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SYLLABUS MANAGEMENT SYSTEM
(SMS)

Name: LIM LAY POH
Matrics No: WET 010061
Supervisor: Ms. MANGALAM SANKUPELLAY
Moderater: PN. SALIMAH MOKHTAR

FACULTY OF SCIENCE COMPUTER AND INFORMATION TECHNOLOGY

ABSTRACT

In these early years of 21st century, information technology is playing an important role in our lives. Syllabus Management System develops especially to increase the quality of teaching and learning and to bring a better experience in lecturing.

Syllabus Management System that consists of note, assignment, marking, plagiarism and forum modules is developed to help lecturer and tutor to manage courses in FSCIT. Note module provides a course template for lecturers. This module also develops a question bank for lecturer to store their exam, quiz or tutorial questions. Lecturer can set up quizzes and tutorial for student more easily. Students can do the quizzes and tutorial online and the system will mark automatically the objective type question and auto calculates students' examination marks. Lecturer can download the students' tutorial and mark. This module also provides a center to let lecturer publish their announcement and let student to view their lecturer announcement.

The waterfall methodology with prototyping is used in development of SMS. Windows XP Professional is a development platform for SMS and have .NET framework. We use SQL Server 2000 in the system database development. The selected programming tools include HTML, Java Script, VB script and ASP.NET. While software application for SMS consist of Macromedia Dreamweaver MX and Microsoft Visual Studio .NET.

With SMS, hopefully our country will have better quality of university graduates in the future.

ACKNOWLEDGEMENT

My WXET 3182 thesis has been completed by 18/2/2004. For almost three months, many people have been helping me to complete my thesis. I would like to use this opportunity to thank all of them.

First of all, I would like to thank Faculty of Science Computer and Information Technology to give this opportunity to me to take this meaningful subject, Latihan Ilmiah WXET 3182. Through this course, I can improve my knowledge on information technology and gain experience on how to develop a system. This is very useful to help me in my future career.

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I would like to especially thank to Mr. Ling Teng Chew, Mr Ang Tang Fung, and Mr Teh Ying Wah for their valuable suggestion and guidance by interviewing them. Because of them, they let me more clearly about the existing system and how the web based syllabus management system work. Beside that, their some precious guidance let me have some idea on how to improve and enhance the existing system to come out with more powerful system.

I would also like to extend my thanks to my group members that are Tan Wan Koon, Hiew Bee Yan, Ooi Miao Eng for their corporation, support, guidance, and friendship to complete my WXET 3182.

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Chapter 1

INTRODUCTION

1.0 INTRODUCTION

Recently, the development of information technologies getting rapid change, gives various systems of university a great influence. University systems are mainly classified into education systems, research systems, library systems, and administrative systems. And it is expected that they work together. Though various systems have already been built in University of Malaya, each system is being developed independently and not suite to Faculty of Science Computer and Information Technology. As to develop a system to well-suite to FSCIT, Syllabus Management System is developed.

By increase effectiveness and easiness to the teaching and learning process would certainly give space for University to increase the education quality to produce future graduates with better quality.

1.1 PROJECT OVERVIEW

In Faculty of Science Computer and Information Technology, although that is a server provide for lecturers FSCIT to set up their own website that can let students to get their course material online, but this cause no standardization between the lecturers website. Furthermore, students FSCIT still submit their assignment manually to lecturer. And there are no system to auto calculates the students' examination marks. So, SMS that include notes, assignment, marking and plagiarism modules is developed to help academician to manage the courses in FSCIT. This system provides a course template for lecturers, so that, by using the template lecturer can manage their course easily and this will save time and energy.

By the way, lecturers can give away their notes without much effort. Beside that, SMS provide a question bank for lecturer to store their exam or quiz questions. Whenever they want to give quizzes or tutorial for students, they can select the questions from the question bank, and then the system will automatically arrange the quizzes or tutorial questions. So, the student can do quiz online. For students, they enable to get their study material easily, anytime, anywhere with just a few clicks. SMS also provide a center to let student read lecturer's announcement online, no more rushing for lecture when lecturer is on emergency leave.

Furthermore, students can submit their tutorial and assignment online. Lecturer can download the students' tutorial and mark online. Students can do the objective type quizzes online and the system mark automatically and will auto calculate students' examination marks. SMS is also provided a plagiarism module to detect plagiarism among students and avoid students copy their assignment from websites. So lecturer can easily catch out student that cheating. In addition, SMS also provide a center for students to exchange ideas and get helps from course mates and lecturers easily and effectively.

1.2 PROBLEM DEFINATION

Although there has a system that helps lecturers and tutors to manage their course material, like "Kursus Online" that provide by "Pusat Pembangunan Multimedia (MDC) University Malaya, but it did not get so much attention by academician. It may be because lack of promotion of the system and no enforcement to lecturers to use the system. The problems that occur in the existing system are:

1. **Waste time and energy**

Whenever lecturers want to distribute notes to students, some lecturers send their notes to the photocopy shop in the faculty and ask their students to buy it from there. Problem with this practice are it could be costly and sometimes students need to wait for long queue.

2. **No standardization**

There is no standardization between lecturers website. It is because lecturers are design their own website, so there is different design occur. It also will waste their time and energy to create a website.

3. **Notice board**

Whenever the lecturer wants to make an announcement or inform his/her students about something, the only way and the most favorable way is to place a note at the notice board. The problem of using the notice board is that there is no guarantee that it will reach every student and you need to be there to see it. Yet, you need to browse through it carefully or you might missed some important message.

4. **Redundancy**

Mostly, lecturers are manually mark, calculated, and key in students mark into the system. This will cause redundancy and wrongly key in the marks.

5. **Plagiarism**

Is a wasting of time if lecturer wants to check plagiarism among students work manually. There are still no systems be used have the function that can detect plagiarism occur among friends and form the website.

6. **Weak Security**

The existing system cannot trace user, is because there is no password protected and users are not require to register to join discussion. The problem that will occur is that ones identity could be replaced.

1.3 PROJECT OBJECTIVE

Syllabus Management System is a system can help lecturers, tutors, and students create an interactive and effective teaching and learning environment. The objectives of SMS are:

1. **To let the lecturers have better manage of their teaching material and to provide students a better access to their study material**

   The system let lecturers easily prepare their teaching materials and publish the information of course at anytime and anywhere that can access to the Internet. The system will let students easily access the lecture notes and the information of their course anytime and anywhere.

2. **To increase productivity of lecturer**

   The system provides a course template that can let lecturers to upload their notes, tutorials and assignments and delivered information about the course to students. Beside that, the system provides question bank that make lecturers easily set up quiz for students and the system will auto marking the quiz. This will save time and energy of lecturers.

3. **To create paperless environment**

   By upload and download notes through computer will reduce the use of paper and will reduce the clerical workload of lecturers. It also can avoid the lost of course material.

4. **To create web-based quizzes easily**

   The lecturer only need to select the questions from the question bank and the system will automatically arrange the questions in the test paper. The time and energy will be reduced compare to the current written test paper.

5. **To provide an effective way for posting announcement**

   Previously, urgent and important announcement would be posted anywhere in the faculty component. It was time-consuming to post a same notice in different place and resources wasting in printing many copies of notice. By using this system, lecturers can post announcement in electronic notice board. Students will get information from system whenever there is new announcement made by either lecturers or administrators.

6. **To avoid plagiarism**

   The system can help lecturer to check whether the student copy their assignment among friends or from the websites.

7. **To ensure only authorized users access to the system**

   The system is only for the administrators, lecturers, tutors and students FSCIT. It is the security use to protect the system.

1.4 PROJECT SCOPE

1.4.1 Target User

Syllabus Management System is developed for the administrators, lecturers, tutors, and students Faculty of Science Computer and Information Technology, University Malaya. The administrators are the people who manage the system. The lecturer and tutor should first register online to get an account and password before

they use the system. The student who wants to use the system also must login first. Lecturers who teach more than one course, they can register more than one account (for each course).

1.4.2 Modules and Function

There are five main modules in Syllabus Management System, which are Note Module, Assignment Module, Marking Module, Plagiarism Module, and Forum Module. This system will be completed by four people that each people are assigned to do a module.

1. **Note**
   - Develop a website to enable students to have fast and easy access to their course materials.
   - Develop a web based management system to let lecturers easily manage their teaching material.
   - Develop a course template for lecturers.
   - Develop a question bank for lecturers to create question, store question and edit question from the database. And let lecturers select question from question bank to give quizzes and tutorial for students online.
   - Develop a communication system through electronic announcement board.

Assignment, marking, plagiarism and forum modules will be developed by Tan Wan Koon, Hiew Bee Yan, and Ooi Miao Eng.

1.5 PROJECT LIMITATIONS

Syllabus Management System is developed to enhance the existing system. But there are several limitations occur to develop the system.

1. **Cannot support multi language**
   - The language uses in the system is fully in English.
2. **Cannot fully detect plagiarism**
   - The system can detect word by word but not the whole sentence with the same meaning.
3. **No virus scanning**
   - The system cannot automatically scan the files that submit by students.
4. **Cannot auto mark essay, tutorial, and assignment**
   - The system can only auto mark the objective questions.
5. **Cannot link to Student Information System database**
   - The system can auto calculate students quizzes, assignments and examination marks, and stored at the Syllabus Management System database but cannot link to Student Information System.

1.6 PROJECT DEVELOPMENT SCHEDULE

The SMS will be developed within two semesters. So, the schedule of the project is developed for the two semesters. The process is broken into eight tasks. The project started on sixteenth of June and will be finish on thirteenth of February next year. The figure 1.1 below shows the Gantt Chart for Syllabus Management System.

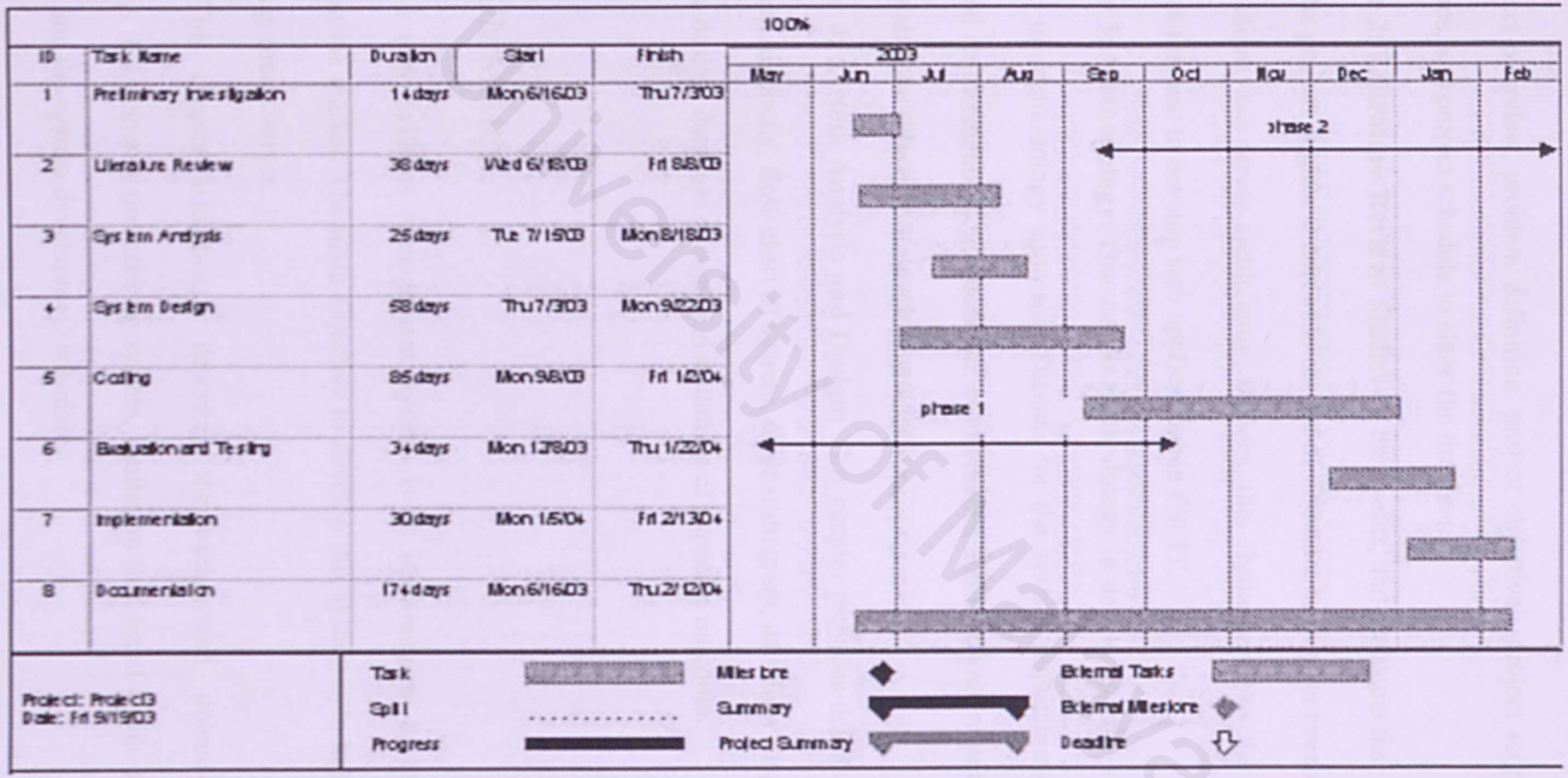


Figure 1.1: The Gantt Chart of Syllabus Management System

1.7 REPORT LAYOUT

Chapter 1: Introduction: Gives a brief introduction to the whole project including the project overview, problem definition, project objectives, project scope, project limitations, and project schedule to show the timeline.

Chapter 2: Literature Review: Studies on the events, and problems that will occur before the project begins. It cores the results of literature survey on several existing system, client, and server architecture. Besides, this chapter reviews the tools, and languages that use to develop web applications in FSCIT.

Chapter 3: Methodology: Discuss the methodology in developing the system and rationale of methodology approach. Discuss for the system requirements such as functional requirements, non functional requirements, and hardware requirements. It also explains the selection of development tool.

Chapter 4: System Analysis and Design: This chapter provides details regarding the system hierarchy, flow chart of system, context diagram, data flow diagram, user interface design, database design, and statement of expected outcome.

1.8 SUMMARY

A new Syllabus Management System is an improvement to the existing system in the market. The main objective to develop this system is to help lecturers to manage their courses.

This chapter also briefly describes the background, objective, scope, problems that occur at the existing system, limitation that faced while develop the system, and the system development schedule.

Chapter 2

LITERATURE REVIEW

2.0 LITERATURE REVIEW

2.1 INTRODUCTION

Literature review is a critical look at the existing research that is significant to the work that a researcher is carrying out. Basically, literature review summarizes, interprets, and evaluates existing literature (or published material) in order to establish current knowledge of a subject. The main purpose is to get a better understanding on the required tools, equipments and other necessary things while developing a system. Without this understanding, is impossible to achieve an effective system design that may be lead to failure.

Literature review forms an essential process in system development. In real world, there is much to be done such as fact-findings, system comparison, analysis, and synthesis of the features and modules in order to achieve a better understanding of the system that will be developed. After gathering all the information needed, choose the most efficient way to achieve aims and objectives of the system and lastly, to developed a full system that fulfilled all the requirements needed.

Researches can be done to existing system or available system in order to have a great and closer view before proceeding on system development. By doing evaluation of existing or other similar system, the system that will be developed will inherit all style that is more pleasant to users.

2.2 WHAT IS E-LEARNING

E-learning allows you to learn anywhere and usually at any time, as long as you can access to the internet. E-learning can be CD-ROM-based, Network-based, Intranet-based or Internet-based. It can include text, video, audio, animation and virtual environments. It can be a very rich learning experience that can even exceed the level of training you might experience in a crowded classroom. It is self-paced and practical learning.

The quality of the electronic-based training, as in every form of training, is in its content and its delivery. E-learning can suffer from many of the same pitfalls as classroom training, such as boring slides, monotonous speech, and little opportunity for interaction. The beauty of e-learning, however, is that new software allows the creation of very effective learning environments that can engulf you in the material.

2.2.1 Benefits of E-learning

E-learning has definite benefits over traditional classroom training. While the most obvious are the flexibility and the cost savings from not having to travel or spend excess time away from work, there are also others that might not be so obvious.[1] For example:

- **It's less expensive to produce**

  E-training is virtually free once you reach the break-even point. Synchronous programs will have continued costs associated with the instructor managing the class, but will still be lower than traditional courses.

- **It moves faster**

E-learning allows learners to skip material they already know and understand and move onto the issues they need training on.

- **It provides a consistent message**

E-learning eliminates the problems associated with different instructors teaching slightly different material on the same subject. For company-based training, this is often critical.

- **It can work from any location and any time**

E-learners can go through training sessions from anywhere, usually at anytime. This Just-In-Time (JIT) benefit can make learning possible for people who never would have been able to work it into their schedules prior to the development of e-learning. (If you manage a corporate learning program, however, be careful about requesting that workers learn on their own time from home.)

- **It can be updated easily and quickly**

Online e-learning sessions are especially easy to keep up-to-date because the updated materials are simply uploaded to a server. CD-ROM-based programs may be slightly more expensive to update and distribute, but still come out cheaper than reprinting manuals and retraining instructors.

- **It can lead to increased retention and a stronger grasp on the subject**

This is because of the many elements that are combined in e-learning to reinforce the message, such as video, audio, quizzes, interaction, etc. There is

also the ability to revisit or replay sections of the training that might not have been clear the first time around.

- **It can be easily managed for large groups of students**

Allows corporate training directors, HR managers and others to keep track of the course offerings, schedule or assign training for employees and track their progress and results. Lecturers can review a student's scores and identify any areas that need additional training.

2.2.2 E-Learning in the Perspective of Syllabus Management System

As the world is embarking on the digital economy era, our primary concern revolves around on how to transform traditional information passing method to a digital method where data are transported from node to node via a network in split of seconds. Time and accuracy of information is vital to ensure the rise of the digital era with the E-learning concept in mind, the idea of the Syllabus management System comes to its existence. Generally, the SMS is a web-based system that hybrids time, knowledge and accuracy factor within a learning environment. Time and space will no longer be the stumbling block for the educational process to be carried out successfully. Therefore, SMS can be made 'a live' in this digital era. This will be an improvement over the unreliable traditional syllabus management method implemented by many faculties today.

2.3 HOMEPAGE TEMPLATE

With the tremendous growth of the Internet and the expansion of the World Wide Web, homepage has the target of academics to explore in web design and development, sharing information, published article and so on. Homepage template allows academic to build a homepage without any code writing, the layout and the format of homepage already set up in the template their choose according to their need. The template built will be convenient to academic because they do not have to spend much time to set up their homepage design and do coding.

To create a website is not a hard task but for those who lack of experience and knowledge of Internet, hence it becomes a hard work for them. HTML is the backbone of Internet; most of the website was create by using this language. In order to make a nice and interesting homepage, a basic understanding of HTML is a necessity. There is much software and web-editor can help the users build website in fast and easy way like Microsoft FrontPage, Macromedia Dreamweaver, Netscape Composer and so on. In order to develop a real nice, interesting dynamic and interactive homepage, knowledge of ASP, JSP or CGI is required.

With the technology, administrator of web page can communicate with the users who come to visit for keeping record; cookies of the visitor in the database by prompt them to fill in the on-line form. Security of website also can guarantee because only the register user can access to certain page of the web pages, this can avoid non-authorized user access the system to perform task illegally.

There are any websites, which provide services of homepage building, for example the most famous Yahoo, Geocities. This commercial website provides

some template for users to choose and then after the selection, users will prompt to answer some question by filling the form. And then the information that users fill in will be shown in the template they choose, as they want. Finally the web page will be set up after the button upload been press. Enhancement also provided for users to add, delete, and update their HTML files.

2.4 ANALYSIS OF EXISTING SYSTEM

2.4.1 Kursus On-line – Pusat Pembangunan Multimedia (MDC), University of Malaya

URL: http://mdc.um.edu.my:88/mdc/mainmenu.nsf [2]

This site is an official site that provide template for lecturers University of Malaya to place their notes and tutorials online. Lecturer who wants to use the system would have to register online and the approval will be done within one week. Students will be given a general username and password during lecture to access the site. Some main modules of the site are as below:

- **The Note Module**
  - Students are allowed to view the notes online. They can also save the notes according to the original file format.
  - Lecturers are allowed to upload and delete the notes (files)
- **The Tutorial Module**
  - Students are allowed to view the tutorials online. They can also save the tutorials according to the original file format.
  - Lecturers are allowed to upload and delete the tutorials (files).
- **The Pengumuman Module**
  - Allow lecturers to post and delete announcements.
- **The Perbincangan Module**
  - Allow both lecturers and students to create new discussion topic and reply to topics that have been created.
- **The Maklumat Kursus Module**
  - Details of information for the particular course.

- **The Maklumat Pensyarah**
  - Personal information about lecturers such as e-mail address and contact number.

Result of Study

- **Strength:**
  - Simple design and mostly text-oriented make it fast to load.
- **Weakness:**
  - Low manageability – MDC control the whole system, if problems occur, lecturer have to approach the administrator at MDC. It may be take a long time to respond.
  - It takes too many step and long flow of pages to accomplish a single task.
  - Low functionality – this site just allow lecturers to upload their notes and tutorial.

2.4.2 Blackboard Learning System

URL: http://www.blackboard.com/

The Blackboard Learning System is a Web-based server software platform that offers industry-leading course management, an open architecture for customization and interoperability, and a scalable design that allows for integration with student information systems and authentication protocols.

The Blackboard Learning System features[3] an online environment designed to complement and supplement either traditional learning or distance learning.

Through an intuitive interface, instructors can manage online environments for teaching and learning by using the following utilities:

1. Content Management and Content Sharing

Content management and content sharing in the Black-board Learning System is curriculum-driven, designed to enhance student performance and provide instructors with complete pedagogical control within the course environment. The Blackboard Learning System provides instructors with greater control over creating and managing course content, course navigation, and expanded course "real-estate." Designed for advanced and novice users, instructors have complete flexibility to create course content, link assignments, and add tests, self-tests, and evaluations through the following capabilities:

- Create folder structures and learning units to organize content
- Post announcements, course materials, assignments, links, faculty and student profiles, and more to the course Web site
- Timed-release of materials (content, assessments, learning units) providing flexibility to present content according to curriculum-driven criteria, including sequential and date/time-driven criteria
- Support for uploading and delivering multiple file and content formats, including: Microsoft Office, Adobe Acrobat PDF, HTML, Digital images, Digital Audio files, Multimedia (e.g. Flash)

2. Assessment Manager

The Blackboard assessment manager allows instructors to raise student preparedness, measure progress against pre-set learning objectives or criteria, and collect student feedback. The Blackboard Learning System provides some

functionality for online quizzes, self-tests, and surveys while at the same time maintaining a familiar, intuitive interface.

- Administer multiple question formats, including multiple choice, multiple answer, true/false matching, ordering, fill-in the blank and short answer/essay.
- Create question pools to store questions, import and export banks of questions, and randomize question delivery in assessments
- Build password-protected quizzes, timed assessments, and customized feedback for correct and incorrect answers
- Make assessments available to students within specified date and time ranges
- Offline authoring of questions in common spreadsheet applications for upload of question sets into assessments
- Provide customized feedback for correct answers and each incorrect answer
- Modify tests after they have been deployed

3. Student Information Systems

Integration between the Blackboard Learning System with student information systems will serves to reduce administrative overhead and automate many of the following functions:

- Creating users, courses
- Pre-populating course templates at the institution, department, section, or course level
- Managing add/drop periods from semester to semester
- Purging obsolete or redundant user and course data

- Providing consistency in course design within and across departments
- Enforcing consistency in authentication and access policies

4. Authentication

The Blackboard Learning System also provides preconfigured, customizable integration for leading identity management/ authentication protocols. Blackboard system management utilities provide administrators with a flexible and robust environment for effectively managing and generating system analytics and utilities through the following core functions:

- Application and system activity logging for optimization, monitoring, and analysis
- System reports to measure level and type of usage on the system
- Full system backup /restore processes
- Web-based access to logs, log rotation, and log consolidation to facilitate issue diagnosis and trouble shooting

2.4.3 Universal Learning Technology's WebCT Campus Edition

URL: http://www.webct.com

Web WebCT Campus Edition 4.0 is one of the markets leading course management system. WebCT is the provider of integrated e-learning systems for higher education. WebCT's e-learning systems deliver advanced educational technology available to support a full range of teaching and learning styles, while making the most intelligent and efficient use of an institution's intellectual and technical resources. Using WebCT allows institutions to provide more personalized

learning options for students, to expand access to academic programs, and to continually improve course and degree program quality. [4]

WebCT has set the standard for e-learning systems in higher education. WebCT provides a highly flexible e-learning environment that empowers institutions across the educational spectrum with the ability to achieve their unique objectives.

Below show the some features of WebCT Campus Edition:

1. Course Design Wizards

WebCT Campus Edition 4.0 includes new course design wizards, providing step-by-step guides that walk faculty and course designers through the completion of common course tasks, including setting up their course Homepage, Syllabus, Organizer Pages, Content Modules, Discussions, Mail, Calendar and Chat.

Using Content Modules, instructors can integrate online content with a wide range of learning activities, contributing to a more holistic learning experience. Using Selective Release capabilities, faculty has the flexibility to control when students access course content based on pre-defined time or performance parameters. For example, an instructor could specify that students must achieve a passing grade on a quiz before advancing to the next content module.

2. Assessment

Instructors have a wide range of options for developing and delivering online assessments - including self-tests, surveys, and quizzes - using virtually all question types. Students have access to a robust online testing environment that delivers rich,

rapid feedback on their performance. WebCT Campus Edition's assessment tools also incorporate critical security features designed to discourage academic dishonesty and preserve the integrity of the learning experience.

3. Integrated HTML Editor

WebCT Campus Edition 4.0 includes an HTML Editor with spell-check, providing course designers with "What You See is What You Get" (WYSIWYG) content creation and editing capabilities, making it easier than ever to create and maintain content within the WebCT course environment.

WebCT Campus Edition makes it easy to bring new faculty on board with online learning. Course design wizards offer step-by-step guides to the most common course design functions, such as setting up a discussion area, adding a syllabus, or posting a PowerPoint presentation. This system also let the faculty access course templates that contain a core set of pre-designed teaching and learning tools.

Figure below shows that the steps by step guide to create course template by WebCT.

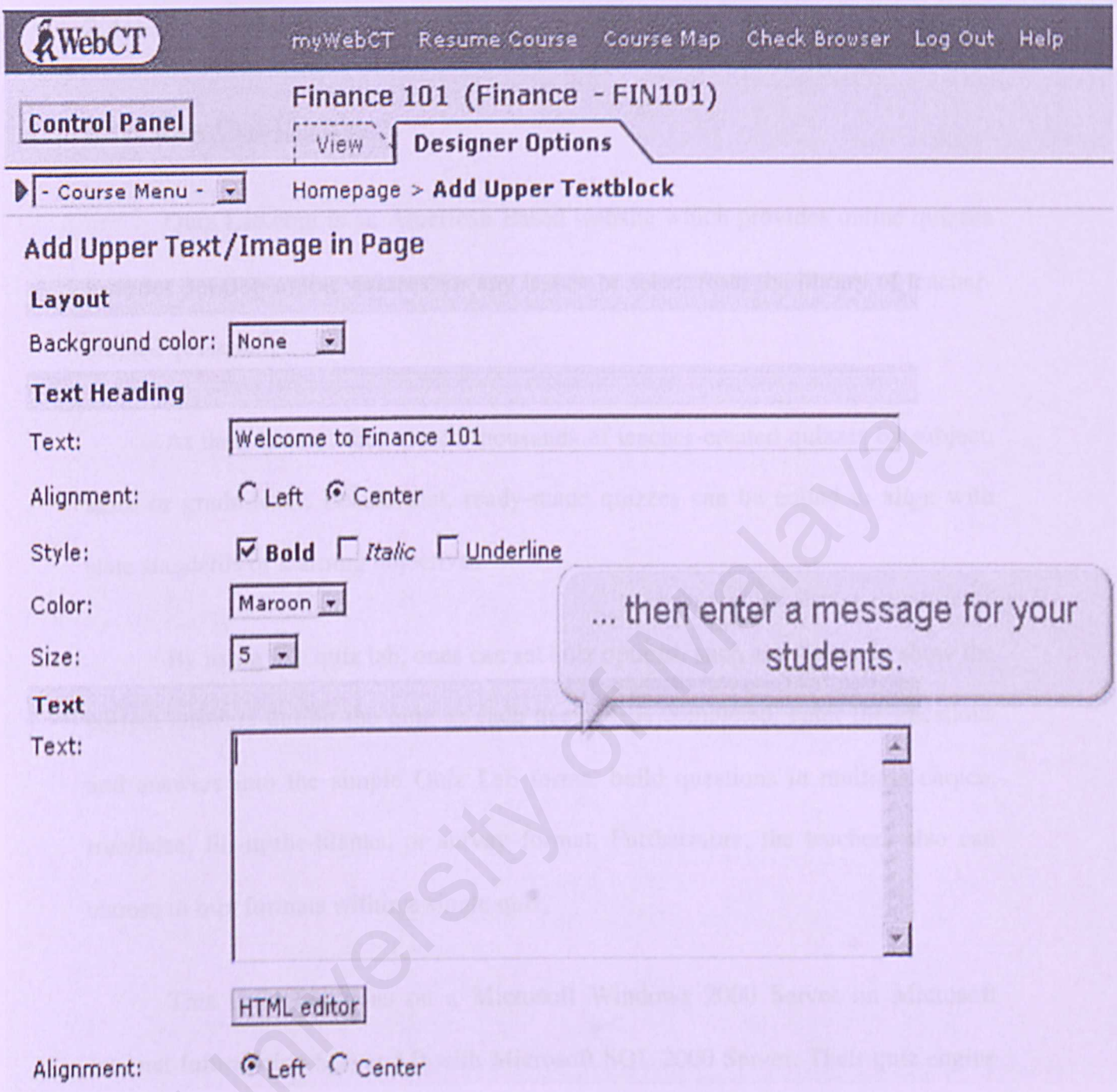


Figure 2.1: Interface that Let Lecturer Set Up Their Course Homepage

2.4.4 Quiz Lab.com

URL: www.Quiz Lab.com

Quiz Lab.com is an American Based website which provides online quizzes includes develop online quizzes for any lesson or select from the library of teacher-created quizzes. [5]

At their library, they stored thousands of teacher-created quizzes by subject, skill, or grade level. Beside that, ready-made quizzes can be edited to align with state standards or learning objectives.

By using this quiz lab, ones can set quiz options, such as whether to show the correct answers during the quiz as each question is completed, enter the questions and answers into the simple Quiz Lab forms, build questions in multiple choice, true/false, fill-in-the-blanks, or survey format. Furthermore, the teachers also can choose to mix formats within a single quiz.

This Quiz Lab runs on a Microsoft Windows 2000 Server on Microsoft Internet Information Server 5.0 with Microsoft SQL 2000 Server. Their quiz engine is written in VBScript using ASP (Active Server Pages) 3.0 that connect to retrieve appropriate records from the SQL server.

This Quiz Lab has their database (SQL) server which stores thousands of multiple choice questions. When you use the quiz engine, the ASP scripts connect to the SQL server to retrieve appropriate questions (database records) and then format the web pages appropriately.

They are using this method to ensure that each quiz is unique and dynamic. The students should never receive the exact same quiz twice, and chances are you won't receive the same quiz as anyone else. Below show the page that let the teachers set the quiz questions.

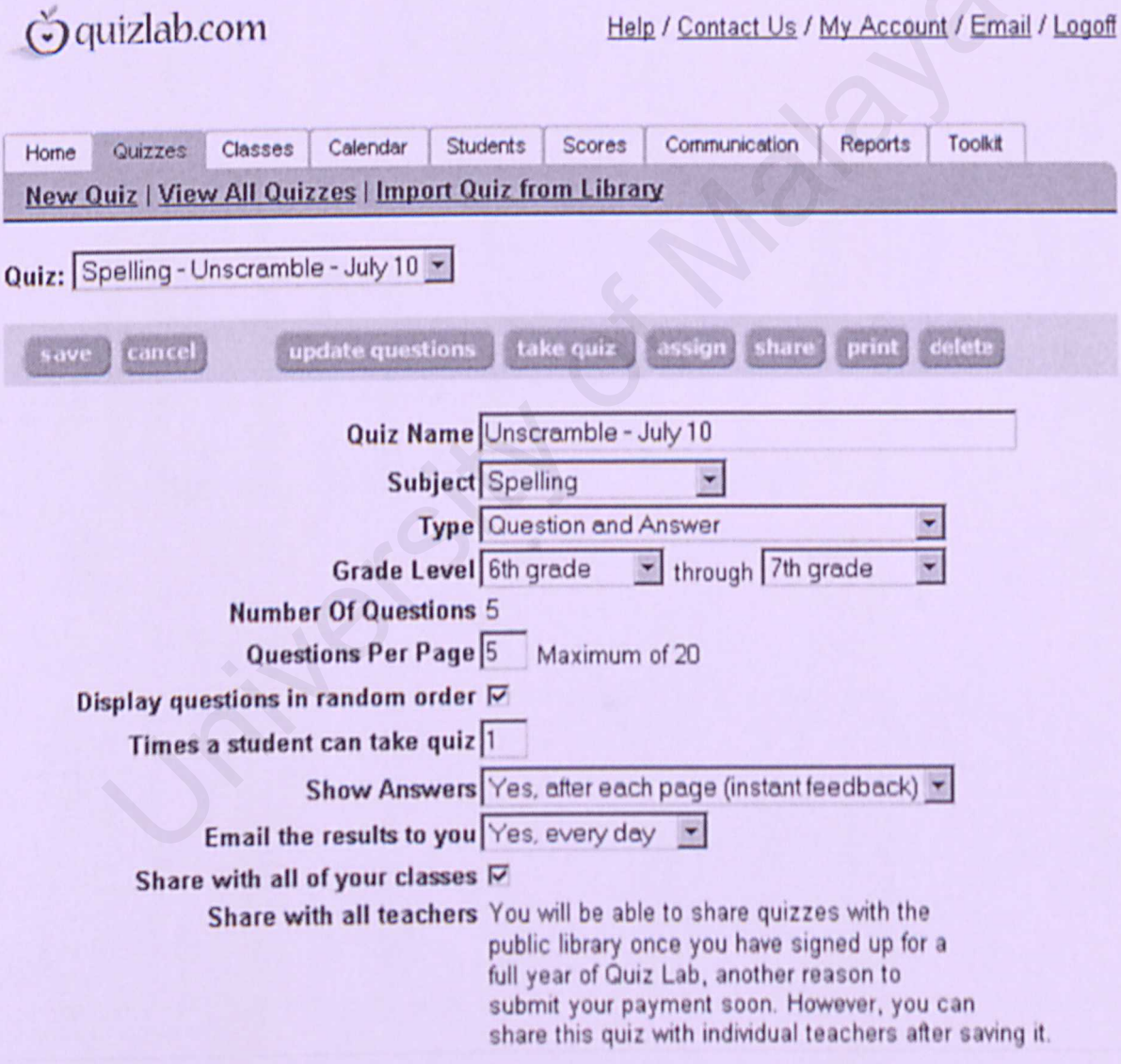


Figure 2.2: Interface for Teacher Set Quiz Question

2.5 SUMMARY

This chapter is mainly to analysis some existing systems that have in the market that can compare with the Syllabus Management System. There are four existing system that I had analyzed, which is Kursus Online University Malaya, Blackboard Learning System, Universal Learning Technology's WebCT Campus Edition, and Quiz Lab.com.

Chapter 3

METHODOLOGY

3.0 METHODOLOGY

3.1 PROJECT DEVELOPMENT METHODOLOGY

The system methodology is a method to create a system with a series of steps or operations or can be defined as system life cycle model. Every system development process model (see figure 3.1) includes system requirements (user needs, resource) as input and a finished product as output.

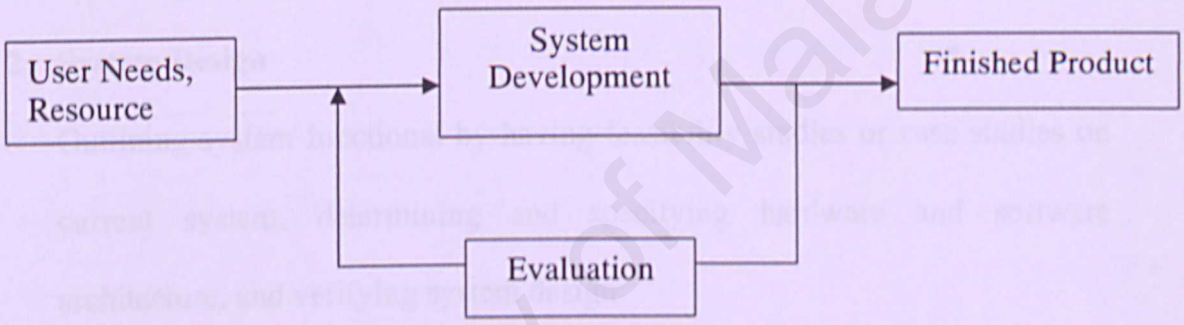


Figure 3.1: System Development Process Model

There are several process models in system development:

1. Waterfall Model
2. Waterfall Model with Prototyping
3. V model
4. Evolutionary Development
5. System Development Life Cycle (SDLC)
6. Spiral Model

3.1.1 Waterfall Model with Prototyping

Waterfall Model with Prototyping consists of eight stages that are depicted as cascading from one to another (see figure 3-1). Each development stage should be complete before the next stage begins. The eight stages are:

1. **Requirement Analysis**

   Understanding and determining users need by having brainstorming, eliciting, and analyzing user requirements by having interview, survey or questionnaire session, collecting and specifying all the user requirements and validating requirements.

2. **System Design**

   Outlining system functional by having feasibility studies or case studies on current system, determining and specifying hardware and software architecture, and verifying system design.

3. **Program Design**

   Determining and specifying program design and database design and verifying program design.

4. **Coding**

   Involving programming, personal planning, tool acquisition, database development component level documentation and programming management.

5. **Unit and Integration Testing**

   Test units separately and integrate the tested units. Then, test on the integrated units.

6. **System Testing**

Combining all the integrated units into a system. Testing on the system specifying, reviewing, and updating of the system test and validating of system.

7. **Acceptance Testing**

Testing on system completed. The system is delivered.

8. **Operation and Maintenance**

Control and maintain the system. Revalidating of the system.

The system has to be validated and verified during the stage of system testing. The verification is to make sure that the function in the Syllabus Management System works correctly and to check the quality of the implementation. The validation is to ensure that Syllabus management System has implemented all the requirements in the specification.

Prototyping is a sub-process and prototype is a partially developed product and a simple simulator of the actual system to examine the proposed system and overview on the functionalities. A prototype of Syllabus management System will be built regarding to the project scope and the analysis of the system before start to build the actual system.

Prototyping is very important because:

- To ensure the system meet the performance goals and constraints.
- To ensure the system are practical and flexible.
- To ensure the system fulfill the users' requirement.
- To have an insight of how the module and sub-modules interact with each other.

There are several reason for choosing the waterfall with prototyping to model the system, there are:

- It presents comprehensives steps on what happens during the development circle.
- The simplicity of waterfall model can make it easy to explain end users who are not familiar with software development.
- With the integration of prototyping, it makes the requirements analysis, system designs and program design much more accurate and easier to be captured and done.
- It easier to identify milestone
- It present in very high level view of what goes on during development
- Project risks have been accessed and are considered to be low

Waterfall Model with Prototyping

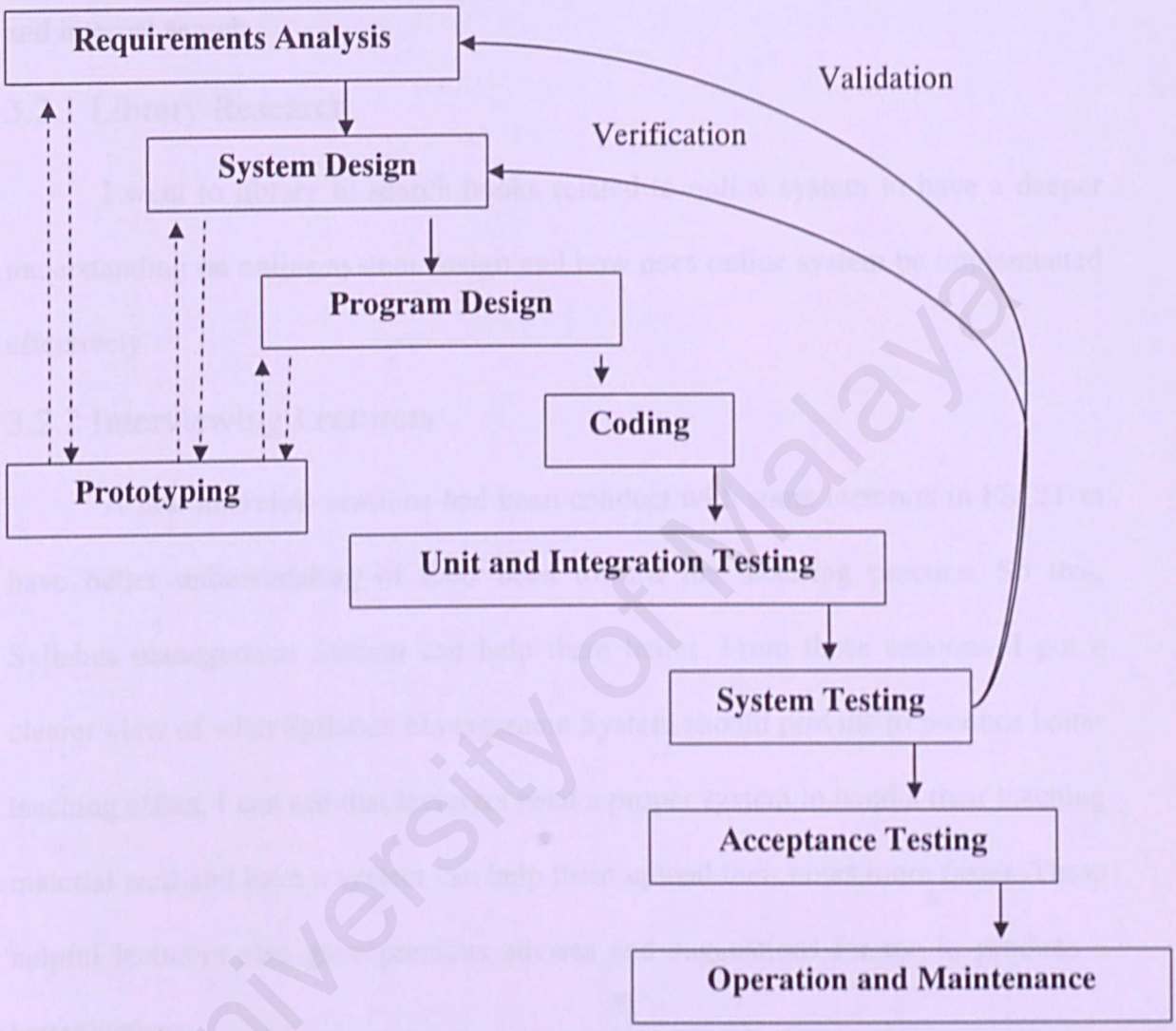


Figure 3.2: Waterfall Model with Prototyping

3.2 TECHNIQUES USED TO DEFINE REQUIREMENT

Effective and appropriate techniques must be used to define and elicit users' requirements. Research methods that usually used are library research, interview, and internet search.

3.2.1 Library Research

I went to library to search books related to online system to have a deeper understanding on online system design and how does online system be implemented effectively.

3.2.2 Interviewing Lecturers

A few interview sessions had been conduct with some lecturers in FSCIT to have better understanding of their need toward the lecturing practice. So that, Syllabus management System can help them better. From those sessions, I got a clearer view of what Syllabus Management System should provide to produce better teaching effect. I can see that lecturers need a proper system to handle their teaching material well and have a system can help them upload their notes more faster. These helpful lecturers also gave precious advises and suggestions for me to produce a better system.

3.2.3 Internet Search

The internet is a platform where a lot of information can be acquired. With search engine such as Googles, Yahoo and Search, relevant information sites can be viewed with only a click away, provided users key in the related keywords in the search box provided. There are many sites available that provide information as guidelines in determining the system requirements. And give me better understanding about Syllabus Management System and web technology available.

3.2.4 Existing Similar Applications and systems

I have some analysis on the similar systems that are available in the internet. Some of these applications requires user authentication, while some are open systems which allows me to explore. With this, I am able to get a better view of the features to be developed in my project.

3.3 FUNCTIONAL REQUIREMENT

Functional requirement refer to functions that the system must have in order to serve precisely the needs of users, or in other words, fulfilling the users requirements. Below is the list of functional requirements:

1. Registration

   There are four parts of registration module. There are for lecturer, tutor, administrator, and student to register. For lecturer and tutor part, they need to state what course he is teaching, his staff ID and password use to login to the system. For student, students have to register themselves for the course they are taking, user ID and password, so they can access to SMS. Administrator also must register first, and then they can manage the system.

2. Authentication

   The identity of a user will be identified once he/she log in to the system according to the data in database. User needs to key in a valid user ID and password to be able to use the system.

3. Course Material

This module allow lecturer to upload their notes and delete notes. Beside that, this module allow lecturer to decide the date in which he/she wants those notes to be publish or made available to the students. The students can view and download notes from this function.

4. Announcement

The lecturer can post, edit, and delete an announcement while students can see the announcement made by the lecturer at the main page.

5. Quiz

This module provides a panel for lecturer to set up the various types of questions such as in multiple choice questions, true/false question, and fill in the blank, and store it at the question bank. Lecturer can choose the quiz question from the question bank and then set date for publish the question and set time for student to finish the quiz.

The multiple choice answers are auto marked while the lecturer will mark other types answers and the result should be storing in database and send to student after lecturer finish marking the answer. This function makes sure that the answer will be auto-submitted when the time up.

6. Tutorial

This module allow lecturer to prepare tutorial question and answer. These tutorial questions will be published at the selected date to the students upon

completion. Once published, the students will actually complete these questions before submitting them online. The lecturer should set due date for student to submit their tutorial.

3.4 NON-FUNCTIONAL REQUIREMENT

Non-functional requirement are as important as functional requirements. It is defined as constraints under which the system must operate and the standard, which must be met in the delivered system.

1. User friendliness

User interface design creates an effective communication medium between a human and a computer. Therefore, it is very important to make sure that the interfaces fulfill user-friendliness so that it would not cause trouble users. The Golden Rules[6] coins three rules:

- Place the user in control

This will define interaction modes in a way that does not force a user into unnecessary or undesired action. Besides, it also provides flexible interaction for different users for instance via mouse movement and keyboard commands.

- Reduce the user's memory load

One of the principles that enable an interface to reduce the users' memory load is reducing demand on short-term memory. The interface

should be design to reduce the requirements to remember past actions and results.

- Make the interface consistent

The interface design should apply to consistent fashion where all visual information must be organized according to a design standard that is maintained throughout all screens displays. Apart from that, input mechanisms are constrained to a limited set that are used consistently throughout the application. Lastly, mechanisms for navigating from talk to talk are consistently defined and implemented.

2. Functionality

The functionality stressed here are the searching and retrieving capability, which is very important in any web application that deal with data retrieval from existing database. Besides, navigation and browsing features as well as application domain-related features will be taken into account.

3. Reliability

Reliability is the extent to which a program can be expected to perform its intended function with required precision. It is closely related to correct link processing, error recovery and user input validation and recovery. This quality is essential as it indicates how far users will be confident in the implementation of the new computerized system in getting daily minutes processing done.

4. Maintainability

Maintainability stress on how easy it is to keep system in operation when modifications to the code become necessary. Maintainability is the ease with which a program can be correct if an error is encountered, adapted if its environment changes, or enhanced if the customer desires a change in requirements.

5. Respond Time

Loading the web pages and forms must have a faster respond time to avoid users become de-motivated as they get stuck and wait for those web pages to be downloaded. So, web pages must simple and nice by using smaller graphics file whenever graphics is needed only, avoid big animations features when it is not necessary. The better and faster hardware is needed to have faster response time when database of the system become very large.

6. Security

The proposed system has also security measures to minimize the risk of data exposure to unauthorized people.

3.5 SELECTION OF DEVELOPMENT TOOL

3.5.1 SOFTWARE ARCHITECTURE

There are a few software architectures available now: client-server architecture, two-tier architecture and three-tier architecture.

3.5.1.1 Client-Server Architecture

Client is networked information requested, usually a PC or workstation, that can query databases and/or other information from a server. Clients rely on server for resources, such as files, devices, and even processing power.

Server is a computer, usually a high-powered workstation, a minicomputer or a mainframe, that houses information for manipulation by networked clients. Server is dedicated to manage disk drives (file servers), database (database servers), printers (print servers), or network traffic (network servers).

Client-server is a network architecture in which each computer or process on the network is either a client or a server. Client-server architecture implies a cooperative processing of requests submitted by a client, or requester, to the server, which processes the requests and returns the results to the client. The client manipulates the data and presents the result to the user.

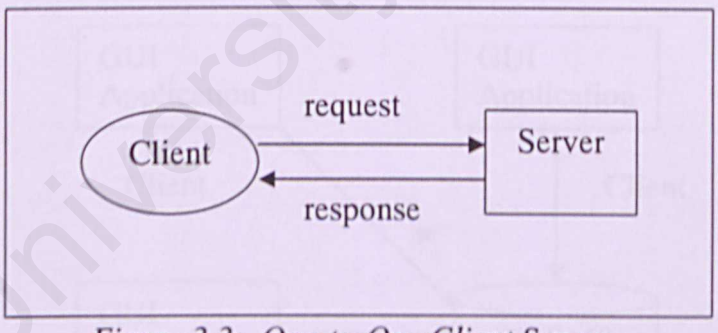


Figure 3.3: One-to-One Client Server

Client server solution can be in a many-to-one design that are more than one client typically makes requests of the server.

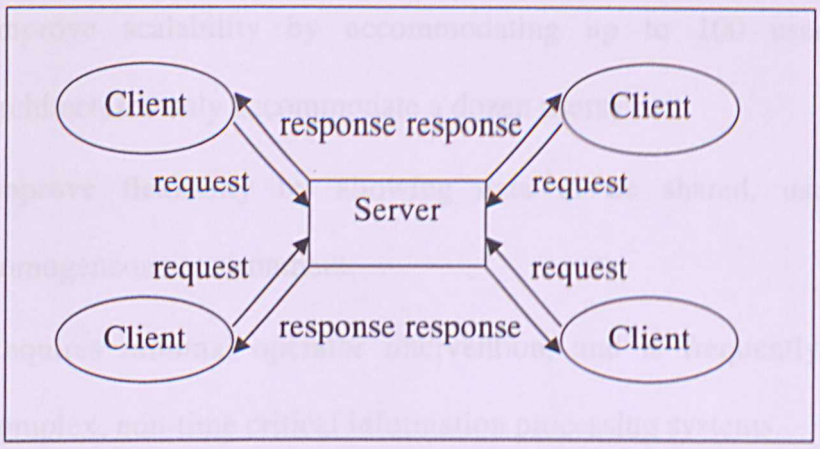


Figure 3.4 Many-to-One Client Server

3.5.1.2 Two-Tier Architecture

Two-tier architecture refers to client/server architectures in which the user interface runs on the client and the database is stored on the server. The actual application logic can run on either the client or the server. There are only the architecturally tiered data server and client.

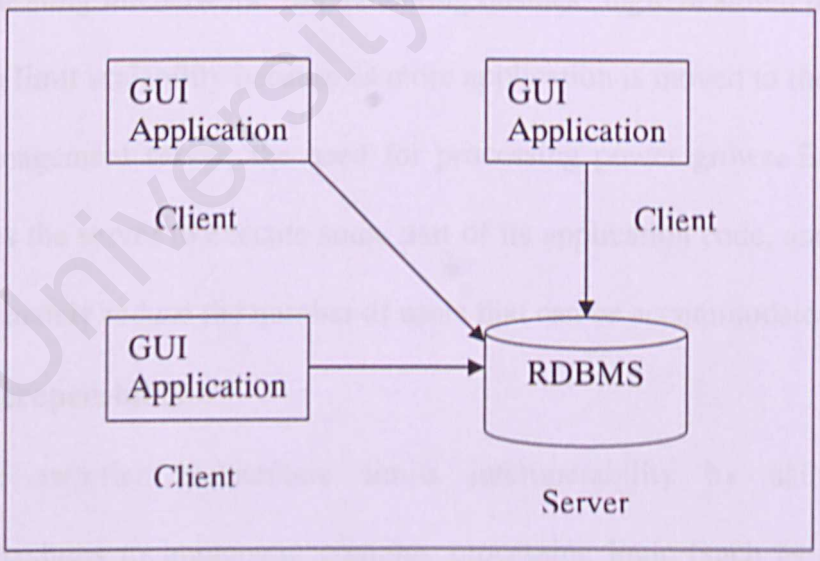


Figure 3.5 Two Tier Architecture

3.5.1.3 Benefits of two-tier client/server

- Improve usability by supporting a forms-based, user-friendly interface.

- Improve scalability by accommodating up to 100 users (file server architectures only accommodate a dozen users)
- Improve flexibility by allowing data to be shared, usually within a homogeneous environment.
- Requires minimal operator intervention, and is frequently used in non-complex, non-time critical information processing systems.

3.5.1.4 Limitation of two-tier client/server

- **Scalability**

  The two-tier design will scale up to service 100 users on a network. It appears that beyond this number of users, the performance capacity is exceeded. This is because the client and server exchange "keep alive" messages continuously, even when no work is being done, thereby saturating the network. Implementing business logic in stored procedures can limit scalability because as more application is moved to the database management server, the need for processing power grows. Each client uses the server to execute some part of its application code, and this will ultimately reduce the number of users that can be accommodated.

- **Interoperability**

  The two-tier architecture limits interoperability by using stored procedures to implement complex processing logic (such as managing distributed database integrity) because stored procedures are normally implementing using a commercial database management system's proprietary language. This means that to change or interoperate with more than one type of database management system, applications may

need to be rewritten. Moreover, database management system's proprietary language are generally not as capable as standard programming languages in that they do not provide a robust programming environment with testing and debugging, version control, and library management capabilities.

- **System administration and configuration**

  Two-tier architecture can be difficult to administer and maintain because when applications reside on the client, every upgrade must be delivered, installed, and tested on each client. The typical lack of uniformity in the client configuration and lack of control over subsequent configuration changes increase administrative workload.

- **Batch jobs**

  The two-tier architecture is not effective running batch programs. The client is typically tied up until the batch job finishes, even if the job executes on the server; thus, the batch job and client users are negatively affected.

3.5.1.5 Three-Tier Architecture

Three-tier architecture is a special type of client-server architecture consisting of three well-defined and separate processes, each running on a different platform.

Three-tier consist of:

- **Client-tier**

Client-tier is responsible for the presentation of data, receiving user events and controlling the user interface. The actual business logic (e.g. calculating added value tax) has been moved to an application-server.

- **Application-server-tier**

  Application-server-tier is the functional modules that actually process data. This middle tier isn't present in two-tier architecture in this explicit form. This tier protected the data from direct access by clients.

- **Data-server-tier**

  Data-server-tier is a database management system that stores the data required by the middle tier.

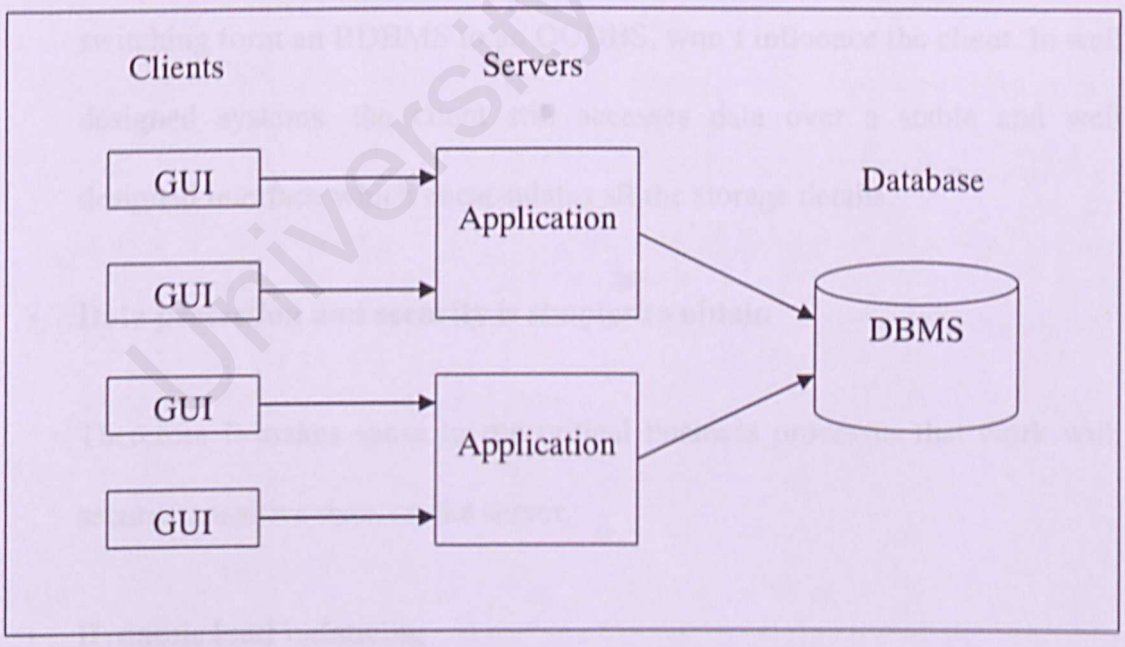


Figure 3.6: Three-Tier Architecture

3.5.1.6 The advantages of 3-tier architecture

- **Clear separation of user-interface-control and data presentation from application-logic**

  Through this separation more clients are able to have access to a wide variety of server applications. The two main advantages for client-applications are clear: quicker development through the reuse of pre-built business-logic components and a shorter test phase, because the server-components have already been tested.

- **Re-definition of the storage strategy won't influence the clients**

  RDBMS' offer a certain independence from storage details for the clients. However, cases like changing table attributes make it necessary to adapt the client's application. In the future, even radical changes, like let's say switching form an RDBMS to an OODBS, won't influence the client. In well designed systems, the client still accesses data over a stable and well designed interface which encapsulates all the storage details.

- **Data protection and security is simpler to obtain**

  Therefore it makes sense to run critical business processes that work with security sensitive data, on the server.

- **Dynamic load balancing**

  If bottlenecks in terms of performance occur, the server process can be moved to other servers at runtime.

- **Change management**

  It is easy and faster to exchange a component on the server than to furnish numerous PCs with new program versions. It is, however, compulsory that interfaces remain stable and that old client versions are still compatible. In addition such components require a high standard of quality control. This is because low quality components can, at worst, endanger the functions of a whole set of client applications. At best, they will still irritate the systems operator. [7]

3.5.1.7 Limitation of Three-Tier Architecture

- Building three-tier architecture is complex work. Programming tools that support the design and deployment of three-tier architecture do not yet provide all of the desired services needed to support a distributed computing environment.
- A potential problem in designing three-tier architecture is that separation of user interface logic, process management logic, and data logic is not always obvious. Some process management logic may appear on all three tiers. The placement of a particular function on a tier should be based on criteria such as the following:
  - Ease of development and testing
  - Ease of administration
  - Scalability of servers
  - Performance (including both processing and network load)

3.5.1.8 The Reason Chooses 3-Tier Web Client/Server Architecture

- Increase performance and reduce network traffics by replacing SQL requests with remote produce calls. Reducing the number of messages applications use id necessary to enhance user access over Wide Area Networks, like the internet.
- Support for a variety of user interfaces by separating the user interface from application.
- Upward scale by integrating TP monitor to funnel client requests, manage server loads and distribute the application across any numbers of servers.
- Better inter-application communication using publishes and subscribe.

3.5.2 OPERATING SYSTEM PLATFORM

Operating system can be defined as the "executive manager", the part of the computing system that manages all of the hardware and all the software. To be specific, it controls every file, every device, every section of main memory, and every nanosecond of processing time. It controls who can use the system and how. In short, it's the boss.

Therefore, when the user sends a command, the operating system must make sure that the command is executed or if it's not executes, must arrange for the user to get a message explaining the error. This does not necessarily mean that the operating system executes the command or sends the error message, but it does control the parts of the system that do.

Window XP Professional

Windows XP Professional delivers the new standard in reliability and performance. This operating system is designed for businesses of all sizes and for users who demand the most from their computing experience. With Windows XP, will be more easier to find information, files, and programs, and more quickly accomplish tasks, such as customizing computer settings, using, storing, and printing files and documents.

Compare with other Microsoft Windows, Windows XP was designed to help users' complete tasks more quickly and with greater success. These design improvements include:

- A redesigned Start Menu, offering a single source for launching applications, finding documents, and changing settings.
- Taskbar grouping organizes open windows, making it easier to work with many items at the same time.
- Less clutter and more meaningful notifications in the taskbar notification area.
- A new navigation pane that displays tasks and details, making it easier to work with files and folders.
- A new Icons view in Control Panel called Category view, making it easier to navigate to common settings and control panel tools.
- Integrated CD-burning features that make it easier to work with CD-R/CD-RW recorder in very simple steps.

Windows XP Professional delivers a reliable foundation that the users need most. Not only is Windows XP more reliable, it also helps users with more easily recovering from system problems.

The benefits of Windows XP Professional:

- Superior operating system technology, including preemptive multitasking, fault tolerance, and system memory protection, which all work to prevent and resolve problems, and to keep the system running smoothly.

- The ability to recover work in many cases, if the program crashes before user can save their work.

  System memory protection to help prevent poorly written software from making computer unstable.

- In addition, when users need to install new software, they usually won't need to reboot Windows XP, as was often required with earlier versions of Windows.

The features in the table below illustrate Microsoft Windows XP Professional.[8]

Table 3.1: Comparison between Windows XP Professional and Windows 2000 Professional

Features	**Feature Description**	**Windows XP Professional**	**Windows 2000 Professional**
System Restore	The System Restore feature enables users and	Feature included	Feature not included

	administrators to restore a computer to a previous state without losing data. System Restore automatically creates easily identifiable restore points, which allow you to restore the system to a previous time		
Device Driver Rollback	When certain classes of new device drivers are installed, Windows XP Professional will maintain a copy of the previously installed driver, which can be reinstalled if problems occur.	Feature included	Feature not included
Scalable Memory and Processor Support	Supports up to 4 gigabytes (GB) of RAM and up to two symmetric multiprocessors.	Feature included	Feature included
Windows File Protection	Protects core system files from being overwritten by application installations. If a file is overwritten, Windows File Protection will restore the correct version.	Feature included	Feature included
Windows Installer	An integrated service that helps users installs, configure, track, upgrade, and remove software programs correctly.	Feature included	Feature included
Encrypting File System (EFS) with Multi-user Support	Encrypts each file with a randomly generated key. The encryption and decryption processes are transparent to the user. In Windows XP Professional, EFS can allow multiple users access to an encrypted document.	Feature included	Feature partly supported/included - No support for use with multiple users
IP Security (IPSec)	Helps protect data transmitted across a network. IPSec is an important part of providing security for virtual private networks (VPNs), which allow organizations to transmit	Feature included	Feature included

	data securely over the Internet.		
Support for Latest Hardware Standards	Windows XP Professional supports the latest hardware standards. It supports UDF 2.01, the latest standard for reading DVD discs. It also supports the formatting of DVD-RAM drives with the FAT32 file system. DirectX 8 API support will be included, and Windows XP Professional fully supports standards for Infrared Data Association (IrDA), Universal Serial Bus (USB), and the high-speed bus known as IEEE 1394.	Feature included	Feature partly supported/included - Support for some standards listed
Fresh Visual Design	While maintaining the core of Windows 2000, Windows XP Professional has a fresh visual design. Common tasks have been consolidated and simplified, and new visual cues have been added to help users navigate their computers. Administrators or users can choose this updated user interface or the classic Windows 2000 interface with the click of a button.	Feature included	Feature not included
Adaptive User Environment	Windows XP Professional adapts to the way you work. With a redesigned Start menu, the most frequently used applications are shown first. When you open multiple files in the same application, (such as multiple e-mail messages in the Outlook messaging and collaboration client) the open windows will be consolidated under a single task bar button. To	Feature included	Feature not included

	remove some of the clutter from the notification area, items that are not being used will be hidden. All of these features can be set via Group Policy.		
Credential Manager	A secured store for password information. It allows users to input usernames and passwords once, and then have the system automatically supply them.	Feature included	Feature not included
Offline Files and Folders	A user can specify which network-based files and folders she needs when she disconnects from the network. Additionally, with Windows XP Professional, offline folders can now be encrypted to provide the highest level of security.	Feature included	Feature partly supported/included - Without encryption support
Network Setup Wizard	Makes it easy for owner to set up and manage a network. The Wizard walks through key steps, such as sharing files and printers, sharing the Internet connection, and configuring the Internet Connection Firewall.	Feature included	Feature not included

3.5.3 WEB SERVER

A web server is a program that using the client/server model and the World Wide Web's Hypertext Transfer Protocol (HTTP), serves the files that form Web pages to Web users (whose computers contain HTTP clients that forward their requests). Every computer on the Internet that contains a website must have a web server program. Two leading web servers are Apache, the most widely installed web server, and Microsoft's Internet Information Server (IIS). Other web servers include

Novell's web server for users of its Netware operating system, and IBM's family of Lotus Domino servers, primarily for IBM's OS/390 and AS/400 customers.

Web server often come as part of larger package of internet- and internet-related programs for serving e-mail, downloading request for File Transfer Protocol (FTP) files, and building and publishing web pages. Considerations in choosing a web server include how well it works with the operating system and other servers, its ability to handle server-side programming, security characteristics, and publishing, search engine, and site building took that may come with it.

3.5.3.1 Personal Web Server (PWS)

Personal Web Server is entry level/mid-range server for Windows 9x/NT platforms. It is a scaled-down version of the commercial Internet Information Server (IIS) include with the server edition of Microsoft Windows NT. Personal Web Server is a great entry-level web server that makes it easy to publish personal homepages, serve small websites, and share documents via a local intranet.

PWS is one of the best servers available for helping to get users up and running quickly. Wizards are included to guide users through the process of setting up home pages and sharing files and the PWS administrator reduces the complexity of actually running the web server itself. Users can also use the familiar Explorer interface or Personal Web Manager to share directories, starts and stop the server, and view website statistics.

One of the best uses for PWS is as a platform for testing out websites on Window 95/Windows NT workstation computers before hosing them on the Internet. This allows users to check the validity of links, scripts, and applications as well as to ensure that the overall organization of the site is functioning correctly.

PWS presents the ability to develop transactional web applications using the Microsoft Transaction Server. Overall, while most large enterprises will likely bypass Microsoft's Personal Web Server for the high-end Internet Information Server, PWS will remain one of best available options for individuals wanting to serve their own personal home pages and for small organizations needing to host their own websites.

Advantages Personal Web Server

- **Provide a good test driver for IIS website**

  Personal Web Server on Microsoft Windows NT workstation is also deal for developing web application for IIS. PWS on Windows NT workstation includes support for feature such as ASP, script debugging and the Internet service manager, the comprehensive administration tool for IIS integrated into Microsoft Management Console.

- **Transactional web applications for Microsoft Transaction Server (MTS), also part of Windows NT Server can be develop**

  PWS is a great platform for testing before hosting the site on the company server, or on an Internet services provider. Links, forms, scripts, and applications can be checked to be sure they are displaying and functioning correctly. Microsoft FrontPage also can used to easily copy a website developed on PWS tools.

- **Provide Wizards**

  PWS includes a wizard that walks developer through setting up a homepage and sharing files. The PWS administrator also reduces the complexity of running a web sever personal web manager enables the developer to start and

stop the server, view statistic and easily share additional directories or the windows Explorer.

3.5.3.2 Microsoft Internet Information Server (IIS)

Internet Information Server (IIS) is the best web server available for Windows NT. This version, which comes exclusively as part of the Windows 2000 Server operating system, contains many new features along with performance and reliability enhancements.

Internet Information Server v6.0 is good as both a first-time web server for those familiar and comfortable with windows operating system, and a high-end server for hosting providers and large corporate installations. It handles the basic well and is better integrated in windows that previous versions. Internet Information Sever v6.0 also comes with performance and feature enhancements that will be attractive for mission-critical tasks.

The ideal computer to run Internet Information Server on is at least a 200MHz Pentium with 128MB of RAM. Organizations should plan on doubling the RAM and CPU speed if then intend to run advanced server's clustering, SQL or Transaction Services on the same machine as web server. The benefits of IIS are stated at the table below. [9]

Table 3.2: Benefits of Internet Information Server 6.0

Benefit	Description
Increased Web server reliability and	IIS 6.0 features a new, fault-tolerant architecture with health monitoring and process recycling that significantly increases the reliability of Web server infrastructure. IIS 6.0 ensures that one

availability	application's problems don't cause another application, or the server itself, to fail. These features increase the availability for Web sites and applications and can reduce the time administrators spend managing these applications.
Easier server management	IIS 6.0 features many new management tools designed to reduce the amount of time it takes to manage Web server infrastructure. These features include a plain text XML configuration file that can be modified without having to stop the server, and command-line scripting. With these features, IIS 6.0 can increase the number of servers that a single administrator can manage.
Server consolidation	IIS 6.0 is a highly-scalable Web server that provides new opportunities for Web server consolidation. By combining a reliable architecture with kernel-mode cache performance, IIS 6.0 enables more applications to be hosted on a single server. Server consolidation can reduce staffing costs, hardware costs, and site management costs.
Faster application development	With Windows Server 2003 and IIS 6.0, application developers benefit from a single, integrated application hosting environment. Building on IIS 6.0, the .NET Framework, and ASP.NET, Windows Server 2003 has broad choice of languages for rapid application development and fast, reliable hosting performance. IIS 6.0 also offers international support and support for the latest Web standards.

Increased security	IIS 6.0 provides significantly improved security for Web servers. IIS 6.0 is locked down by default, limiting the attack surface area through aggressive security defaults. In addition, authentication and authorization have been improved. IIS 6.0 also provides increased management capabilities, improved administration with the XML metabase, and new command-line tools. IIS 6.0 can increase the security of information systems and decreasing system management costs.

The Weaknesses of IIS are as below:

- Lack of support for UNIX platform
- Only runs on server edition of Windows NT
- Complicated to configure
- SMTP does not support pop mail boxes
- Mediocre documentation

3.5.4 WEB BROWSER

3.5.4.1 Internet Explorer 6

Internet Explorer 6 helps protect your privacy on the Web by giving user more control over cookies and more information on a Web site's privacy policy. A cookie is a small text file created by a Web site that can be stored on user computer so that next time user visit the site, it can automatically access information about

user, such as users browsing preferences, or user name, address, or telephone number. A Web site's privacy policy tells user what kind of information the site collects, to whom it gives that information, and how it uses the information.

Below are the major features that make Internet Explorer 6 a private, reliable, and flexible Internet browsing experience.[10]

- **Web Privacy Tools**

  Provide tools to protect your privacy and allows you to control the personal information Web sites collect about you. These tools support the Platform for Privacy Preferences (P3P), a technology under development by the World Wide Web Consortium (W3C).

- **Fault Collection**

  Enables users to extract information about an Internet Explorer problem and upload the data to Microsoft for analysis. This information can help identify potential issues Microsoft needs to address in future Internet Explorer Service Packs.

- **Image Toolbar**

  Allows users to quickly and easily save, e-mail, and print pictures from their Web page, as well as view all their saved pictures in the My Pictures folder.

When users point to pictures on Web pages, the Image toolbar appears giving instant access to My Pictures functions.

- **Media Bar**

  Provides a user interface for locating and playing media within the browser window. Users can play music, video, or mixed-media files without opening a separate window; users can also control the audio volume, choose which media files or tracks to play, and access different media on their computer or on the Microsoft WindowsMedia.com Web site.

- **Auto Image Resize**

  If pictures are too large to display in the browser window, the new automatic picture resizing feature resizes the pictures so they fit within the dimensions of the browser window.

- **The Internet Explorer DHTML Platform**

  Provides DHTML features to build a powerful user interface for your Web based applications. Includes the developer features in Internet Explorer 5.5, including significant enhancements to the support for key Web standards.

- **Full CSS Level 1 Support**

Provides full support for Cascading Style Sheets, Level 1 (CSS1) including borders, padding, and margins which are now supported for inline elements. It also adds dotted and dashed border effects to your HTML documents, the ability to lay out articles in the same style used by newspapers and magazines, and display text vertically on Web pages.

- **.NET integration**

  As part of the Web Service behavior, makes integration of server and client side code easier, and enables applications to call functions on the server asynchronously. You can use this behavior to avoid page navigations and to retrieve data from the server using XML and SOAP.

- **Java VM**

  Java applets run in Internet Explorer 6 (a component of Windows XP) just as they run in older versions of Internet Explorer. The Java VM is not installed as part of the typical installation, but is installed on demand when a user encounters a page that uses a Java Applet.

3.5.4.2 Netscape Navigator

Netscape Communicator is a comprehensive set of components that integrates browsing, e-mail, web-based, word processing, and chat to allow users to easily communicates, share and access information. One of the main components of Netscape Communicator is Netscape Navigator.

Netscape Navigator is the world's premier browser. Based on open standards, Navigator is the cornerstone of Netscape Communicator's ability to access the

wealth of information and network applications available on intranets, extranets, and the Internet. Following are the features on Netscape Navigator:

- Suggests sites and in formations related to the web page users are currently viewing (that what's repeated feature).
- Lets user type common words into the location field to find what they want (the outernet keyword feature).
- Screen out offensive web content by using net watch, which is based on the DICS standard.
- Support cascading style sheets, absolute positioning, and HTML fonts.
- Support JDK 1.1 on multiple platforms with performance enhancements.
- Support JavaScript 1.3, which is ECMA-252 compliant.
- Include context – sensitive help.

The smart browsing feature in Netscape Navigator can understand common words (in addition to traditional URLS) and use them to guide user to the correct information. It can filter out pages with inappropriate material and intelligently recommend other web sites and information related to the material that a user is currently viewing.

As web content continues to be more interactive and more like an application, support for the latest standards-based web technology is critical. Navigator has integrated support for the Java Development Kit (JDK) 1.1, including AWT 1-1-5, Java Beans, and JN1. Navigator also supports JavaScript 1.3, which ECMA-252 complaint.

3.5.5 DEVELOPMENT FRAMEWORK

3.5.5.1Microsoft .NET Framework

Microsoft .NET platform is more than just a development or/and addition of some very significant shift in technology paradigms, allowing developers to build reusable and highly scalable functionality that is available across a network and the internet regardless of platform. If suppose every .Net solution becoming a set of building blocks, then software developers can easily reuse, rearrange, and integrate these blocks in a quick manner with each successive solution thereby reducing the time to take them to market and client drastically.

The significant features of Microsoft .Net are listed as below:

- The VB language has been hugely upgraded, so it now includes classes and most of features previously accessible in C++.
- A new language, C# has been introduced, which combines the efficiency of C++ with some of the case of development VB.
- Memory management for .Net component is extremely unlikely to crash other components running in the same process.
- ASP.NET, the replacement for ASP, offers compiled web pages (making processing of web requests much more efficient) and includes a large number of pre-written components that can generate commonly used HTML form and user interface items.

Microsoft .NET Framework is chosen as the development framework because it's specifically design and has unique feature in developing a powerful web application. It provides convenience and easier way to establish a fully operable

system without any obstacle. The platform technologies used are different in both .NET and J2EE.

Table 3.3: Platform Technologies

Service or feature	**.NET**	**J2EE**
Language	Any of 20+	Java
OS platform	Windows	Multiple
GUI/in-proc component	.NET class	Java Beans
Server-side component	ASP.NET	JSP/ Servlet
Scripting	WSH	- none -
Data Access	ADO.NET	JDBC,SQL/J
Queuing	MSMQ	JMS
Asynchronous invocation	Queued components	Message Beans
Eventing	COM+ Events	- Not specific -
Remoting	SOAP/HTTP	RMI-over-IIOP
HTTP Engine	IIS	Any
XML	System.XML	-add on-

Furthermore, there are some features that make it preferable if compare to Java 2 Enterprise Edition as the framework, which are:

Table 3.4: Comparison of .NET and J2EE

Features	**.NET**	**J2EE**
Vendor Neutrality	Not vendor neutrality, as it	Not totally vendor

	is tied to Microsoft	neutrality
Maturity	Is far mature and develop high volume highly reliable website using .Net technologies.	Still new in the market.
interoperability	Stronger technology neutral eCollaboration strategy as .Net is designed to interoperate between patforms.	The scope for J2EE is limited to J2EE vendors and CORBA vendors.
Web srevices	.Net is specially designed to support web services	J2EE is being retrofitted by the addition of further API to support web services.
Scalability	Can support a large amount of workload with lower cost.	It is not proven that it can handle these workload at any price.
Framework support	.Net platform includes an eCommerce framework called commerce server.	There is not equivalent vendor-neutral framework in J2EE. Have to build a new application from scratch.
Language	Support any language except java. Also supports any languages that are	Only supports java, not supporting other languages now or in

	likely emerge in future.	future.
Portability	Not very	J2EE is designed to inherit such feature.

3.5.6 WEB APPLICATION DEVELOPMENT

3.5.6.1 Microsoft Visual Studio .NET

Microsoft Visual Studio .NET, the latest development tool for developing web application and web services which support multi-language such as C# .NET, Jscript .NET, C++ .NET and Visual Basic .NET. With this development tool, powerful applications can be built faster and effectively. Beside that, the main purpose is to build the next-generation Internet or span any platform or device.

Visual Studio .NET is the only development environment built from the group up for XML web services. By allowing applications to share data over the Internet, XML web services enable developers to assemble applications from new and existing code, regardless of platform, programming language, or object model.

The Microsoft Visual Studio .NET will be used as the software for coding of the system. It provides many features and is stable in performance. This software supports languages that can be used for writing codes. In addition, one simple but very useful feature in Microsoft Visual Studio .NET I it highlights all HTML codes, the ASP.Net scripts and VB.NET in different colors. This software is user-friendly and powerful. Therefore, it becomes the most popular software for writing codes.

Besides that, Visual Studio .NET enables to rapidly build a broad range of applications for Microsoft Windows, the Web, and mobile devices. Visual Studio .NET use to:

- **Quickly build professional software.**
  With an extensive set of visual designers, a range of programming languages, and integrated Visual Database Tools, Visual Studio .NET 2003 enables us to build powerful software quickly.

- **Reduce IT operating costs.**
  Easy, Web-style deployment of rich Windows-based applications, built-in security, and an infrastructure for reusing existing code make the latest version of the Microsoft .NET Framework a dependable platform for software development.

- **Integrate with a wide range of applications, systems, and devices.**
  Support for the latest XML Web service standards and visual designers for mobile application development enable you to easily extend your applications to other systems and devices.

As a result, Microsoft Visual Studio .NET will be most suitable development tool to do coding and is chosen due to the familiarity.

3.5.6.2 Macromedia Dreamweaver MX

This Macromedia Dreamweaver is the software that uses to design the website. This is the easiest way to create professional websites and to build powerful

Internet applications. Get visual layout tools, extensive code-editing support, and rapid web application development - all in one complete, integrated solution make the designing and coding more easily.

By using Dreamweaver, the developer can achieve complete control over code and design. Build the site they want, the way they want it, using the visual layout tools of Dreamweaver combined with the code-editing tools of HomeSite. Deamweaver can enhance productivity using the new integrated workspace, which is shared with Macromedia Flash MX and Fireworks MX. The workspace includes tabbed document windows, dockable panel groups, customizable toolbars, and integrated file browsing. Beside that, it has jumpstart design and production using professional-quality, pre-built layouts and code, including site structures, forms, accessible templates, and JavaScript functions for client-side interactivity. Create new sites with a Site Setup Wizard and enhance team content collaboration with support of Macromedia Contribute. Macromedia Dreamweaver writes code faster than ever before using high powered coding features like code hints, tag editors, extensible color-coding, tag choosers, snippets, and code validation.

They also can rapidly develop Internet applications for the latest server technologies. Drag-and drop visual tools and robust code-editing support make it easy to develop for any popular server technology. Dreamweaver use one integrated development environment to develop HTML, XHTML, XML, ASP, ASP.NET, JSP, PHP, and Macromedia ColdFusion websites. Customize and extend the development environment with more than 700 free extensions available through the Macromedia Exchange for Dreamweaver. Quickly develop common Internet applications using libraries of code to create database insertion and update forms, recordset navigation

pages, and user authentication pages. Test layouts using live data to populate the design view.

Accelerate next-generation development with support for XML, including creating, editing, and validating XML code, and importing XML schemas. Easily introspect XML web services. Ensure standards compliance with default creation of XHTML output, easy conversion from standard HTML to XHTML, and increased support for CSS2. Dreamweaver provide work in the technologies in a cross-platform, technology-agnostic development environment that supports J2EE and .NET, runs on Windows and Mac, and offers open integration with industry-leading tools such as Macromedia Flash MX, Fireworks MX, and Macromedia Contribute.

3.5.7 WEB APPLICATION PROGRAMMING TECHNOLOGY

3.5.7.1 Active Server Pages (ASP)

ASP is an HTML page that includes one or more script (small embedded programs) that is processed on a Microsoft Web Server before the page is sent to the user. An ASP is somewhat similar to a server-side include or a Common Gateway Interface (CGI) application in that all involve programs that run on the server, usually tailoring a page for the user. Typically, the script in the web page at the server uses input received as the result of the user's request for the page to access data from a database and then builds or customizes the page on the fly before sending it to the requester.

ASP is a feature of the Microsoft Internet Information Server, but, since the server-side script is just building a regular HTML page, it can be delivered to almost any browser. We can create an ASP file by including a script written in VB Script or

Jscript in an HTML file or by using ActiveX Data Objects (ADOs) program statement in the HTML file. We name the HTML file with the ".asp" file suffix. Microsoft recommends the use of the server-side ASP rather than a client-side script, where there is actually a choice, because the server-side script (for example, with Java Script) may not work as intended on older browser.

3.5.7.2 Java Server Pages (JSP)

Java Server Pages technology allows web developers and designer to rapidly develop and easily maintain, info-rich, dynamic web pages that leverage existing business system. JSP technology enables rapid development of web based application that is platform independent. JSP technology separates the user interface from content generation enabling designers to change the overall page layout without altering the underlying dynamic content.

Java Server Pages technology uses XML like tags and scriptlets written in the Java Programming Language to encapsulate the logic that generates the content for the page. Additionally, the application logic can reside in server-based resources that the page accesses with these tags and scriptlets. Any and all formatting (HTML or XML) tags are passed directly back to the response page. By separating the pages logic from its design and display and supporting a reasonable component-based design, JSP technology is an extension of the Java Servlet Technology. Servlets are platform-independent, 100% pure Java Server Side modules that fit seamlessly with minimal overhead, maintenance, and support. Servlets involve no platform-specific consideration or modifications; they are java applications that are downloading, on demand, to the part of the system that needs them.

Key Feature of Java Server Pages

- Easy and rapid web development, deployment and maintenance.
- Emphasizing reusable components
- Separating content generation from presentation
- Open development and widespread industry support
- Platform independence
- Simplifying page development with tags

3.5.7.3 ASP.NET

ASP.NET is a programming framework built on the common language runtime that can be used on a server to built powerful web application. ASP.NET offers several important advantages over previous web development models:

- **Enhanced Performance**

  ASP.NET is compiled common language runtime code running on the server. Unlike its interpreted predecessors, ASP.NET can take advantage of early binding, just-in-time compilation, native optimization, and caching services right out of the box. This amounts to dramatically better performance before you ever write a line of code.

- **Flexible Language Options**

  Because ASP.NET is based on the common language runtime, the power and flexibility of that entire platform is available to web application developers. ASP.NET is also language-independent; any languages can be used in developing application. Unlike classic ASP, which supports only interpreted VBScript and JScript, ASP.NET now supports more than 25 .NET

languages (including built-in support for VB.NET, C#, and JScript.NET -- no tool required)

- **Simplicity**

  ASP.NET makes it easy to perform common tasks, from simple form submission and client authentication to deployment and site configuration. Additionally, the common language runtime simplifies development, with managed cod services such as automatic reference counting and garbage collection.

- **Manageability**

  ASP.NET employs a text-based, hierarchical configuration system, which simplifies applying settings to your server environment and web applications without any help from administrator. An ASP.NET Framework application is deployed to a server simply by copying the necessary files to the server.

- **Scalability and Availability**

  ASP.NET is designed to improve performance in clustered and multiprocessor environments. Processes are closely monitored and managed by the ASP.NET runtime, so that if on misbehaves (leaks, deadlocks), a new process can be created, which maintains application constantly available to handle requests.

- **Customization and Extensibility**

  It is possible to extend or replace any subcomponent of the ASP.NET runtime with flexible custom-written component. Implementing custom authentication or state services has never been easier.

3.5.7.4 Visual Basic .NET

Microsoft Visual Basic .NET is the newest, most productive version of the Visual Basic tool set that enables developers to address today's pressing application development issues effectively and efficiently. Visual Basic .NET enables you to create rich application if Microsoft Windows in less time, incorporate data access from a wider range of database scenarios, create components with minimal code, and build web-based applications efficiently.

Build more robust windows-based applications with less code and maintain existing code without the need to rewrite. Moreover, it can create reusable, enterprise-class code using full object-oriented constructs and reuse all of your existing ActiveX Controls. With Visual Basic .NET, not only it can build applications more rapidly, but also can deploy and maintain them with greater efficiency. Furthermore, it is flexible and simplified data access with Microsoft ADO.NET and Microsoft ActiveX Data Objects (ADO) data access. Finally, it can develop applications using the most readable and easy-to-write programming language available faster and more effectively.

3.5.7.5 C#

Microsoft introduced a language called C# (pronounced "c sharp"). C# is a modern object-oriented language that enables programmers to quickly build a wide range of applications for the new Microsoft .NET platform, which provides tools and services that fully exploit both computing and communications.

Because of its elegant object-oriented design, C# is a great choice for architecting a wide range of components from high-level business objects to system-level applications. Using simple C# language construct, from any language runtime on any operating system.

More than anything else, C# is designed to bring rapid development to the C++ programmer, without sacrificing the power and control that have been a hallmark of C and C++ because of this heritage, C# has a high degree of fidelity with C and C++.

3.5.7.6 Comparison of ASP.NET, ASP, and JSP

ASP.NET will be use as the server side scripting language for system coding development. It has very good database capabilities, which can be link with Microsoft's powerful ODBC, ADO.NET more easily. ASP.NET is more efficient than JSP because it is not tied to a particular browser or required no specific browser. There are some features that differ from the ASP.NET from Active Server Pages (ASP) and Java Server Page (JSP), which are:

Table 3.5: Comparison of ASP.NET, ASP, and JSP

Features	**ASP.NET**	**ASP**	**JSP**
Web server	Microsoft IIS	Microsoft IIS or PWS	Any Web server, including Apache, and IIS
Platforms	Most of the Microsoft Windows	Microsoft Windows – Accessing other platforms requires third-party ASP porting products	Solaris Operating Environment, Microsoft Windows
Portable across platform/ server	Yes	No	No

Security against system crashes	Yes	No	Yes
Memory leak protection	No	No	Yes
Scripting language	Supports more than 25 .NET languages (including built-in support for VB.NET, C# and Jscript.NET – No tool required)	Supports only interpreted VBScript and Jscript	Java
Compatible with legacy databases	Yes (using ADO.NET)	Yes (COM)	Yes (using JDBC, API)
Compiled execution	Much faster than ASP ASP.NET will automatically detect any changes Dynamically compile the file if need and store the compile results to reuse for subsequent requests.	Fast	Fast
Extensive tool support	Yes (Visual Studio .NET)	Yes	Yes
Support concurrent	Yes	Yes	Yes

access without separate processes			

3.5.8 DATABASE

A database is a structure collection of data. It may be anything from a simple shopping list to a picture gallery or the vast amounts of information in a corporate network. To add, access and process data stored in a computer database, you need a database management system. Database management plays a central role in computing, as stand-alone utilities, or as parts of other applications.

3.5.8.1 Microsoft SQL Server 2000

Microsoft SQL Server 2000 is one of Microsoft's most popular database servers. SQL server 2000 provides agility in data management and analysis, allowing any organization to adapt quickly and gracefully to derive competitive advantage in a fact-changing environment. From a data management and analysis perspective, it is critical to turn raw intelligently and take full advantage of the opportunities presented by the web. A complete database and data analysis package, SQL server 2000 opens the door to the rapid development of a new generation of enterprise class applications that provides a critical competitive advantage. SQL server 2000 is a fully web-enabled database product, providing core support for Extensible Markup Language (XML) and the ability to query across the Internet and beyond the firewall. Below are the features of Microsoft SQL Server 2000:

- **Fully Web-enable**

SQL Server 2000 provides extensive database programming capabilities built on web standards. It is powerful, flexible and fully web-based analysis in manipulating data. Rich XML and internet standard support providing the ability to store and retrieve data in XML format easily with built-in stored procedures and insert, update and delete data entry.

- **Highly Scalable and Reliable**

  Unparalleled scalability and reliability can be achieved using SQL Server 2000 with scale up and scale out capabilities, SQL Server meets the needs of demanding ecommerce and enterprise applications.

- **Simplify Management and Tuning**

  SQL Server 2000 can easily manage databases centrally along side enterprise resources and stay online while easily moving and copying databases across computers or between instances.

3.5.8.2 Microsoft Access 2000

Microsoft Access 2000 is a relational database management system designed for small office or home user to use for storing data in relational type with data access interface paradigm such as Remote Date Object (RDO) and Data Access Object (DAO). Microsoft Access 2000 can be used as a database in client/server or/and n-tier architecture system. It provides intuitive and user friendly interface to create a database easily. However, Microsoft Access 2000 is quite slow in processing transaction compared to Microsoft SQL Server 2000.

3.5.8.3 MySQL

MySQL is developed and provided by MySQL. MySQL is a relational database management system. A relational database stores data in separate tables rather than putting all the data in one big store room and contributes much in speed and flexibility. The tables are linked together by defined relations making it possible to combine data from several tables on request. The SQL part of "MySQL" stands for Structured Query Language or the most common standardized language used to access databases. MySQL software is open source. Open source means that it is possible for anyone to use and modify. Anybody can download the MySQL software from the internet and use it without paying anything. Anybody so inclined can study the source code and change it to fit their needs. To MySQL software uses the GPL (GNU General Public License), to define what you may and may not do with the software in different situations.

The MySQL Database Server is very fast, reliable, and easy to use. MySQL server also has a practical set of features developed in close cooperation with our users. MySQL server was originally developed to handle large databases much faster than existing solutions. Its connectivity, speed, and security make MySQL server highly suited for accessing databases on the Internet.

Table 3.6: Comparison between Microsoft SQL Server 2000 and Microsoft Access 2000

Features	**Microsoft SQL Server 2000**	**Microsoft Access 2000**
Data Capacity	2.2 Terabytes per Database	1.2 Gigabyte of Database
Solution for Transaction-based	Rollback automatically, reduces the expense of	Do not support automatic recovery,

Database of Downtime	downtime.	data can be lost.
Degree of Security	Offering login IDs and passwords, user permission and encryption	Allow developers to customize security to their needs.
Application Run Time	Fast	Slow
Maximum Number of Users	Supported 32,000 concurrent users with sub second response times.	255

3.5.9 APPLICATION PROGRAMMING INTERFACE

3.5.9.1 ADO.NET

ADO.NET offers several advantages over previous versions of ADO and over other data access components. These benefits fall into the following categories:

- **Interoperability**

  ADO.NET applications can take advantage of the flexibility and broad acceptance of XML. Because XML is the format for transmitting datasets across the network, any component that can read the XML format can process data. In fact, the receiving component need not be an ADO.NET component at all: The transmitting component can simply transmit the dataset to its destination without regard to how the receiving component is implemented. The destination component might be a Visual Studio application or any other application implemented with any tool whatsoever. The only requirement is that the

receiving component be able to read XML. As an industry standard, XML was designed with exactly this kind of interoperability in mind.

- **Maintainability**

In the life of a deployed system, modest changes are possible, but substantial, architectural changes are rarely attempted because they are so difficult. That is unfortunate, because in a natural course of events, such substantial changes can become necessary. For example, as a deployed application becomes popular with users, the increased performance load might require architectural changes. As the performance load on a deployed application server grows, system resources can become scarce and response time or throughput can suffer. Faced with this problem, software architects can choose to divide the server's business-logic processing and user-interface processing onto separate tiers on separate machines. In effect, the application server tier is replaced with two tiers, alleviating the shortage of system resources.

The problem is not designing a three-tiered application. Rather, it is increasing the number of tiers after an application is deployed. If the original application is implemented in ADO.NET using datasets, this transformation is made easier. Remember, when you replace a single tier with two tiers, you arrange for those two tiers to trade information. Because the tiers can transmit data through XML-formatted datasets, the communication is relatively easy.

- **Programmability**

ADO.NET data components in Visual Studio encapsulate data access functionality in various ways that help you program more quickly and with

fewer mistakes. For example, data commands abstract the task of building and executing SQL statements or stored procedures.

- **Performance**

  For disconnected applications, ADO.NET datasets offer performance advantages over ADO disconnected recordsets. When using COM marshalling to transmit a disconnected recordset among tiers, a significant processing cost can result from converting the values in the recordset to data types recognized by COM. In ADO.NET, such data-type conversion is not necessary.

- **Scalability**

  ADO.NET accommodates scalability by encouraging programmers to conserve limited resources. Because any ADO.NET application employs disconnected access to data, it does not retain database locks or active database connections for long durations. [11]

Table 3.7: Comparison of ADO.NET and ADO

Features	**ADO**	**ADO.NET**
In-memory Representation of data	Recordset	Dataset
Number of Tables	Looks like a single table. It must use a JOIN query, which assembles the data from the various database tables into a single result table.	Collection of one or more table. The table within a dataset is called data tables. Each Data Table object typically corresponds to a single database table or view.

		In this way, a dataset can mimic the structure of the underlying database. A dataset usually also contains relationships. A relationship within a dataset is analogous to a foreign-key relationship in a database—that is associates rows of the tables with each other. Because the dataset can hold multiple, separate tables and maintain information about relationship between them, it can hold much richer data structures than a recordset, including self-relating tables and tables with many-to many relationships.
Data Navigation and Cursors	Scan sequentially through the rows of the recordset using the ADO MoveNext method.	Rows are represented as collections, so you can loop through a table as you would through any collection, or access particular rows via ordinal or primary key index.

		DataRelation objects maintain information about master and detail records and provide a method that allows you to get records related to the one you are working with.
Minimized Open Connections	Recordset can provide disconnected access, but ADO is designed primarily for connected access. Communicate with the database by making calls to an OLE DB provider.	Open connections only long enough to perform a database operation, such as a Select or Update. You can read rows into a dataset and then work with them without staying connected to the data source. Communicate with the database through a data adapter, which makes calls to an OLE DB provider or the APIs provided by the underlying data source. The data adapter allows you to control how the changes to the dataset area transmitted to the database—by optimizing for performance,

		performing data validation checks, or adding any other extra processing.
Sharing Data Between Applications	To transmit ADO disconnected recordset from one component to another, use COM marshalling.	To transmit data in ADO.NET, use a dataset, which can transmit an XML stream.
Richer data types	Limited set of data types - those defined by the COM standard	No restriction on data types - Because the transmission of datasets in ADO.NET is based on XML format.
Performance	Allow minimize the transmitted data	Allow minimize the transmitted data
Penetrating Firewalls	A firewall can interface with two components trying to transmit disconnected ADO recordset.	Because components exchange ADO.NET dataset using XML, firewalls can allows datasets to pass.

3.5.10 SCRIPTING LANGUAGE

3.5.10.1 JavaScript

JavaScript is an interpreted programming or script language from Netscape. It is somewhat similar in capability to Microsoft's Visual Basic, Sun's Tcl, the

UNIX-derived Perl, and IBM's REX. In general, script languages are easier and faster to code in than the more structured and compiled languages such as C and C++. Script languages generally take longer to process than compiled languages, but are very useful for shorter programs.

JavaScript is used in Web site development to do such things as:

- Automatically change a formatted date on a Web page
- Cause a linked-to page to appear in popup window
- Cause text or a graphic image to change during a mouse rollover

JavaScript uses some of the ideas found in Java, the compiled object-oriented programming derived from C++. JavaScript code can be imbedded in HTML pages and interpreted by the Web browser (or client). JavaScript can also be run at the server as in Microsoft's active Server Pages before the pages is sent to requestor. Both Microsoft and Netscape browsers support JavaScript, but sometimes in slightly different ways.

3.5.10.2 VBScript

Visual Basic Scripting brings active scripting to a wide variety of environments, including Web client scripting in Microsoft Internet Explorer and Web server scripting in Microsoft Internet Information Service.

- **Easy to Use and Learn**

  If you already know Visual Basic or Visual Basic for Applications (VBA), VBScript will be very familiar. Even if do not know about Visual Basic, once

you learn VBScript, you are on your way to programming with the whole family of Visual Basic languages.

- **Windows Script**

  VBScript talks to host applications using Windows Script. With Windows Script, browsers and other host applications do not require special integration code for each scripting component. Windows Script enables a host to compile scripts, obtain and call entry points, and manage the namespace available to the developer. With Windows Script, language vendors can create standard language run times for scripting. Microsoft will provide run-time support for VBScript. Microsoft is working with various Internet groups to define the Windows Script standard so that scripting engines can be interchangeable. Windows Script is used in Microsoft Internet Explorer and in Microsoft Internet Information Service.

- **VBScript in Other Applications and Browsers**

  As a developer, VBScript source can be licensed and implementation at no charge for use. Microsoft provides binary implementations of VBScript for the 32-bit Windows API, the 16-bit Windows API, and the Macintosh. VBScript is integrated with World Wide Web browsers. VBScript and Windows Script can also be used as a general scripting language in other applications.

3.5.11 WEB APPLICATION LANGUAGES

3.5.11.1 HTML

Hypertext markup languages (HTML) are the language used to prepare web hypertext documents. HTML contains commands, called elements or tags, to mark text as headings, paragraphs, lists, quotations and so on. It also has tags for including images within the documents, for including fill-in forms that accept user input, and most importantly for including hypertext links connecting the document being read to other documents or Internet resources such as anonymous File Transfer Protocol (FTP) sites. It is these last features that allow the users click on a string of highlighted text and access a new document, an image, or a movie file from a computer thousand of miles away. This can be accessed through a Uniform Resource Locater (URL), which is including in the HTML. Markup instructions and is used by the user's browser to find the designated resource.

The URL may be points to other HTML documents, pictures, sound files, movie files, or even database search engines. They can be download able programs in Java or other languages. They can also be located on the user's computer or anywhere on the Internet. In fact, they can be accessed from HTTP servers or from FTP, Gopher or others servers. The URL is an immensely flexible scheme, and in combination with HTML, yields an incredibly powerful package for preparing a web of hypertext documents linked to each other. This image of interlinks resources is in fact the vision that gave rise to the name, World Wide Web.

Writing good HTML documents involve both technical issues and design issues. Technical issue includes proper construction of the document while design issues ensure that the information or content is clearing presented to the user. HTML can be used to create web pages without any specialized software in less time that it

takes to schedule and wait for an appointment with a highly paid HTML wizard. It is a fact that this language can be learned very fast by example.

3.5.11.2 XML

XML is a markup language for documents containing structures information. It is a set of rules for designing text formats that let user structures their data. XML is not a programming language, and anybody doesn't have to be a programmer to use it or learn it. XML makes it easy for a computer to generate data, red data, and ensure that the data structure is unambiguous. XML avoids common pitfalls in language design. It is extensible, platform-independent, and it supports internationalization and localization. XML is fully Unicode-complaint.

XML was created so that richly structured documents could be used over the web. The only available alternatives, HTML and SGML, are not practical for this purpose. HTML comes bound with a set semantics and does not provide arbitrary structure. SGML provides arbitrary structure, but it too difficult to implement just for a web browser. While XML is being designed to deliver structured content over the web, some of the very features it lacks to make this practical, make SGML a more satisfactory solution for the creation and long-time storage of complex documents.

3.6 HARDWARE REQUIREMENT

The minimum hardware specifications are:

Computer Processor	Intel Pentium III 800MHz or higher Pentium compatible Central Processing Unit(CPU)
Hard Disk	10GB
Memory	128MB RAM or more recommended
Display Peripherals	Monitor Keyboard and mouse or compatible pointing device(optional)

3.7 SOFTWARE REQUIREMENT

Summary of Software Requirements

The software requirements are:

Operating System	Windows XP Professional
Web Server	Microsoft Internet Information Services (IIS)
Web Application Development Tool	Macromedia Dreamweaver MX Microsoft Visual Studio .NET
Database	Microsoft SQL Server 2000
Markup Language	HTML

Scripting Languages	JavaScript, VBScript
Web Application Programming Language	ASP.NET
Web Browser	Microsoft Internet Explorer 6.0
Data Access Technologies	ADO.NET

3.8 SUMMARY

The methodology used in this project is waterfall model with prototyping. This model is chosen because it is the suite most to the development environment of the system.

This chapter also plays an important role in order to meet the requirements of the system. The system definitely cannot be accomplished without the existence of these needed requirements. These requirements are further divided in to two categories: functional and non-functional requirements.

Beside that, software and hardware requirements have been identified to ease the development process.

Chapter 4

SYSTEM ANALYSIS AND DESIGN

4.0 SYSTEM ANALYSIS AND DESIGN

System analysis and design play an important role in order to meet requirements of the system. This is the phase and process where all the conceptual ideas from requirement specification are converted into technical specification. In the system design phase, the system requirements gathered during the analysis phase and research conducted earlier are transmitted into a representation of system. Initially, the representation depicts a holistic view of system; subsequently refinement leads to design representation that is close to source code.

In this system analysis and design phase, input, output, file and database were produced which include the designed of input forms, screen in order to gather input data, data dictionary, file specification and report design. The objective of system analysis and design are listed below:

- Specify logical design elements
  - Detailed design phase specifications that describe the features of an information system: input, output, files, and database and procedures.
- Meet user requirement
  - Meet user needs stated in term of
    - Performing appropriate procedures correctly
    - Presenting proper form of information
    - Providing accurate results
    - Using appropriate method of interaction
    - Providing overall reliability
- Ease of use
  - Favorable human engineering effectiveness and efficiency
  - Ergonomic design which is physically comfortable to user

- Provide software specification
  - Specific components and functions with adequate detail to construct application software

4.1 SYSTEM ARCHITECTURE DESIGN

Architecture design is the earliest phase in the system design process. Architecture associates the system capabilities identified in the requirement specification with the system components that will implement them. The architecture also describes the interconnections among these components. Below is the figure of distributed system architecture of SMS described in term of the topology of their configuration.

Three-tier client server architecture on the web is used in this web based application. Each machine (client and server) is assigned functions that it is best suited to perform. This architecture taking the form of web browser processing client side presentation in the form of HTML, the web server using programming language and database server (SQL server) for serving up the data. This web-based application that is deployed from a web site requires an architecture that is robust, secure and scalable, and that can accommodate rapidly changing technologies. The middle tier is a web server that talks to a data repository.

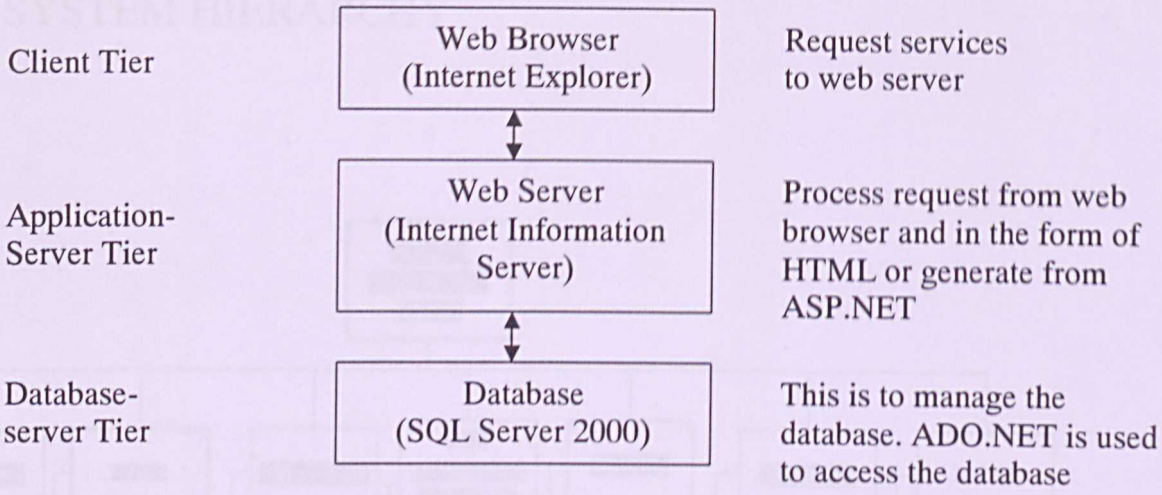


Figure 4.1: System Architecture for Syllabus Management System

4.2 SYSTEM HIERARCHY

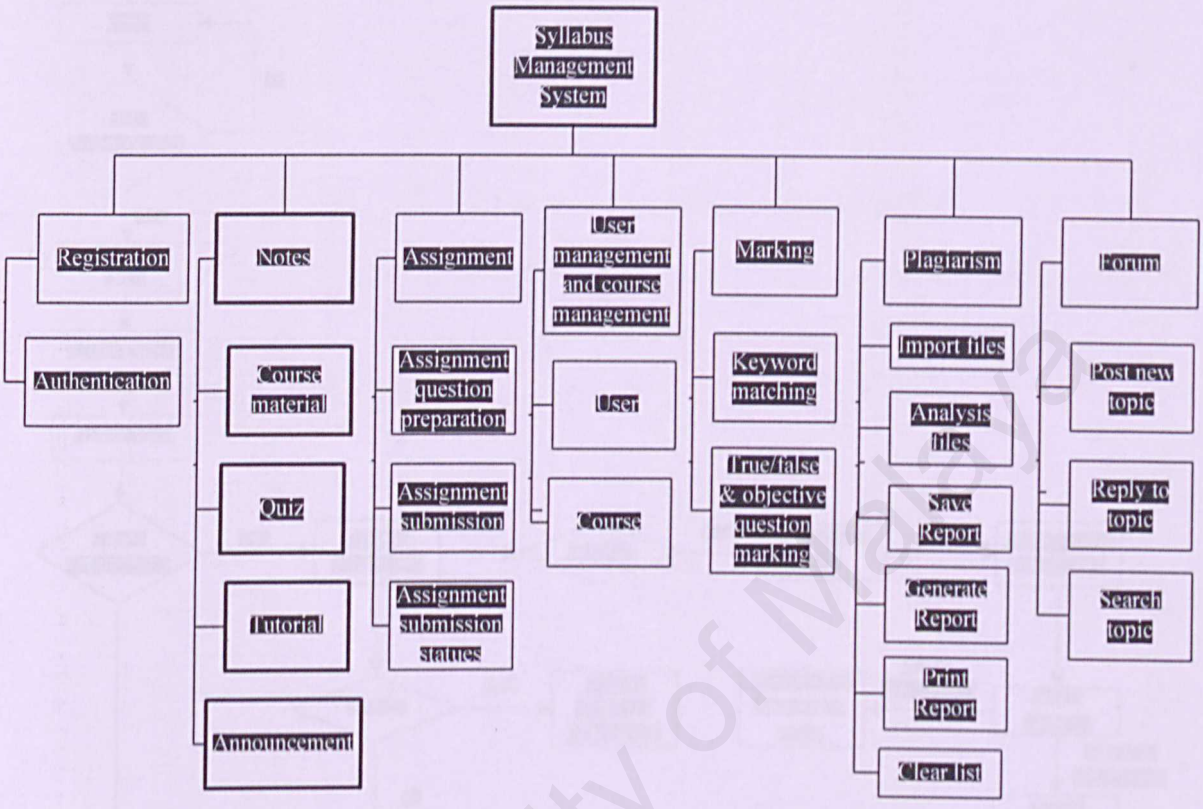


Figure 4.2: System Hierarchy for Syllabus Management System

4.3 FLOW CHART

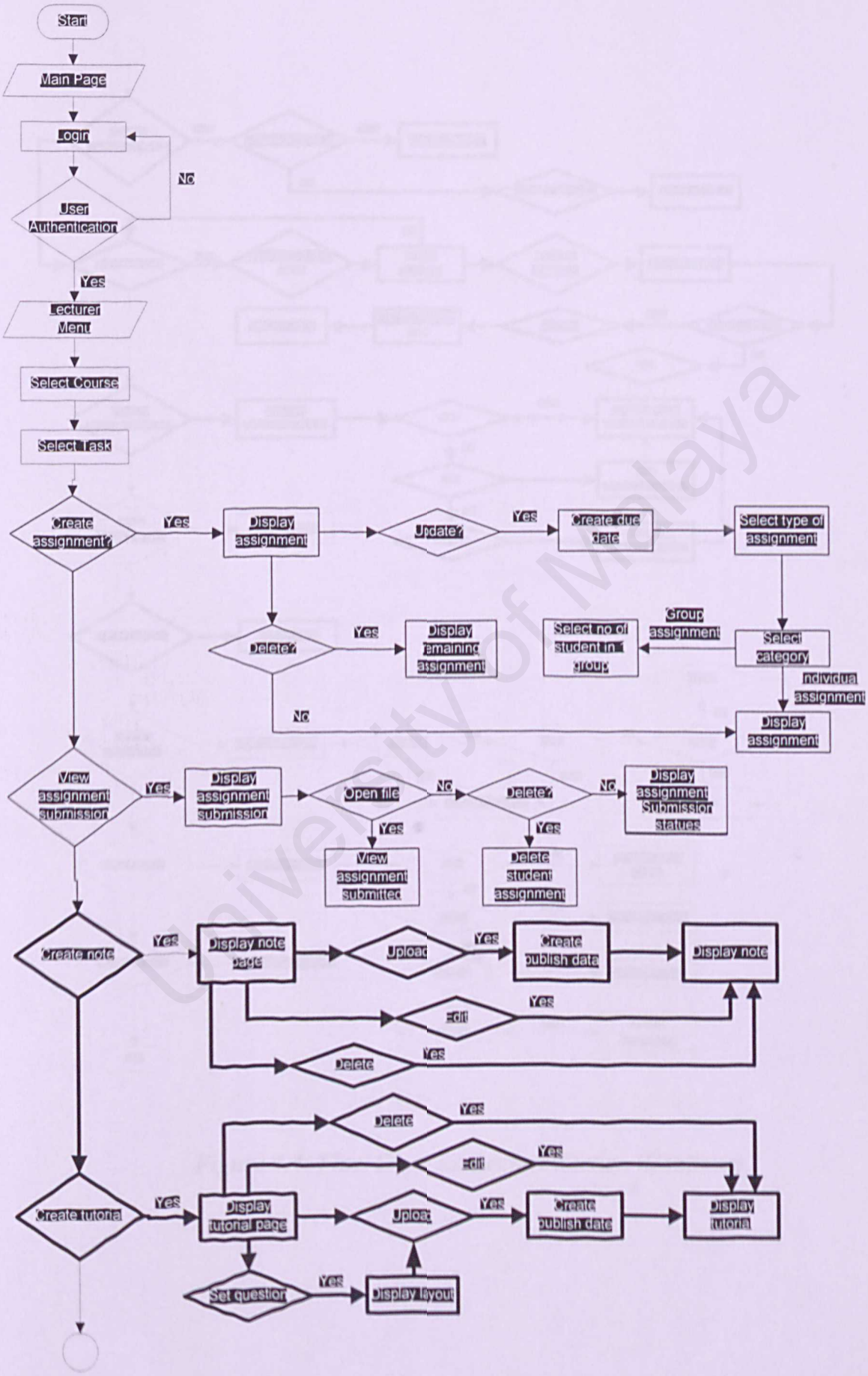


Figure 4.3: Flow Chart for Lecture Section

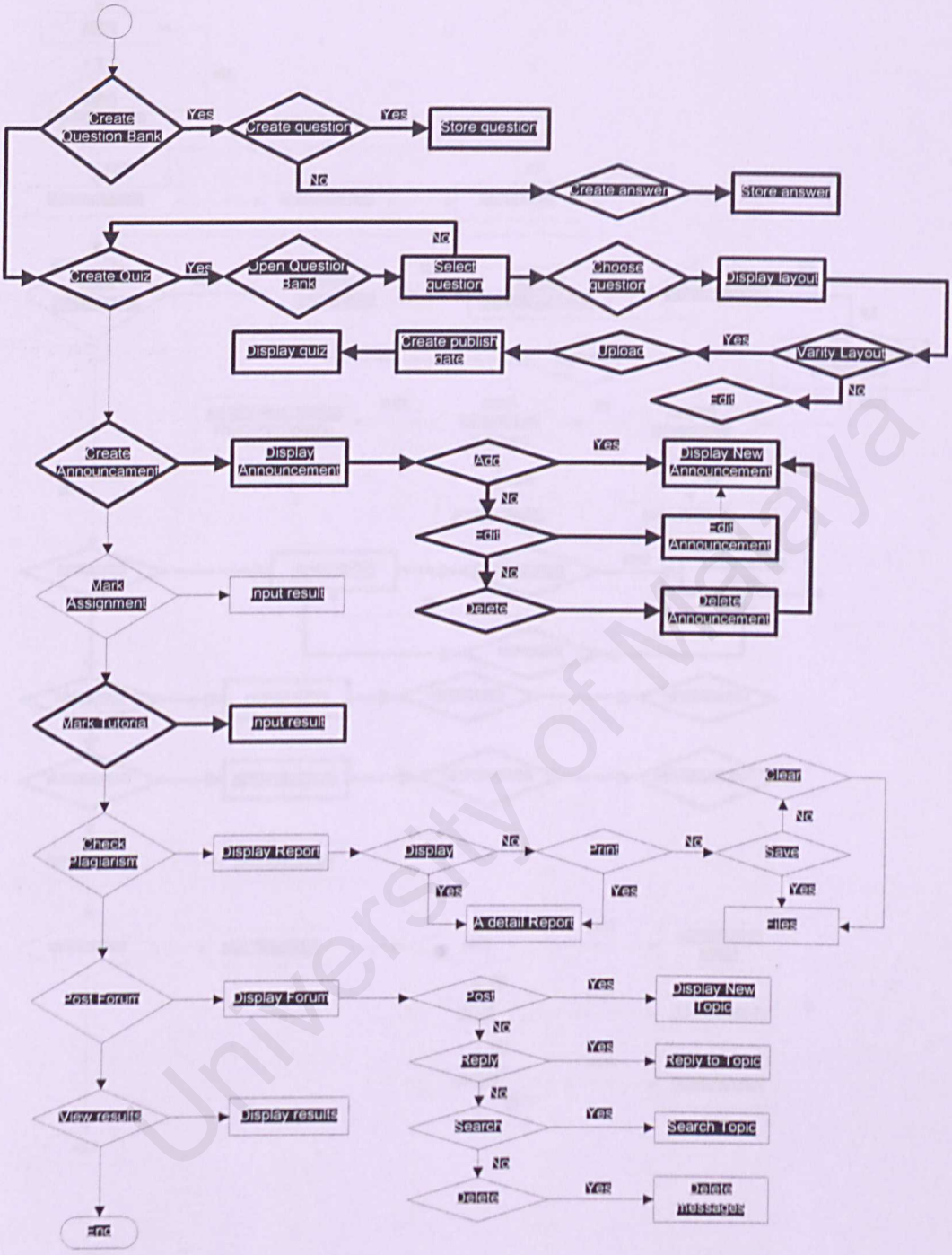


Figure 4.4: Flow Chart for Lecture Section (Continue)

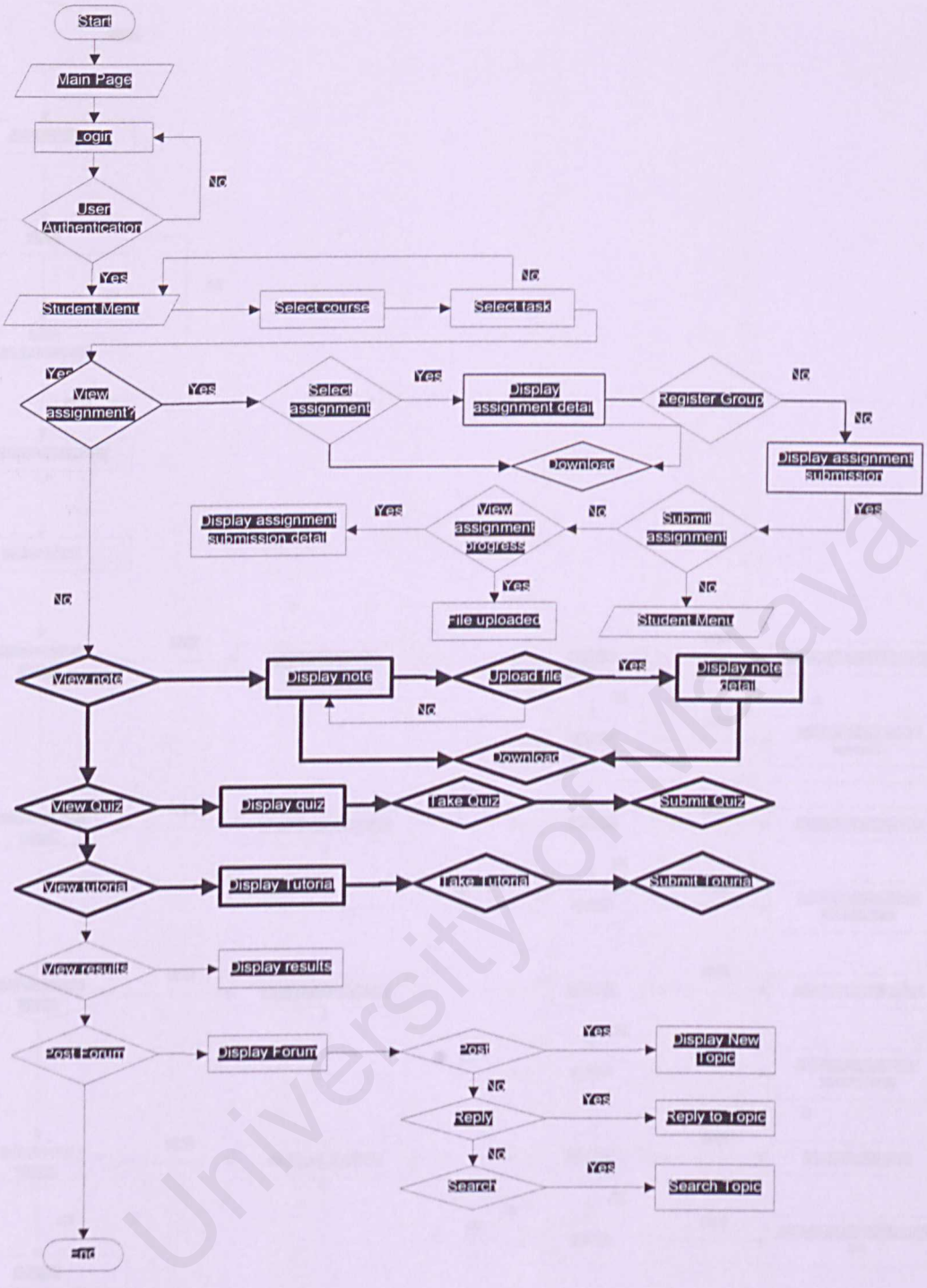


Figure 4.5: Flow Chart of System for Student Section

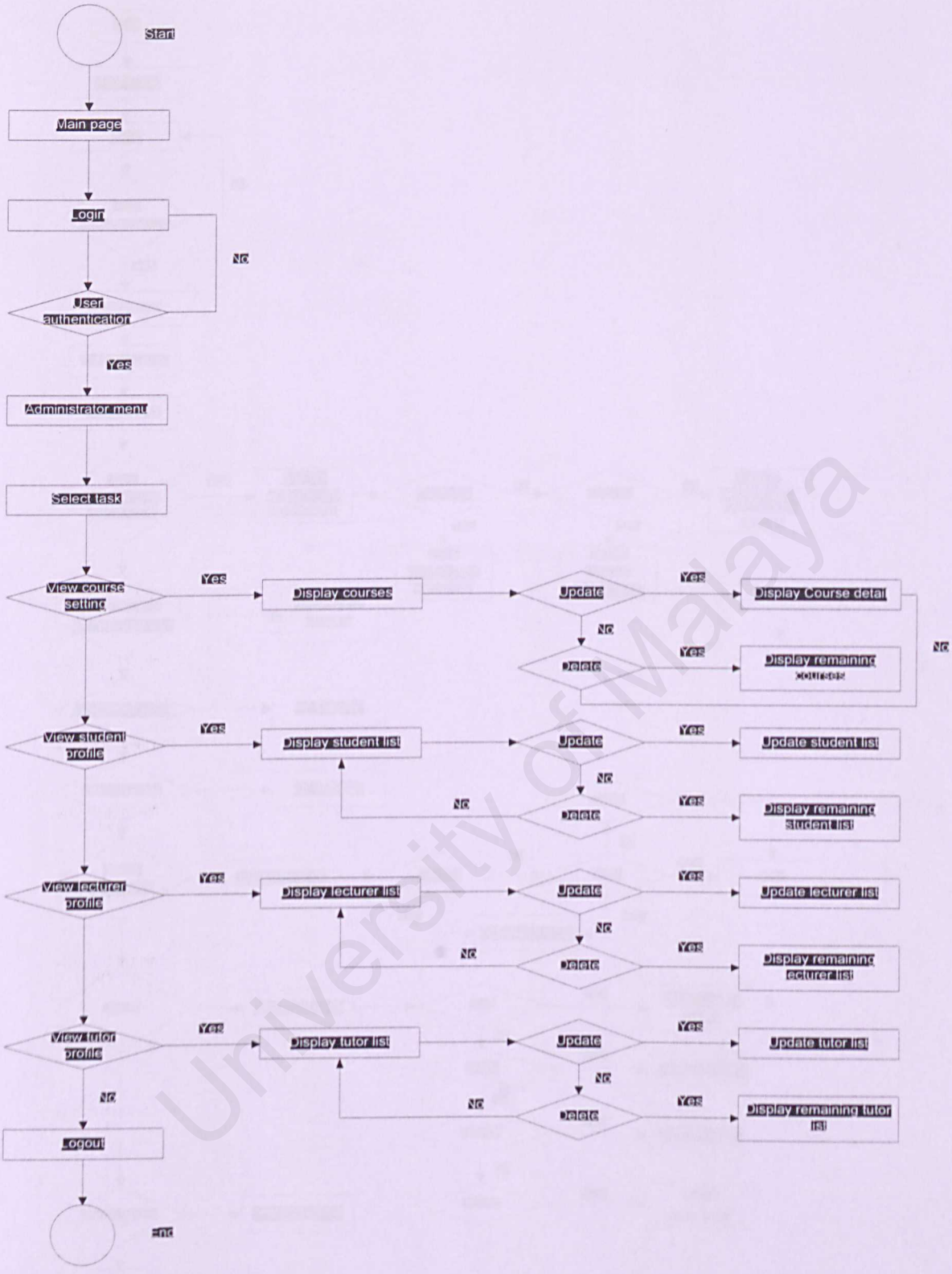


Figure 4.6: Flow Chart of System for Administrator Section

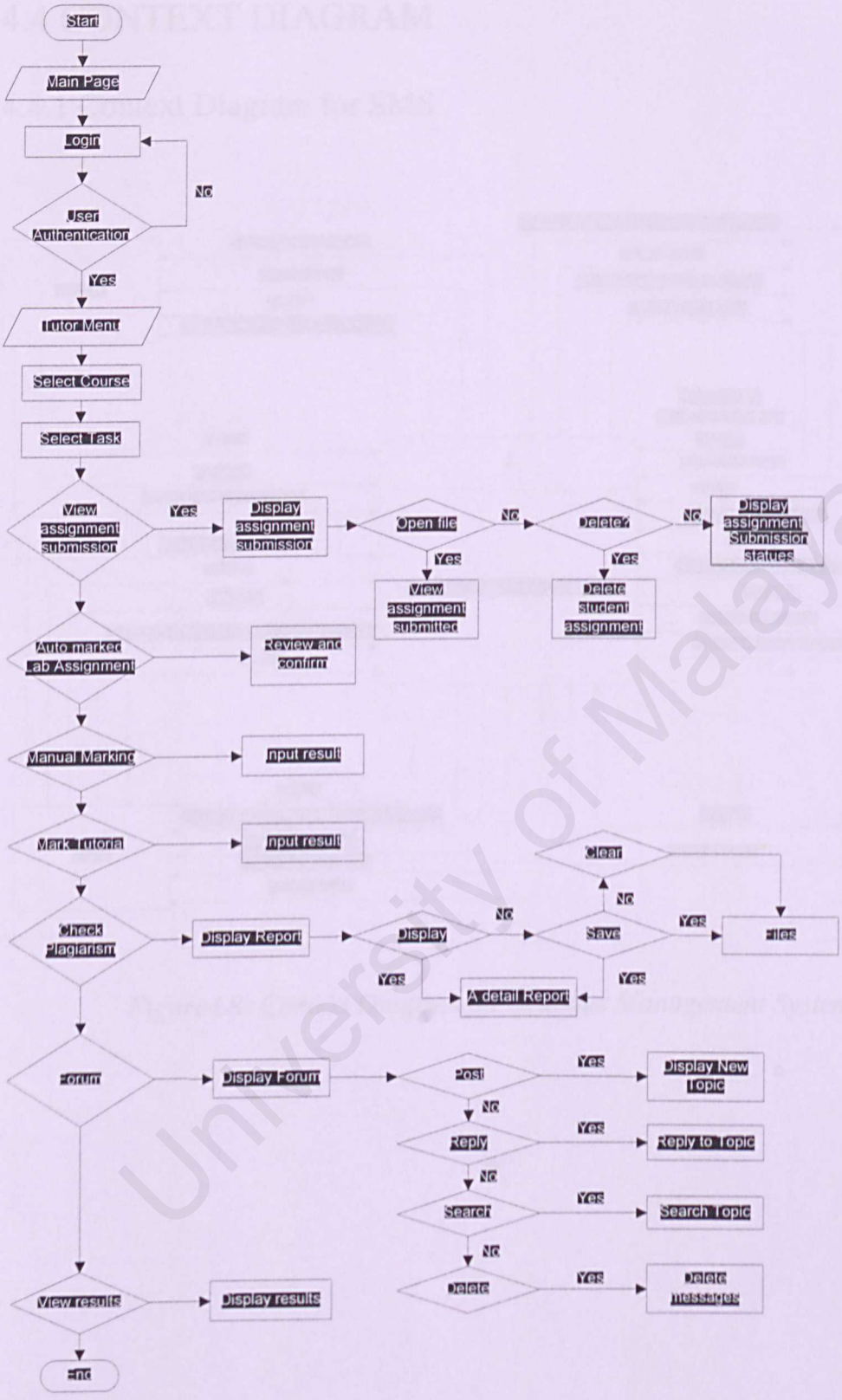


Figure 4.7: Flow Chart of System for Tutor Section

4.4 CONTEXT DIAGRAM

4.4.1 Context Diagram for SMS

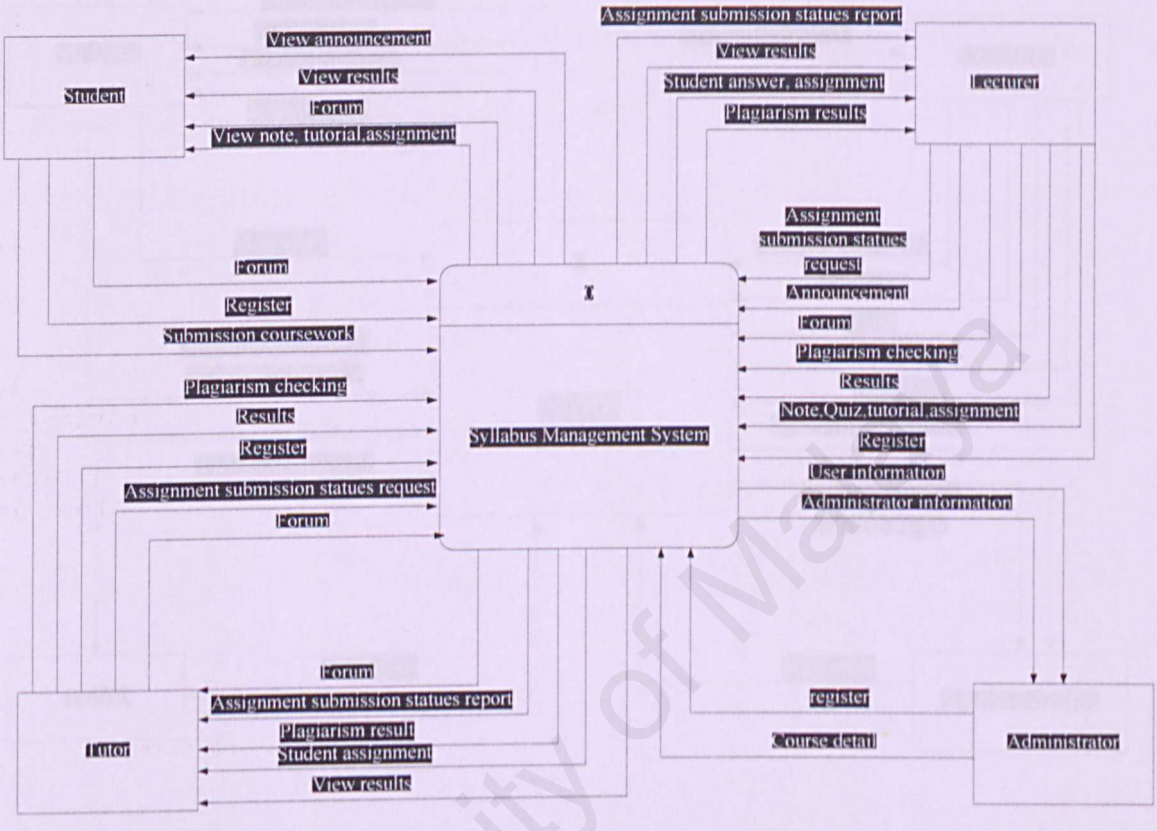


Figure4.8: Context Diagram for Syllabus Management System

4.4.2 Context diagram for Note Module

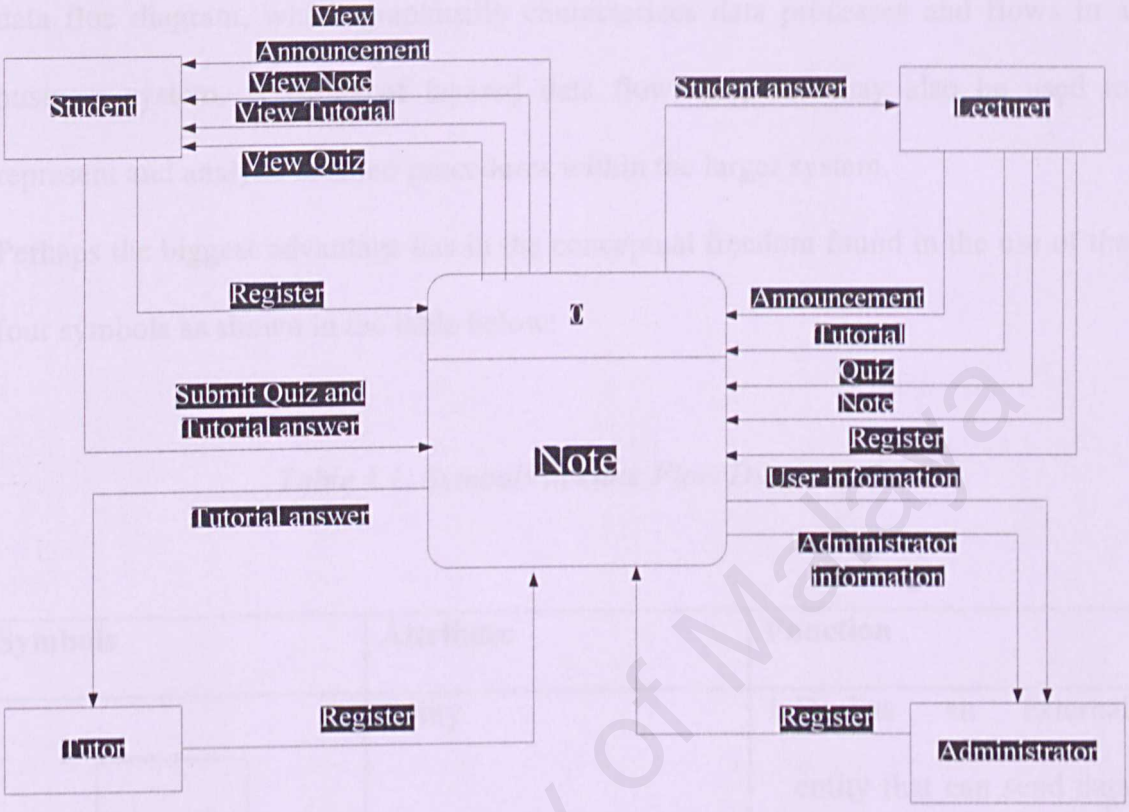


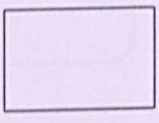
Figure4.9: Context Diagram for Note Module

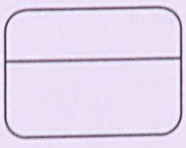
4.5 DATA FLOW DIAGRAM

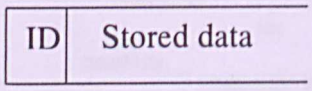
The system analyst needs to make use of the conceptual freedom afforded by the data floe diagram, which graphically characterizes data processes and flows in a business system. A series of layered data flow diagrams may also be used to represent and analyze detailed procedures within the larger system.

Perhaps the biggest advantage has in the conceptual freedom found in the use of the four symbols as shown in the table below:

Table 4.1: Symbols in Data Flow Diagram

Symbols	**Attribute**	**Function**
	Entity	1. Depicts an external entity that can send data to or receive by the system. 2. Called source or destination of data, considered as outside of the boundaries of the system.
	Data flow	1. Represent the flow of data and information from one object to another. 2. Arrow denoted the

		direction of data flow 3.Each data flow is labeled with the name and details of the information represented by the data flow. 4.Data flows occurring simultaneously can be depicted doing just that through the use of parallel around.
	process	1. Transform the input data to output data 2. Represent by rectangle shape 3. Comprise 2/3 sections: – top section contains the identifier information – center section contains a description of the process – lower section contains the

		physical and computer program information
	Data store	1. Represents data store and holds data for a given time within the system 2. May represent manual store, such as filing cabinets a computerized files and databases 3. Comprises of two section: – identifier reference number – description of the data store

4.5.1 Diagram 0

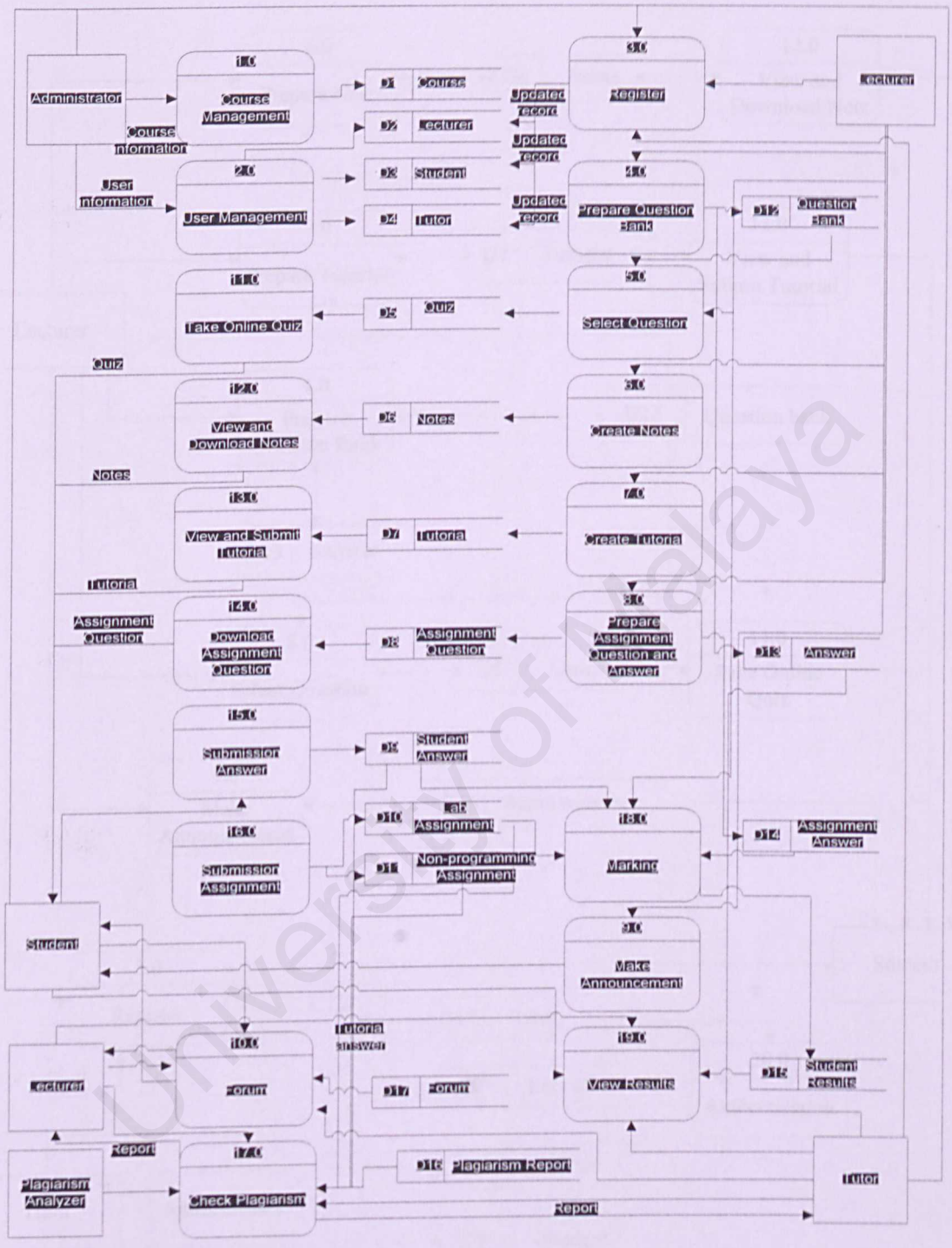


Figure 4.10: Diagram 0 for Syllabus Management System

4.5.2 Diagram 0 for Note Module

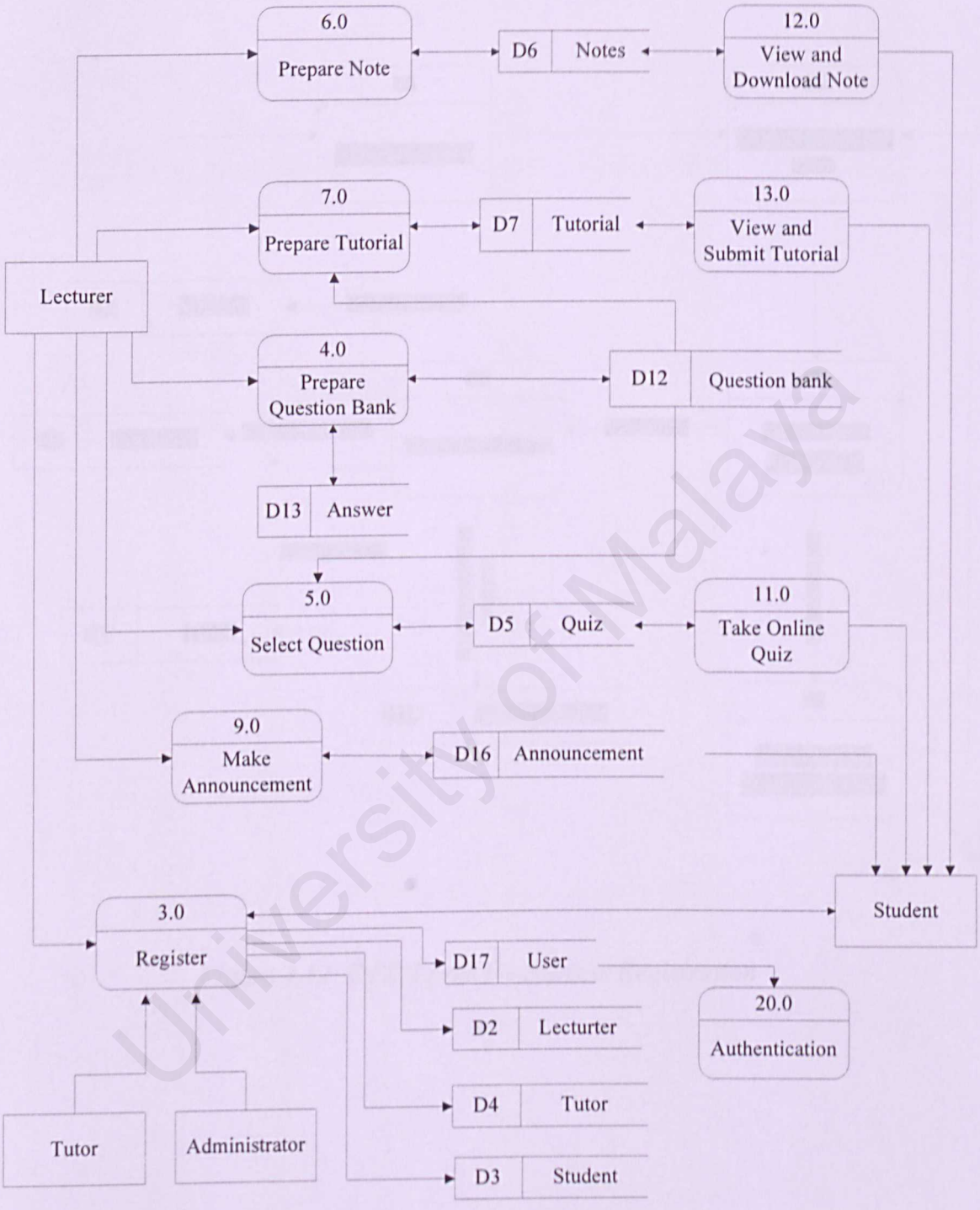


Figure 4.11: Diagram 0 for Note Module

4.5.3 DFD –Registration Process

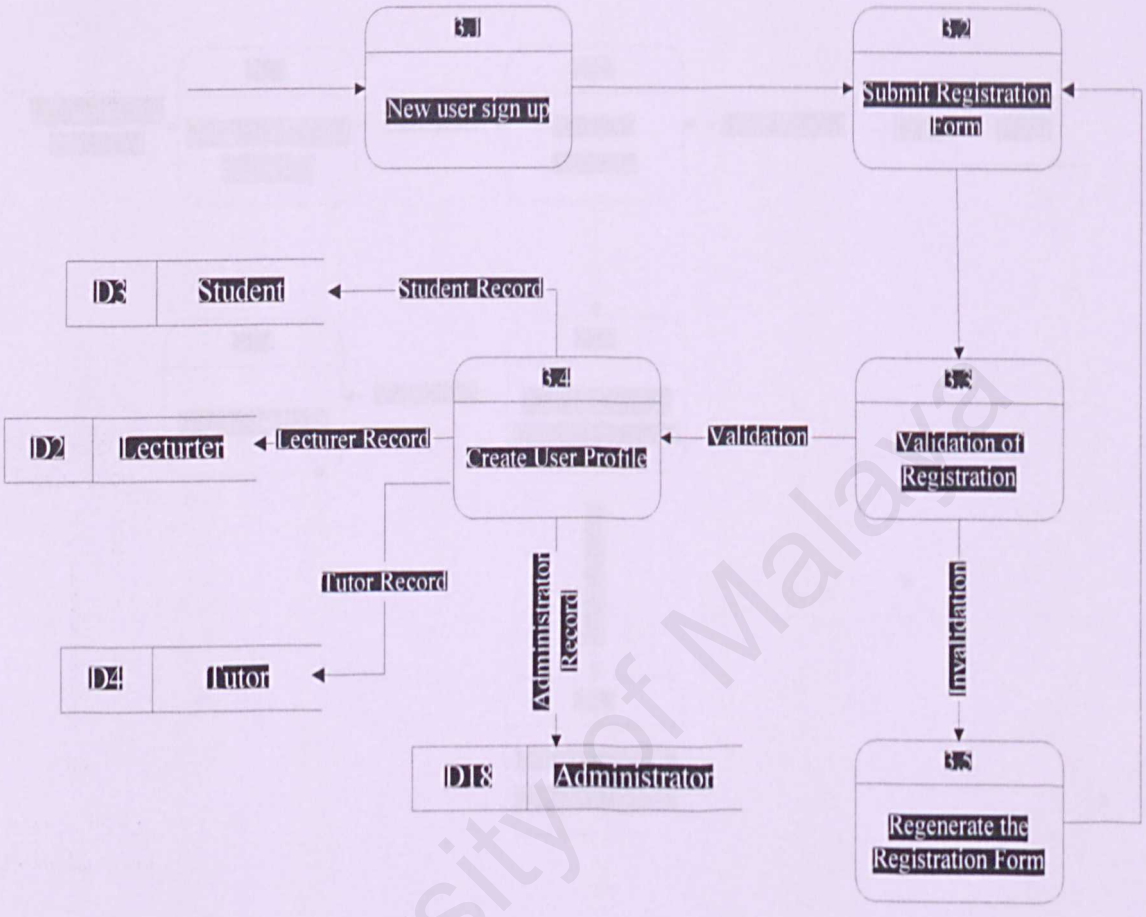


Figure 4.12: DFD Level 1 – Process Registration

4.5.4 DFD – Authentication Process

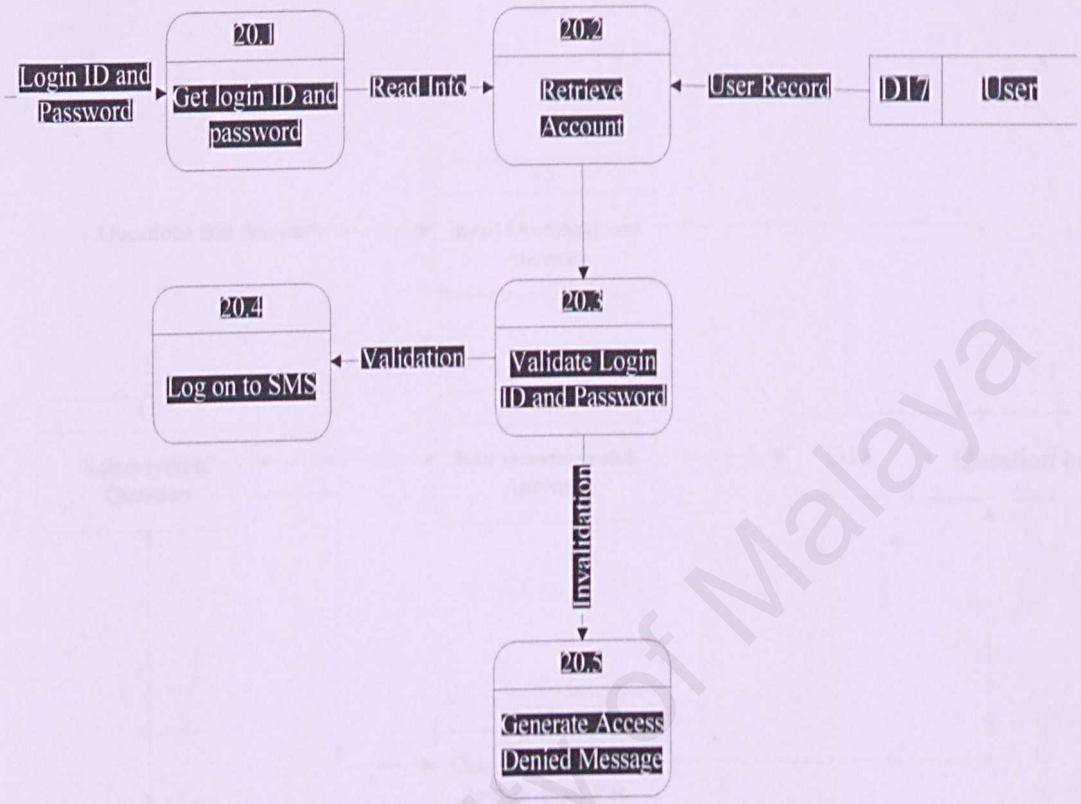


Figure 4.13: DFD Level 1 – Process Authentication

4.5.5 DFD – Prepare Question Bank

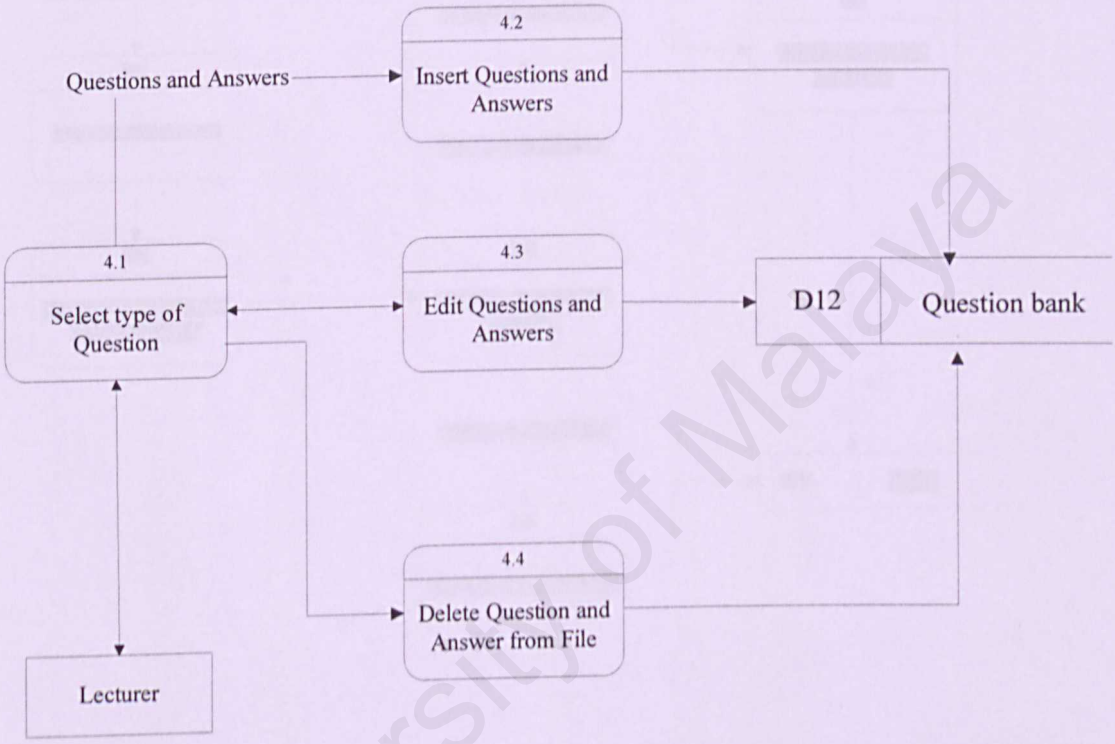


Figure 4.14: DFD Level 1 – Process Prepare Question Bank

4.5.6 DFD – Select Question Process

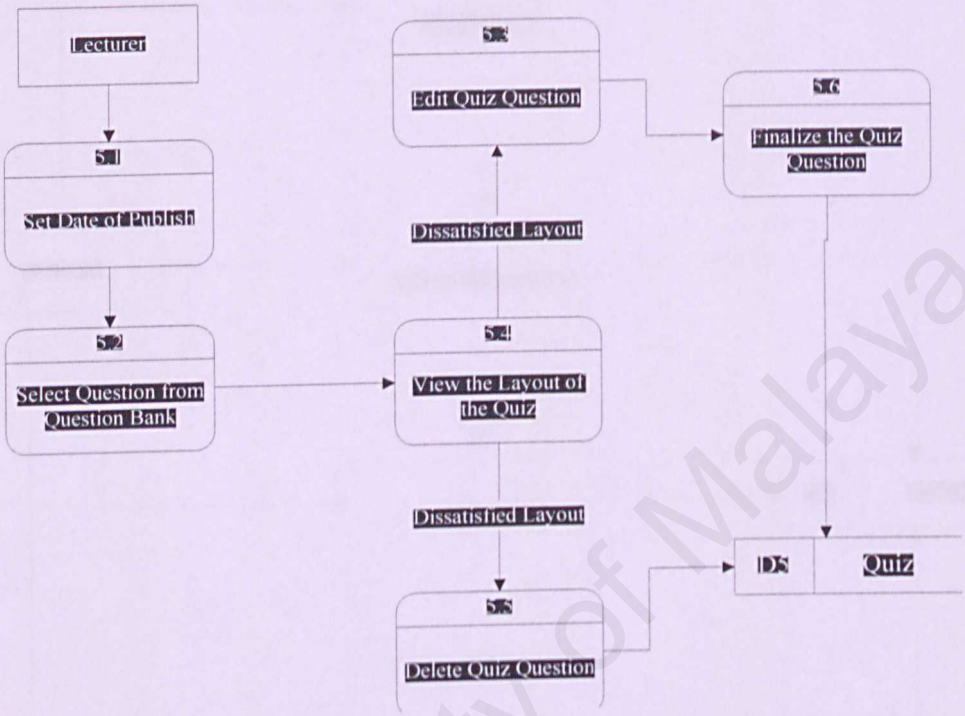


Figure 4.15: DFD Level 1 – Process Select Question

4.5.7 DFD – Prepare Notes Process

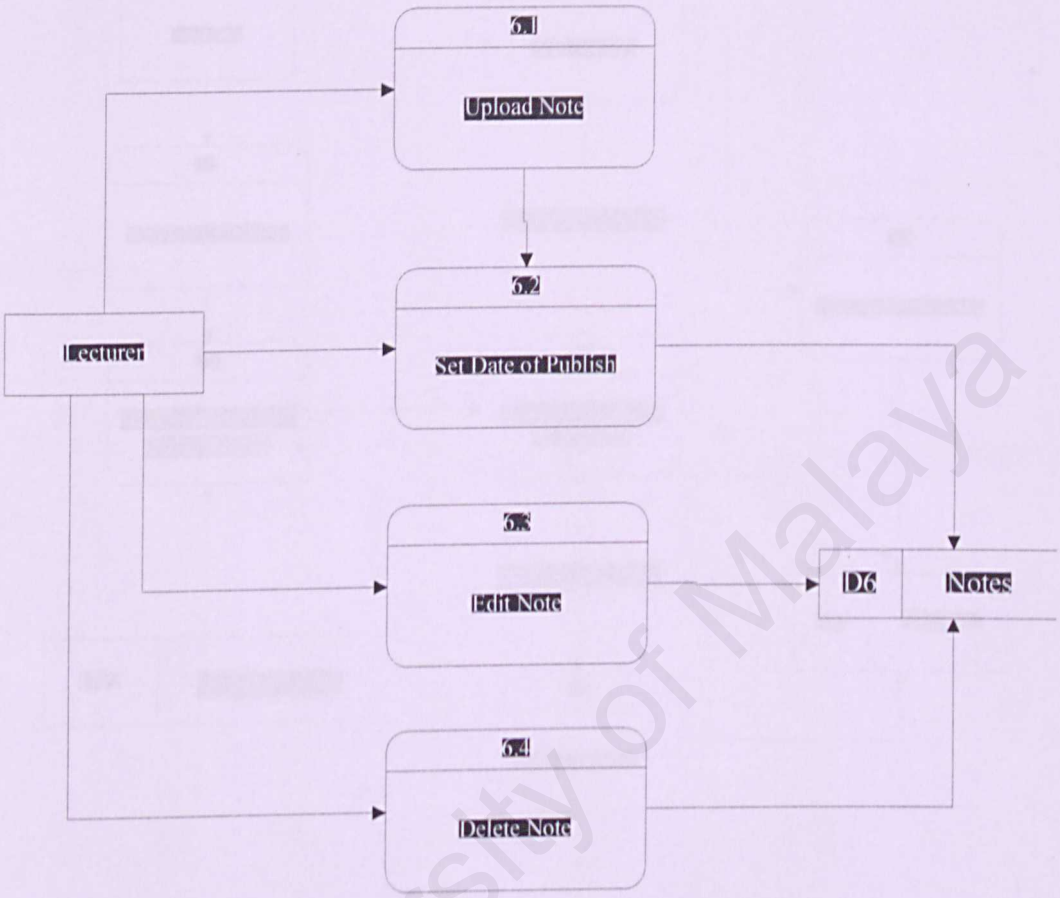


Figure 4.16: DFD Level 1 – Process Prepare Notes

4.5.8 DFD – Prepare Tutorials Process

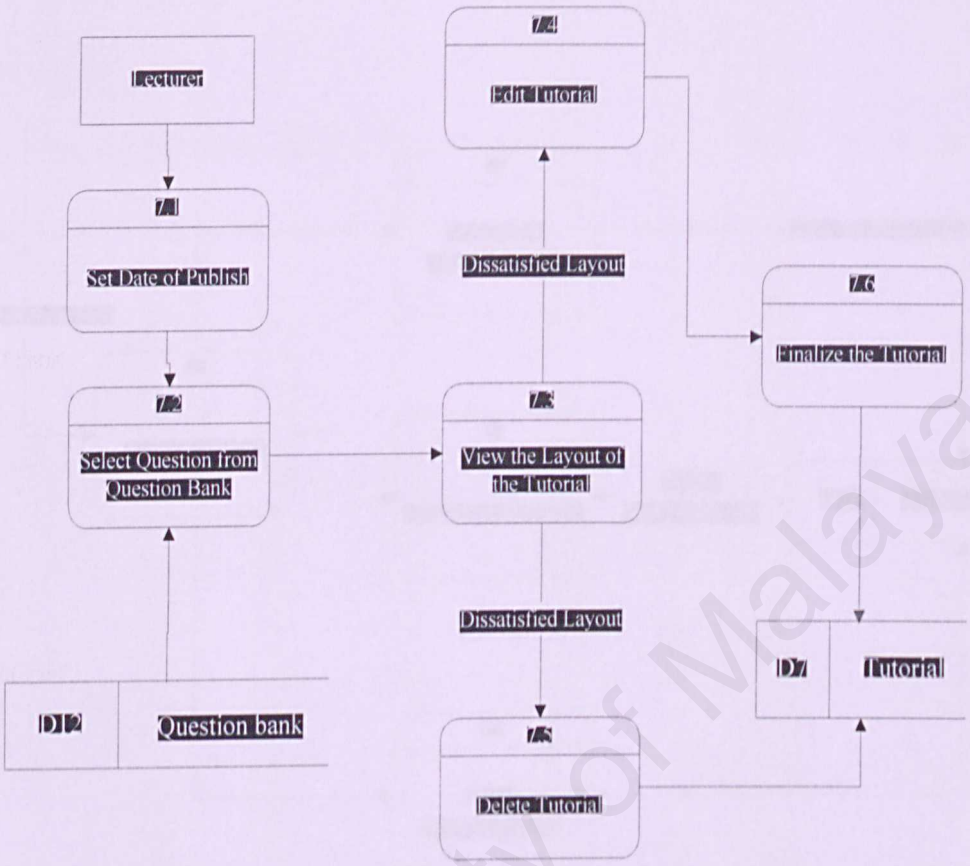


Figure 4.17: DFD Level 1 – Process Prepare Tutorials

4.5.9 DFD – Make Announcement Process

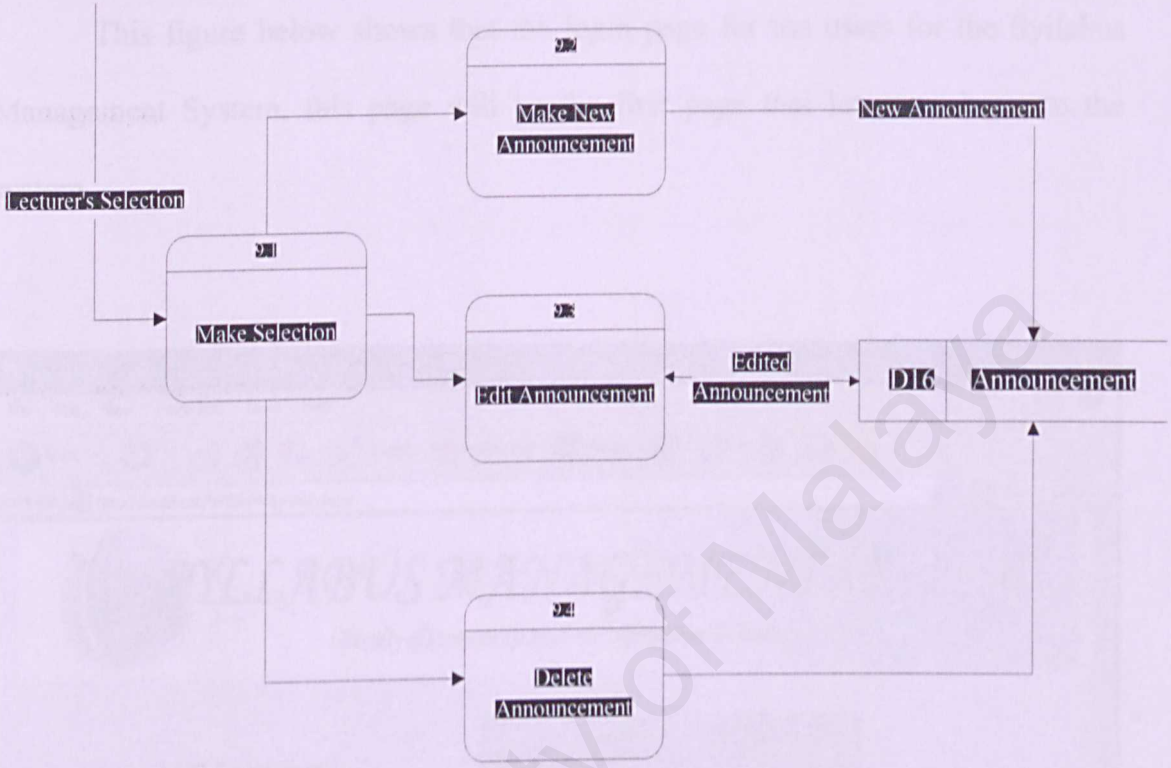


Figure 4.18: DFD Level 1 – Process Make Announcement

4.6 USER INTERFACE DESIGN

User interface describe how software communicate with the human user who uses it. The web services system user interface design focuses on the effective general interaction between its user and the system. It also takes into account development of complete, unambiguous and easy-to-understand information displays.

The interface is the system for most users. However, well or poorly designed, it stands as the representative of the system. The goal of good interface design is to produce interface that helps users and businesses get the information they need in and out the system by addressing the following objectives:

i. Effectiveness in allowing user to access the system in the way that is congruent with the individual needs.

ii. Efficiency in increasing the speed of the data entry and reduce the number of errors that occur.

iii. The productivity as measured by economically sound principles to design for user interface and workspaces.

Interfaces need to be usable and consist of certain characteristic in common:

i. They reflect the workflows that are familiar and comfortable.

ii. They support the user's learning style.

iii. They are compatible in the user's working environment.

iv. They encompass and design concept (a metaphor or idiom) that is familiar to the users.

v. They have a consistency of representation (layout, icons, and interactions) that makes them reliable and easy to learn.

vi. The usage of language and illustrations are familiar to the users or are easy to learn.

In short, usable interfaces fit in, simply and elegantly, with user's life and work needs.

This figure below shows that the login page for the users for the Syllabus Management System, this page will be the first page that let users login to the system.

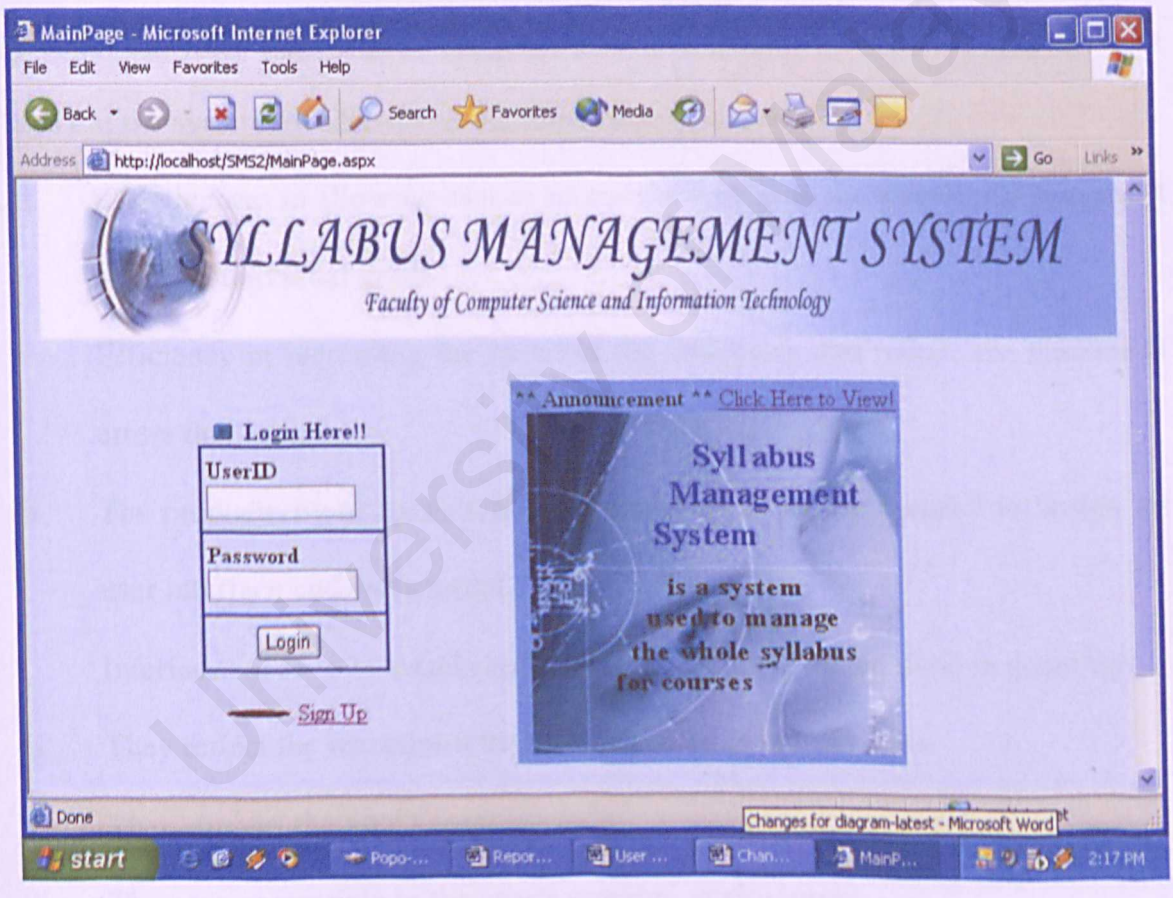


Figure 4.19: User Interface for Login Page

4.6 USER INTERFACE DESIGN

User interface describe how software communicate with the human user who uses it. The web services system user interface design focuses on the effective general interaction between its user and the system. It also takes into account development of complete, unambiguous and easy-to-understand information displays.

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iii. They are compatible in the user's working environment.

iv. They encompass and design concept (a metaphor or idiom) that is familiar to the users.

v. They have a consistency of representation (layout, icons, and interactions) that makes them reliable and easy to learn.

4.7 DATABASE DESIGN

1. Lecturer Table

Table 4.2: Table of SMS Lecturer Data

Field Name	Field Type	Field Size	Description
lecID	varchar	30	The identification key of the lecturer which is unique.
lecName	varchar	30	The name of the lecturer.
departmentID	varchar	30	The department in which the lecturer is in.
RoomNo	char	10	The location of the lecturer's room.
telephone	numeric	9	The lecturer's contact number.
email	varchar	30	The lecturer's email address.

This table stores the entire lecturer's data when he/she register as the system's new user.

2. Tutor Table

Table 4.3: Table of SMS Tutor Data

Field Name	Field Type	Field Size	Description
TutorID	nnvarchar	30	The identification key of the lecturer which is unique.
Name	nvarchar	30	The name of the lecturer.
Email	nvarchar	30	The lecturer's email address.

This table stores the entire tutor's data when he/she register as the system's new user.

3. Student Table

Table 4.4: Table of SMS student data

Field Name	Field Type	Field Size	Description
stuID	varchar	30	The unique identification key for the student.
name	varchar	30	The student's full name.
session	varchar	30	The session in which the student register in the University.
departmentID	varchar	30	The name of department in which

			the student is in.
Email	nvarchar	30	Student's valid email address.

This table stores all the students' personal data when they register as the system's user.

4. Course Table

Table 4.5: Table of SMS course data

.

Field Name	Field Type	Field Size	Description
CourseID	varchar	30	The identification key of the subject. It is the course code.
CourseName	varchar	30	The name of the course.
CourseSem	Int	1	Select semester 1 or semester 2.
prasyarat	varchar	30	The ID of the lecturer who is teaching the course.
CreditHour	int	4	The number of credit hour for the course.

This table stores all the course detail

5. AssignmentQuestion Table

Table 4.6: Table of SMS assignment question

Field Name	Field Type	Field Size	Description
assQueID	varchar	30	The identification key for the assignment title.
courseID	varchar	30	The course code in which the assignment question are written.
lecID	varchar	30	Lecturer login ID who create the assignment question.
dueDate	datetime	8	Assignment submission due date.
category	varchar	30	Select individual or group assignment.
noOfGroup	int	4	Number of group.
noStuOneGroup	int	4	Number of student in one group.
assQueName	varchar	30	Refer to the assignment's question name.
lateSubDate	datetime	8	Last Date consider as late submission.
Point	int	4	Point for assignment

This table provides all the data in a particular assignment questions.

6. Assignment Table

Table 4.7: Table of SMS non-programming assignment

Field Name	Field Type	Field Size	Description
assID	varchar	30	The identification key for the assignment title.
assQueID	varchar	30	The assignment question ID.
stuID	varchar	30	student ID.
groupID	varchar	30	Assignment submission group ID
assSubDate	datetime	8	Assignment's submission date and time.
statues	varchar	10	Assignment's submission statues.
fileName	varchar	50	File name for submission assignment.
fileSize	int	4	File size for submission assignment.
contentType	varchar	50	Content type for submission assignment.
review	varchar	10	Review for submission assignment.
userID	varchar	50	Lecturer or tutor who receive the assignment.

This table keeps track of the assignment answers submitted by the students.

7. Administrator Table

Table 4.8: Table of SMS Administrator

Field Name	Field Type	Field Size	Description
AdminID	varchar	30	The identification key for administrator.
AdminName	varchar	30	The administrators' name
Position	varchar	30	The job position for administrator.
Email	varchar	30	The valid email for administrator

This table stores the data for administrator.

8. AssQueFile Table

Table 4.9: Table of SMS AssQueFile

Field Name	Field Type	Field Size	Description
fileID	int	4	The identification key for file.

fileName	varchar	30	The file name for assignment question.
fileSize	int	4	The file size
contentType	varchar	30	The content type for file
assQueID	varchar	50	The assignment question ID

This table stores the data for assignment question file.

9. Registration1 Table

Table 4.10: Table of SMS Registration1

Field Name	Field Type	Field Size	Description
Registration1ID	int	4	The identification key for Registration1
stuID	varchar	30	The student ID.
courseID	varchar	30	The course ID

This table stores the data for joining the Course Table and Student Table.

10. RegistrationGroup Table

Table 4.11: Table of SMS RegistrationGroup

Field Name	Field Type	Field Size	Description
RegistrationGroupID	int	4	The identification key for RegistrationGroup.
stuID	varchar	30	The student ID.
groupID	varchar	30	The group ID

This table stores the data for joining the Group Table and Student Table.

11. Class Table

Table 4.12: Table of SMS Class

Field Name	Field Type	Field Size	Description
classID	int	4	The identification key for Class.
lecID	varchar	30	The lecturer ID.
courseID	varchar	30	The course ID

This table stores the data for joining the Group Table and Student Table.

12. TutorClass Table

Table 4.13: Table of SMS TutorClass

Field Name	Field Type	Field Size	Description
tutorClassID	int	4	The unique identification key for the tutor class.
courseID	varchar	50	The course ID.
TutorID	nvarchar	50	Tutor login ID.

This table is created for joining the Tutor Table and Course Table

13. Group Table

Table 4.14: Table of SMS Group Assignment Information

Field Name	Field Type	Field Size	Description
groupID	varchar	30	The identification key assignment submission group ID
groupName	varchar	30	Group name.
assQueID	varchar	30	The identification key for the assignment title.

This table is created when student register for their group of assignment. It stores group assignment information.

14. Assignment Result Table

Table 4.15: Table of SMS Assignment Result

Field Name	Field Type	Field Size	Description
assReID	int	4	The identification key assignment result.
StuID	varchar	50	The identification key for the student.
assQueID	varchar	30	The identification key for the assignment title.
Score	int	4	The score of the student
CourseID	nvarchar	50	The identification key for the course.

This table is stores the students' assignment results.

15. Assessment Table

Table 4.16: Table of SMS Course Assessment

Field Name	Field Type	Field Size	Description
courseMarkID	nvarchar	50	The identification key assignment course assessment ID
courseID	varchar	50	The identification key the course.
assRe	int	4	The marks allocated for final assignment results
tutRe	int	4	The marks allocated for final tutorial results
quizRe	int	4	The marks allocated for final quiz results
examRe	int	4	The marks allocated for final test results
FinalexamRe	int	4	The marks allocated for final exam results

This table is stores the assessment for the course.

16. Course Final Result Table

Table 4.17: Table of SMS Final Course Result

Field Name	Field Type	Field Size	Description
courseReID	int	4	The identification key assignment course Result ID.
stuID	nvarchar	50	The identification key for the student.
courseID	varchar	50	The identification key for the course.
AssRe	int	4	Student's assignment results
TutRe	int	4	Student's tutorial results
QuizRe	int	4	Student's quiz results
ExamRe	int	4	Student's final test results
FinalexamRe	int	4	Student's final exam results
finalResult	int	4	Student's final course results
gred	nvarchar	50	Student's gred

This table is stores the student final course results.

17. Test Result Table

Table 4.18: Table of SMS Test Result

Field Name	Field Type	Field Size	Description
ExamReID	int	4	The identification key test result ID

stuID	varchar	50	The identification key for the student.
courseID	varchar	30	The identification key for the course.
Score	int	4	The score of the student
examID	nvarchar	50	The identification key for the test.

This table is stores the students' test results.

18. Student's Quiz Fill in the Blank Answer Table

Table 4.19: Table of SMS Student's Quiz Fill in the Blank Answer

Field Name	Field Type	Field Size	Description
quizFIBAnsID	int	4	The identification key of the student's quiz fill in the blank answer
fibQuesID	int	4	The identification key for the quiz question.
stuID	varchar	50	The identification key for the student.
courseID	varchar	30	The identification key for the course.
score	int	4	The score of the student
quizID	nvarchar	50	The identification key for the quiz.
ans	text	16	The answer of the student.

This table is stores the student's quiz fills in the blank answer.

19. Student's Quiz Multiple Choice Question Answer Table

Table 4.20: Table of SMS Student's Quiz Multiple Choice Question Answer

Field Name	Field Type	Field Size	Description
quizMCQAnsID	int	4	The identification key of the student's quiz multiple choice question answer
mcqQuesID	int	4	The identification key for the quiz question.
stuID	varchar	50	The identification key for the student.
courseID	varchar	30	The identification key for the course.
score	int	4	The score of the student
quizID	nvarchar	50	The identification key for the quiz.
ans	text	16	The answer of the student.

This table is stores the student's quiz multiple choice question answer.

20. Student's Quiz True False Question Answer Table

Table 4.21: Table of SMS Student's Quiz True False Question Answer

Field Name	Field Type	Field Size	Description
quizTFAnsID	int	4	The identification key of the student's quiz true false question answer
tfQuesID	int	4	The identification key for the quiz question.
stuID	varchar	50	The identification key for the student.
courseID	varchar	30	The identification key for the course.
score	int	4	The score of the student
quizID	nvarchar	50	The identification key for the quiz.
ans	text	16	The answer of the student.

This table is stores the student's quiz true false question answer.

21. Assignment Result Table

Table 4.22: Table of SMS Quiz Result

Field Name	Field Type	Field Size	Description
quizReID	int	4	The identification key of quiz result.
StuID	varchar	50	The identification key for the student.
quizID	varchar	30	The identification key for the quiz
Score	int	4	The score of the student
courseID	nvarchar	50	The identification key for the course.
status	nvarchar	50	Check the status of the student (have taken the quiz or not)

This table is stores the students' quiz results.

22. Student's Tutorial Answer Table

Table 4.23: Table of SMS Student's Tutorial Answer

Field Name	Field Type	Field Size	Description

tutAnsID	nvarchar	4	The identification key of the student's tutorial answer
tutQuesID	int	4	The identification key for the tutorial question.
stuID	varchar	50	The identification key for the student.
courseID	varchar	30	The identification key for the course.
score	int	4	The score of the student
tutPaperID	nvarchar	50	The identification key for the tutorial.
ans	text	16	The answer of the student.
status	nvarchar	50	The status of the student(on time submission, late submission or not submit

This table is stores the student's tutorial answer.

23. Tutorial Result Table

Table 4.24: Table of SMS Tutorial Result

Field Name	Field Type	Field Size	Description
tutorialReID	int	4	The identification key of tutorial result.
stuID	varchar	50	The identification key for the student.
TutPaperID	varchar	30	The identification key for the tutorial
Score	int	4	The score of the student
courseID	nvarchar	50	The identification key for the course.

This table is stores the students' tutorial results.

24. Authentication Table

Table 4.25: Table of SMS user

Field Name	Field Type	Field Size	Description
userID	nvarchar	50	The ID key for the user
userPassword	nvarchar	50	The user's password
userType	nvarchar	50	The user's type like administrator, lecturer, tutor and student.

This table stores the ID and password for user which is administrator, lecturer, tutor, and student.

25. Announcement table

Table4.26: Table of SMS Announcement

Field name	Field type	Field size	Description
annID	int	4	The ID of announcement
dateCreate	datetime	8	The date creates the announcement.
title	nvarchar	16	The title for this announcement.
message	nvarchar	1000	The message that lecturer want to write.
lecID	nvarchar	50	The lecturer that post the announcement.
courseID	nvarchar	50	The course the lecturer post the announcement.

This table stores the announcement that make by the lecturer.

26. Quiz table

Table 4.27: Table of SMS Quiz

Field name	Field type	Field size	Description
quizID	int	4	The identification key for the quiz
title	nvarchar	50	Refer to the quiz title
quizNo	int	4	Refer to the total number of questions selected.
quizType	nvarchar	50	Refer to the quiz type like True False question, Fill in the Blank question and Multiple Choice question.
lecID	nvarchar	50	Refers to the lecturer who prepares the quiz
courseID	nvarchar	50	The course code in which the quizzes are write
startTime	nvarchar	50	The start date and time which let student start the quiz.
endTime	nvarchar	50	The end date and time which student should pass up the quiz.

This table stores the quiz detail.

27. Fill in the Blank Table

Table4.28: Table of SMS Fill in the Blank Question

Field name	Field type	Field size	Description
fibQuesID	int	4	The ID key of fill in the blank.
question	nvarchar	4000	The question of fill in the blank.
answer1	nvarchar	50	The answer of fill in the blank.
answer2	nvarchar	50	The answer of fill in the blank.
answer3	nvarchar	50	The answer of fill in the blank.
point1	int	4	The point of fill in the blank.
point2	int	4	The point of fill in the blank.
point3	int	4	The point of fill in the blank.
courseID	nvarchar	50	The course code in which the question are write

This table stores fill in the blank question. Lecturer can retrieve data from the question bank and set the question for quiz.

28. True False Question Table

Table4.29: Table of SMS True False Question

Field name	Field type	Field size	Description
tfQuesID	int	4	The ID key of true false question.
question	nvarchar	4000	The question of true false question.
answer	nvarchar	50	The answer of true false question.
courseID	nvarchar	50	The course code in which the question are write

This table stores true false question. Lecturer can retrieve data from the question bank and set the question for quiz.

29. Multiple Choice Table

Table4.30: Table of SMS Multiple Choice Question

Field name	Field type	Field size	Description
mcqQuesID	int	4	The ID key of multiple choice questions.
question	nvarchar	4000	The question of multiple choice questions.
mcqOption1	nvarchar	50	The answer of multiple choice questions.
mcqOption1	nvarchar	50	The answer of multiple choice questions.
mcqOption1	nvarchar	50	The answer of multiple choice questions.
mcqOption1	nvarchar	50	The answer of multiple choice questions.
answer	nvarchar	50	The answer of multiple choice questions.
courseID	nvarchar	50	The course code in which the question are write

This table stores multiple choice questions. Lecturer can retrieve data from the question bank and set the question for quiz.

30. Quiz True False Table

Table4.31: Table of SMS Quiz True False Question

Field name	Field type	Field size	Description
QuizTFPaperID	int	4	The ID of quiz and true false question.
tfQuesID	int	4	The ID key of true false question.
quizID	int	4	The quiz ID.

This table stores quiz ID and true false question ID. It is use to link the true false question table and quiz table.

31. Quiz Objective Table

Table4.32: Table of SMS Quiz Objective Question

Field name	Field type	Field size	Description
QuizObjPaperID	int	4	The ID of quiz and multiple choice question.
mcqQuesID	int	4	The ID key of multiple choice question.
quizID	int	4	The quiz ID.

This table stores quiz ID and multiple choice question ID. It is use to link the multiple choice question table and quiz table.

32. Quiz Fill in the Blank Table

Table4.33: Table of SMS Quiz Fill in the Blank Question

Field name	Field type	Field size	Description
QuizFibPaperID	int	4	The ID of quiz and fill in the blank question.
fibQuesID	int	4	The ID key of fill in the blank question.
quizID	int	4	The quiz ID.

This table stores quiz ID and fill in the blank question ID. It is use to link the true false question table and quiz table.

33. Note Table

Table 4.34: Table of SMS Note

Field name	Field type	Field size	Description
noteID	int	4	The identification key for the notes
title	nvarchar	50	Refer to the note title
dateofPublish	datetime	8	The date in which the notes will be officially viewed by students
lastDate	datetime	8	The date in which the notes will

			not be viewed by students
upload File	nvarchar	50	Contains the files name that was uploaded. The file name can end with either the extension of .ppt, .doc, or .txt.
fileSize	nvarchar	50	Contains the files size that was uploaded.
lecID	nvarchar	50	The lecturer that post the announcement.
courseID	nvarchar	50	The course code in which the question are write

This table stores the information of notes.

34. BankTutQues table

Table4.35: Table of SMS Tutorial Question Bank

Field name	Field type	Field size	Description
TutQuesID	int	4	The ID for tutorial question.
TutQues	nvarchar	1000	The question for the tutorial.
Answer	nvarchar	1000	The answer for the tutorial.
Point	int	4	The point for the tutorial question.
courseID	nvarchar	50	The course code which the tutorial question is.

This table stores the tutorial question.

35. TutPaperInfo table

Table4.36: Table of SMS Tutorial

Field name	Field type	Field size	Description
TutPaperID	int	4	The ID for tutorial.
courseID	nvarchar	50	The course code which the tutorial question is.
TutName	nvarchar	50	The name for the tutorial.
TotalQuestion	Int	4	The total question that lecturer selected.
Dateline	datetime	8	The last date that student should pass up their tutorial.
Point	Int	4	The point for the tutorial question.

This table stores the tutorial information.

36. TutQuesPaper Table

Table4.37: Table of SMS Quiz Fill in the Blank Question

Field name	Field type	Field size	Description
TutQuesPaperID	int	4	The ID of tutorial question and tutorial.
TutPaperID	int	4	The ID key tutorial.
TutQuesID	int	4	The tutorial question ID.

This table stores tutorial ID and tutorial questions ID. It is use to link the TutPaperInfo table and BankTutQues table.

37.TutorialGroup Table

Table4.38: Table of SMS Tutorial Group

Field name	Field type	Field size	Description
tutGroupID	nvarchar	50	The tutorial group ID
time	nvarchar	50	Time when the tutorial will be held
place	nvarchar	50	The venue where the tutorial will be held
day	nvarchar	50	The day where the tutorial will be held
noOfStudent	int	4	The number of students in that group
pID	nvarchar	50	The lecturer or tutor ID who will be incharge
courseID	nvarchar	50	The course code in which the tutorial is
pName	nvarchar	50	The lecturer or tutor name who will be incharge

This table stores the information about the tutorial class.

38. StudentTutGroup Table

Table4.39: Table of SMS Student List of Tutorial Group

Field name	Field type	Field size	Description

StuTutGroupID	int	4	The ID of the student in the list
stuID	nvarchar	50	The students ID number who has register for this subject
tutGroupID	int	4	The identification tutorial group.

This table stores the group of tutorial for students.

39. Forum Users Table

Table 4.40: Table of SMS Forum's Users

Field Name	Field Type	Field Size	Description
ID	int	4	The identification key of the forum's users which is unique.
Username	nvarchar	50	The name of the user.
Pass	nvarchar	50	The password of the user.

This table stores all the forum users' data when he/she register as the forum's new user.

40. Forum Category Table

Table 4.41: Table of SMS Student's Forum's Category

Field Name	Field Type	Field Size	Description
ID	int	4	The identification key of the forum's category which is unique.
Catagory	nvarchar	1000	The category title of forum.
Description	nvarchar	2000	The description about the category title of forum.
PostCount	int	4	The number of user who post the thread title.
LastPostBy	int	4	The name of the last user who post the thread title.
LastPostDate	datetime	8	The date and time of the latest thread title.

This table stores the entire forum category's title data.

41. Forum Original Thread Table

Table 4.42: Table of SMS Forum's Original Thread Title

Field Name	Field Type	Field Size	Description
ID	int	4	The identification key of the forum's thread title which is unique.
ThreadTitle	nvarchar	1000	The thread title of forum.
ThreadText	nvarchar	2000	The description about the thread title of forum.
CreatedBy	int	4	The user id who post the thread title.
CreatedOn	datetime	8	The date and time when the thread title had been created by the user.
ForumID	int	4	The identification key of the forum's category id.
LastReplyOn	datetime	8	The date and time of the latest thread title.
LastReplyBy	int	4	The user id who reply to the thread title.

This table stores all the forum thread title data.

42. Forum Replies Table

Table 4.43: Table of SMS Forum's Replies

Field Name	Field Type	Field Size	Description
ID	int	4	The identification key of the forum's reply title which is unique.
ReplyTitle	nvarchar	1000	The reply title of forum.
ReplyText	nvarchar	2000	The description about the reply title of forum.
ReplyBy	int	4	The user id who reply to the thread title.
ReplyOn	datetime	8	The date and time of the reply title.
ReplyTo	int	4	The thread id where the reply title refer to.

This table stores the entire forum category's title data.

4.7.1 Entity Relationship Diagram

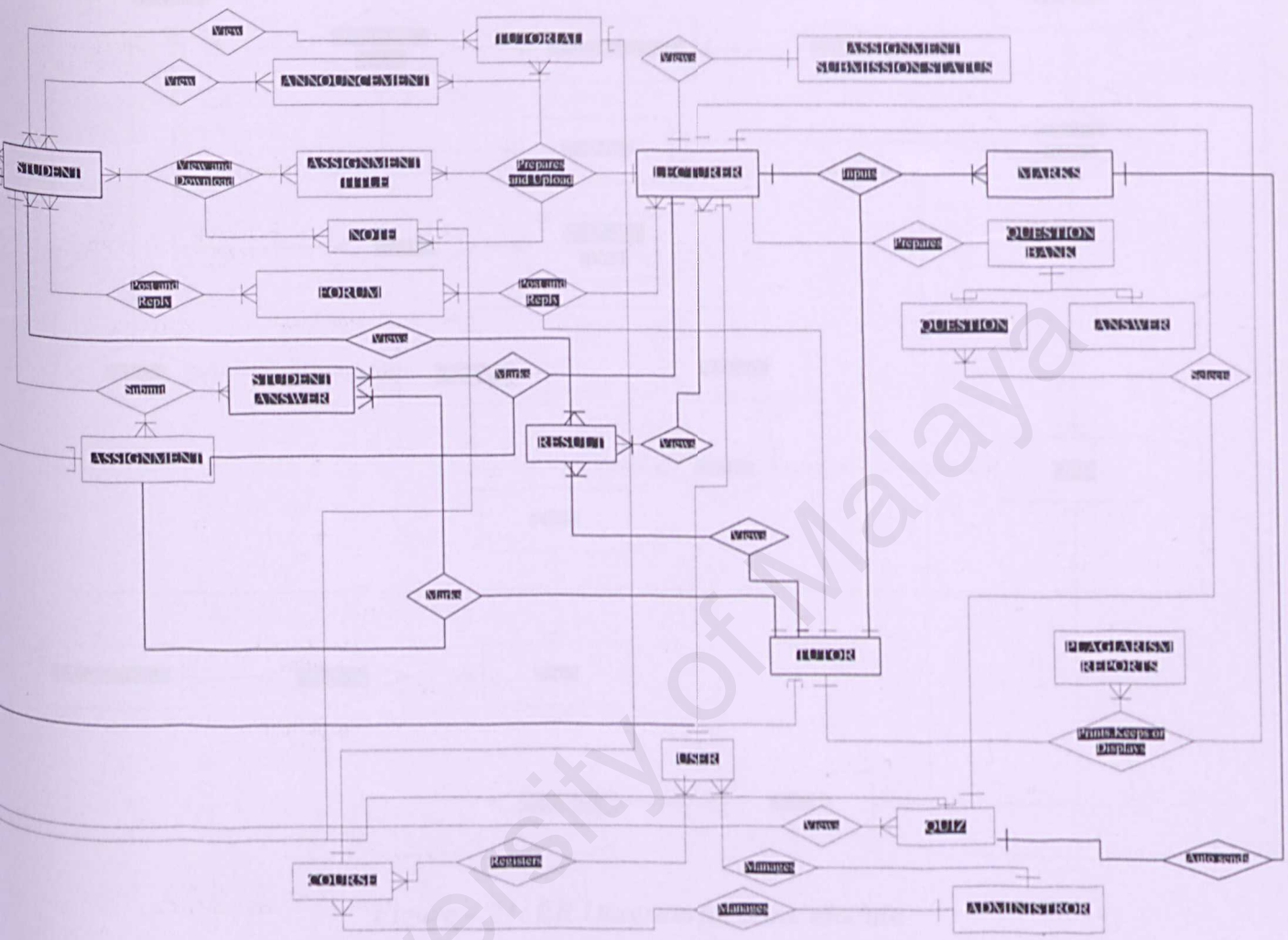

Figure 4.20: ER Diagram for SMS

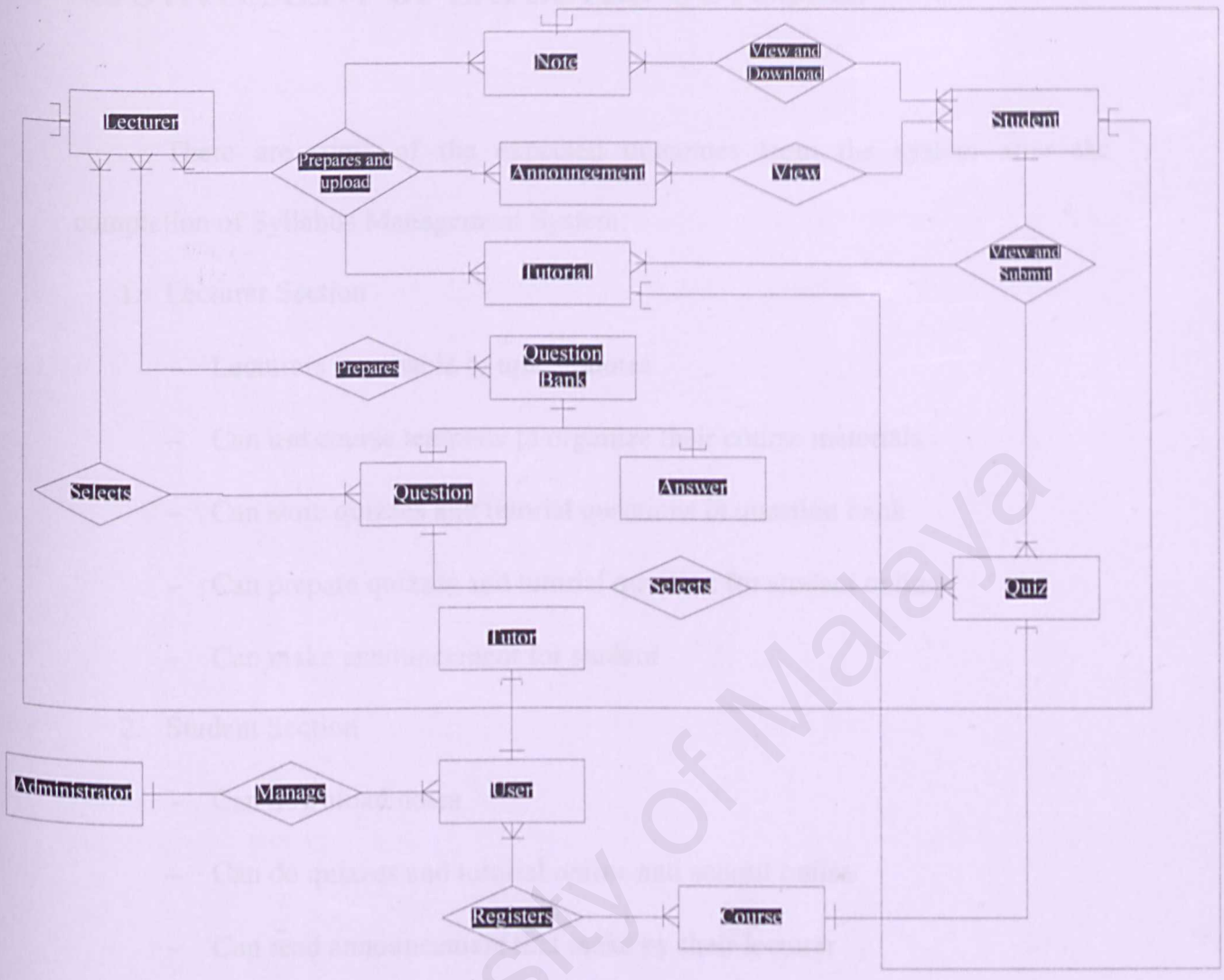

Figure 4.21: ER Diagram for Note Module

4.8 STATEMENT OF EXPECTED OUTCOME

There are some of the expected outcomes from the system after the completion of Syllabus Management System:

1. Lecturer Section
   - Lecturers are enable to upload notes
   - Can use course template to organize their course materials
   - Can store quizzes and tutorial questions in question bank
   - Can prepare quizzes and tutorial question for student online
   - Can make announcement for student
2. Student Section
   - Can download notes
   - Can do quizzes and tutorial online and submit online
   - Can read announcement that make by their lecturer
3. Tutor Section
   - Can collect student tutorial and mark

4.9 SUMMARY

This chapter is importantly stated out the system hierarchy, flow chart, context diagram, data flow diagram, and database design. System hierarchy stated out the modules in the system. Data flow diagram provides general idea of the process flow. The data flow can be decomposed into several layers according to its level of abstraction.

Several interface design are shown in this chapter. Lastly, a statement of expected outcome of the project is stated.

Chapter 5

SYSTEM IMPLEMENTATION

5.0 SYSTEM IMPLEMENTATION

5.1 INTRODUCTION OF SYSTEM IMPLEMENTATION

System Implementation is a process of producing a real working system by converting the system requirement and designs into program codes which these requirements and designs act as the guideline to produce the required system. The process of implementation may include coding methodologies in order to ease the process of maintenance after the system has been successfully implemented.

For syllabus management system, each module is developed separately and later integrated into a fully functional system once every module has been tested successfully.

5.2 DEVELOPMENT ENVIRONMENT

Development requirement has certain impact on the development of system. Using the suitable hardware will help speed up system development as it helps the programmer to debug the errors more effectively and also efficient. The hardware and software tools used to develop and documented the entire system are discussed as below.

5.2.1 Hardware requirements

Certain requirements must be fulfilled in order to implement syllabus management system. Some of the hardware required to create this project include:

1. Intel Pentium (III) 866 Mhz processor
2. 128 SD RAM

3. 20 GB Hard Disk
4. 15' 256-color monitor capable of 1028 x 728 resolution
5. 1.44 MB Floppy Drive
6. 56x CD-ROM Drive
7. Speaker
8. Other Standard computer peripherals

5.2.2 Software Requirement

1. Window XP as OS and server platform to run Microsoft Visual Studio .Net, Microsoft SQL server 2000 and Internet Explorer 128 Ram.
2. Microsoft Internet Information Services 5.1 as web server
3. Microsoft SQL server as database management
4. Internet Explorer 6.0 as web browser to view to web pages design and application
5. Microsoft Visual Studio .Net to write ASP .Net, VB .Net
6. Photoshop 7.0 to design graphics and interfaces
7. Microsoft word XP for documenting

5.3 SYSTEM CODING

System coding comprising software programming and preliminary testing of the prototype model, convert the prior system design into a working and functional system through the define computer- readable source codes. Programming transforms the structure charts, logical and physical data flow diagrams as well as interface design into working prototype model. Both processing and testing should

occur in parallel when this process happens. The testing done in this phase is the development testing. The preliminary testing done is important in that it helps to correct the individual modules and the integration of multiple modules of prototype model.

5.3.1 Coding approach

The proposed system is developed using both structural and modular programming where some modules are completed using bottom up approach. Structural programming extends the principles governing structures design to the writing of program. It is also based on the principles of modularization that follows from the bottom up development. Structure is a method of organizing and coding programs that simplifies control paths so that the programs can be easily understood and modified. Structures programming reduces the complexity created when programs jump forward and backward to other parts of the program, obscuring the logic and flow of the program. ASP .Net supports the structural programming by providing sequential, iteration with FOR and WHILE statement.

Modular programming is defined as breaking the application into well-define logical and manageable modules. By breaking the programming apart, the bottom-up approach reduce the complexity of the system as well as making the development more, as building a system modules up all at once. Only when the modules have been tested to be working and functioning as required. The progress will continue and ends when the overall system is modeled.

5.3.2 Coding methodology

The Syllabus Management System refers to the type of approach used in the developing of the entire Syllabus Management System. To develop the said system, I have chosen to implement the Bottom-Up Approach as my coding methodology.

Bottom-Up Approach

In this approach, the entire system is divided into different modules. As the breakdown goes deeper, each module consists of sub-modules and functions. The sub-modules in the lowest layer of the call hierarchy are tested individually. Then the next sub-module is tested that call the previously tested sub-module. This is done repeatedly until all subsystem is included in the testing. Each individual function will from the basis where the coding initiates. This approach ensures that every module is developed and tested individually and completely.

In the SMS, the entire system is divided into four main modules namely notes, assignments, marking and plagiarism. As stated in the earlier chapters, these modules have been divided into sub modules.

For example, the note module is consists of the following sub-modules:

- Registration
- Authentication
- Upload note
- Question bank
- Tutorial
- Announcement

5.4 CODING STYLE

Good coding practices are essential to keep the proposed system consistent, maintainable and readable. By practicing good coding, the programs written will be much clearer, more understandable, more debug able and more maintainable especially when looking hack at previous program that is written maybe sometimes before the following sections discussed some of the important coding styles implemented in the system development.

5.4.1 Include Script Files

The use of the Include Script Files is significant when the project development reached a stage where a large amount of ASP pages have been created. This is because the Include Script Files avoid the need of modifying the same section or segment on each and every ASP or HTML page. Only the include instruction syntax a inserted into the pages with the same elements to make use of the Include Script Files.

5.4.2 Formatting and Indenting Codes

Not a necessary but nevertheless a good programming practice. Although codes that are written without a proper a formatting or indenting will function or work just as well as a formatted code, these type of codes and hard to read especially when over hundreds of lines have been written or the codes have been written sometimes ago and the programs are using a lot of recursive and looping functions.

By indenting the codes, the structure of the code will stand out and make detection of errors or changes that need to be made easier. The using of the tab key helps to create a standard size for the indentation throughout the whole process of writing coding.

5.4.3 Commenting Codes

Comment take up space and increase the size of the codes in term of kilobytes. Moreover, pages of comments run significantly slower because script interpreter has to read and then skip the comment lines each time. Nevertheless, the advantages of suing comments still out weight the disadvantages. Comments help to document the coding and help the programmers to understand the purpose of what some line of codes does and how it is done. Comments help to ease maintenance and guide other programmers to modify the codes, perform debugging or when they need to enhance the existing system in the future. Comments are included before each line or block of code so as to describe the purpose. The way comments are inserted for ASP.Net is by using the single quotation mark at the beginning of every comment.

There are 2 types of code documentation; internal documentation and external documentation. Internal documentation is descriptive material written directly within the code. All other documentation is external documentation. Code documentation begins with the selection of identifier names, continues with connecting and ends with the organization of program.

Internal documentation contains information directed at the person who will be reading the source code of the program and might possibly enhance the application. Thus in Syllabus Management System, description is given in order to

give a summary on how and what the coding is all about. A statement of purpose dictating the function of the module and descriptive comments are embedded within the body of the source code to describe processing functions.

External documentation is intended to be read by those never look at the actual source code of a program. External document gives the programmer a chance to explain more broadly than might be reasonable within the program comments.

In Syllabus Management System, the external documentation consists of a user manual which explains the user on how to use Syllabus Management System. It gives instruction on operating and during Syllabus Management System. The use of screen shot and images give the user a clearer picture of the functions on the Syllabus Management System and the ways to utilize the function embedded.

5.4.4 Program optimization

Program optimization is a process of improving the efficiency of the system. The speed at which information appears on the screen often gives the user an impression on how well the program will perform. There are 2 ways in optimizing the program.

i) Increase the execution speed of the program

To increase the speed of a program, the programmers should avoid using variant data requires additional internal program standards to identify the information being stored. Besides that, the programmers must minimize the amount of program initialization. The form will be forced to appear before the startup code is executed. This makes the user perceive that the program is running faster.

In addition, images that are used should be controlled and in smaller file format so that the loading time is shorter.

ii) Decrease the program size

The codes should be received in order to identify unused variants, constants and remove it from the program codes. Apart from that, assigning the string variables to zero-length string has to be done if it is no longer needed in the program.

5.5 SYSTEM DEVELOPMENT

The development of system involves setting up the database system, developing application and connecting the application to the database which will be explain more detail in the following section.

5.5.1 Web page layout development

Since the HTML is the standard web-based scripting language that marks up a web page with formatting command, therefore it is widely used in the Syllabus Management System web page layout and development. By using HTML, presentable web pages and images have been developed. In addition, HTML is also used in Syllabus Management System to generate forms that enable system to collect data. For instance, radio button, command button, textbox, checkbox and others from component are inserted into forms to perform specific tasks or functions. In Syllabus Management System, some of the form components are employed in the

registration page. By using ASP.Net that fully supports HTML features, presentable web pages have been developed.

5.5.1.1 Client side scripting

Beside using HTML, client side scripting such as Java script are embedded in the HTML codes for further enhances the functionality of web pages. Besides that, by using the validation controls, which is one of the features in ASP.Net manages to validate required field and it has the same functioning as Java script. In Syllabus Management System, most of the client side scripting is employed to perform interactive tasks at the client side such as checking form completeness and validate user's input information. Client Side Scripting has been imposed to validate user's login ID and password, whether applicant key in the right ID and password. Client side scripting is widely used in most of the forms in Syllabus Management System because it can improve the overall performance of the application to the web server for further processing. By using this scripting technology, it may free up server resources for other processing tasks and improve the overall web server performance.

5.5.1.2 Server Side Scripting

In Syllabus Management System, ASP.Net codes, as Server Side Scripting is embedded in the HTML scripts to enhance the web page functionality. ASP.Net will be default server side scripting for Syllabus Management System to execute logic on the server and produce consistent results regardless the browser used by client. This is very important as ASP.Net have the capability to pass parameter from one page to other web pages. Scripting delimiters <%.....%> have to be inserted for the server

side execution. Codes located within these delimiters are invisible to the client and are only executed in the server. Below are some of the basic ASP.Net objects employed in Syllabus Management System:

1. **Response Object**

   Response object is used specially to deal with server's response back to the user or browser. In Syllabus Management System, response object is widely used in all the modules whereby web server will send details requested by user back to their browser displaying purpose.

2. **Request Object**

   ASP.Net processes the form data passes by using Request Object. When a web browser or other client application sends a form requested to server in order to ask the server to process the form, all the input data passed through the form is stored or packaged in the form collection of the request object. An example of usage of the Request Object is to dynamically construct a response page to the request page.

3. **Session Object**

   The further enhance the functionality of the system, Syllabus Management System has made use of the session object to manipulate data that needs to be shared between different pages. In other words, session object is a special ASP.Net component that only acts upon individual user under a specific condition. In Syllabus Management System, each user that make his or her first request to the Syllabus Management System will be assigned a session object to track user's activities on the web site. Users will be first being

assigned session to be able to login the Syllabus management System before they can browse the content and use the services.

5.5.2 Database Development

The backend of the system is Microsoft SQL server 2000. The database is built according the system requirements as depicted in system design. All the tables in the system have been normalized unit BCNF. Microsoft SQL server is chosen because it can support the large amount of capacity as the system needed a lot of records especially for Question Bank.

The database for the system is created by using SQL Enterprise Manager. Besides creating the database, SQL Enterprise Manager is also used to means of relationship so as to enforce referential integrity. Referential integrity is vital in that it helps to constraint a relationship so as to ensure consistency between the linked one related tables.

In Syllabus management System, all the related database tables will be created by specifying all the fields for each table and the field's property using Microsoft SQL server 2000. After the creation of all the database tables, appropriate data or information will be inserted into some of these database tables to initialize the system. For example, user type will be inserted into the Authentication table. Furthermore, relationship between tables established after the table being created to enforce referential integrity. The referential integrity is an important constraint on a relationship that ensures consistency between related tables.

A. Database connection

The ADO.Net connection object is used to connect to a data source. It represents the actual connection between the data source and the data consumer. To open up a connection, the connection object has as Open() method which open up the connection specified in the connection string. The connection string contains the information we need to connect to the actual store of data; it is made up of these parts, although there are different among the different Providers and Drivers:

⇒ The first specified the kind of provider or driver that we want to use

⇒ The second specified which database to use

⇒ The last section usually contains security in for such as the user's name and password. These can come from the web page's visitor, or may simply be an ID representing the web server and therefore not specific for any one visitor.

The three most common strings are those for Access, SQL server and the managed SQL server direct connection. For Access, use the Jet Provider (Jet refers to the data engine with Access):

"Provider= Microsoft.Jet.OLEDB.4.0; data source=c:/MyPath/MyFile.MDB"

The standard OLEDB string for a database in a Microsoft SQL server (All on one line):

"Provider= sqloledb; server=local; database=SMS, UID=sa; PWD=sa"

the Managed Provider for Microsoft SQL server has a similar syntax (Note that there as no specification of a provider):

"server=local; database=SMS, UID=sa; PWD=sa"

The syntax of the connection string as slightly different from some of other strings that we have come across:

⇒ The arguments are separated by semicolons

⇒ Some argument names have a space in them (for example: initial catalog), which looks odd, but is correct.

⇒ Quotes are not used around each argument value; rather a pair of double quotes goes around the entire string.

5.6 SUMMARY

For this phase, coding has been the most critical step to do. Coding has converted the system requirements and design into a functioning system. The usage of suitable hardware and software tools can help to achieve the objects for system. To implement the system design into a full-integrated system, an effective system coding style and coding methodology has been used.

Chapter 6

SYSTEM TESTING

6.0 SYSTEM TESTING

6.1 OVERVIEW OF TESTING

The purpose of the test phase is to make sure that does what the users want and to guarantee all the internal bugs have been removed. The exhaustive and through process will determines whether this subsystem produces the desired results under known conditions.

Test issues that take in for considerations when test plan is organized are:

⇒ User GUI (Graphic User Interface) considerations

⇒ Target environment and platform diversity considerations

⇒ Non-robust target environment

⇒ Data transfer speed

The type of test that could be done is:

1. **Application function tests**

The functionality of user and this subsystem is tested. In essence, the application is test offline; the purpose is to attempt to uncover errors in its operation.

2. **Database tests**

The accuracy and integrity of data stored is tested. Transactions posted by user applications are examined to ensure that data are properly stored, updated and retrieved. Archiving is also tested.

3. **Transaction tests**

The performance and response time of a transaction is tested. The testing strategy adopted for this subsystem was divided into three main tests: unit testing, integration testing and system testing.

6.2 THE TESTING PROCESS

Except for small programs, systems should not be tested as a single, monolithic unit. Large systems are built out of sub system, which are built out of modules, which are composed of procedures and functions. The testing process should therefore proceed in stages where testing is carried out incrementally in conjunction with system implementation. The most widely used testing process consists of five stages.

6.2.1 Unit Testing

This is a small unit testing where testing are done on individual components of the system to ensure that they operate correctly. Each function is tested independently, without other system components. The levels, which are tested, are basically at the field level/ form level. In this system, Syllabus Management System is tested by form or document submission and input validation.

⇒ Form/document submission

The feedback message will show whether the document is submitted successfully. Another way to verify is by checking the database and see whether the data are already inserted in the database or not.

⇒ Input validation

Input validation is to test the inserted data whether they are valid and according to the form/ field and tested. If the input is incorrect, a message will appear to warn the user.

6.2.2 Module Testing

A module is a collection of dependent components such as an object class, an abstract data type or some looser collection of procedures and functions. The main object of doing module testing is to test interfacing and integration between the tested units that form the system.

The modules are tested with some dummy data. If an error occurs, the related error to that unit is checked and then modified. Then, these units are integrates until no error occurs on the integration module. Sometimes the error is due to the integration coding of the units. If this is the case, the integration code has to be checked in all related units. Another possibility of the error occurring in module integration is misspelling the name of the database files.

6.2.3 Integration testing

Integration testing is performing after all object, components and individual sub modules has passed local unit tests. It is the process if verifying that the system component work together as described in the system and program design specifications. System with integrated sub modules and modules must go through integration testing to ensure valid linking and dynamic relationship establishments between modules of whole system and between sub-modules contained in all individual modules is no different. It is a systematic technique for constructing the program structure while at the same time conducting test to uncover errors associated with interfacing.

In this system, bottom up testing approach (Figure 6.1) has been used to test the integration of all components and modules. Each component at the lowest level

of the system hierarchy was tested individually first. Then the next components to be tested were those that call the previously tested one.

For example, login module and note module has been tested to see if there are any error occurs after they were being integrated. These have to be integrated because only registered and login members are permitted to use the system facilities. Information passing between modules such as userID has to be ensured that the flow is successful.

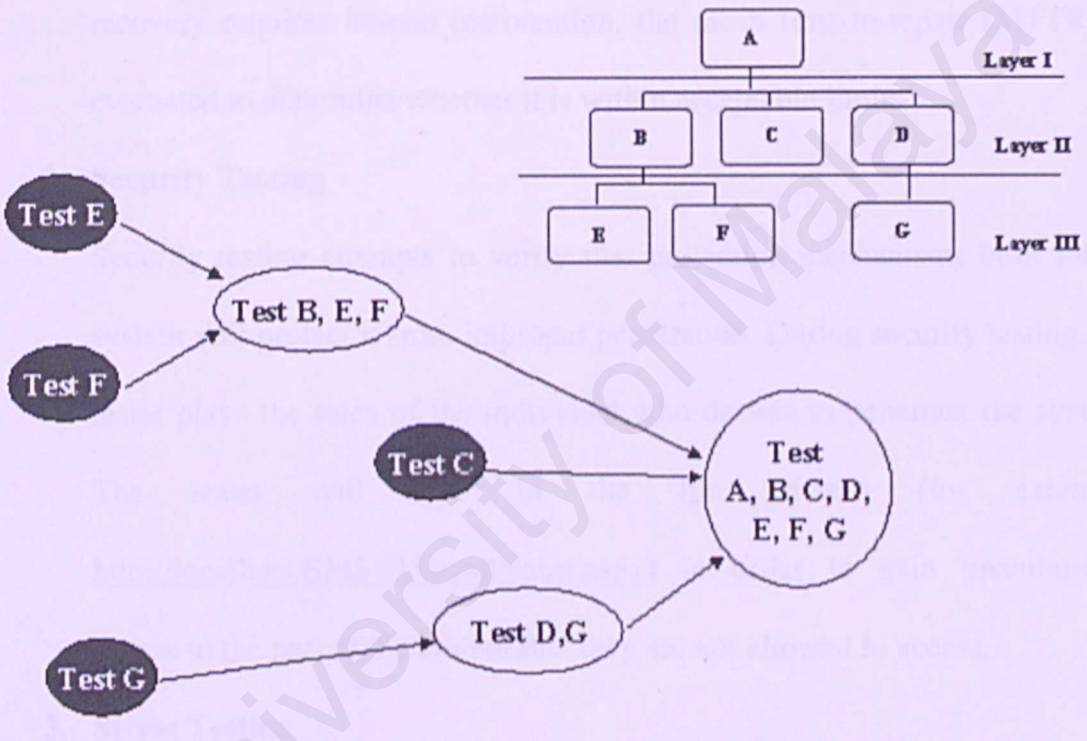

Figure 6.1: Bottom Up Approach

6.2.4 System Testing

The subsystem testing is integrated to make up the entire system. The testing process is concerned with finding errors, which result from anticipated interactions between subsystem and system components. It is also concerned with validation that

the system fulfills the functional and non-functional requirements. System testing can be categorized into a few types:

1. **Recovering Testing**

   Recovering testing is a system test that forces the software to fail in a variety of ways and verifies that recovery is properly performed. If recovery is automatic (performed by the system itself), reinitialization, check pointing mechanisms, data recovery and restart are evaluated for correctness. If recovery requires human intervention, the mean time-to-repair (MTTR) is evaluated to determine whether it is within acceptable limits.

2. **Security Testing**

   Security testing attempts to verify that protection mechanisms built into a system will protect it from improper penetration. During security testing, the tester plays the roles of the individual who desires to penetrate the system. The tester will type in the file address (for example, http://localhost/SMS2/UploadNotes.aspx) in order to gain unauthorized access to the part of the system that they are not allowed to access.

3. **Stress Testing**

   This is to determine the program fulfills the requirements defined for it. It is equally important to ensure that the program works, as it should even under extreme conditions. In order perform stress testing, execute the system in a manner that demand resources in abnormal, quantity, frequency or volume.

4. **Performance Testing**

   For real-time and embedded system software that provides required function but doe not conform to performance requirements is unacceptable. Performance testing is designed to test the run time performance of software

within the content of an integrated system. Performance testing occurs throughout all steps in the testing process.

6.2.5 Acceptance Testing

The purpose of acceptance testing is to determine whether this system is meeting the need expectations of the users or not. This testing is conducted by the users.

6.3 Test Data

Sample data is needed to prepare and keyed in for execution. Sample output is than compared with the actual results to find errors. There are three basic types of test data used:

1. **Normal Test Data**

   Normal test data will provide a simple test to determine whether the program is error-prone or error-free.

2. **Extreme Test Data**

   Extreme test data will test how well the system in handling huge amounts of data without affecting the overall system's accuracy and efficiency.

3. **Stress Test Data**

   Stress test data is performed where errors are keyed into the system intentionally. The purpose is to determine how the system will react and handle incorrect data.

6.3.1 Syllabus Management System Note module Testing

The following are the final test cases for note module.

Test Manual for Authentication and Verification

Table 6.1: Table for Testing Manual for Authentication

No	Test Manual	Expected result	Result of Testing	Changes
1	User register as new user by put in the full detail of user.	MainPage display so that users can login using the ID and password registered.	Main Page displayed	-
2	User click submit button without put any data.	An '*' shown the field that must filled in	'*' shown beside the field that user should filled in first	-
3	User register by using registration form and put in the different confirm password compare with password.	A prompted message shown that user confirms password is wrongly typed.	A prompted message shown.	-
4	User enters invalid username and password and click "Login" button.	Pop up message display.	Access is denied where pop up message is display	-
5	User enters valid username and password and click "Login" button.	Display MainPage.	Access is granted where Main Page is display.	-
6	Session object tracking	System can get user's detail whenever it needs by using session	Testing successful.	-

		object assigned to each user.		
7	Logout	Users logs out from Syllabus Management System. Session will be removed.	User logs out successful and session removed.	-

Test Manual for Upload Note

Table 6.2: Table for Testing Manual for Upload Note

No	Test Manual	Expected result	Result of Testing	Changes
1	Lecturer put in the right information with title, date publish, last date and file that browse from the directory and click upload button.	A message shows that the file is uploading successfully.	As the excepted result.	-
2	Lecturer click upload button without key in any data.	A message shown that should put in the file before want to proceed.	As the excepted result.	-
3	Update note	The old note detail will be updated once the lecturer has modified it.	Note detail had updated.	-
4	Lecturer click delete link to delete note.	A pop up message show to confirm whether lecturer want to	As the excepted result.	-

		delete the selected note or not.		
5	Hyperlink testing	User can view other web pages by clicking on hyperlinks.	User can view other web pages by clicking on hyperlinks.	-
6	Dropdown list testing	When a user selects from quiz level, the dropdown list for category will change based on the selected level.	The dropdown list for category change based on the selected level.	-

Test Manual for Create Tutorial and Tutorial Group

Table 6.3: Table for Testing Manual for Tutorial

No	Test Manual	Expected result	Result of Testing	Changes
1	Lecturer adds questions, answer and point for tutorial question- and click add button.	A prompted message shown that question have been and saved.	A message shown that the question has been saved.	-
2	Lecturer adds tutorial class detail and clicks the Add button.	A datagrid shown with the detail of class that added.	A datagrid shown with the detail of class that added.	-
3	Lecturer fill in the tutorial title, dateline and last date for submission and point then click Add	A data grid shown with the detail of class that added.	A data grid shown with the detail of class that added.	-

	button.			

Test Manual for Quiz

Table 6.4: Table for Testing Manual for Quiz

No	Test Manual	Expected result	Result of Testing	Changes
1	Lecturer add question and answer for True False Question.	A prompted message shown that question have been and saved.	An error message shown that the data is truncated.	Change the data length at the true false question table to longer that can save more words.
1	Lecturer add question and answer for Multiple Choice Question.	A prompted message shown that question have been and saved.	A message shown that the question has been saved.	-
2	Lecturer adds tutorial class detail and clicks the Add button.	A datagrid shown with the detail of class that added.	A datagrid shown with the detail of class that added.	-
3	Lecturer fill in the quiz title, start time and end time and select question type then click Add button.	A question bank which the question type selected is shown.	A error message show that the date type with 28/2/04 is wrong.	Change the 28/2/04 to 2/28/04.

Test Manual for Download and Tutorial Module for Student

Table 6.5: Table for Testing Manual for Download Note

No	Test Manual	Expected result	Result of Testing	Changes
1	Student clicks the link for the note.	A pop up window that let student to open, save or cancel shown.	A blank window shown.	Delete the code behind <%@ Language = vb AutoEvent Wireup="false" Codebehind ="DownloadNote.aspx.vb" Inherits="SMS2.DownloadNote" %>
2	Student selects a tutorial class that hasn't full and click Select button.	A detail of the tutorial class and a button for student to confirm.	A detail of the tutorial class and a button for student to confirm shown.	-
3	Student selects a tutorial class that already full and click Select button.	A pop up message shown that the particular class is full.	A confirm tutorial class page shown, student still can add the tutorial class.	Change the if statement **if stuNo >= No** to **if stuNo > No.**

6.4 SUMMARY

There are plenty of methods and techniques that could be used to test a developed system. Testing a system is not merely for fault searching but also includes the investigation for system reliability, availability and maintainability. In the testing phase of Syllabus Management System, multiple ways are used to ensure that the system performs well during and after delivery. However, an error-free or fault-free system is rare. Not all fault and error are able to be discovered in a short period of testing. For a stable and trustworthy system, a continuous testing and maintenance are required. Due to the limitation of time, the testing of Syllabus Management System are carried out to ensure that most of the fault and errors are absent during implementation.

Chapter 7

SYSTEM EVALUATION

7.0 SYSTEM EVALUATION

7.1 INTRODUCTION

System evaluation was evaluation by end users that collect feedback and comment from the user after they test on my system. Evaluation can be positive and negative.

Through this evaluation, I can know that how is my system meet their need, which part is most attractive part and which part need to be improved. I have found end users to test on my system and answer my questionnaire. (Appendix)

7.2 EVALUATION MANUAL

The targeted end-users for this system are the users of Faculty of Science Computer and Information Technology. There 10 users testing the system and below are the table show their responses for the questionnaire.

Table 7.1: Evaluation Result

Evaluation Type		**Result of Evaluation**	**Analysis of Evaluation**
INTERFACE			
1	Reading characters on the screen	There are 60% of users said that is easy to read the characters on the screen, 20% said very easy and 20% said moderate.	Most of the people feel that the characters used by the system are suitable and simple and easy to read.
2	Highlighting simplifies task	There are 70% of users said that is much highlighting simplifies	Most of the people feel that the system has highlighting

		task, 20% said very much and 10% said moderate.	simplifies task.
3	Organization of information	There are 50% of the users feel moderate about the organization information in SMS, 40% of users said clear and 10% feel that is very clear.	Organization of the information should be improved because half of the users just feel moderate about the organization.
4	Sequence of screens	There are 60% users clear about the sequence, 20% of them very clear and others not so clear.	The sequence of the screens is satisfied.
5	Design of the interface	There are 60% users like the interface of SMS, 30% of them like it very much and others result is moderate.	Most of the users found that the system interface is attractive.
SYSTEM CAPABILITIES(PERFORMANCE)			
6	System speed	Half of the total number of users feel that the system response is fast enough, 40% of them feel that is fast and others is moderate.	As a result, most of the users feel that this SMS is fast response to the users whatever users want.
7	System reliability	70% of the users said that SMS is reliable and others said very reliable.	SMS is a reliable and secure system and very suitable for different users.
8	Correcting your mistakes	60% of users feel that SMS is correcting the	The SMS are enabling to correct

		users mistake very easily, and others is feel easy.	users' mistake quick and accuracy.
9	Designed for all levels of users in the faculty.	70% of the users said that SMS is always designed for all levels of users in the faculty and others said ok.	SMS is suitable to use by all types of users in the faculty.
HELP			
10	Is it clear where on the screen to find the help system?	80% of the users are very satisfied about easy finding SMS help system, others 20% are satisfied.	There are help button at very page of the system, so users are very convenience to find help whenever they need help by just click on the help button.
11	Is it clear how to begin to use the help system? (Is it obvious how to invoke the help?)	70% of the users are very satisfied about easy to begin to use the help system, 10% are satisfied and others are moderate.	Most of the users are satisfied with the help system on how to begin to use.
12	Is it clear how to exit help system at any time?	90% of the total users are satisfied about clear on how to exit help system at any time and others are satisfied.	System will pop up a new window for help page, whenever they want to exit the help page just click close window. So is easier for users to exit help system.
13	Does the information in the help system point you to the next task in a workflow?	70% of the total users are satisfied, 20% are very satisfied and the rest are moderate.	Most of the users are satisfied with the information in the help system.

14	Context/Purpose: Does the information in the help system answer why a given task is necessary?	There are 60% of total users are not so satisfied, 20% are satisfied and others are very satisfied.	The help system in SMS just given the steps on how to do a task but not on why the task is necessary.
NAVIGATION			
15	The links to other pages are clearly marked	There are 60% of total users are very agreed, 30% are agreed and others are moderate.	Most of the users are satisfied and agreed that the link pages are clearly marked. There are menu bar and side bar for the system, users are easily seen and users the link.
16	I can logout of (leave) the website quickly.	80% of the total users are agreed that they can logout the website quickly.	Users just need to click logout button at the side menu bar to logout. Is easy to logout for any users.
17	There are enough links to jump to relevant area in the website without going through too many links.	80% of the users are graded moderate and the others are agreed with this statement.	Most of the users said that they need to go through a few link to go in the relevant area, like quiz, if they want to edit questions, they have to choose view question and select types then can go in.
18	The links go to where I expect them to go.	All the users are agreed that the links are going to the pages that expected	The links in the system are perfectly linked.

		them to go.	

7.3 SUMMARY

End users responses are important because the end users are the people who interact with the system. The end user can provide comment and suggestions that are useful to enhance and improve the services.

From the response return by end users, improvement and modifications are made to the system.

Chapter 8

DISCUSSION AND CONCLUSION

8.0 DISCUSSION AND CONCLUSION

This chapter highlights the problem encountered throughout the development of the system and the solutions to the various problems, system strengths and weakness and some possible future enhancement that evaluate by the end users.

8.1 PROBLEMS ENCOUNTERED AND RECOMMENDED SOLUTIONS

There have been many problems that encountered throughout the development of the proposed system. The following section below highlights the problem faced and the solutions taken:

a) Difficulty in Determining Development Software Tools

Although there are plenty of development tools are available in the market, each of the tools has it own strength and limitations. To master each or most of the available tools is impossible, so it is vital to decide on a few tools that would be adequate to develop the propose system. To determine the optimum development tools for the system, several factors have to be considered carefully. One of the factors is to be determined the feasibility of the tools. Some development tools might be full of powerful features, but the cost of them might be far too expensive and thus out weight the possibility of choosing them as the development tools. Then there are some tools that are indeed suitable to develop the system, but the complexity of suing the tools makes it unadvisable to choose them.

Solution:

To seek advice from seniors and course mates, as well as surfing the Internet to obtain relevant information that helped to determine the strengths and limitations of tools and ultimately decide on the most suitable development tools.

b) Retrieving And Inserting Data Into Database

At the initial stage of system development, it was important to build the database to retrieve and store data. However, due to lack of knowledge and the complexity of SQL statement required, it was difficult to retrieve and insert the correct data to the tables.

Solution:

The problem was solved by discussing with team members and course mates as well as finding online tutorials related to SQL statements and database.

c) Programming problems

Lack of programming skills caused a lot of problems during the system coding phase. The skills had to be learnt from scratch as the programming and scripting languages were not learnt beforehand. This progress at the initial stage was rather slow and unproductive as a lot of trails and errors had to be done to grasp and understand the languages better.

Solution:

To overcome this problem, I took a lot of reading, internet surfing and advise from more experienced friends

d) Understanding Error Message

Error messages shown are often vague and confusing. More often than not, when an error is told on a particular line, it has in fact occurred on another line. Thus a lot of time is wasted conducting trial and errors trying to rectify the error. It is especially frustrating when the error message keep appearing but on different lines. Also, while trying to correct one error, more errors are generated in the process.

Solution:

Thus, the solution to this problem is to be more careful when writing and editing coding and also to keep back-ups of the ASP.Net pages before attempting to put or delete a line of code.

e) Designing an Attractive Layout

Throughout the system development, color matching, image editing, alignment and other relevant features had to be undertaken in order to achieve an attractive and standard interface. Designing the forms in such a way that it is user friendly was also especially difficult.

Solution:

Several attempts were done before finally coming out with a satisfactory design, based on opinions and suggestions of my team members and course mates.

f) Integration

When doing integration within four main modules, there are some problems encountered. That is mismatch of the interface and un-standardize wording.

Solution:

Doing testing often and have discussion among team members.

g) Time Constraint

The lack of time to learn and develop the Syllabus Management System concurrently was one of the largest problems faced. Due to this constraint the development time has been tight and hardly enough for any extra or advanced features to be included in the Syllabus Management System.

Solution:

To solve this problem, some references and function codes from the Internet were explored and used to decrease the time needed for development.

8.2 SYSTEM STRENGTHS

The Syllabus Management System is built with several strengths. These strengths are:

a) Easy to Use Graphical User Interface

The interface is easy to use. Simple navigation bars and command buttons are provided to facilitate users. Dropdown list and checkbox are also used to minimize the users' actions while performing certain tasks, especially

filling in forms and selecting questions. Navigation around the system is direct and not misleading and thus it is easy to navigate from page to page.

b) Authorization and Authentication

Only registered users with correct login userID and password are given access to certain modules of the system. Users will be redirected to the main page if they attempt to enter the system without first logging in. They are given a second chance to login userID and password if they are mistyping their userID and password. There are also different levels of users, the administrators, lecturers, tutors and students. Thus each user logs in at a different site. This is important to ensure that there is indeed security in the system.

c) Easy Management and Maintenance

The purpose system let the users to manage and maintain the system easily through user friendly graphical interface. User can add, delete and update or query the data in the database by just clicking on the appropriate icons or link. This has eliminated any need to write and run any SQL statement in order to add, change or query the data in the database. Users need not to know where the database resides, the system structure, the database management system or anything related to the system built.

d) Informative Message and Pages

Appropriate error messages will be prompted to the user when the users have performed illegal actions, such as entering invalid userID and

password or leaving a form blank. This system will also provide confirmation message box before the users have completed tasks such as successfully added the question into the database. The users will also be prompted with adequate warning when performing vital tasks, such as deleting files in order to avoid accidental deletion of their files.

e) Relatively Fast Response

Each web page is designed to be light weight. These pages are loaded in reasonable amount of time to ensure that the users need not to wait too long to view the pages.

f) Online Quiz

The lecturers can set the questions for particular quiz in the system and only the students that take that particular course are allowed to join the quiz. There are three types of question that can be set: objective questions, true false questions and fill in the blank questions. Automated marking and generating result will be done by the system and students can view their result after they confirm to submit their answer to the system. Furthermore, the system will auto submit the student answer when the time is over and the students' mark will be shown.

g) Detail User Manual

A detailed and complete user manual and navigation guides for Syllabus Management System has been created in order to guide the users, namely the website users and administrators. This will help them navigate

and browse through Syllabus Management System as well as web site and understand each functions and procedures available in Syllabus Management System.

8.3 SYSTEM LIMITATION

The proposed system is not a really perfect. There are still a number of constraints that are listed and explained in the following sections.

a) No Searching Function

Currently, the system does not have searching records function. So lecturer cannot search for the questions he wants for the faster way.

b) Limitation of Targeted Users

The system targeted only Faculty of Science Computer and Information Technology staff and students. It is not for the whole University users.

c) Unilateral Lingual Support

Syllabus Management System was developed in English, which means that the instruction, messages, commands and content of web page are all presented in English. Thus, this will be a limitation or problem to those who are not familiar or hardly to understand in English.

d) Fixed Table Field in Database

The table field in the database are all fixed length, which means that the storage allocated for each field are fixed although the field might not be fully filled. On the other hand, if the length of data is longer than the field length assigned, the remaining data will be truncated. Therefore, as more records are added into the database, storage waste will become more significant.

e) No Chat Rooms

This system provide forum but dun have chat rooms for effective communicating for lecturer and student.

f) No Mix Question Type Quiz

The system provides that the quiz can created according to three types of question which is True False Question, Multiple Choice Question and Fill in the Blank Question. The quiz question is created separately by the question type, the system cannot mix all three types of question in one quiz paper.

8.4 FUTURE ENHANCEMENT

It is undeniable that the proposed system has the potential to be further enhanced as well as to reduce its constraints as mentioned in above section. The following section discussed about some possible enhancement to be incorporated into the system.

a) Searching Function

This enhancement will help users to find the records they need in a better and faster way.

b) Chat Rooms

This enhancement will enable user to chat to another and can let lecturer and student interact more efficiency.

c) Linkage to other database system

By integrating this system with other database system, it will avoid to do unnecessary work such as registering users and courses.

d) Use More Advance Date Format

The system uses the month/day/year hour:minute:second AM/PM that the format is very inefficiency and not user friendly. Change the format that can let lecturer insert date and time separately and the date format should be day/month/year.

e) Add More Advanced Functions

Advanced features such as automated essay grading system, multiple type question in one quiz, online video and audio streaming, video conferencing and multi lingual support can be added to the system in order to be used world wide and support more users such as distance learning or e-learning.

8.5 CONCLUSION

This system has successfully achieved its objective in meeting the requirements specified during the initial stage. A lot of effort and time was consumed to make this project successfully. After considering the minimum requirements and time constraints, only the most important function and feature that were needed in Syllabus Management System was proposed. The eventual of the product is a working prototype, which is simple yet workable. Although there were several limitations, with further enhancements, this system will be more reliable and able to incorporate more features.

Much experience has been gained, new knowledge acquired and there have been opportunities to practice some project management and communication skills. In addition, the development of proposed system has enable me to learn how to design, plan and schedule the tasks that need to be implement according to one's capability. The full system development life cycle is much clearer now. Writing and communication skills also have changed for better

Throughout the whole project, all the knowledge attained over the three years has been put to full use. Seven months intense hard work, in turn, presented me with a great opportunity to learn more new things from this project.

Overall, developing this project has directly helped me in developing skills useful in the advancement of my career in Information Technology. Last but not least, I have discovered that these is still a room for me to improve my skill in analysis and soon. Therefore, in the near future, I hope I can sharpen these skills.

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APPENDIX

Syllabus Management System

Interview Lecturer Questions

Below are the questions used for interviewing the lecturers:

1. What is your opinion on the existing syllabus management system?
2. How to improve the syllabus management existing system?
3. How you mark your student tutorial, assignment and exam?
4. What is the process of marking?
5. What is the process of giving out notes?
6. What did you find about online quiz or test?
7. What is the main source of current assignment submission method?
8. What is the most common method for assignment submission?
9. Are you facing any problem by using the current assignment submission method?
10. What is your opinion of FCSIT syllabus management system?
11. What is your opinion of "Kursus" Online?
12. What are your expectations to syllabus management system?
13. What feature did you wish to add in to syllabus management system?
14. What do you think about plagiarism activities in our faculty?

Syllabus Management System

Interview Student Questions

Below are the questions used for interviewing the students:

1. What are the assignment submission methods you used most?

2. Are you facing any problems by using the current assignment submission method?

3. What are the problems for getting notes from lecturer?

4. What are your expectations to the new proposed Syllabus Management System?

Syllabus Management System Evaluation Questionnaires

INTERFACE		1	2	3	4	5	
1. Reading characters on the screen	hard	○	○	○	○	○	easy
2. Highlighting simplifies task	not at all	○	○	○	○	○	very much
3. Organization of information	confusing	○	○	○	○	○	very clear
4. Sequence of screens	confusing	○	○	○	○	○	very clear
5. Design of the interface	dull	○	○	○	○	○	attractive
SYSTEM CAPABILITIES(PERFORMANCE)		**1**	**2**	**3**	**4**	**5**	
6. System speed	too slow	○	○	○	○	○	fast enough
7. System reliability	unreliable	○	○	○	○	○	reliable
8. Correcting your mistakes	difficult	○	○	○	○	○	easy
9. Designed for all levels of users in the faculty.	never	○	○	○	○	○	always
HELP		**1**	**2**	**3**	**4**	**5**	
10. Is it clear where on the screen to find the help system?	Very Unsatisfied	○	○	○	○	○	Very Satisfied
11. Is it clear how to begin to use the help system? (Is it obvious how to invoke the help?)	Very Unsatisfied	○	○	○	○	○	Very Satisfied
12.) Is it clear how to exit help system at any time?	Very Unsatisfied	○	○	○	○	○	Very Satisfied
13. Does the information in the help system point you to the next task in a workflow?	Very Unsatisfied	○	○	○	○	○	Very Satisfied
14. Context/Purpose: Does the information in the help system answer why a given task is necessary?	Very Unsatisfied	○	○	○	○	○	Very Satisfied
NAVIGATION		**1**	**2**	**3**	**4**	**5**	
15. The links to other pages are clearly marked	disagree	○	○	○	○	○	agree

SAMPLE CODE

```
        sqlconnection.Open()
        str = "Select * From Authentication Where userID = '" &
username & "' AND userPassword = '" & password & "'"
        sqlcommand = New SqlCommand(str, sqlconnection)
        sqlReader = sqlcommand.ExecuteReader
        'if the login id and password matched, login success
        If sqlReader.Read() Then
            login = "success"
            sqlReader.Close()

        Else
            'if the login id and password matched, login fail
            login = "wrongPassword"
            sqlReader.Close()
        End If

    End Function
```

```
            str = "SELECT quizID FROM  Quiz  WHERE title= '" & title &
"' and quizType= '" & TBType.Text & "' and courseID= '" &
Session("courseID") & "'"
            sqlcommand = New SqlCommand(str, sqlconnection)
            DBReader = sqlcommand.ExecuteReader
            If DBReader.Read() Then
                quizid = DBReader("quizID")
                Session("quiz") = quizid
                DBReader.Close()


                Dim DSPageData As New DataSet

                sqlDataAdapter = New SqlDataAdapter("SELECT  stuID
FROM  Registration1 WHERE   (courseID = '" & Session("courseID") &
"')", sqlconnection)
                sqlDataAdapter.Fill(DSPageData, "StudentList")

                Dim i As Integer
                Dim stuID As String

                For i = 0 To
DSPageData.Tables("StudentList").Rows.Count - 1
                    stuID =
DSPageData.Tables("StudentList").Rows(i).Item("stuID")


                    'insert----------------------------------------
-
                    str = "INSERT QuizRe(stuID, courseID, score,
quizID, status) VALUES('" & stuID & "', '" & Session("courseID") & "'
,0, '" & Session("quiz") & "', 'N')"

                    sqlcommand = New SqlCommand(str, sqlconnection)

                    sqlcommand.ExecuteNonQuery()
                    Next

            End If
            sqlconnection.Close()
            Response.Redirect("McqQuesBank.aspx", True)

        End If


        ' Select True False Question --------------------------------
-
        If DropDownList2.Items(1).Selected Then
            TBType.Text = 1
            str = "SELECT tfQuesID FROM TrueFalseQuestions WHERE
courseID = '" & Session("courseID") & "'"
            sqlcommand = New SqlCommand(str, sqlconnection)
            DBReader = sqlcommand.ExecuteReader
            If Not DBReader.Read() Then
                Response.Redirect("AddQuizError1.aspx")
            End If
            DBReader.Close()
```

```
            str = "SELECT fibQuesID FROM FIBquestions WHERE  courseID
= '" & Session("courseID") & "'"
            sqlcommand = New SqlCommand(str, sqlconnection)
            DBReader = sqlcommand.ExecuteReader
            If Not DBReader.Read() Then
                Response.Redirect("AddQuizError3.aspx")
            End If
            DBReader.Close()

            str = "Insert into Quiz values ('" & title & "', '0',
'3', '" & Session("userID") & " ','" & Session("courseID") & " ', '" &
start & "', '" & endt & "')"
            sqlcommand = New SqlCommand(str, sqlconnection)
            sqlReader = sqlcommand.ExecuteReader()
            sqlReader.Close()


            str = "SELECT  quizID, title, quizType, courseID FROM
Quiz WHERE title= '" & title & "' and quizType= '" & TBType.Text & "'
and courseID= '" & Session("courseID") & "'"
            sqlcommand = New SqlCommand(str, sqlconnection)
            DBReader = sqlcommand.ExecuteReader
            If DBReader.Read() Then
                quizid = DBReader("quizID")
                Session("quiz") = quizid
                DBReader.Close()

                Dim DSPageData As New DataSet

                sqlDataAdapter = New SqlDataAdapter("SELECT   stuID
FROM  Registration1 WHERE   (courseID = '" & Session("courseID") &
"')", sqlconnection)
                sqlDataAdapter.Fill(DSPageData, "StudentList")

                Dim i As Integer
                Dim stuID As String

                For i = 0 To
DSPageData.Tables("StudentList").Rows.Count - 1
                    stuID =
DSPageData.Tables("StudentList").Rows(i).Item("stuID")


                    'insert----------------------------------------
-
                    str = "INSERT QuizRe(stuID, courseID, score,
quizID, status) VALUES('" & stuID & "', '" & Session("courseID") & "'
,0, '" & Session("quiz") & "', 'N')"

                    sqlcommand = New SqlCommand(str, sqlconnection)

                    sqlcommand.ExecuteNonQuery()
                    '-----------------------------------------------
-

                Next
            End If
```

```
            sqlconnection.Close()
            Response.Redirect("FIBquesBank.aspx", True)

        End If

    End Sub
```

Select Question form Question Bank Code:

```
Imports System.Data.SqlClient
Imports System.Text
Public Class McqQuesBank
    Inherits System.Web.UI.Page
    Protected WithEvents Form1 As System.Web.UI.HtmlControls.HtmlForm
    Protected WithEvents Label1 As System.Web.UI.WebControls.Label
    Dim sqlconnection As SqlConnection
    Dim sqlcommand As SqlCommand
    Dim sqlReader As SqlDataReader
    Protected WithEvents Label2 As System.Web.UI.WebControls.Label
  Protected WithEvents P1 As
System.Web.UI.HtmlControls.HtmlGenericControl
Protected WithEvents ImageButton1 As
System.Web.UI.WebControls.ImageButton
Protected WithEvents ImageButton2 As
System.Web.UI.WebControls.ImageButton
Protected WithEvents ImageButton3 As
System.Web.UI.WebControls.ImageButton
Protected WithEvents ImageButton4 As
System.Web.UI.WebControls.ImageButton
Protected WithEvents ImageButton5 As
System.Web.UI.WebControls.ImageButton
Protected WithEvents MyDataGrid As System.Web.UI.WebControls.DataGrid
    Dim str As String

   Dim strcn As String

Private Sub Page_Load(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles MyBase.Load
        If Not Page.IsPostBack Then
            BindData()
        End If
   End Sub


    Private Sub ImageButton1_Click(ByVal sender As System.Object,
ByVal e As System.Web.UI.ImageClickEventArgs) Handles
ImageButton1.Click
        Dim rowCount As Integer = 0
        Dim i As Integer = 0
        Dim mcqQuesID As Integer
        Dim gridSelections As StringBuilder = New StringBuilder()
```

```
        gridSelections.AppendFormat("Total number questions selected :
{0}<br>", rowCount.ToString())
        Label2.Text = gridSelections.ToString()
    End Sub


    'Check all the check box----------------------------------------
-
 Private Sub ImageButton2_Click(ByVal sender As System.Object, ByVal e
As System.Web.UI.ImageClickEventArgs) Handles ImageButton2.Click
        Dim GridItem As DataGridItem
        For Each GridItem In MyDataGrid.Items
            Dim myCheckbox As CheckBox =
CType(GridItem.Cells(0).Controls(1), CheckBox)
            myCheckbox.Checked = True
        Next
    End Sub


    'Un Check all the check box--------------------------------------
-
Private Sub ImageButton3_Click(ByVal sender As System.Object, ByVal e
As System.Web.UI.ImageClickEventArgs) Handles ImageButton3.Click
        Dim GridItem As DataGridItem
        For Each GridItem In MyDataGrid.Items
            Dim myCheckbox As CheckBox =
CType(GridItem.Cells(0).Controls(1), CheckBox)
            myCheckbox.Checked = False
        Next
    End Sub

    Private Sub ImageButton4_Click(ByVal sender As System.Object,
ByVal e As System.Web.UI.ImageClickEventArgs) Handles
ImageButton4.Click
        Response.Redirect("ViewMcqQuiz.aspx")
    End Sub

    Private Sub ImageButton5_Click(ByVal sender As System.Object,
ByVal e As System.Web.UI.ImageClickEventArgs) Handles
ImageButton5.Click
        Response.Redirect("AddQuiz.aspx")
    End Sub

    Sub BindData()
        strcn = ConfigurationSettings.AppSettings("MyConnection")
        sqlconnection = New SqlConnection(strcn)

        sqlconnection.Open()
        str = "Select * From MCQquestions  where courseID = '" &
Session("courseID") & "'"
        sqlcommand = New SqlCommand(str, sqlconnection)
        sqlReader = sqlcommand.ExecuteReader()

        MyDataGrid.DataSource = sqlReader
        MyDataGrid.DataBind()
        sqlReader.Close()
```

```
        sqlconnection.Close()
    End Sub

End Class
```

Code Sample for Student Register Tutorial Group

```
Private Sub Button1_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles Button1.Click

        Dim tutGroupID As Integer
        Dim gridSelections As StringBuilder = New StringBuilder()
        Dim i As Integer = 0

        'Loop through each DataGridItem, and determine which CheckBox
controls have been selected.
        Dim GridItem As DataGridItem
        For Each GridItem In DataGrid1.Items
            Dim ck As CheckBox = CType(GridItem.Cells(0).Controls(1),
CheckBox)
            If ck.Checked = True Then
          ' Determine the key of the selected record ------------
                tutGroupID = CType(DataGrid1.DataKeys(i), Integer)
            End If

            i += 1
        Next

        strcn = ConfigurationSettings.AppSettings("MyConnection")
        sqlconnection = New SqlConnection(strcn)
        sqlconnection.Open()
        str = "SELECT  StuTutGroup.stuID, StuTutGroup.tutGroupID ,
TutorialGroup.courseID FROM  StuTutGroup INNER JOIN TutorialGroup ON
StuTutGroup.tutGroupID = TutorialGroup.tutGroupID Where
StuTutGroup.stuID = '" & Session("userID") & "' AND
TutorialGroup.courseID = '" & Session("courseID") & "'"
        sqlcommand = New SqlCommand(str, sqlconnection)
        sqlReader = sqlcommand.ExecuteReader

      'Check whether student is register already or not ------------
        If sqlReader.Read() Then
            ShowMsg("You are already registered !!")
            sqlReader.Close()
        Else

 ' Compare the number limited by lecturer for each tutorial group
            'and the number of student the already registered
            sqlReader.Close()
            Dim stuNo As Integer
            str = "SELECT count( stuID) FROM StuTutGroup WHERE
tutGroupID ='" & tutGroupID & "' "
            sqlcommand = New SqlCommand(str, sqlconnection)
            stuNo = sqlcommand.ExecuteScalar
```

```
            Dim No As Integer
            str = "SELECT noOfStudent FROM TutorialGroup WHERE
tutGroupID ='" & tutGroupID & "' and courseID =  '" &
Session("courseID") & "'"
            sqlcommand = New SqlCommand(str, sqlconnection)
            No = sqlcommand.ExecuteScalar

            If stuNo >= No Then
                ShowMsg("Sorry, this tutorial slot is full, please
choose another tutorial group!!")
            End If
            If stuNo < No Or stuNo = 0 Then
                Session("tutGroupID") = tutGroupID
                Response.Redirect("TutSlot.aspx")
            End If

            sqlconnection.Close()
        End If

    End Sub
```