Bilingual Translation System (BTS)

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Abstract

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Educational tools have evolved tremendously over the past few years. Educational tools used to be restricted to anything involving pen and paper, it is not so now. With the introduction of computers, the way things are handled and conducted in society has changed. The educational field is not excluded. Parents and educators are aware of the impact of computers on our lives and the lives of their children. Computer usage have been integrated with learning. Therefore more and more educational programs are being developed each day.

The Bilingual Translation System (BTS) is a stand-alone system. It is a translation system where English words are translated to other languages. It is to be used like a dual language dictionary. It is expected to cater the students who are learning a foreign language as well as by the lecturer of that language.

In Malaysia, getting revision and reference materials including dictionaries for foreign languages is not an easy task. With the introduction of this package, it is hoped that local students will no longer have difficulty in finding a translation system.

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Bilingual Translation System (BTS)

Chapter 1

Chapter 1: Introduction

1.1 Project Background

The Bilingual Translation System (BTS) will serve as a stand alone translation system for students and lecturers of a foreign language. It could be used as a learning package or be used as reference material.

The system was designed with the intent of enabling the students to translate one word from the English language into a word of a foreign language and vice-versa quickly without having to access the Internet. The words available in the system will be directly related to the syllabus of their respective language of learning. The system is not designed to replace the lecturer but more to assist students in daily lessons and revisions.

The students are able to conduct a search within the system using 4 methods. They will be explained later on in the report.

The will be three types of users for this system – lecturers/administrators, students and super user. The lecturer/administrator has the ability to enter and modify data in the database. The student is only allowed to conduct a search and view information in the database. The super user would manage the overall system – including information regarding the administrator and student.

1.2 Project aim

The Bilingual Translation System (BTS) was created with an aim to support and translate the English Language into another language and vice versa. The system will be able to support up to an unspecified amount of languages that does not have special characters in their alphabet.

1.3 Project objective

Some of the objectives of this system include:

1. The main objective of this system to create a system that will translate words in English into a foreign language or vice versa.

2. This software is a stand-alone system and not a web based system. Therefore students do not need an Internet connection to use this system. This feature would enable all students to have the chance to utilize this system and not subjected to those with Internet connection only.

3. This system could act as a stress relief for students. If they are not able to get a copy of a dictionary, they could use this system for word translations related to their topic of learning. This is because data in the database is added in by the lecturer themselves.

4. This system would indirectly assist the students in building up their vocabulary for the language. By using the system to translate the required words, students eventually would be able to remember the words easily. This will help to build up their vocabulary.

5. The computer to be used as an educational tool. Steps are being taken to allow computers to assist in learning with the set-ups of smart schools, the introduction of educational software's and many more. The usage of this system would be one step forward the government's goal which is integrating computers with the education system.

1.4 Project scope

The scope of this project is to determine the current practice of translations between languages before integrating it with a computer language learning system. The system intended would be the Bilingual Translation System (BTS). Observations will be able to determine how the system will function.

Observations and interviews to all potential parties was done and recorded. It was concluded that the scope of this project will be broken to 3 groups. They are:

1. Student scope
2. Lecturer scope
3. Super user scope

1.4.1 Student's scope

Students will be the main users for this package will be students currently enrolled in a foreign language course. They will be allowed to search the database using more than one method. The students will probably consist of the following :-

i. University students

   a. Linguistic students – will be taking a foreign language either as a major/minor/elective subject. The hours they spend learning the language would depend on whether they are majoring/minoring or taking the language as an elective subject.

   b. Students of other faculties – will be taking this subject as an elective subject. They will attend approximately 4 hours of classes each week for 15 weeks.

   c. Students who are taking the course privately – will be taking this subject out of interest/for work purposes.

The main objective of this system is to translate a word/phrase from the English language to a foreign language.

1.4.2. Lecturer's scope

The lecturer would act as the administrator for this system. He would also be the first person to use the system. He will key in the English words/phrases as well as the translations into the table of the database.

This system is not meant to replace his classes. This system is meant to act as a dictionary for quick reference purposes during formal class hours.

1.4.3 Super user

The main person in charge of maintaining the system is known as the super user. He will oversee all details included into the database. He is the only one allowed to modify existing in the admin and student table.

1.5 Importance of this project

High importance is placed on this system. The reason is because while learning a language, referring to a dictionary to translate a word is a common routine among students. A syllabus specific computerized translating system could act as a dictionary to those in need.

The advantages of using a syllabus specific computerized translating system includes:

1. No paper wastage – The system will be installed into a computer. No paper would be used.

2. Does not waste time – The system would be syllabus specific. There fore, the required word will be included into the database. Students would not have to go through a whole list of word unrelated to their syllabus before finding the required word. This would the time spent looking for the meaning of a word.

This system is expected to help the students to build a bigger vocabulary in the foreign language. Therefore, this system is important.

1.6 Hardware and software requirements

Hardware and software are necessary in the process of building or designing a software. This project is no different. Listed below are a few suggested hardware and software requirements needed.

1.6.1 Hardware requirements

A personal computer (PC) with minimum a Pentium processor, 32MB RAM, CD-ROM driver, speakers, keyboard, computer mouse and a monitor.

1.6.2 Software requirements

Windows 98 operating system, Microsoft Access 97, Microsoft Visual Basic 6.0, Microsoft Word 97 and SQL engine.

ACTIVITY DONE	DURATION										
	Mac	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan
Understanding & planning the system											
Software learning											
Literature review											
System analysis											
System design											
System coding/programming											
System testing											
Documentation											

TABLE 1.1 PROJECT SCHEDULING

To complete this project, tasks involved in building this software will be divided into several phases. The phases will be completed stage by stage. The Gantt chart diagram on page 9 explains the amount of time needed phase by phase as well as the whole duration of the project in whole.

1.7.1 Understanding and planning the system

Initially, a research was conducted towards the way the lecturer would conduct his lessons. The problems involved as well as the software requirements are identified and recorded. Interviews with the lecturer and students (which included previous and current students) were also conducted. This is so ensure that the scope involved is clear for all parties involved.

Research and observations were also done on language learning sites currently available on the web as well as software which are already available in the market. Observation and research were conducted on the following categories:

1. Online websites

   existing web pages on the Internet were visited. Ideas of how the software's presentation was gathered in this activity.

2. Reports by past year students

   Various reports by previous students of the faculty was evaluated to get a clearer idea on how will the software be built, including the ways of coding and also information on database manipulation.

3. Determining software to use for developing the system.

   There are several software that were purchased by the Computer Science and Information Technology Faculty (FSKTM) which were tried and tested before a decision was made. Interviews were also done to gather opinions of the suitable software to be used. Most of the opinions were gathered from the students of FSKTM and individuals from the private sector.

1.7.2 Familiarizing with the chosen software

This phase was time consuming as the software chosen is the latest version available. It was later decided that these software's would be use to develop BTS:

i. Microsoft Word 97 – a product of Microsoft Corp

ii. Microsoft Visual Basic 6.0 – a product of Microsoft Corp

iii. Microsoft Access 97 – a product of Microsoft Corp

This phase is deemed the critical phase for the whole project. It is also the hardest of all phases. Software's which were chosen will have to be learnt on my own by reading through materials available. Hands-on learning is also required to familiarize with the software.

1.7.3 Literature Review

Suitable and relevant information are analyzed in this stage. Getting articles and relevant materials are quite tricky because not many systems supports multiple languages are

available. Most of the software's available concentrate more on teaching the language and does not place any emphasis on translation. Information regarding teaching of other languages is used as a substitute. However, online resources are quite extensive and it makes up the majority of the literature reviewed although most of it supports only two languages at one time. Ideas on the process of teaching a language using the computer was noted and recorded.

Not much time was spent on this phase as more emphasis is given to the coding phase.

1.7.4 System Analysis

In this phase, research is done to determine the needs of the system in detail. Discussions are done to determine to generate suitable ideas. Because this system is a teaching/learning system, it is important one understands what is suppose to be taught. All the information collected is recorded.

In general, information regarding the Bilingual Translation System (BTS) is done. Information regarding the database, relationships between the tables involved, data flow, screen design, interface design and system architecture is recorded. This will be discussed further in Chapter 4: System Implementation.

A more detailed system scope is done so the system will be user-friendly. Analysis is also conducted on previous year's students report for comparison and is recorded.

1.7.5 System Design

In this phase, all information related to how the system is going to be built is recorded. Activities and tasks involved in building a system will be coordinated with the chosen way the system will be built. This is important as the system will be built in an organized manner.

1.7.6 Documentation

The main aim of this report is to document information collected and implemented during the whole course of this project. The process of documenting this project is divided into several chapters:-

Chapter 1: Introduction

This chapter provides a simple explanation regarding the project built. Information provided includes the objective and planning of the project.

Chapter 2: Literature Review

This chapter explains the learning process done in building the software.

Chapter 3: Methodology/ System analysis

This chapter explains the methodology chosen in building this software. It also includes the analysis done on the software.

Chapter 4: System Design

This chapter explains how the system is built. Includes the system architecture as well as database architecture.

Chapter 5: System Implementation

This chapter discusses the coding approach as well as the style used in implementing the system. The scripting language chosen will also be mentioned in this chapter.

Chapter 6: Testing

This chapter will discuss the various testing methods available and which methods were used with this system (testing by unit, module etc).

Chapter 7: System Evaluation

This chapter discusses the problems encountered during the development of the system and measures taken to solve it. It also mentions briefly about the systems characteristics and future plans for the system.

User Manual

This manual will be a guideline for users new to the system.

Appendices

Relevant documentation will be included in this chapter to complement the system and report.

1.8 Chapter summary

The Bilingual Translation System (BTS) is similar to a dictionary. Its main objective is to provide word translation from the English language to another language or vice versa. The scope for this project would include students and the lecturers.

The project scheduling for this project has been determined. It is important that the scheduling is followed as to allow the system to be developed in an organized manner.

Bilingual Translation System (BTS)

Chapter 2

Chapter 2: Literature Review

The introduction of computers has changed the world we live in today. Having come a long way from the first time it was introduced, the computer has now become a necessity instead of merely a luxury. With the personal computer (PC) becoming more affordable, nearly every home is equipped with a PC of its own.

When the computer was first introduced, it was used mainly to store data. The users at that time were adults working for large corporations. Computers were then gradually introduced to society. More and more companies and organizations were computerizing operations which were done manually before. To enable the computer to be used by every level of society, the computer programmers have introduced programs and applications that are user friendly and easy to use. Today computers are now smaller in sizing, yet more powerful and affordable. This has helped change the role of computers today.

A bilingual dictionary is an important tool when learning a foreign language. It is common practice for students to refer to a bilingual dictionary whenever they need to translate one word from a language to another. Most of the time, the meaning of the word is not important; the students only require the word in that language.
For example, a Malay language student needs to know the word "pameran" in English. She looks up her bilingual dictionary and finds the word "exhibition". She does not need

to read the meaning of the word "exhibition" because she already knows the meaning of the word. She knew the meaning of the word in Malay; she just needed it to be translated to English.

The Bilingual Translation System (BTS)is similar to a bilingual dictionary. The only difference is, it supports multiple languages.

Before this when one wanted to translate one word from the other, a dictionary was used. However, with more people spending more time in front of their computers, creating a system that would enable them to translate words/phrases using a computer seems to be a practical solution.

Before developing the Bilingual Translation System (BTS), some research had to be conducted. The research covered resources such as Internet websites, reference books, interviews and existing educational software.

Web based systems and stand-alone systems were tried and tested. It is not easy to find a bilingual translation system that supports multiple languages. There are however a few on-line sites which offer translation services into various languages. Contents of the sites were for more specific purposes like for those who were migrating/moving to a new country or who are traveling on a vacation. It did not include translation for academic

purposes. Language learning systems were also used as part the systems reviewed. It is later decided that the Bilingual Translation System (BTS) be a stand-alone system.

Interviews and discussions were conducted in getting information regarding the most suitable software to be used in building the system. It is the idea that the applications used are easy to learn and handle but will be able to produce good results. The interview conducted helps in getting a general view regarding the planning of developing the system.

2.1 Literature Reviewed

In writing this project report, research work was conducted. The research was divided into several areas based on the type of resources available. This chapter would involve the websites and software's or any related materials which I have reviewed in the course of my research. Comparisons between systems were made. Systems were divided into two groups -- web based and stand-alone. Most of the systems reviewed are web based systems.

a. Web based systems

   Language sites available on the World Wide Web (WWW) were part of the research resource. From surfing the Internet, it was found that quite a number of sites are attempting to teach a language online. Most of the sites were hosted by universities and language centers.

It is important that websites of various languages were included in the research as the Bilingual Translation System (BTS) is meant to support multiple languages.

The websites covered has placed more emphasis on interactivity between the user and the application while learning. How the user and the system interact is an important part of building a system. It would not serve the purpose if the system built is not user friendly and difficult to use. This would eventually lead to system failure.

The interfaces of the systems were also observed. It is found that those with pleasant interfaces as well as easy to use were more popular with users compared to the mundane ones.

Below is a list of systems which were observed.

1. The Language House - www.taalhuis.com

   This is a website hosted by a language house in the Netherlands. Free language online classes are offered here. The classes are divided into two categories – beginners and intermediate.

This site concentrates more on the writing part of the language and not on the speaking part. The interface of this site is appealing and is easy to use. This is definitely a good site for online reference.

Advantages:

- user friendly
- objective is met

2. Test your Dutch - http://www.directdutch.com/intake.htm

This website does not teach the language online. The thing that caught my attention was the online test provided by the site – to distinguish the level of the student who is about to enroll for the course.

The test included multiple choice questions and fill in the blanks. It was easy to use and the question format is interesting.

Disadvantages:

- Not a learning software

3. Test your vocabulary - http://www.vokabel.com/

This website enables you to test your vocabulary in 4 languages. Select the language which is your mother tongue then select a language you wish to be tested upon.

Click on 'new word' to select a word, key in the answer and click 'test' to get the correct answer. Each word list consists of a 100 words or phrases.

This website is quite similar to Bilingual Translation System (BTS). This website is not for the beginner but more for an intermediate or advance student, someone who already has knowledge of the words in the learnt language. It is not meant to teach the vocabulary to the student but to test the users vocabulary skills.

The interface is a simple one and it is easy to use.

Advantages:-

- user friendly
- multiple languages

4. Foreign Languages for Travelers - http://www.travlang.com/languages/cgi-bin/langchoice.cgi

This website is dedicated for users who will be traveling to a particular country. This site provides online translation of the most important words/phrases needed

to know by a traveler. The users were then tested on their knowledge by answering the online quiz provided.

This website is an interactive one with a different way of getting the attention of the users. This website does not concentrate on the language proper but serves more as a guide for those traveling to a certain country. The syllabus available on this site is relevant to the target user.

Advantages:

- Phrases taught are useful
- Interactive
- Simple and easy to use

5. Learn Dutch Online - http://www.learndutch.org/

This site provides several ways to learn Dutch. Target users for this site are those who are interested in learning Dutch long distance. The courses are divided into – No Time, Time to Learn, More Time and Dutch.

Some of the activities include reading a text and answering questions related to the text and answering questions based on a picture provided. Users are given a chance to test themselves by doing the test questions provided.

This website concentrates not only on teaching the rules of the language but it also emphasizes on the speaking and listening part of the language. By adding in pictures , clips of text (comes with a sound file which reads out the text) as well as videos, it allows the users to familiarized themselves with conversational Dutch. An interesting site for beginners and intermediate users.

Advantages:

- Integrated audio and text screen
- Different chapters to suit the student's level

6. Brendan's Language Page - http://www.ultrasw.com/pawlowski/brendan/

This website is actually more of a pronunciation guide. It is a pronunciation guide for over 50 languages.

The web master of this site has included a table with two entities – pronunciation and examples. As this is a pronunciation guide, the web master relies on phonetic sounds. Sound files are not available. He then lists out a list of vocabulary in English and translates it to the chosen language.

The downside of this site is that the user has to be familiar with phonetic rules. Sound files are not available, therefore the user has to be able to make out the

sounds of the words using the phonetics signs. Users will not be able to double check whether they are doing it right.

Advantages:

- Pronunciation through phonetics
- Lots of reference words

Disadvantages:

- Text based only

7. fonetiks.org - http://www.fonetiks.org/

If one is interested in knowing the right way to pronounce a word in a language, this site is the place to be.

To know the right way to pronounce vowels sounds or other sounds, one would have to mouse over the vowel for the sound file to be played.

As sound files are included with the site, users would be able to know the right way of pronunciation by listening to the sounds projected.

Advantages:

- includes sound file

Disadvantages:-

- not a language learning site
- download time is long

8. Ellie Wood Languages - http://www.wood.demon.nl/ewl2/index.htm

This website has an interesting section title 'New to the Netherlands?' which is for the convenience of those who are new to the country. Here you will be introduced to common phrases deemed important in the every day lives of the user. The site does not provide any translation services. The translated phrases are fixed and displayed on the web page. Users are not allowed to submit in specific phrases.

Common phrases include phrases used while shopping, at the bank and going to the doctors. It is a good site for users who have just moved into the country. A very informative and useful guide.

Advantages:

- Good reference guide for beginners
- User friendly

b. Stand-alone system

Finding a non-web based translation system is hard. Most software's available in Malaysia did not concentrate on translation but more to teaching the language.

The software's reviewed here were contributed by Mr. Pieter van der Vorm from the Language and Linguistics Faculty, University Malaya.

9. Van in Informatica – Educatieve software

This software is more towards testing the users vocabulary. Users are given two sentences which contain one blank each. Users are then required to fill in ONE answer which would complete both the sentences. If the user keys in the wrong answer, a third sentence will appear which is of a lesser difficulty compared to the first two sentences. If the user still fails to submit in the right answer, a clue will be given. If the user still fails, the answer will then appear on the screen.

By using this software, users are tested on their vocabulary skills. This software also tests their level of understanding as to give the right answer, they would have to understand the sentences given.

This software however does not have an interesting user interface. As it uses MS Dos, the screen is black with white fonts.

10. LINC – Language Interactive Culture

This LINC multimedia language package presents real language materials embedded in the Dutch language culture. It is designed to help the user communicate more fluently with the native speakers of the language – either for business or pleasure purposes. The user is expected to have a basic knowledge of the language to use this package.

The contents of this package include video topics with transcripts and explanation of cultural issues. It also has hundreds of exercises on reading, writing, listening, speaking, vocabulary and grammar with feedback and pedagogical help screens. Reference grammar and a mini-dictionary is available with this software.

As the package uses integrated on-screen video, audio and text, the interface for this software is simply wonderful! It is very attractive, colourful, interesting and yet it is user friendly at the same time. The graphics are well done and the layout of the interface was well prepared.

Advantages:

- Easy to use
- Attractive and interesting
- Meets target objective

- Requires minimum computer specifications

11. Microsoft Encarta Language Learning Spanish

This software is a self-study language program to help students communicate in Spanish. Students will gain Spanish speaking and listening skills as well as learn how to recognize and use proper language given a situation. This software is not meant to replace a physical lesson but more as a help to students when it comes to studying.

It integrates videos, audio and text as part of the activities. It is interactive and interesting and will not easily bore the students.

Advantages:

- Interactive and user friendly
- Interesting and not boring
- Fun to use

12. TriplePlayPlus! French

Random Houses and Syracuse Language Systems Program jointly develop this software. Users will learn to understand, read and speak French.

This software includes many interactive games and comic strips that teaches over 1000 French words and phrases as well as complete conversations. It helps improve pronunciation by integrating speech recognition and record and playback features into the software.

Advantages:

- Fun and easy to use
- Multimedia application
- Satisfaction guaranteed
- Many great activities to be completed

13. F.O.C.U.S – High School Foreign Language

F.O.C.U.S is a step by step method targeted to the developmental stage of high school students. This software gives the user the ownership of the learning process for greater initiative, organization and independence.

This software focuses on a subject. Users will be able to plan their own study session by organizing and customizing a study plan. Includes interactive tutorials that are fun and easy to solve.

Advantages:

- Interactive and fun

- Integrates audio, video and text activities into the software
- User friendly
- More than enough tutorials available

Conclusion

Listed below are some of the conclusions made after reviewing the systems.

1. Areas covered in the system

   The activities of the language learning system included reading, listening and activity lessons to make learning interesting. Interesting texts and excerpts from the news or a video were added into the system as part of their activities. However, most of the systems did not offer any translation features. If a student had any difficulty in understanding a word/phrase, she would need to refer to a traditional bilingual dictionary. And in doing so, she would have to go through a whole list of words before finding the word she is looking for. This is time consuming and would interrupt the lesson. If the student needed to know the meaning of only one word, this would not pose a problem. But if she had difficulties with at least 10 words, it would not only be frustrating for her, but for the lecturer as well.

2. Database of words is not relevant to syllabus

   The translation software available today does not meet the need of the students. The words that are required by the student might not be available in the database. The software would then be useless because it does not meet the need of that student.

For example, a student is reading scientific material as part of her reading module for her language, and most software provides meaning of general words. Scientific terms are considered specific and would not be included into the system database.

3. Fixed target audience

   The systems in the market today have a fixed target audience. The system is suitable for beginner, intermediate or advance students. This means that if a lecturer has 3 sets of students of different level, he would need to use at least 3 software. The system data is fixed and is not tailored to the needs of the lecturer/student.

After reviewing the system, it was concluded that the BTS would be a stand-alone system. The system would also be tailored to the needs of the end user. This is done by enabling the lecturer to determine the kind of data he wants into the database by personally adding his own data. He is also allowed to modify the existing to meet his wishes and needs.

c. Interviews

Interviews with the lecturers and students were conducted. Some of the questions asked during the interview include:

- Would you use a computer software in learning a language?
- Would you prefer a web based or a non web based system?
- What are the requirements you would expect from the system?
- What are your expectations of an ideal system?
- What ideas do you feel that would benefit the system?

i. interview with the lecturers

ii. interviews with past year and current students

The main objective for the interview was to determine the kind of system that the users feel would be useful while learning the language. The interviews also helped in determining the kind of application software's to be used during the building of the system.

During these interviews, students were asked the difficulties of the language from their point of view. They were then asked to give a few suggestions on how what is needed in the software to be considered useful and successful. All feedback and opinions were noted and recorded.

Description	Systems reviewed (system number)												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1. System Interface													
pleasant and appealing					X		X	X		X	X	X	X
interesting				X				X			X	X	
normal	X	X	X										
boring						X			X				
2. System Interactivity													
A lot			X		X					X	X	X	X
so-so	X	X		X			X	X	X				
none						X							
3. Is system objective met?													
Yes	X		X	X	X		X	X	X	X	X	X	X
No		X											
I don't know						X							
4. System type													
Learning	X			X	X		X	X			X	X	X
Testing	X	X	X	X							X	X	X
5. Who are the target users?													
Adult students	X	X		X	X	X	X	X	X	X	X	X	X
Children		X		X			X		X	X		X	
Beginners	X			X	X		X	X			X	X	X
Intermediate/Advanced	X	X	X	X								X	
6. Is the system user-friendly?													
Yes	X	X	X	X	X			X		X	X	X	X
Not really but ok							X		X				
No						X							
7. Hardware/software requirements													
Minimal		X		X	X		X			X			
Normal											X	X	X
High													
Internet access	X	X	X	X	X	X	X	X					
Requires installation										X	X	X	X
8. Overall judgment													
Impressive			X	X	X			X		X	X	X	
Mediocre	X	X					X		X				X
Poor						X							
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Systems reviewed (system number)												

TABLE 2.1 SUMMARY OF LITERATURE REVIEWED

From this interview, it is learned that students find it difficult to find a dictionary that would be useful to them. They would like to have a system which provides syllabus specific words as this would make it easier for them to look for the word. They would not have to waste time going through a whole list of words listed in the dictionary. This would also make it easier for them to understand the word in the context of the syllabus.

2.2 Chapter summary

Literature review is an important part of software development. By going through resources similar to the system soon to be built, it gives the developer a better idea on how the final product is going to be.

For this project, the main sources of literature reviewed were in the form of websites teaching and translating a foreign language and existing language software's available in the local market. Interviews were also conducted to get a better picture on steps to be taken and observed while building the software.

Bilingual Translation System (BTS)

Chapter 3

Chapter 3: Methodology & System Analysis

3.1 System building methodology

3.1.1 Introduction

In this chapter, methodologies used in building a system will be explained in detail. A study was done on suitable approaches involved in developing a system. This is important, as the best approach will be chosen when developing the Bilingual Translation System (BTS) system.

Choosing a suitable approach is not easy. All aspects will have to be taken into consideration. Choosing an approach to be used whole developing a system is actually a critical decision. Choosing an unsuitable approach might result in a system that is ineffective, unsuitable and might not even fulfill its objective. In designing this system, the system development life-cycle (SDLC) approach is being used.

By using the SDLC technique, various methodologies are introduced. Each methodology has its own benefits as well as downfalls. Some of the popular choices of approaches include:

1. Computer-Aided Software Engineering (CASE)
2. Flow charts
3. Decision tables
4. Prototyping approach

After taking various factors into considerations, it has been decided that the prototyping approach will be the best option. The reason behind this is because the user would be able to see a working sample of how the system will eventually be. This gives them a better idea and feedback provided will be used to enhance the system.

3.1.2 System Development Life Cycle (SDLC)

The development of information system consists of various approaches or methods. Each approach differs from one another. However, the most favoured approach among individuals as well as organizations would be the SDLC. The SDLC is an approach which refers to the needs of system development based on an organised step by step process. The process is divided into 5 main phases. They are :-

1. Investigation phase or identification the problem phase
2. System analysis phase
3. System design phase
4. System implementation phase
5. System evaluation and maintenance phase.

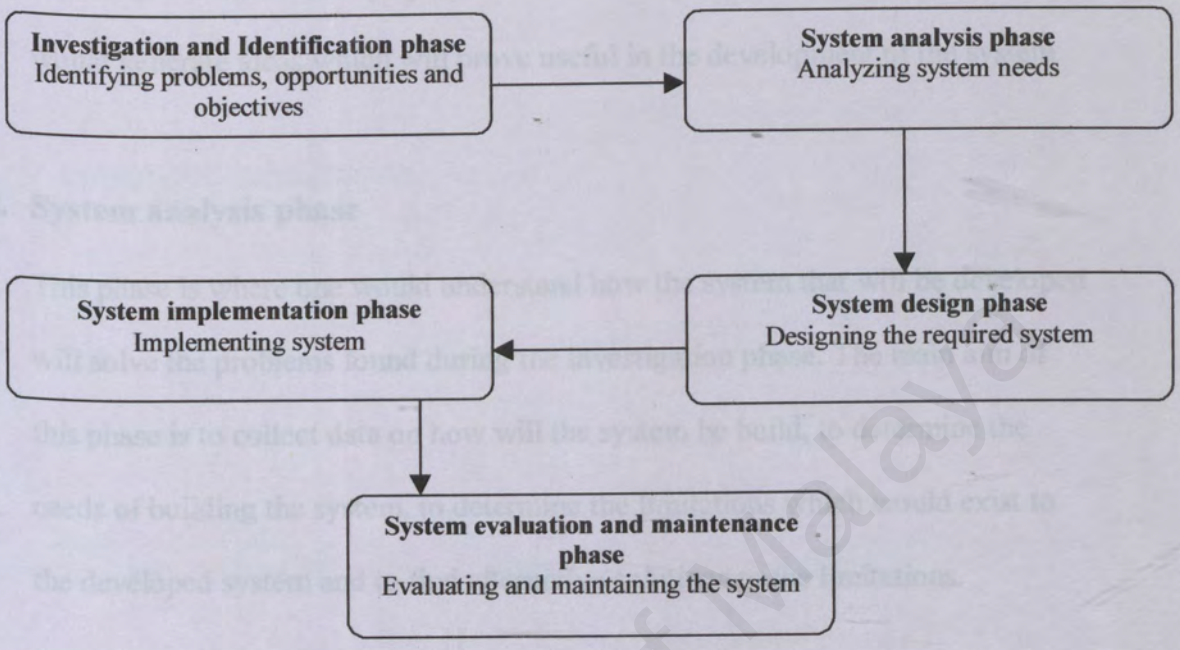


DIAGRAM 3.1 THE PHASES OF THE SYSTEMS DEVELOPMENT LIFE CYCLE

1. Investigation and identification phase

The first step towards developing a new system would or to redesign a currently existing system would be the investigation phase. At this point, one should discover whether developing a system or redeveloping an existing system would meet the objectives defined. Problems and opportunities will also be discovered as part of the investigation process.

In the context for the Bilingual Translation System (BTS), the project supervisor as well as students would play a main role in this phase. This is important as it would generate ideas which will prove useful in the development of the system.

2. System analysis phase

This phase is where one would understand how the system that will be developed will solve the problems found during the investigation phase. The main aim of this phase is to collect data on how will the system be build, to determine the needs of building the system, to determine the limitations which would exist to the developed system and to find alternative solutions to the limitations.

3. System design phase

The main task in this phase to choose and plan the system which would solve the problems faced. Models which have been previously designed will be used to create a complete system. This would include detailed information regarding the physical and logical designs. The design information would include output generated by the system, user interface, hardware, software and database requirements, and procedures. The links between all these elements will have to be included.

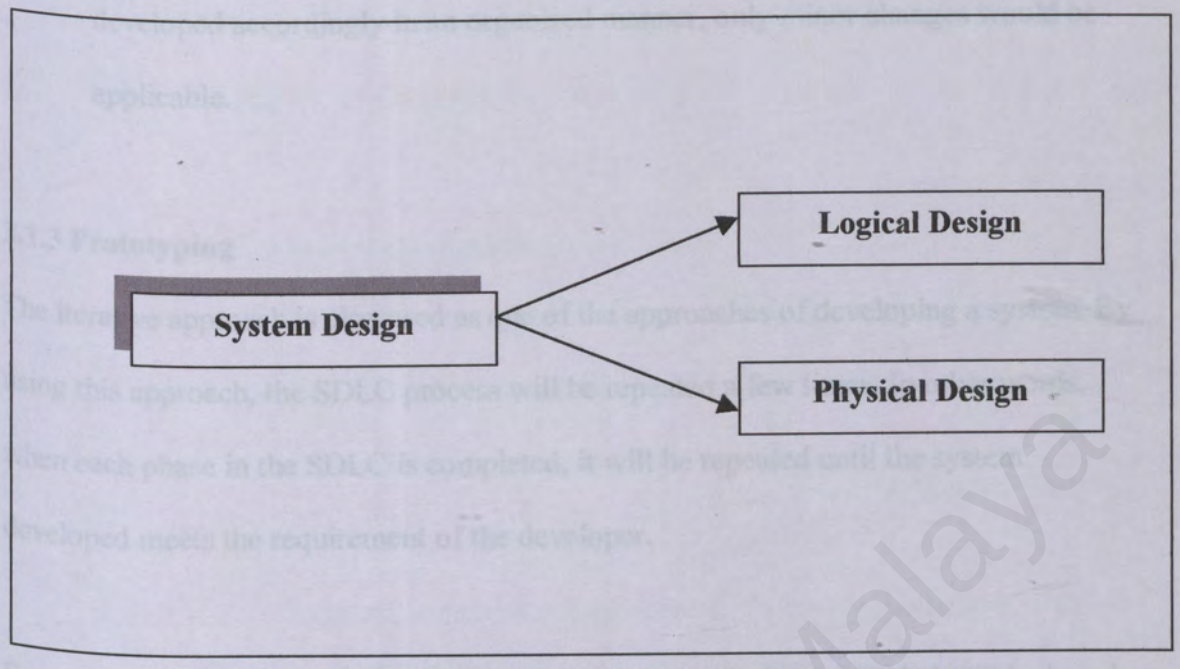


DIAGRAM 3.2 COMPONENTS OF SYSTEM DESIGN

4. System implementation phase

Before a finished is implemented, there are a few steps which need to be taken. This duration of this process is also known as the implementation phase. Some of the steps taken in this phase include hardware procurement, coding of the software, determining user readiness, installation of the software, and software testing.

5. System maintenance and evaluation phase.

System maintenance includes counter-checking, modifying and making the system more interesting so it would achieve the objectives set earlier. In certain cases, major modifications need to be done. However, if the system was

developed accordingly in an organized manner, only minor changes would be applicable.

3.1.3 Prototyping

The iterative approach is also used as one of the approaches of developing a system. By using this approach, the SDLC process will be repeated a few times. In other words, when each phase in the SDLC is completed, it will be repeated until the system developed meets the requirement of the developer.

For every iterative and repeated phase, the needs and solutions provided will be based on the problem analyzed, it developed and partly implemented.

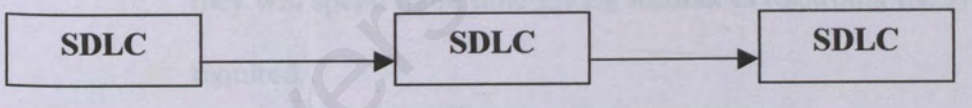


DIAGRAM 3.3 THE ITERATIVE APPROACH IN SYSTEM DEVELOPMENT

Several phases are involved in prototyping. They are:-

1. Investigating, analyzing and defining the problem
2. Designing the system prototype

3. Prototype operations are carried out
4. Modifying or changing the prototype

Advantages and disadvantages of prototyping

Every approach available in developing a system has its advantages and disadvantages. The same goes for prototyping. However after much research, it is found that there are more advantages in using prototyping compared to the disadvantages.

1. Higher commitment is received from the user and good input during the whole process. One of the main objectives in the prototyping process is to design a system that satisfies the user at a maximum level. With prototyping, the user will spend more time in observing the way the developer develops the system. Hence they will spend more time giving feedbacks regarding the system required.
2. Short developing time. It is easy to come out with a prototype and it is not time consuming. Results can be obtained instantly even though the process of designing the final system will take more time.
3. It is inexpensive to make corrections or modifications. When an error is recognized at the early stages of development, it is more cost effective when making corrections or medications. It is more

expensive when corrections and modifications are done after the system is built.

The disadvantages of prototyping include:-

1. Requires more attention and commitment from the programmer as well as the user.
2. Prototyping might results in building a system with an unplanned scope. Users will always require a better system. Feedback from user might increase the size of the system from the original size. This might make the system to be less effective, slower or it may even cause the system to not work. Good organization in the SDLC phase will minimize this problem.

3.2 Information searching techniques

There are several approaches used while searching for more information relevant to the research. The approaches used included:-

3.2.1 Reading

Documents that are similar or related to this project are available from the Science Computer and Information Technology document room. Documents were mainly made out of the previous project reports completed by the past year students. Notes were made

and recorded. Information gathered from here will be used for reference when building the Bilingual Translation System (BTS).

3.2.2 Observation

Existing systems currently available in the market were observed as part of the observation. Similarities and differences were noted. The advantages and disadvantages of the system were also noted and recorded. This is important as it would ensure that the same mistakes made in some of the systems are not repeated. Information gathered from here will be used for reference when building the Bilingual Translation System (BTS).

3.2.3 Internet surfing

Web based systems that are related to language learning were visited. The systems were tested. The advantages and disadvantages of each system was noted and recorded. Information gathered from here will be used for reference when building the Bilingual Translation System (BTS).

3.2.4 Interviews and discussions

Two types of interviews were conducted – formal and informal interviews. Formal interviews included interviews with lecturers and students currently learning a foreign language. Informal interviews included opinions from friends and parents.

3.3 Function Analysis

3.3.1 Function needs

i. Admin module – this module will be activated only when the system is being used by a lecturer. The lecturer would input the data into the database.

ii. Student module – this module is activated when the user is a student. The student is not allowed to make any modifications to database. The student is only allowed to access the table in read-only mode.

3.3.2 Non-function needs

Based on my research, I have come upon a few conclusions which are important and directly related to the designing and building of the software. They are listed below:-

1. The right target user

   Defining the right target audience is important when creating a software. One has to know who will the target audience (target user) be before creating the software. Software that does not match the requirements of the selected target user will not be successful.

2. Friendly user interface

   The user interface of the software has to be attractive and appealing. User interfaces which are boring and is thought boring will not attract the attention of the user. However, it is good to note that while the interface is attractive and appealing, it is also important for it to be user friendly. Users will not use a software that does not have a user friendly interface – no matter how good the software is.

3. Ability to attract attention of the users

   The software does not have to be out of the ordinary. It should however have the ability to hold the attention span of the users for the duration of the time needed.

4. Modularity

   The system will be built in modular form. This means that each modular will be developed separately and combined for the end result.

3.4 Choice of Programming Language

Visual Basic (VB) is used to build the Bilingual Translation System (BTS). Therefore Microsoft's Visual Basic 6.0 will be used as the developing software.

Visual Basic is an English-like programming language. All the commands, functions and other keywords in VB are English words, groups of words, or abbreviations. This makes

VB easier to learn than other languages. It is also similar to Hypertext Markup Language (HTML).

The software applications below are used in developing the software.

i. Microsoft's Visual Basic 6.0

This application is used to create the forms and link the database together with the system.

ii. Microsoft Access 97

This application is used for database developing purposes.

iii. Microsoft Word 97

This application is used to insert text or symbols related to the alphabets of a particular language.

iv. SQL

3.5 System needs

3.5.1 Hardware configurations

a. Intel Celeron 450 MHz or Pentium processor

b. Windows operating system

c. 32 MB RAM

d. 8.6 GB hard disk

e. CD-ROM driver 10x

f. 1.44MB Floppy disk driver

g. computer monitor

h. keyboard

i. computer mouse

3.6 Chapter Summary

Several important issues were discussed in this chapter. Methodologies used in building a system were discussed. The methodology chosen to build this system was also discussed.

The techniques used during the information gathering phase were mentioned. And the functions needed in the system were determined during the function analysis phase. The choice of programming languages was also discussed here as well as the system needs.

Bilingual Translation System (BTS)

Chapter 4

Chapter 4: System Design

4.1 Introduction

Designing the proposed system is an important task that needs to be done carefully. If the task is done in a hasty manner, the end result might not be satisfactory to the programmer or the user.

When designing the system, certain considerations will have to be taken account such as the main objective of the system as well as the user requirements. The programmer will have to ensure that the end system will meet the requirements and standards of the users. A system done without good planning will end up a failure. Therefore the activities involved while designing the system will ensure that the system being developed achieve its objective as a complete system.

4.2 System design

When designing a system, there are two aspects that will be taken into consideration – the logical design and the physical design. The logical design is where the modules of the system are situated. The physical design involves the hardware and software required whilst building this system. These two designs will be discussed in detail below.

4.2.1 Logical design

When designing the logical aspect of the software, one would have to determine what modules are needed by the system. It will also reflect the concepts used while developing the system and the aspects of problem solving.

After some careful consideration and planning, it is determined that two main modules will be used in Bilingual Translation System (BTS). They are:

1. administrator module

   This module allows the administrator to create a new adminID, create new course as well as add data into the database.

2. student module

   This module allows the student to create new studentID and search. It does not allow any adding or modifying of data.

3. super user module

   This module allows the super user to monitor the system. He is the only one who is able to change the user information and create a report for all the information available related to the database.

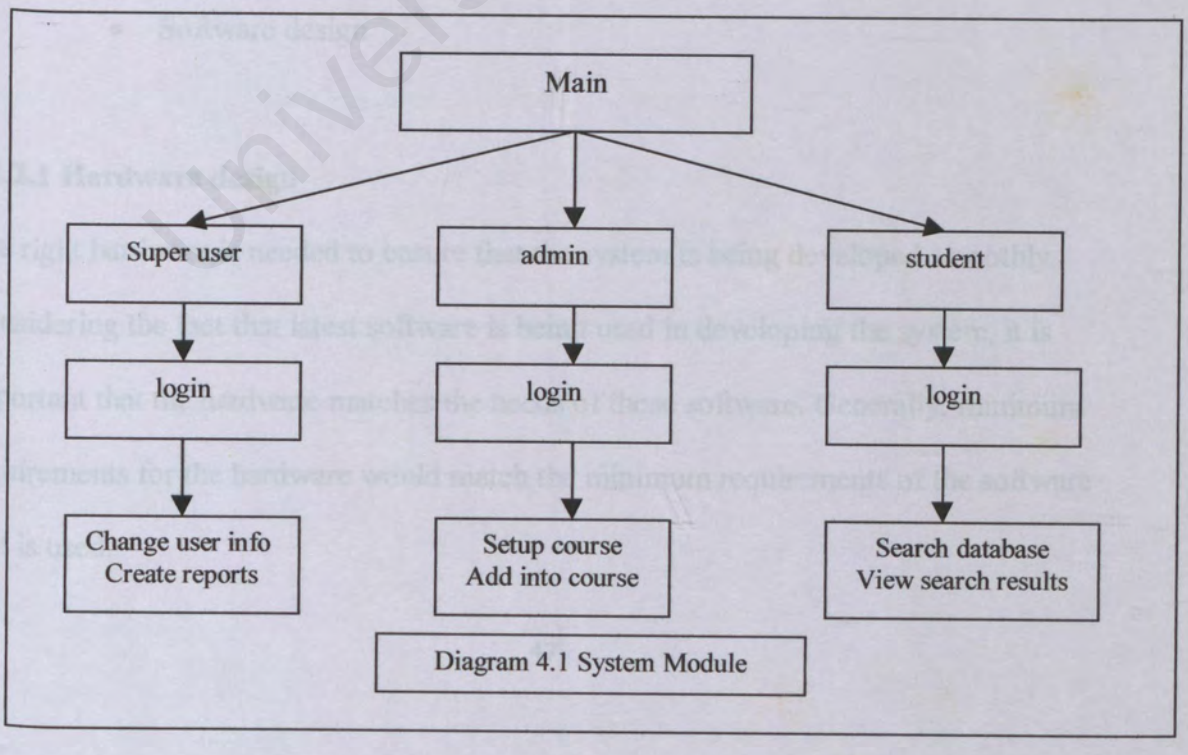


Diagram 4.1 System Module

4.2.2 Physical Design

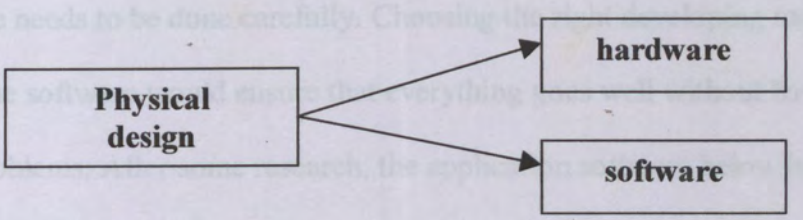


DIAGRAM 4.2 PHYSICAL DESIGN COMPONENTS

The role of the physical design is just as important when compared to the role of the logical design. Choosing the wrong applications when building the system could lead to a system that does not meet the requirements or worse system failure. Accurate or minimum specifications are important to ensure the development of the system goes on as planned. The physical design specifications are divided into two:

- Hardware design
- Software design

4.2.2.1 Hardware design

The right hardware is needed to ensure that the system is being developed smoothly. Considering the fact that latest software is being used in developing the system, it is important that the hardware matches the needs of those software. Generally, minimum requirements for the hardware would match the minimum requirements of the software that is used.

4.2.2.2 Software design

All the elements in the logical design require the right software. Therefore choosing the right software needs to be done carefully. Choosing the right developing tool in developing the software would ensure that everything goes well without having to face any major problems. After some research, the application software below has been identified as suitable to be used. They are:

1. Microsoft Visual Basic 6.0
2. Microsoft Access 97
3. SQL engine

4.3 Input Form

Below is a guideline when designing an input form.

1. Easy to use and effective.
2. Accurate.
3. Simple yet attractive.
4. Consistent from one screen to the other.

For this system, the input form consists of several screens. They are the:

i. Login screen – user will provide user name and password to access the system.

ii. Registration screen – new user would have to register before being allowed access to the system.

iii. Data input screen – administrator would key in data into the table.

4.4 User Interface Design

When designing user interfaces, there are a few objectives that have to be taken into consideration. They are:

a. Effectiveness

The interface has to be effective in meeting the needs of the user.

b. Efficiency

The interface has to be efficient. It is no point if the user had to go through one whole paragraph of instructions when a single line will suffix.

c. User consideration

When the interface is designed, the end user will have to be in mind. The type of user is important. Is it not suitable to have an interface full of words and sentences when the target users are children below 10 years old.

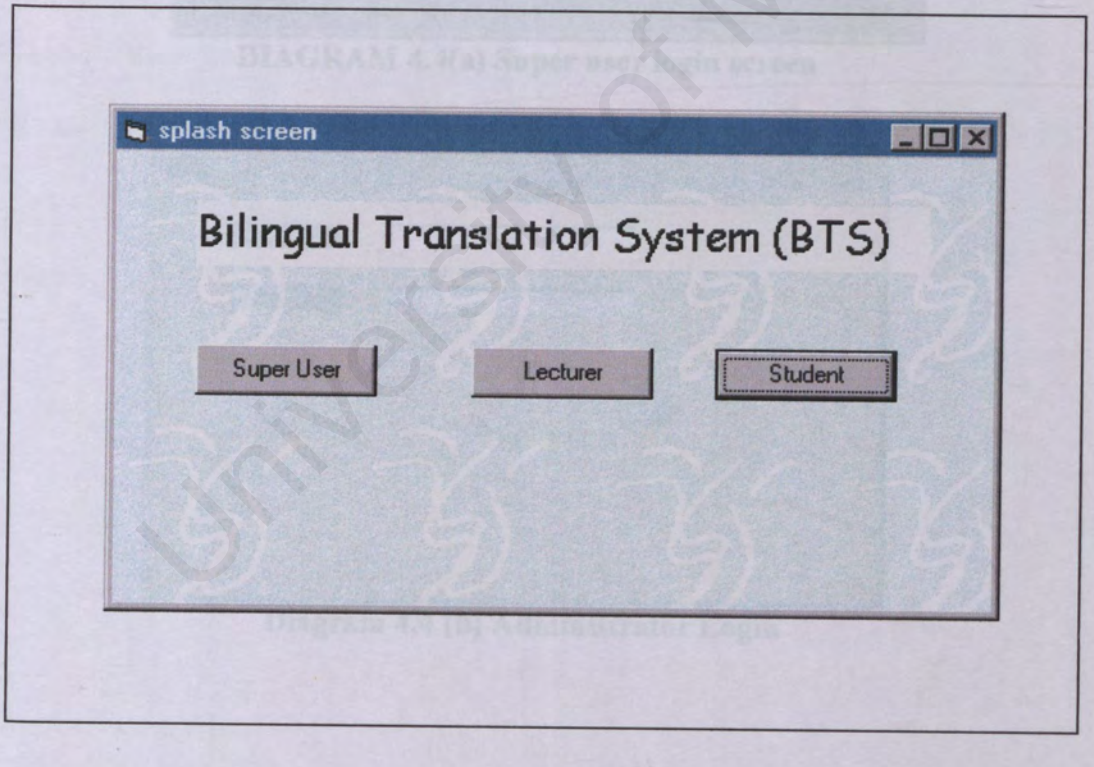
d. Productivity

The interface will have to encourage productivity among the users. A pleasant interface will help in this aspect.

For Bilingual Translation System (BTS), three or four types of interfaces are suitable to use. They are the menu interface, graphical user interface (GUI) and the form-fill interface.

4.4.1 Main menu Screen

This screen is the first screen the user will when starting the program. The user is required to select user type – super user, lecturer or student.



4.4.2 Login screen

The login screen will be displayed after the introduction screen. User is expected to key in user name and password for access into the system. New users would click on the respective icon to register.

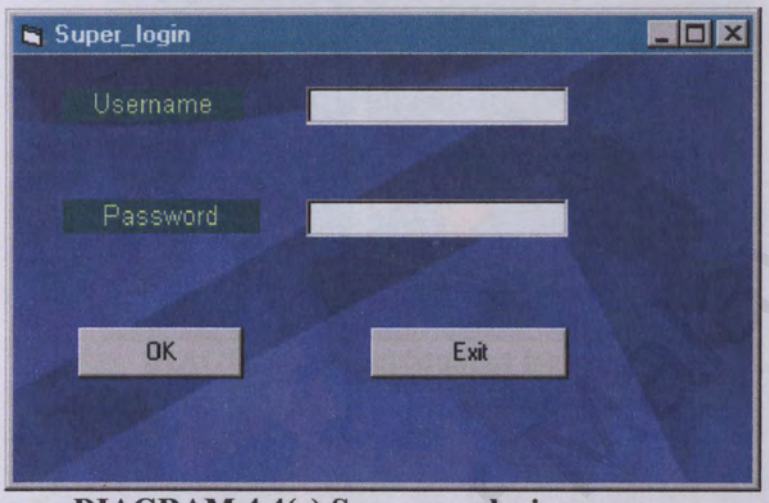


DIAGRAM 4.4(a) Super user login screen

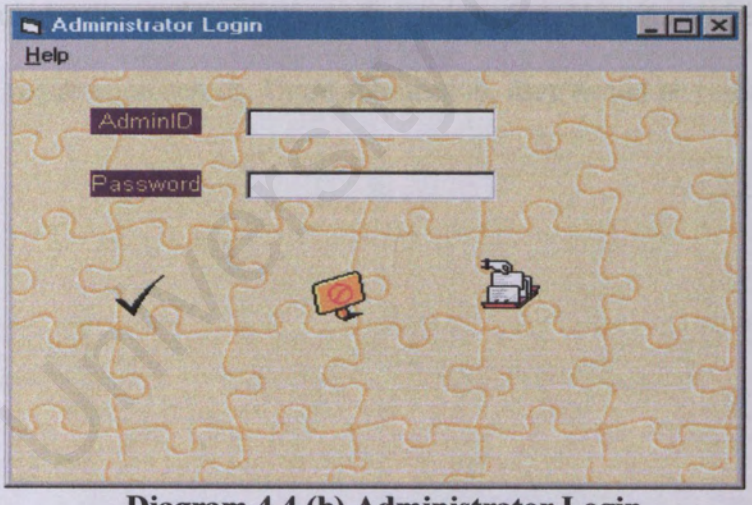


Diagram 4.4 (b) Administrator Login

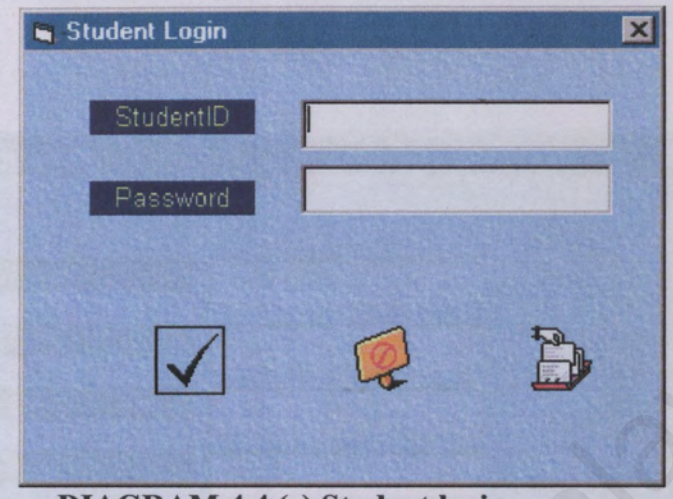


DIAGRAM 4.4 (c) Student login

4.4.3 Registration Screen

A new user would be directed to this form for registration. User is required to fill in all the fields at the registration screen. Upon submission, user would be re-directed to the login screen.

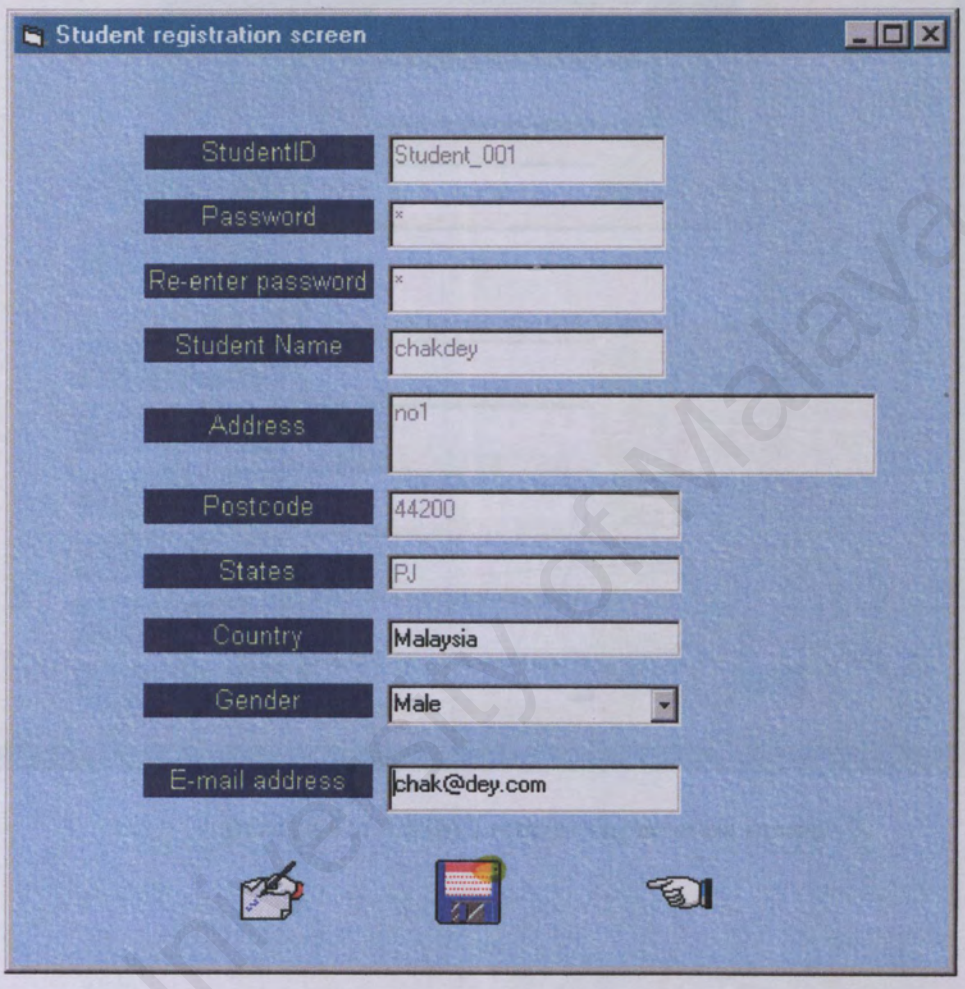


Diagram 4.5 (a) Student registration screen

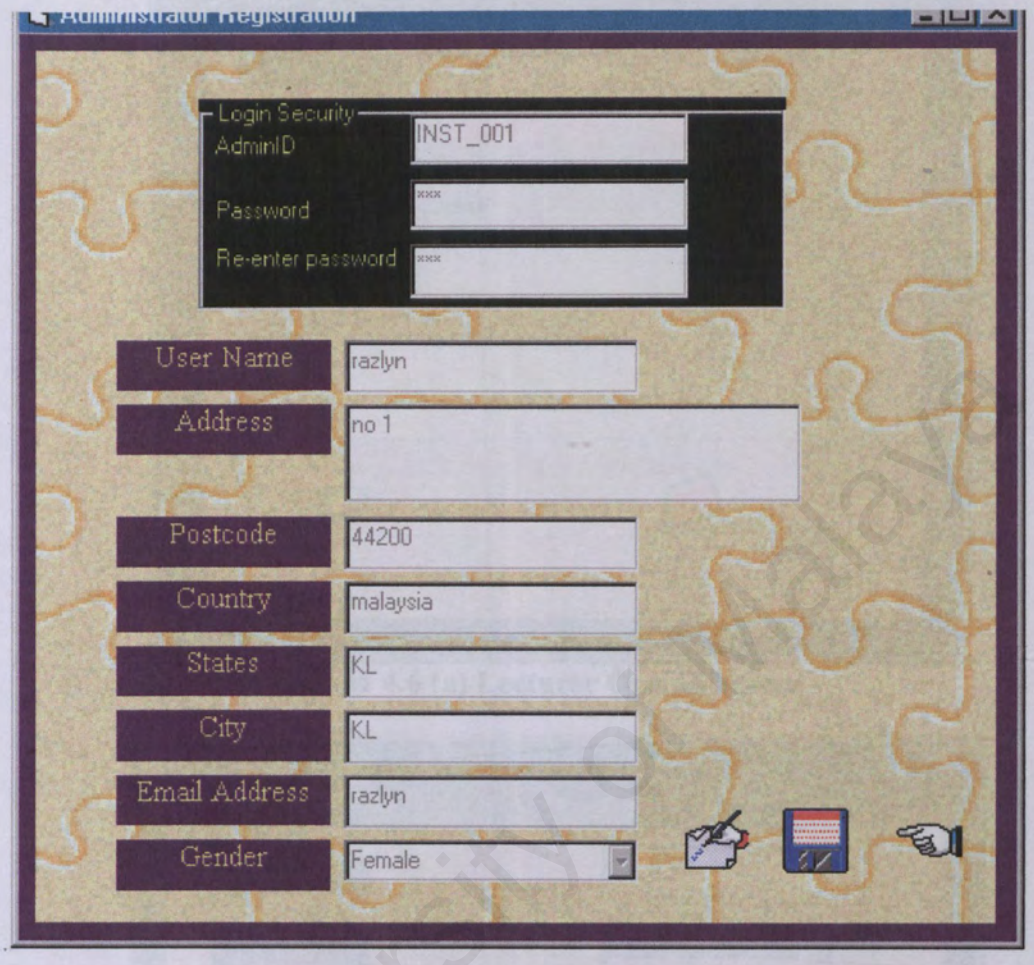


DIAGRAM 4.5 (b) Lecturer registration screen

4.4.5 Input Screen

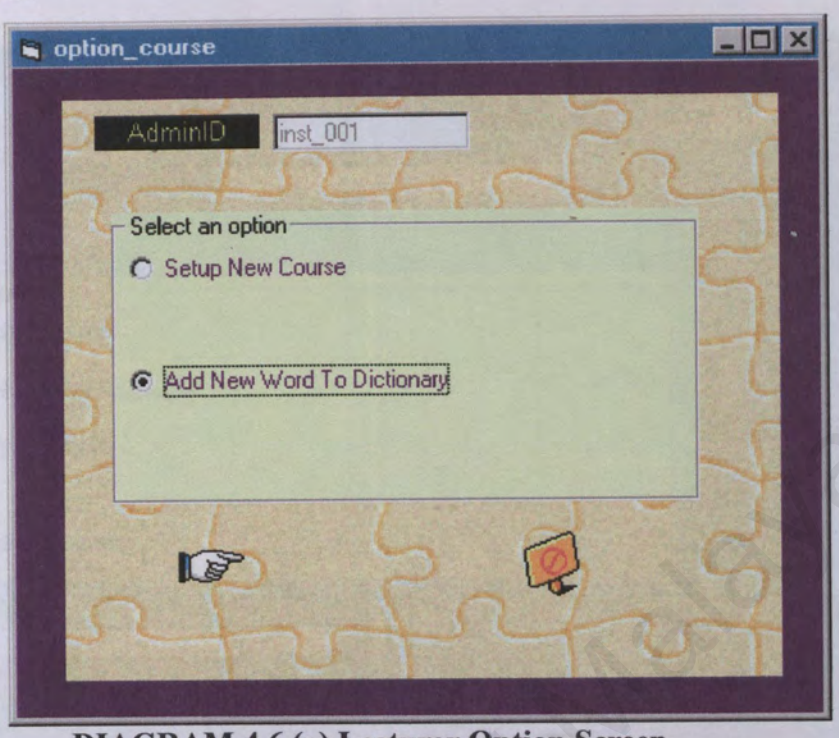


DIAGRAM 4.6 (a) Lecturer Option Screen

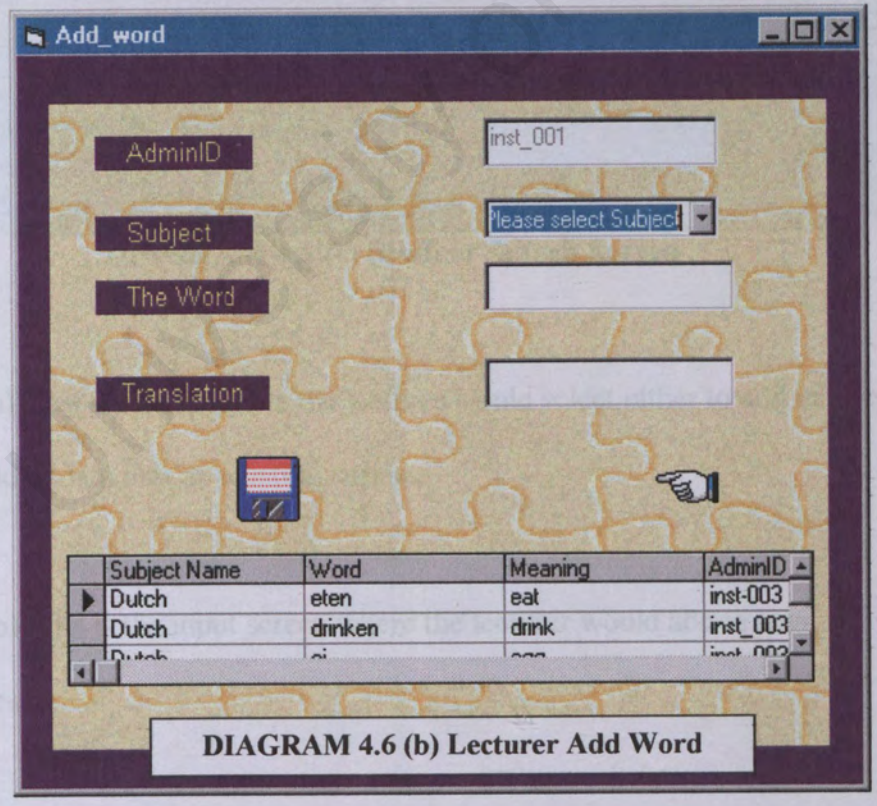


DIAGRAM 4.6 (b) Lecturer Add Word

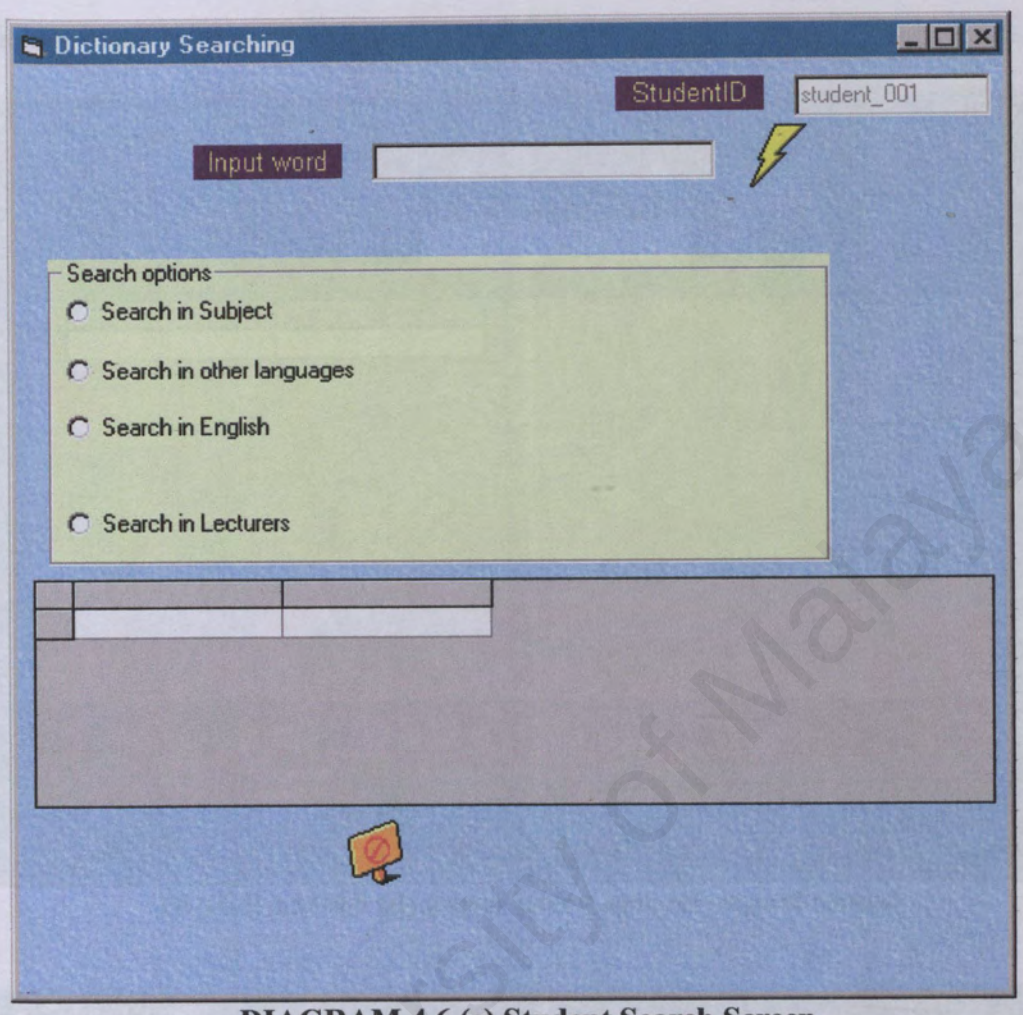


DIAGRAM 4.6 (c) Student Search Screen

Diagram 4.6 (a) This screen is where the lecturer would select either to add in a new course or to add in data into an existing course.

Diagram 4.6 (b) This is the input screen where the lecturer would add in new data into existing courses.

Diagram 4.6 (c) This is the input screen where students would enter in a search value into the field provided and conduct a search based on the options given.

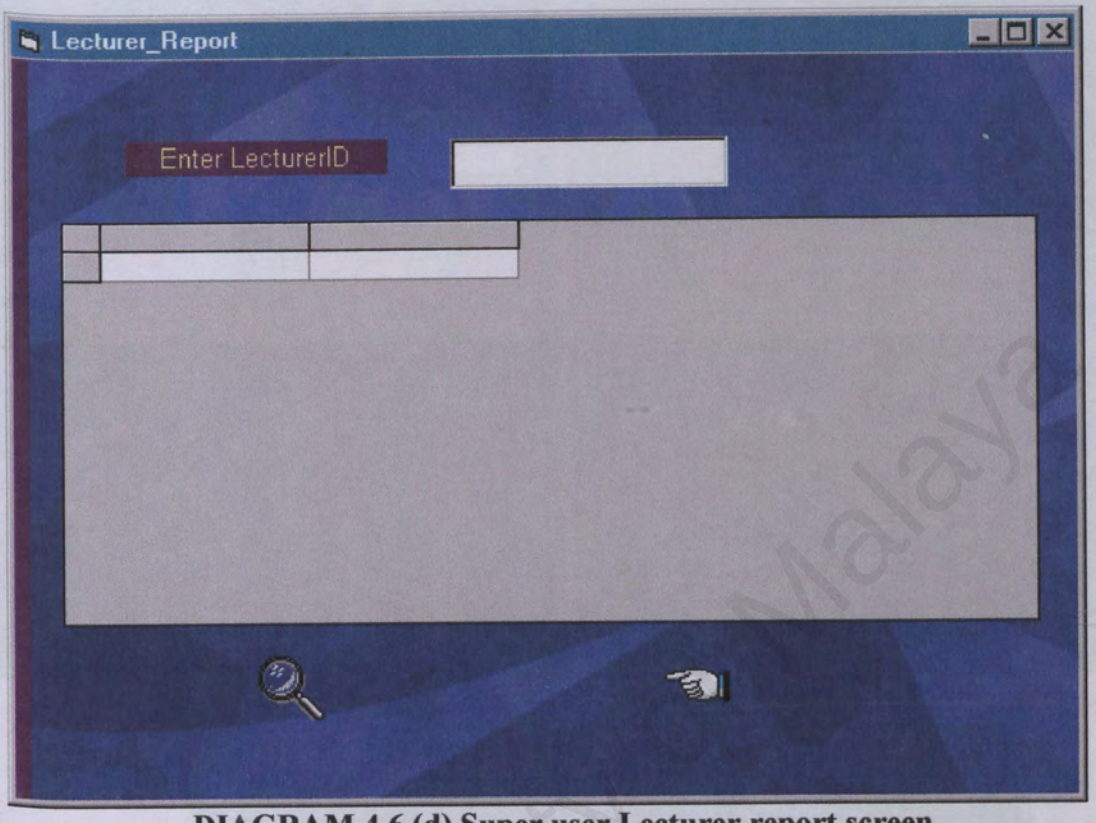


DIAGRAM 4.6 (d) Super user Lecturer report screen

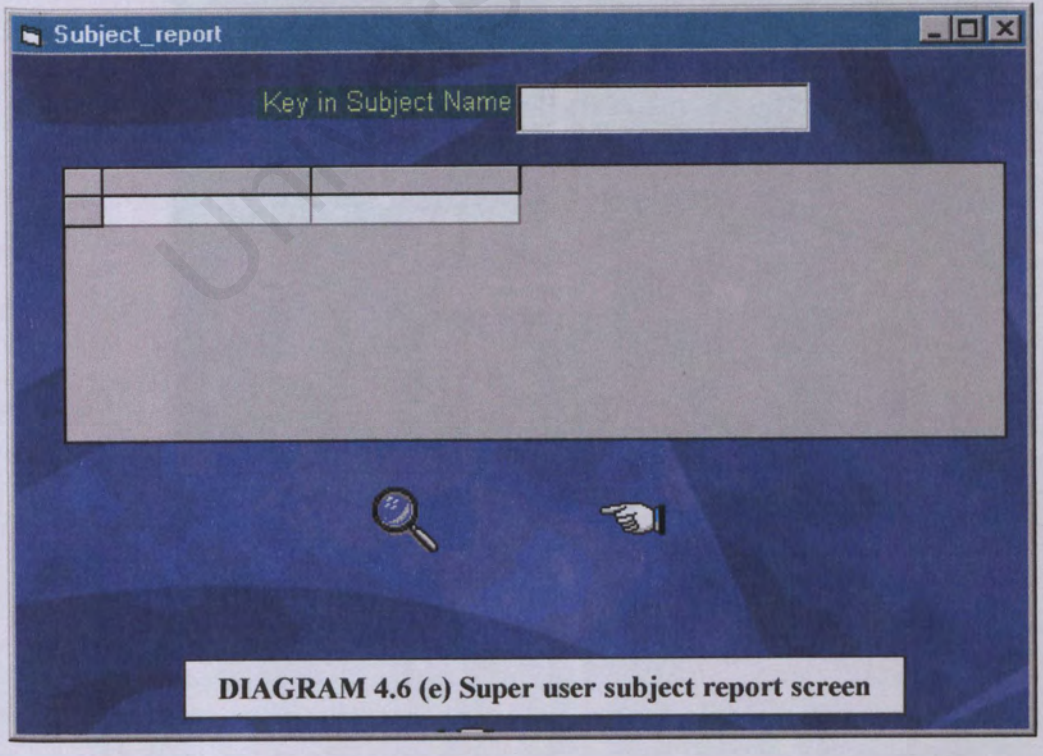


DIAGRAM 4.6 (e) Super user subject report screen

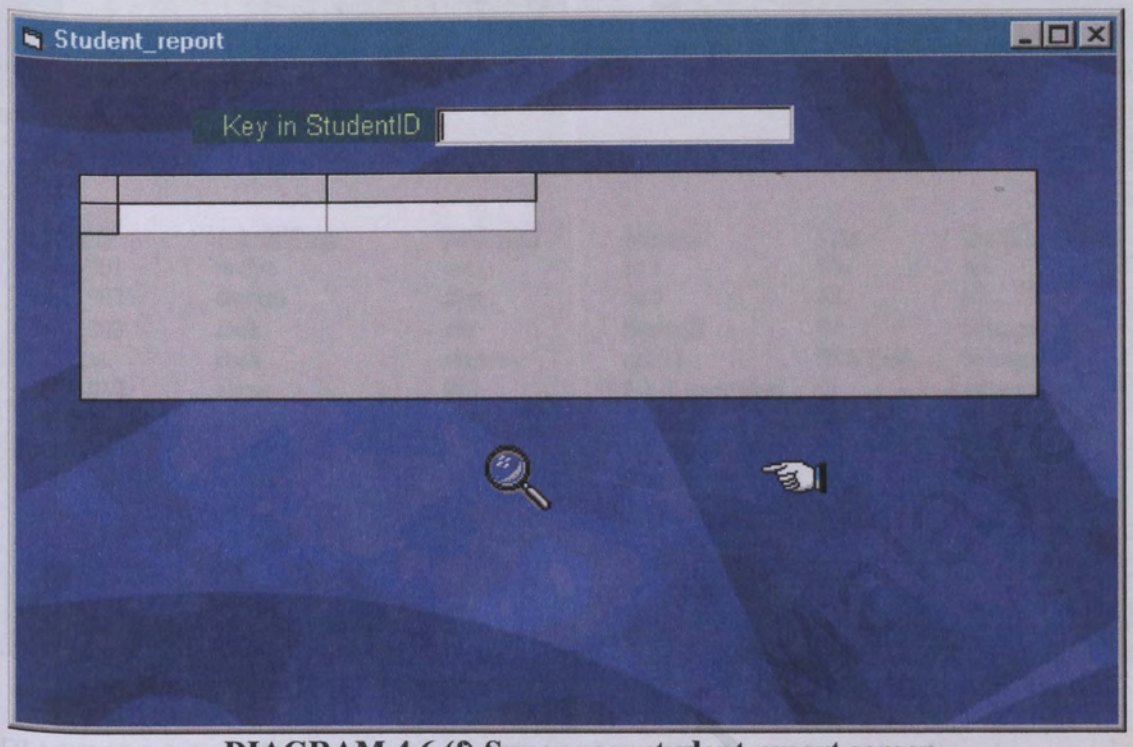


DIAGRAM 4.6 (f) Super user student report screen

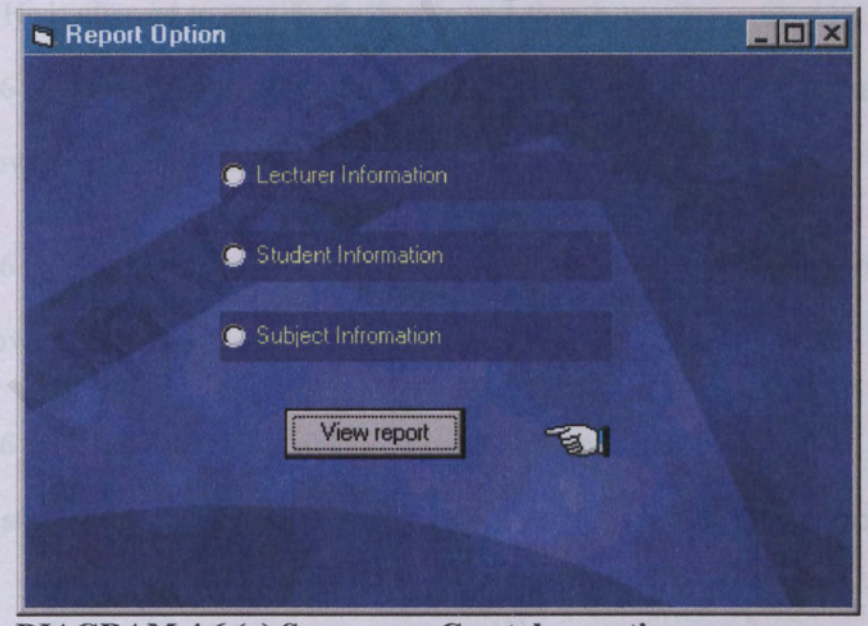


DIAGRAM 4.6 (g) Super user Crystal reporting screen

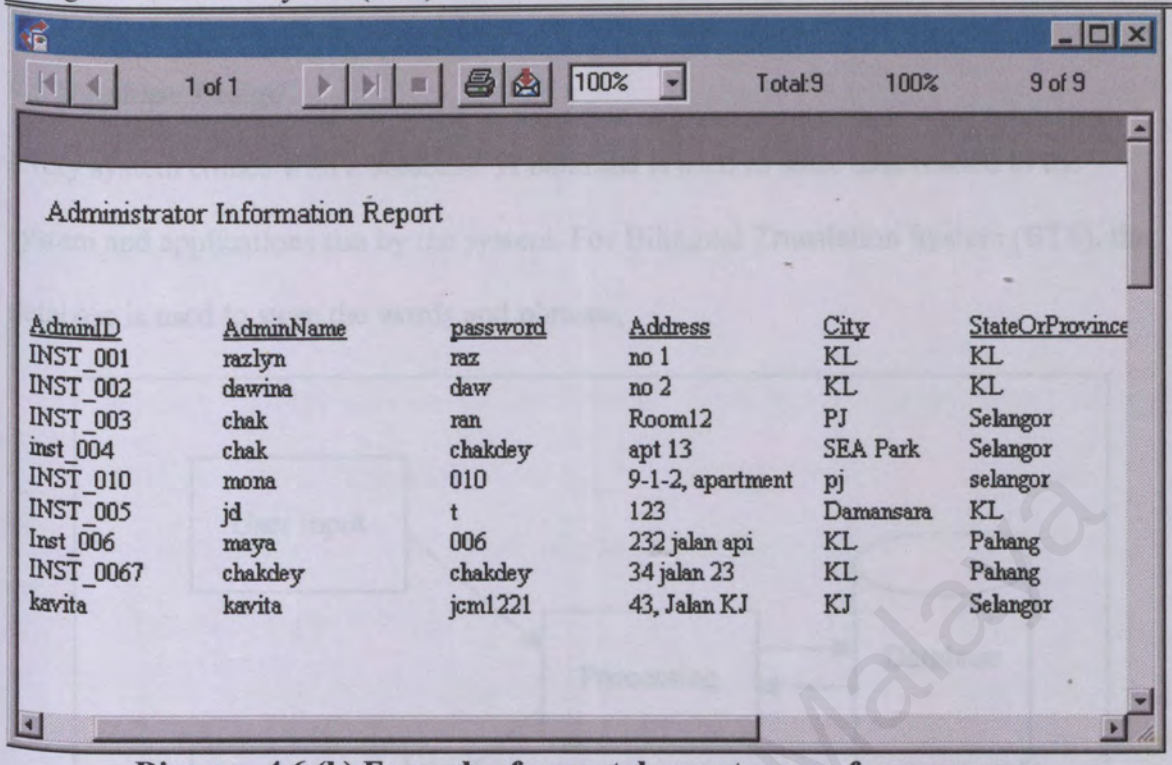


Diagram 4.6 (h) Example of a crystal report screen for super user

DIAGRAM 4.6 (d) The super user is able to view all information regarding the administrator. He is allowed to modify the data in real-time here.

DIAGRAM 4.6 (e) The super user is able to view all information regarding the subject here. He is allowed to modify the data in real-time.

DIAGRAM 4.6 (f) The super user is able to view all information regarding the student here. He is allowed to modify the data in real-time.

DIAGRAM 4.6 (g) The super user is able to view all information regarding the administrator, student and subject in the form of a report. He is not allowed to modify any data here.

DIAGRAM 4.6 (h) A sample output of the crystal report.

4.5 Database Design

Every system comes with a database. A database is used to store data related to the system and applications run by the system. For Bilingual Translation System (BTS), the database is used to store the words and phrases.

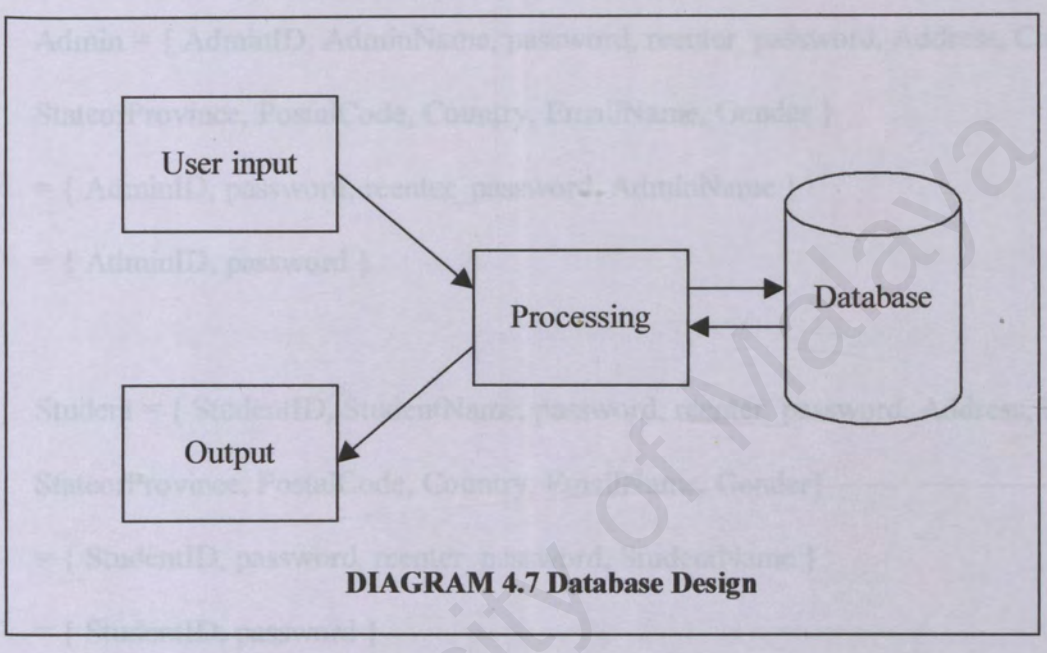


DIAGRAM 4.7 Database Design

4.5.1 Normalization of database.

A modification anomaly exists in BTS. It is known as an insertion anomaly because each lecturer needs to have a Subject name allocated to him before he is allowed to add new words into the database. If he is a new user and does not have any courses allocated to him, he will not be able to do any inserting of data.

To handle this matter, normalization of the database is done to eliminate any anomalies. There are two ways of doing so – redefine the relations of the database or normalize the database.

Below shows how the database used in BTS is normalised.

Admin = { AdminID, AdminName, password, reenter_password, Address, City, StateorProvince, PostalCode, Country, EmailName, Gender }

= { AdminID, password, reenter_password, AdminName }

= { AdminID, password }

Student = { StudentID, StudentName, password, reenter_password, Address, City, StateorProvince, PostalCode, Country, EmailName, Gender}

= { StudentID, password, reenter_password, StudentName }

= { StudentID, password }

Dictionary = { Subject Name, Word, Meaning, AdminID }

= { Word, Meaning, Subject Name}

= {Word, Meaning)

Subject = { AdminID, Subject Name }

4.6 Expected System

The system is system used to translate words into another language. The system is not expected to replace formal classes or lectures but merely as a tool to assist the students in learning the language. This software would be suitable to be used for revision purposes. However, it should also help students who do not have access to formal lessons but are forced to study on their own.

The system is also expected to be an interactive system. Students will be able to interact with the system when attempting the fun and interesting activities that has been prepared.

4.7 Chapter summary

The main objective of system design is to ensure that the built system would achieve its objective as a complete system. Therefore careful planning should be done while designing the system.

The end product might not be the exactly the same as the initial designs provided here. Modifications would have to be done if the present design is found unsuitable. However, a good design would not differ much once the system is completed. So it is important that the programmer attempt at designing the system before building it.

Bilingual Translation System (BTS)

Chapter 5

Chapter 5: System Implementation

5.0 Introduction

The name of this system is Bilingual Translation System (BTS). The reason this name was chosen is because it translates words from the English language to a foreign language. It involves a maximum of two languages at one time.

Two programming languages used in this system. They are Visual Basic (VB) and SQL. VB is used for all codes involving the graphic user interface (GUI). VB was chosen as a programming language because it is easy to learn yet it can be manipulated to create powerful applications. The coding syntax of VB is quite similar to the English language. Therefore it makes it easier for a beginner to learn the language. For example, to navigate from Screen A to Screen B, the code would look like

```
Unload me
ScreenB.show
```

SQL is a language popularly used for searching and retrieving specific data. As it is with VB, it is easy to use yet it can be manipulated to perform various tasks according to the needs of the user.

An example of SQL would be:

```
Select * FROM name WHERE student
```

In this example, the system would retrieve all data from the name column. The name column resides in the student table. The complexity of the SQL table depends entirely on the programmer.

Most systems require data that needs to be stored in a database. For this system, Microsoft Access 97 is used as the system database. Access 97 is used because currently, the compiler Visual Basic 6.0 does not support Access 2000.

This system has three modules. They are:

i. lecturer module – lecturer will be able to setup a new course as well as add words into existing courses.
ii. Student module – students will be able to search database and view search results.
iii. Super user module – super user will be able to modify data in the database. He is not allowed to add in data.

5.1 System coding

5.1.1 Dataflow Diagrams (DFDs)

A Context Diagram simply shows the system as a box, things external to the system as circles and the information flows into and out of the system. Below is the start of the context diagram for BTS.

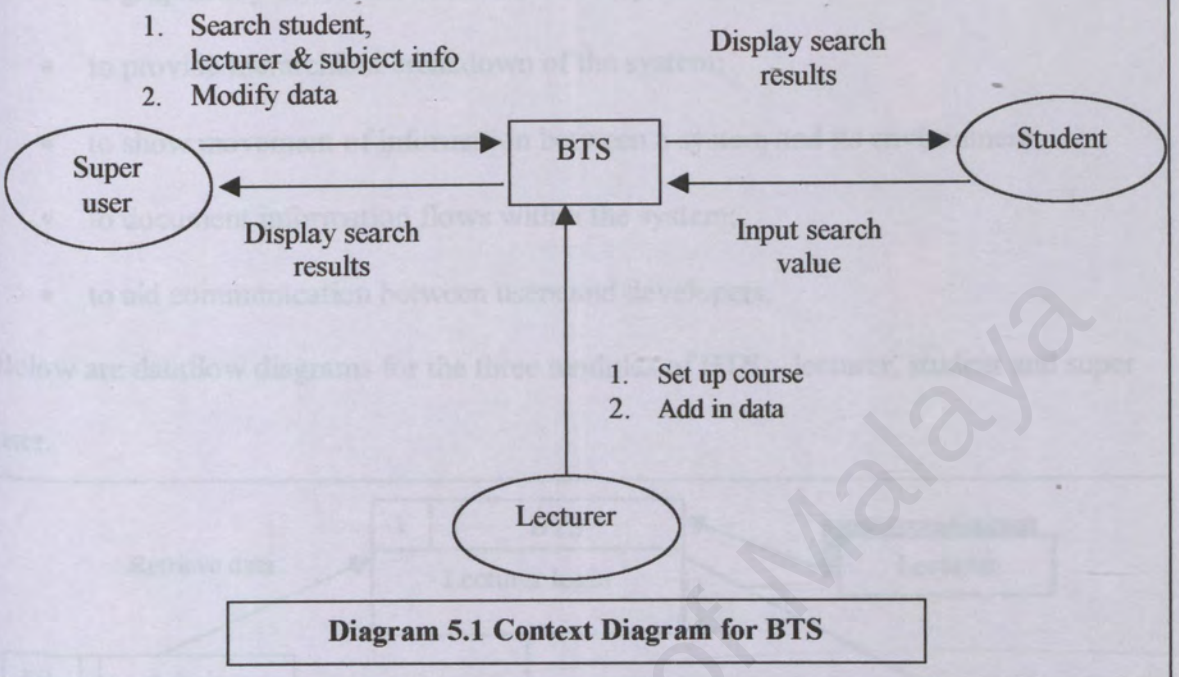


Diagram 5.1 Context Diagram for BTS

Data Flow Modeling represents the flow of information around a system, the way it is changed and stored and the *'sources'* and *'sinks'* of information outside the system.

Data Flow Diagrams (DFDs) take a *'top-down'* approach, expanding the system description into more and more detail via a series of *'levels'*, so a set of DFDs will comprise a Context Diagram, a Level 1 DFD, and perhaps some Level 2 DFDs, (one for each complicated Process at Level 1).

DFD show how information flows around a system, they:

- represent a situation from the viewpoint of the data;

- Is a technique to assist analysis of processes in the system.

Objectives:

- to graphically document boundaries of a system;
- to provide hierarchical breakdown of the system;
- to show movement of information between a system and its environment;
- to document information flows within the system;
- to aid communication between users and developers.

Below are dataflow diagrams for the three modules of BTS – lecturer, student and super user.

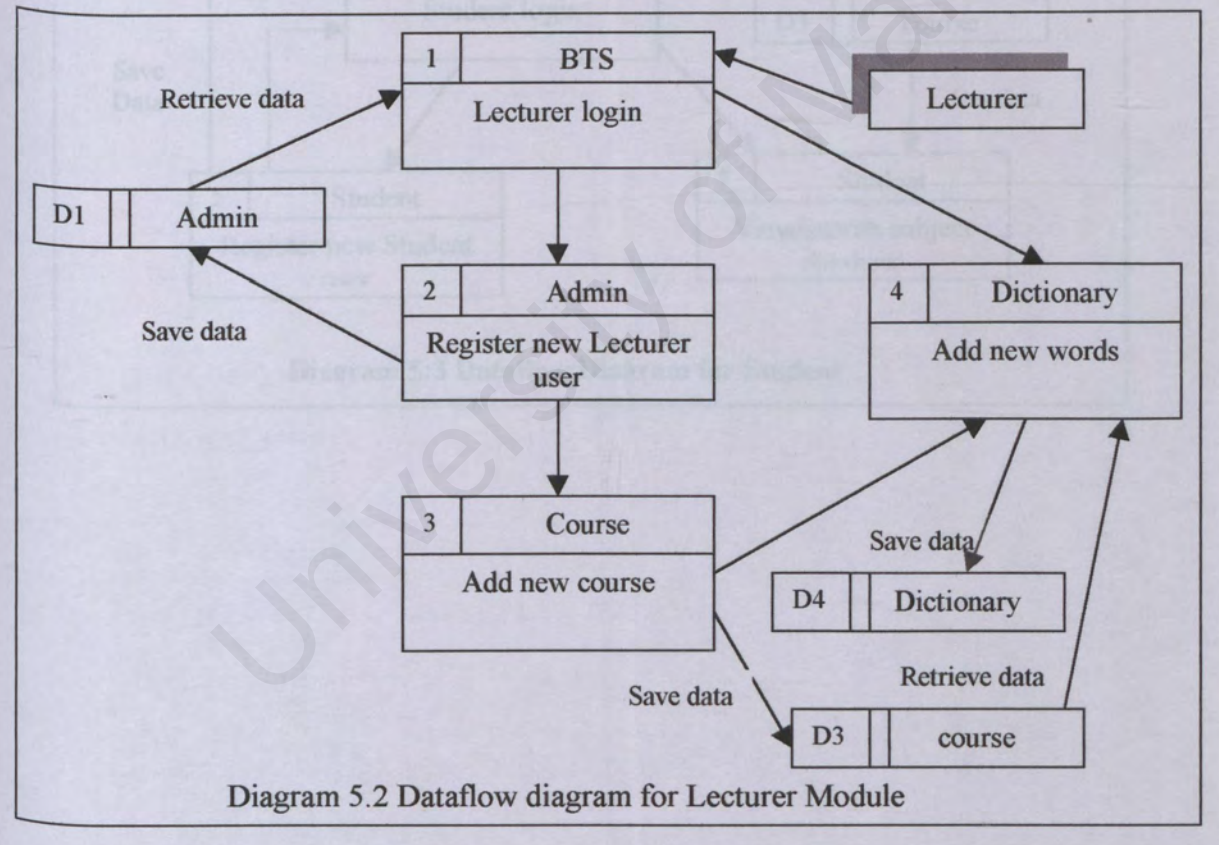


Diagram 5.2 Dataflow diagram for Lecturer Module

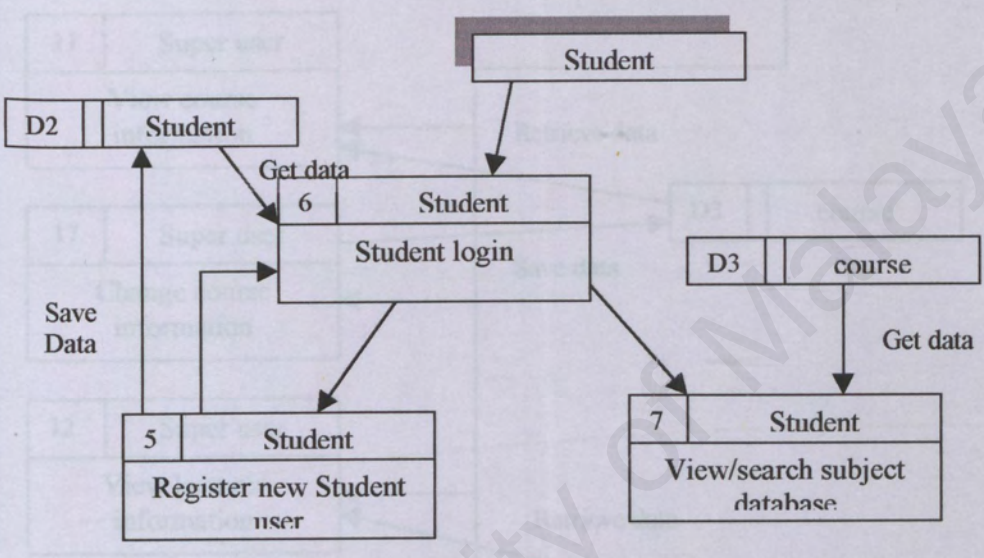


Diagram 5:3 Dataflow Diagram for Student

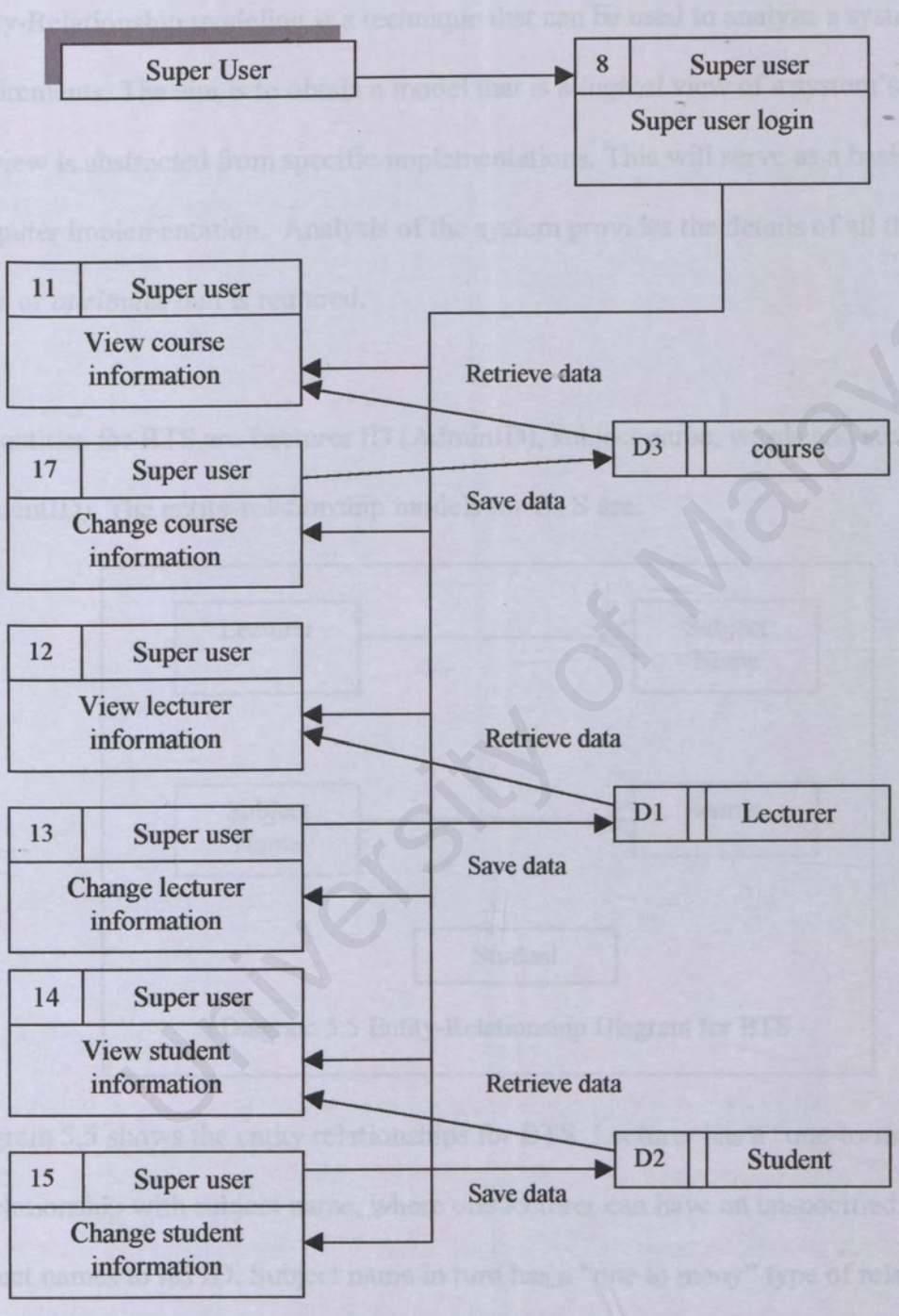


Diagram 5.4 Dataflow diagram for Super user module

5.1.2 Entity-Relationship Diagram (ER diagram)

Entity-Relationship modeling is a technique that can be used to analyze a system's data requirements. The aim is to obtain a model that is a *logical* view of a system's data i.e. the view is abstracted from specific implementations. This will serve as a basis for computer implementation. Analysis of the system provides the details of all the data items or *attributes* that is required.

The entities for BTS are Lecturer ID (AdminID), subject name, words and student (StudentID). The entity-relationship models for BTS are:

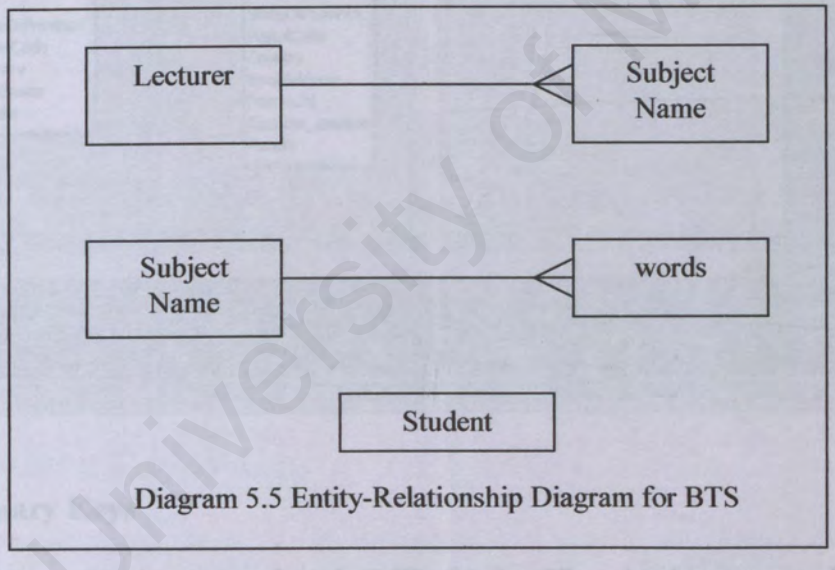
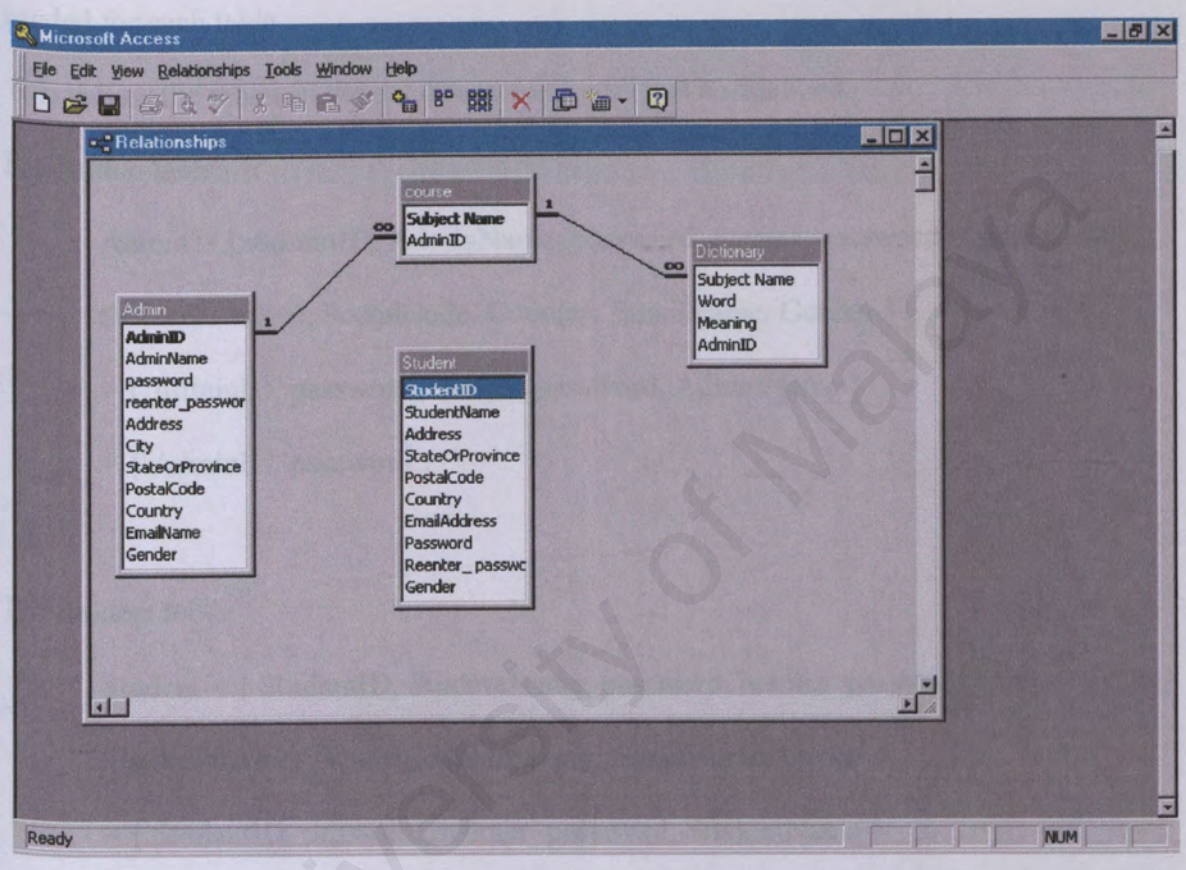


Diagram 5.5 Entity-Relationship Diagram for BTS

Diagram 5.5 shows the entity relationships for BTS. Lecturer has a "one-to-many" type of relationship with subject name, where one lecturer can have an unspecified number of subject names to his ID. Subject name in turn has a "one to many" type of relationship

with words where many words can have the same subject name. Student does not have a relationship with the other entities of the system.

5.1.3 Database relationship



5.1.3.1 Primary Keys

The primary keys for the system is AdminID, StudentID and subject name. Word is not a primary key because some words are similar even though they come from different languages. For example, air means air in English but water in Malay. If word was made a primary key, the word air will not be accepted by the system.

5.1.3.2 Database Normalization

When building a system, it is important that the database is normalised. Normalizing a database would determine which attributes in the database are important and will be needed for each table.

This is how the tables in the database used by BTS is normalized.

For Admin table:

Admin = { AdminID, AdminName, password, reenter_password, Address, City, StateorProvince, PostalCode, Country, EmailName, Gender }

= { AdminID, password, reenter_password, AdminName }

= { AdminID, password }

For Student table:

Student = { StudentID, StudentName, password, reenter_password, Address, City, StateorProvince, PostalCode, Country, EmailName, Gender}

= { StudentID, password, reenter_password, StudentName }

= { StudentID, password }

For Dictionary table:

Dictionary = { Subject Name, Word, Meaning, AdminID }

= { Word, Meaning, Subject Name}

= {Word, Meaning)

For course table:

course = { AdminID, Subject Name }

5.2 Summary

Before implementing a system, it is important that the programmer know the dataflow of the system, the entities involved as well as the relationships, and the database relationship. These information would not only guide him in implementing his system, but if would make things simpler as he already has a general idea on how his system is meant to be.

Bilingual Translation System (BTS)

Chapter 6

Chapter 6: System Testing

6.0 Introduction

A completed system will have to go through a testing phase to ensure that the system will run properly.

In this phase, the system will be tested to ensure that there are no errors existing. Once an error is detected, it will be rectified immediately. Delaying in rectifying the error should not be practiced as this will burden the programmer in the end.

Necessary modifications are also done to ensure that the system runs smoothly and as planned.

6.1 Types of error

i. Syntax error

This error is caused by incorrect programming declarations and format. It will be detected during compilation by the compiler. Examples of syntax error in Visual Basic includes incorrect declaration of variables, incomplete If-Else coding etc.

E.g.

```
Private sub verify_click()
If text1.text = "AdminID" Then
Msgbox "Welcome AdminID"
```

```
End Sub
```

For this example, a syntax error has occurred. It is important for every IF added into the code, there is an End IF to match.

ii. Run time error

This error is detected during run time but not during compilation.

Example:

```
Private sub command1_click()
Unload me
FormB.show
Command1.Enabled = False
Command2.Enabled = True
End sub
```

By clicking on the "OK" button (command1), you will go from Form A (formA.frm) to Form B (formB.frm). There is no command2 button existing in the form. At compilation time, there won't be any error because the syntax regarding command2 is right. But during run-time, an error will be detected because command2 does not exist. This is what you call run-time error.

6.3 System Testing

6.3.1 Module testing

All three modules of BTS were tested separately. The modules were tested during the implementation phase itself. Each step was tested and errors were noted immediately. All modules are tested to determine that they are able to perform its functions as wanted by the programmer. By testing each module individually, minor errors detected will be able to be solved on the spot.

With every progress, the module was tested. The command buttons or icons were checked to determine whether they were correctly linked and also whether they were functioning correctly. It was also checked to see whether the flow of the system was smooth and correct, and whether it was progressing to the right screen after clicking on the required button.

The advantages of module testing includes that the programmer will not have to deal with too many errors at once. He is able to handle each error one at a time.

6.3.2 System Integration Testing

All modules are integrated and testing as a whole system in this phase. The system is repeatedly tested to ensure that the the objectives and functions of the system are met. The system will then be tested by a group of end users. Feedback and suggestions are noted and necessary modifications are made if required.

The system testing phase is further divided into three:

i. testing with test data – Much of the responsibility of this type of testing resides with the original author(s) of each program.

ii. Link testing with test data – also known as string testing. Test data are created that covers various processes for link testing. First, the system is tested with normal transactions. If everything goes well, then variations are added including invalid data to ensure that the system can properly detect errors

iii. Full systems testing with test data – When link tests are satisfactorily concluded, the system as a complete entity must be tested. Here, operators and end users of the system will be actively involved in the testing.

6.4 Summary

The testing phase is important in system development as this is the time when errors are detected. Errors detected early will be rectified immediately. It is also during this phase that it is decided whether the system actually meets its objectives. Modifications are done to ensure that objectives are met.

Because errors and dataflow are tested in this phase, it will help in maintaining the cost of developing the system. This is because the earlier the errors are detected in the development period, the lower the cost of rectification. Stumbling onto an error once the system is completed would require a lot of resources in terms of man power and money.

Bilingual Translation System (BTS)

Chapter 7

Chapter 7: Systems Evaluation

7.1 Introduction

In this chapter, the problems encountered while developing the system is discussed. The solutions to the problems are also documented in this section. The systems strengths, weaknesses and future enhancements were studied and documented.

7.2 Problems encountered and solutions

It is natural to encounter problems while building and implementing a system. The problems encountered and recorded. Solutions to the problems were found to ensure that the system would be able to run smoothly. The problems and solutions will be discussed after this.

7.2.1 Problems encountered during the system investigation phase

Below are the problems encountered during the investigation phase.

Problem: Difficulty in choosing the right software and tools

There are too much software's available in the market today that can be used to develop a system. A developer is spoilt for choice in this area. A lot of time is used to learn more about the features, benefits and disadvantages various software's before settling on one.

Solution: Interviews with computer programmers in the private sector and discussions among students were conducted. Their feedback regarding a particular software was noted and used as a reference when choosing software.

Problem: Difficulty in defining system scope

Defining the scope of the system proved to be difficult. Because there are not enough resources regarding stand-alone systems, the scope of this system proved to be quite broad.

Solution: Discussions and interviews with students, lecturers and previous students were done to help determine the system scope. The immediate task was to ensure that the system would fulfill its objective. Eventhough there would be other systems that would perform better than the SRWT; it does not fit the requirements wanted by the students themselves.

Problem: Designing database

Deciding the entities and attributes of the database was an important task. Incorrectly defining entities and attributes would result in an inefficient database that would eventually lead to an inefficient system.

Solution: The attributes of the database were decided. Several rough sketches of probable tables were done. It was decided that three types of tables would be used – the administrator details table, student details table and table for languages.

7.2.2 Problems encountered during the implementation phase

Problems encountered here were mainly discovered during the coding of the system.

Problem: Database integration

The database could not be linked with the system. The database was initially created using Microsoft Access 2000. The system was developed using Visual Basic 6.0

Solution: It was discovered that Visual Basic 6.0 does not support Microsoft Access 2000. Therefore all databases created would have to be converted to Access 97. Microsoft Office 2000 was uninstalled and Microsoft Office 97 was installed. The tables of the database were created again with Access 97.

Problem: Database Integration

The database still would not link to the system. An error message stating that Access 97 could not link with the system due to licensing problems were encountered.

Solution: This is a common problem faced by most programmers using Microsoft Office 97. A tool solving this problem is available for download at the online Microsoft Download Center. The file AcLisens.exe was downloaded and installed. This solved the problem.

Problem: Unable to add and update table in database

During the coding phase, the system would not be able to add and update new user data into the database. Instead it would delete the existing data and replace it with the new data saved.

Solution: Modifications with the coding was done. After a few tries, the system was able to add and update data into the table without deleting existing user data.

Problem: Adding and updating of database in an unorganized manner

The administrator is not able to update data into the database in an organized manner. The auto numbering of the table does not work correctly. The number is randomly picked in ascending mode.

Solution: Modifications with the coding was done. The system was initially adding and updating the database while deleting a few empty rows at the same time – thus resulting in the random auto-numbering. The auto-numbering feature was removed from the type field in the Access table.

Problem: Data retrieval from database

Due to the design and layout of the table, retrieving data was complicated. During the implementation phase, the designs of the tables in the database were revised. An additional type table was added - this table would be used to support data for each language. Each language will have its own table instead of the initial design where they shared one table.

Problem: Difficulty in differentiating between administrator and non-administrator.

Solution: The information saved after registration was updated into the same table. Another table was created solely to store data of non-administrators.

7.3 Evaluation by end users

After the system was completed, a group of end users were invited to test and evaluate the system. Their feedback and suggestions were incorporated into the system where suitable. Below are some of the feedback received.

a. Easier navigation

Tooltip texts were added when cursor is placed over icon. Tooltip text will alert user on the ongoing action or the next action if clicked.

b. User interface

Buttons were initially used for navigation. Most users asked for picture images instead of text buttons as this will make the interface less monotonous and more interesting.

c. Multiple search options

The initial search option was to search from one language to the other and vice versa. However users felt that multiple search options would make the system more beneficial to them.

7.4 System strengths

The strengths of this system includes:

a. Tailored to users' needs

i. The administrator stores all data. Therefore the system is tailored to the needs of the users.

ii. The administrators creates or setup courses as well as keys in the data relevant to the system.

iii. It is able to support an unspecified number of languages. Lecturer will have the option to create a new course as required.

b. Easy to use and user friendly

i. When a user clicks on an icon, a message box will appear informing the user on what is currently going on and what will happen next.

ii. When an error is about to occur, the system notifies the user by displaying a message box.

iii. When mouse cursor is over an icon, a tool tip text box will automatically appear to display icon function.

iv. Allows students to search for data using different methods.

v. Supports crystal reporting for monitoring purposes.

c. Secure system

i. The username and password for the super user has been embedded within the system. It is not possible for anyone to hack for the username and password. Therefore unauthorized changes to the lecturers and students information is prevented.

ii. The user ID will be held throughout the whole session after the initial login.

7.5 System constraints

a. Unsupported languages

Languages that uses special characters as part of their alphabet are not supported. Examples of these languages include Japanese, Arabic and Chinese.

b. System currently does not support audio files.

7.6 Future Enhancements

a. System will be able to support languages that uses special characters or images that represent a character/word in the language. Examples of languages able to be supported in future include Japanese, Tamil and Chinese.

b. The system will be more interactive and support more multimedia applications such as audio and movie files.

c. Test or examination questions will be added to the system to enable students to test their knowledge.

7.7 Knowledge and experienced gained

Creating a system is a learning process for everyone. Even though one might be an experienced programmer, it is not uncommon to find that there is something new to be learnt with each system developed. These valuable knowledge and experiences gained will be helpful with future software development. Below are some of the important things learnt while developing BTS.

a. Enhanced my knowledge of Visual Basic programming language

Prior to this, my knowledge of Visual Basic was limited and basic. Due to the complexity of the software, I learnt many tips and tricks that helped in developing

this software. The knowledge I gained here will definitely assist me in future programming assignments.

b. Enhanced my programming skills

By developing this system, I was able to enhance my programming skills. Initially my programming skills were limited to basic simple programming, but after this experience I am more confident in creating more complex systems.

7.8 Summary

It is normal for problems to occur while building a system. It is important for the developer to try and solve these problems the moment it occurs. Delaying in solving the problem might create bigger and complex problems as the system occurs.

It is also important for the developer to recognise the systems strengths as well as the weaknesses. It does not mean that by admitting that your system has weaknesses is a sign that the system has failed in it objectives. By identifying the weaknesses, you will be able to predict any future enhancements to the system.

While developing any system, each developer will gain new knowledge and experiences, no matter how minor it might be. These new knowledge and experiences will help in making the developer a better programmer in the future.

7.9 Conclusion

The theories of developing a system might not always apply when developing a system. Therefore a developer must always adapt to the situation and make modifications if necessary.

The problems that occur are never the same for every system. Each system has it own unique problems and solutions. It is also important to remember that there is no one solution to a problem. The solution might come in various forms but it is up to the developer to decide and pick the best for the system.

While developing this system, I have learnt the importance of project planning, time scheduling as well as developing a system with an open mind. I have learnt that it is necessary to "leave spaces" for modifications if necessary as this will not burden the system as well as the programmer.

It has been an enlightening experience while developing this system. Whatever learnt will definitely guide me in future programming assignments.

17. Microsoft Encarta Language Learning Spanish –

http://www.encarta.com/languages

18. Macromedia Flash Homepage - http://www.macromedia.com/flash

19. Microsoft Corp Homepage - http://www.microsoft.com/

20. Netherlands Search Engine -

http://www.appliedhealthservices.com/personal/netherlands.htm

21. Test your Dutch - http://www.directdutch.com/intake.htm

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12. Ellie Wood Languages - http://www.wood.demon.nl/ewl2/index.htm
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14. fonetiks.org - http://www.fonetiks.org/
15. Learn Dutch Online - http://www.learndutch.org/
16. Macromedia Director Homepage - http://www.macromedia.com/director

Appendices

Bilingual Translation System (BTS)

User Manual

Table of contents

This user manual will be a step-by-step guide for users who will be using the Bilingual Translation System (BTS).

Installing BTS

1. Insert CD into CD-ROM drive
2. Go to "Start".
3. Go to "run"
4. Click "browse" to look for setup file.
5. Click setup.exe
6. Follow instructions of dialog boxes.

Start BTS

1. Go to Start, Program and look for BTS.
2. Highlight BTS.
3. Click on BTS
4. Main Menu Screen will appear.

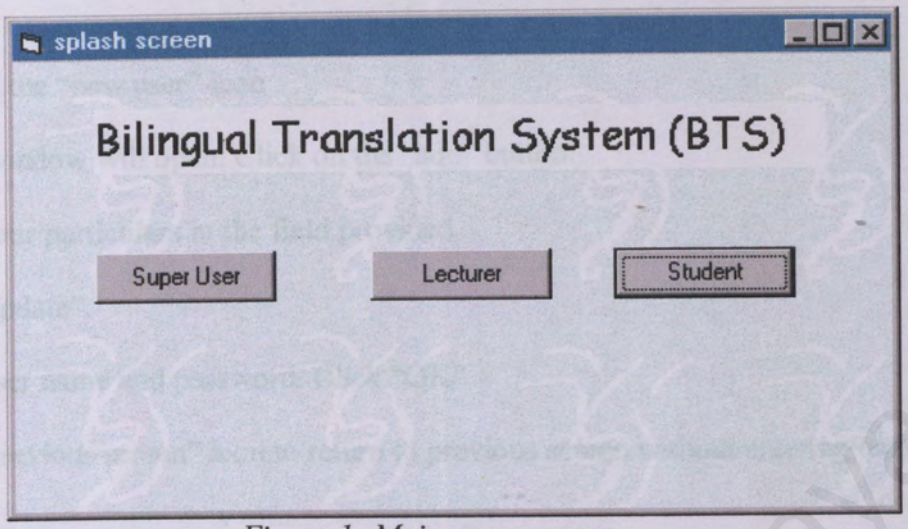


Figure 1: Main menu screen

User manual for the lecturer/administrator

1. Click "lecturer"

Login procedures

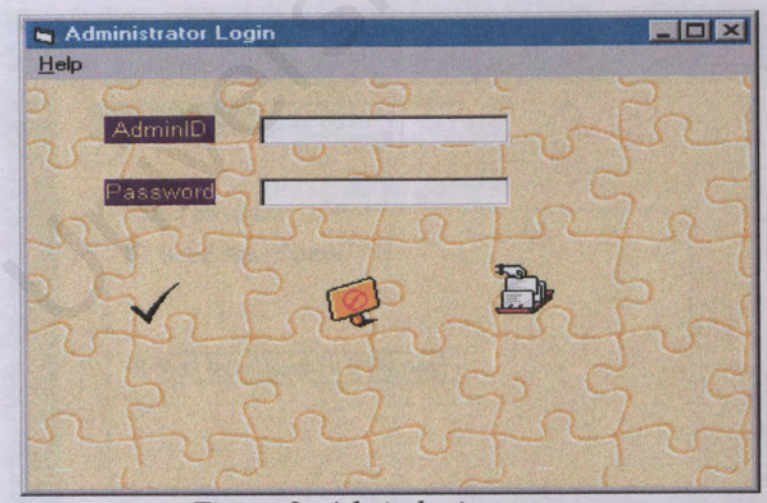


Figure 2: Admin login screen

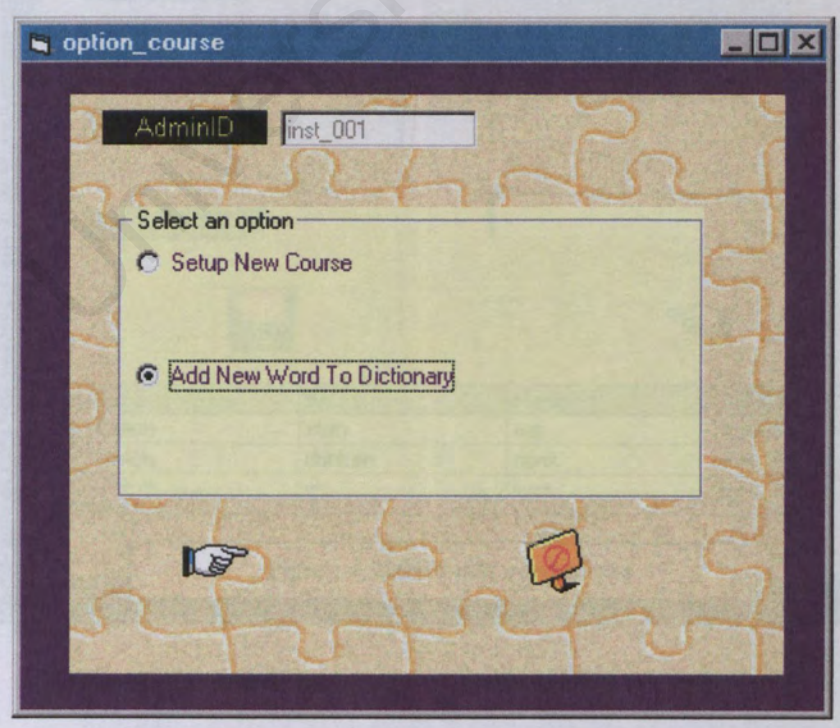
New user

2. Click on the "new user" icon
3. A new window will open. Click on the "add" button.
4. Fill in your particulars in the field provided.
5. Click "update".
6. Fill in user name and password. Click "OK"
7. Click "previous screen" icon to return to previous screen without entering data.

For existing user

8. Fill in user name and password. Click "OK" icon
9. Click "previous screen" icon to return to previous screen without entering data.

Figure 3: Admin option screen



To setup new course

10. Select "Setup new course".

11. Click on "next page" icon.

12. Go to step 17.

Or

13. Select "Add new word into dictionary"

14. Click on "next page" icon"

15. Go to step 16.

To add new word to dictionary

15. Select Subject for word to be added in.

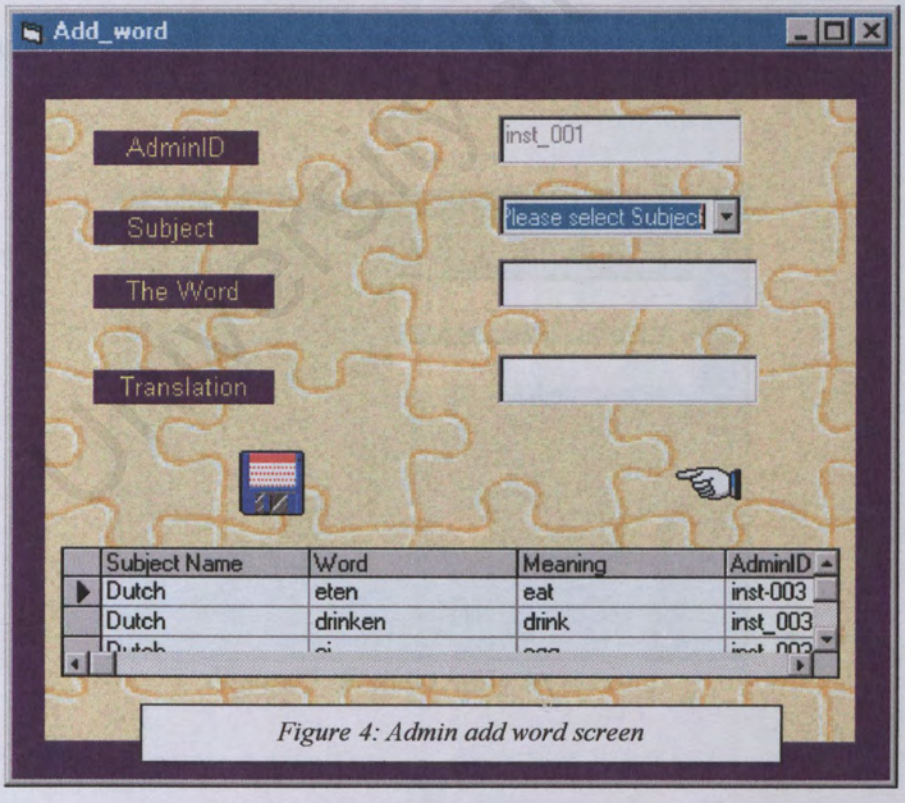


Figure 4: Admin add word screen

16. Key in word in foreign language.

17. Key in word in English.

18. Click "save" icon.

19. Repeat steps 16-18 for more words.

To exit

20. Click "previous screen" icon.

21. Click "end session" icon.

User manual for the student

1. Click "student" button.

Login procedures

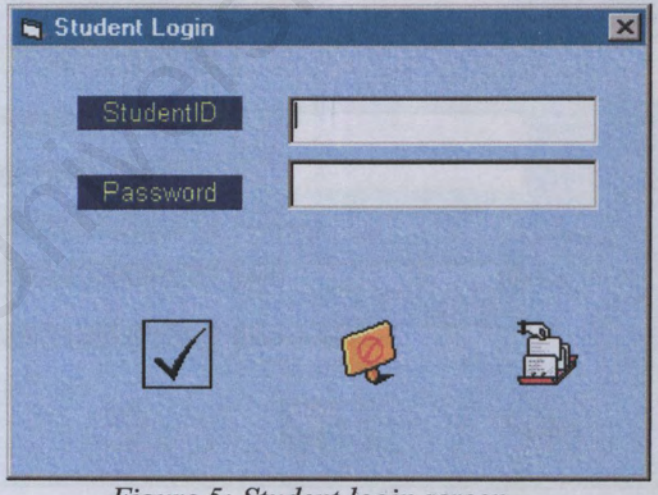


Figure 5: Student login screen

For new user

2. Click on the "new user" icon.
3. You are now in student registration screen.
4. To return to previous screen without adding any data, click "previous screen" icon.
5. Click on the "add" icon.
6. Fill in your particulars in the field provided.
7. Click "update" icon.
8. Fill in user name and password. Click "OK" icon
9. To clear fields, click "cancel".

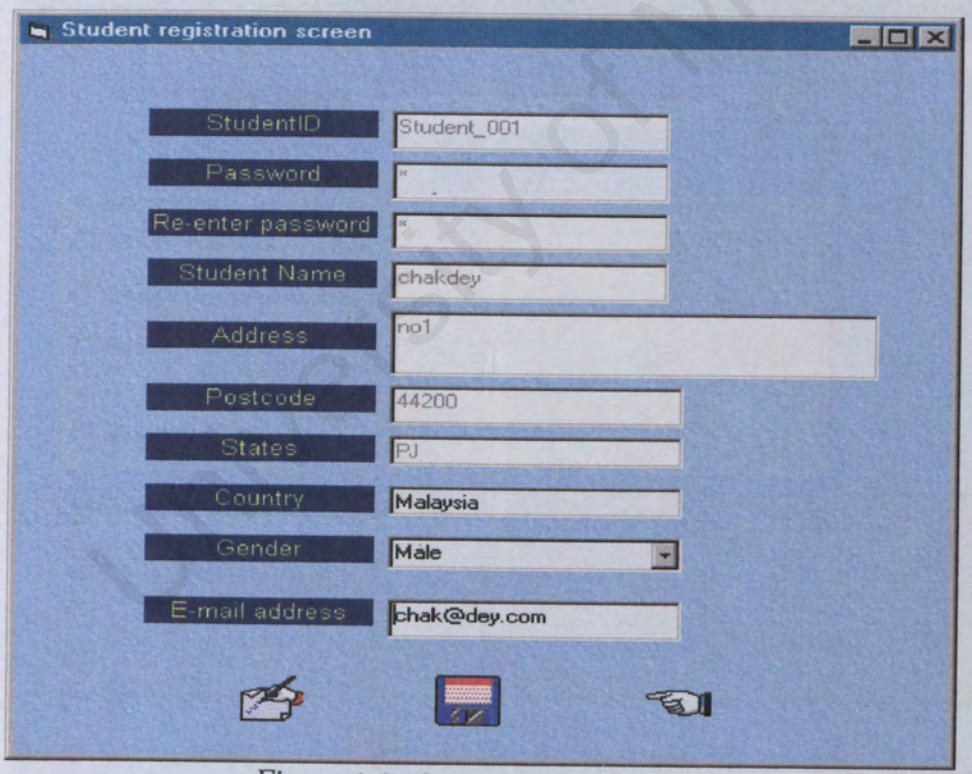


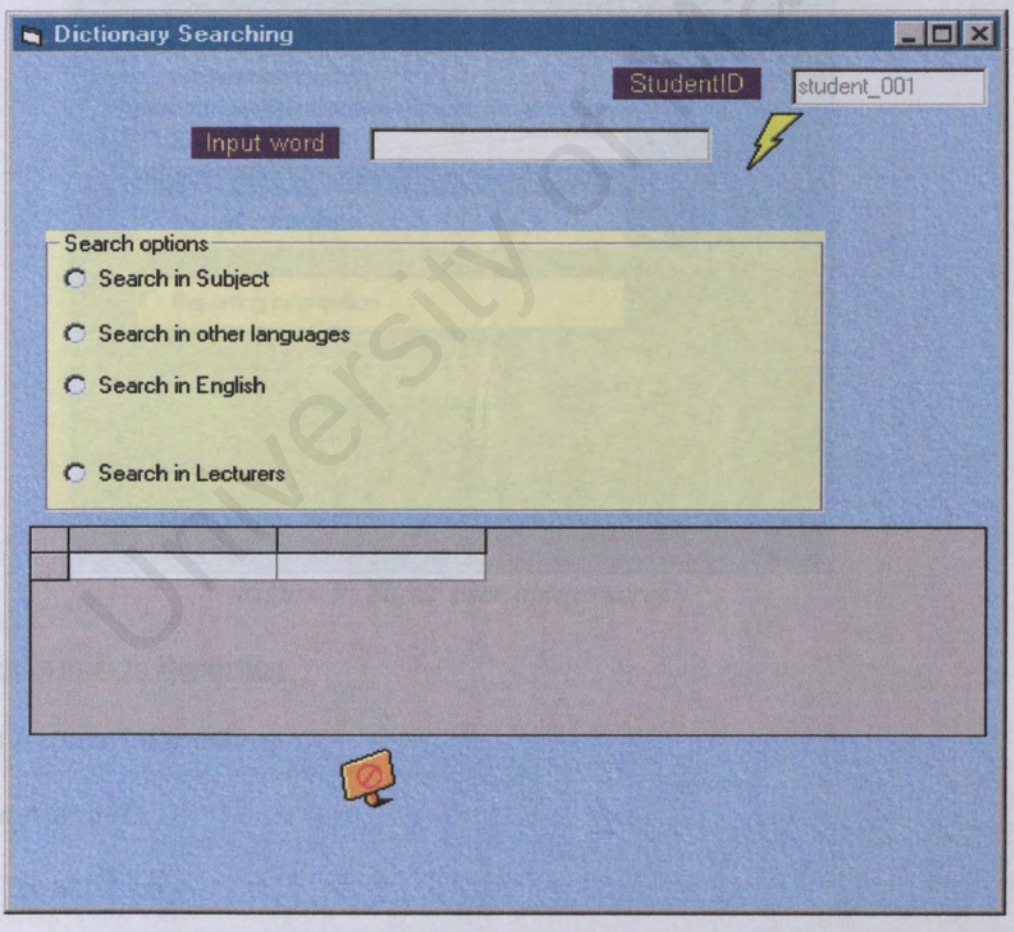
Figure 6: Student registration screen

For existing user

1. Fill in user name and password. Click "OK"
2. To clear fields, click "cancel".

To do search

1. Key in search value into text box.
2. Select Search option.
3. Search will be displayed within the search results box.
4. To enter new search value, click "refresh" icon



For super user login

1. Add in username and password.
2. Click "ok" button.
3. To exit, click "exit".

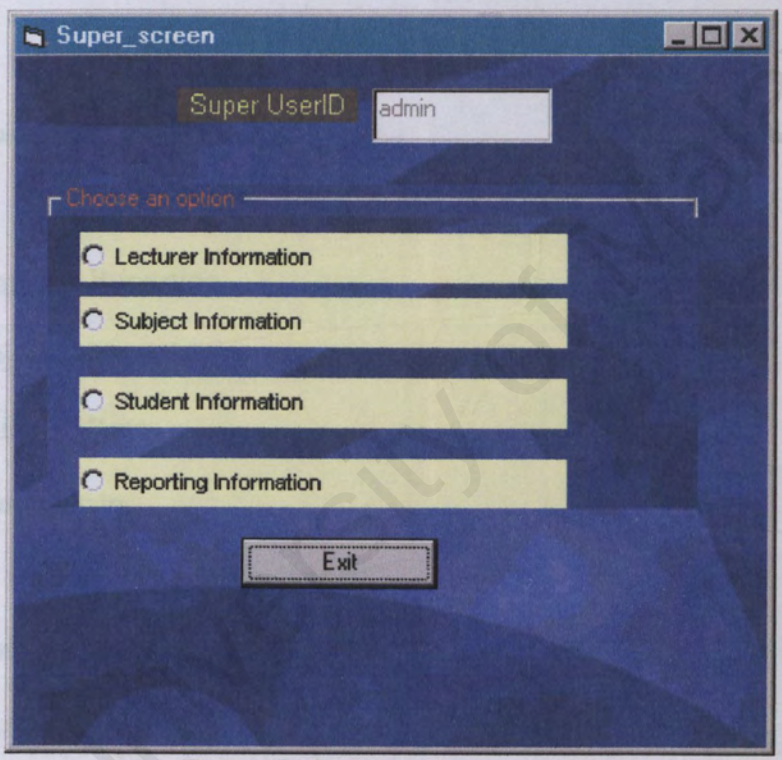


Figure 9: Super user option screen

Lecturer information Reporting

1. Select lecturer information
2. Key in AdminID.
3. Click "search" icon.

4. To search for all AdminID, type "*".
5. To edit, just click on column and type.

Student information Reporting

1. Select student information
2. Key in StudentID.
3. Click "search" icon.
4. To search for all StudentID, type "*".
5. To edit, just click on column and type.

Subject information Reporting

1. Select subject information
2. Key in Subject Name.
3. Click "search" icon.
4. To search for all subject name, type "*".
5. To edit, just click on column and type.

Reporting information (no editing)

1. For crystal reporting.
2. Select category, click "view".

Icons used within the system and what it represents.

Icon	Description
	Name: OK Icon Function: Verify data
	Name: New user Icon Function: To user registration screen
	Name: Back Icon Function: Go to previous screen
	Name: Next Icon Function: Go to next screen
	Name: Add Icon Function: Click to add data

Icon	Description
	Name: Search Icon Function: To start search
	Name: Refresh Icon Function: To clear search textbox
	Name: Exit Icon Function: To end user session
	Name: Find Icon Function: To start search
	Name: Save Icon Function: To update data in database

Figure 10: Icons and descriptions

Questionnaires

Questionnaire.

1. Are you currently learning a foreign language? Yes No

2. Were you a student of a foreign language? Yes No

3. What difficulties did you face while learning the language?

_____

_____

_____

4. List down the learning aids do you normally use when learning the language (e.g dictionary, bilingual dictionary, newspaper, friends' advice etc)

_____

_____

_____

5. Is it important to use learning softwares when learning a language? Yes No

6. Will you use language learning softwares as a learning aid? Yes No

7. What feature(s) did you like about that software?

_____

_____

_____

8. What feature(s) did you dislike in that software?

_____

_____

_____

9. If you could improve on the software, what would you add/remove?

_____

_____

_____

10. Based on your opinion, what is important in a language learning software?

_____

_____

_____

Questionnaire for end user testing of Bilingual Translation System

1. Are you currently learning a foreign language? Yes No

2. Were you a student of a foreign language? Yes No

3. List down the learning aids do you normally use when learning the language (e.g. dictionary, bilingual dictionary, newspaper, friends' advice etc)

_____
_____
_____
_____

4. Did you find the Bilingual Translation System easy to understand and use?
   Yes No

5. What feature(s) did you like about the Bilingual Translation System (BTS)?
_____
_____
_____
_____

6. What feature(s) did you dislike in BTS?
_____
_____
_____
_____

7. Is there room for improvement for BTS? Yes No

   If yes, please state
_____
_____
_____
_____
_____

System Codes

Add course screen

```
Private Sub Form_Activate()
Text1.Text = ins
End Sub

Private Sub Image1_Click()
On Error GoTo a:

If Text3.Text = "" Then
MsgBox "Please KeyIn the Subject Name"
Exit Sub
Else
Data1.RecordSource = "select * from course"
Data1.Refresh
Data1.Recordset.AddNew
Data1.Recordset("AdminID") = Text1.Text
Data1.Recordset("Subject Name") = Text3.Text
Data1.Recordset.Update
MsgBox "Record Updated"
Unload Me
Add_word.Show

Exit Sub
a:
MsgBox "Please choose another Subject Name"
Text3.Text = ""

End If
End Sub

Private Sub Image2_Click()
Unload Me
option_course.Show
End Sub
```

Add word screen

```
Private Sub coursename_Change()
Adodc1.RecordSource = "select * from course where [Subject Name] = " + "'" + coursename.Text + "'"
Adodc1.Refresh
End Sub

Private Sub coursename_Click(Area As Integer)
Text1.Enabled = True
Text2.Enabled = True
Image2.Enabled = False
End Sub

Private Sub coursename_GotFocus()
Data1.RecordSource = "select * from course where AdminID = '" & ins & "'"
Data1.Refresh
End Sub
```

```
Private Sub Form_Activate()
 Text3.Text = ins
End Sub

Private Sub Form_Load()
Text1.Enabled = False
Text2.Enabled = False
End Sub

Private Sub Image1_Click()
Unload Me
option_course.Show
End Sub

Private Sub Image2_Click()
If Text1.Text = "" And Text2.Text = "" Then
MsgBox "Please Keyin the Word and Meaning,thank you."
Else
Data2.Recordset.AddNew
Data2.Recordset("Subject Name") = coursename.Text
Data2.Recordset("Word") = Text1.Text
Data2.Recordset("Meaning") = Text2.Text
Data2.Recordset("AdminID") = Text3.Text
Data2.Recordset.Update
MsgBox "Record has been saved into database"
coursename.Text = ""
Text1.Text = ""
Text2.Text = ""
End If
End Sub

Private Sub Text2_KeyPress(KeyAscii As Integer)
Image2.Enabled = True
End Sub
```

Dictionary

```
Private Sub Command1_Click()
Dim SQL

Data1.RecordSource = "select  * from Dictonary where [Word] like " + "'" + Text1.Text + "'"
Data1.Refresh
SQL = "Select [Word], Meaning ,[Subject Name]" & _
      "FROM  Dictonary " & _
      "WHERE "

SQL = SQL & "Meaning LIKE '" & Text1.Text & "*' ORDER BY [Meaning] "

Text2.Text = SQL

   Data1.RecordSource = SQL
   Data1.Refresh
```

```
If (DBGrid1 = "") Then
   MsgBox " Null ", vbOKOnly, "Null"
Text1.Text = ""

End If
End Sub

Private Sub Form_Activate()
Text1.Text = ins
End Sub

Private Sub Form_Load()
Data1.RecordSource = ""
HScroll1.Min = 100  ' Set minimum.
   HScroll1.Max = 900  ' Set maximum
Image1.Visible = False
Image5.Visible = False
Image6.Visible = False
Image7.Visible = False

Option1.Value = False
Option2.Value = False
Option3.Value = False
Option4.Value = False
End Sub

Private Sub Frame1_MouseMove(Button As Integer, Shift As Integer, X As Single, Y As Single)
Option1.FontSize = 8
Option2.FontSize = 8
Option3.FontSize = 8
Option4.FontSize = 8

Image1.Visible = False
Image5.Visible = False
Image6.Visible = False
Image7.Visible = False
End Sub

Private Sub Image1_Click()
Dim SQL

Data1.RecordSource = "select  * from Dictionary where [Word] like " + "'" + Text1.Text + "'"
Data1.Refresh
SQL = "Select [Subject Name],[Word], Meaning " & _
      "FROM  Dictionary " & _
      "WHERE "


SQL = SQL & "Meaning LIKE '" & Text1.Text & "*' ORDER BY [Meaning] "
Text2.Text = SQL

   Data1.RecordSource = SQL
   Data1.Refresh
```

```
If (DBGrid1 = "") Then
   MsgBox " Null ", vbOKOnly, "Null"
Text1.Text = ""

End If
End Sub

Private Sub Image12_Click()
Unload Me
End Sub

Private Sub Image3_Click()
Option1.Value = False
Option2.Value = False
Option3.Value = False
Text3.Text = ""
Option4.Value = False
End Sub

Private Sub Option1_Click()
Dim SQL

SQL = "Select  [Word], Meaning, [Subject Name] " & _
     "FROM  Dictionary " & _
     "WHERE "

If (Text3.Text = "") Then
  MsgBox ("Please enter word")
Else
   SQL = SQL & "[Word] LIKE '" & Text3.Text & "*' ORDER BY [Word] "
   Text2.Text = SQL

   Data1.RecordSource = SQL
   Data1.Refresh
End If

If (DBGrid1 = "") Then
   MsgBox " Null ", vbOKOnly, "Null"
Text3.Text = ""
Option1.Value = False
Option2.Value = False
Option3.Value = False
Option4.Value = False
End If
End Sub

Private Sub Option1_MouseMove(Button As Integer, Shift As Integer, X As Single, Y As Single)
Option1.FontSize = 15
Option2.FontSize = 8
Option3.FontSize = 8
Option4.FontSize = 8
Image1.Visible = False
Image5.Visible = True
```

```
Image6.Visible = False
Image7.Visible = False
End Sub

Private Sub Option2_Click()
Dim SQL

SQL = "Select Meaning, [Word], [Subject Name]  " & _
      "FROM  Dictionary " & _
      "WHERE "

If (Text3.Text = "") Then
  MsgBox ("Please enter word")
Else
   SQL = SQL & "[Meaning] LIKE '" & Text3.Text & "*' ORDER BY [Meaning] "
   Text2.Text = SQL

   Data1.RecordSource = SQL
   Data1.Refresh
End If

If (DBGrid1 = "") Then
   MsgBox " Null ", vbOKOnly, "Null"
Text3.Text = ""
Option1.Value = False
Option2.Value = False
Option3.Value = False
Option4.Value = False
End If
End Sub

Private Sub Option2_MouseMove(Button As Integer, Shift As Integer, X As Single, Y As Single)
Option1.FontSize = 8
Option2.FontSize = 15
Option3.FontSize = 8
Option4.FontSize = 8
Image1.Visible = False
Image5.Visible = False
Image6.Visible = True
Image7.Visible = False

End Sub

Private Sub Option3_Click()
Dim SQL

SQL = "Select [Subject Name], [Word], Meaning  " & _
      "FROM  Dictionary " & _
      "WHERE "

If (Text3.Text = "") Then
  MsgBox ("Please enter word")
Else
   SQL = SQL & "[Subject Name] LIKE '" & Text3.Text & "*' ORDER BY [Subject Name] "
```

```
    Text2.Text = SQL

    Data1.RecordSource = SQL
    Data1.Refresh
End If

If (DBGrid1 = "") Then
    MsgBox " Null ", vbOKOnly, "Null"
Text3.Text = ""
Option1.Value = False
Option2.Value = False
Option3.Value = False
Option4.Value = False
End If
End Sub

Private Sub Option3_MouseMove(Button As Integer, Shift As Integer, X As Single, Y As Single)
Option1.FontSize = 8
Option2.FontSize = 8
Option3.FontSize = 15
Option4.FontSize = 8
Image1.Visible = True
Image5.Visible = False
Image6.Visible = False
Image7.Visible = False
End Sub

Private Sub Option4_Click()
'Command2.Enabled = True
Dim SQL

SQL = "Select  AdminID, Meaning, [Word], [Subject Name]   " & _
      "FROM  Dictionary " & _
      "WHERE "

If (Text3.Text = "") Then
  MsgBox ("Please enter word")
Else
    SQL = SQL & "[AdminID] LIKE '" & Text3.Text & "*' ORDER BY [AdminID] "
    Text2.Text = SQL

    Data1.RecordSource = SQL
    Data1.Refresh
End If

If (DBGrid1 = "") Then
    MsgBox " Null ", vbOKOnly, "Null"
Text3.Text = ""
Option1.Value = False
Option2.Value = False
Option4.Value = False
Option3.Value = False
End If
End Sub
```

```
Private Sub Option4_MouseMove(Button As Integer, Shift As Integer, X As Single, Y As Single)
Option1.FontSize = 8
Option2.FontSize = 8
Option3.FontSize = 8
Option4.FontSize = 15
Image1.Visible = False
Image5.Visible = False
Image6.Visible = False
Image7.Visible = True

End Sub

Private Sub Text1_KeyPress(KeyAscii As Integer)
Call Validation_Check(KeyAscii, 3)
End Sub

Private Sub Timer1_Timer()
SvrDate(0).Text = Format$(Date, "dd/mm/yyyy")
 SvrTime(1).Text = Format$(Time, "h:mm:ss AMPM")
End Sub

Private Sub Timer2_Timer()
 ' Switch BackColor between red and blue.
   If Label1(1).ForeColor = &H8080FF Then
      Label1(1).ForeColor = &HFF0000
   Else
      Label1(1).ForeColor = &H8080FF
End If
End Sub
```

Lecturer report

```
Private Sub Command1_Click()
Dim SQL

SQL = "Select [AdminID], [AdminName], [password], [reenter_password], [Address], [City],
[StateOrProvince], [PostalCode], [Country], [EmailName], [Gender] " & _
      "FROM  Admin " & _
      "WHERE "

If (Text1.Text = "") Then
  MsgBox ("Please enter word")
Else
   SQL = SQL & "[AdminID] LIKE '" & Text1.Text & "*' ORDER BY [AdminID] "

   Data1.RecordSource = SQL
   Data1.Refresh
End If

If (DBGrid1 = "") Then
   MsgBox " Null ", vbOKOnly, "Null"
Text1.Text = ""
```

```
End If
End Sub

Private Sub Command2_Click()
Unload Me
Super_screen.Show
End Sub

Private Sub Form_Activate()
Data1.RecordSource = ""
End Sub

Private Sub Form_Load()
Data1.RecordSource = ""
End Sub

Private Sub Image1_Click()
Dim SQL

SQL = "Select [AdminID], [AdminName], [password], [reenter_password], [Address], [City],
[StateOrProvince], [PostalCode], [Country], [EmailName], [Gender] " & _
      "FROM  Admin " & _
      "WHERE "

If (Text1.Text = "") Then
  MsgBox ("Please enter word")
Else
   SQL = SQL & "[AdminID] LIKE '" & Text1.Text & "*' ORDER BY [AdminID] "
   'Text2.Text = SQL

   Data1.RecordSource = SQL
   Data1.Refresh
End If

If (DBGrid1 = "") Then
   MsgBox " Null ", vbOKOnly, "Null"
Text1.Text = ""
End If
End Sub

Private Sub Image2_Click()
Unload Me
Super_screen.Show
End Sub
```

Admin Login

```
Private Sub clear_Click()
MsgBox "Do you want to refresh the screen?"
Text1.Text = " "
Text2.Text = " "
End Sub
```

```
Private Sub Image1_Click()
If Text1.Text = "" And Text2.Text = "" Then
   MsgBox "The fields shouldn't be empty !!!"
   Exit Sub
End If
Data1.RecordSource = "select * from Admin where AdminID like " + "'" + Text1.Text + "'"
Data1.Refresh
If Data1.Recordset.RecordCount = 0 Then
   MsgBox "User doesn't exist"

   Text1.Text = ""
   Text1.TabStop = True
   Exit Sub
End If

If Data1.Recordset("password") <> Text2.Text Then
   MsgBox "Invalid password"
   Text2.Text = ""
   Text2.TabStop = True
   Exit Sub
End If
usrname = Text1.Text
MsgBox "login successful!"

ins = Text1.Text
Unload Me
option_course.Show
End Sub

Private Sub Image2_Click()
MsgBox "This will end your session"
Unload Me
main.Show
End Sub

Private Sub Image3_Click()
Unload Me
register_admin.Show
End Sub

Private Sub new_admin_Click()
Unload Me
register_admin.Show
End Sub

Private Sub verify_Click()
If Text1.Text = "" And Text2.Text = "" Then
   MsgBox "The fields shouldn't be empty !!!"
   Exit Sub
End If
Data1.RecordSource = "select * from Admin where AdminID like " + "'" + Text1.Text + "'"
Data1.Refresh
If Data1.Recordset.RecordCount = 0 Then
   MsgBox "User doesn't exist"
```

```
Text4.Enabled = True
Text5.Enabled = True
Text6.Enabled = True
Text7.Enabled = True
Text8.Enabled = True
Text9.Enabled = True
Text10.Enabled = True
Combo1.Enabled = True
Image1.Enabled = False
Image2.Enabled = True
End Sub

Private Sub Image2_Click()
On Error GoTo a:
If Text1.Text = "" And Text2.Text = "" And Text3.Text = "" And Text4.Text = "" And Text5.Text = ""
Then
MsgBox "Please enter fields"
Else
If Text3.Text <> Text2.Text Then
MsgBox "Mismatched password"
Text3.Text = ""
Else

MsgBox "update"
Data1.Recordset.Update
Unload Me
login_admin.Show
Exit Sub
a:
MsgBox "AdminID Exists"
Text1.Text = ""
End If
End If
End Sub

Private Sub Image3_Click()
Unload Me
login_admin.Show
End Sub
```

Student register

```
Private Sub Form_Load()
Text1.Enabled = False
Text2.Enabled = False
Text3.Enabled = False
Text4.Enabled = False
Text5.Enabled = False
Text6.Enabled = False
Text7.Enabled = False
Image1.Enabled = True
Image2.Enabled = False
End Sub
```

```
Private Sub Image1_Click()
MsgBox "Add record"
Data1.Recordset.AddNew
Text1.Enabled = True
Text2.Enabled = True
Text3.Enabled = True
Text4.Enabled = True
Text5.Enabled = True
Text6.Enabled = True
Text7.Enabled = True
Combo1.Enabled = True
Text9.Enabled = True
Image1.Enabled = False
Image2.Enabled = True
Image3.Enabled = False
End Sub

Private Sub Image2_Click()
On Error GoTo a:
If Text1.Text = "" Then
MsgBox "Please enter StudentID"
Else
If Text3.Text <> Text2.Text Then
MsgBox "Mismatched password"
Text3.Text = ""
Exit Sub
Else
MsgBox "Record has been saved"
Data1.Recordset.Update
Unload Me
student_login.Show
Exit Sub
a:
MsgBox "StudentID exists"
Text1.Text = ""
End If
End If
End Sub

Private Sub Image3_Click()
Unload Me
student_login.Show
End Sub
```

Report

```
Private Sub Command4_Click()
If Option1.Value = True Then
CrystalReport4.PrintReport
Else
If Option2.Value = True Then
CrystalReport1.PrintReport
```

```
Else
If Option3.Value = True Then
CrystalReport2.PrintReport
End If
End If
End If
End Sub

Private Sub Form_Load()
Option1.Value = False
Option2.Value = False
Option3.Value = False
End Sub

Private Sub Image2_Click()
Unload Me
Super_screen.Show
End Sub

Private Sub clear_Click()
MsgBox " Have a nice day"
Unload Me
End Sub

Private Sub Image1_Click()
If Text1.Text = "" And Text2.Text = "" Then
   MsgBox "The fields shouldn't be empty !!!"
   Exit Sub
End If
Data1.RecordSource = "select * from  Student where StudentID like " + "'" + Text1.Text + "'"
Data1.Refresh
If Data1.Recordset.RecordCount = 0 Then
   MsgBox "User doesn't exist"

   Text1.Text = ""
   Text1.TabStop = True
   Exit Sub
End If
If Data1.Recordset("Password") <> Text2.Text Then
   MsgBox "Invalid password"
   Text2.Text = ""
   Text2.TabStop = True
   Exit Sub
End If
usrname = Text1.Text
MsgBox "login successful!"

ins = Text1.Text

Unload Me
Dictionary.Show
End Sub

Private Sub Image2_Click()
```

```
MsgBox " Have a nice day"
Unload Me
main.Show
End Sub

Private Sub Image3_Click()
Unload Me
register_student.Show
End Sub

Private Sub new_Click()
Unload Me
register_student.Show
End Sub
```

Student login

```
Private Sub verify_Click()
If Text1.Text = "" And Text2.Text = "" Then
   MsgBox "The fields shouldn't be empty !!!"
   Exit Sub
End If
Data1.RecordSource = "select * from  Student where StudentID like " + "'" + Text1.Text + "'"
Data1.Refresh
If Data1.Recordset.RecordCount = 0 Then
   MsgBox "User doesn't exist"

   Text1.Text = ""
   Text1.TabStop = True
   Exit Sub
End If
If Data1.Recordset("Password") <> Text2.Text Then
   MsgBox "Invalid password"
   Text2.Text = ""
   Text2.TabStop = True
   Exit Sub
End If
usrname = Text1.Text
MsgBox "login successful!"

ins = Text1.Text

Unload Me
Dictionary.Show
End Sub
```

Student report

```
Private Sub Form_Activate()
Data1.RecordSource = ""
End Sub

Private Sub Form_Load()
Data1.RecordSource = ""
End Sub

Private Sub Image1_Click()
Unload Me
Super_screen.Show
End Sub

Private Sub Image2_Click()
Dim SQL

SQL = "Select [StudentID], [StudentName], [Password], [Reenter_ password], [Address],
[StateOrProvince], [PostalCode], [Country], [EmailAddress], [Gender]" & _
      "FROM Student " & _
      "WHERE "

If (Text1.Text = "") Then
  MsgBox ("Please enter word")
Else
   SQL = SQL & "[StudentID] LIKE '" & Text1.Text & "*' ORDER BY [StudentID] "
   'Text2.Text = SQL

   Data1.RecordSource = SQL
   Data1.Refresh
End If

If (DBGrid1 = "") Then
   MsgBox " Null ", vbOKOnly, "Null"
Text1.Text = ""
'Option1.Value = False
'Option2.Value = False
End If
End Sub
```

Subject report

```
Private Sub Form_Activate()
Data1.RecordSource = ""
End Sub

Private Sub Form_Load()
Data1.RecordSource = ""
End Sub

Private Sub Image2_Click()
Dim SQL

SQL = "Select [Subject Name], [Word], [Meaning], [AdminID] " & _
```

```
    "FROM  Dictionary " & _
    "WHERE "
If (Text1.Text = "") Then
  MsgBox ("Please enter word")
Else
   SQL = SQL & "[Subject Name] LIKE '" & Text1.Text & "*' ORDER BY [Subject Name] "
   'Text2.Text = SQL

   Data1.RecordSource = SQL
   Data1.Refresh
End If

If (DBGrid1 = "") Then
   MsgBox " Null ", vbOKOnly, "Null"
Text1.Text = ""
'Option1.Value = False
'Option2.Value = False
End If
End Sub

Private Sub Image3_Click()
Unload Me
Super_screen.Show
End Sub
```

Super login

```
Private Sub Command1_Click()
If Text1.Text = "" And Text2.Text = "" Then
MsgBox "Put the username and password"
Else
If Text1 <> "admin" Then
MsgBox "User does not exist "
Text1 = ""
Else
If Text2 <> "password" Then
MsgBox "Invalid password"
Text2 = ""
Text1 = ""
Else
If Text1.Text = "admin" And Text2.Text = "password" Then
Image1.Visible = True
MsgBox "Login successful"

yt = Text1.Text
Unload Me
Super_screen.Show
End If
End If
End If
End If
End Sub
```

```
Private Sub Command2_Click()
MsgBox "This will end your session"
Unload Me
main.Show
End Sub

Private Sub Form_Load()
Image1.Visible = False
End Sub

Private Sub Image1_Click()
If Text1.Text = "" And Text2.Text = "" Then
MsgBox "Put the username and password"
Else
If Text1 <> "admin" Then
MsgBox "User does not exist"
Text1 = ""
Else
If Text2 <> "password" Then
MsgBox "Invalid password"
Text2 = ""
Text1 = ""
Else
If Text1.Text = "admin" And Text2.Text = "password" Then
MsgBox "Login successful"
yt = Text1.Text
chak = Text3.Text
Unload Me
Super_screen.Show
End If
End If
End If
End If
End Sub
```

Super screen

```
Private Sub Command1_Click()
Unload Me
End Sub

Private Sub Form_Activate()
Option1.Value = False
Option2.Value = False
Option3.Value = False
Option4.Value = False
Text1.Text = yt

End Sub

Private Sub Form_Load()
Option1.Value = False
```

```
Option2.Value = False
Option3.Value = False
Option4.Value = False

End Sub

Private Sub Image1_Click()
Unload Me
End Sub

Private Sub Option1_Click()
If Option1.Value = True Then
Unload Me
Lecturer_Report.Show
End If
End Sub

Private Sub Option2_Click()
If Option2.Value = True Then
Unload Me
Subject_report.Show
End If
End Sub

Private Sub Option3_Click()
If Option3.Value = True Then
Unload Me
Student_report.Show
End If
End Sub

Private Sub Option4_Click()
If Option4.Value = True Then
Unload Me
report.Show
End If
End Sub
```