E-ABACUS ANIMATOR

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Abstract

E-Abacus Animator is a web-based teaching-learning tool that is aimed at providing users with all possibilities to learn and teach mental arithmetic with an abacus like the E-Learning system. An abacus is a calculating instrument with a number of beads sliding back and forth along rods, for doing and teaching arithmetic. Mental arithmetic is the way to do math in our head without any pencil and paper. It can be make our get clearer picture for the arithmetic problem. E-Abacus Animator will be provides skills, examples, tutorials and tests for each arithmetic operation to make sure the user get the clear understanding for the arithmetic problem by using the Abacus. E-Abacus Animator is divided into two parts: user homepage and administrator homepage. The user homepage provides all possibilities for learning and teaching mental arithmetic with an abacus, and provides strategies, examples, tutorials for each arithmetic operation. It provides the following functions:

· Lessons learning: consists of 5 sections comprising of a simulated abacus for calculation and 4 lessons for reading an abacus, addition, subtraction, multiplication, division and combined operation.

The administrator homepage allows the administrator to maintain all steps of the examples, tutorials and test questions at the back-end database system. It provides the following functions:

· Administrator authorization: to check the authorizations to access the administrator homepage.

· Question module: consists of 4 sections comprising of search, add and delete,

for maintaining the questions and answers and steps in the database.

This report provides an overview for the E-Abacus Animator after make some enhancements. The enhancements provide a homepage and the database.

The main objective of this system is introduce a database system to assist the system. After the enhancement, it divides into two categories. (the administrator part and a user part)

E-Abacus Animator system is implemented by using the development tool which is Microsoft Visual Studio .NET 2003 in this case.

Acknowledgement

I would like to express my heartfelt gratitude to the following person who helped me a lot on my development system.

First of all, I would like to thank my supervisor, Assoc. Prof. Dr. Lee Sai Peck who gave the chance to me to do this system.

Besides that, I also appreciate the helps given by all my course mates and friends, Lim Kah Hwee, Koh Koon Meng, Kee Chia Chun, Chan Foo Sun and another, thanks for rendering your friendship and at the same time for being supporting and encouraging all these years.

Last but not least, to all my family members, who had been very loving and encouraging all these years.

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Chapter 1: Introduction

1.1 Overview

1.1.1 Project Definition

The E-Abacus Animator is a web-based teaching-learning tool that is aimed at providing users with all possibilities to learn and teach mental arithmetic with an abacus by the skill like E-Learning. The term of the "E-Abacus Animator" used to describe practical Abacus knowledge where the more 'practical' means it can be applied to used and practice. An abacus is a calculating instrument with a number of beads sliding back and forth along rods, for doing and teaching arithmetic. This include knowledge such addition, subtraction, multiplication, division while the actual mechanics will also be explained in briefly. It is supported by a back-end database that can stores and keeps track of the steps of each arithmetic operation and the user information, which enables to provide the features required for an instructional teaching-learning technique and for system administration.

1.2 Definition of E-Learning

E-Abacus is a system like an E-Learning which can be helping the user to learn the Abacus by using the multimedia. At this system, the E-learning will be the guideline for build up the system. What is the E-Learning? Below that are the mean and the advantage of using E-Learning to learn the Abacus.

Network-enabled transfer of skills and knowledge. E-learning refers to using electronic applications and processes to learn. E-learning applications and processes include Web-based learning, computer-based learning, virtual

classrooms, and digital collaboration. Content is delivered via the Internet, intranet/extranet, audio or video tape, satellite TV, and CD-ROM. The advantages of E-learning are seen in the just in time - available for the users when they need it to complete the task, on-demand - available when they need it, not in a couple of days time, or a week or a month; bite-sized - available in small chunks that take only a short time to complete, i.e. 15-20 minutes, course can be tailored to specify the need and asynchronous learning is possible. E-learning can be used for the distance learning by the internet and also can be the flexible learning for the user and also can be considered to be a form of flexible learning. Often, but not always, e-learning will also attempt to be a student-centered learning solution. Some view e-learning as a means to effective or efficient learning, due to its ease of access and the pace being determined by the learner, but to date little research has reinforced this.

The term of the e-learning is not very precise, and it should be pointed out that learning is only an element for the education. So, the term online education should cover a much broader range of services than the term e-learning. One may also claim that e-learning companies often focus on course content, while online education institutions cover the whole range of educational services.

Not every e-learning resource, usage or provision is necessarily 'exclusively e-learning', sometimes a hybrid 'blended-learning' solution is available, either combining distance learning with direct contact 'close at hand' human educational resources, or combining software driven resources with human intervention (whether remote or local, computer mediated (such as through

email or 'chat) or non-computer mediated (such as face to face of telephone) or combining software driven resources with any other educational resource (TV, radio, books, tapes, etc.)

On the practical side some e-learning is about organizing the topics to be taught and creating multimedia CD ROMs or web sites. An important advantage is generally seen in the fact that hyperlinking is possible and having interactive parts illustrating difficult things or for doing exercises. In higher education especially, the increasing tendency is to create a Managed Learning Environment (MLE; also called a Virtual Learning Environment, VLE) in which all aspects of a course are handled through a consistent interface, using specialized software that is standard through an institution so gives students a consistent user interface.

Often a design approach is implemented which involves creating or re-using *Learning Objects*. These are self contained units properly tagged with keywords, or other metadata, and preferably stored in an XML file format. These are put in a database and creating a course requires putting together a sequence of learning objects.

One important point is to help teachers organize their pedagogical perspective. Some institutes for Higher education are devoted to this mission (training, counseling, funding, development, etc.).

More recent approaches focus on dialogue, interaction and collaborative activities - courses still contain content but it is of secondary importance or is generated by the students. An open source course management system that makes this approach easier is Moodle. This advocates Social-Constructivism as

a pedagogical perspective, whereby learners construct their knowledge through discussion, thereby enhancing their thinking skills.

1.3 Context of E-Learning with the Project

- Build a software system to assists the learning process directly.
- Present a way that it facilitates learning and not merely pasted together.
- The underlying engine will be use for it.
- The E-Abacus will be including the GUI, data structure, executable and other pieces of software to display the particular information.
- The text and the picture will be using as well as how they to present the information.
- The system wills consideration the level of accessibility of the language used in the text.

1.4 Project Objective

The project objective of E-learning is to produce software that can help the people to learn how to use the Abacus to calculate. By using the Abacus, it can make the people brain cleverer and the calculation of Abacus is faster than using the calculator. The Abacus is most accurate than the calculator. Nowadays, many schools are promoting the Abacus learning into their lesson for their student.

1.5 Project scope

The project scope is research on the subject matter, which is about the Abacus. At here, must be selecting the correct material for the selected audience to make sure the system is useful for them. Make a research on the various tools

and programming language where one will eventually be picked to develop the software. And then, make a testing the different form of the presentation for the software as well as GUI. Design the layout and screen flow for the software. At last, evaluate the software.

1.6 Significance of Project

1. Flexibility

The question of the E-Learning can be more flexibility after we use the database to save the question and the question can be always change by the administrator to make sure the user always face to different question.

2. Maintainability

At this system, the database is be use to maintain the data of the system. So, the system can be more powerful to maintain the data.

3. Evaluation

This system got a question for the user to review their learning.

1.7 Target User

The target user for this system is the student in the primary school or any body who have the interest to learn the Abacus.

1.8 Schedule Project

Below is the schedule for this project.

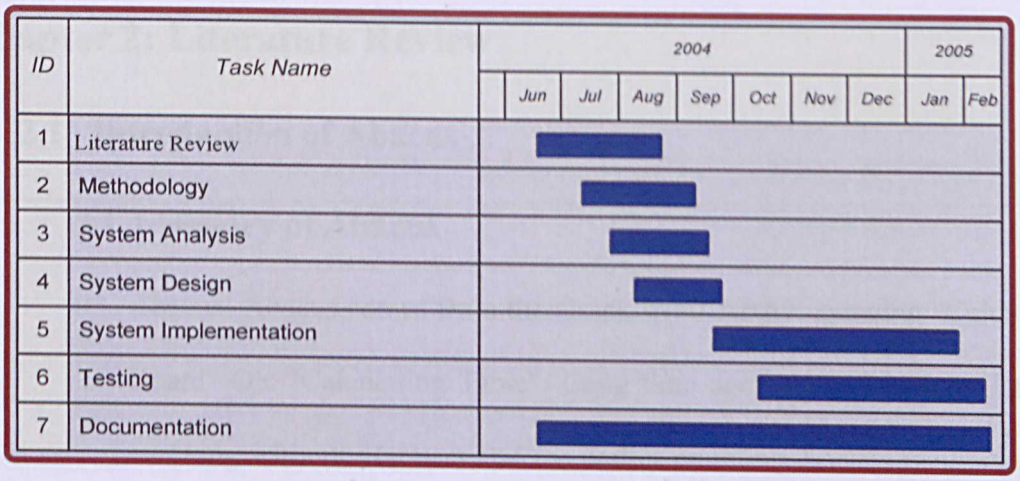


Figure 1.1 schedule project

Chapter 2: Literature Review

2.1 Introduction of Abacus

2.1.1 History of Abacus

Abacus! Abacus comes from the Greek word ABAX meaning "Calculating Board" OR "Calculating Table". Long time ago, it is difficult to imagine counting without numbers and the earlier counting devices is human hand their fingers. Then, people were calculating by using sand and little rocks. This might not seem an appropriate word to describe "today's" abacus device. The first generation of abacus was known as counting boards. The counting board is a piece of wood, stone or metal with carved grooves or painted lines between which beads, pebbles or metal discs were moved. Next generation of abacus became a set of beads on strings in the wooden frame that was invented in China about 700 years ago, during the Yuan Dynasty. So that Chinese Abacus is most popular from the other Abacus variations. This type of abacus was so successful that its use spread from China to many other countries. It was handy as it could be held and carried around easily. Believe or not, but abacus is still used in some countries. In countries like Russia and India abacus was slightly different but the principle was the same. In some other countries Abacus has different spelling, such as Abakus, abackus, Abax, but in most countries it is spelled as Abacus.

The evolution of the abacus can be divided into three ages: Ancient Times, Middle Ages, and Modern Times. The time-line below traces the

developing abacus from its beginnings circa 500 B.C., to the present.

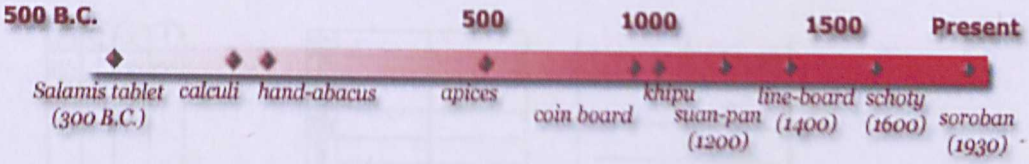


Figure 2.1: The evolution of the Abacus

Evolutionary Time-line: *This time-line shows the evolution from the earliest counting board to the present day abacus. (Compared to the rate of progress in last one-thousand years, the progress during the first one-thousand years of civilization was rather slow).*

Ancient Times

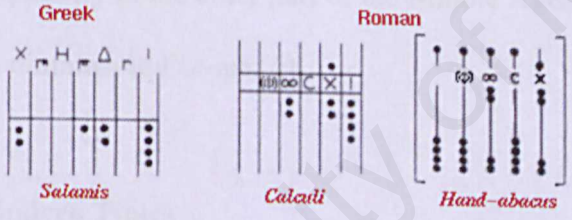


Figure 2.2: Ancient Times: ***The Salamis Tablet, the Roman Calculi and Hand-abacus are from the period c. 300 B.C to c. 500 A.D.***

During Greek and Roman times, counting boards, like the ***Roman hand-abacus***, that survive are constructed from stone and metal (as a point of reference, the Roman empire fell circa 500 A.D.).

The Middle Ages

Figure 2.3: Middle Ages ***The Apices, the coin-board and the Line-board are from the period c. 5 A.D. to c. 1400 A.D.***

Wood was the primary material from which counting boards were manufactured; the orientation of the beads switched from vertical to horizontal. As arithmetic (counting using written numbers) gained popularity in the latter part of the Middle Ages, the use of the abacus began to diminish in Europe.[6]

Modern Times

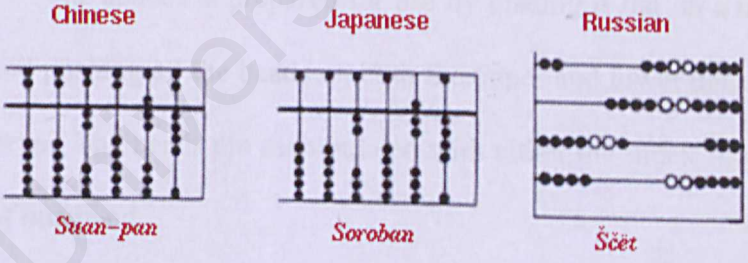


Figure 2.4: Modern Times: ***The Suan-pan, the Soroban and the Schoty are from the period c. 1200 A.D to the present.***

2.1.2 Anatomy & Construction

The standard abacus can be used to perform addition, subtraction, division and multiplication; the abacus can also be used to extract square-roots and

cubic roots.

The abacus is typically constructed of various types of hardwoods and comes in varying sizes. The frame of the abacus has a series of vertical *rods* on which a number of wooden *beads* are allowed to slide freely. A horizontal *beam* separates the frame into two sections, known as the *upper deck* and the *lower deck*.[6]

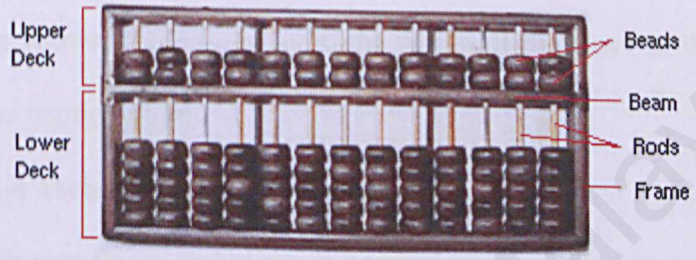


Figure 2.5: Abacus Parts: The various parts of the abacus are identified here: the frame, the beam, the beads and rods and the upper and lower decks.

2.1.2.1 Basics

The abacus is prepared for use by placing it flat on a table or one's lap and pushing all the beads on both the upper and lower decks away from the beam. The beads are manipulated with either the index finger or the thumb of one hand.

2.1.2.2 Bead Values

Each bead in the *upper deck* has a value of 5; each bead in the *lower deck* has a value of 1. Beads are considered counted, when moved *towards* the beam that separates the two decks.

2.1.2.3 Counting

After 5 beads are counted in the lower deck, the result is "carried" to

the upper deck; after both beads in the upper deck are counted, the result (10) is then carried to the left-most adjacent column.

The right-most column is the ones column; the next adjacent to the left is the tens column; the next adjacent to the left is the hundreds column, and so on. Floating point calculations are performed by designating a space between 2 columns as the decimal-point and all the rows to the right of that space represent fractional portions while all the rows to the left represent whole number digits.

2.1.2.4 Technique

Proper finger technique is paramount in achieving proficiency on the abacus. With a Chinese abacus, the thumb and the index finger together with the middle finger are used to manipulate the beads. Beads in lower deck are moved *up* with the thumb and *down* with the index finger. In certain calculations, the middle finger is used to move beads in the upper deck.

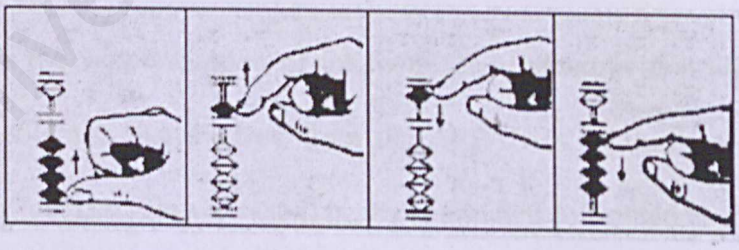


Figure 2.6: the finger technique of the use of Japanese Abacus

Finger Technique: A Japanese textbook published in 1954 shows the proper technique for moving the beads. It shows the thumb being used to count beads in the lower deck and the index finger being used in all other cases. With the Japanese version, only the index finger and thumb are used. The

beads are moved *up* with the thumb and *down* with the index finger. However, certain complex operations require that the index finger move beads up; e.g. adding 3 to 8 (the adding of the three is called *Jian Chi Jia Shi* which literally means, *"subtract 7 add 10"*). [6]

2.1.3 The Merits of Learning Arithmetic with the Abacus

By using the abacus to calculate can make the children enable

1) to understand the basic number systems such as base-ten and place values,

2) to understand concepts of carrying and borrowing in arithmetic,

3) to understand combinations of 5 and 10 and complement of numbers,

4) to visualize close relations between numbers and numerals and

5) to develop children's ability of mental calculations.

2.2 Web-Based Application

2.2.1 Introduction to the Internet and www

Internet is the vast collection of interconnected networks that all use the TCP/IP protocols and that evolved from the ARPANET of the late 60's and early 70's. An "internet" (lower case i) is any computers connected to each other (a network) in the same building by the cable, and are not part of the Internet unless their use TCP/IP protocols. An "intranet" is a private network inside a company or organization that uses the same kinds of software that you would find on the public Internet, but that is only for internal use. An intranet may be on the Internet or may simply be a network.

The www (World Wide Web) is a system of Internet servers that support specially formatted documents. The documents are formatted in a markup language called HTML (*Hypertext Markup Language*) that supports links to other documents, as well as graphics, audio, and video files. This means you can jump from one document to another simply by clicking on hot spots. Not all Internet servers are part of the World Wide Web.

There are several applications called Web browsers that make it easy to access the World Wide Web; Two of the most popular being Netscape Navigator and Microsoft's Internet Explorer.

2.2.2 Benefits of using E-Learning

The E-Learning can be bring a briefly benefit to the user. At the below will be list down the benefits of using E-Learning:

1. Substantial cost savings due to elimination of travel expenses

The biggest benefit of e-Learning is that it eliminates the expense and inconvenience of getting the instructor and students in the same place. Opting for e-Learning also means that courses can be cut into shorter sessions and spread out over several days or weeks so that the user have more time to do their own work and can be muse their time more flexible.

2. Improved Tracking and Reporting

E-Learning offers companies an array of new tracking, testing and control tools that were seemingly non-existent with previous training methodologies. E-Learning registers users, tracks courses in a catalogue, and records data from learners; it also provides appropriate reports to

management. The database capability of the e-Learning extends to additional functions such as company management, online assessments, personalization, and other resources.

E-Learning systems administer and track both online and classroom-based learning events, as well as other training processes (these would need to be manually entered into the system for tracking purposes).

3. Online training is less intimidating than instructor-led courses

Students taking an online course enter a risk-free environment in which they can try new things and make mistakes without exposing themselves. This characteristic is particularly valuable when trying to learn soft skills, such as leadership and decision-making. A good learning program shows the consequences of students' actions and where/why they went wrong. After a failure, students can go back and try again. This type of learning experience eliminates the embarrassment of failure in front of a group.

4. Just-in-time access to timely information

Web-based products allow instructors to update lessons and materials across the entire network instantly. This keeps content fresh and consistent and gives students immediate access to the most current data. Information can be retrieved just before it is required, rather than being learned once in a classroom and subsequently forgotten. Training Magazine reported that technology-based training has proven to have a 50-60% better consistency of learning than traditional classroom learning.

5. Higher retention of content through personalized learning

E-Learning solutions allow more room for individual differences in

learning styles. They also provide a high level of simulation that can be tailored to the learner's level of proficiency. With 24x7 accesses, people can learn at their own pace and review course material as often as needed. Since they can customize the learning material to their own needs, students have more control over their learning process and can better understand the material, leading to a 60% faster learning curve, compared to instructor-led training. The delivery of content in smaller units, called "chunks," contributes further to a more lasting learning effect. Whereas the average content retention rate for an instructor-led class is only 58%, the more intensive e-Learning experience enhances the retention rate by 25 - 60%. Higher retention of the material puts a higher value on every dollar spent on training.

6. Anywhere, anytime, anyone

The Internet can offer the logical solution for a company's education and training objectives. Approximately 80% of the professional workforce already uses computers on the job. Technical obstacles, such as access, standards, infrastructure, and bandwidth, are becoming less of an issue everyday. The growth of the World Wide Web, high-capacity corporate networks, and high-speed desktop computers will make learning available to people 24 hours a day, seven days a week around the globe. This will enable businesses to distribute training and critical information to multiple locations easily and conveniently. Employees can then access training when it is convenient for them, at home or in the office.

7. Improved collaboration and interactivity among students

In times when small instructor-led classes tend to be the exception, electronic learning solutions can offer more collaboration and interaction with experts and peers as well as a higher success rate than the live alternative. Teaching and communication techniques that create an interactive online environment include case studies, story telling, demonstrations, role-playing, simulations, online references, personalized coaching and mentoring, discussion groups, project teams, chat rooms, e-mail, bulletin boards, tips, tutorials, FAQs, and wizards. Distance education can be more stimulating and encourage more critical reasoning than a traditional large instructor-led class because it allows the kind of interaction that takes place in small group settings. Studies have shown that students who take online courses are typically drawn into the subject matter of the class more deeply than in a traditional course because of the discussions they get involved in. This engagement is further facilitated by the fact that instructors do not monopolize attention in an online environment. Another study found that online students had more peer contact with others in the class, enjoyed it more, spent more time on class work, understood the material better, and performed, on average, 20% better than students who were taught in the traditional classroom.

2.3 Database

2.3.1 Introduction

This is a data structure used to store organized information. A database is typically made up of many linked tables of rows and columns. For example, a

company might use a database to store information about their products, their employees, and financial information. Databases are now also used in nearly all e-commerce sites to store product inventory and customer information. Database software, such as Microsoft Access, FileMaker Pro, and MySQL is designed to help companies and individuals organize large amounts of information in a way where the data can be easily searched, sorted, and updated. The database use for this system is the Microsoft Office Access 2003.

2.3.2 Objectives of the Database Approach

The objectives of using database are list down at below:

1. **Control of data redundancy**

   The database approach attempts to eliminate the redundancy by integrating the files so the multiple copies of the same data are not store.

2. **Data consistency**

   When any update to data in the database, the value has to be performed only once and the new value is available immediately to all users. If data is stored more than once, the system can ensure all copies of the item are kept consistent.

3. **Sharing of data**

   By using the database, more users can be use the data. New application can build on the existing data in the database and add only the data that is not currently stored, rather than having to define all data requirements again. The new application can also rely on the functions provided by the DBMS.

4. **Improved data integrity**

   Database integrity refers to the validity and the consistency of stored data. Integrity is usually expressed in terms of constraints, which are consistency rules that the database is not permitted to violate. Constraints may apply to data items within a single record or they may apply to relationships between

records.

5. **Improved security**

   Database security is the protection of the database from unauthorized users. Without the suitable security measures, integration make the data more vulnerable than file-based systems. This can be solving by use the user name and password to make sure who can be access the data.

6. **Increased the productivity**

   The DBMS provides many of the standard functions that the programmer would normally have to write in a file-based application. Many DBMSs also provide a fourth-generation environment consisting of tools to simplify the development of database applications. This results increase programmer productivity and reduced development time.

7. **Improved maintenance through data independence**

   DBMS separates the data description from the applications, thereby making applications immune to changes in the data descriptions. The provision of data independence simplifies database application maintenance.

8. **Improved backup and recovery services**

   DBMSs provide facilities to minimize the amount of processing that is lost following a failure.

2.3.3 Use of database in education

Database can be use in the education for stored the record of the students. At this system the database can be use to stored the users information, questions, results and another thing. Below will be list down the use of the database for this system:

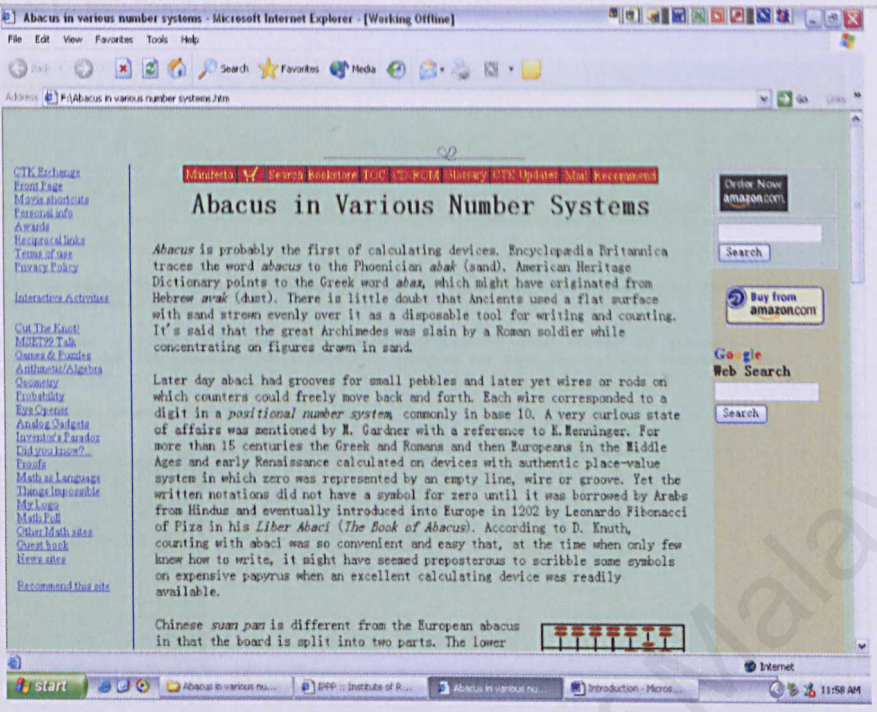
1. **Question Editing**

   The database can be use to stored the editing question for the lesson.

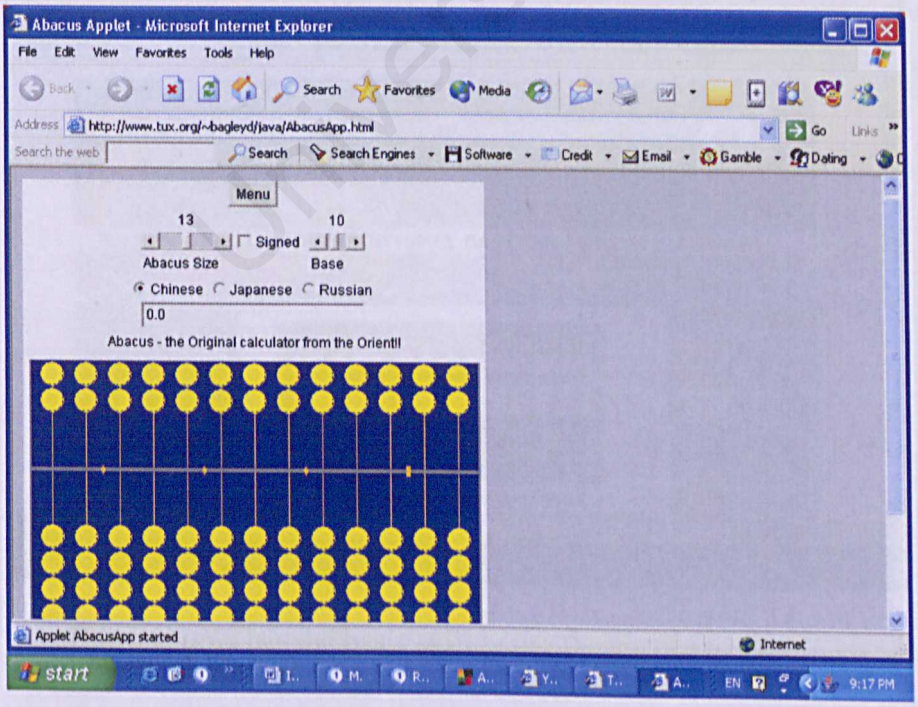
2. **Tutorial**

   Make sure the set of tutorial can be stored in the database.

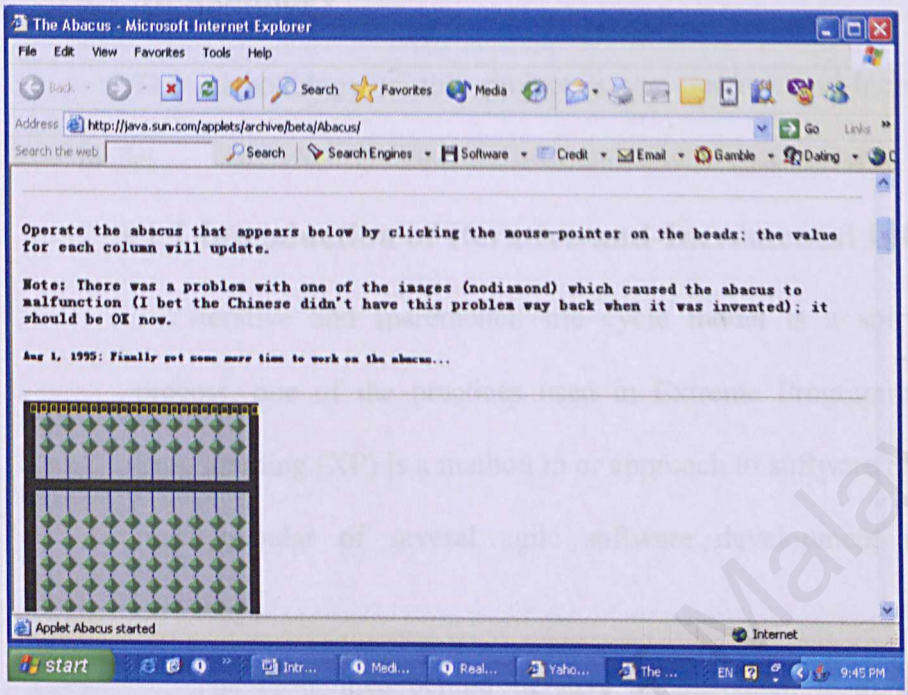
2.4 The Exiting System



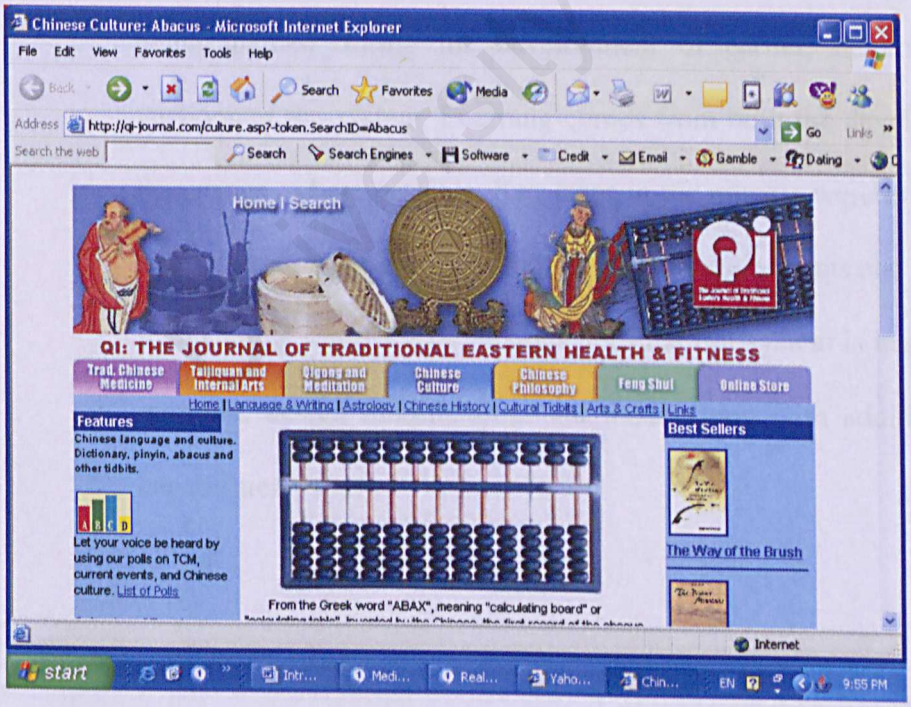
From this Web site, it only descript the briefly history of the Abacus. By that, it also displays an Abacus applet to be user to play. But, the web site not teaches the user how to use the Abacus to make a calculation.



This one only has the simulate Abacus and not any instruction or lesson to teach the user to use the Abacus.



This one not has the tutorial and test for user to practice.



This one only has the basic skill to use the abacus to count.

Chapter 3: Methodology

3.1 Methodology

The methodology of this project is the Iterative-and-Incremental life cycle model.

3.1.1 Introduction of Iterative-and-Incremental Life Cycle Model

Iterative and Incremental life cycle model is a software development process, one of the practices used in Extreme Programming. The Extreme Programming (XP) is a method in or approach to software engineering. It is the most popular of several agile software development methodologies for nowadays.

The basic idea behind iterative enhancement is to develop a software system incrementally, allowing the developer to take advantage of what was being learned during the development of earlier, incremental, deliverable versions of the system. Learning comes from both the development and use of the system, where possible. Key steps in the process were to start with a simple implementation of a subset of the software requirements and iteratively enhance the evolving sequence of versions until the full system is implemented. At each iteration, design modifications are made along with addition new functional capabilities.

Figure 3.1: The construction of a software product in four increments

From the figure 3.1, that got five core workflows, the requirements workflow, analysis workflow, design workflow, implementation workflow, and test workflow. All five of these workflows are performed over the life cycle of a software product. There got predominates for the five workflows.

At the beginning of the life cycle, the requirement workflow got predominates over the other four workflows. These requirements artifacts are extended and modified during the remainder of the life cycle. During that time, the other four will be predominate. The implementation and test workflows will occupy far more of time for the members of the software development team toward the end of the life cycle than they do at the beginning. Planning and the documentation activities are perform over the life cycle.

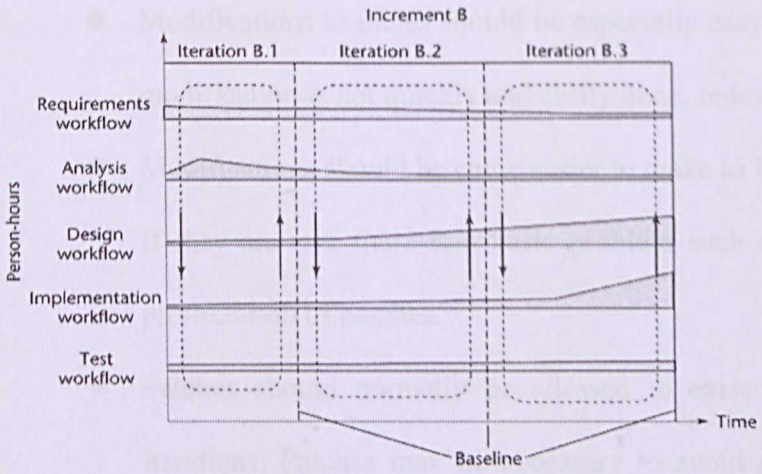


Figure 3.2: The three iterations of Increment B of the iterative-and incremental life cycle model of Figure 3.1

The figure 3.2 is to be show iteration within each increment and repeat that all five workflows (requirements, analysis, design, implementation, and testing) are carried out during almost every iteration, although in varying proportions each time.

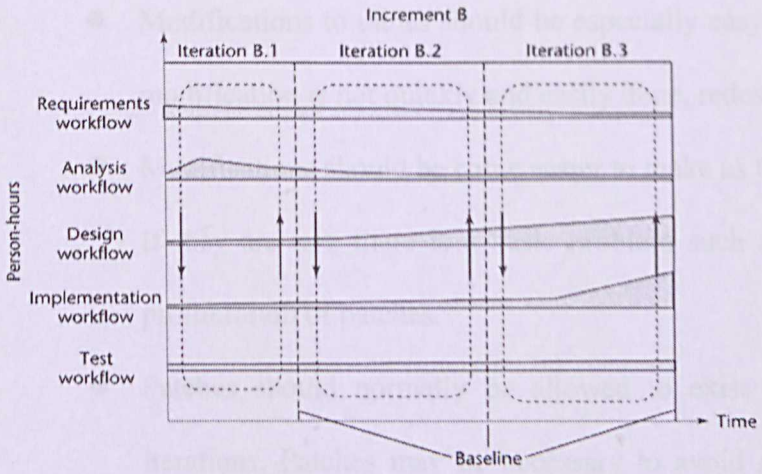
The advantages of the iteration development include:

- The complexity is never overwhelming.
- Early feedback is generated, because implementation occurs rapidly for a small subset of the system.

3.1.2 Guidelines

Guidelines the drive the implementation and analysis include:

- Any difficulty in design, coding and testing a modification should signal then need for redesign or re-coding.
- Modifications should fit easily into isolated and easy-to-find- modules. If they do not, some redesign is needed.



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3.1.2 Guidelines

Guidelines the drive the implementation and analysis include:

- Any difficulty in design, coding and testing a modification should signal then need for redesign or re-coding.
- Modifications should fit easily into isolated and easy-to-find- modules. If they do not, some redesign is needed.

- Modifications to tables should be especially easy to make. If any table modification is not quickly and easily done, redesign is indicated.
- Modifications should be come easier to make as the iterations progress. If they are not, there is a basic problem such as a design flaw or a proliferation of patches.
- Patches should normally be allowed to exist for only one or two iterations. Patches may be necessary to avoid redesigning during an implementation phase.
- The existing implementation should be analyzed frequently to determine how well it measures up to project goals.
- Program analysis facilities should be used whenever available to aid in the analysis of partial implementations
- User reaction should be solicited and analyzed for indications of deficiencies in the current implementation

Chapter 4: System Analysis

4.1 Introduction

The system analysis will be list out the functional requirement and non-functional for the system based on the requirement of the users. The functional requirement and the non functional requirement for this project will be list down at the below.

4.2 Functional Requirement

The functional requirement is provide a detailed overview of the system provided to the user. Organize this part in a matter that is easy the user to understand. The use case will be use to description for require of the user. The UML is used here to graphically support the text. The first step is to list all the use cases that might be part of the product. Each of these is classified as essential, desired or optional. The functional requirement can be will be list down at the below.

4.2.1 User Homepage

The user homepage is using by the user to access the learning lesson and teaching mental arithmetic with an abacus from the web site. The user page also got the strategies, examples, tutorials for each of the lesson. The user homepage got 2 function modules for the user to be using and will be list down at below.

4.2.1.1 Learning Lesson Module

At this module, it consists of 5 sections comprising of a simulated abacus for calculation and 5 lessons for reading an abacus, addition, subtraction, multiplication and division.

4.2.2 Administrator Homepage

The administrator homepage allows the administrator to maintain all steps of the examples, tutorials and test questions at the back-end database system.

4.2.2.1 Administrator Authorization Module

At this module, it allows the administrator to check the authorization to access the administrator homepage. It also can be set up who can be access the administrator homepage to be updating the question for the tutorial.

4.2.2.2 Question Module

At this module, it has 4 sections comprising of search, add, edit and delete, for maintaining the questions and answers and steps in the database.

1. **Add**

   At this section, it allows the administrator to add the new question into the web site.

2. **Delete**

   At this section, it allows the administrator to delete the questions which not need any more.

3. **View**

   At this section, it allows the administrator to view the questions which are already insert into the database.

4.3 Non Functional Requirement

The non functional requirement is the requirement which are non list down by the customer, but it need to apply to the system to make sure the system can run properly. Below that is the non functional requirement for this system:

4.3.1 User-Friendly

The system must be user friendly, which is the system, must be familiar to the user and easy to use. The system also not got any complex step to use it.

4.3.2 Reliability

The result for the tutorial and the test must be reliability and accurate.

4.3.3 Security

By using the database, the will be more secure. The unauthorization can be preventing by only allows the users whom got the authorization to access the system and the result or the information for the user can be defend.

4.3.4 Response Time

Response time is the time need to retrieve the data from the database. The time must be as soon as possible.

4.3.5 Maintainability

By using the database, the maintainability of the system will be more easy and reliability.

4.4 Hardware and Software Requirements

	Development Environment	Runtime Environment
Hardware	• Intel Pentium 4 Processor 450 MHz	•Intel Pentium III Processor 450 MHz

Requirement	• 128 MD RAM • 20.4 GB Hard Drive • CD ROM Drive •VGA or high resolution color monitor •Mouse or any compatible pointing device	• 32 MD RAM • 16.4 GB Hard Drive • CD ROM Drive • VGA or high resolution color monitor •Mouse or any compatible pointing device
Software Requirement	• Microsoft Windows XP • ASP.NET •Java • Microsoft Access 2000 •IE 5.0	• Microsoft Windows XP • ASP.NET •Java • Microsoft Access 2000 •IE 5.0

4.5 Technology Consideration

At here, the technology which is use in this project will be list down.

4.5.1 Programming Languages

4.5.1.1 ASP.net

ASP.NET a next generation of ASP (Active Server Pages) introduced by Microsoft. Similar to previous server-side scripting technologies, ASP.NET allows you to build powerful, reliable, and scalable distributed applications. ASP.NET is based on the Microsoft .NET framework and uses the .NET features and tools to develop Web applications and Web services.

Even though ASP.NET sounds like ASP and syntaxes are compatible with ASP but ASP.NET is much more than that. It provides many features and tools, which let you develop more reliable and scalable, Web applications and Web services in less time and resources. Since ASP.NET is

a compiled, .NET-based environment; you can use any .NET supported languages, including VB.NET, C#, JScript.NET, and VBScript.NET to develop ASP.NET applications.

Advantages of ASP.NET

Some of the major advantages of ASP.NET are following.

1. .NET Compatible
2. Web Forms and Rapid Development
3. Native XML Support and XML Web Services
4. Databases and ADO.NET
5. Graphics and GDI+
6. Caching and State Management
7. Enhanced Security
8. Mobile Device Development
9. Messaging and Directory Services
10. Migration from ASP to ASP.NET

4.5.1.2 Java Language

Java is a new computer programming language developed by Sun Microsystems. Java has a good chance to be the first really successful new computer language in several decades. Advanced programmers like it because it has a clean, well-designed definition. Business likes it because it dominates an important new application, Web programming.

Java has several important features:

- A Java program runs exactly the same way on all computers. Most other languages allow small differences in interpretation of the standards.

- It is not just the source that is portable. A Java program is a stream of bytes that can be run on any machine. An interpreter program is built into Web browsers, though it can run separately. Java programs can be distributed through the Web to any client computer.

- Java applets are safe. The interpreter program does not allow Java code loaded from the network to access local disk files, other machines on the local network, or local databases. The code can display information on the screen and communicate back to the server from which it was loaded.

4.5.2 Programming Tool

4.5.2.1 Visual Studio .NET 2003 Professional

Visual Studio .NET 2003 Professional enables you to rapidly build a broad range of applications for Microsoft Windows, the Web, and mobile devices. Developers can use Visual Studio .NET 2003 Professional 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 you 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.

Visual Studio .NET 2003 delivers the developer productivity you need to deliver a range of professional software in record time. The integrated development environment (IDE) provides a consistent interface for all languages, including Microsoft Visual Basic .NET, Microsoft Visual C++ .NET, Microsoft Visual C# .NET, and Microsoft Visual J# .NET. Using the language best suited to your skill set, you can take advantage of shared visual designers to build rich Windows-based applications and dynamic Web applications that render in any browser.

Quickly Build Windows-based Applications

Windows developers will find the enhanced Windows Forms designer to be intuitive and efficient. Windows Forms are also compatible with any .NET development language.

With visual inheritance, developers can greatly simplify the creation of Windows-based applications by reusing common logic and user interface throughout their solution. Using control anchoring and docking, programmers can build resizable forms automatically, while the in-place menu editor enables developers to visually author menus directly from within the Forms Designer.

Streamline Web-based Development

With its powerful WYSIWYG designer for Web pages, IntelliSense TML editing features, and Style Sheet Editor, Visual Studio .NET 2003

helps developers feel comfortable authoring complex Web-based solutions.

Developers can also leverage Visual XML designers and IntelliSense XML tag completion for drag-and-drop creation and data manipulation. By using automatically generated client-side validation code, Web developers can reduce the amount of client-side JavaScript and ensure that their application will work in both Microsoft Internet Explorer and Netscape browsers.

Create Server-Side Business Logic

Extending visual design capabilities to the server is easier than ever with Visual Studio .NET 2003. The Component Designer provides a canvas for building and instantiating business logic components using the familiar drag-and-drop paradigm. In addition, the Server Explorer delivers direct access to server-side resources, including databases, message queues, event logs, Windows Services, Crystal Reports, and performance counters. Integrating any of these resources into your application is as easy as dragging controls onto a form. The enhanced XML Designer provides panning and zoom capabilities for graphically navigating and manipulating XML data and schema files. Visual Database tools deliver powerful designers and wizards for creating and managing data-driven applications.

IDE Productivity and Extensibility

Numerous productivity features within the IDE knock down traditional barriers to rapid development of professional software:

The multi-language Solution Explorer and Class View windows provide organized, hierarchical views of your projects.

Dynamic Help and integrated features from MSDN provide assistance based on your current task and programming language, ensuring that relevant help is always on hand.

Enhanced IntelliSense statement completion, automatic syntax error detection, the cross-language remote debugger, and the Task List help you track down bugs and ensure delivery of robust software.

A comprehensive object model and a fully extensible IDE provide you with the benefits of a vibrant third-party add-in and component vendor community. And, with Visual Studio macros, you can automate routine tasks within the IDE to enhance your productivity during the software development process. Macros can be both recorded and played back, or manually created using the Macros IDE and the full power of the Visual Basic .NET language.**[1]**

4.5.3 System Platform

4.5.3.1 Windows XP

The system platform is windows XP.

4.5.4 Database

4.5.4.1 Microsoft Access 2000

Microsoft Access database design tools are used in creating small database applications for a variety of purposes. Microsoft Access is an optimal database design system for specific environments. According to Clear form Software, a Massachusetts based database design company, the

following are the advantages and disadvantages of using Microsoft Access for your database design:

Advantages of Microsoft Access:

- Easy to use
- Data migration
- Simple backups/archiving

Disadvantages of Microsoft Access:

- Limited to small databases
- Limited to low transaction rates
- Limited to low concurrent database usage

Chapter 5: System Design

5.1 Introduction

Design is both the process of defining the architecture, components, interfaces, and other characteristics of a system or component and the result of that process. The system design is the phase which is use to transforming the problem into a solution. *Software design* is the activity where software requirements are analyzed in order to produce a description of the internal structure and organization of the system that will serve as the basis for its construction. There are two activities

1. Software architectural design - the top-level structure and organization of the system is described and various components are identified (how the system is decomposed and organized into components and must describe the interfaces between these components.
2. Software implementation design - each component is sufficiently described to allow for its coding.

The software design *objectives*:

- to produce various models that can be analyzed and evaluated to determine if they will allow the various requirements to be fulfilled,
- to examine and evaluate various alternative solutions and trade-offs, and
- To plan the subsequent development activities.

5.2 Abacus Animator System Design

The architectural system design shows all the relation between modules in a system. This system divided into 2 main modules which are user and administrator home page. The user's homepage provide the learning package to the user and the

administrator homepage provide the administration facilities to the administrator. The architectural design for both user and the administrator homepage is shows in the figure 5.1 and figure 5.2 accordingly.

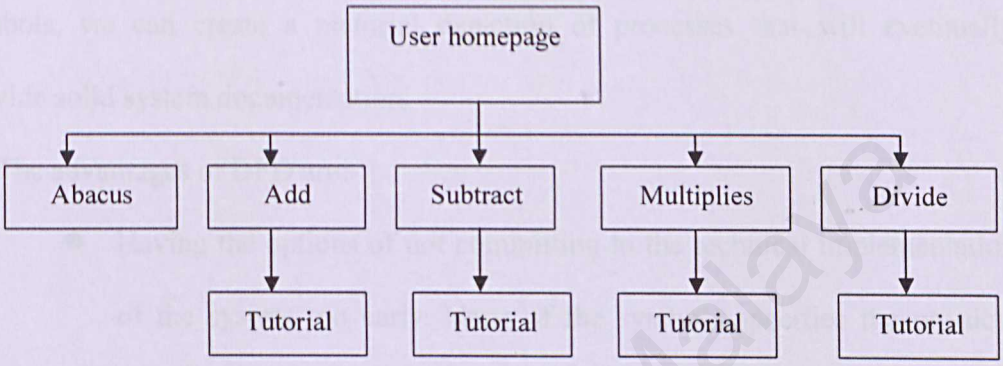


Figure 5.1: Architectural model for User's Homepage

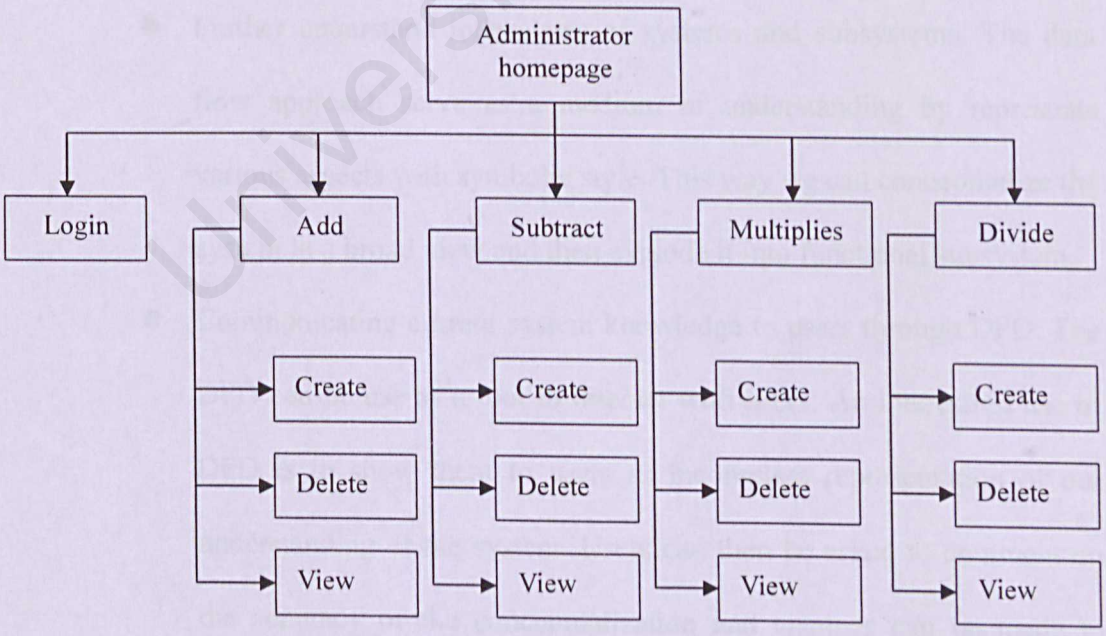


Figure 5.2: Architectural model for Administrator's Homepage

5.3 Data Flow Diagram

From a data flow diagram (DFD), we can put together a graphical representation of data processes throughout the application. The DFD approach emphasizes the logic under laying the system. By using combinations of only four symbols, we can create a pictorial depiction of processes that will eventually provide solid system documentation.

The advantages of DFD are:-

- Having the options of not committing to the technical implementation of the system too early. None of the symbols specifies the physical aspects of implementation. For example, we know that data are stored at a particular point, the DFD approach does not dictate specifying medium for storage. This allows us to conceptualize necessary data flows and avoid committing to quickly to their technical aspects.
- Further understand interrelates of systems and subsystems. The data flow approach serve as a medium of understanding by represents various aspects with symbolic style. This way we can conceptualize the system in a broad view and then explode it into functional subsystem.
- Communicating current system knowledge to users through DFD. The DFD can be use as a tool to interact with users. An interesting use of DFD is to show them to users as incomplete representation of our understanding of the system. Users can then be asked to comment on the accuracy of the conceptualization and changes can be made to reflect the system from user's perspectives.

- Analysis of a proposed system to determine if the necessary data and process have been defined. DFD can allow us to describe each component in a system. Analysis can then be performed to ensure that all necessary output may be obtained from the input data and that processing logic is reflected in the diagram. This will help in detecting and correcting error and design flow in earlier stage of system development phase.

The following figure depicts the Data Flow Diagram of the automated essay grading system.

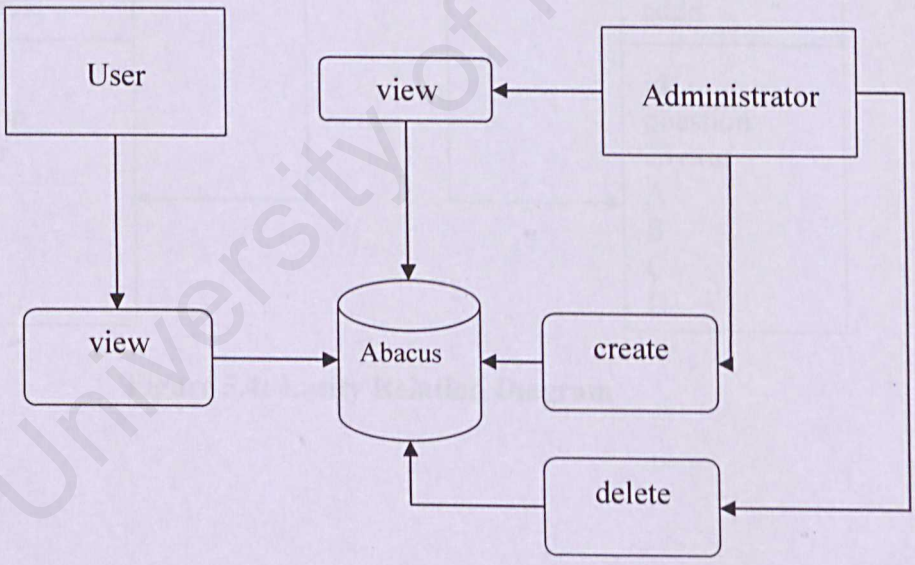


Figure 5.3: The Data Flow Diagram

5.4 Database Design

5.4.1 Entity Relationship (ER) Model

The ER-Diagram will be shows out the relationship for all the entity use in the database. The figure 5.3 will shows out the ER diagram.

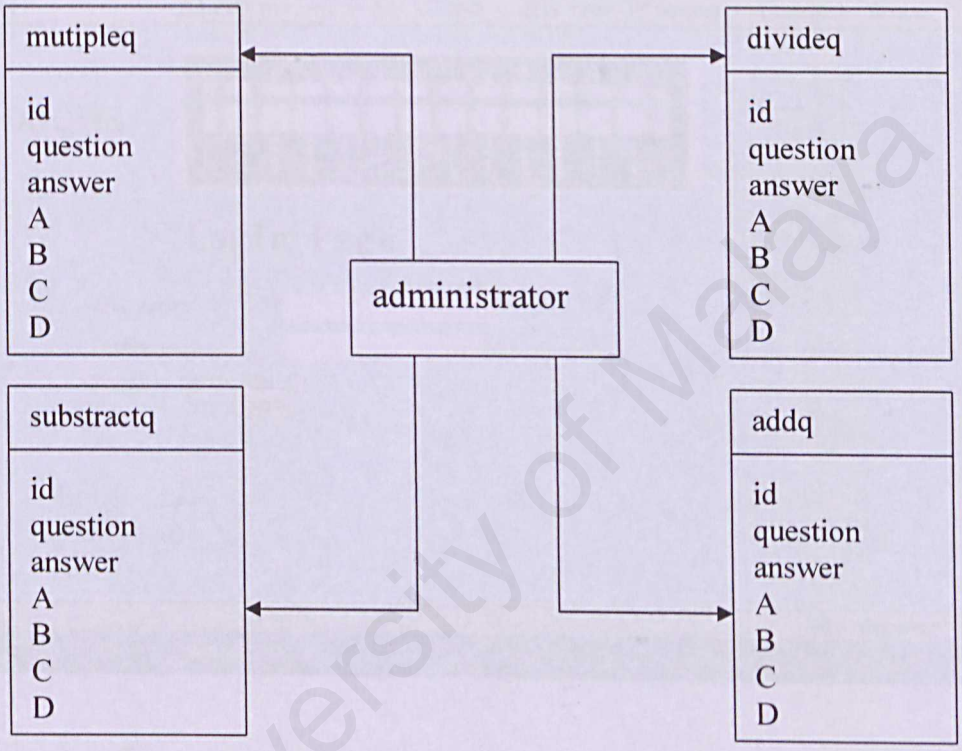
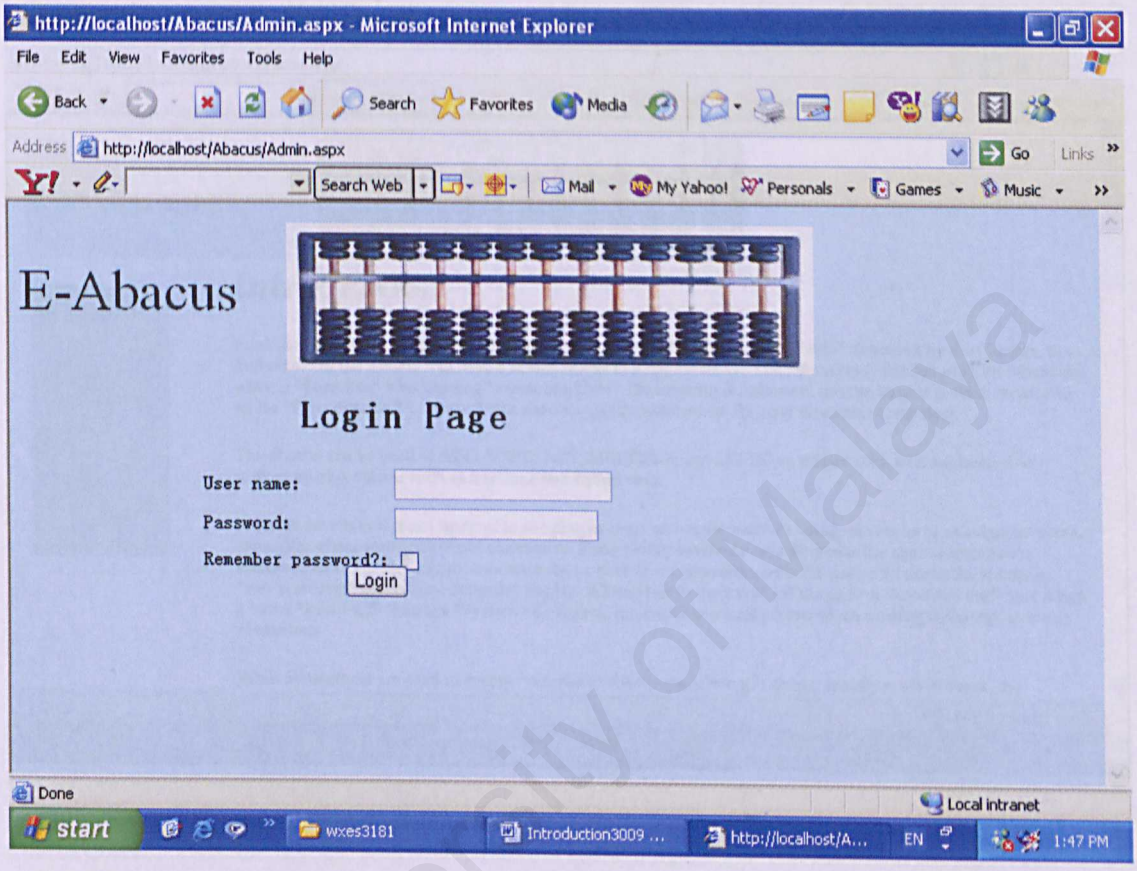


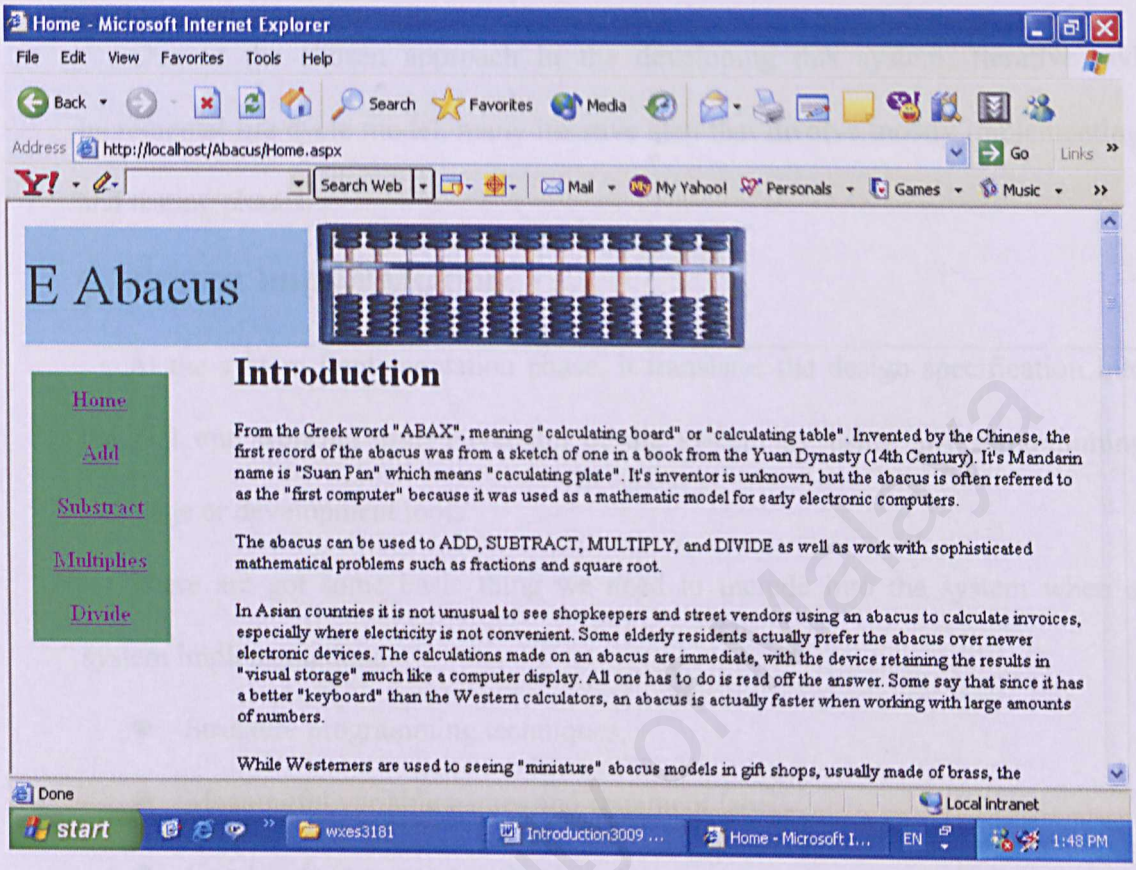
Figure 5.4: Entity Relation Diagram

5.5 The interfaces of system

5.5.1 The Administrator Homepage



5.5.2 The User Homepage



Chapter 6 System Implementation

Due to the chosen approach in the developing this system, Iterative and Incremental life cycle model, many iterative step that involve mostly implementing and testing phases.

6.1 System Implementation

At the system Implementation phase, it translates the design specification into the real one working system version of the system by using any programming language or development tools.

There are got some basic thing we need to include into the system when at system implementation:

- Structure programming techniques
- Meaningful variable names and statement labels
- Good code formatting and indentation
- Clear and meaningful internal comments

6.1.1 Software Tools used

6.1.1.1 Design and Documentation

Microsoft Office 2003

- Used to do the documentation.

6.1.1.2 Development

The initial stage of system implementation involves setting up the development environment. Development environment is very important to

the development of a system as a suitable hardware and software will determine the success of the project. The hardware and software tools used to develop the entire system are:

Software

The final software implementation environment used for the system is summarized as below:

Internet Explorer 5.0 version

- It used to browse the web pages which are already created.

Visual Studio .NET 2003 Professional

- It used to develop the system.

Microsoft Access 2000

- It used to create the database

6.1.2 Database Development

Using databases to store information is an efficient method of displaying up-to-date information in E- Abacus system. Thus, it would allow administrators to store and manipulate the data in database. The database for E-Abacus system is created using Microsoft Access 2000. By using this, creation and modification can be made easily.

6.1.3 Program Development

The design must be translated into form that can be understood by the

machine. The code generation step performs this task. If design is performed in a detailed manner, code generation can be accomplished mechanically.

6.1.3.1 System Development Process

Basically the process for development of E-Abacus Animator consists of 5 important steps:

- Step 1 : Review the Program Documentation

The program document that was prepared during the early phases needs to be reviewed. This documentation enabled the developer to have better understanding of the work that needs to be done during the development phase. It also lowers the risk of misinterpreting and incomplete requirements due to outside influence or forgetfulness.

- Step 2 : Design the Program

After reviewing the program documentation, the program design needs to be completed during the system development where the developers decide exactly what the program's capabilities and what it can accomplish. This is the process developing a logical solution to accomplish its requirements and also solves any problems that arise.

- Step 3 : Code the Program

Coding is a process of writing the program instruction where this instruction implements the program design. The coding step actually translates the design specification to machine-readable format using programming languages so that the machine understands what tasks the system wants to perform.

- Step 4 : Test the Program

During the program testing phase, the program processes actual data and produces information on which user will be relying on. The program will also be tested on the how it will react to our request and actions. The testing involved most are unit testing and integration testing.

- Step 5 : Completing the Program Documentation

Completing the program documentation is essential for the successful operation and maintenance of the system. This documentation includes the system's user manual that may be needed by most of the customer as well as the system administrator. It is also important for the future enhancements of the program.

6.1.3.2 Coding Principles

The technique used in developing the system is called the top-down, stepwise refinement approach. It is essential for developing a well structured program.

Top-down approach involves building the higher-level software modules that are refined into functions and procedures. That means the higher-level modules to be coded first before the lower level modules. The codes in the lower modules contain only an entry and an exit. A module with such characteristic is called a shell. The higher level modules will reference the lower ones if they are coded and available. Reference to a shell will result in an empty action.

This approach will ensure that the most important modules will be developed and tested first. It also gives the preliminary version of the system sooner.

6.1.3.3 Coding Principles

Several principles are applied during the development of the system to ensure that the quality and proper structure in the code generated. These principles include of the following:

- **Readability**

It is very important when it comes to the future enhancement of the system. Code should be easily read and understood. To achieve this, comments can be used to explain the module or code. Variables and labels with meanings will also be helpful in the code.

- Maintainability

Code should be easily read, corrected and revised. Codes designed using object oriented concept can ease the process of maintaining or changes to the program code. Codes that perform functions for one module should be grouped and tried as much as possible to achieve high cohesion and loose coupling.

Chapter7 Testing System

Software testing is a formal process carried out by a specialized testing team in which a software unit, several integrated software units or an entire software package are examined by running the programs on a computer. All the associated tests are performed according to approved test procedures on approved test cases.[2]

The objectives of software testing are:

Direct objectives

- To identify and reveal as many errors as possible in the tested software
- To bring the tested software to an acceptable quality level
- To perform the required testing in an efficient and effective way, within budgetary and scheduling limitations

Indirect objective

- To supply records of software errors to be used for errors prevention[2]

7.1 Testing Strategies

In order to conduct a proper and thorough set of tests, the types of testing mentioned below should be performed in the order in which they are described. However, some system or hardware can happen concurrently with software testing.

7.1.1 Unit Testing

Unit testing procedure utilizes the white-box method and concentrates on testing individual programming units. These units are sometimes referred to as modules or atomic modules and they represent the smallest programming entity.

Unit testing is essentially a set of path test performed to examine the many different paths through the modules. These types of tests are conducted to prove

that all paths in the program are solid and without errors and will not cause abnormal termination of the program or other undesirable results.

7.1.2 Integration Testing

Integration testing focuses on testing multiple modules working together. Two basic types of integration are usually used: top-down or bottom up.

Top down, as the term suggests, starts at the top of the program hierarchy and travels down its branches. This can be done in either depth-first (shortest path down to the deepest level) or breadth-first (across the hierarchy, before proceeding to the next level). The main advantage of this type of integration is that the basic skeleton of the program/system can be seen and tested early. The main disadvantage is the use of program stubs until the actual modules are written. This basically limits the up-flow of information and therefore does not provide for a good test of the top level modules.

Bottom-up type of integration has the lowest level modules built and tested first on individual bases and in clusters using test drivers. This insures each module is fully tested before its utilized by its calling module. This method has a great advantage in uncovering errors in critical modules early. Main disadvantage is the fact that most or many modules must be build before a working program can be presented.

Integration testing procedure can be performed in three ways: *Top-down, Bottom-up*, or using an approach called *"Big-Bang"* [5].

7.1.2.1 Top-Down Strategy

Top down integration is basically an approach where modules are

developed and tested starting at the top level of the programming hierarchy and continuing with the lower levels.

It is an incremental approach because we processed one level at a time. It can be done in either *"depth"* or *"breadth"* manner.

- Depth means we proceed from the top level all the way down to the lowest level.
- Breadth, on the other hand, means that we start at the top of the hierarchy and then go to the next level. We develop and test all modules at this level before continuing with another level.

Either way, this testing procedure allows us to establish a complete **skeleton** of the system or product.

The benefits of Top-down integration are that, having the skeleton, we can test major functions early in the development process.

At the same time we can also test any interfaces that we have and thus discover any errors in that area very early on.

But the major benefit of this procedure is that we have a partially working model to demonstrate to the clients and the top management. This of course builds everybody's confidence not only in the development team but also in the model itself. We have something that proves our design was correct and we took the correct approach to implement it.

However, there are some drawbacks to this procedure as well:

Using stubs does not permit all the necessary upward data flow. There is simply not enough data in the stubs to feed back to the calling module.

As a result, the top level modules can not be really tested properly and

every time the stubs are replaced with the actual modules, the calling modules should be re-tested for integrity again.

7.1.2.2 Bottom-Up Strategy

Bottom-up approach, as the name suggests, is the opposite of the Top-down method.

This process starts with building and testing the low level modules first, working its way up the hierarchy.

Because the modules at the low levels are very specific, we may need to combine several of them into what is sometimes called a cluster or build in order to test them properly.

Then to test these builds, a test driver has to be written and put in place.

The advantage of Bottom-up integration is that there is no need for program stubs as we start developing and testing with the actual modules.

Starting at the bottom of the hierarchy also means that the critical modules are usually build first and therefore any errors in these modules are discovered early in the process.

As with Top-down integration, there are some drawbacks to this procedure.

In order to test the modules we have to build the test drivers which are more complex than stubs. And in addition to that they themselves have to be tested. So more effort is required.

A major disadvantage to Bottom-up integration is that no working model can be presented or tested until many modules have been built [5].

This also means that any errors in any of the interfaces are discovered very late in the process.

7.1.2.3 Big-Bang Strategy

Big-Bang approach is very simple in its philosophy where basically all the modules or builds are constructed and tested independently of each other and when they are finished, they are all put together at the same time.

The main advantage of this approach is that it is very quick as no drivers or stubs are needed, thus cutting down on the development time.

However, as with anything that is quickly slapped together, this process usually yields more errors than the other two. Since these errors have to be fixed and take more time to fix than errors at the module level, this method is usually considered the least effective.

Because of the amount of coordination that is required it is also very demanding on the resources.

Another drawback is that there is really nothing to demonstrate until all the modules have been built and integrated.

7.1.3 Function Testing

Function testing is a testing process that is black-box in nature. It is aimed at examining the overall functionality of the product. It usually includes testing of all the interfaces and should therefore involve the clients in the process. Because every aspect of the software system is being tested, the specifications for this test should be very detailed describing who, where, when and how will conduct the tests and what exactly will be tested.

The portion of the testing that will involve the clients is usually conducted as an alpha test where the developers closely monitor how the clients use the system. They take notes on what needs to be improved.

7.1.4 System Testing

Final stage of the testing process should be System Testing. This type of test involves examination of the whole computer system. All the software components, all the hardware components and any interfaces.

The whole computer based system is checked not only for validity but also for met objectives.

It should include ***recovery testing, security testing, stress testing*** **and** ***performance testing.***

Recovery testing uses test cases designed to examine how easily and completely the system can recover from a disaster (power shut down, blown circuit, disk crash, interface failure, insufficient memory, etc.). It is desirable to have a system capable of recovering quickly and with minimal human intervention. It should also have a log of activities happening before the crash (these should be part of daily operations) and a log of messages during the failure (if possible) and upon re-start.

Security testing involves testing the system in order to make sure that unauthorized personnel or other systems cannot gain access to the system and information or resources within it. Programs that check for access to the system via passwords are tested along with any organizational security procedures established.

Stress testing encompasses creating unusual loads on the system in attempts to break it. System is monitored for performance loss and susceptibility to crashing during the load times. If it does crash as a result of high load, it provides for just one more recovery test.

Performance testing involves monitoring and recording the performance levels during regular and low and high stress loads. It tests the amount of resource usage under the just described conditions and serves as basis for making a forecast of additional resources needed (if any) in the future. It is important to note that performance objectives should have been developed during the planning stage and performance testing is to assure that these objectives are being met. However, these tests may be run in initial stages of production to compare the actual usage to the forecasted figures [3]

Chapter 8 System Evaluation and Conclusion

8.1 Introduction

Throughout the software development phase, problems were encountered and for the most part resolved. The system was evaluated to identify its strengths limitations and possibilities for future enhancement. At here will be discuss the mentioned aspects and highlights some of the problems encounter throughout the system development.

8.2 System Evaluation

System evaluation is a process which is identifying the system strength and limitation by measuring the system is being built against expectations.

8.2.1 System Strength

8.2.1.1 Administrator Maintenance

This system enables the administrator to update the question into the database. It also allows the administrator to create, delete and view the question which is stored in the database.

8.2.1.2 Security Features

Security issues are taken into consideration so as to prevent an unauthorized user from breaking into the system. This is done through the implementation of a login procedure before the user can access the administrator page.

8.2.2 System Limitations

All of the system must be had the limitation. So, this system is also had the limitation.

8.2.2.1 Not Enough the Example

The system is not enough the example to be the reference to the user to learn the technique use the abacus.

8.3 Future Enhancement

There are always got new ideas encounter to during the development of the system. But, due to the time is constraints, not all the ideas can be incorporate into the system.

8.3.1 User verification

The user can be stored their information into the database. It also can be make the system more secure for the user to be use.

8.3.2 More examples

It need more example and animation to be insert into the system to make sure the system is more attractive and more easy to be learn the technique use the abacus.

8.3.3 Test Module

The test module need to be insert into the system to make sure the user are really understand the technique how to use the abacus.

8.4 Problems Encountered

8.4.1 Unfamiliarity with ASP.NET

Although ASP.net is widely considered to be one of the easiest programming languages to master, there was still difficulty faced in learning how to use it. Most of the reference books provide guidance in using data controls to connect to the database. However the data control method is rather limited in its functionality and therefore was not considered as a viable option. None of the numerous ASP.NET books provided any in depth reference on using alternative methods to connect to the database. Help was sought from friends in using alternative methods to connect to the database.

8.4.2 Insufficient Time

That is too more spent on the learning the developing tools in helping in the development the system. Especially there are not enough reference sources to be referred. So, the coding is start lately.

8.4.3 System requirement is not clear

System requirement is not clear enough to be specific the system. So, the system is hard to be developing and always change the requirement.

8.5 Knowledge Gained

There are much knowledge gained from the process of developing the system and implementation the system.

- Fundamental knowledge in the ASP.NET
- Fundamental knowledge in the C# programming language.
- Techniques in planning and developing an interactive website

- Techniques in designing and maintaining the database.
- Knowledge in using the additional software as a developing tools, like Microsoft Visual Studio .NET 2003.

8.6 Conclusion

Finally, the system has been built. Although the system is always achieved its objectives and the specifications, so that still got the room to be improve, especially on the interface of the system and the function.

It was good to learn the fundamental language like the ASP.NET. It allow many programming language embedded into it code.

Beside the technical knowledge gains, that is also got the non technical gain like use the abacus to calculate the arithmetic operation.

Reference

1.(*http://www.academicsuperstore.com/market/marketdisp.html?PartNo=632673&qk_srch=Microsoft*), 01/03/2005

2. Daniel G. (2004). Software Quality Assurance, England, Pearson Education Limited

3. (*http://www.hio.hen.nl/~vanleeuw/deeltijd/testtechnieken.html*), 01/03/2005

4. Pressman, R.S. (1997). Software Engineering, a practitioner's approach. U.S.A., McGraw Hill

5. Humphrey, W.S. (1989). Managing the software process. U.S.A., Addison-Wesley.

6. (*http://www.ee.ryerson.ca:8080/~elf/abacus/*), 31/08/2004

APPENDIX

Content

A User Manual

A.1 Introduction

The E-Abacus Animator is a web-based teaching-learning tool that is aimed at providing users with all possibilities to learn and teach mental arithmetic with an abacus by the skill like E-Learning. The term of the "E-Abacus Animator" used to describe practical Abacus knowledge where the more 'practical' means it can be applied to used and practice. An abacus is a calculating instrument with a number of beads sliding back and forth along rods, for doing and teaching arithmetic. This include knowledge such addition, subtraction, multiplication, division while the actual mechanics will also be explained in briefly. It is supported by a back-end database that can stores and keeps track of the steps of each arithmetic operation and the user information, which enables to provide the features required for an instructional teaching-learning technique and for system administration.

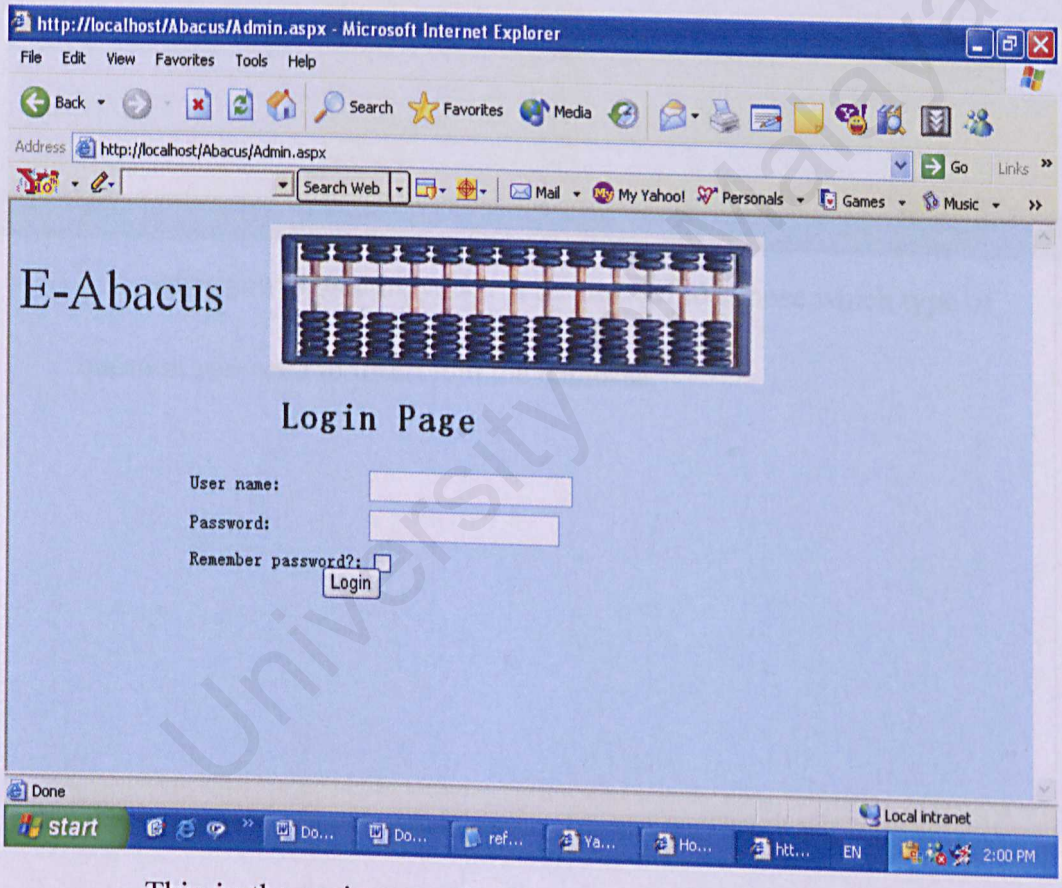
The project objective of E-learning is to produce software that can help the people to learn how to use the Abacus to calculate. By using the Abacus, it can make the people brain cleverer and the calculation of Abacus is faster than using the calculator. The Abacus is most accurate than the calculator. Nowadays, many schools are promoting the Abacus learning into their lesson for their student.

A.2 About This Manual

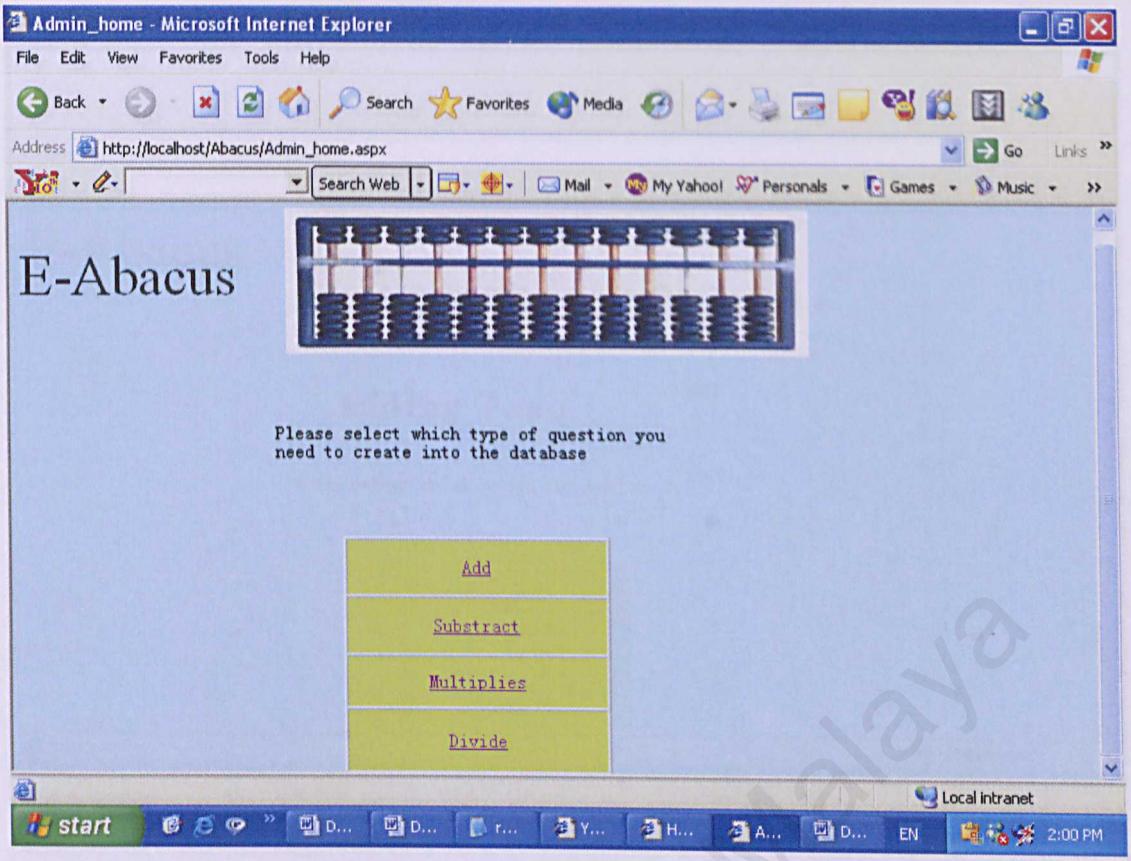
The system is divided into two parts, which is the administrator homepage and the user homepage.

A.2.1 Administrator homepage

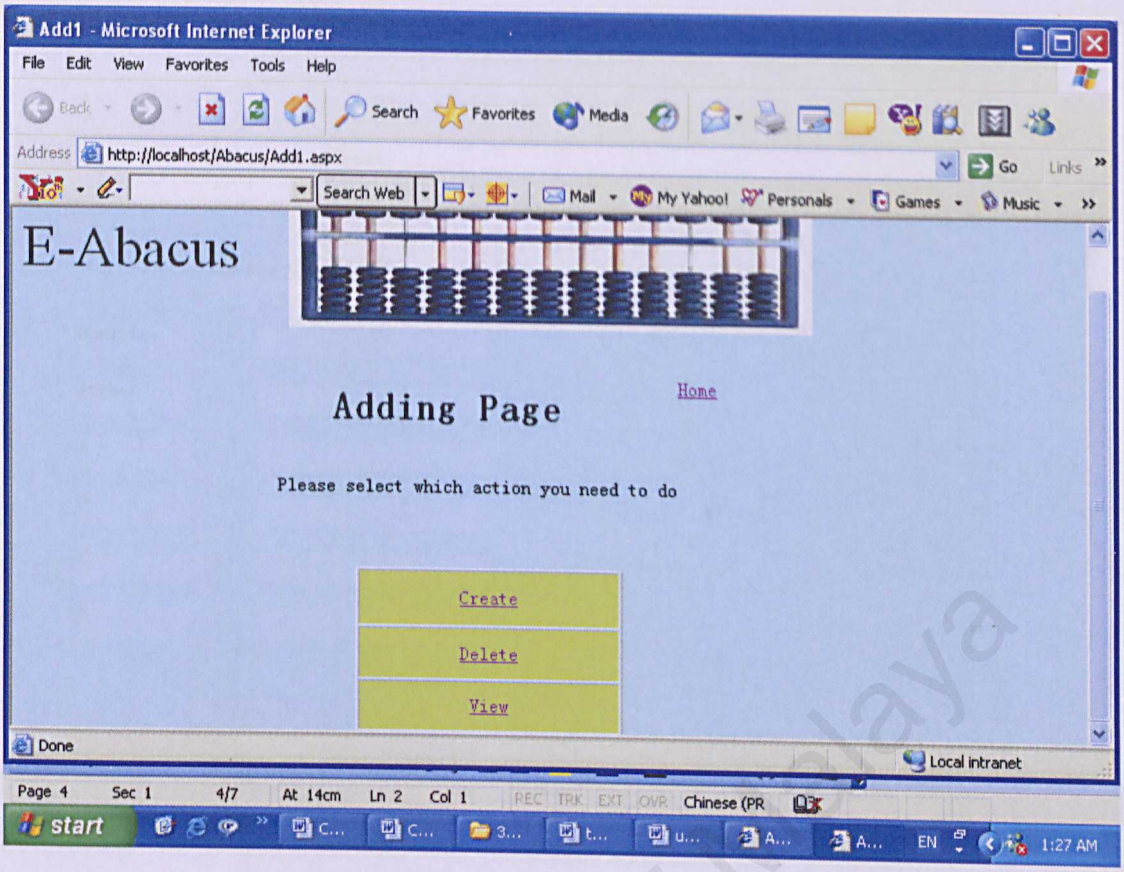
The administrator homepage allows the administrator to edit the tutorial questions in the back-end database system.



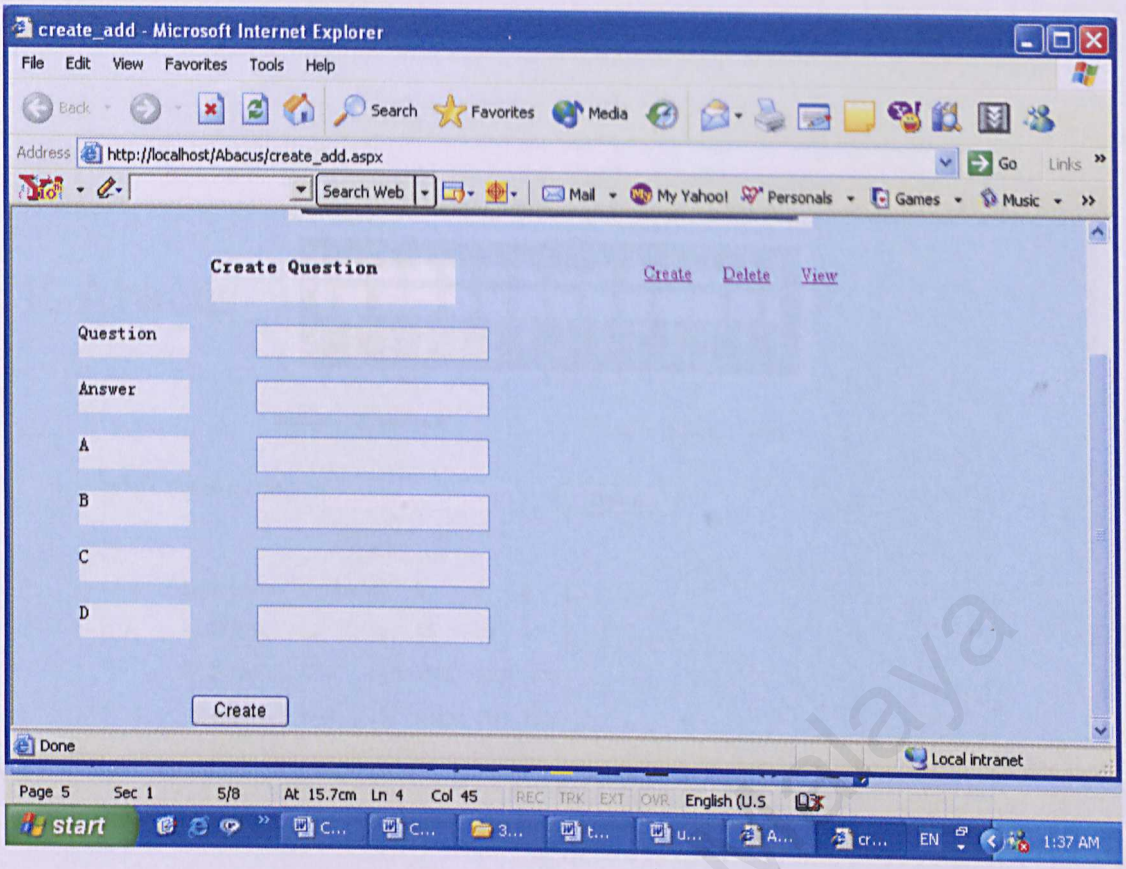
This is the main page for the administrator, you must first insert the correct user name and the password before you start using this system. When you press the Login button, if the user name and the password are both correct, you will be allowed to use the system.



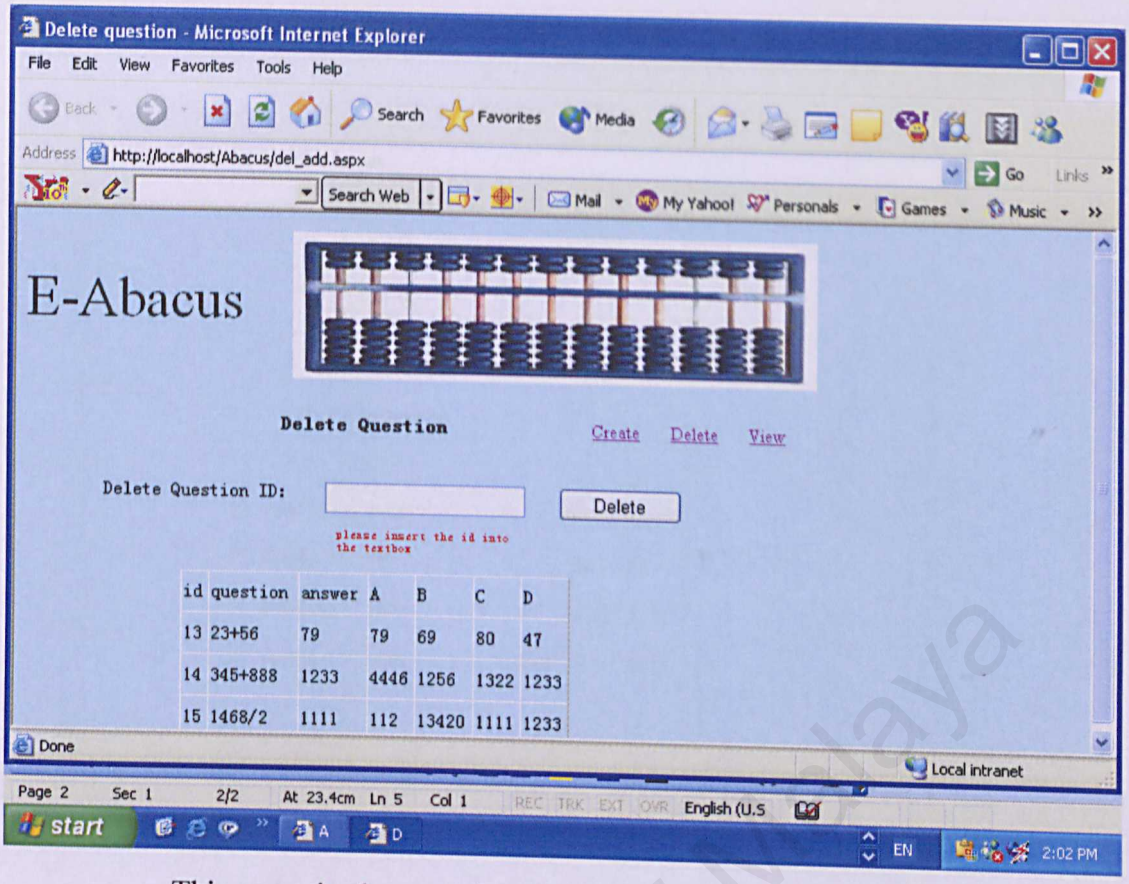
After you logged in, you will be allowed to choose which type of question you need to insert into the database.



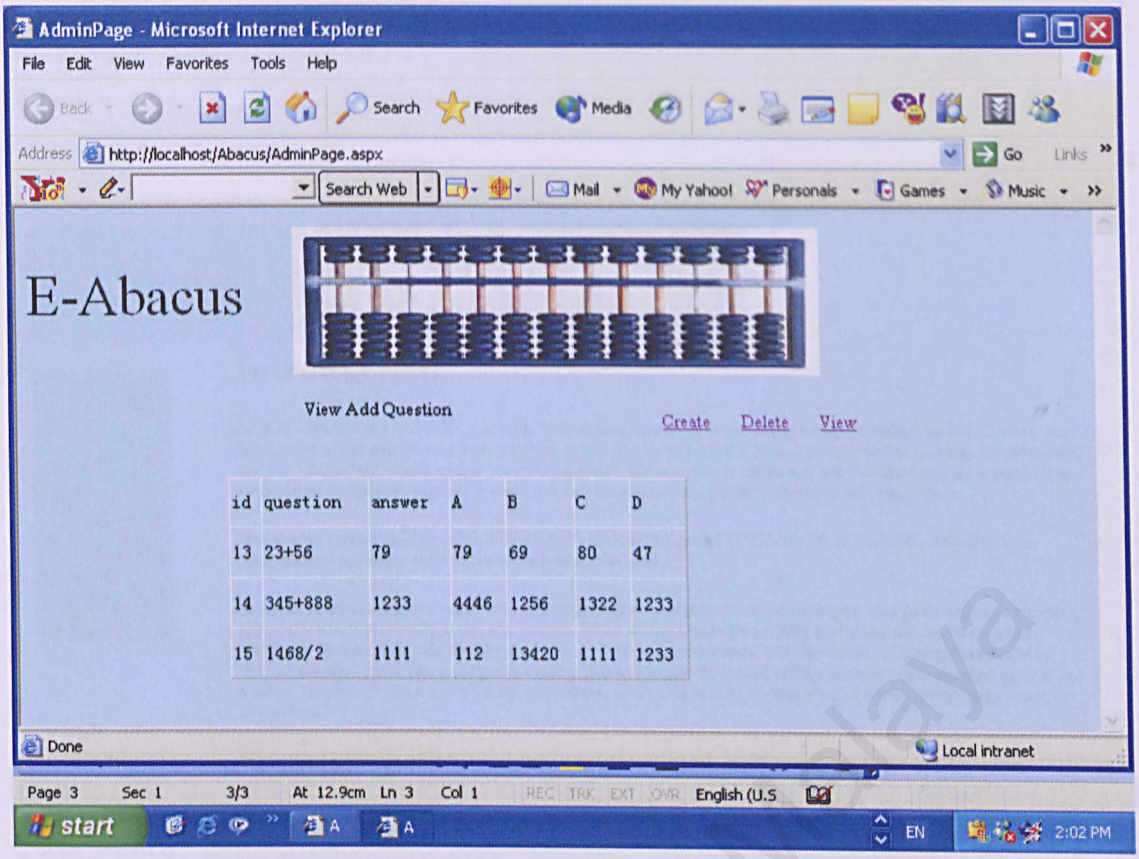
As an example, when you click on the Add button, this website will link you to a particular page which allow you to choose what you want do at next step, like choose to create an all new question, delete or have a view on the existing questions in the database. You must click on the hyperlink to make your choice.



This is a question-creating page, here you can insert the question, answer, multiple chooses into the textboxes which are available. After you insert all the textboxes, you must click on the create button to store the data into the abacus database. And then, it will link to the view page. This is o allow the user to make sure data was already stored into the database.



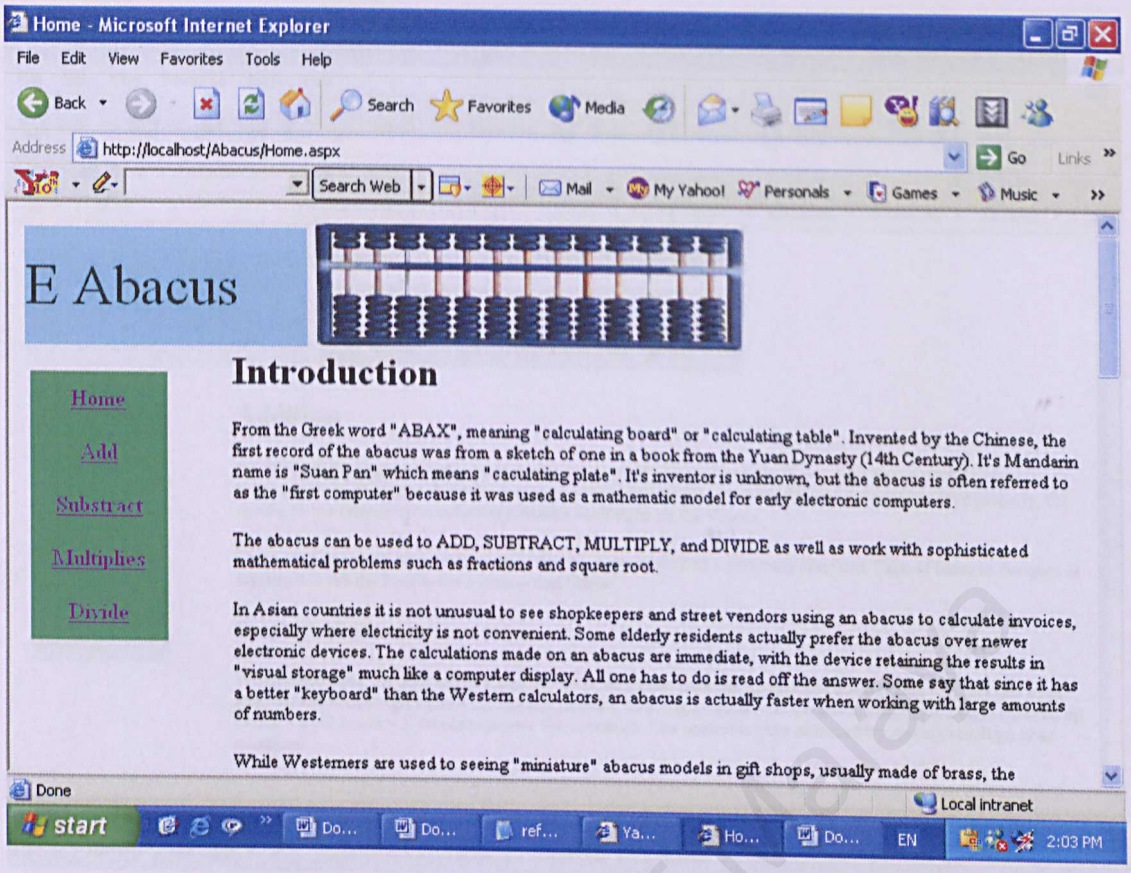
This page is the question-deleting page, at this page user can delete those existing questions. This is to reduce the size of the database. You need to insert the id of the question into the textbox to delete the question. And then click on the delete button to delete the selected question. After that, the page will be linked to the view page as well to enable the user to confirm that the question was deleted.



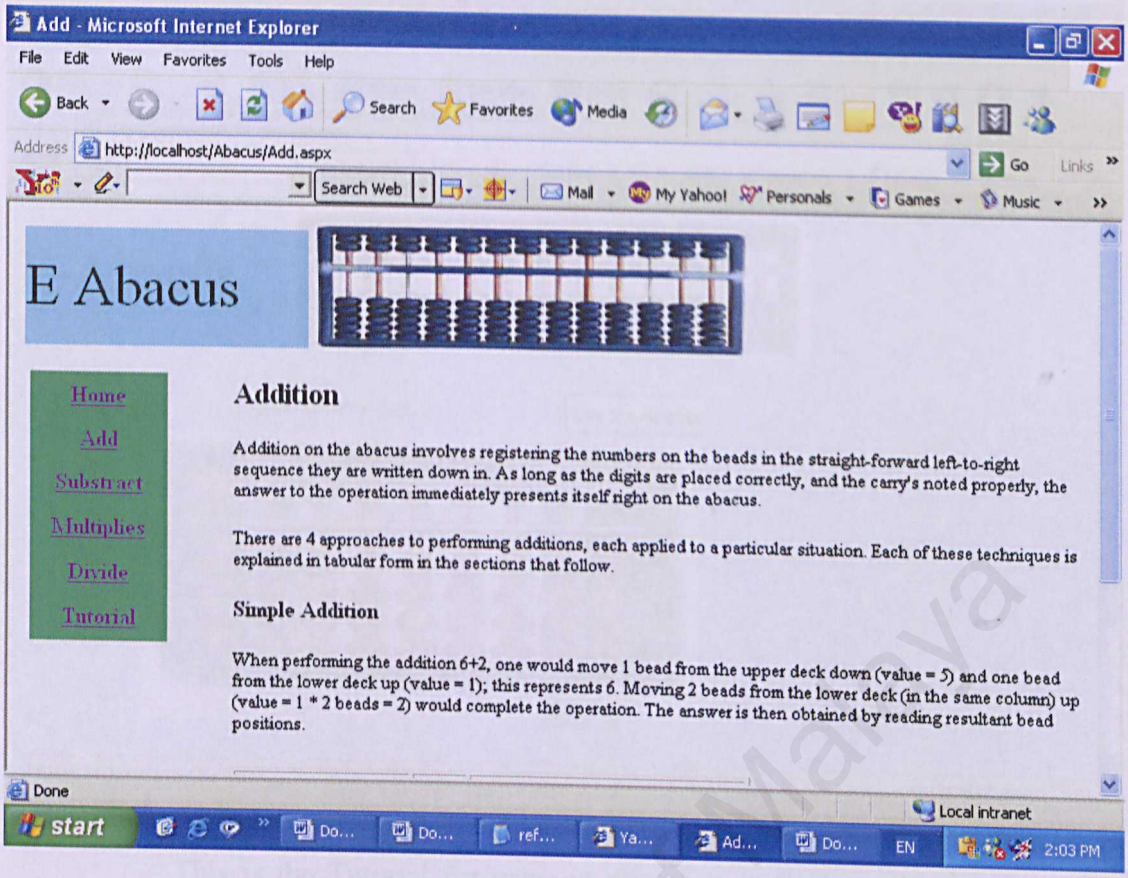
This is the view page. At this page you can view all the data which were already stored in the database. At here, got three hyperlinks which are create, delete and view which allow the user to continue on their work.

A.2.2 User Homepage

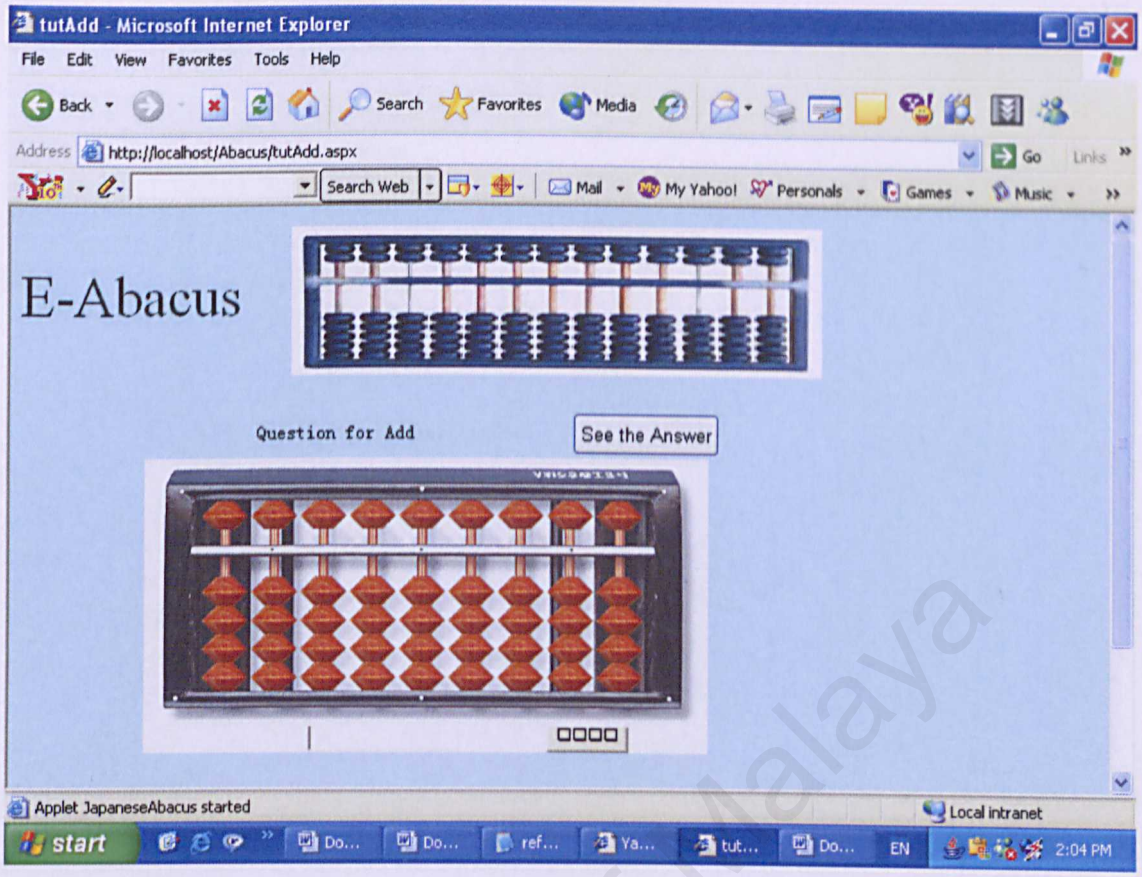
The user homepage is using by the user to access the learning lesson with an abacus from the web site. This user homepage provides abacus-using guideline, examples and tutorials for each lesson.



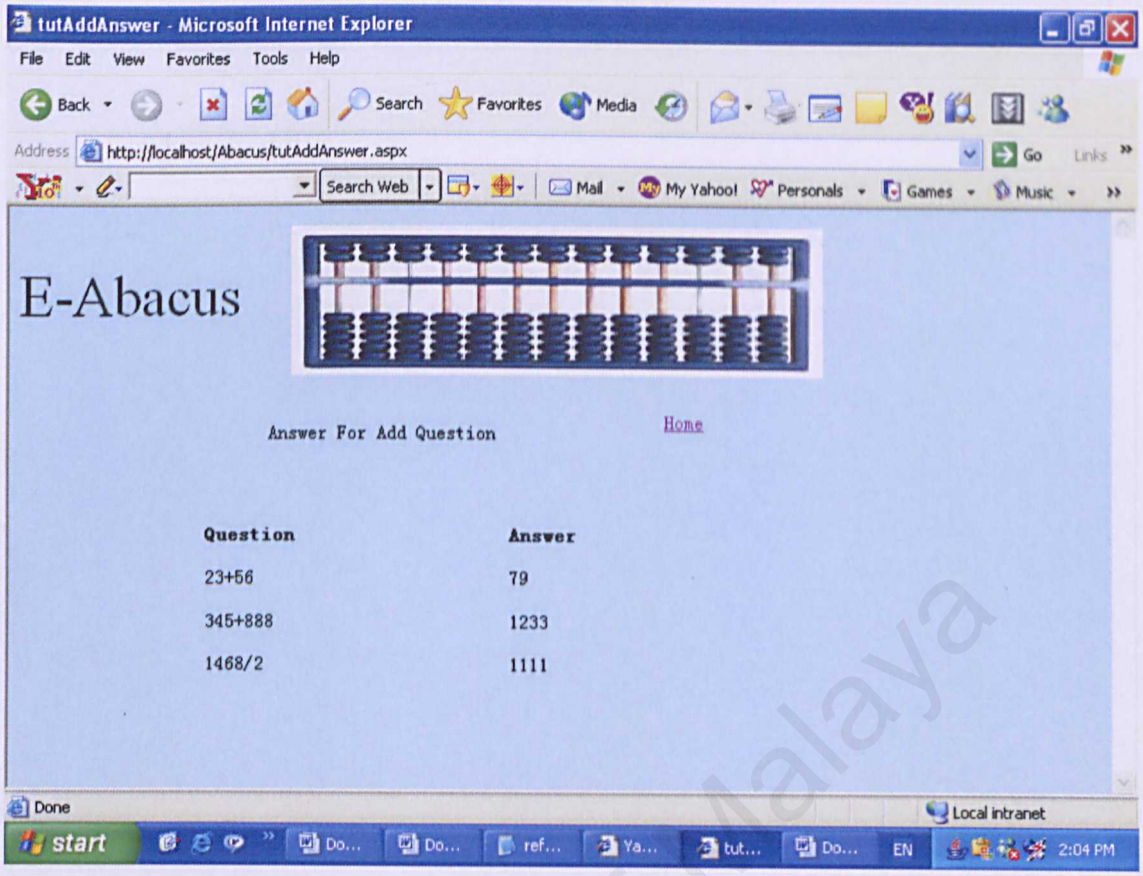
This is the main page of the user homepage. In this page it describes the history, basic technique of using abacus and providing a virtual abacus to the user. At here, you can choose which lessons you want to learn like addition, subtraction, multiplication and division operation.



This is the lesson page for the addition operation. It shows the technique of how to do the addition operation by using the abacus. At this page got one virtual abacus as the learning tool to make the user familiar with the abacus after this lesson. There are also some tutorial questions for user to practice their abacus skill.



This is the Tutorial for user; at this page it displays all the questions which were already stored in the database by the administrator. In this page, a virtual abacus is also provided for the user to do the calculation. After that, user can see the answer of the tutorial by simply click on the "see the answer" button.



These are the answers of the tutorial which were stored in the database.

Click on "home" will link the user back to the main page.