

DESIGN AND IMPLEMENTATION OF A STUDENTS DATABASE
MANAGEMENT SYSTEM

CASE STUDY: KAMPALA INTERNATIONAL UNIVERSITY

BY

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Computer science
Of
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SUPERVISED BY:
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21ST JUNE 2010

DECLARATION

I Chrispin Otieno Okello do hereby declare to best of my knowledge that this graduation project is my original work and that it has never been submitted to any university or any other institution.

The literature and citations from other peoples work have been duly referenced and acknowledged in the text, footnotes and bibliography.

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APPROVAL

This is to certify that this research project submitted in partial fulfillment of a degree in computer science by Chrispin Otieno Okello is under my supervision and guidance and is now ready to be submitted to the school of computer science of Kampala International University with my approval.

Signed:



.....

Professor Vicente Gonzalez

Supervisor

Date:

24/June/2010
.....

DEDICATION

This piece of work is a dedication to God almighty creator of heaven and earth. Through
Him I managed to do all this.

Why am I discouraged? Why is my heart so sad? I will put my hope in God! I will praise
Him again-my savior and my God
PSALMS 43:5

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I would like to acknowledge my beloved father Mr. Walter Okello Ogwindo and mother Dorcas Okello for the supported they have shown me during my three years. I appreciate their efforts financially, emotionally, and parent wise. Without them, I would not be here writing this research proposal.

I would also like to thank my family members at large. My brothers and sisters: Mary, Lydia, Velma, Claris, Sharon and Gideon for the patience they have had in me.

Special thanks also goes to the institution that is Kampala International University for the support it has shown to ensure that I complete my education.

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Special thanks also go to my friends who have been there for me in good and bad times during my stay at the university.

Special thanks also goes to Hagreeves Kedogo and Phelix Karani for the support they have given me. God bless you all.

ABSTRACT

This project research is mainly based on developing a Database management system for Kampala International University. It emphasizes how data is stored and maintained in a database as regards to students personal information, course enrollment and fee management. Data is entered into the database using the input forms of students registration. The context diagram as shown in the later chapters will show how data flows in the database and the attributes connected to the entities. Data management should be given first priority and Database Management will put this into effect by user to achieve their full potential and objectives.

“Any sufficient advanced technology is indistinguishable from magic.”
Arthur C. Clarke

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CHAPTER ONE

INTRODUCTION

1.0 Introduction

In this chapter, the researcher introduces the background of the study that is the overall overview of the research as well as the problem statement and the kind of problems that led to this research.

1.1 Background of the study

Companies, organizations, institutions and government bodies face three major problems of risks: low demand of products and services, inefficient handling of information and lack of innovation to stay ahead. Being an institution of higher learning, Kampala international university (KIU) is with no exemptions from one of this risks and that is inefficient handling of information and lack of innovation to stay ahead.

Up to now, KIU relies heavily on file system. That is the use of files to store student's information. This system has been proved to be bulky, costly and non flexible when it comes to supplying needed data accurately and promptly. Data redundancy is one major issue we can't ignore with this kind of system. This is because independent data easily produce duplicates and when updates are needed, each separate file needs to be updated. That is why there is a need for a database management system at KIU. With this system, KIU will be able to handle the present, remember the past and prepare for the future.

So if KIU wants to survive, thrive and compete then it can no longer ignore this innovative system.

1.2 Problem statement

Up to now there is no easy, fast, reliable and cost effective way for staff at KIU to handle data. There is a lot of paper work, sharing of information amongst staff require exchange of letters between departments, and finally queue and time management is a big issue.

Providing up to date information is crucial for KIU therefore by introducing this innovative system, it will minimize waiting time and ensure that there's efficiency in storage, retrieval and updating of students information.

1.3 Objectives of the study

1.3.1 Main objective

In the age of information and communication technology (ICT), setting out good and considered objectives is crucial to the success of any project. Short term objectives should be as specific as possible, because they usually give direct benefits to end users. Long term objectives are connected primarily with architectural decisions. Therefore they give more value to developers and solution architects than to end users.

Having this in mind the main objective of this study is to design and implement a students database management system for Kampala international university where student's information will be well managed and monitored easily.

1.3.2 Specific Objectives

- To developed logic plan using tools such as flow charts, ER diagrams that will assist in the development of the system.
- To test the program at different phases to ensure that it meets the specified requirements.
- To create a database system that will enable easy handling of students data at KIU
- To study current KIU database systems so as to enable the researcher create a new system easily.

1.4 Research questions

In today's business world, it is becoming more and more apparent that we must learn to think like business managers. IT is expanding at a record pace. Information is a major capital investment that must be justified, just as marketing must justify a new product and manufacturing must justify a new plant or equipment.

Having this in mind, I came up with the following research questions:

- Will the application provide end users with timely, pertinent, accurate, updated, and useful information?
- Will the application offer adequate controls to protect against fraud and embezzlement and to guarantee the accuracy and security of data and information?
- Will the school management and students support the application?
- How will the students (end users) feel about their role in the new application?

1.5 Scope of the study

The scope of this study includes all the students' personal information during registration at different departments and faculties.

1.6 Significance of the research

This study will overcome earlier faced problems enabling easy accessibility of data, reliability, and security which will make decision making and administrative activities simplified even with fewer employees. Apart from this, the study will also be of significance to a number of people:

1. To the researcher

The main significance is acquiring knowledge of designing a database and its related features through understanding of the organization of data, rules governing it and how it is to be physically used targeting the functionality of the database management system.

2. To the institution

The study will lead to improved and efficient handling of student's information and data.

3. To other researchers

Other researchers will of course benefit from this research in that they will be able to study the limitations of it and improve on it. Other people with interest in the same field will also acquire knowledge in regards to the research.

1.7 Justification

Students are the focal point of any institution and in this case Kampala International University. Each process is geared toward students: registration, monitoring fee payments and library usage. Therefore KIU need a software solution that supports student-centered processes and allows quick and effective reaction to ever changing requirements. And since database is now the underlying framework of the information system and has fundamentally changed the way many organizations operate. In particular, the developments in this technology over the last few years have produced systems that are more powerful and more intuitive to use (Thomas Connolly, et al, 1995). Therefore this research is one of the most important in this age of Information Technology for KIU.

All students-related data is stored centrally, making it accessible at any time, from anywhere. This capability reduces data redundancy and guarantees a secure and stable system.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

In this chapter the researcher reviews a summary and explanation of the complete and current state of knowledge on limited topics as found in academic books and journal articles.

2.1 History of databases

Before the database management approach, organizations relied on file processing systems to organize, store, and process data files. End users became aggravated with file processing because data is stored in many different files and each organized in a different way. Each file was specialized to be used with a specific application.

Needless to say, file processing was bulky, costly and nonflexible when it came to supplying needed data accurately and promptly. Data redundancy is an issue with the file processing system because the independent data files produce duplicate data so when updates were needed each separate file would need to be updated. Another issue is the lack of data integration. The data is dependent on other data to organize and store it. Lastly, there was not any consistency or standardization of the data in a file processing system which makes maintenance difficult.

For all these reasons, the database management approach was produced. According to John Vaughn of Hobart and William Smith Colleges, Relational Databases have gone through three major Stages of Evolution.

These stages are;

Stage one: The Early Days.

The theoretical foundation for Relational Databases was formulated by Dr. Edgar (Ted) Codd at IBM Research, Almaden, California and published a seminal Paper in 1969, entitled "A Relational Model of Data for Large Shared Data Banks".

Ingres from the University of California at Berkeley was the first academic initiative which picked up Codd's published work from IBM and then developed and Oracle was the first commercial product based on this work. In 1976, Peter Chen published a very important Paper on Data Modeling entitled "The Entity-Relationship Model - Towards a Unified View of Data" in the ACM Transaction on Database Systems.

C.F Date who, of course, occupies a unique role and made an essential contribution to the success of Relational Databases wrote an historical article on relational databases.

Stage two: The Middle Years

IBM, Informix and Sybase entered the Arena. Finally Microsoft bought Sybase's technology to join the fray.

Stage three: The Future

The future will evolve to incorporate Objects, Hybrids and will be geared to meet the requirements of the Internet.

The most likely scenario sees the survival of only three Vendors, (which was confirmed by IBM's acquisition of Informix for \$1 Billion) that is Oracle, IBM and Microsoft.

This is a quote from one of the earlier workshop on databases.

The history of database management systems research is one of exceptional productivity and startling economic impact. Barely 20 years old as a basic science research field, database has research fueled an information service industry estimated at \$ 10 billion per year in the U.S alone. Achievements in database research underpin fundamental advances in communication systems, transportation, and logistics, financial management, knowledge based systems, accessibility to scientific literature and a host of other civilian and defense application. They serve as the foundation for considerable progress in the basic science fields ranging from computing to biology. (Silberschatz et al, 1991).

Having looked at the history of databases, let's try and differentiate the different characteristics of file system and databases.

2.2 File system vs. Databases

There are number of characteristics that differ from traditional file management system. In file system approach, each user defines and implements the needed files for a specific application to run. For example in sales department of an enterprise, One user will be maintaining the details of how many sales personnel are there in the sales department and their grades, these details will be stored and maintained in a separate file.

Another user will be maintaining the salesperson salary details working in the concern, the detailed salary report will be stored and maintained in a separate file. Although both of the users are interested in the data's of the salespersons they will be having their details in separate files and they need different programs to manipulate their files. This will lead to wastage of space and redundancy or replication of data's, which may lead to confusion, sharing of data among various users is not possible, data inconsistency may occur. These files will not be having any inter-relationship among the data's stored in these files. Therefore in traditional file

processing every user will be defining their own constraints and implement the files needed for the applications.

In database approach, a single repository of data is maintained that is defined once and then accessed by many users. The fundamental characteristic of database approach is that the database system not only contains data's but it contains complete definition or description of the database structure and constraints. These definitions are stored in a system catalog, which contains the information about the structure and definitions of the database. The information stored in the catalog is called the metadata, it describes the primary database. Hence this approach will work on any type of database for example, insurance database, Airlines, banking database, Finance details, and Enterprise information database. But in traditional file processing system the application is developed for a specific purpose and they will access specific database only.

The other main characteristic of the database is that it will allow multiple users to access the database at the same time and sharing of data is possible. The database must include concurrency control software to ensure that several users trying to update the same data at the same time, it should maintain in a controlled manner. In file system approach many programmers will be creating files over a long period and various files have different format, in various application languages.

Therefore there is possibility of information getting duplicated, this redundancy is storing same data multiple times leads to higher costs and wastage of space. This may result in data inconsistency in the application; this is because update is done to some of the files only and not all the files. Moreover in database approach multiple views can be created. View is a tailored representation of information contained in one or more tables. View is also called as "Virtual

table” because view does not contain physically stored records and will not occupy any space. A multi-user database whose users have variety of applications must provide facilities for defining multiple views. In traditional file system, if any changes are made to the structure of the files it will affect all the programs, so changes to the structure of a file may require changing of all programs that access the file. But in case of database approach the structure of the database is stored separately in the system catalog from the access of the application programs. This property is known as program-data independence.

Database can be used to provide persistent storage for program objects and data structures that resulted in object oriented database approach. Traditional systems suffered from impedance mismatch problem and difficulty in accessing the data, which is avoided in object oriented database system. Database can be used to represent complex relationships among data's as well as to retrieve and update related data easily and efficiently.

It is possible to define and enforce integrity constraints for the data's stored in the database. The database also provides facilities for recovering hardware and software failures. The backup and recovery subsystem is responsible for recovery. It reduces the application development time considerably when compared to the file system approach and availability of up-to-date information of all the users. It also provides security to the data's stored in the database system. Having compared the two, it is evident enough that databases are the best when it comes to retrieval, storage and data manipulation

2.3 Types of databases

Database range from those for a single user with a desktop computer to those on main frame computers with thousands of users. The range of database applications can be divided into four categories, from simplest to most complex:

- Personal computer (or pc) databases
- Workgroup databases
- Department databases
- Enterprise databases.

In this chapter the researcher discusses about personal computer databases only. This is because this application is for a personal computer database.

Personal computer databases

Personal computer (PC) databases are designed to support one user with a stand alone PC. For example consider a company that has a number of salespersons who call on actual prospective customers'. Each salesperson might carry a laptop computer with a simple database application to record customer information and the details of contacts with each customer. Some of the key decisions that must be made in developing personal computer databases are:

1. Should the application be purchased from an outside vender or developed within the organization?
2. If the database application is developed internally, should it be developed by the end user or by a professional within the information system (IS) department?
3. What data are required by the user and how should the database be designed?
4. What commercial DBMS product should be used for the application?
5. How should data in the personal computer database be synchronized with data in other databases?
6. Who is responsible for the accuracy of the data in the personal computer database?

Personal computer databases are widely used because they can often improve personal productivity.

However, they entail a risk:

The data cannot easily be shared with other users. This illustrates a very common problem: if data are of interest to one person, they probably are of interest to other s as well. For this reason, personal computer databases should be limited to those rather special situations (such as in a very small organization) where the need to share the data among users of the personal computer database is unlikely to rise. This project has been specifically developed to work in personal computers i.e. to work as a personal computer database, As explained above many risks are involved.

2.4 Advantages of databases

1. Program data independence

The separation of data description (metadata) from the application programs that use the data is called data independence. With the database approach, data descriptions are stored in a central location called the repository. This property of database systems allows an organization data to change and evolve (with limits) without changing the application programs that process the data.

2. Minimal data redundancy

The design goal with database approach is that previously separate (and redundant) data files are integrated into a single, logical structure. Each primary fact is recorded (ideally) in only one place in the database. However database approach does not eliminate redundancy entirely, but it allows the designer to carefully control the type and amount of redundancy. At other times it may be desirable to include some limited redundancy to improve database performance.

3. Improved data consistency

By eliminating or controlling data redundancy, we greatly reduce the opportunities for inconsistency. We also avoid the wasted storage space that results from redundant data storage.

4. Improved data sharing

A database is designed as a shared corporate resource. Authorized users are granted permission to use the database, and each user (or group of users) is provided one or more user views to facilitate this use. A user view is a logical description of some portion of the database that is required by a user to perform some task.

5. Increased productivity of application development

A major advantage of the database approach is that it greatly reduces the cost and time for developing new business applications. There are two important reasons that database applications can often be developed much more rapidly than conventional file applications:

- Assuming that the database and related data capture and maintenance applications have already been designed and implemented, the programmer can concentrate on the specific functions required for the new application, without having to worry about file design or low-level implementation details.
- The database management system provides a number of high-level languages that automate some of the activities of database design and implementation.

6. Enforcement of standards

When the database approach is implemented with full management support, the database administration function should be granted single-point authority and responsibility for establishing and enforcing data standards. These will include naming conventions, data

quality standards, and uniform procedures for accessing, updating, and protecting data. The data repository provides database administration with a powerful set of tools for developing and enforcing these standards. Unfortunately, the failure to implement a strong database administration function is perhaps the most common sources of database failures in organizations.

7. Improved data quality

Concern with poor quality of data is a common theme in database administration today (Redman, 1995). The database approach provides a number of tools and processes to improve data quality. Two of the more important are the following:

- Database designers can specify integrity constraints that are enforced by the DBMS. A constraint is a rule that cannot be violated by database users.
- One of the objectives of data warehouse environment is to clean up (or “scrub”) operational data before they are placed in the data warehouse (Jordan, 1996).

8. Improved data accessibility and responsiveness

With a relational database, end users without programming experience can often retrieve and display data, even when it crosses traditional department boundaries.

9. Reduced program maintenance

Stored data must be changed frequently for a variety of reasons: new data item types are added, data formats are changed, and so on. A celebrated (or rather dreaded) example of this problem results from the well-known “year 2000” problem, in which common two-digit year fields will have to be extended to four digits to accommodate the rollover from the year 1999 to the year 2000.

2.5 Costs and risks of the data base management

As with many business decisions, the database approach entails some additional costs and risks that must be recognized and managed while implementing this approach.

2.5.1 New, specialized Personnel

Frequently, organizations that adopt the data base approach need to hire or train individuals to design and implement data bases, provide data base administration services, and manage a staff of new people. Further, because of the rapid changes in technology these new people will have to be retrained or upgraded on a regular basis. This personnel increase may be more than offset by other productivity gains, and an organization should not minimize the need of these specialized skills which are required to obtain the most from the potential benefits.

2.5.2 Installation and management cost and complexity

A multi-user data base management system is a large and complex suite of software that has high initial cost, requires a staff of trained personnel to install and operate, and also has substantial annual maintenance and support costs. Installing such a system may also require upgrades to the hardware and data communications system in the organization. Substantial training is normally required on an ongoing basis to keep up with new releases and upgrades. Additional or more sophisticated and costly database software may be needed to provide security and to ensure proper concurrent updating of shared data.

2.5.3 Conversion costs

The term legacy system is widely used to refer to older applications in an organization that are based on file processing and/or older data base technology. The cost of converting these older

systems to modern data base technology-measured in terms of dollars, time, and organizational commitment-may often seem prohibitive to an organization. As will be shown in chapter 14, the use of data warehouses is one strategy for continuing to use older systems while at the same time exploiting modern data base technology and techniques.

2.5.4 Need for Explicit Backup and Recovery

A shared corporate database must be accurate and available at all times. This requires that comprehensive procedures be developed and used for providing backup copies of data and for restoring a database when damage occurs. A modern database management system normally automates many more of the backup and recovery tasks than a file system.

2.5.5 Organizational Conflict

A shared database requires a consensus on data definitions and ownership as well as responsibilities for accurate data maintenance. Experience has shown that conflicts on data definitions, data formats and coding, rights to update shared data, and associated issues are frequent and often difficult to resolve. Handling these issues requires organizational commitments to database approach, organized database administrators, and a sound evolutionary approach to database development. If strong management support and commitment to the database approach is lacking, end-user development of stand-alone databases is likely to proliferate. These databases do not follow general database approach that we have described, and they are unlikely to provide benefits described earlier.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter discusses the methodologies that the researcher used to come up with the new system.

3.1 Background reading

Sources of background reading includes company reports, organization charts, policy manuals, job descriptions other types of reports, documentation of existing systems.

The researcher used this methodology due to the following reasons:

It helped the researcher get an understanding of the organization before meeting the people who work there

It also allowed the analyst to prepare for other types of fact findings

It also provided documentation of the existing system.

More information about the institution came from its website that is www.kiu.ac.ug

3.2 Observation

The researcher used observation as a methodology for development of the system. This was advantageous in the following ways:

- Observation provided first hand experience of the way the current system operates.
- Data was collected in real time and had a high level of validity.
- It can be used to verify information from other sources or to look for exceptions to the standard procedure.

3.3 Development tools for the system

The following are the development tools used in the project.

- **Operating system:** Windows xp, vista
- **Programming language:** Visual basic 6.0, Adobe Photoshop, Fireworks MX
- **Database development:** Visual basic database, Microsoft office access

3.4 System requirements

For the program to run efficiently, the following minimum system requirements are needed

1. Processor: 1.0 GHZ and above
2. Memory requirements: 128 MB and above
3. Hard disk: 20GB and above
4. Display unit: 14 inch colored monitor and above

3.5 Document development methodology

Coming up with a work plan wasn't easy. This is because the researcher was under pressure to write the project proposal .And before structuring his work plan; I had to ask myself about my ability o deliver the project. I therefore had to consider the following questions.

1. Do I have sufficient experience of the project management?
2. Do I have stable and sufficient sources of finance?
3. Do I have sufficient management capacity including the hardware, software, equipment and the ability to handle the budget of the project?

Having considered these questions, the researcher came up with the following life development life cycle.

Number:	Task	Description
1	Problem analysis	Here the researcher will define the problem. Propose the project, write the program specification i.e. inputs, processing, outputs, and user interface.
2	Design the program	A developed logic plan using tools such as flow charts
3	Coding	The program will be coded using visual basic 6.0
4	Testing and debugging	Testing will take different phases and it will be done after every phase.
5	Maintaining the program	The program will be handed to KIU for use and maintenance

TABLE 3.1 Development life cycle

CHAPTER FOUR

SYSTEM DEVELOPMENT ANALYSIS AND DESIGN

4.0 Introduction

This is a practical presentation of the concepts and the patterns laid down by the design in terms of the system analysis. It also includes software and hardware that were used in the system development.

4.1 Review of the existing system

As discussed in chapter one, the existing system is a file based system that doesn't use databases which has a lot of disadvantages concerning storage of data. One major disadvantage is data duplication, redundancy and space wastage which in turn lead to added cost. The existing system at KIU is in a way that every department manages its own data. Most departments keep their records in a file system. For example the computer science department uses spreadsheets such as excel to manage students records, students results and time tables.

4.2 The new system

The new system is almost the same as the old system. The only difference is that the new system uses a database to store the student's information. The next subsection contains the system design and the architecture of the new system.

4.3 System design

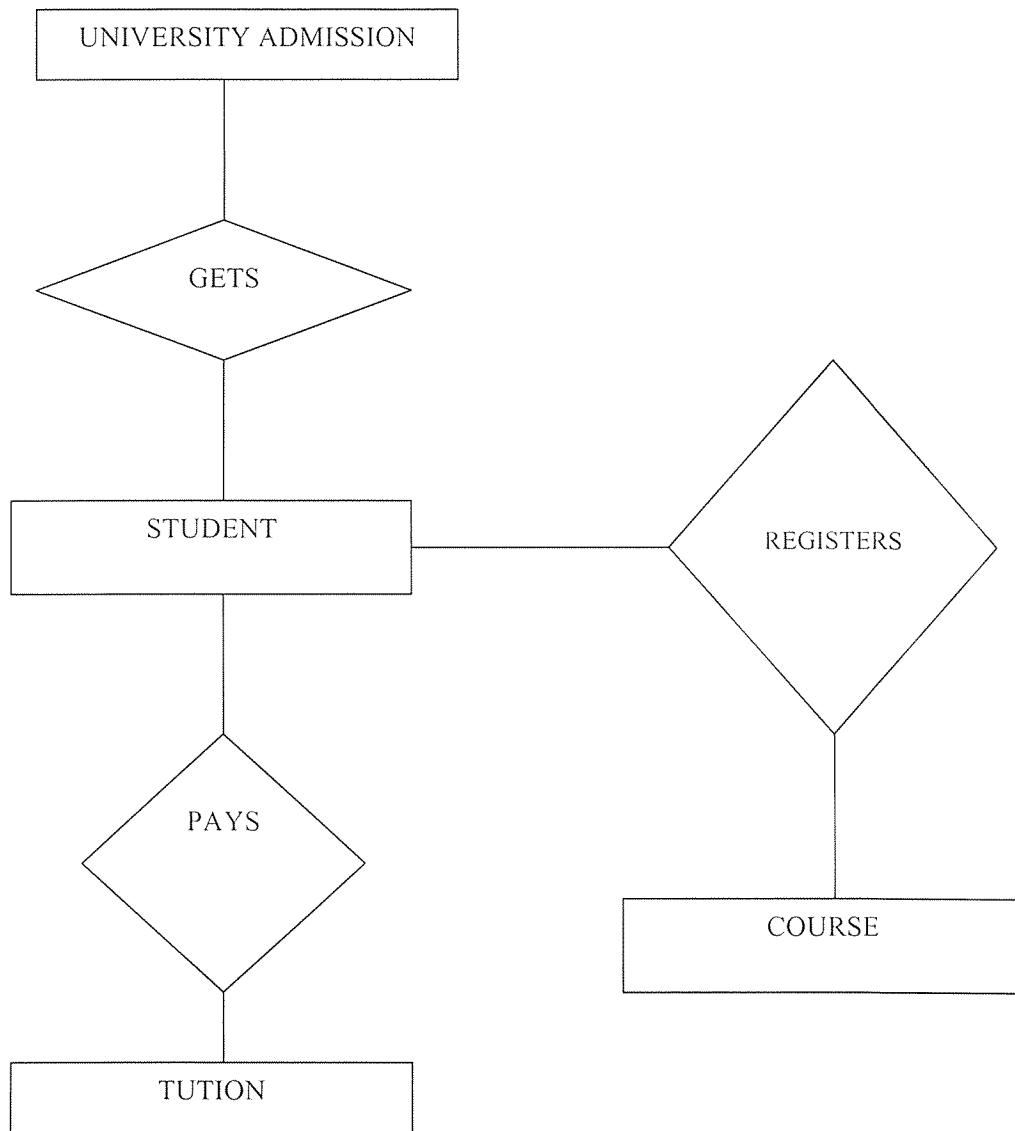


FIGURE 4.1: Entity relationship diagram of the new system.

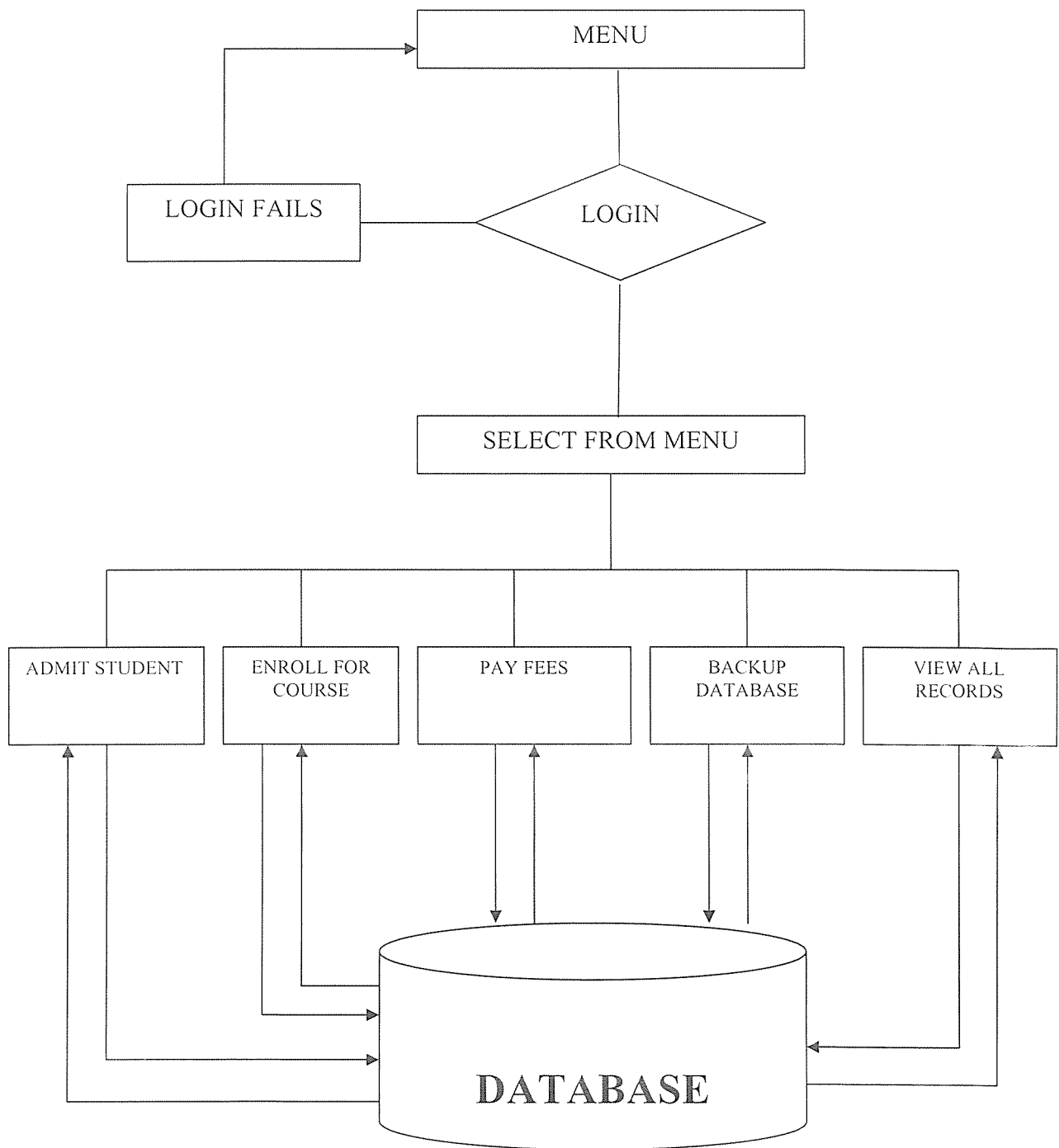


FIGURE 4.2: The systems architecture

4.4 Application Area

The application is expected to perform as follows:

The user can be able to perform the following anomalies:

1. Add new students information
2. Save the students information
3. Update any students information
4. Delete any unwanted students information

Further the user can be able to search through the database using one or more of the applications criteria. A list of all the records is also available for creating reports and finally the application also support navigation through the current records: First record, last record, previous record and the next record. The application area has been summarized in the figure below.

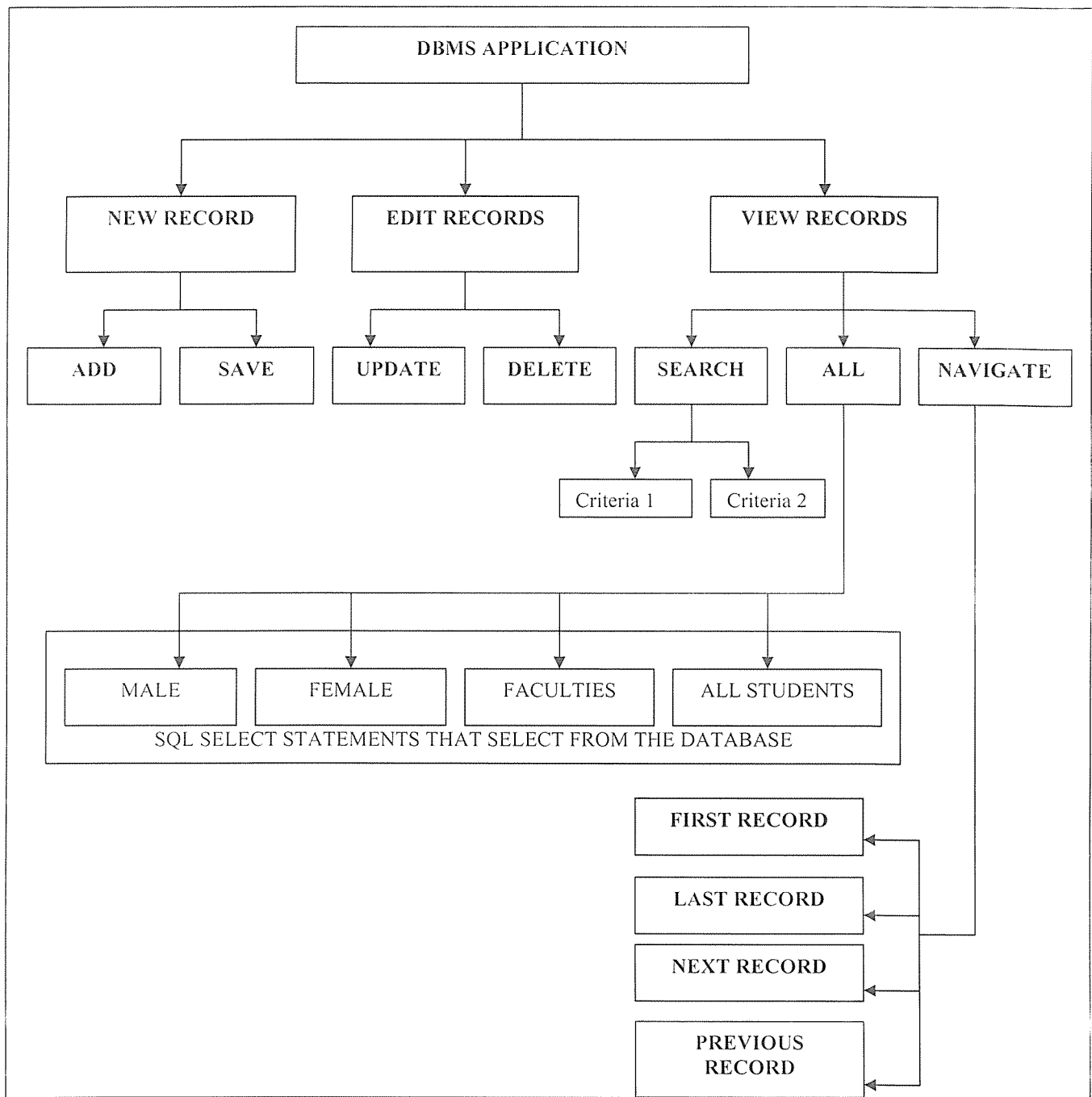


Figure 4.3: The application area of the system

4.5 Beneficiaries and benefits

4.5.1 Benefits

The benefits of this particular application are illustrated in the Figure 1 below

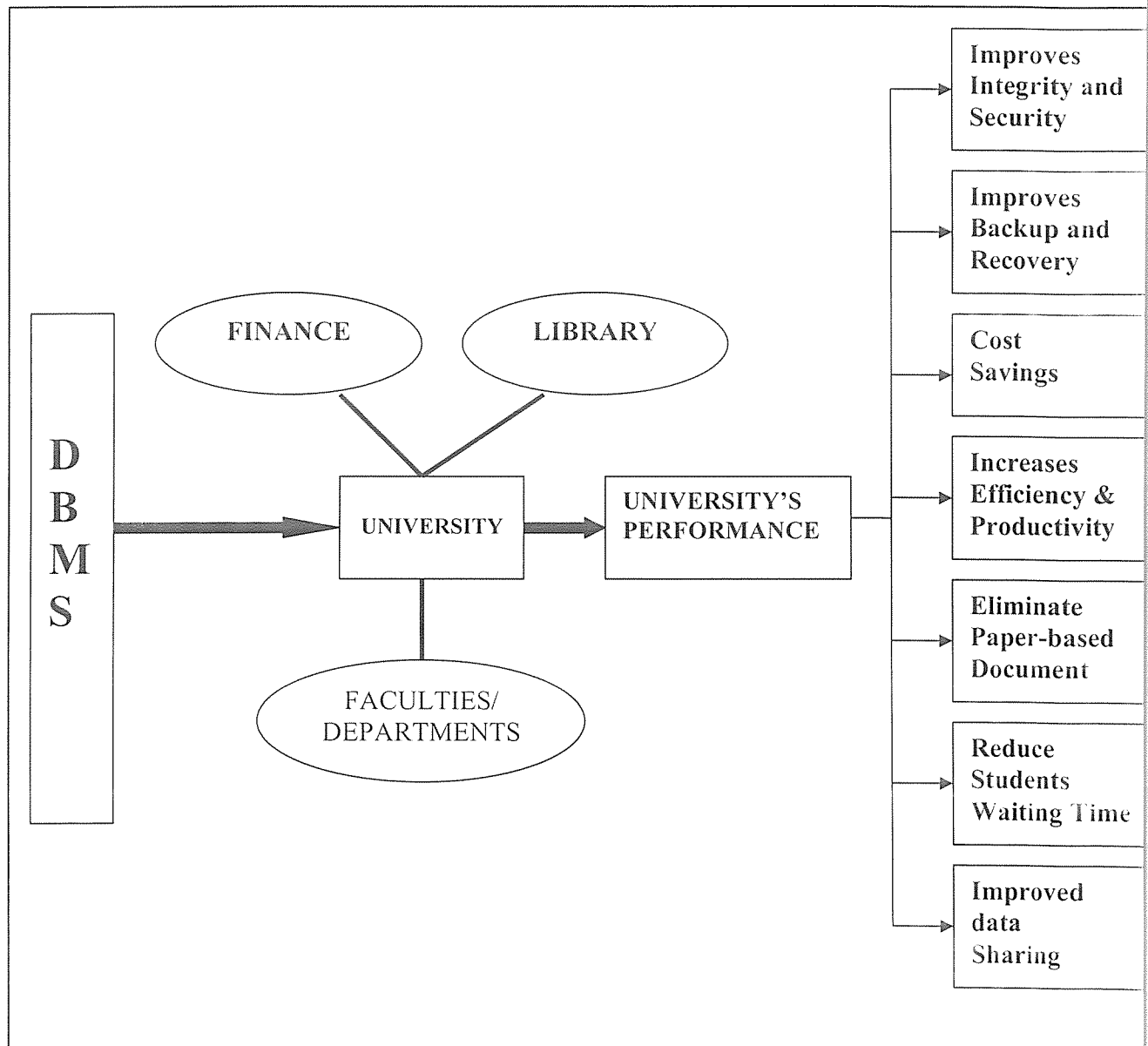


Figure 4.4: Benefits of the system at KIU

4.5.2 The beneficiaries

Having considered the benefits of this project, it's also important to look at those people who will benefit from the research and how it will assist them accomplish various objectives. The first beneficiaries are of course the students. The application will reduce students Waiting Time during registration, further it will increase efficiency and productivity. Other beneficiaries are the lecturers who not need to exchange a lot of papers to find out about a student or to see all the students he or she is going to take care of. Finally the staffs at KIU will also benefit since organizing student's information will be easy, fast and reliable.

4.6 Activities of the project

In this section we will discuss only the implementation details that the system will provide. As noted earlier in chapter one, the main objective of this study is to develop a student's database management system for Kampala international university where student's information will be well managed and monitored easily. However the implementation details can extend far beyond the scope of this research. Apart from the main campus, it can extend to Western campus using a network model.

Therefore the main activities of this research will focus on development of a user friendly interface design. The User interface design of this system will not respect the principles of usability everywhere, because the researcher will focus his efforts on a simple solution that will help KIU students, staff and lecturers to do their job as quickly and easily as possible. The application will have different forms; main form with the menu controls, login form, registration form, update form, search form and selection form.

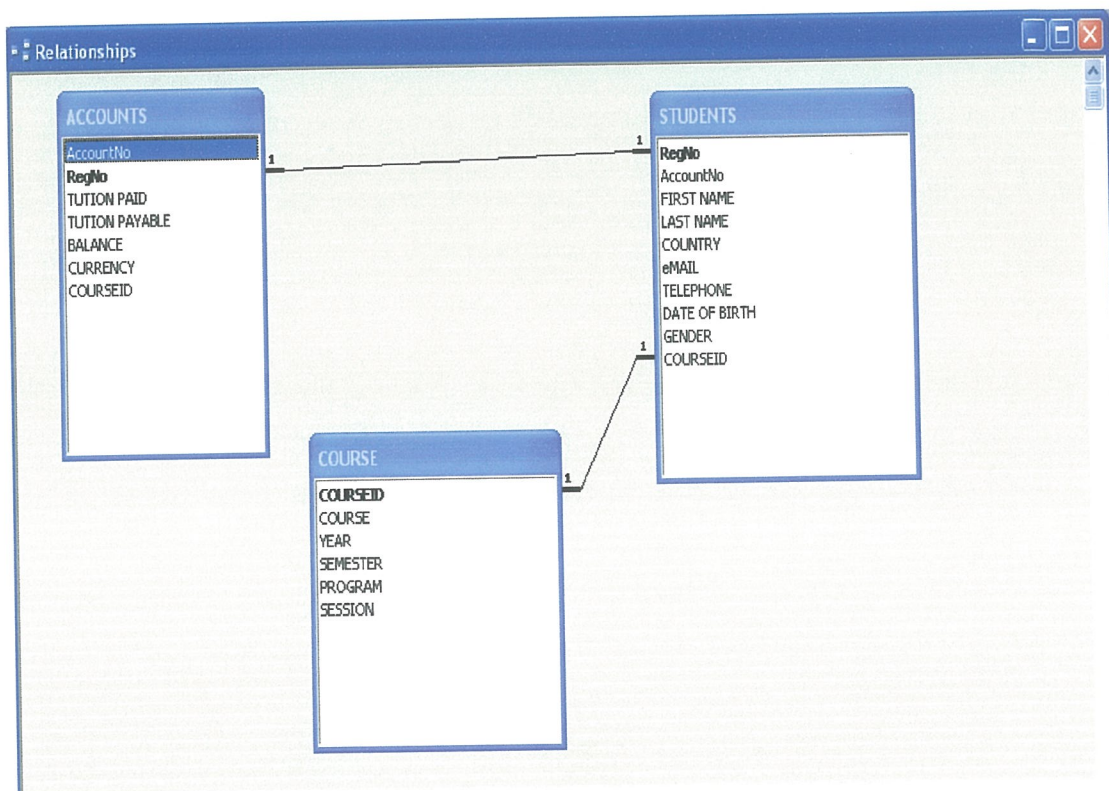
One most important activity will be to analyze KIU current system and try to come up with the new system

Another activity will involve the development of a database system that is secure and only the authorized persons will be able to access its contents. For example one will need to register with a valid registration number that will identify him or her as a student of the university, staff or lecturer.

Coding is one of the most important activity that will take place after the interface design and the database design. All the functionalities of the application will depend on the coding. Without the codes, then the project will fail.

For every end of a coding face, the application will be tested with live data to ensure that it functions as required. Finally the researcher will train the people who are expected to use the application but have little or no knowledge about the application.

4.7 Entity Relationship Diagram of the New System



Screenshot 1.0 Relationship of the different tables

An Entity Relationship diagram is an illustration of the associations that exists between the different tables found in a particular database of a given Management Information System for example, in this case; the above Entity Relationship diagram is for the database of Kampala International University's new system.

4.8 Data dictionary of the new system

A data dictionary that is also known as the system catalog provides a description of data contained in a database. It is also a documentation that displays the different data types used in the system and their properties

DATA ELEMENT	TYPE	LENGTH	DESCRIPTION
RegNo	Text	30	Students registration number
Account_No	Text	30	Students account number
First name	Text	30	Students first name
Last name	Text	30	Students last name
Country	Text	30	Students place of origin
E mail	Text	30	E mail address of the student
Telephone number	Number	10	Students telephone number
DateOfBirth	Date	Not applicable	Students date of birth
Gender	Text	10	Students gender(male or female)
CourseID	Number	30	Students course id

TABLE 4.2: DATA DICTIONARY OF STUDENTS TABLE

DATA ELEMENT	TYPE	LENGTH	DESCRIPTION
Account_No	Text	30	Students account number
Courseld	Auto Number	10	Students course id
RegNo	Number	10	Students registration number
Fee payable	Currency	Not applicable	Fee payable by student
Fee paid	Currency	Not applicable	Fee paid by student
Fee Balance	Currency	Not applicable	Fees that the student owes the school
Currency	Text	30	Currency Type

TABLE 4.3: DATA DICTIONARY OF ACCOUNTS TABLE

DATA ELEMENT	TYPE	LENGTH	DESCRIPTION
Courseld	Auto Number	10	Students course id
Course	Text	30	Course a student registered for
Year	Number	10	Students year
Semester	Number	10	Students semester
Program	Text	30	Certificate,diploma,degree etc of student
Session	Text	30	Day,Evening,Weekend,Afternoon

TABLE 4.4: DATA DICTIONARY OF COURSE REGISTRATION TABLE

4.9.2.1 Why secure databases

Data is an asset of any organization. The ability of any organization to succeed in the global economy lies in its data.

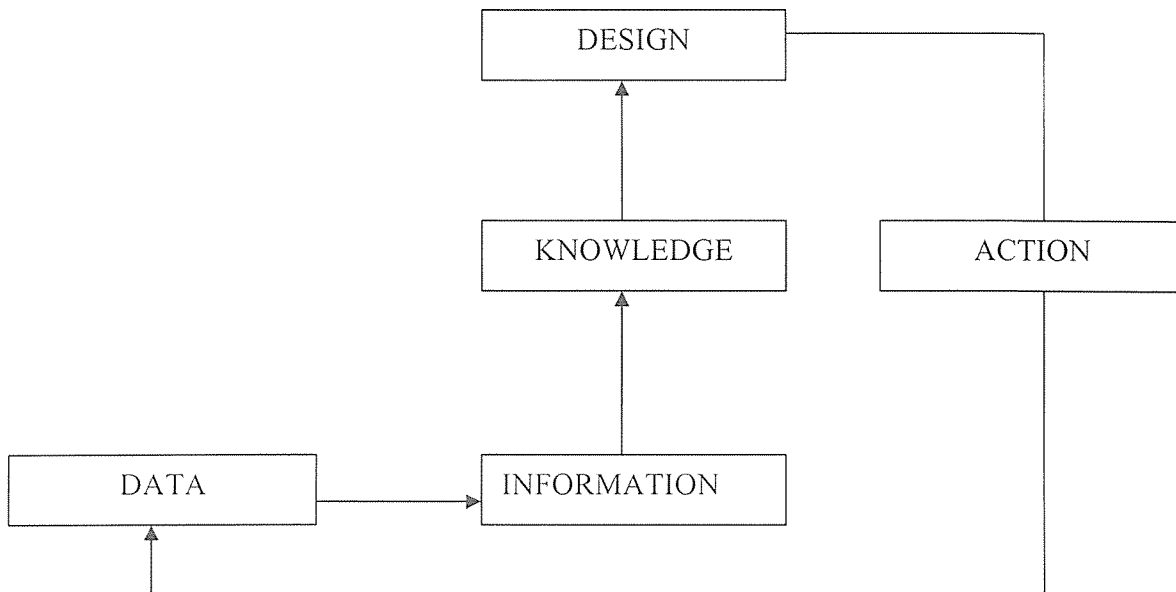


FIGURE 4.5: Summary of why we should secure databases.

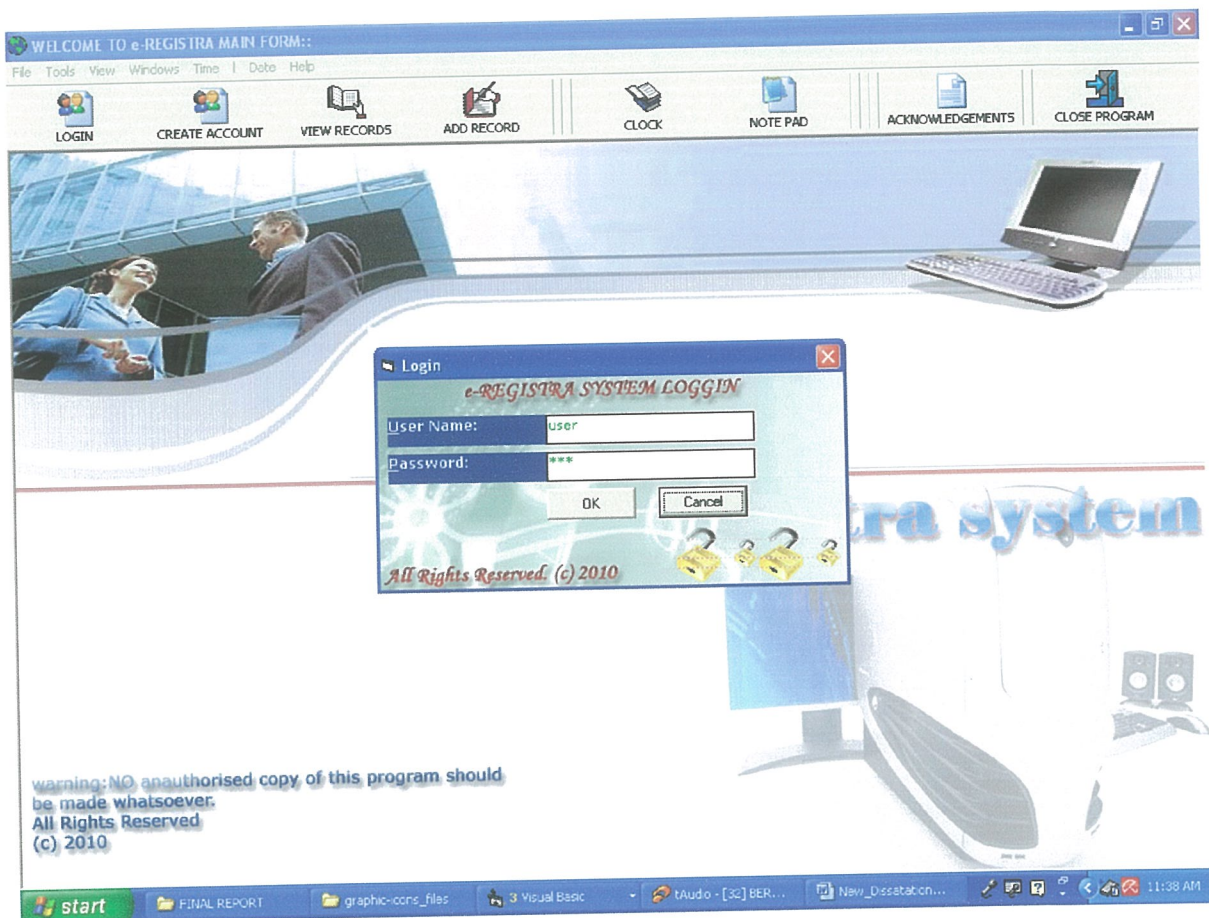
4.9.3 User interface of the new system

The following screenshots describe the user interface of the system.

4.9.3.1 Login interface

After the main interface, this is the next form that the user sees.

It has two command buttons. That is the Ok button which authenticates the user i.e. it confirms that the user is who he/she claims to be. If the login is not correct then the user gets an error message which denies him or her access to the program.



Screenshot 1.1 Login interface

4.9.3.2 The main menu of the program

If the user has the correct password and user name, then he or she is accepted and the main menu form loads. Then the user can select from the available options of whatever he or she wants to do. From this form, we have a variety of choices as explained below:

Main menu

- Students Admission
 - A student can enroll using this form
- Course enrollment

With his or her registration number, a student can enroll for a course of his or her choice. Note that a student cannot enroll for his or her course without registering

- Tuition payment

A student can pay his or her tuition using this form.

- Students list

This form list all the students registered at the university.

- Exit application

Exits the application

Create database backup

- Database backup

Creates a backup of the database with all its current data.

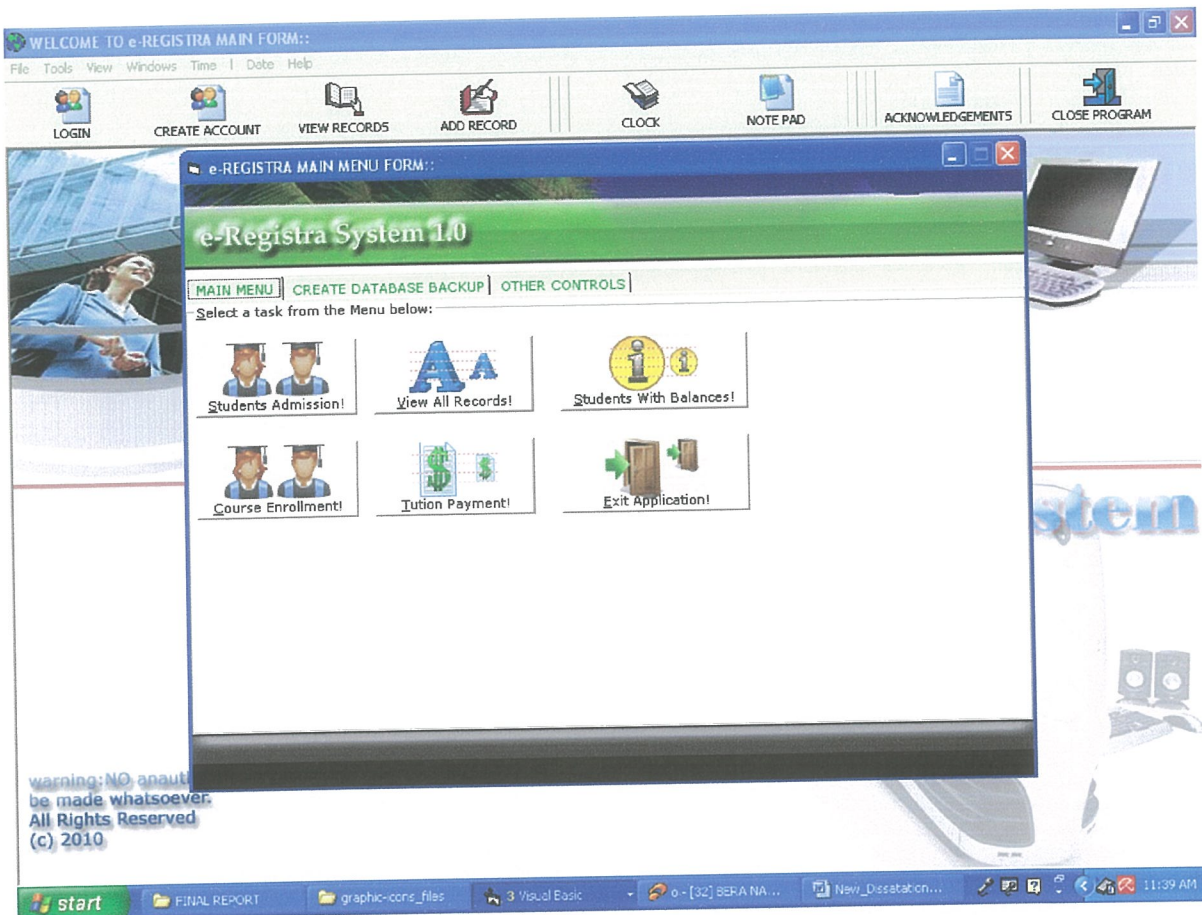
Other controls

- Exit application

Exits the application

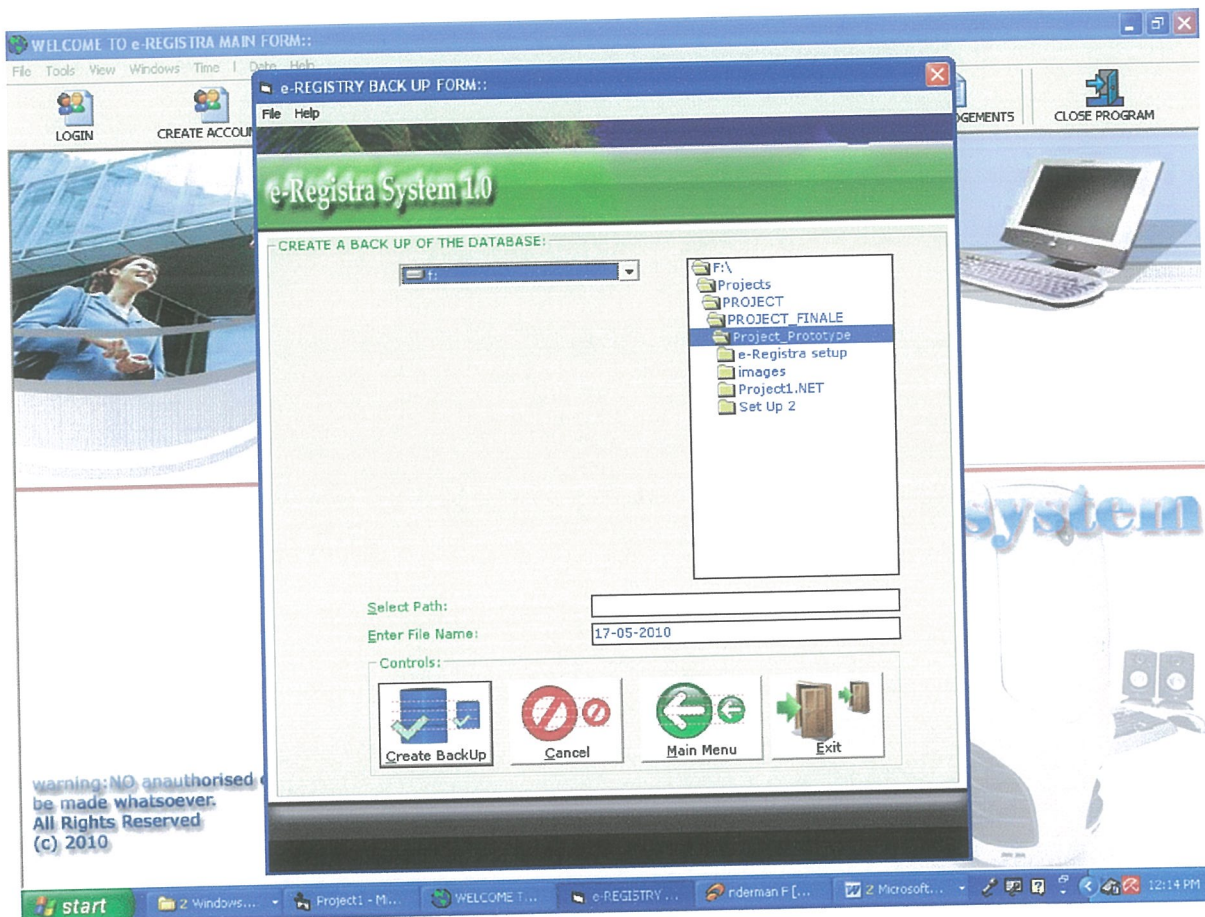
- About e-Registra

Tells more about the system



Screenshot 1.2 Main Menu

The main menu comes with the controls of the program. For example the main menu of this application includes students registration where the student registers from, it also contains course enrollment button where the student enrolls after registering, further it contains the button where students with fee balances can be retrieved and a button to record students fee payments, a button to create database backup and a button to exit the application. Finally there is a button where one can view all the records in the students table. These are the most important controls on this menu form.



Screenshot 1.3 Database backup

The database backup form contains four controls and these are: Create backup where one can create a backup of the database and all the data in the tables, there is the cancel button where one can cancel the backup operation, another useful button on this form is the main menu button where one can return or navigate to the main menu of the application and finally there is the exit button which exits the application.

The screenshot displays the 'e-Registra System' web application. The top navigation bar includes 'WELCOME TO KIU e-REGISTRA' and a menu with 'File', 'Search', 'Select', 'Edit', 'View', 'Move To', 'Help', and 'Home'. The main content area is titled 'e-Registra System' and contains two primary sections: 'STUDENTS DETAILS' and 'Controls'.

STUDENTS DETAILS

Course ID:	8
Account No:	1
Registration No:	BCS/16877/71/DF
First Name:	CHRISPIN
Last Name:	OTIENO
Sex:	MALE
Date Of Birth:	05 May 1988
Country:	KENYA
Email:	CRISOTIENO@YAHOO.COM
Telephone No:	720176323

Controls

- Add:** Represented by a green plus sign icon.
- Save:** Represented by a floppy disk icon.
- View All:** Represented by a blue 'A' icon.
- Delete:** Represented by a red 'X' icon.
- Update:** Represented by a blue house icon.
- Search:** Represented by a magnifying glass icon.
- Main Menu:** Represented by a green circular arrow icon.
- Show Report:** Represented by a green document icon.

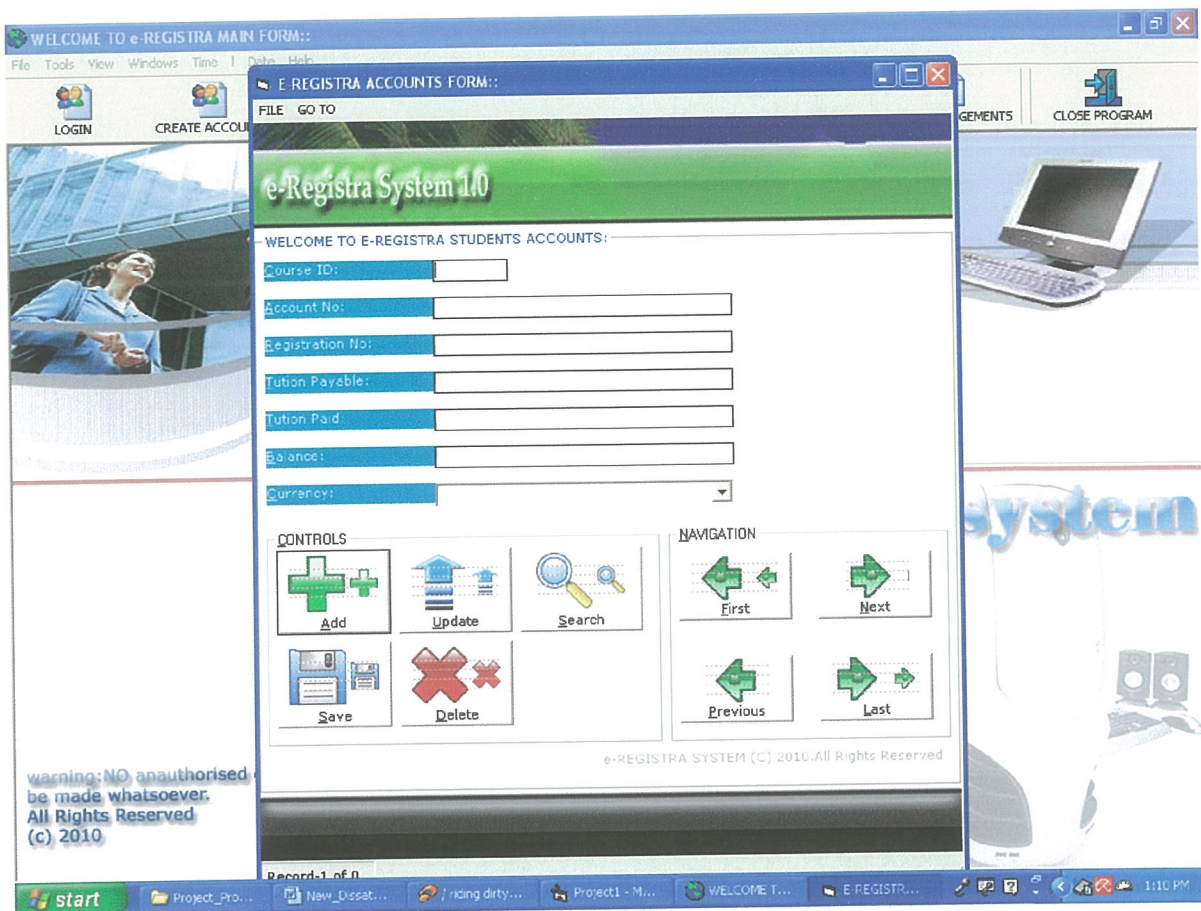
Navigation

- First:** Represented by a green double left arrow icon.
- Previous:** Represented by a green single left arrow icon.
- Next:** Represented by a green single right arrow icon.
- Last:** Represented by a green double right arrow icon.

At the bottom of the application window, a status bar shows 'Record1 of 2', the date '5/17/2010', and the time '1:05 PM'. The Windows taskbar at the very bottom displays the 'start' button, several open application windows, and the system clock.

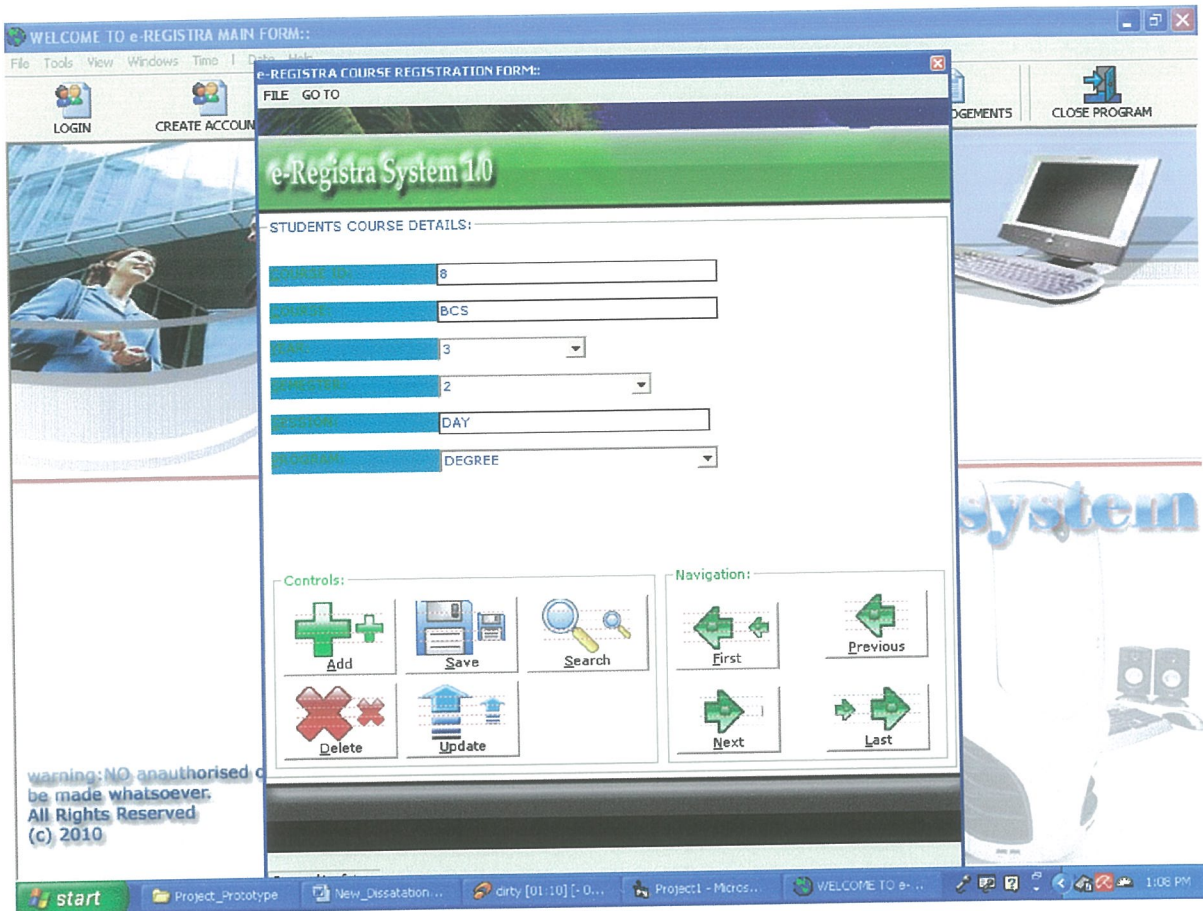
Screenshot 1.4 Students registration form

The student's registration form contains the controls for adding, saving, deleting updating and searching for a record. Remember that the tables are related therefore one must register before enrolling for a course and recording the fee payments. Other controls include view all control where one can view all the records in the database, show report control where one can view students report and the main menu where one can navigate back to the main menu. The course Id of the student is assigned automatically therefore one need not to fill it. In fact it has been disabled to prevent users from adding data into it. Other textboxes have not been disabled and one just needs to add in data. However remember that no textbox should be left blank when adding data. This will cause an error. Finally there are also navigation buttons which are first, next, previous and last which assists the user to navigate from one record to the other.



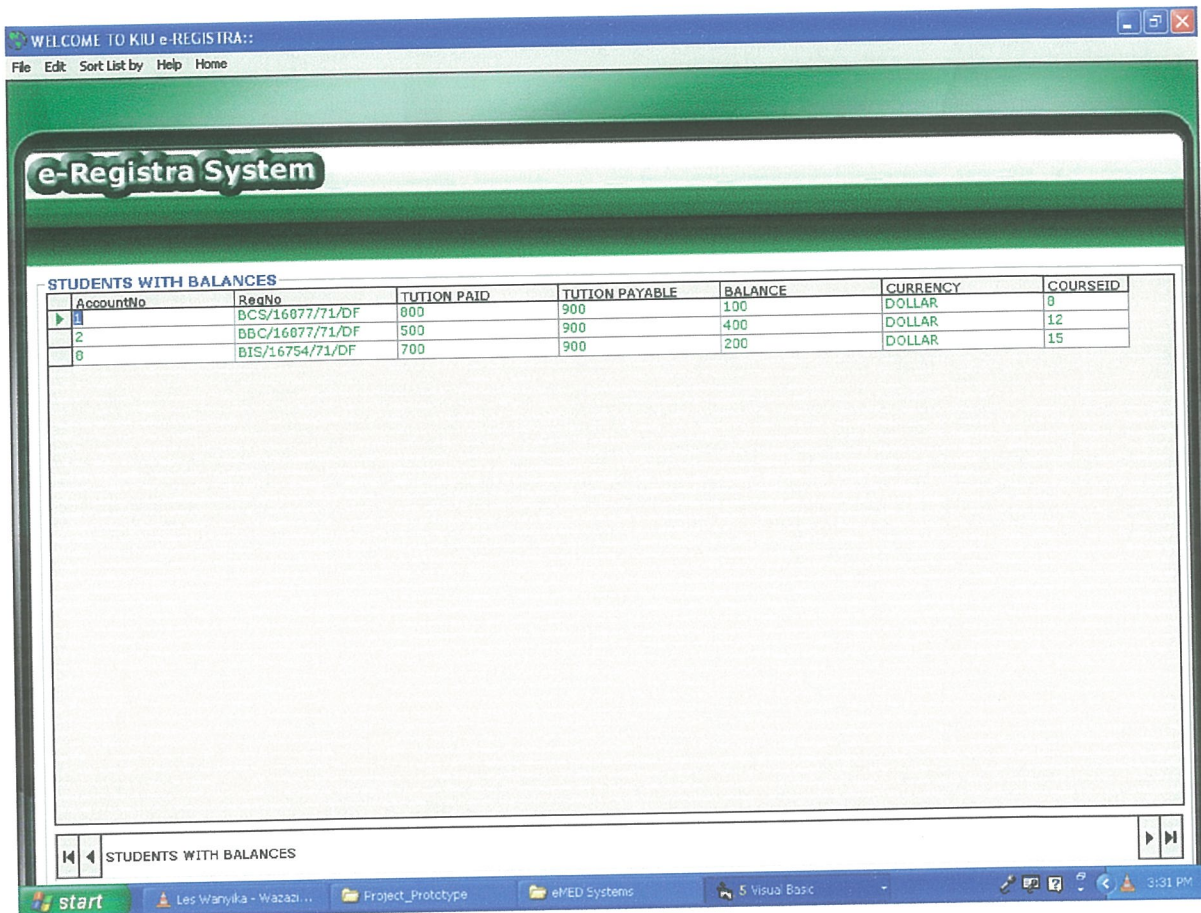
Screenshot 1.5 Students accounts form

This form contains the controls same as the ones of the registration form. That is add, update, search, save and delete which have the same functionalities as the ones of the registration form. There are also the navigation controls which assist the user to navigate from record to record. However one must register before recording his/her fee payments because the tables are related.



Screenshot 1.6 Students course enrollment form

This form also contains the controls same as the registration form. That is add, update, search, save and delete which have the same functionalities as the registration form. There are also the navigation controls which assist the user to navigate from record to record. However one must register before enrolling for a course because the tables are related.



Screenshot 1.7 Students with balance form

This form lists all students with balances. It contains no controls because its objective is to list all students with balances. It only has a menu that enables one to exit the program and to go back to the main menu.

STUDENTS ENROLLMENT REPORT					
Zoom 100%					
ADMISSIONS STUDENTS REPORT					
RegNo:	FIRST NAME:	LAST NAME:	COUNTRY:	eMAIL:	GENDER:
BCS/16877/11/DF	CHRISPIN	OTIENO	KENYA	CRISOTIENO@YA	MALE
BBC/16877/11/DF	DENNIS	MOMANYI	KENYA	DENNIS@YAHOO.	MALE
BBC/20987/11/DF	PETER	OCHOLA	KENYA	PETEROCHOLA@	MALE
BBC/20987/11/DF	SAMUEL	OTIENP	KENYA	SAMUELOTIENO@	MALE
BIT/17899/11/DF	ERICK	RAUDO	USA	RAUDO@YAHOO.	MALE
BIS/16754/11/DF	ERICK	OMONDI	TANZANIA	ERICKOMONDI@Y	MALE
ADMISSIONS STUDENTS REPORT					
Pages: 1					
start Mapangala - Widon... FINAL REPORT eMED Systems Visual Basic					

Screenshot 1.8 Students report

This form shows the students report where one can print all the information about the students.

The report can also be converted to other format such as html.

CHAPTER FIVE

RECOMMENDATIONS, LIMITATIONS AND CONCLUSIONS

5.0 Introduction

This chapter presents discussions, recommendations and conclusions of the project according to the objectives of the research.

5.1 Recommendations

From the discussion above the researcher recommends that in future, this project should not be developed for a stand alone environment. Its development should take a more centralized consideration. A network environment should be considered in this regard.

Regular deletion of unwanted (obsolete) records should also be corrected to maintain an adequate memory for better performance. The members of staff or any other user involved in data entry in the system should validate the data before entry in order to maximize accuracy and system reliability.

Unlike the object oriented structure which has the ability to handle graphics, pictures, voice and text, types of data, without difficulty this structure is only popular for text, and types of data. Therefore the researcher recommends that in future this application should be improved to handle graphics, pictures, and voice.

5.2 Conclusion

From this research, it can be concluded that database management system is now such an integral part of our day to day life that often we are not aware that we are using one.

But let us not depart from the traditional file system which is largely obsolete. There are very good reasons for its existence.

For example understanding the problems inherent in file-based systems may prevent us from repeating these problems in a database system.

Secondly if you wish to convert a file – based system to a database system, understanding how the file system works will be extremely useful, if not essential.

We have shown the application and implementation of the above system. Using this application KIU have a chance to track fast and accurate students identification, improve student's information security by capturing basic data (such as students unique registration number, account number, course id, name), prevent/reduce registration errors, increases efficiency and productivity, and cost savings. The application also helps the institution to build a better, more collaborative environment between different departments, such as the finance, faculty, and admissions.

However, this application entails a risk:

The data cannot easily be shared with other users. This illustrates a very common problem: if data are of interest to one person, they probably are of interest to other s as well. For this reason, personal computer databases should be limited to those rather special situations (such as in a very small organization) where the need to share the data among users of the personal computer database is unlikely to rise. This project has been specifically developed to work in

personal computers i.e. to work as a personal computer database of which is still an improvement from the existing system.

So there's every justification that KIU really needs a system that will provide up to date information which is very crucial to every organization.

5.3 Project Limitations

When carrying out this research, the researcher faced the following problems:

1. The time frame that was given for the research was not enough therefore some of the things were left out undone.
2. The researcher had limited finances to finance the research therefore the researcher was unable to finish every objective of the research.

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APPENDIX A

1.0 Budget of the project

ITEM	PRICE
Internet	40,000 ugx
Flash disk 2GB	50,000 ugx
Blank CDS	3,000 ugx
1 Rim of papers	10,000 ugx
Photocopy, Printing, Binding	50,000 ugx
Transport and food	70,000 ugx
Air time	40,000 ugx
Total	263 ,000 ugx

TABLE 5.5: BUDGET OF THE PROJECT

1.2 Project plan

Note that the project duration is for six months

Number	Task	December	January	February	March	April	May
1	Problem analysis						
2	Design the program						
3	Coding						
4	Testing and debugging						
5	Maintaining the program						

TABLE 5.6: Table showing the project plan

KEY:



COMPLETED TASKS



INCOMPLETE TASKS

APPENDIX B: SYSTEMS CODES

CODE FOR ADDING A NEW RECORD

```
Private Sub cmdAdd_Click()
```

```
'Add a new record
```

```
On Error GoTo HandleError
```

```
If cmdAdd.Caption = "&Add" Then
```

```
    rsStudent.AddNew
```

```
    DisableControls
```

```
    SetUpAdd
```

```
Else
```

```
    rsStudent.CancelUpdate
```

```
    txtReg.Locked = True
```

```
    EnableControls
```

```
    cmdSave.Enabled = False
```

```
    cmdAdd.Caption = "&Add"
```

```
    rsStudent.MoveLast
```

```
End If
```

```
cmdadd_Click_Exit:
```

```
Exit Sub
```

```
HandleError:
```

```
MsgBox "Unable to carry out requested action.", vbInformation, "e-Registra System"
```

```
On Error GoTo 0
```

```
End Sub
```


CODE FOR SAVING A RECORD

```
Private Sub cmdSave_Click()

'Save the current record

On Error GoTo handleErrors

rsStudent.Update

txtReg.Locked = True

EnableControls

cmdSave.Enabled = False

cmdAdd.Caption = "&Add"

cmdSave_click_Exit:

Exit Sub

handleErrors:

Dim strmessage As String

Dim errDBError As ADODB.Error

For Each errDBError In conAVB.Errors

strmessage = strmessage & errDBError.Description & vbCrLf

Next

MsgBox strmessage, vbExclamation, "Duplicate Add"

On Error GoTo 0

End Sub
```

CODE FOR DELETING A RECORD

```
Private Sub cmdDelete_Click()

Dim confirm As String
```

```

confirm = MsgBox("Are you sure you want to delete this record?", vbYesNo, "e-Registra
Delete Confirm")

On Error GoTo HandleError

If confirm = vbYes Then

With rsStudent

    .Delete

    .MoveNext

    MsgBox "Record Deleted!", vbInformation, "e-Regitra system"

    If .EOF Then

        .MovePrevious

        If .BOF Then

            MsgBox "The record set is empty.", vbInformation, "e-Registry No Records"

            DisableControls

        End If

    End If

End With

Else

MsgBox "Record NOT deleted!", vbInformation, "e-Regitra system"

End If

cmddelete_click_exit:

Exit Sub

HandleError:

MsgBox "Unable to carryout requested action.", vbInformation, "e-Registra System"

```

On Error GoTo 0

End Sub

CODE FOR NAVIGATING THROUGH THE RECORDS

Private Sub cmdMoveFirst_Click()

'move to the first record

On Error Resume Next

rsStudent.MoveFirst

DisplayRecordCount

End Sub

Private Sub cmdMovePrevious_Click()

'Move to the previous record

On Error Resume Next

With rsStudent

 .MovePrevious

 If .BOF Then

 .MoveLast

 End If

End With

AdoStudent.Recordset.MovePrevious

DisplayRecordCount

End Sub

```
Private Sub cmdMoveNext_Click()
```

```
'Move to the next record
```

```
On Error Resume Next
```

```
With rsStudent
```

```
    .MoveNext
```

```
    If .EOF Then
```

```
        .MoveFirst
```

```
    End If
```

```
    DisplayRecordCount
```

```
End With
```

```
End Sub
```

```
Private Sub cmdMoveLast_Click()
```

```
'move to the last record
```

```
On Error Resume Next
```

```
rsStudent.MoveLast
```

```
DisplayRecordCount
```

```
End Sub
```

```
CODE FOR CREATING THE DATABASE BACKUP
```

```
Private Sub cmdBackup_Click()
```

```
FileName = "" + Me.txtpath.Text + "\" + Me.textfile.Text + ".mdb"
```

```
    Set FileSystemObject = CreateObject("Scripting.FileSystemObject")
```

```
    FileSystemObject.copyfile App.Path & "\e-register.mdb", FileName
```

```
    MsgBox "Successfully back-up", vbInformation, "e-REGISTRA SYSTEM"
```

```

        Me.Drive1.SetFocus

        Unload Me

        frmMainMenu.Show

    End Sub

    Private Sub Dir1_Change()

        Me.txtpath.Text = "" & Dir1.Path

    End Sub

    Private Sub Drive1_Change()

        Dim d, fs As Object

        Set fs = CreateObject("Scripting.FileSystemObject")

        Set d = fs.getdrive(fs.getdrivename(Drive1.Drive))

        If d.isready Then

            Dir1.Path = Drive1.Drive

            Dir1.SetFocus

        Else

            MsgBox "DRIVE IS NOT READY!!", vbCritical, "e-REGISTRA SYSTEM"

        End If

    End Sub

    Private Sub Form_Load()

        Unload MainFrm

        Me.Drive1.Refresh

        Me.Dir1.Refresh

        Me.Drive1.Refresh

```

```

        Me.textfile.Text = Format$(Now, "d-mm-YYYY")

End Sub

CODE FOR LOGIN

Private Sub cmdok_Click()

    'check for correct password

    If txtpassword = "pwd" And txtUserName = "user" Then

        'place code to here to pass the

        'success to the calling sub

        'setting a global var is the easiest

        LoginSucceeded = True

        Unload Me

        frmMainMenu.Show

    Else

        MsgBox "Invalid Password, try again!", , "Login"

        txtUserName.SetFocus

        SendKeys "{Home}+{End}"

    End If

End Sub

```

THE CODE FOR SEARCHING A RECORD IN THE DATABASE TABLES

```

Private Sub cmdLetter_Click(Index As Integer)

    Dim BookMark1 As Variant

    'Mark your place in case no match is found

    BookMark1 = AdoStudent.Recordset.Bookmark

```

```

'Move to top of table to start search

AdoStudent.Recordset.MoveFirst

AdoStudent.Recordset.Find "eMAIL >=" + cmdLetter(Index).Caption + "", 0,
adSearchForward

If AdoStudent.Recordset.EOF = True Then

    AdoStudent.Recordset.Bookmark = BookMark1

End If

txtReg.SetFocus

End Sub

Private Sub Form_Load()

Dim i As Integer

'Size buttons

cmdLetter(0).Width = (frmSearch.ScaleWidth - 2 * cmdLetter(0).Left) / 26

For i = 1 To 25

Load cmdLetter(i) ' Create new control array element

'Position new letter next to previous one

cmdLetter(i).Left = cmdLetter(i - 1).Left + cmdLetter(0).Width

'Set caption and make visible

cmdLetter(i).Caption = Chr(vbKeyA + i)

cmdLetter(i).Visible = True

Next i

End Sub

```