datetime		Null	dtPDate
Basic_salary	varchar	20	Null	Basic salary
Medical_allowance	money		Null	Medical allowance
Housing_allowance	money		Null	Housing allowance
Overtime_allowance	money		Null	Overtime allowance
Gross_pay money	money		Null	Gross pay money

4.7.5Table7 ORGANISATION DETAILS TABLE

Field	Data type	Width	Constant	Description
<u>STAFF_ID</u>	Varchar	20	Primary key	Staff id
FIRST_NAME	Varchar	20	Not null	First name
LAST_NAME	Varchar	20	Not null	Last name
GENDER	Varchar	20	null	Gender
CONTACT	Bigint		null	Contact
DEPARTMENT	Varchar	20	null	Department
E_MAIL	Varchar	20	null	E_mail
COURSE_UNIT	Int		Not null	Receipt Number
QUALIFICATION	Datetime		Not null	Date Of Payment
NATIONALITY	Varchar	20	Not null	Payment Mode

4.8 Table8 Hardware Requirements Table

Hardware	Minimum requirements
Processor	Intel® or Pentium (III, IV, V), Cyrix, AMD Athlon 266 GHz or higher.
Memory (RAM)	Minimum 96GB, 128 GB recommended or higher.
Hard disk space	Minimum 40 GB or higher
Monitor	VGA 800x600 (recommended) or higher resolution required for the SQL Server graphical tools
Mouse	PS/2 or any compatible.
Keyboard	Any compatible
UPS	1000VA/600W capacity
Power stabilizer	Model: AVR-1000W or higher
Printer	Hp DeskJet 1000C or any compatible

In terms of software requirements the software will only function in windows based machines. It has not been tested on Linux

Table8 Software Requirements Table

Software	Requirement
Operating system	Microsoft Windows 98 or NT, and higher versions

4.8 System maintenance and security

4.8.1 Maintenance:

This is the ongoing maintenance of the system when it is in operation. It includes program maintenance and system improvements. The following activities are involved:

Correct errors or bugs which may have been due to design flaws, miscommunication of requirements, situations that are not anticipated and thus not tested.

Recover the system; a system might crash or hang and depending on the nature of the cause the system must be recovered, by the system analyst, system administrators, or users.

Backup of the system:

Adapt the system to new requirements or reengineering which refers to the modification or expansion of the application system in response to constantly changing requirements.

4.9 Security Controls

4.9.1 Physical Controls

This control measure is done on the site of the system to ensure that natural disaster like rain, sun heat, dust and other conventional threats can be prevented from causing malfunctioning of the system.

4.9.2 Electronic Controls

This control is to identify any one accessing the system. Intruder detection, e.g. passwords, logon identification, voice and hand detection.

4.9.3 Software Controls

These are program codes and software used to prevent, identify or recover from errors, unauthorized access and other threats.

4.9.4 Management Controls

The management can implement policies and procedures e.g. employees should back up and or archive data at regular intervals and take back ups to secure sites.

4.9.5 Common Threats

1. Virus which refers to a package automated combination of program codes that are designed to alter the normal functioning of the program.

2. Trojan horse this is software that outwardly has a legitimate purpose but that when executed, compromises the security of the user.

Hacking, this refers to an attempt to gain unauthorized access to the system illegally.

Natural threats which could be from floods, sun heat, etc.

Employee's errors, they may enter incorrect data thus the output will be wrong.

4.10 Implementation and Testing

This is the construction of the new system and the delivery of the system into production i.e. day to day operation.

4.10.1 Coding

In this stage, the whole system is converted into computer language. This helps in fast development, maintenance and future change, if required.

This system has been developed using the Visual studio 2005 and Microsoft SQL as database management software.

4.10.2 Testing

Before actually implementing the new system into operations, a test run of the system is done removing all the bugs, if any. It is an important phase of a successful system. After the above codifying of the whole program of the system, a test plan should be developed and run on a given set of test data. The output of the test run should match the expected results.

The following test run are carried out:

4.9.3 Unit testing

This is the first stage of testing; this is done by using written test plan and prepared test data. The path consists of a number of test runs such as valid paths through the codes. For each test run, there is a list of conditions tested, the test data used and the expected results. All the forms that are on the system are tested against the test plan and the conditions.

4.10.3 Integration testing

This tests the interfaces between programs in the same functional area. Each program is linked to other programs with which it interacts. The whole process must be in a specified sequence and within specified response time. The integration between the program interfaces created in Visual studio 2005 and the database created in SQL server is fully tested to ensure that they effectively link.

4.10.4 System testing and implementation.

This tests the whole system by linking together all the programs subsystems. Bugs are recorded and the categorized in terms of priority are fixed and those with less priority can be addressed in the follow-ups releases. The following are also carried out.

1) Performance Testing

Validate that all the response times or transaction periods specified in the functional specifications can be met by the system especially when it is fully loaded. Involves timing how long the system takes to respond to a user request, timing normal case paths through processing and exception cases.

2) Regression test

This ensures that the correction during the system test have not introduced new bugs, and test the key functions.

3) Acceptance testing.

This proves to the client, that the system, meets the business requirements agreed upon, in the functional specifications. The test data is replaced with live data provided by the client. The

client records all errors, discrepancies and other aspects. They are discussed with the developer, whereby, the errors are corrected by the developer, and the changes are implemented at the expenses of the client.

I. Data take-on and conversion

The data from the old system is transferred safely to the new system. This is done by:

Users enter data; one has to ensure that data entry errors are controlled.

Data conversion by using a developed program that transfers data from the old format to the new format.

II. User Training

Training should take place in a learning environment with competent trainers and with well defined training objectives. The training should cover all the functions of the system until when the users are competent in the use of the system. The training is done by the system developers, more experienced staff.

III. Installation and change over.

This stage involves the following;

1 .Installation on site

The hardware is brought on site, the software is installed (this include operating system, and management information system)

2. Site commissioning. The system is installed on site, connected to any other third party components; commissioning tests are run to identify discrepancies between interfaces, until the system .

3. Works without any problem. System change over, direct method is used, it occurs when at a given time one system ends, and a replacement starts immediately. The advantage is that it is the cheapest and there is a clear break between the old and the new system.

4.11 Evaluation

4.11.1 Introduction

The current system was evaluated and found to be having inefficiencies and lacks effectiveness in the following areas of operation

4.11.2 A data entry

This is done manually by writing down on paper for particular records. There is no data validation scheme, the Stores as a result is prone to, errors leading to misconceptions and other inconveniences associated with lack of proper record keeping. There is a direct setback being experienced through wastage of materials such as Stationary, time loss through tedious manual data entry and retrieval methods.

4.11.3 Future expansion and development of the system

1. Changing the back end to oracle.

Adapting the system to new requirements or reengineering or modifying the application system in response to constantly changing environment.

Improving the system to be in a server- based technology

4.11.4 Challenges encountered during project development

1. Power failures at times leading to loss of data that would cause delays on the time schedules.

2. Time was limited and we had to work overtime to meet our objectives.

3. Inadequate finance for meeting costs such as, printing, Internet surfing, transport costs to and from the case study area and purchasing of storage devices.

4.12 Screen shots of design of enhanced employee management information system

User Interface.

User interface refers to the methods and devices that are used to accommodate interaction between the machines and human being (users). It consists of buttons, menus, icons that allows users to carry out a given task through by clicking on them.

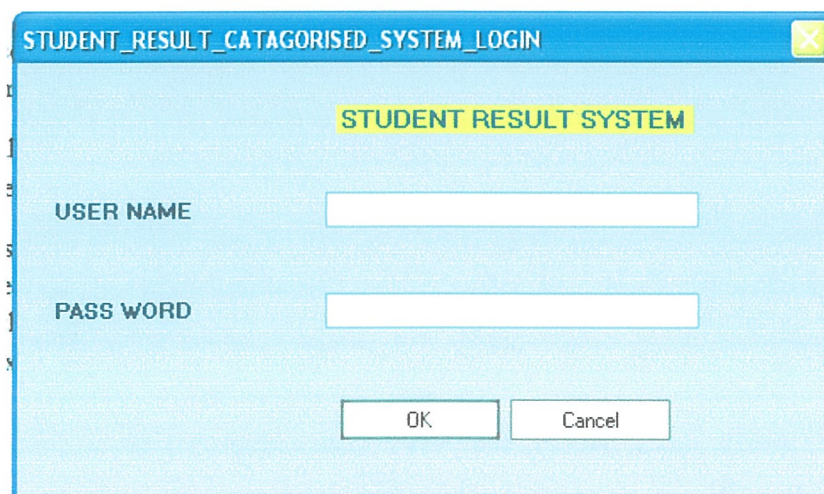
Log-in-form

Here the researcher designed a log-in form, where the user is to enter the correct User Name and password in order to be allowed to use the system.

All users will be assigned a username and a password from the system administrator as shown below in the design log-in-form.

When the user enters the correct username and password, the system allows him/her to access the main menu. Otherwise it would show the message “incorrect password and username”. In this case if the user wants to re-enter a correct password, clicks on the OK button on the message box. This gives you a provision to re-enter the correct password and username.

1. The login form

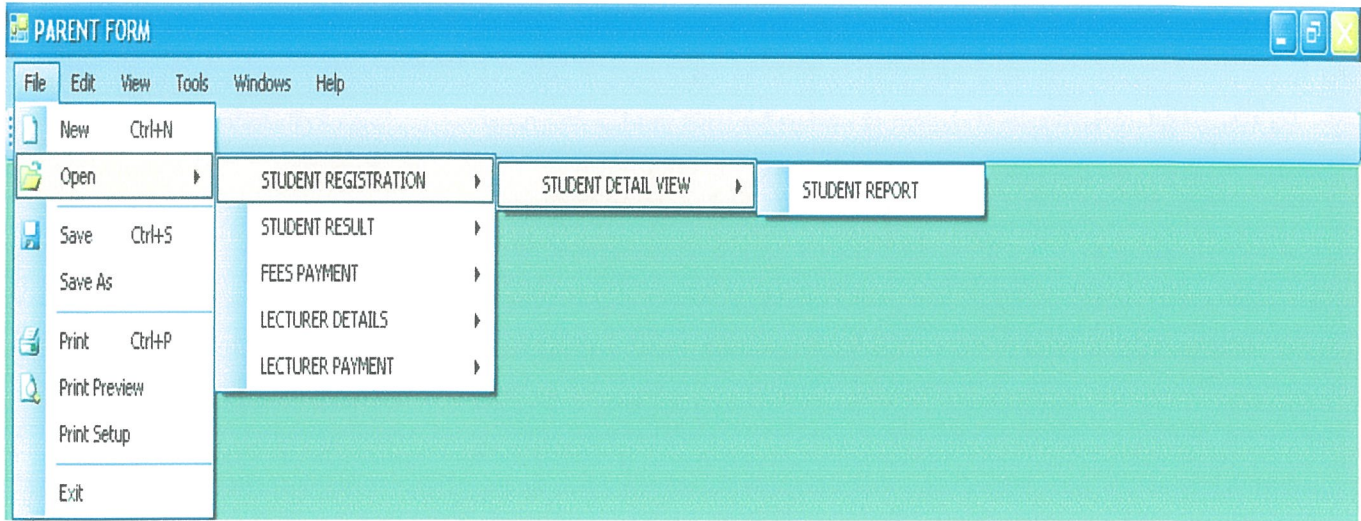
A screenshot of a login form window titled 'STUDENT_RESULT_CATAGORISED_SYSTEM_LOGIN'. The window has a blue title bar with a yellow close button. The main area has a light blue background. At the top, the text 'STUDENT RESULT SYSTEM' is displayed in a yellow box. Below this, there are two labels: 'USER NAME' and 'PASS WORD'. Each label is followed by a white text input field. At the bottom of the form, there are two buttons: 'OK' and 'Cancel'.

The main menu form

Multiple Document Interface (MDI) form

The MDI form appears first after the user has logged into the system. It will help the users to navigate through different forms that exist within the system. MDI form contains the main menu with sub menus that allow the user to interact with the system as shown below.

File menu. To interact with file menu, click on file where a drop down menu appears, then go to open, another drop down menu which contains a list of forms that is to be displayed. These forms are; student details, student marks, staff details, staff payment and fees payment form. Therefore, in order to access information on the following forms, users must click on each form as they are shown below



Student detail form:

This form, allows users to input student details into the database. In order one to become a student and to do exams and pay fees he or she must be registered in this form.

STUDENT REGISTRATION FORM

1 of 12

STUDENT RESULT CATAGORISED MANAGEMENT SYSTEM

REG NUMBER: CONTACT NUMBER:

FIRST NAME: NATIONALITY:

LAST NAME: YEAR OF STUDY:

DATE OF BIRTH: SEMISTER:

GENDER: COURSE:

E mail:

STUDENT REGISTRATION

1 of 12

	REG_NUMBER	FIRST_NAME	LAST_NAME	GENDER	E_mail	CONTACT_NUMBI	YEAR_OF_STUDY	SEMISTER	COURSE
▶	BBC	KIMASII	ABUBAKA	MALE	abubaka@gmail	234478996	FIRST	SEM ONE	Business C
	BBC1	MPONIPA	AGUSTINE	MALE	mponipa@yahoo	771929329	FIRST	SEM ONE	Business C
	BBC2	WAIRIMU	FRED	MALE	wairimu@yahoo	347888887	SECOND	SEM ONE	Business C
	BBC3	WAGIKU	KARORU	FEMALE	karoru@yahoo.c...	734929772	THIRD	SEM TWO	Business C
	BCE1	ARINITWE	PHIONAH	FEMALE	arinitwe@yahoo	798245678	THIRD	SEM TWO	Comp Eng
	BCE2	KEITESII	JOAN	FEMALE	ketesii	783872649	THIRD	SEM ONE	Educ With
	BCE3	KAMUSIIME	PHIONAH	FEMALE	katusiime	78769854249	FIRST	SEM TWO	Educ With
	BCS1	AHUMUZA	DORIS	FEMALE	AHUMUZA@YA...	779723412	THIRD	SEM TWO	Comp Sci
	BCS2	MUSHABE	PEACE	FEMALE	MUSHABE@YA...	778767745	SECOND	SEM ONE	Comp Sci
	BCS3	MUSUGA	MORIECE	MALE	musuga@gmail	7746789818	SECOND	SEM TWO	Comp Sci
	BEC1	KAJURA	FRED	MALE	kajura@yahoo	322328911	THIRD	SEM ONE	Educ With
	BIS1	AKAKWASA	BETTY	FEMALE	AKAKWASA@Y...	782372233	FIRST	SEM TWO	Inform Sys

Student result form:

This form, allows users to input student marks into the database. These records include; registration number names and marks. It also allows you to calculate the total marks and get its grade by clicking on Compute total grade button as shown below.

STUDENT RESULT FORM

4 of 9

STUDENT RESULT CATEGORISED MANAGEMENT SYSTEM

COURSE DETAILS

REG NUMBER: BCE1

SEMESTER: 1

COURSE: Business Computing

COURSE CODE: B002

UP DATE TIME: 12:06:26 AM

ASSESSMENT

COURSE UNIT: ACCOUNTING

COURSE WORK: 25

EXAM MARK: 35

TOTAL MARK: 60

GRADE: C+

Buttons: SAVE, SEARCH, UP DATE, CANCEL, GET GRADE

STUDENT RESULT FORM

3 of 6

REG_NUMBER	SEMESTER	Uptime	COURSE_UNIT	COURSE_WORK	EXAM_MARK	TOTAL_MARK	GRADE
BCS3	1	1/1/1900 6:46 PM	JAVA	34	32	66	B
BBC	2	1/1/1900 6:46 PM	AI	34	45	79	A
BCS2	2	1/1/1900 8:10 PM	JAVA	22	35	57	C+
BEC1	2	1/1/1900 6:46 PM	DATABASE	33	35	68	B
BBC2	2	1/1/1900 6:46 PM	SPSS	29	35	64	B-
BCS2	2	1/1/1900 8:10 PM	JAVA	22	35	57	C+
*							

Student fees payment.

This shows details of student who have paid fees.

STUDENT FEES PAYMENT FORM

1 of 7

STUDENT RESULT CATAGORISED MANAGEMENT SYSTEM

STUDENT FEES PAYMENT FORM

ACCOUNTNO: C001

REG NUMBER: BCS1

FIRST NAME: AHUMUZA

OTHER NAME: DORIS

SAVE

SEARCH

UPDATE

CANCEL

DATE OF PAYMENT: 7/ 1/2011

AMOUNT PAID: 100000

Bank SLIP NO: C10001

CLEARANCE STATUS: CLEARED

STUDENT FEES PAYMENT

1 of 7

	Account_No	REG_NUMBER	First_Name	Other_Name	Date_Of_Payment	Amount_Paid	BankSlip_No	Clearance_Status
▶	C001	BCS1	AHUMUZA	DORIS	7/1/2011	100000	C10001	CLEARED
	C002	BCS2	MUSHABE	PEACE	7/1/2011	70000	C1002	HALF
	C003	BCS3	MUSUGA	MORIECE	7/1/2011	50000	C001	HALF
	C004	BEC1	KAJURA	FRED	7/1/2011	100000	C10003	CLEARED
	C005	BIS1	AKAKWASA	BETTY	7/1/2011	100000	C1004	CLEARED
	C006	BCE3	KAMUSIIME	PHIONAH	7/1/2011	50000	C10006	HALF
	C23	BBC	KIMASII	ABUBAKA	7/1/2011	10000	C1005	CLEARED
*								

Staff salary payment form

STAFF SALARY PAYMENT FORM

1 of 6

STUDENT RESULT CATAGORISED MANAGEMENT SYSTEM

STAFF ID:

FIRST NAME:

LAST NAME:

DATE:

BASIC SALARY:

SAVE

SEARCH

UPDATE

CANCEL

HOUSING ALLOWANCE:

OVERTIME ALLOWANCE:

MEDICAL ALLOWANCE:

GROSS PAY:

GET GROSS

LECTURER PAYMENT FORM

1 of 6

STAFF_ID	FIRST_NAME	LAST_NAME	Basic_salary	Medical_allowance	Housing_allowance	Overtime_allowanc	Gross_pay
ST002	BAKAKI	ABUDULU	300000.0000	20000.0000	5000.0000	3000.0000	328000.0000
ST003	KAMUSIIME	ESTHER	200000.0000	10000.0000	20000.0000	20000.0000	250000.0000
ST004	MUSIMENTA	FLORENCE	300000.0000	25000.0000	20000.0000	10000.0000	355000.0000
ST005	TUSHABE	FREDRIC	300000.0000	20000.0000	20000.0000	10000.0000	350000.0000
ST006	MUKAMA	ALLEN	100000.0000	10000.0000	10000.0000	20000.0000	140000.0000
ST007	KIMASI	KIRORU	2000000.0000	10000.0000	20000.0000	30000.0000	2060000.0000

Report menu

This is where the users can produce the report of what has been recorded about student details information management system. This will be in form of hard copy or soft copy depending on what is required from the management.

To access the report, users have to click on report on the main menu, whereby a drop down menu appears containing a list of reports; and then you click on the report. Below is the format of the report to be produced within the system. To print the reports, users should click on the print icon.

To magnify the size of the report, users should click on zoom icon

Fig student details

STUDENT DETAILS							6/30/2011
REG NUMBER	FIRST NAME	LAST NAME	E mail	CONTACT	YEAROFSTUDY	SEMISTER	COURSE
BBC	KIMASII	ABUBAKA	abubaka@gmail	234,478,996.00	FIRST	SEM ONE	Business Computir
BBC1	MPONIPA	AGUSTINE	mponipa@yahoo	771,929,329.00	FIRST	SEM ONE	Business Computir
BBC2	WAIRIMU	FRED	wairimu@yahoo	347,888,887.00	SECOND	SEM ONE	Business Computir
BBC3	WAGIKU	KARORU	karoru@yahoo.com	734,929,772.00	THIRD	SEM TWO	Business Computir
BCE1	ARINITWE	PHIONAH	arinitwe@yahoo	798,245,678.00	THIRD	SEM TWO	Comp Engineering
BCE2	KEITESII	JOAN	ketesii	783,872,649.00	THIRD	SEM ONE	Educ With Comput
BCE3	KAMUSIIME	PHIONAH	katusiime	8,769,854,249.00	FIRST	SEM TWO	Educ With Comput
BCS1	AHUMUZA	DORIS	AHUMUZA@YAH	779,723,412.00	THIRD	SEM TWO	Comp Science
BCS2	MUSHABE	PEACE	MUSHABE@YAH	778,767,745.00	SECOND	SEM ONE	Comp Science
BCS3	MUSUGA	MORIECE	musuga@gmail	7,746,789,818.00	SECOND	SEM TWO	Comp Science
BEC1	KAJURA	FRED	kajura@yahoo	322,328,911.00	THIRD	SEM ONE	Educ With Comput
BIS1	AKAKWASA	BETTY	AKAKWASA@YAH	782,372,233.00	FIRST	SEM TWO	Inform Systems

Fig student fees payment report

This shows details of student who have paid fees. Payment of student fees according to registration numbers date of pay and the amount paid.

FEES PAYMENT

7/1/2011

REG NUMBER	Account No	First Name	Other Name	Amount Paid	Bank Slip No	Clearance Status
BBC	C23	KIMASII	ABUBAKA	10,000.00	C1005	CLEARED
BCE3	C006	KAMUSIIME	PHIONAH	50,000.00	C10006	HALF
BCS1	C001	AHUMUZA	DORIS	100,000.00	C10001	CLEARED
BCS2	C002	MUSHABE	PEACE	70,000.00	C1002	HALF
BCS3	C003	MUSUGA	MORIECE	50,000.00	C001	HALF
BEC1	C004	KAJURA	FRED	100,000.00	C10003	CLEARED
BIS1	C005	AKAKWASA	BETTY	100,000.00	C1004	CLEARED

This report is used to show the lecturer and how much they earn names id and basic salary.

LECTURER SALARY

7/1/2011

STAFF ID	FIRST NAME	LAST NAME	Basic salary	Medical allowance	Housing allowance	Overtime Allow	Gross pay
ST002	BAKAKI	ABUDULU	\$300,000.00	\$20,000.00	\$5,000.00	\$3,000.00	\$328,000.00
ST003	KAMUSIIME	ESTHER	\$200,000.00	\$10,000.00	\$20,000.00	\$20,000.00	\$250,000.00
ST004	MUSIMENTA	FLORENCE	\$300,000.00	\$25,000.00	\$20,000.00	\$10,000.00	\$355,000.00
ST005	TUSHABE	FREDRIC	\$300,000.00	\$20,000.00	\$20,000.00	\$10,000.00	\$350,000.00
ST006	MUKAMA	ALLEN	\$100,000.00	\$10,000.00	\$10,000.00	\$20,000.00	\$140,000.00
ST007	KIMASI	KIRORU	\$100,000.00	\$10,000.00	\$20,000.00	\$30,000.00	\$160,000.00

Student result report

This Payment of student marks and their grades

STUDENT MARKS REPORT

7/1/2011

REG NUMBER	COURSE	SEMISTER	COURSE UNIT	COURSE WORK	EXAM MARK	TOTAL MARK	GRADE
BBC1	Business Computing	1	SPSS	30	42	72	B
BBC2	Information Technol	1	spss	24	35	59	C+
BBC3	Business Computing	2	AI	35	30	65	B-
BCE1	Business Computing	1	ACCOUNTING	25	35	60	C+
BCE3	Information Systems	2	SPSS	31	40	71	B+
BCS1	Computer Science	1	uml	30	40	70	B
BCS2	Business Computing	2	DATABASES	35	45	80	A
BCS3	Computer Science	1	JAVA	35	30	65	B-
BEC1	Education With Com	2	VB	20	23	43	D

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion.

The design and implementation of the new system at Mbarara University was a very interesting venture although there was unavailability of enough resources but, it was successful as it allows users to store large amount of data and manipulate their data with a minimum of ease compared to the old system. Thus the project objective was achieved whereby the new system is to keep all the records of students and manage their results very effectively.

However, the fact that a computerized system offers the best choice for the user of the system, it is also a very difficult task to design it as it requires much time and attention to designed it effectively.

5.2 Recommendation.

Although too much work was done to design and implement a categorized student result information management system at mbarara university, there is still need for future requirements of upgrading the designed system in order to keep on giving out the required result at the required time.

The project designer recommends that, the designed system should be used effectively in order to perform well its functionality. This should be done through training the users of the system especially those who have no idea about the use of computers.

The researcher also recommends the use of other programming tools that would be in position to enhance more functionality in order to improve the system.

Finally, it is recommended that the new system should be run alongside with the old system in order to prevent unexpected embarrassment that might occur. But this should be done for a certain period of time then later, direct conversation is encouraged to be implemented.

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APPENDICES

Appendix 1: Glossary

- Abstract** This is an over view perception of the available and involving ideas
- Attributes** Describe the entity of which they are associated. A particular instance of an attribute is a value.
- A many-to-many (M:M) relationship** Sometimes called non-specific, is when for one instance of entity A, there are zero, one, or many instances of entity B and for one instance of entity B there are zero, one, or many instances of entity A.
- A one-to-many (1:M) relationships** Is when for one instance of entity A, there are zero, one, or many instances of entity B, but for one instance of entity B, there is only one instance of entity A.
- A one-to-one (1:1) relationship** is when at most one instance of an entity A is associated with one instance of entity B.
- Back-up** A copy of data stored on a remote site to recover in case of data loss or data corruption.
- Data** Raw facts that have not been processed
- Data model** This is an integrated collection of concept for describing data, relationships between data, and constraints on the data in an organization.
- Data flow** The arrow represents movements between entities, process and data stores. Normally labeled to describe data that is involved.
- Data store** Such as a file held on the disk or batch of documents.

Database This is a collection of stored, integrated files that can be maintained and manipulated with great flexibility.

Database Administrator The person, responsible for establishing policies and procedures to control and protect a database. He (she or it) works within guidelines set by data administration to control the database structure, manage data changes, and maintain DBMS programs.

Entity This is any tangible or intangible object on which an organization wishes to store data.

File The group of related records

Field or attribute The characteristic of data element that describes an entity or is part of a record.

Goal This is a desired state that may have a gap from the current state.

Hardware Physical components of a computer system i.e. the monitor, keyboard, hard disk

Hard Disk A storage device in the computer used for storage of data.

Information Data that has being processed.

Manual system A system that uses a manual means of collecting data, inputting, outputting and storage through the use of manpower.

Management information system This is a computer-based information system that uses data recorded by transaction processing system (TPS) as input programs that produce routine reports as output.

Metadata This refers to data about particular data.

Model This is a representation of real world objects and events and their associations.

Operating System This is a complex set of instructions which allow the computer hardware to be usable, provides a platform for other software's to work on

Primary key The candidate key selected to uniquely identify tuples/records within a relation.

Process An operation performed on data

Redundancy	Repetition of data.
Relation	A table with columns and rows
Relational database	This is a collection of normalized relations.
Relational model	This is a model where all data is logically structured within relations
The Degree of a relationship	Is the number of entities associated with the relationship.
Threats	These inhibit progress and provide risk in normal functioning of the system within the organization
Time schedule	This is the stipulated time period under which tasks are set to be accomplished
Training	This is directing the person to use the system in order for them to work on them effectively.
Security	Provides the much needed protection for the system to allow normal functioning
Software	Are set of instruction a computer system responds to.
Storage device	These are the devices providing permanent and temporary keeping areas for the data in the organization
MSSQL	This is a complex but comprehensive database management system tool used in the creating, maintaining and manipulating databases (collection of data).
System	Refers to a set of components that work together to accomplish a common task.

Appendix 2: Glossary

Sample codes for the development of enhanced employee management system

Sample code for password for employee system

```
Me.Cursor = Cursors.WaitCursor

Try

If txtUsername.Text = "Admin" And txtPassword.Text = "doris" Then

frmMainform.Show()

Me.Hide()

Else

MsgBox("wrong password")

End If

Catch ex As Exception

End Try

Dim nupage As New frmunbs

nupage.MdiParent = Me

nupage.show()

End Sub

End Class
```

Student form form:

This form, allows users to input student's records within the database.

Save button in visual basic 2005

```
Private Sub Button1_Click(ByVal sender As System.Object, ByVal e As System.EventArgs)
Handles Button1.Click
Try
Me.Cursor = Cursors.WaitCursor
cmd = New SqlCommand("uspinsertstudent_marksinfor", con)
cmd.CommandType = CommandType.StoredProcedure
With cmd.Parameters
.Add(New SqlParameter("@REG_NUMBER", REG_NUMBERTextBox1.Text))
.Add(New SqlParameter("@SEMISTER", SEMISTERComboBox1.Text))
.Add(New SqlParameter("@COURSE", COURSEComboBox1.Text))

```

```

.Add(New SqlParameter("@COURSE_CODE", COURSE_CODETextBox1.Text))
.Add(New SqlParameter("@Updatetime", UpdatetimeDateTimePicker1.Text))
.Add(New SqlParameter("@COURSE_UNIT", COURSE_UNITTextBox1.Text))
.Add(New SqlParameter("@COURSE_WORK", COURSE_WORKTextBox1.Text))
.Add(New SqlParameter("@EXAM_MARK", EXAM_MARKTextBox1.Text))
.Add(New SqlParameter("@TOTAL_MARK", TOTAL_MARKTextBox1.Text))
.Add(New SqlParameter("@GRADE", GRADETextBox1.Text))
'.Add(New SqlParameter("@Record_Number", Record_NumberTextBox.Text))
'.Add(New SqlParameter("@graduationDate", dtpDate_Of_Appointment.Text))
'.Add(New SqlParameter("@gurdianName", TxtgurdianName.Text))
'.Add(New SqlParameter("@SponsorName", TxtSponsorName.Text))
'.Add(New SqlParameter("@SponsorCountry", TxtSponsorCountry.Text))
End With
con.Open()
cmd.ExecuteNonQuery()
REG_NUMBERTextBox1.Text = ""
SEMISTERComboBox1.Text = ""
COURSEComboBox1.Text = ""
COURSE_CODETextBox1.Text = ""
UpdatetimeDateTimePicker1.Text = ""
COURSE_UNITTextBox1.Text = ""
COURSE_WORKTextBox1.Text = ""
EXAM_MARKTextBox1.Text = ""
TOTAL_MARKTextBox1.Text = ""
GRADETextBox1.Text = ""
'dtpDate_Of_Appointment.Text = ""
'TxtgurdianName.Text = ""
'TxtSponsorName.Text = ""
'TxtSponsorCountry.Text = ""
'dtpAdmissionDate.Value = ""
Catch ex As Exception
    MsgBox(ex.Message, MsgBoxStyle.Information)
Finally
    con.Close()
    Me.Cursor = Cursors.Default
End Try
End Sub

```

Code in VB to update student table fields

```

Private Sub BtnUPDATE_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles BtnUPDATE.Click
Try
    Me.Cursor = Cursors.WaitCursor

    cmd = New SqlCommand("uspupdate_student_marksinforatREG_NUMBER", con)
    cmd.CommandType = CommandType.StoredProcedure

```

With cmd.Parameters

```
.Add(New SqlParameter("@REG_NUMBER", REG_NUMBERTextBox1.Text))  
.Add(New SqlParameter("@SEMISTER", SEMISTERComboBox1.Text))  
.Add(New SqlParameter("@COURSE", COURSEComboBox1.Text))  
.Add(New SqlParameter("@COURSE_CODE", COURSE_CODETextBox1.Text))  
.Add(New SqlParameter("@Updatetime", UpdatetimeDateTimePicker1.Text))  
.Add(New SqlParameter("@COURSE_UNIT", COURSE_UNITTextBox1.Text))  
.Add(New SqlParameter("@COURSE_WORK", COURSE_WORKTextBox1.Text))  
.Add(New SqlParameter("@EXAM_MARK", EXAM_MARKTextBox1.Text))  
.Add(New SqlParameter("@TOTAL_MARK", TOTAL_MARKTextBox1.Text))  
.Add(New SqlParameter("@GRADE", GRADETextBox1.Text))  
'Add(New SqlParameter("@Record_Number", Record_NumberTextBox.Text))  
'Add(New SqlParameter("@graduationDate", UpDate_Of_AppointmentText))  
'Add(New SqlParameter("@gurdianName", TxtgurdianName.Text))  
'Add(New SqlParameter("@SponsorName", TxtSponsorName.Text))  
'Add(New SqlParameter("@SponsorCountry", TxtSponsorCountry.Text))
```

End With

con.Open()

cmd.ExecuteNonQuery()

REG_NUMBERTextBox1.Text = ""

SEMISTERComboBox1.Text = ""

COURSEComboBox1.Text = ""

COURSE_CODETextBox1.Text = ""

UpdatetimeDateTimePicker1.Text = ""

COURSE_UNITTextBox1.Text = ""

COURSE_WORKTextBox1.Text = ""

EXAM_MARKTextBox1.Text = ""

TOTAL_MARKTextBox1.Text = ""

GRADETextBox1.Text = ""

'dtpDate_Of_Appointment.Text = ""

'TxtgurdianName.Text = ""

'TxtSponsorName.Text = ""

'TxtSponsorCountry.Text = ""

'dtpAdmissionDate.Value = ""

Catch ex As Exception

MsgBox(ex.Message, MsgBoxStyle.Information)

Finally

con.Close()

Me.Cursor = Cursors.Default

End Try

End Sub

Code in VB to search in table employee

```
Private Sub get_student_marks()  
    Try  
        Me.Cursor = Cursors.WaitCursor  
        cmd = New SqlCommand("uspget_student_marksinforatREG_NUMBER", con)  
        cmd.CommandType = CommandType.StoredProcedure  
        With cmd.Parameters  
            .Add(New SqlParameter("@REG_NUMBER", REG_NUMBERTextBox1.Text))  
        End With  
        da.SelectCommand = cmd  
        Dim ds As New DataSet  
        da.Fill(ds, "mu")  
        If ds.Tables("mu").Rows.Count > 0 Then  
            REG_NUMBERTextBox1.Text = ds.Tables("mu").Rows(0).Item("REG_NUMBER")  
            SEMISTERComboBox1.Text = ds.Tables("mu").Rows(0).Item("SEMISTER")  
            COURSEComboBox1.Text = ds.Tables("mu").Rows(0).Item("COURSE")  
            COURSE_CODETextBox1.Text = ds.Tables("mu").Rows(0).Item("COURSE_CODE") =  
            UpdatetimeDateTimePicker1.Text = ds.Tables("mu").Rows(0).Item("Updatetime")  
            COURSE_UNITTextBox1.Text = ds.Tables("mu").Rows(0).Item("COURSE_UNIT")  
            COURSE_WORKTextBox1.Text = ds.Tables("mu").Rows(0).Item("COURSE_WORK") =  
            EXAM_MARKTextBox1.Text = ds.Tables("mu").Rows(0).Item("EXAM_MARK")  
            TOTAL_MARKTextBox1.Text = ds.Tables("mu").Rows(0).Item("TOTAL_MARK")  
            GRADETextBox1.Text = ds.Tables("mu").Rows(0).Item("GRADE")  
            'dtpDate_Of_Appointment.Text = ds.Tables("mu").Rows(0).Item("registrationDate")  
            'DateTimePicker1.Text = ds.Tables("mu").Rows(0).Item("graduationDate")  
            'TxtgurdianName.Text = ds.Tables("mu").Rows(0).Item("gurdianName")  
            'TxtSponsorName.Text = ds.Tables("mu").Rows(0).Item("SponsorName")  
            'TxtSponsorCountry.Text = ds.Tables("mu").Rows(0).Item("SponsorCountry")  
            'Guest_Name, Country, Gender, DOB, TelNo, EmailAddress, Occupation  
        End If  
    Catch ex As Exception  
        MsgBox(ex.Message, MsgBoxStyle.Information)  
    Finally  
        Me.Cursor = Cursors.Default  
    End Try  
End Sub
```

Code to in VB update table employee

```
Try  
Me.Cursor = Cursors.WaitCursor  
cmd = New SqlCommand("uspupdate_AssetdetailsinforatAsset_ID", con)  
cmd.CommandType = CommandType.StoredProcedure
```

```

With cmd.Parameters
    .Add(New SqlParameter("@Asset_ID", TxtAsset_id.Text))
    .Add(New SqlParameter("@Asset_Name", TxtAsset_Name.Text))
    .Add(New SqlParameter("@Asset_detail", RichTxtAsset_details.Text))
    .Add(New SqlParameter("@Purchase_Date", dtpDate.Text))
    .Add(New SqlParameter("@Purchase_Value", TxtValue.Text))
    .Add(New SqlParameter("@Department_ID", TxtDepartment_id.Text))
End With

con.Open()

cmd.ExecuteNonQuery()

TxtAsset_id.Text = ""
TxtAsset_Name.Text = ""
RichTxtAsset_details.Text = ""
dtpDate.Value = Today
TxtValue.Text = ""
TxtDepartment_id.Text = ""

Catch ex As Exception

MsgBox(ex.Message, MsgBoxStyle.Information)

Finally

con.Close()

Me.Cursor = Cursors.Default

End Try

```

Code to create database and table student detail table

```

use master
go
create database studentgrading_system
go
use studentgrading_system
go
create table student_details(REG_NUMBER varchar(20) not null primary key,

```



```

FIRST_NAME varchar(20),
LAST_NAME varchar(20),
DATE_OF_BIRTH datetime,
GENDER varchar(20),
E_mail varchar(20),
CONTACT_NUMBER bigint,
NATIONALITY varchar(20),
YEAR_OF_STUDY varchar(20),
SEMISTER varchar(20),
COURSE varchar(20));
Go

```

Insert procedure for table student details table

```

if exists(select* from sysobjects where name='uspinsertstudent_detailsinfor')
drop proc uspinsertstudent_detailsinfor

```

```

go

```

```

create proc uspinsertstudent_detailsinfor
(@REG_NUMBER varchar(20),
 @FIRST_NAME varchar(20),
 @LAST_NAME varchar(20),
 @DATE_OF_BIRTH datetime,
 @GENDER varchar(20),
 @E_mail varchar(20),
 @CONTACT_NUMBER bigint,
 @NATIONALITY varchar(20),
 @YEAR_OF_STUDY varchar(20),
 @SEMISTER varchar(20),
 @COURSE varchar(20))
as
INSERT INTO student_details
      (REG_NUMBER, FIRST_NAME, LAST_NAME, DATE_OF_BIRTH, GENDER,
E_mail, CONTACT_NUMBER, NATIONALITY, YEAR_OF_STUDY, SEMISTER,
      COURSE)
VALUES
(@REG_NUMBER,@FIRST_NAME,@LAST_NAME,@DATE_OF_BIRTH,@GENDER,@E
_mail,@CONTACT_NUMBER,@NATIONALITY,@YEAR_OF_STUDY,@SEMISTER,@C
OURSE)
Go

```

Update procedure for table student detail table

```

use studentgrading_system
go
if exists(select*from sysobjects where name='uspupdate_student_detailsinforatREG_NUMBER')

```

```
drop proc uspupdate_student_detailsinforatREG_NUMBER
go
```

```
create proc uspupdate_student_detailsinforatREG_NUMBER(
  @REG_NUMBER varchar(20),
  @FIRST_NAME varchar(20),
  @LAST_NAME varchar(20),
  @DATE_OF_BIRTH datetime,
  @GENDER varchar(20),
  @E_mail varchar(20),
  @CONTACT_NUMBER bigint,
  @NATIONALITY varchar(20),
  @YEAR_OF_STUDY varchar(20),
  @SEMISTER varchar(20),
  @COURSE varchar(20))
as
UPDATE student_details
SET      REG_NUMBER = @REG_NUMBER, FIRST_NAME = @FIRST_NAME,
LAST_NAME = @LAST_NAME, DATE_OF_BIRTH = @DATE_OF_BIRTH,
        GENDER = @GENDER, E_mail = @E_mail, CONTACT_NUMBER =
@CONTACT_NUMBER, NATIONALITY = @NATIONALITY,
        YEAR_OF_STUDY = @YEAR_OF_STUDY, SEMISTER = @SEMISTER,
COURSE = @COURSE
WHERE (REG_NUMBER = @REG_NUMBER)
Go
```

Appendix 3: Glossary

Sample of the questionnaire

A questionnaire about the design and implementation of employee's management information System for government agency

Date.

I am by the names Ahumuza Doris an undergraduate student of Kampala International University pursuing a Bachelor of Computer science. I am in my final year and i here by carry out a research that will help me to design a categorized student result information management system. This system will keep all results of students which will be beneficial both to me your university at large. I present this questionnaire to you as a way of seeking information from you on how your results have been handled.

Names.....

Address.....

Tel. Number.....

Instructions:

1. Tick the appropriate answer.
2. Fill the space provided where appropriate.

1. When was the university started?.....

8. a) What kind of system do you use to keep results of students?

a. Database ☐ b. Manual file ☐ c. File processing system ☐ d. Both above ☐

b) What problems do you face in keeping the results of your students?

.....
.....
.....

c) What advantages have you found with the use of the current system in storing the records about students?

.....
.....
.....

9. Would you welcome the introduction of a computerized system to the university? If

Yes, give reasons for you answer

.....
.....
.....

Thank you so much for your great assistance and contribution towards my research.