

Development of Student Information System

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Abstract: *Information system in any organization is an essential element. For this purposed, many organization spend budget to buy a good system in order to have a reliable system to be operated in their organization. Many systems that invented are focused on the user friendly element e.g. easy to print out the document, available in cellphone and easy to access from anywhere. The proposed project developed student information that be used in Faculty of Electronics & Computer Engineering (FKEKK) and is known as the Student Information System (SIS). This system focused on recording and updating the student data. It is also will provide report for the lecturer who wanted to check their student status. Besides, this system was developed based on the forms oriented which used by the existing Staff Information System before. This new system used database concept to store all the information, which related to land application processes. As guidance for this project development, Rapid Application Design (RAD) methodology is used. As the conclusion, the software was fully functional and achieved the objectives. This system will contribute a new knowledge to the student information system and give the ease to the user for making arrangement or scheduling the student matters. This system will give a better performance in arranging the lecturer and student information without having to do it manually. For the future improvement, it is suggested that this system available and able to be used through cellular phone as the nowadays demand.*

Keywords: Database, Graphical User Interface (GUI), Information System, Rapid Application Design (RAD)

1. Introduction

The information system is important in collecting all data and information of all staff or member in one organization to be in one place. The system is normally provided very helpful task that will replace the human as to keep it in file as the inventory or other purposes. In order to design a helpful system in order to make ease to the user, the system is developed by using Microsoft Visual Basic 6.0 software linking with database that is using Microsoft Access 2003 and 'sql' as the language or instruction of the system. The proposed system is a standalone system. This system focused on recording and updating the data. It is also provided report or printed document to the user in the system which will make the status of the student easier to be checked. Further, this system development is based on the forms oriented which was already been used by the FKEKK staffs before. This new system used database concept to store all the information which related with land application processes [1].

Several literature reviews have been conducted to find the knowledge and source to start the project. After survey has been conducted, system named Student Information System is developed for FKEKK. Main focus is to make helpful and easier system to student and lecturer in order to manage the student information. Therefore, it will help lecturer to search and update information and decrease redundant information and repeated information in the future. Therefore, this student information system is developed with one of group database that included lecturer information, student information, student list, activity information, and report view. Lecturer in FKEKK can choose any information from the system and update all the data through this Student Information System.

Based on the existing system, there is not much information that can be retained and checked by lecturers. For this purposes the lecturer need to save manually all the data in order to check and analyze the data from the system. This proposed system will save time and reduce a delay process in

surfing when the certain information is required. The existing system made repeated of information to be saved and the old information cannot be updated. This system will solve these problems that frequently occurred at the existing system. From the previous system, all data that been used are recorded in the system. The disadvantage of the existing system is not reliable for the user. In the case when a file is opened for each application, the previous system showed that there some problems occurred e.g. data loss and damage, the list of files is difficult to be viewed and difficult to be checked the student status. As to respond to all the problems stated, the project targeted several objectives that to be achieved at the end of this project. The objective is to improvement data security issue. This system based on database concept which is more reliable. All student data will be kept in a dedicated database. By using this database concept, some problems such as data loss and damage can be avoided. This system also targeted to make an easy checking students' status. By using this system, staffs can check the students' status faster in time compared to the existing system. Therefore, the staff can reduce waiting time in order to check all the files like before. The other objective is the issue that related to searching and updating the data. Staffs can search and update the data systematically. This system will provide some functions such as searching and updating in order to help the staffs to control the data applications.

The questionnaire was distributed to learners of the current system. There are 15 respondents who have spent their time to give their feedback to the existing system and the new proposed system. According to the studies, there are 97% of respondents agreed to have an improvement of Student Information System in the effectiveness of student learning environment.

2. Methodology

This project methodology is needed to make sure the project that consists of software development will be developed systematically in order to acquire a better result. The overall of the project methodology is shown as figure below.

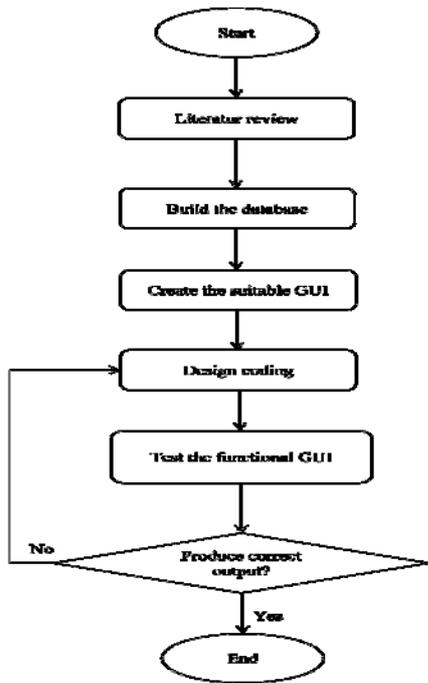


Figure 1: Flowchart of the overall project

The methodology is divided to four main components which are literature review, database design, creating a Graphical user interface (GUI) and finally is the software testing.

2.1. Literature Review

The project begins with literature review where the overview of the project needs to be known. The literature review is done by finding out numbers of lectures student and class provided, involved for Faculty of Electronics and Computer Engineering (FKEKK), how many class and how many lecturers contribute to this faculty. All this information need to be known in order to provide information inside the software that is useful in arranging the database.

2.2. Database Design

Database is required to improve the functionality of this project. Therefore, the first stage of software development is to create the database. Database is a body of information made up of related pieces of data organized so that they can be easily been manipulated by the computer. As for the software development, it is important to have database as all the information needed can be saved for future used [2].

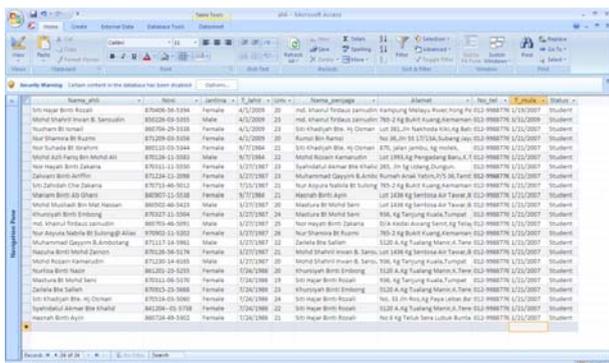


Figure 2: Interface of the database using Microsoft Access 2007

2.3. Create the suitable GUI complete with coding

GUI is a way to interact with a computer using pictures and other visual elements displayed on a computer screen. The pictures and buttons used to control many Internet sites are an example of a GUI. GUI is important to make the user easy to understand what they need to do in order to use the software [3], [4]. GUI must be user friendly and easy to be understood [5]. In order to make the GUI function, Microsoft Visual Studio coding must be inserted to make the software work properly [6].

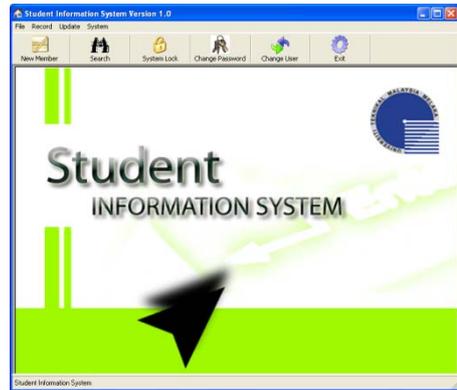


Figure 3: GUI of the main module of Student Information System

2.4. Software testing

Software testing is the process used to measure the quality of developed computer software to determine that the software meets its required results. This testing process of executing a program is intended of finding errors.

2.5. RAD (Rapid Application Design) Methodology

This Student Information System development used RAD (Rapid Application Design) methodology. This methodology method follows the System Development Life Cycle (SDLC) that in a sequential and structured away. RAD is a methodology for compressing the analysis, design, build, and test phases into a series of short, iterative development cycles. This has a number of distinct advantages over the traditional sequential development model. Iteration allows for effectiveness and self-correction. Studies have shown that human beings almost never perform a complex task correctly the first time. However, people are extremely good at making an adequate beginning and then making many small refinements and improvements. RAD projects are typically operated with small-integrated teams comprised of developers, end users, and IT technical resources. Small teams, combined with short, iterative development cycles optimize speed, unity of vision and purpose, effective informal communication and simple project management.

The fundamental principle of iterative development iteration delivers a functional version of the final system. It is a properly engineered, fully working portion of the final system and is not the same as a prototype. For example, the first iteration might deliver 100% of 10%, the second iteration 100% of 25% and etc. The RAD method has a task list and a work breakdown structure that is designed for speed. However, the major difference in RAD is a set of

management techniques that are optimized for speed. Among the most important are prototyping, iteration and time boxing.

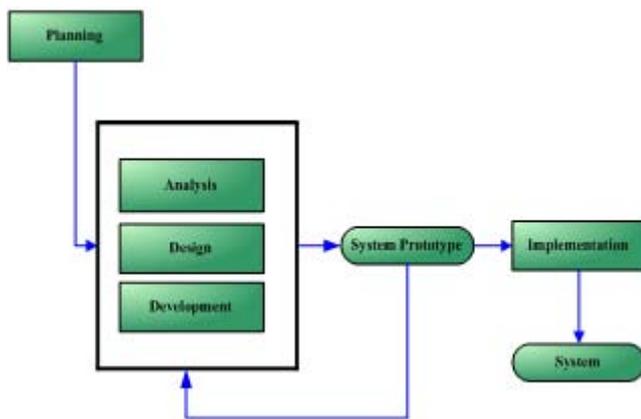


Figure 4: System prototype diagram

2.6. Requirement Plan Phase

Before developing the system, either small or large system the proper planning needs to be put in the first place. This is to make sure that all the activities that will execute and overall development are under control. The purpose of planning is to prepare the workflow for project management start from early stages of project development until end of development. The developer need to mention that it is very important to divide the project into subtasks to make sure about time estimation and to identify source requirement to complete this Student Information System project.

In addition, the developer also needs to identify what is the hardware and software will be used. The hardware that been used to develop this system are Personal Computer (PC), keyboard and mouse, 128 MB of RAM, 40 GB of Memory, printer and Universal Serial Bus Flash (USB Praline). Otherwise, for software, are use Microsoft Visual Basic 6.0, and Microsoft Access 2003.

2.7. Requirement Specification Analysis Phase

All the requirement analysis phase will be started after the study case for this system has been completed. Through this phase, developer will determine clearly who will use the system, function of the system, when and where the system will be executed.

Developer will begin the study from existing system to define the strength and weakness. This is important as it can identify the opportunities to improve the existing system to a new system. If there are any shortcomings or defects, it can be corrected in the new system. After this research, the concept of new system is developed. Besides, the information is collected by using fact-finding techniques such as background reading, interviewing and observation.

As a developer, it needs to analyze the feasibility of new system, which is to improve the system as to make sure that the new system will fulfill the user requirement. All the constraints and limitation of the new system also need to analyze.

2.8. Design Phase

Design phase started after the specification and analysis phase completed. In this step, specified technical designs were created to the smallest detail. It is common for several alternative solutions to be identified, but only one must ultimately be chosen as the best of the system and users. Tradeoff may become part of the reality for the project, which may include time, scopes and functionality. The purpose of the system designing is to create a blueprint for the new system that will satisfy all documented requirements. There are several things to identify during system designing such as all necessary outputs, inputs, interfaces and processes. Furthermore, for this phase, optimal solution of the designing was developed. The main objects for the system and relationship between object are well defined to make sure that there will be an interaction on it, so that all the objects need to classify on their own classes. Other than that, the attribute of class also was defined.

Also in this phase, there are few designing, which applied into new system such as database design, interface design and coding design.

2.8.1. Database Design

To design database, it considers and concerns in many aspects. The specification will be determined by what is the data need to be stored in database. In database design, each step of the process needs to be done very carefully for avoiding any unexpected errors. The errors might occur in database, it can give complex problem for the system. These databases are designed by using Microsoft Access 2003. For Student Information System database, there are seven tables involved such as student, lecturer, activity, position, and class, list of student and list of lecturer.

2.8.2. Interface Design

The purpose of interface design is to determine how the layout of the system and to make sure that this layout suitable with user requirement. The good designing can attract the users and supposedly not confused the users with each functions of the system. For instance, the developer also needs to concern about user-friendly interface during designing phase. Through this system, there are some elements, which been used to design the interface.

2.8.2.1. Text Box

The user can key in the input in the text boxes. However, certain text boxes only receive numeric inputs, but not character input such as Identity Card (IC) number.

2.8.2.2. Button

There are a few buttons which been prepared for the user's usage such as accept, ok, cancel, close, update, save, print and search button. All these buttons have their own functions.

2.8.2.3. Combo Box

The purpose of the combo box is to list all selection items there. Therefore, the users do not need to key in any input, but they can drag down the scroll and choose the best list as their input.

2.8.2.4. List View

All the data will be view in this 'list view' in the system

2.8.2.5. Data Designer-Report Generator

It used to view the report about summary of data record and list of files, which are already kept in database.

2.8.3. Coding Design

This coding designing showed how programming language would be implemented. It also will explain the purpose for each coding development. SQL statement is used in order to make sure that interfaces can be connected with database.

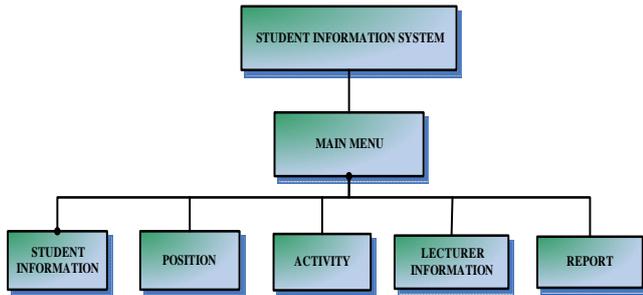


Figure 5: System structure diagram

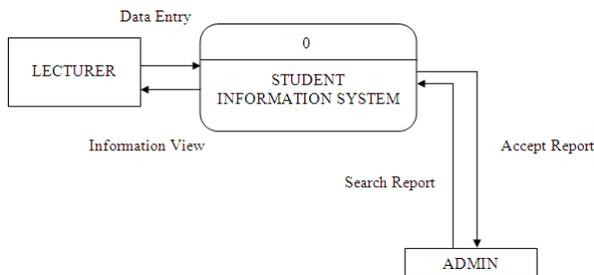


Figure 6: Context diagram

2.9. Data Flow Diagram (DFD)

In design module, Data Flow Diagram (DFD) is used to show the data flow and how it move or work in task on system. Therefore, DFD used several levels such as level 0 refer to synopsis of the system and level 1.

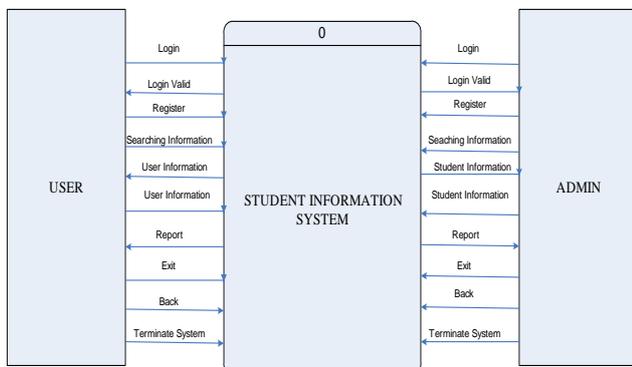


Figure 7: Level 0 flow diagram

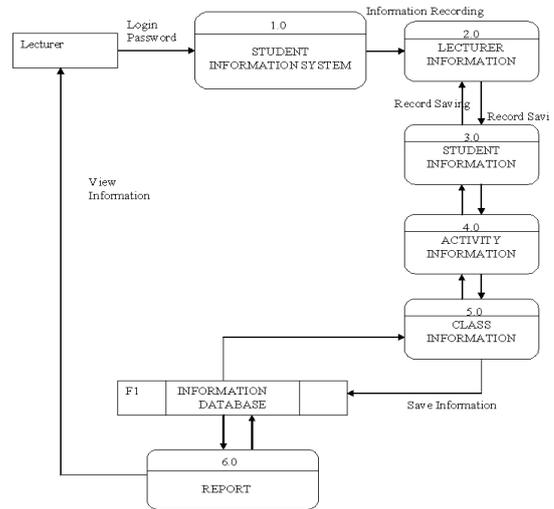


Figure 8: Level 1 flow diagram

3. Results

In software development, a prototype is a basic part of working model of a product or information system, usually built for demonstration purposes or as part of the development process. Before creating the full software needed, a prototype is built in order to demonstrate what the software is basically about. Here is the GUI example of the prototype that is fully functioning.

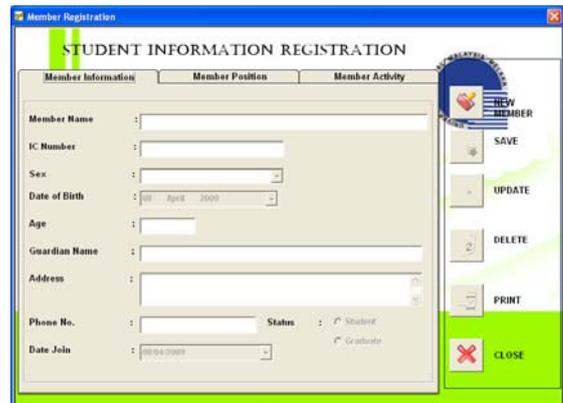


Figure 9: GUI of fully functional prototype

The system showed good result as presenting the GUI which as the desire in project objectives. The following figures below show the real GUI for the user by using this system.

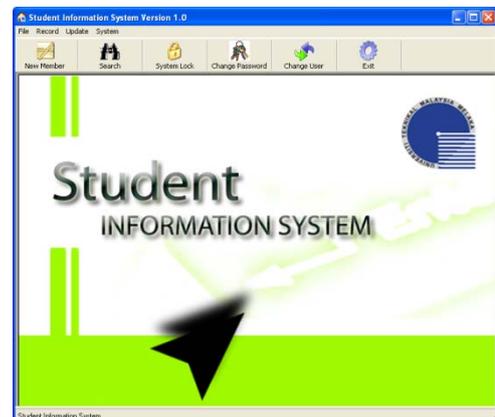


Figure 10: Main menu of the system

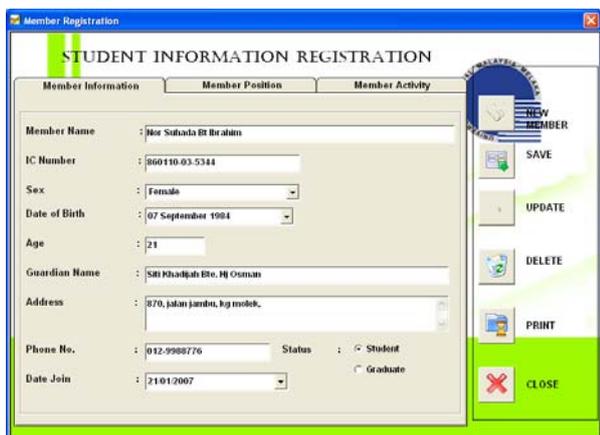


Figure 11: Student interface

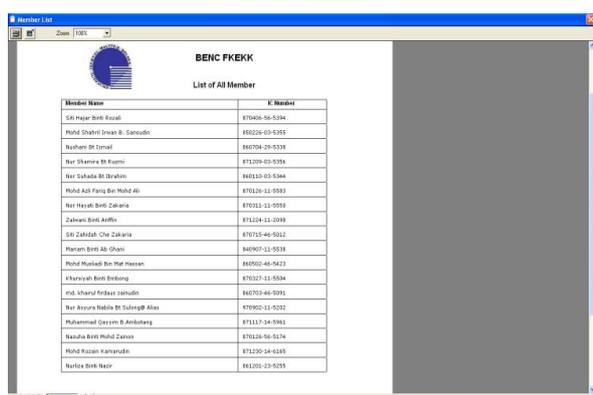


Figure 12: Student info list (output)

4. Conclusions

As for the conclusion, the objectives for this project were achieved and functioned well as the desired target. This system will help the Student Information System database works systematically and will make ease the user in order to manage all the student data in the system. This system will give a better performance in arranging the lecturer and student information without having to do it manually. This system will help faculty’s staff to arrange student matter and schedule faster and easier. Furthermore it will allow the lecturer to focus on other important task in the Faculty. As the future recommendation, the project is recommended to be built with the fully functional software that fulfills all the criteria needed and also applied with more complicated algorithm to the system.

5. Acknowledgment

We are grateful to Universiti Teknikal Malaysia Melaka (UTeM) for their kind help for giving their laboratory facility as the place to do research and experimental works in order to complete this study. Thank you to all the supports given from our Centre of Telecommunication Research and Innovation (CeTRI) especially the knowledge and supplying the components which related to this project.

References

[1] Universiti Teknikal Malaysia Melaka, “Buku Panduan Diploma dan Sarjana Muda, Fakulti Kejuruteraan Elektronik dan Kejuruteraan Komputer Sesi Akademik

2007/2008”, Penerbit Unirsiti Teknikal Malaysia Melaka, 2008.
 [2] Rick Dobson, “Programming Microsoft Access 2000”, 1999.
 [3] G. Steven Tuthill, Ed.D. & Susan T. Levy. “Knowledge Based Systems”, 1991.
 [4] Rolston D.W. “Principles of Artificial Intelligence and Expert Systems Development”, 1988.
 [5] N. M. Z. Hashim, N. A. Ali, A. S. Jaafar , N. R. Mohamad, L. Salahuddin, N. A. Ishak, “Smart Ordering System via Bluetooth”, International Journal of Computer Trends and Technology (IJCTT) – volume 4 Issue 7, pp. 2253-2256, 2013.
 [6] Eliason & Malarkey, “Visual Basic 6.0, Environment, Programming & Application”, 1999.

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