

D&D text-based CAPTCHA Logic Question In Web  
Services

TAN KIA HIM

BACHELOR DEGREE OF COMPUTER SCIENCE  
(COMPUTER SYSTEMS & NETWORKING) WITH  
HONOURS

UNIVERSITI MALAYSIA PAHANG

2014

D&D text-base



Web Services

TAN KIA HIM

A thesis submitted in fulfillment of the  
Requirements for the award of the degree of  
Bachelor of Computer Science (Computer system & networking) with Honours

FACULTY OF COMPUTER SYSTEM & SOFTWARE ENGINEERING

UNIVERSITY MALAYSIA PAHANG  
**103216**

DECEMBER 2014



UNIVERSITI MALAYSIA PAHANG

**BORANG PENGESAHAN STATUS TESIS**

JUDUL: D & D TEST-BASED CAPTCHA LOGIC QUESTION IN WEB SERVICES

SESI PENGAJIAN: 2013/2014

SAYA TAM KIA HIM (910517-03-5621)

Mengaku membenarkan tesis/laporan PSM ini disimpan di Perpustakaan Universiti Malaysia Pahang dengan syarat-syarat kegunaan seperti berikut:

1. Tesis/Laporan adalah hakmilik Universiti Malaysia Pahang.
2. Perpustakaan Universiti Malaysia Pahang dibenarkan membuat salinan untuk tujuan pengajian sahaja.
3. Perpustakaan dibenarkan membuat salinan tesis ini sebagai bahan pertukaran antara institut pengajian tinggi.
4. \*\*Sila tandakan (✓)

SULIT (Mengandungi maklumat yang berdarjah keselamatan atau kepentingan Malaysia seperti yang termaktub di dalam AKTA RAHSIA RASMI 1972) \*

TERHAD (Mengandungi maklumat TERHAD yang telah ditentukan oleh organisasi/badan di mana penyelidikan dijalankan) \*

TIDAK TERHAD

.....  
 Alamat Tetap:  
 1170, Jalan Hulu Pasar,  
 16200, Tumpat,  
 Kelantan.

Tarikh: 25/12/2014

Disahkan Oleh  
 .....  
 Penyelia:  
**Pn Wan Nurul Safawati Binti  
 Wan Manan**

Tarikh: 5/1/2015

\*Sila lampirkan surat daripada pihak berkuasa/organisasi berkenaan dengan menyatakan sekali sebab dan tempoh tesis/laporan ini perlu dikelaskan sebagai SULIT atau TERHAD.

### DECLARATION

I hereby declare the thesis "D&D text-based CAPTCHA Logic Question In Web Services" is the result of my own research thesis except as cited in the references which have been used for acknowledged. This project has not been accepted for any degree and is not concurrently submitted for award of other degree.



---

(Signature)


Name: TAN KIA HIM

Matric Number: CA11101

Date: 25/12/2014

**SUPERVISOR'S DECLARATION**

I hereby declare that I have read this thesis. In my opinion, this thesis is sufficient in terms of scope and standard for the submission of PSM 2, degree in Computer Science (Computer System & Networking).

Signature :  \_\_\_\_\_

Supervisor : PN. WAN NURULSAFAWATI BINTI WAN MANAN

Date : 5/1/2015

## ACKNOWLEDGEMENT

Firstly, I would like to thank the one and only God for giving me patience and good health for completed of my Bachelor technical report.

Secondary, I am very fortunate to have Pn. Wan Nurulsafawati Binti Wan Manan as my research supervisor. I am sincerely thankful for her guidance, advices and support me to complete my PSM 1 and PSM 2 within these two semesters.

Lastly, I would very grateful to my family for their love and endless support during completion of my technical report.

## ABSTRACT

The research discusses on the CAPTCHA, A CAPTCHA is an acronym for "Completely Automated Public Turing test to tell Computers and Humans Apart" to differentiate human from machine. In the previous condition, there are many types of CAPTCHA that implemented in the web. For example, text based, audio based, image based and puzzle based CAPTCHA.. In this project, a drag and drop (D&D) text-based CAPTCHA will be develop for a better approach to CAPTCHA, text-based CAPTCHA using a simple logic question with a drag and drop feature for validation. Drag and drop is a pointing device gesture which user selects a virtual object by "grabbing" it and dragging it to a different place. The CAPTCHA will be created in web based application in web services using nuSoap library.

Keywords: CAPTCHA; Drag and Drop, logic questions

## ABSTRAK

Kajian ini membincangkan tentang CAPTCHA "Completely Automated Public Turing test to tell Computers and Humans Apart", ia digunakan untuk membezakan robot atau manusia yang menggunakan web aplikasi komputer. Zaman ini terdapat pelbagai jenis CAPTCHA yang telah diwujudkan seperti gambar, suara, teks dan puzzle. Dalam projek ini, drag dan drop (D & D) CAPTCHA berasaskan teks akan membangunkan pendekatan yang lebih baik untuk CAPTCHA, CAPTCHA berasaskan teks menggunakan soalan logik mudah dengan drag dan drop ciri untuk pengesahan. Drag dan drop adalah alat isyarat yang menunjuk pengguna memilih objek maya oleh "meraih" dan menyeret ke tempat lain. CAPTCHA yang akan diwujudkan dalam aplikasi berasaskan web dalam perkhidmatan web menggunakan nuSoap library.

Kata Kunci: CAPTCHA; Drag dan Drop, soalan logik



## TABLE OF CONTENTS

DECLARATION .....	i
SUPERVISOR'S DECLARATION .....	ii
ACKNOWLEDGEMENT .....	iii
ABSTRACT.....	iv
ABSTRAK.....	v
CHAPTER I.....	1
INTRODUCTION .....	1
1.1 Introduction.....	1
1.2 Problem Statement .....	2
1.3 Objectives.....	3
1.4 Scopes .....	3
1.5 Thesis Organization .....	4
CHAPTER II.....	5
STUDIES EXISTING SYSTEM.....	5
2.0 Introduction.....	5
2.1 Existing System I: reCAPTCHA .....	5
2.1.1 System Description (reCAPTCHA) .....	5
2.1.2 Problem in Existing System (reCAPTCHA).....	6
2.2 Existing System II: TextCAPTCHA.....	7
2.2.1 System Description (TextCAPTCHA) .....	7
2.2.2 Problem in Existing System (TextCAPTCHA).....	8
2.3 Existing System III: QuickCaptcha 1.0.....	9
2.3.1 System Description (QuickCaptcha 1.0) .....	9
2.3.2 Problem in Existing System (QuickCaptcha 1.0).....	9
2.4 Comparison within Existing System.....	10

CHAPTER III .....	11
METHODOLOGY .....	11
3.0 Introduction .....	11
3.1 Methodology .....	11
3.2 Phase I: Requirement .....	12
3.3 Phase II: Design & Development.....	14
3.4 Design Description.....	14
3.4.1 Use Case Diagram .....	15
3.4.2 Flow Chart Diagram .....	16
3.4.3 Context Diagram .....	19
3.4.4 Entity- Relationship Diagram.....	19
3.4.5 Data Flow Diagram Level 0 .....	20
3.4.6 Prototype Interface .....	20
3.5 Development Tools .....	22
3.5.1 Hardware Requirements .....	22
3.5.2 Software Requirements .....	22
3.6 Phase III: Testing .....	23
3.7 Phase: Implementation .....	23
CHAPTER IV .....	24
DESIGN AND IMPLEMENTATION .....	24
4.1 Introduction .....	24
4.2 Database Development.....	24
4.3 System Development .....	25
4.3.1 Main page .....	25
4.3.2 CAPTCHA demo page .....	26
4.3.3 Result of the validation page .....	29
4.3.4 Result of the validation page ( coding).....	30
4.3.5 Login page .....	31
4.3.6 Create CAPTCHA questions page .....	31
4.3.7 CAPTCHA Data List.....	32
4.3.8 Client Profile .....	33

4.3.9 Registration page .....	33
4.3.10 User Sign up page.....	34
4.3.11 CAPTCHA.php .....	35
4.3.12 CAPTCHAserver.php.....	36
4.3.13 CAPTCHAserver.php.....	38
4.3.14 CAPTCHAserver.php.....	39
4.3.15 WSDL Addresses .....	41
4.3.16 Index.php .....	41
4.3.17 validate.php .....	43
CHAPTER V .....	44
RESULT AND DISCUSSION .....	44
5.1 Introduction.....	44
5.2 Advantages and Disadvantages.....	45
5.2.1 Advantages.....	45
5.2.2 Disadvantages .....	45
5.3 Constraints.....	46
5.4 Summary .....	46
CHAPTER VI.....	47
CONCLUSION.....	47
6.1 Conclusion.....	47
6.2 Future Enhancement.....	48
REFERENCES .....	49
APPENDIX A.....	50
Work Schedule in Gantt Chart.....	50
APPENDIXB.....	50

**LIST OF TABLES**

<b>Table Number</b>	<b>Page</b>
Table 2. 1: The comparison within the existing system .....	10
Table 3.5. 1: Hardware Requirements.....	22
Table 3.5. 2: Software Requirements .....	22

## LIST OF FIGURES

Figure Number	Page
Figure 1.1: Most Maddening Types of CAPTCHA ( Mackenzie Yang,2013) .....	2
Figure 1.2: Most Maddening Types of CAPTCHA ( Mackenzie Yang,2013) .....	2
Figure 2.1: The interface of reCAPTCHA( Shane McGlaun,2014).....	6
Figure 2.2: Most Maddening Types of CAPTCHA ( Mackenzie Yang,2013) .....	7
Figure 2.3: The interface of TextCAPTCHA(Softpedia,2014).....	8
Figure 2.4: The answer with MD5 Encrytion.(TextCAPTCHA,2014).....	8
Figure 2.5: The interface of QuickCAPTCHA( web1Marketing,2014) .....	9
Figure3.1: Interactive Model Phase .....	11
Figure 3.2: Use Case Diagram .....	15
Figure 3.3: Flow Chart of Web Service .....	16
Figure 3.4: Flow Chart of Admin.....	17
Figure 3.5: Flow Chart of Client.....	18
Figure 3.6: Context Diagram .....	19
Figure 3.7: Entity Relationship Diagram .....	19
Figure 3.8: Admin Login Interface .....	20
Figure 3.9: Create CAPTCHA Interface.....	20
Figure 3.10: View Client Interface.....	20
Figure 3.11: View CAPTCHA Questions Interface.....	21
Figure 3.12: D&D text-based CAPTCHA Logic Question Interface .....	21
Figure 4.1: CAPTCHA database.....	24
Figure 4.2: Example table .....	24
Figure 4.3: Client table.....	25
Figure 4.4: Main page .....	25
Figure 4.5:CAPTCHA demo page .....	26
Figure 4.6: demo.js.....	28
Figure 4.7: demo.php .....	29
Figure 4.8: Result of the validation page .....	29
Figure 4.9: Result of the valifation page( coding) .....	30
Figure 4.10: Login page .....	31
Figure 4.11: Create CAPTCHA question page .....	32
Figure 4.12: CAPTCHA Data list .....	32
Figure 4.13:Client profile.....	33
Figure 4.14:Registration page .....	33
Figure 4.15: User Sign up4.3.13 WSDL Addresses.....	34
Figure 4.16: Interactive Description WSDL Addresses.....	34
Figure 4.17: CAPTCHA Server.php .....	35
Figure 4.18: WSDL Addressess .....	41
Figure 4.19: Index.php.....	42
Figure 4.20:Validate.php.....	43

## LIST OF ABBREVIATIONS

CAPTCHA: Completely Automated Public Turing Test To Tell Computers and Human Apart.

BOTS : Robots , automated processes.

D&D : Drag and Drop

Lib : library

## CHAPTER I

### INTRODUCTION

#### 1.1 Introduction

Nowadays, the growth of internet has been increase rapidly. This will cause the web security become a critical and challenging issue. Some hacker wrote a malicious program called BOT. BOT also known as robot which can run automated tasks over the internet and create problem to the web services. In order to prevent the BOT from creating problem, a CAPTCHA based security will be implemented in the web.

A CAPTCHA is an acronym for "Completely Automated Public Turing test to tell Computers and Humans Apart" to differentiate human from machine. The function of CAPTCHA is to determine whether the human or BOT by giving the user an image with word, the user must key in the word in textbox for validation. For example Yahoo, Hotmail or Gmail implement the CAPTCHA in sign up process to avoid BOT from signing up a lot of free accounts.

There are many type of CAPTCHA such as text based, audio based, image based and puzzle based CAPTCHA. In this project, a drag and drop text-based CAPTCHA will be develop for a better approach to CAPTCHA, text-based CAPTCHA using a simple logic question with a drag and drop feature for validation. Drag and drop is a pointing device gesture in which the user selects a virtual object by "grabbing" it and dragging it to a different place. The objective of this system is to provide a simple logic question with multiple choice answer where the question are designed according to the intelligence of above age of seven-year-old child to user, user require to drag the answer in order to answer the following question for validation.

## 1.2 Problem Statement

The problem that face by the current CAPTCHA are:

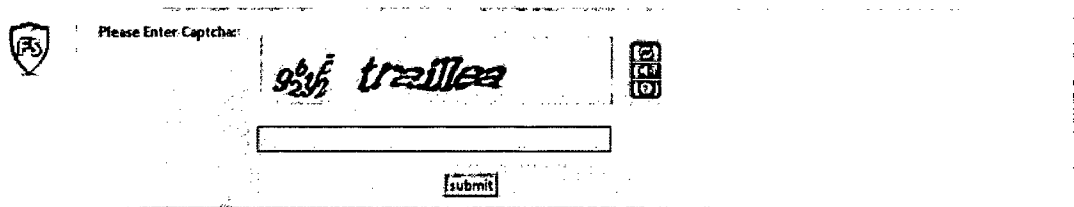
- i) The provided image was blur.



**Figure 1.1:** Most Maddening Types of CAPTCHA ( Mackenzie Yang,2013)

From the figure 1.1: User unable to enter those numbers because of the picture is not clear enough.

- ii) The provided text was unknown.



**Figure 1.2:** Most Maddening Types of CAPTCHA ( Mackenzie Yang,2013)

From the figure 1.2, how user going to type the text that provided?

- iii) The provided image was often so distorted that even a human cannot read them.

That's a particular problem in nonsense words like "rl10Ozirl." Are those lowercase Ls or number ones? Zero or letter O? (David Pogue, 2012)



### 1.3 Objectives

- i) To develop a text-based CAPTCHA in the system.
  - A simple logic question for validation to overcome the blur background with distorted characters.
  
- ii) To implement drag and drop feature for text-based CAPTCHA in the system.
  - Drag and drop any object is very easy for every human and no needs special analytical or technical abilities.
  
- iii) To implement a web service for drag and drop text-based CAPTCHA using NuSOAP lib.
  
- iv) To grant an improve security control over the usual CAPTCHA technique at the same time improve user friendliness.

### 1.4 Scopes

Scope of project is going to be conducted as follows:

- i) Developed a simple logic question drag and drop text-based CAPTCHA using web-based application.
  
- ii) The programming language that will be using in this project are HTML, PHP, and javascript.
  
- iii) Developed a web service for web-based application using NuSOAP.

## **1.5 Thesis Organization**

The thesis is consists of five chapters:

Chapter 1 will discuss about overview of the system or research. It included with introduction, problem statement, objectives, scopes and thesis organization.

Chapter 2 will consists of the literature review about the previous existing systems. It might give new interpretation of the old materials, then enhance it with old information.

Chapter 3 will discuss about the methodology included with the method or technique to be used.

Chapter 4 is about the design and implementation of the system. The system design, architecture design and module design will be conducted.

Chapter 5 is the conclusion part which will summarize the overall achievement of the project and system future enhancement.

## CHAPTER II

### STUDIES EXISTING SYSTEM

#### 2.0 Introduction

From the title "Drag and Drop text-based CAPTCHA ", this chapter will discuss about the findings of the existing system reviews from various literatures or article to make the comparison between previous system about the type of CAPTCHA, objective function, problem, and the implementation. During this phase, all the journal, thesis, article and more will be reviewed.

The existing system that will compare are reCAPTCHA, TextCAPTCHA and QuickCaptcha 1.0.

#### 2.1 Existing System I: reCAPTCHA

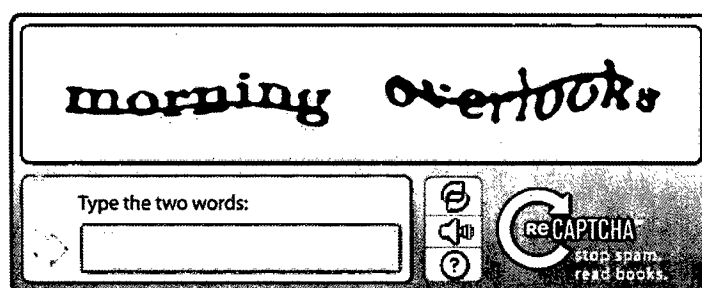
reCAPTCHA is a authentication system that develop by Luis von Ahn, Ben Maurer, Colin McMillen, David Abraham and Manuel Blum. In September 2009, the system has been acquired by the Google.(Google, 2009)

##### 2.1.1 System Description (reCAPTCHA)

reCAPTCHA provide a free service authentication system for user to protect the website from spam and abuse, user able to use reCAPTCHA application programming interface (API) by register using Google account.

reCAPTCHA is a image-based CAPTCHA , the objective of the system is to provide a image that is difficult to recognition by a BOT and easily be identified by human. It will provided an image for user and ask user to key in the validation to protect website from BOT attempting such as free email providers, social network, wikis, blogs and more. For example to prevent BOT from register a millions of free account in email providers such as Hotmail, Gmail and more, which used to send spam email.( Luis von Ahn et al,2008)

The implementation of reCAPTCHA is using Java script API with the server making a callback to reCAPTCHA after the request has been submitted. It also offers plugins for several web-application platforms such as ASP.NET, Ruby, or PHP to ease the implementation of the service.(Google,2014) reCAPTCHA also offer a audio CAPTCHA option for blind people.

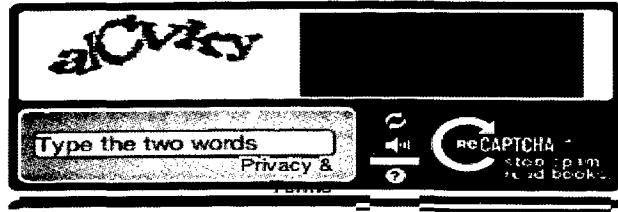


**Figure 2.1:** The interface of reCAPTCHA( Shane McGlaun,2014)

Figure 2.1 shows the interface of the reCAPTCHA system that used for authentication validation.

### 2.1.2 Problem in Existing System (reCAPTCHA)

reCAPTCHA is a good authentication system because it is difficult to crack by a optical character recognition (OCR) tool or software.( Luis von Ahn et al,2008) In order to make the image difficult to crack by the OCR, the provided image must be more blur this will cause the problem for the user.



**Figure 2.2:** Most Maddening Types of CAPTCHA ( Mackenzie Yang,2013)

From the figure 2.2, user are able to key in the "alcvky" but unable to enter those number because the image are blur. (Mackenzie Yang, 2013)

## 2.2 Existing System II: TextCAPTCHA

TextCAPTCHA is also a authentication system that are widely used to prevent spamming on website.

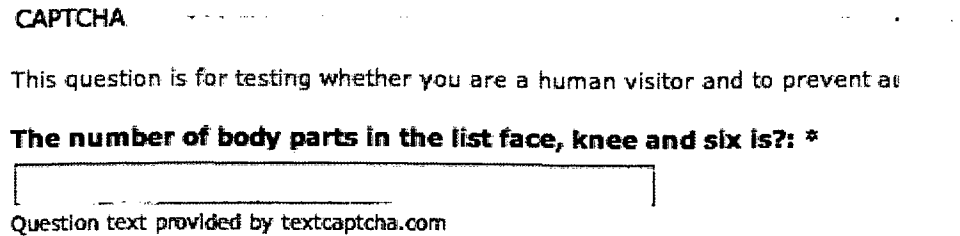
### 2.2.1 System Description (TextCAPTCHA)

TextCAPTCHA also provides a free simple web service to user for using the system, registration are required to obtain the application programming interface (API) key so that user are able to use the system.

TextCAPTCHA is different from other CAPTCHA, it is a text-based CAPTCHA but using a simple logic question for validation. The objective of this system is to provide a simple logic question for validation. So far this system have 180,243,205 simple logic question, the question are designed according to the intelligence of a seven-year-old child so it is easy to be answer.(David Bushell, 2011)

Example of the question are:

- The 6th letter in “unrolled” is?
- What is fifty-eight thousand, five hundred and seventy-four as digits?
- Which of 3, twenty-nine, 70, 46 or 65 is the lowest?



**Figure 2.3:** The interface of TextCAPTCHA(Softpedia,2014)

TextCAPTCHA using web service API as their implementation, by using API key user are able to access the XML web service interface. The XML will response with a plain text question, and the answer will be converted to lowercase and encrypt with MD5 hashes. Figure 2.4 shows the answer that has been encrypt with MD5 in simple XML.

```
<captcha>
<question>If tomorrow is Saturday, what day is today?</question>
<answer>f6f7fec07f372b7bd5eb196bbca0f3f4</answer>
<answer>dfc47c8ef18b4689b982979d05cf4cc6</answer>
</captcha>
```

**Figure 2.4:** The answer with MD5 Encryption.(TextCAPTCHA,2014)

### 2.2.2 Problem in Existing System (TextCAPTCHA)

One of the problem that existing in this system are the accessibility, because the question that are provided by the system is only English. This will be a problem to people who are not using English as their primary language.(Lewis, 2007)

Beside that limited questions in the system also is one of the problem, according to (Lewis, 2007) because there's only a limited amount of questions in the system provided, and soon enough bots will have indexed all the default ones, or indexed all the ones from popular boards. The questions only need to be human solved once, and then the BOT can cache the question and answer and spam away. These make it not a great choice for the developers to include by default.

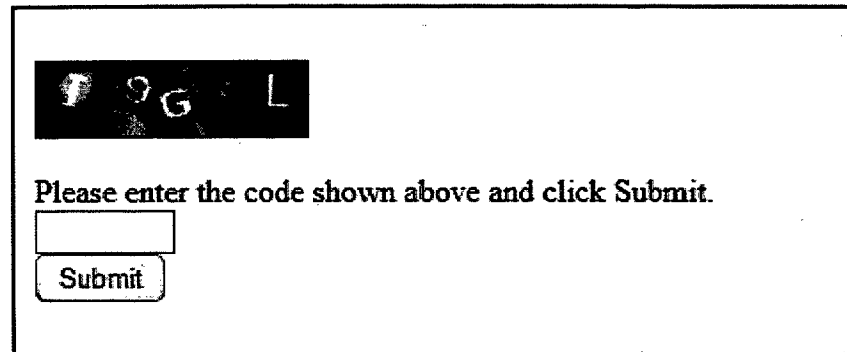
## 2.3 Existing System III: QuickCaptcha 1.0

QuickCaptcha 1.0 is a script that will provide CAPTCHA functionality to any website.

### 2.3.1 System Description (QuickCaptcha 1.0)

QuickCaptcha 1.0 is different from TextCAPTCHA and reCAPTCHA because it is not a web service, it is a PHP script that will provide a CAPTCHA functionality. The script is free, user able to modified the script.

QuickCaptcha is a image-based CAPTCHA. The objective function of QuickCaptcha is to provide the graphic or picture that are easily read by humans but not so easily by the BOT.



**Figure 2.5:** The interface of QuickCAPTCHA( web1Marketing,2014)

QuickCaptcha 1.0 use PHP programming language to implement the CAPTCHA, the requirement of use this CAPTCHA are PHP version 4.3.2 with GD library 2.0.2. QuickCaptcha also allow user to configure the CAPTCHA setting such as specify string length, allowable characters, color contrast, adn several kinds of geometric obfuscation elements.

### 2.3.2 Problem in Existing System (QuickCaptcha 1.0)

One of the problem of QuickCaptcha 1.0 are, user must have a PHP programming language knowledge to configure the CAPTCHA setting. If user does not have the PHP knowledge, user unable to configure the string length, allowable

characters, color contrast, and several kinds of geometric obfuscation elements of the CAPTCHA because QuickCaptcha does not provide an interface for configuration.

The next problem is the browser will not refresh the image. This will happen when user key in the wrong code and click "back" button to return to the form, the browser will not refresh the image although the expected number is changed.

## 2.4 Comparison within Existing System

**Table 2. 1:** The comparison within the existing system

Features	Drag and Drop text-based CAPTCHA	reCAPTCHA	TextCAPTCHA	QuickCaptcha 1.0
Type of CAPTCHA	Text based captcha	Image based captcha	Text based captcha	Image based captcha
Audio CAPTCHA	No	Yes	No	No
Drag and drop feature	Yes	No	No	No
Reload Button	No	Yes	No	No
Web Service	Yes	Yes	Yes	No

Based on the above table, Drag and drop text-based CAPTCHA and TextCAPTCHA have the similarity of the type of CAPTCHA which are based on text based CAPTCHA while reCAPTCHA and QuickCAPTCHA are based on image based CAPTCHA. The comparison also shows that reCAPTCHA, TextCAPTCHA and QuickCAPTCHA does not using the Drag and Drop feature. Most of the CAPTCHA are implement in web services.



## CHAPTER III

### METHODOLOGY

#### 3.0 Introduction

This chapter will discuss about the phases of the overall project methodology in order to ensure that the project is carry out with correct sequences. A suitable system development methodology is needs to be selected as software methodology is the framework that used to structure, plan and control the process of developing information systems. With a suitable methodology, it will lead the development of software become more effectively and efficiently.

#### 3.1 Methodology

The system development methodology that will use in this project is iterative model. The reason that choosing the iterative model is because Iterative process starts with a simple implementation of a subset of the software requirements and iteratively enhances the evolving versions until the full system is implemented.

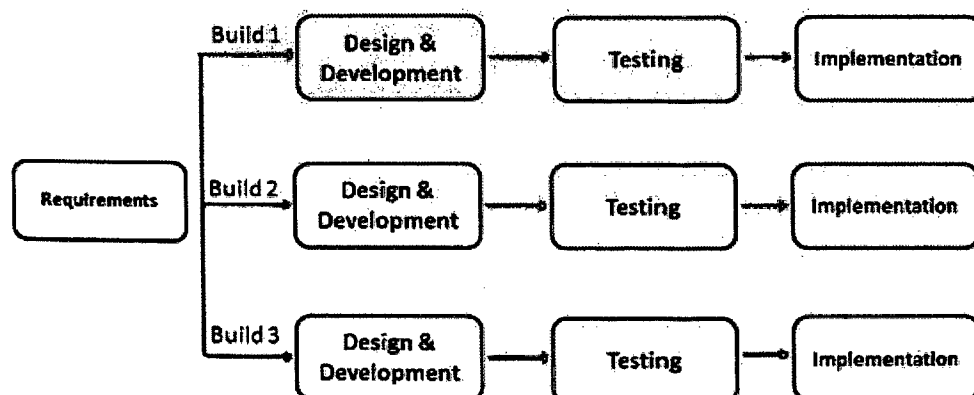
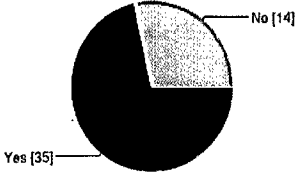


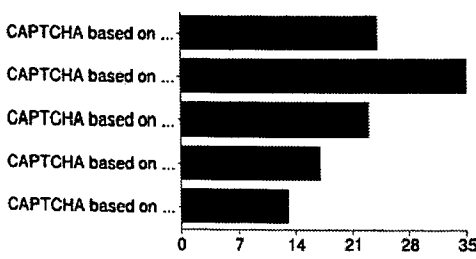
Figure3.1: Iterative Model Phase

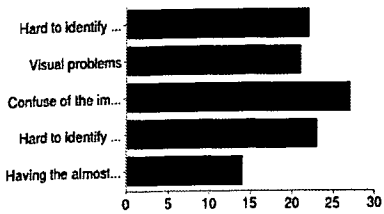
Figure 3.1 show that the iterative model consist 4 phases that are requirement, design and development, testing and implementation.

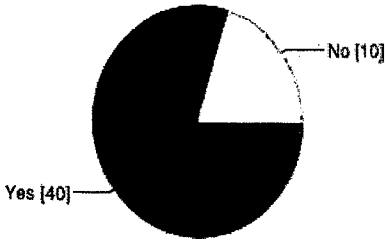
### 3.2 Phase I: Requirement

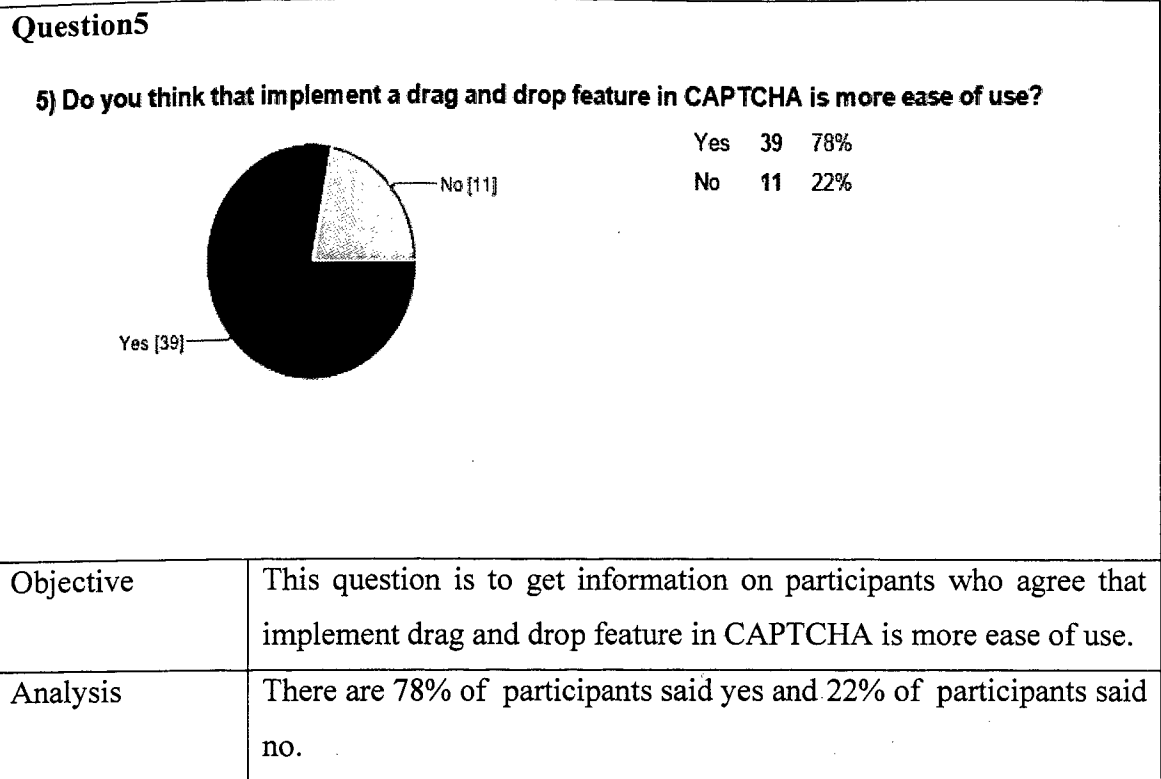
This phase is analyzed the requirements of the proposed system, collect the data from users. The requirements will comprise the function and interface that are expected by the users. The questionnaire will parallel processing with the requirement analysis.

<p><b>Question1</b></p> <p>1) Do you know what is Completely Automated Public Turing test to tell Computers and Humans Apart (CAPTCHA)?</p> <div style="display: flex; align-items: center;">  <table style="margin-left: 20px;"> <tr> <td>Yes</td> <td>35</td> <td>70%</td> </tr> <tr> <td>No</td> <td>14</td> <td>28%</td> </tr> </table> </div>		Yes	35	70%	No	14	28%
Yes	35	70%					
No	14	28%					
Objective	This question is to get information on participants who know about the CAPTCHA.						
Analysis	There are 70% of participants know about the CAPTCHA and 28% of participants doesn't know.						

<p><b>Question2</b></p> <p>2) What categories of CAPTCHA you have seen before ?( can choose more than one answer )</p> <div style="display: flex; align-items: center;">  <table style="margin-left: 20px;"> <tr> <td>CAPTCHA based on text</td> <td>24</td> <td>48%</td> </tr> <tr> <td>CAPTCHA based on image</td> <td>35</td> <td>70%</td> </tr> <tr> <td>CAPTCHA based on audio</td> <td>23</td> <td>46%</td> </tr> <tr> <td>CAPTCHA based on video</td> <td>17</td> <td>34%</td> </tr> <tr> <td>CAPTCHA based on puzzle</td> <td>13</td> <td>26%</td> </tr> </table> </div>		CAPTCHA based on text	24	48%	CAPTCHA based on image	35	70%	CAPTCHA based on audio	23	46%	CAPTCHA based on video	17	34%	CAPTCHA based on puzzle	13	26%
CAPTCHA based on text	24	48%														
CAPTCHA based on image	35	70%														
CAPTCHA based on audio	23	46%														
CAPTCHA based on video	17	34%														
CAPTCHA based on puzzle	13	26%														
Objective	This question is to differentiate the types of CAPTCHA often saw by participants.															
Analysis	Most of the participants saw Image-based CAPTCHA which occupy 70% of the participants, followed by Text-based CAPTCHA which hold 48%, then is the Audio-base CAPTCHA shown 46% and the least is the Puzzle-based CAPTCHA which is only 26% of the participant saw it often.															

Question3																																		
<p>3) What problems do you have when enter the CAPTCHA ?( can choose more than one answer)</p> <div style="display: flex; align-items: flex-start;"> <div style="flex: 1;">  <table border="1" style="margin-top: 10px;"> <thead> <tr> <th>Problem</th> <th>Count</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Hard to identify due to the number of classes of characters and digits are very small.</td> <td>22</td> <td>44%</td> </tr> <tr> <td>Visual problems</td> <td>21</td> <td>42%</td> </tr> <tr> <td>Confuse of the image identification due to images blurring.</td> <td>27</td> <td>54%</td> </tr> <tr> <td>Hard to identify actual arrangement of puzzles.</td> <td>23</td> <td>46%</td> </tr> <tr> <td>Having the almost same similar sound of character.</td> <td>14</td> <td>28%</td> </tr> </tbody> </table> </div> <div style="flex: 1; padding-left: 20px;"> <table border="0"> <tr> <td>Hard to identify due to the number of classes of characters and digits are very small.</td> <td style="text-align: right;">22</td> <td style="text-align: right;">44%</td> </tr> <tr> <td>Visual problems</td> <td style="text-align: right;">21</td> <td style="text-align: right;">42%</td> </tr> <tr> <td>Confuse of the image identification due to images blurring.</td> <td style="text-align: right;">27</td> <td style="text-align: right;">54%</td> </tr> <tr> <td>Hard to identify actual arrangement of puzzles.</td> <td style="text-align: right;">23</td> <td style="text-align: right;">46%</td> </tr> <tr> <td>Having the almost same similar sound of character.</td> <td style="text-align: right;">14</td> <td style="text-align: right;">28%</td> </tr> </table> </div> </div>		Problem	Count	Percentage	Hard to identify due to the number of classes of characters and digits are very small.	22	44%	Visual problems	21	42%	Confuse of the image identification due to images blurring.	27	54%	Hard to identify actual arrangement of puzzles.	23	46%	Having the almost same similar sound of character.	14	28%	Hard to identify due to the number of classes of characters and digits are very small.	22	44%	Visual problems	21	42%	Confuse of the image identification due to images blurring.	27	54%	Hard to identify actual arrangement of puzzles.	23	46%	Having the almost same similar sound of character.	14	28%
Problem	Count	Percentage																																
Hard to identify due to the number of classes of characters and digits are very small.	22	44%																																
Visual problems	21	42%																																
Confuse of the image identification due to images blurring.	27	54%																																
Hard to identify actual arrangement of puzzles.	23	46%																																
Having the almost same similar sound of character.	14	28%																																
Hard to identify due to the number of classes of characters and digits are very small.	22	44%																																
Visual problems	21	42%																																
Confuse of the image identification due to images blurring.	27	54%																																
Hard to identify actual arrangement of puzzles.	23	46%																																
Having the almost same similar sound of character.	14	28%																																
Objective	This question is to demonstrate the problems that face by the users when entering the CAPTCHA.																																	
Analysis	54% of the user confuse of the image identification due to image blurring; 46% of the user mentioned hard to identify actual arrangement of puzzle; 44% of the user mentioned hard to identify due to the number of classes of characters and digits are very small; 42% of the user mentioned about visual problems and the rest 28% having the almost same similar sound of character.																																	

Question4																
<p>4) Do you agree that CAPTCHA can bring highest level of security by prevent the BOT attacks?</p> <div style="display: flex; align-items: center;"> <div style="flex: 1;">  <table border="1" style="margin-top: 10px;"> <thead> <tr> <th>Response</th> <th>Count</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Yes</td> <td>40</td> <td>80%</td> </tr> <tr> <td>No</td> <td>10</td> <td>20%</td> </tr> </tbody> </table> </div> <div style="flex: 1; padding-left: 20px;"> <table border="0"> <tr> <td>Yes</td> <td style="text-align: right;">40</td> <td style="text-align: right;">80%</td> </tr> <tr> <td>No</td> <td style="text-align: right;">10</td> <td style="text-align: right;">20%</td> </tr> </table> </div> </div>		Response	Count	Percentage	Yes	40	80%	No	10	20%	Yes	40	80%	No	10	20%
Response	Count	Percentage														
Yes	40	80%														
No	10	20%														
Yes	40	80%														
No	10	20%														
Objective	This question is to get information on participants who agree that CAPTCHA can bring highest level of security.															
Analysis	There are 80% of participants said yes and 20% of participants said no.															



### 3.3 Phase II: Design & Development

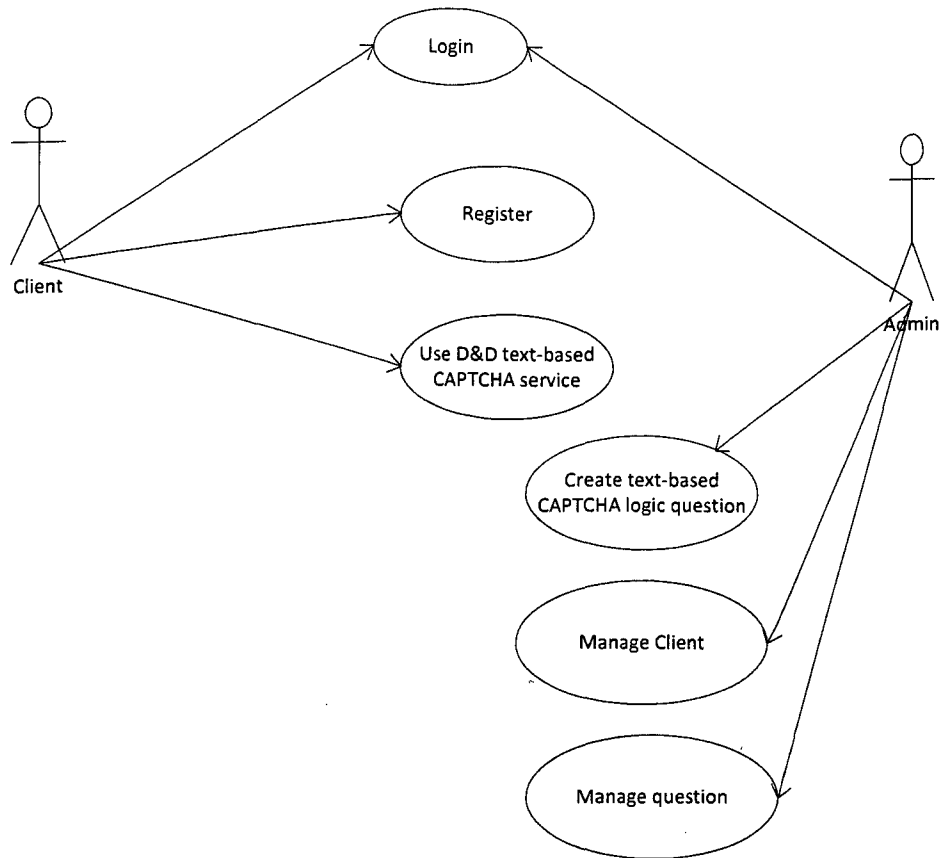
In this phase, the analysis data will be convert into logical and physical design system specification such as flow chart, use case diagram, context diagram, Entity–relationship diagrams and Prototype Interface will be created and all the material that will be used in the project will be listed.

After having the design plan, diagrams and virtual interface, the development will start with coding. The project will be code by using PHP language, JavaScript, and HTML.

### 3.4 Design Description

The design descriptions that will be created are Use Case Diagram, Flow Chart, Context Diagram, Entity–relationship diagrams and Prototype Interface.

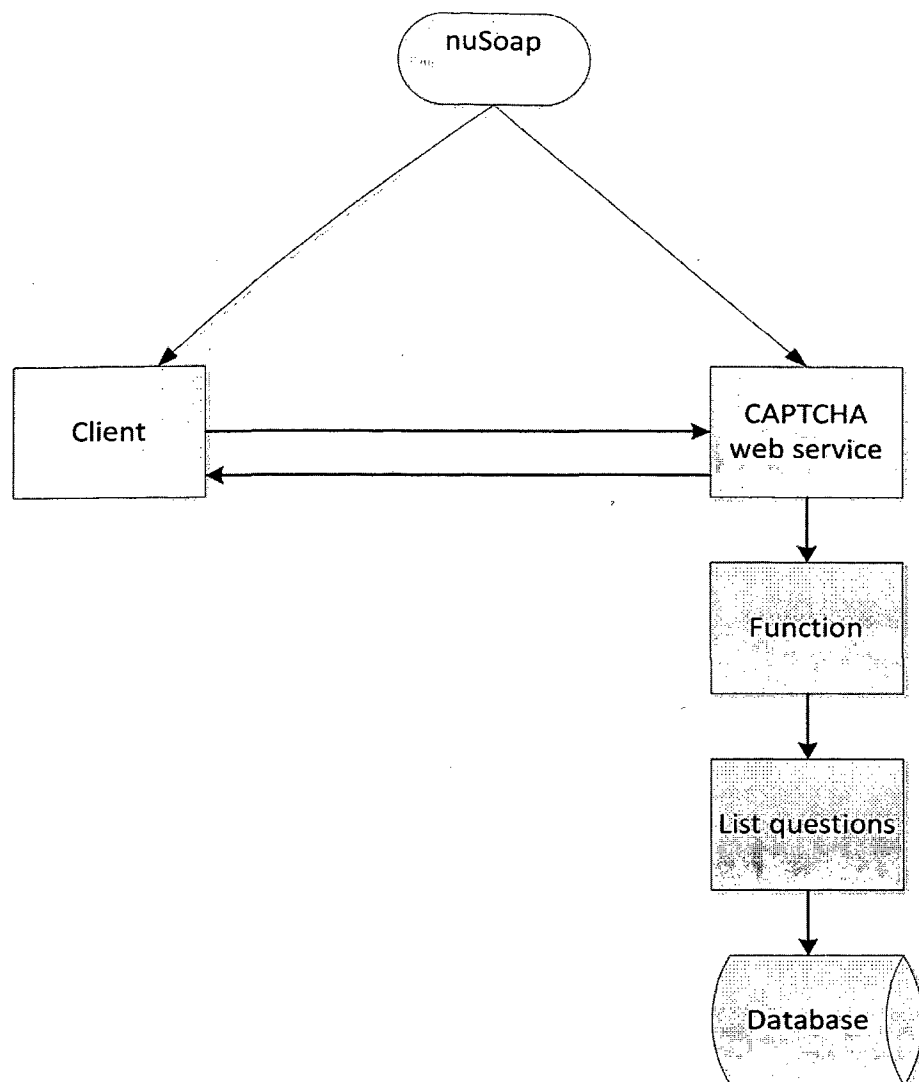
### 3.4.1 Use Case Diagram



**Figure 3.2:** Use Case Diagram

Figure 3.2 is a Use Case Diagrams that show the functions of between the client and admin in the system. In the system, admin able to create the text-based CAPTCHA logic question and store in the database. Admin also able to the manage the system such as delete and view the client and question information. For the client, client must register in order to use the provided service. After registration, client will get a authentication key and password and able to use D&D text-based CAPTCHA service.

### 3.4.2 Flow Chart Diagram



**Figure 3.3:** Flow Chart of Web Service

A flow chart represents the overall flow of the proposed CAPTCHA system. From this, we can clearly know the process of the system.

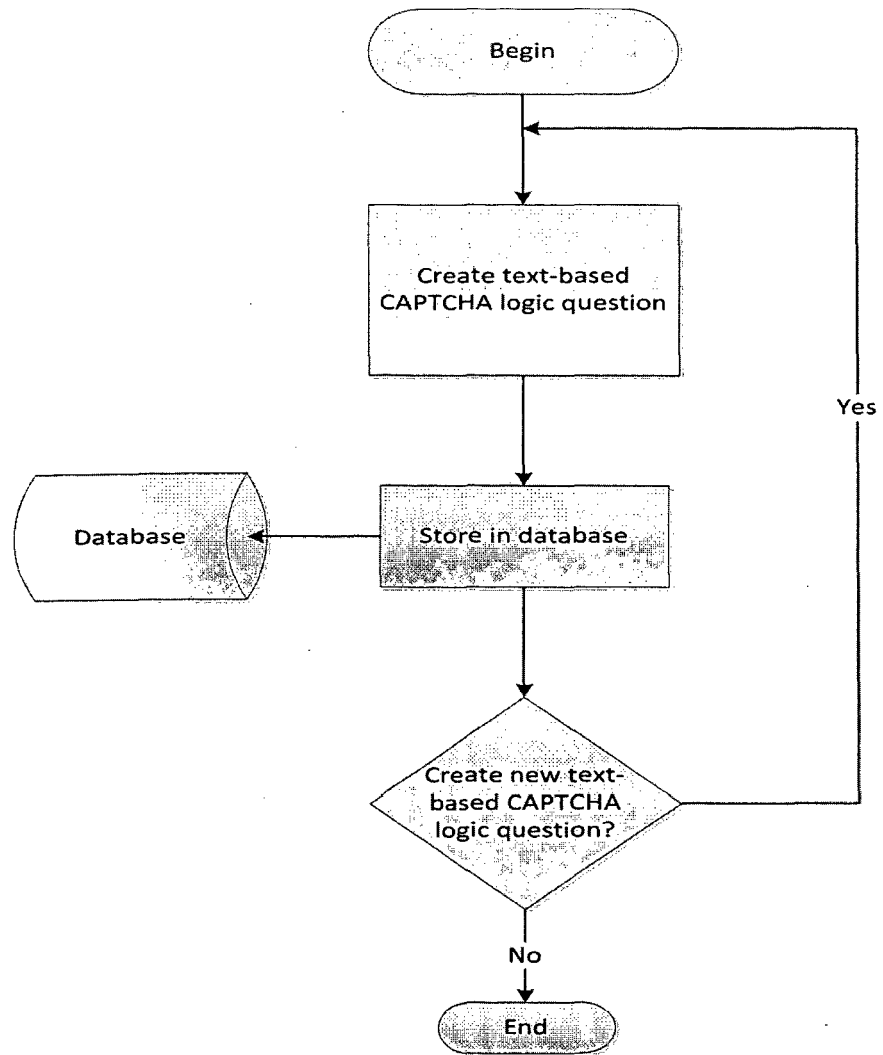
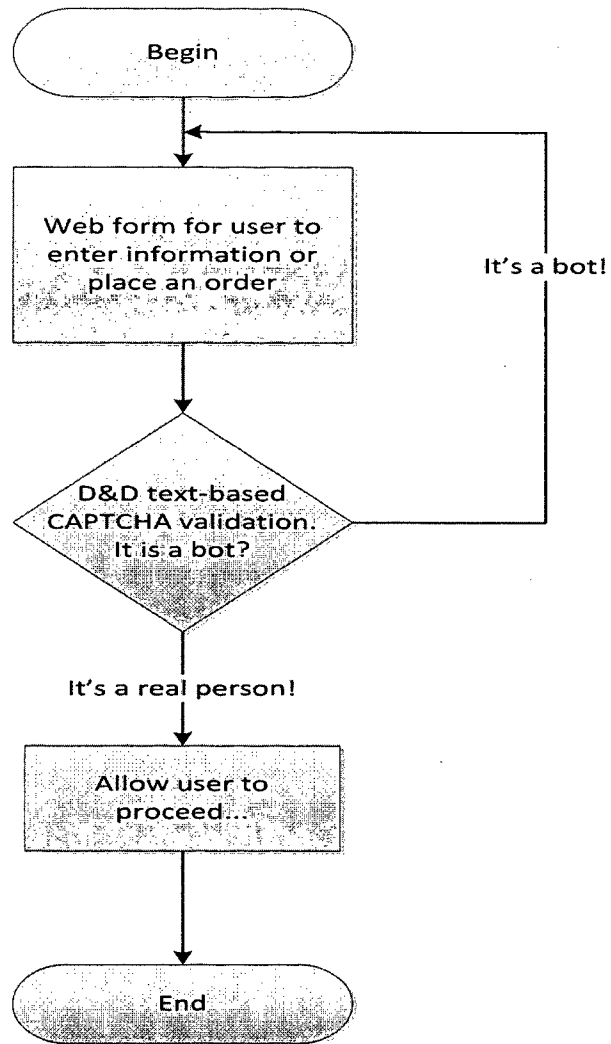


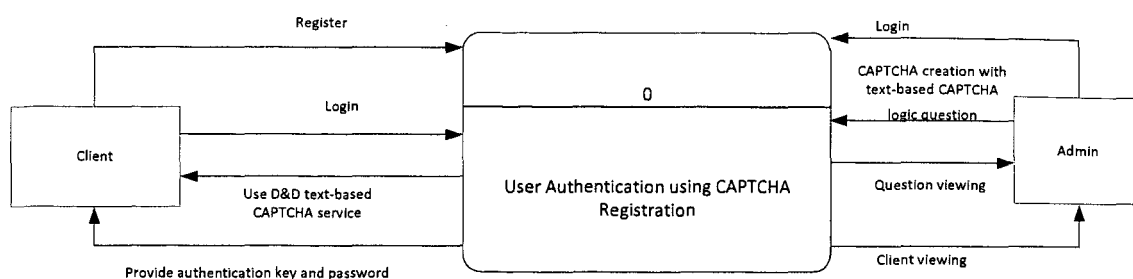
Figure 3.4: Flow Chart of Admin



**Figure 3.5:** Flow Chart of Client



### 3.4.3 Context Diagram

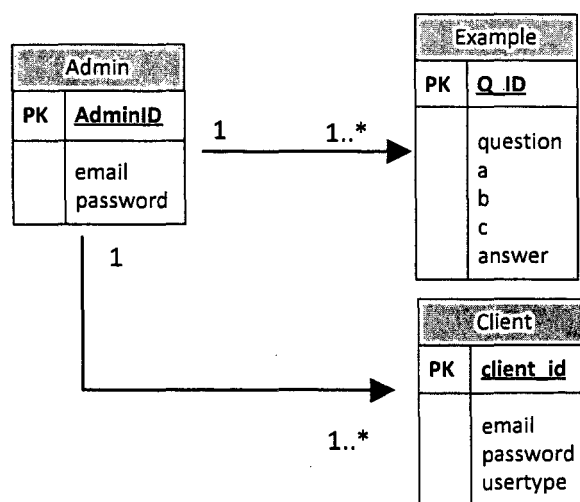


**Figure 3.6:** Context Diagram

There are two main users of the proposed system which are Admin and the user. Admin are required to login to the system with the correct information. After login, Admin are able to create new CAPTCHA and view the CAPTCHA that has been created.

When user want to register the system will provide the CAPTCHA for user for validation, user required to enter the validation code in order to be able to register in the system.

### 3.4.4 Entity- Relationship Diagram



**Figure 3.7:** Entity Relationship Diagram

Entity-Relation Diagram is a graphical representation of entities and their relationships to each other. It is used in my system to show the data within databases or information systems.

### 3.4.5 Data Flow Diagram Level 0

### 3.4.6 Prototype Interface

**Client Login**

Not a member yet? [Click Here To Sign Up.](#)

Email:

Password:

Figure 3.8: Admin Login Interface

**CAPTCHA Registration**

Question :

Choice A :

Choice B :

Choice C :

Answer :

Figure 3.9: Create CAPTCHA Interface

**WELCOME ADMIN**

Client Profile

Id	Email	Password	User Type	
1	admin@hotmail.com	0192023a7bbd73250516f069df18b500	admin	<a href="#">Delete</a>
3	kiahim@hotmail.com	e10adc3949ba59abbe56e057f20f883e	client	<a href="#">Delete</a>
5	yong@hotmail.com	6c44e5cd17f0019c64b042e4a745412a	client	<a href="#">Delete</a>

Figure 3.10: View Client Interface

**WELCOME ADMIN**  
**CAPTCHA Data List**

Id	Question	Choice A	Choice B	Choice C	Answer	
1	Which of the following is not an example of animal?	Chicken	Table Lamp	Kitten	77296e97e3d084080207e57848b4e2a3	Delete
2	If tomorrow is Saturday, what day is today?	Friday	Monday	Sunday	c33b138a163847cdb6caeeb7c9a126b4	Delete
3	What is the opposite of upstairs ?	Behind	Front	Downstair	5e8773a320df643d66516c4dc957ff57	Delete
5	Which of the following is not a flower?	Jasmine	Leopard	Rose	56b903949445076a918fa89b29b3a255	Delete
7	Which of the following number is an odd number?	Twelve	Twenty-three	Twenty	6d37b420f415ee48e3b99348b766e3f6	Delete
9	Which set of food cannot categories as fast food ?	Kentucky Fried Chicken	Mc Donald	Vegetarian	09f36cbbb6a7055eb5d864f6d89c2690	Delete
11	What is the answer when 10 plus 65?	One hundred	Seventy-five	Fifty-five	01a3f100a0c18b62fd550ccf73960a50	Delete
12	What is the pronunciation for 1000 ?	One thousand	One hundred	Million	f09c2aacd3dbecfc844a54f04a48b516	Delete

Figure 3.11: View CAPTCHA Questions Interface

## Drag and Drop CAPTCHA DEMO

**Question: If tomorrow is Saturday, what day is today?**

Drag the answer into the drop area.

The interface shows a list of possible answers on the left: Sunday, Friday, Monday, and a Submit button. To the right is a dashed rectangular area labeled "Drop Here!" for the user to drag the correct answer into.

Figure 3.12: D&D text-based CAPTCHA Logic Question Interface

### 3.5 Development Tools

Software and hardware tools are used to deliver and perform the system in higher efficiency level. The need is to use them wisely to create good quality projects and have characteristic such as usability, user friendly and higher incorporation.

#### 3.5.1 Hardware Requirements

**Table 3.5. 1:** Hardware Requirements

No	Hardware	Specification	Function/ Description
1	Laptop	- ASUS A53S Notebook PC - Intel® Core i5-2410M - CPU@2.30GHz 8GB RAM	- Use to design and development the system. - Use to testing the system. - Use to maintenance the system. - As a device/ platform that use to run the system.

#### 3.5.2 Software Requirements

**Table 3.5. 2:** Software Requirements

No	Software	Function/ Description
1	Windows 7 Professional	Operating system that contribute for develop the system.
2	Microsoft Word 2010	Project Documentation.
3	Microsoft Excel 2010	Use to making the graft of the survey.
4	Microsoft Visio 2010	Use to drawing the diagram. Example : Use Case Diagram, Data Flow Diagram, Activity Diagram and etc.
5	Apache XAMPP	Web Server.
6	PHP My SQL	Database of the system.
7	JavaScript	Language that using to coding the system.

8	HTML5	Language that using to coding the system.
9	Web browser	Works as search engine and run the system.
10	Notepad	User to write and compile coding.

### **3.6 Phase III: Testing**

In this phase the system will be tested to make sure the whole system can run properly and stable ability. If the system has no error it will continue to the next phase.

### **3.7 Phase: Implementation**

In this phase, the iterative process will take place, the system will be iterative enhances the evolving versions until the full system is implemented.

## CHAPTER IV

### DESIGN AND IMPLEMENTATION

#### 4.1 Introduction

The purpose of this chapter is to discuss the process and the coding that are implemented to develop the complete system. In this section will include the important function and method that are using to create the database for storing of information and the steps to implement the system. The complete process of database implementation is in section 4.2 and the process and coding to develop the system are in section 4.3.

#### 4.2 Database Development

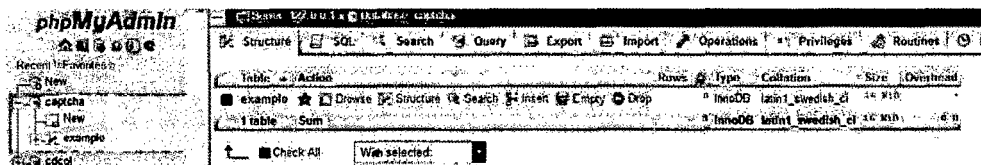


Figure 4.1: CAPTCHA database

Figure 4.1 show the database called "captcha" where it only consist of one table that is called "example".

+ Options		Q ID	question	a	b	c	answer
<input type="checkbox"/>	<input type="checkbox"/>	1	Which of the following is not an example of animal...	Chicken	Table	Dog	Table
<input type="checkbox"/>	<input type="checkbox"/>	2	If tomorrow is Saturday, what day is today?	Friday	Monday	Sunday	Friday
<input type="checkbox"/>	<input type="checkbox"/>	3	What is the opposite of upstairs ?	Behind	Front	Downstair	Downstair

↑  Check All With selected:  Change  Delete  Export

Figure 4.2: Example table

Figure 4.2 show the example table where it used to store the CAPTCHA question, multiple choice answer and answer.

	client_id	email	password	usertype
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	1	admin@hotmail.com	0192023a7bb673250516f069df18b500	admin
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	3	kiahim@hotmail.com	e10adc3949ba59abbe56e057f20f883e	client
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	5	yong@hotmail.com	6c44e5cd17f0019c64b042e4a745412a	client

Check All    With selected:  Change     Delete     Export

Figure 4.3: Client table

Figure 4.3 shows the client table where it used to store client information such as email, password and user type.

## 4.3 System Development

### 4.3.1 Main page

The following figure is the main page of the system. It includes with Home, Demo, Support & Documentation, Contact Us, and Login tabs.

## D&D textCAPTCHA Logic Question

[Home](#)    [Demo](#)    [Support & Documentation](#)    [Contact Us](#)    [Login](#)

**What is D&D textCAPTCHA Logic Question**

A CAPTCHA is a test to tell humans and robots apart. You've probably used one before: identifying a string of letters from an image to show that you are human, rather than a "bot". This site provides a web service to generate textual CAPTCHAs based on simple logic questions with drag and drop feature.

The objective of this D&D textCAPTCHA Logic Question is to provide a simple logic question for validation. All the question are designed according to the intelligence of a seven-year-old child so it is easy to be answer.

Example of the question are:

- If tomorrow is Saturday, what day is today?

With drag and drop feature, user are required to drag the following answer into the given drop area for validation. Example:

**D&D textCAPTCHA Logic Question DEMO**

Question: If tomorrow is Saturday, what day is today?

Sunday

Friday

Monday

Drag the Answer Into Here!

**D&D textCAPTCHA Logic Question DEMO**

Question: If tomorrow is Saturday, what day is today?

Sunday

Monday

Friday

[Click Here To Try D&D textCAPTCHA!](#)

Figure 4.4: Main page

### 4.3.2 CAPTCHA demo page

The figure below shows that the interface to let user to demo the CAPTCHA.

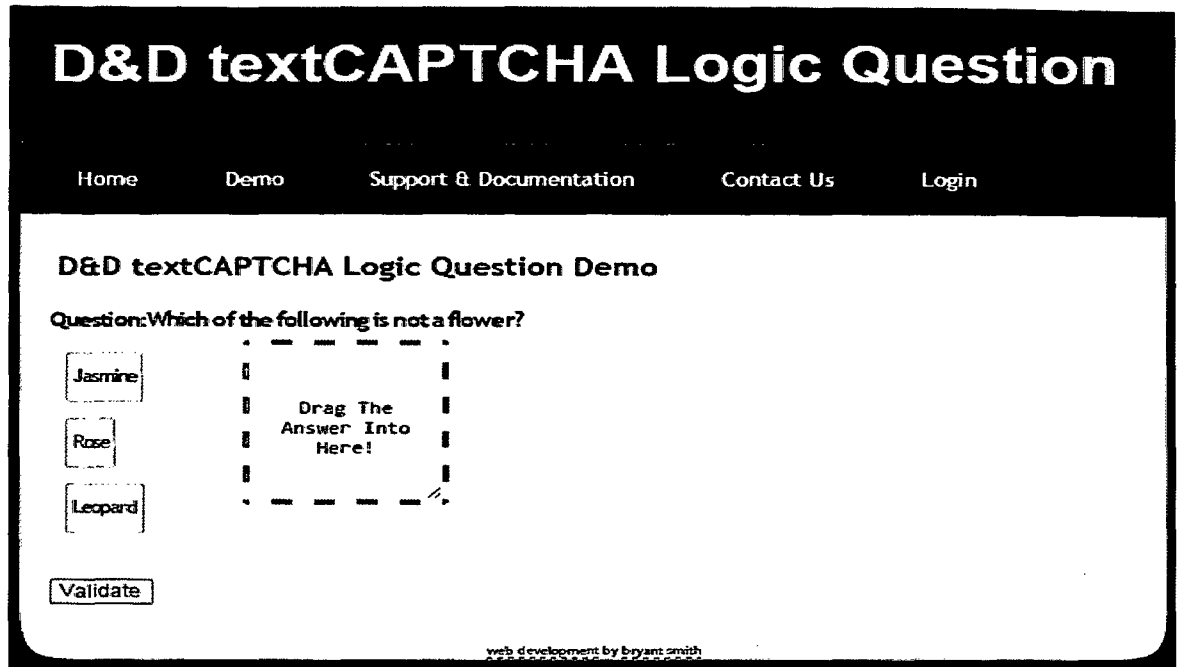


Figure 4.5: CAPTCHA demo page

```

window.onload = function() {

    var dropZoneOne = document.querySelector("#drop-target-one");
    var dragElements = document.querySelectorAll("#drag-elements li");
    var elementDragged = null;

    for (var i = 0; i < dragElements.length; i++) {

        // Event Listener for when the drag interaction starts.
        dragElements[i].addEventListener('dragstart', function(e) {
            e.dataTransfer.effectAllowed = 'move';
            e.dataTransfer.setData('text', this.innerHTML);
            elementDragged = this;
        });

        // Event Listener for when the drag interaction finishes.
    }
}

```



```
        dragElements[i].addEventListener('dragend', function(e) {
            elementDragged = null;
        });
    };

    // Event Listener for when the dragged element is over the drop zone.
    dropZoneOne.addEventListener('dragover', function(e) {
        if (e.preventDefault) {
            e.preventDefault();
        }

        e.dataTransfer.dropEffect = 'move';

        return false;
    });

    // Event Listener for when the dragged element enters the drop zone.
    dropZoneOne.addEventListener('dragenter', function(e) {
        this.className = "over";
    });

    // Event Listener for when the dragged element leaves the drop zone.
    dropZoneOne.addEventListener('dragleave', function(e) {
        this.className = "";
    });

    // Event Listener for when the dragged element dropped in the drop zone.
    dropZoneOne.addEventListener('drop', function(e) {
        if (e.preventDefault) e.preventDefault();
        if (e.stopPropagation) e.stopPropagation();

        this.className = "";
        this.innerHTML = e.dataTransfer.getData('text');
```

```

        // Remove the element from the list.
        document.querySelector('#drag-
elements').removeChild(elementDragged);
        elementDragged = null;

        return false;
    });
};

```

**Figure 4.6:** demo.js

The figure 4.6 shows the coding of drag element and the drag zone.

```

<?php
include("dbase.php");
$offset_result = mysql_query( " SELECT FLOOR(RAND() * COUNT(*)) AS `offset`
FROM `example` ");
$offset_row = mysql_fetch_object( $offset_result );
$offset = $offset_row->offset;
$result = mysql_query( " SELECT * FROM `example` LIMIT $offset, 1 " );
while($row = mysql_fetch_array($result))
{
    $id = $row["Q_ID"];
    $question = $row["question"];
    $a = $row["a"];
    $b = $row["b"];
    $c = $row["c"];
    $answer = $row["answer"];
}
?>
<h3>Question:<?php echo $question; ?></h3>

<div id="dd-elements">
<?php
        echo "<ul id='drag-elements'>";

```

```

        $array = array( $a, $b, $c);
        shuffle($array);
        foreach ($array as $d){
            echo "<li draggable='true'>".$d."</li>";}
    echo "</ul>";
    ?>
<?php
    }
?>

```

Figure 4.7: demo.php

Figure 4.7 shows the coding of randomize question and multiple choice.

### 4.3.3 Result of the validation page

The following figure is after user have answering the question using drag and drop method, then it will show the validation result.

The screenshot shows a web page with a black header and a white content area. The header contains the title "D&D textCAPTCHA Logic Question" and a navigation menu with links for Home, Demo, Support & Documentation, Contact Us, and Login. The main content area has a sub-header "D&D textCAPTCHA Logic Question Demo" and a section titled "Validation Result" with the text "You successfully answer the following question!". Below this is a "Try It Now!" section with a paragraph of text and a link "Click here for Sign Up". At the bottom of the page, there is a small footer that reads "web development by bryant smith".

Figure 4.8: Result of the validation page

#### 4.3.4 Result of the validation page ( coding)

```
<?php

extract($_POST);
$answer = md5($ans);
include("dbase.php");
$query = "SELECT * FROM example WHERE answer = '$answer'";

$result = mysql_query($query, $conn) or die(mysql_error());

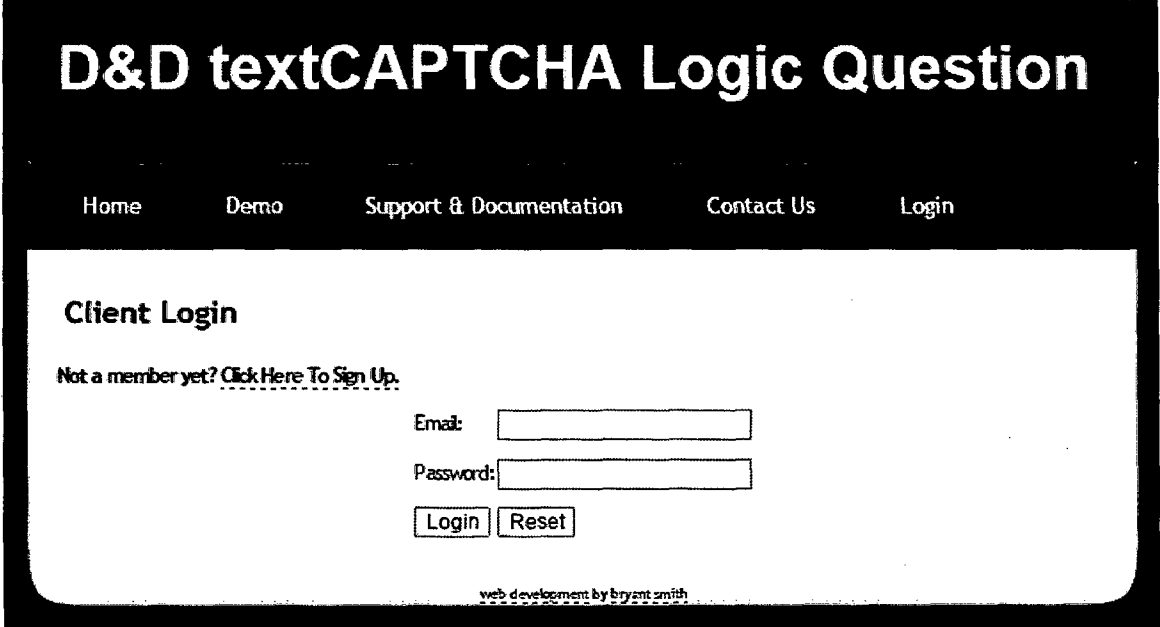
if(isset($result)) {
    if(mysql_num_rows($result) == 1)
    {
        $member = mysql_fetch_assoc($result);
        header("location: success.php");
        exit();
    }
    else
    {
        header("location: failed.php");
        exit();
    }
}
?>
```

**Figure 4.9:** Result of the validation page( coding)

The following figure 4.9 shows the coding on how the answer is validate from the server.

### 4.3.5 Login page

The figure 4.10 shows the user side login. User need to sign up first by clicking the hyperlink that provided then enter email and password as validation to login to the system.



The screenshot shows a web page titled "D&D textCAPTCHA Logic Question". At the top, there is a navigation menu with links for "Home", "Demo", "Support & Documentation", "Contact Us", and "Login". Below the navigation is a "Client Login" section. It includes a link for "Not a member yet? Click Here To Sign Up." followed by input fields for "Email:" and "Password:". Below these fields are "Login" and "Reset" buttons. At the bottom of the page, there is a small footer that reads "web development by bryant smith".

Figure 4.10: Login page

### 4.3.6 Create CAPTCHA questions page

The figure below is about the CAPTCHA question created page. Through this page admin can add more questions by typing text and click the "Add Question" button, then it will successfully be created and save in the database.

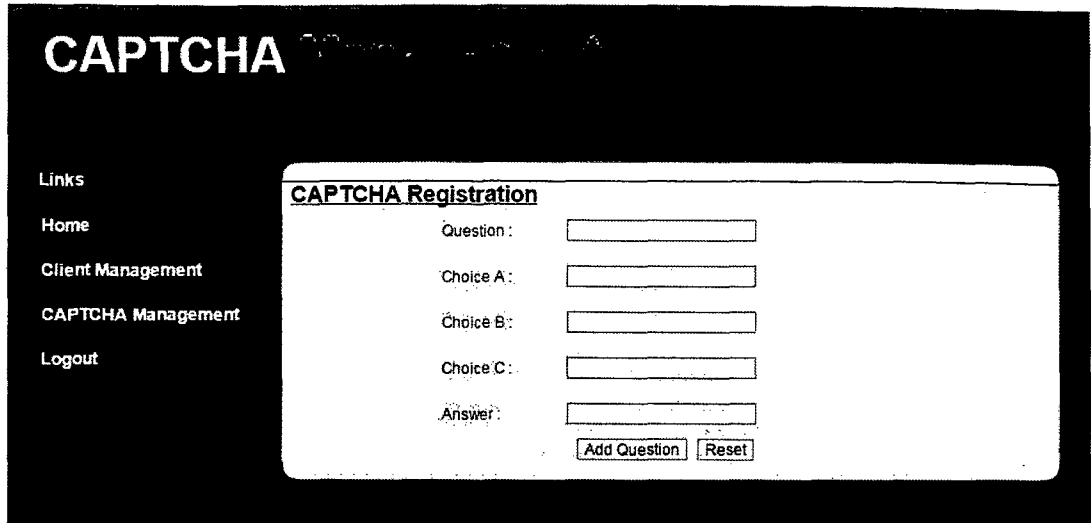


Figure 4.11: Create CAPTCHA question page

### 4.3.7 CAPTCHA Data List

The figure 4.12 shows the list of the questions that have been created by admin. Admin can delete it by click the "Delete" hyperlink then it also will automatically delete it at the database.

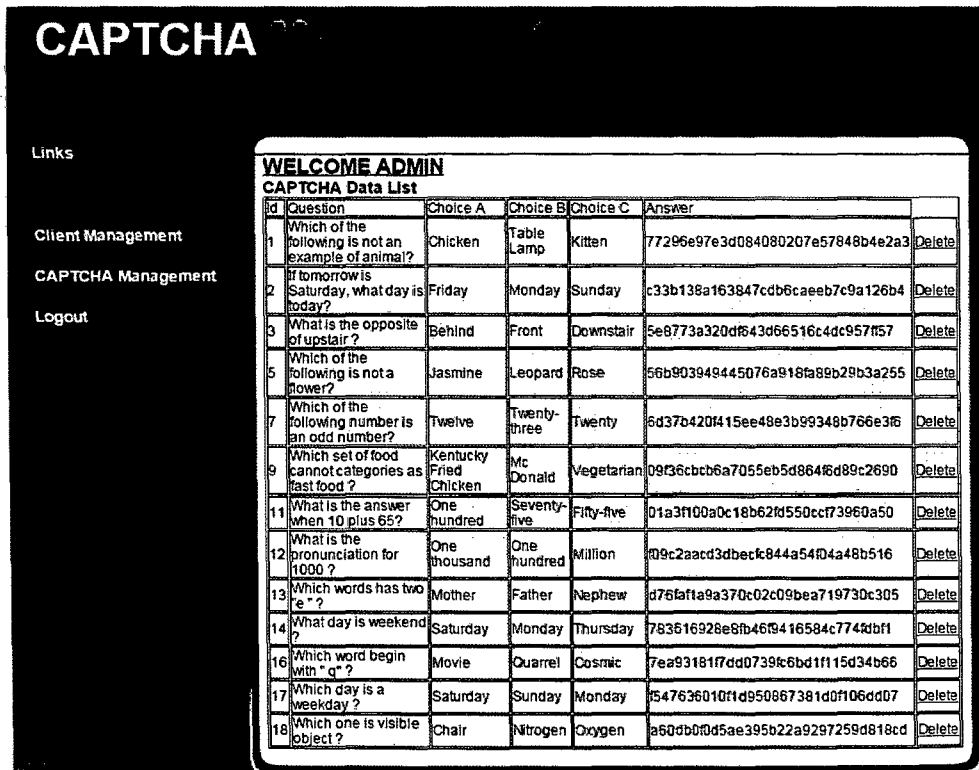


Figure 4.12: CAPTCHA Data list

### 4.3.8 Client Profile

The figure below shows the user database that who have register through this system. Admin can view and delete user from database by clicking the Delete hyperlink. By click "Delete" hyperlink then all the information will not be stored inside the database anymore.

The screenshot shows a web application interface with a dark background. On the left, there is a navigation menu with links: Home, Client Management, CAPTCHA Management, and Logout. The main content area is titled 'WELCOME ADMIN' and 'Client Profile'. It contains a table with the following data:

ID	Email	Password	User Type	Delete
1	admin@hotmail.com	0192023a7bbd73250518fd69dff8b500	admin	Delete
3	kiahim@hotmail.com	e10adc3949ba59abbe56e05720883e	client	Delete
5	lyong@hotmail.com	6c44e5cd17f0019c64b042e4a745412a	client	Delete

Figure 4.13:Client profile

### 4.3.9 Registration page

The figure 4.14 is about user have success to sign up to use the system.

The screenshot shows a web application interface with a dark background. The main heading is 'D&D textCAPTCHA Logic Question'. Below the heading, there is a navigation menu with links: Home, Demo, Support & Documentation, Contact Us, and Logout. The main content area is titled 'Welcome kiahim@hotmail.com' and 'Thank You For Choosing Our Service.'. It contains a list of details:

- CAPTCHA Services For Authentication
  - GUID: 21232f297a57a5a74389-4a0e4a801fc3
  - Password: 47e2a2bc8c8a6968b78e57fe6d19b74d

At the bottom, there is a small text: 'web development by bryant smith'.

Figure 4.14:Registration page

### 4.3.10 User Sign up page

The following figure is the sign up page. User need to enter email, password and answer the question through drag and drop the correct answer.

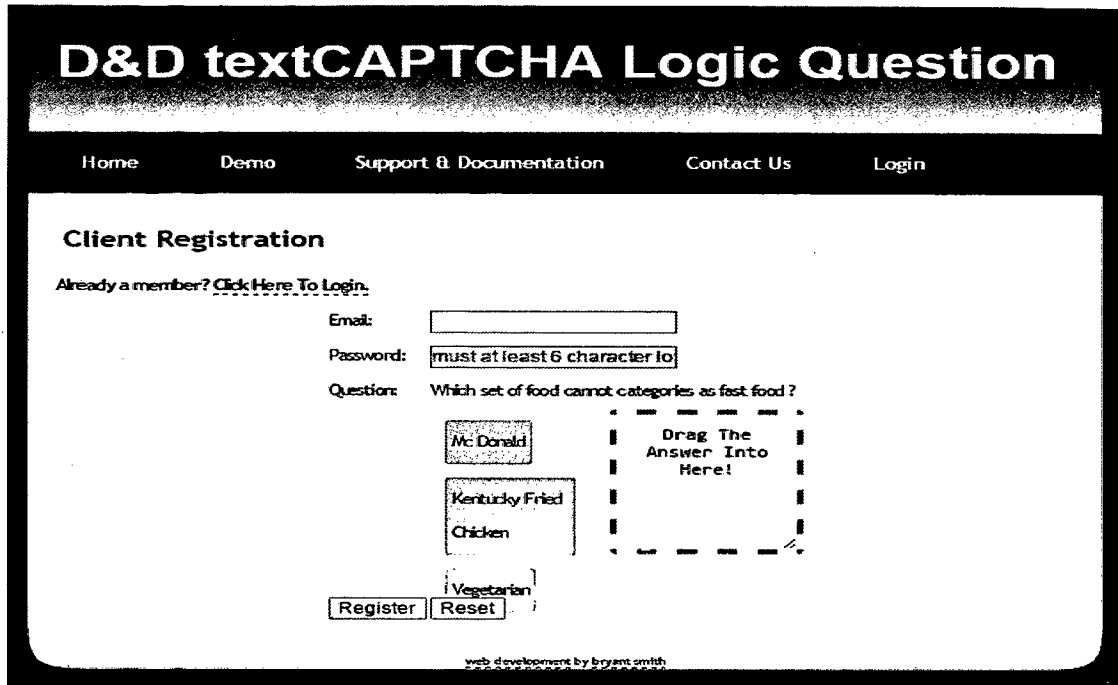


Figure 4.15: User Sign up4.3.13 WSDL Addresses

The following page is show about the interactive description of WSDL addresses.

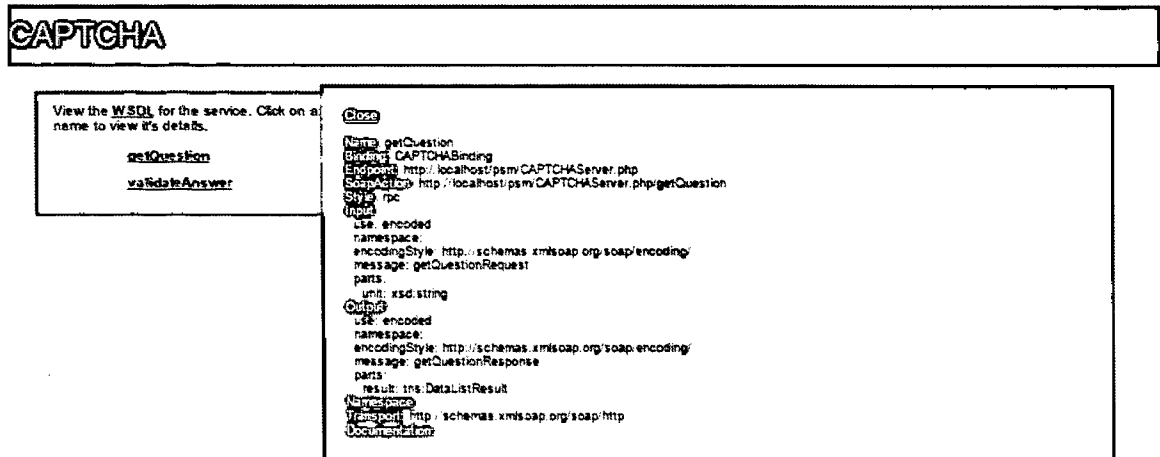


Figure 4.16: Interactive Description WSDL Addresses



### 4.3.11 CAPTCHA.php

```
//Perform client authentication
//Unauthenticated clients are not allowed to access functionality
function doAuthenticate() {
    if (isset($_SERVER['PHP_AUTH_USER']) and
isset($_SERVER['PHP_AUTH_PW'])) {

        if ($_SERVER['PHP_AUTH_USER'] ==
"21232f297a57a5a743894a0e4a801fc3" && $_SERVER['PHP_AUTH_PW'] ==
"47e2a2bc8c8a6988b78e57fe6d19b74d")
            return true;
        else
            return false;
    }
}
```

**Figure 4.17:** CAPTCHA Server.php

Figure 4.17 show the coding of client authentication.

### 4.3.12 CAPTCHAServer.php

```

//Create a new soap server
    $server = new soap_server();

    //Define our namespace
    //Configure our WSDL
    $server->configureWSDL("CAPTCHA", "urn:server");
    $server->wsdl->schemaTargetNamespace = 'urn:server';
    //Add ComplexType
    $server->wsdl->addComplexType(
        'DataList',
        'complexType',
        'struct',
        'all',
        "",
        array(
            'Q_ID' => array('name' => 'Q_ID', 'type' =>
'xsd:string'),
            'question' => array('name' => 'question', 'type' =>
'xsd:string'),
            'a' => array('name' => 'a', 'type' => 'xsd:string'),
            'b' => array('name' => 'b', 'type' => 'xsd:string'),
            'c' => array('name' => 'c', 'type' => 'xsd:string'),
            'answer' => array('name' => 'answer', 'type' =>
'xsd:string')
        )
    );

    //Add ComplexType
    $server->wsdl->addComplexType(
        'DataListResult',

```

```

        'complexType',
        'array',
        ",
        'SOAP-ENC:Array',
        array(),
        array(
            array('ref=>'SOAP-
ENC:arrayType','wsdl:arrayType'=>'tns:DataList[]')
        ),
        'tns:DataList'
    );

    // Register service and method
    $server->register('getQuestion', // method name
        array('unit' => "xsd:string" ), // input parameters
        array('result' => 'tns:DataListResult'));

    $server->register('validateAnswer', // method name
        array('answer' => "xsd:string" ), // input parameters
        array('result' => 'tns:DataListResult'));

    // Get our posted data if the service is being consumed
    // otherwise leave this data blank.
    $POST_DATA = isset($GLOBALS['HTTP_RAW_POST_DATA']) ?
    $GLOBALS['HTTP_RAW_POST_DATA'] : "";

    // pass our posted data (or nothing) to the soap service
    $server->service($POST_DATA);
    exit();

```

Show the coding on how to create the soap server, configure WSDL, add complex type and register function.

## 4.3.13 CAPTCHAServer.php

```

function getQuestion()
    {
        if (!doAuthenticate()){
            return false;
        }else{

            $objConnect = mysql_connect("localhost","root","") or
die(mysql_error());

            $objDB = mysql_select_db("captcha");
            //$strSQL = "SELECT * FROM example ORDER BY
RAND() LIMIT 0,1";

            $offset_result = mysql_query( " SELECT FLOOR
(RAND() * COUNT(*)) AS offset FROM example ");
            $offset_row = mysql_fetch_object( $offset_result );
            $offset = $offset_row->offset;
            $strSQL = "SELECT * FROM example LIMIT $offset, 1
";

            $objQuery = mysql_query($strSQL) or die
(mysql_error());

            $intNumField = mysql_num_fields($objQuery);
            $resultArray = array();
            while($objResult = mysql_fetch_array($objQuery))
            {
                $arrCol = array();
                for($i=0;$i<$intNumField;$i++)
                {
                    $arrCol[mysql_field_name($objQuery,$i)]
= $objResult[$i];
                }
                array_push($resultArray,$arrCol);
            }
        }
    }

```

```

mysql_close($objConnect);
return $resultArray;
}
}

```

Show the coding of function getQuestion(), the question will be choose randomize in database then return to the client side.

#### 4.3.14 CAPTCHAServer.php

```

function validateAnswer($answer)
{
    //$answer2 = md5($answer);
    $objConnect = mysql_connect("localhost","root","") or
die(mysql_error());

    $objDB = mysql_select_db("captcha");
    $strSQL = "SELECT * FROM example WHERE answer
= '$answer'";

    //$strSQL = "SELECT * FROM example LIMIT $offset,
1 ";

    $objQuery = mysql_query($strSQL) or die
(mysql_error());

    $intNumField = mysql_num_fields($objQuery);
    $resultArray = array();
    while($objResult = mysql_fetch_array($objQuery))
    {
        $arrCol = array();
        for($i=0;$i<$intNumField;$i++)
        {
            $arrCol[mysql_field_name($objQuery,$i)]
= $objResult[$i];
        }
        array_push($resultArray,$arrCol);
    }
}

```

```
    }  
    mysql_close($objConnect);  
    return $resultArray;  
  
    /*$result = mysql_query($query, $conn) or  
die(mysql_error());  
  
    if(isset($result)) {  
    if(mysql_num_rows($result) == 1)  
    {  
        // $member = mysql_fetch_assoc($result);  
        return true;  
    }  
    else  
    {  
        return false;  
    }  
    } */  
}
```

Show the function of `validateAnswer()` used to validate the answer that given to user and return true or false.

### 4.3.15 WSDL Addresses

The following page is show about WSDL addresses.

```

This XML file does not appear to have any style information associated with it. The document tree is shown below.
<?xml version="1.0" encoding="UTF-8" standalone="no" namespace="http://schemas.xmlsoap.org/wsdl/">
  <definitions xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/" xmlns:xs="http://www.w3.org/2001/XMLSchema" xmlns: xsi="http://www.w3.org/2003/XMLSchema-instance" xmlns:SOAP-ENC="http://schemas.xmlsoap.org/soap/encoding/" xmlns:tns="urn:server">
    <types>
      <xsd:schema base="http://schemas.xmlsoap.org/soap/envelope/">
        <xsd:import namespace="http://schemas.xmlsoap.org/wsdl/">
          <xsd:complexType name="DataList">
            <xsd:sequence base="xsd:string">
              <xsd:element name="Question" type="xsd:string"/>
              <xsd:element name="a" type="xsd:string"/>
              <xsd:element name="b" type="xsd:string"/>
              <xsd:element name="c" type="xsd:string"/>
              <xsd:element name="answer" type="xsd:string"/>
            </xsd:sequence>
          </xsd:complexType>
          <xsd:complexType name="DataListResult">
            <xsd:sequence base="xsd:string">
              <xsd:element name="result" type="xsd:string"/>
            </xsd:sequence>
          </xsd:complexType>
        </xsd:schema>
      </types>
      <message name="getQuestionRequest">
        <part name="url" type="xsd:string"/>
      </message>
      <message name="getQuestionResponse">
        <part name="result" type="xsd:string"/>
      </message>
      <message name="validateRequest">
        <part name="url" type="xsd:string"/>
      </message>
      <message name="validateResponse">
        <part name="result" type="xsd:string"/>
      </message>
      <operation name="getQuestion">
        <input message="getQuestionRequest"/>
        <output message="getQuestionResponse"/>
      </operation>
      <operation name="validate">
        <input message="validateRequest"/>
        <output message="validateResponse"/>
      </operation>
    </definitions>
  </xml>

```

Figure 4.18: WSDL Addresses

### 4.3.16 Index.php

```

<form method="post" action="validate.php">

<?php

include("lib/nusoap.php");

// register as a member to get the GUID and password for authenticate.
$GUID = "21232f297a57a5a743894a0e4a801fc3";
$password = "47e2a2bc8c8a6988b78e57fe6d19b74d";
$client = new
nusoap_client("http://localhost/psm/CAPTCHAServer.php?wsdl",true);
$client->setCredentials($GUID,$password,"basic");
$client->getError();
$data = $client->call('getQuestion');

```

```

foreach ($data as $result) {
echo "<h3>Question:". $result["question"]."</h3>";
echo "<div id='dd-elements'>";
echo "<ul id='drag-elements'>";

$array = array ($result["a"], $result["b"], $result["c"]);
shuffle($array);
foreach ($array as $d){ echo "<li draggable='true'>". $d."</li>";}
echo "</ul>";
}
echo "</div>";

echo "<textarea name='ans' id='drop-target-one' style='overflow:hidden'
readonly>";
echo "Drag The Answer Into Here!";
echo "</textarea>";
echo "<p>&nbsp;</p>";
echo "<p>&nbsp;</p>";
echo "<p>&nbsp;</p>";
echo "<p>&nbsp;</p>";
echo "<p>&nbsp;</p>";
echo "<p><input id='aa' type='submit' name='Submit' value='Submit' ></p>";

?>

</form>

```

**Figure 4.19: Index.php**

Figure 4.19 show the client's side coding in order to use the provided service.



## 4.3.17 validate.php

```

<?php
    include("lib/nusoap.php");
    // register as a member to get the GUID and password for authenticate.
    $GUID = "47e2a2bc8c8a6988b78e57fe6d19b74d";
    $password = "47e2a2bc8c8a6988b78e57fe6d19b74d";
    $client = new
nusoap_client("http://localhost/psm/CAPTCHAServer.php?wsdl",true);
    $client->setCredentials($GUID,$password,"basic");
    $client->getError();
    // the answer is encrypted with MD5
    $params = array('answer' => md5($_POST['ans']));
    $result = $client->call('validateAnswer', $params);

    if (count($result) == 1) {
        echo 'The answer matched what was saved on the server.';

        } else {
            //echo 'The answer did <b>not</b> match what was saved on the
server.';

            print '<script type="text/javascript">';
            print 'alert("The answer did not match what was saved on the
server!! Please try again");';
            print '</script>';
            echo "<script type='text/javascript'>
window.location='index.php' </script>";

        }
?>

```

Figure 4.20: Validate.php

Figure 4.20 show the validation coding on the client side.

## CHAPTER V

### RESULT AND DISCUSSION

#### 5.1 Introduction

In this chapter, I will discuss about the result after develop and testing of the D&D text-based CAPTCHA Logic Question in web services, the advantages and disadvantages, the constraints of this application.

After this application was testing, the developer found out that this application meets the objective that stated in chapter 1 before which is:

- i. To develop a text-based CAPTCHA in the system, by using a simple logic question for validation to overcome the blur background with distorted characters.
- ii. To implement a drag and drop feature for text-based CAPTCHA in the system.
- iii. To implement a web service for drag and drop text-based CAPTCHA using nuSoap lib.
- iv. To grant an improve security control over the usual CAPTCHA technique at the same time improves user friendliness.

## 5.2 Advantages and Disadvantages

Any system development must have its own advantages and disadvantages. On this system, the developer will explain briefly about the system advantages and disadvantages.

### 5.2.1 Advantages

D&D text-based CAPTCHA Logic Question developed was given advantages to the web developer. Among the advantages are:

- i. The text-based CAPTCHA using logic question for validation and the question are designed according to the intelligence of a seven-year-old child so it is easy to be answer.
- ii. The text-based CAPTCHA also provided drag and drop feature which can make the CAPTCHA more user friendly this is because drag and drop object can be very easy for every human and no needs special analytical or technical abilities and also can avoid user from typing error.
- iii. D&D text-based CAPTCHA Logic Question is easy to implement by using nusoap lib, client able to use the services.

### 5.2.2 Disadvantages

Although this system is achieves the objective, but there are still has the disadvantages and limitation. The disadvantages of this system are:

Text-based CAPTCHA are definitely less "secure" than other image/audio-based CAPTCHA because the recent evolution in natural language parsers such as Wolfram Alpha has made question easy to crack.

The logic question are language specific. Currently this system only offers English logic question.

### **5.3 Constraints**

During the development process, the developer faces with few constraints. Among of the constraints are:

- i. Limited of knowledge

The main constraint is about the knowledge on how to develop this system. This is because this system required the knowledge of JavaScript, SOAP and WSDL knowledge to implement web service which is not familiar by the developer.

### **5.4 Summary**

The result of the D&D text-based CAPTCHA Logic Question are presented and discussed in this chapter. The following chapter will focuses on the conclusion and the suggestion for future enhancement.

## CHAPTER VI

### CONCLUSION

#### 6.1 Conclusion

A CAPTCHA is an acronym for "Completely Automated Public Turing test to tell Computers and Humans Apart" to differentiate human from machine. The function of CAPTCHA is to determine whether the human or BOT by giving the user an image with word, the user must key in the word in textbox for validation. For example Yahoo, Hotmail or Gmail implement the CAPTCHA in sign up process to avoid BOT from signing up a lot of free accounts.

As a conclusion, an implemented D & D with text based logic questions can overcome the problem in existing system such as the blur image, unknown text and distorted image. With drag and drop feature it can help to improve the user friendliness. This is because drag and drop is very easy for every human and no needs special analytical or technical abilities. Therefore, the aim of the proposed system is to allow user can fast and effective use the D&D CAPTCHA without causing any typing error. It is much more effectiveness and convenience to user by just drag the answer without needed to key in any words.

## 6.2 Future Enhancement

It is needed to enhance the system again although it is already fulfill the objectives and purpose of the system. Here is the future works that needed to do :

- 1) The features of the design should be design to the more GUI to make the system look attractive.
- 2) The database design of the system should be enhance more.
- 3) More functionality is needed to make the system look valuable in the market.

## REFERENCES

David Bushell, (2011). In Search of The Perfect CAPTCHA. Smashing Magazine.

David Pogue, (2012). Time to Kill Off Captchas. Scientific American.

Denso-Wave, (2011). QR Code Features. QR Code Essentials.

Lewis, (2007). CAPTCHA vs Human Logic. TYLERCRUZ.

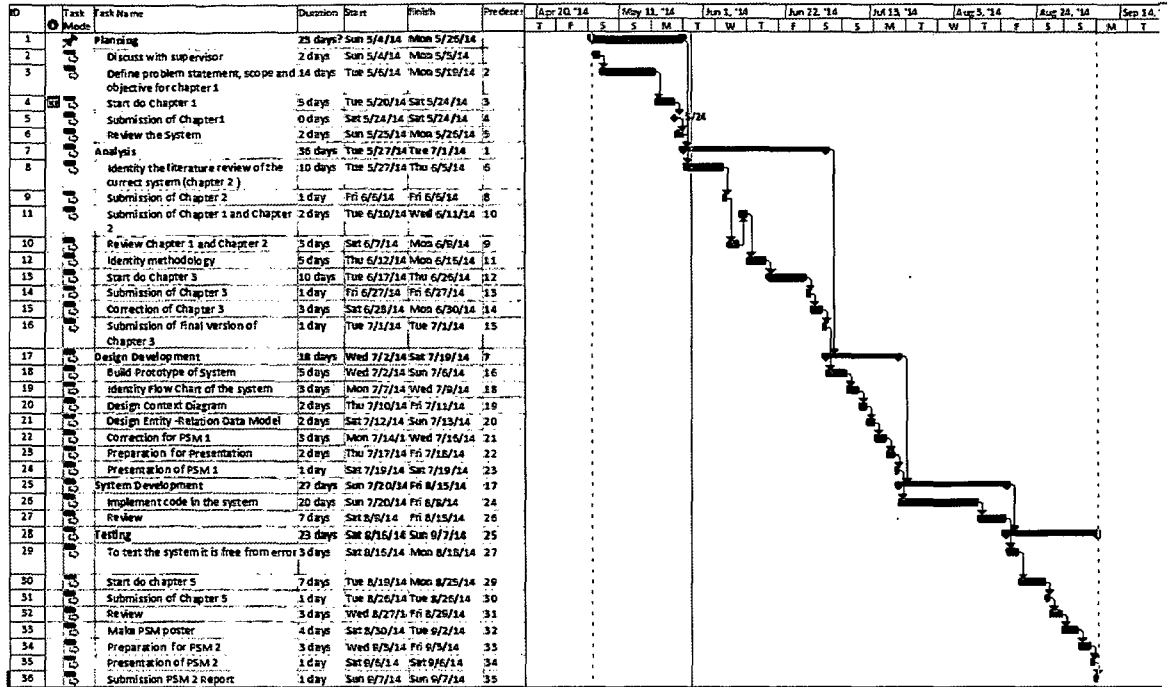
Luis Von Ahn, Benjamin Maurer, Colin McMillen, David Abraham, Manuel Blum, (2008). reCAPTCHA: Human-Based Character Recognition via Web Security Measures. Sciencemag.

Mackenzie Yang, (2013). The 6 Most Maddening Types of CAPTCHA. Time.

Shane McGlaun, (2014). Google Street View and reCAPTCHA Get Smarter with New Algorithm.

# APPENDIX A

## Work Schedule in Gantt Chart



# APPENDIX B

## Survey Form

1) Do you know what is Completely Automated Public Turing test to tell Computers and Humans Apart (CAPTCHA)?

- Yes
- No

2) What categories of CAPTCHA you have seen before ?( can choose more than one answer )

- CAPTCHA based on text
- CAPTCHA based on image
- CAPTCHA based on audio
- CAPTCHA based on video
- CAPTCHA based on puzzle



**3) What problems do you have when enter the CAPTCHA ?( can choose more than one answer)**

- Hard to identify due to the number of classes of characters and digits are very small.
- Visual problems
- Confuse of the image identification due to images blurring.
- Hard to identify actual arrangement of puzzles.
- Having the almost same similar sound of character.

**4) Do you agree that CAPTCHA can bring highest level of security by prevent the BOT attacks?**

- Yes
- No

**5) Do you think that implement a drag and drop feature in CAPTCHA is more ease of use?**

- Yes
- No