

**DESIGN AND DEVELOPMENT OF TENDER
MANAGEMENT AND MONITORING SYSTEM
(TMMS)**

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**BUSINESS INFORMATION SYSTEM (BIS)
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(TMMS)**

by

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Dissertation submitted in partial fulfillment of
the requirements for the
Bachelor of Technology (Hons)
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CERTIFICATION OF APPROVAL

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A project dissertation submitted to the
Business Information System Programme
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BACHELOR OF TECHNOLOGY (Hons)
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January 2014

CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or person.

(ABDUL AZZIM BIN ABDUL KUDDUS)

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ABSTRACT

Tender Management and Monitoring System (TMMS) is a server-based database system developed for Governance Unit, Project Procurement Management Department (PPMD), Technology and Engineering Division (T&E), PETRONAS. As it is a server-based database system, the application of the system would be using the intranet connection available in PETRONAS. The function carried out by the system are insertion, storing, modification and deletion of the databases regarding tender management. This system allocated storage for the user to save data in a systematic way. The objective of having this functionality is to enable a well-organized data storage for tender information within Governance Unit. In addition, the system would also include monitoring and flagging system. This system will automatically notified the user on several important information on tenders especially something related to submission of tender documents. On the other hand, monitoring and flagging system would enable the user to categorize the tenders into different categories based on selected criteria. Hence, the process of enhancing the job efficiency will easily be carried out using the system. The main objective having this system is to provide a system which will improve the efficiency level in the workplace. The methodology used in designing and development of the system is based on Database Management System Lifecycle. The system will be developed using web development software such as Adobe Dreamweaver with the implementation of PHP programming language for integration between web pages and databases. TMMS would also equipped with user interface that will aid the processes carried out by the system in an organized way.

TABLE OF CONTENT

ABSTRACT	vi
LIST OF FIGURES	ix
LIST OF TABLES	x
ABBREVIATION AND NOMENCLATURES	xi
CHAPTER 1	1
INTRODUCTION	1
1.1 Background of Study	1
1.2 Problem Statement	1
1.2.1 Monitoring Using Microsoft Excel is obsolete	1
1.2.2 Inefficiency of Management and Monitoring Process	2
1.3 Significant of the Project	2
1.4 Objective	3
1.5 Scope of Study	3
1.6 Relevancy of the Project	4
1.7 Feasibility of the Project	5
CHAPTER 2	6
LITERATURE REVIEW	6
2.1 Database Management System	6
2.2 Flagging System	7
CHAPTER 3	9
METHODOLOGY	9
3.1 Data Collection and Research Phase	10
3.2 System Development Phase	11
3.3 Related Database Diagram	15
3.3.1 Use Case Diagram	15
3.3.2 Entity Relationship Diagram (ERD)	16
3.4 Key Milestones	17
3.5 Project Gantt's Chart	18
3.6 System Architecture	19
CHAPTER 4	20
RESULT AND DISCUSSION	20
4.1 Research Findings	20
4.2 System Features	22
4.3 User Feedback	24

4.4	Software and System Used.....	25
4.5	System Design and Implementation	26
CHAPTER 6	35
CONCLUSION	35
6.1	Relevancy to the Problem Statement and Objectives	35
6.1.1	Monitoring Using Microsoft Excel is obsolete.....	35
6.1.2	Inefficiency of Management and Monitoring Process	35
6.2	Future Recommendation	36
6.2.1	Automatic Reminder System	36
6.2.2	Performance Review	36
REFERENCES	37

LIST OF FIGURES

<i>Figure 3.0</i>	<i>Methodology</i>	<i>9</i>
<i>Figure 3.1</i>	<i>Data Collection and Research Phase</i>	<i>10</i>
<i>Figure 3.2</i>	<i>System Development Phase</i>	<i>11</i>
<i>Figure 3.31</i>	<i>Use Case Diagram</i>	<i>15</i>
<i>Figure 3.32</i>	<i>Entity Relationship Diagram</i>	<i>16</i>
<i>Figure 3.4</i>	<i>Key Milestone</i>	<i>17</i>
<i>Figure 3.6</i>	<i>General System Architecture</i>	<i>19</i>
<i>Figure 4.3</i>	<i>User Feedback for TMMS</i>	<i>24</i>
<i>Figure 4.51</i>	<i>Code Tab for Web Designing</i>	<i>26</i>
<i>Figure 4.52</i>	<i>Homepage for TMMS</i>	<i>27</i>
<i>Figure 4.53</i>	<i>Overall System Flow</i>	<i>28</i>
<i>Figure 4.54</i>	<i>Administrator Account</i>	<i>29</i>
<i>Figure 4.55</i>	<i>Tender Secretary Account</i>	<i>31</i>
<i>Figure 4.56</i>	<i>Tender Input Account</i>	<i>31</i>
<i>Figure 4.57</i>	<i>Close up page for Tender Secretary</i>	<i>32</i>
<i>Figure 4.58</i>	<i>Tender Update</i>	<i>33</i>
<i>Figure 4.59</i>	<i>Tender Update cont'd</i>	<i>33</i>
<i>Figure 4.6</i>	<i>XAMPP as Database Server</i>	<i>34</i>

LIST OF TABLES

<i>Table 3.5</i>	<i>Project's Gantt Chart</i>	<i>10</i>
<i>Table 4.1</i>	<i>Overall Feedback for Interview</i>	<i>20</i>
<i>Table 4.2</i>	<i>Software and Programming Language Used</i>	<i>25</i>
<i>Table 4.3</i>	<i>Role for Tender Input and Tender Secretary</i>	<i>30</i>

ABBREVIATION AND NOMENCLATURES

APT	Average Processing Time
DBMS	Database Management System
ERD	Entity Relationship Diagram
FYP	Final Year Project
IS	Information System
IT	Information Technology
PPMD	Project Procurement Management Department
T&E	Technology and Engineering Division
TMMS	Tender Management and Monitoring System
UI	User Interface

CHAPTER 1

INTRODUCTION

1.1 Background of Study

Since the era of information and technology (IT) had risen, people start using computerized and intelligent system compared to the conventional one. Especially in business organization, people think that by using management system accelerate by IT would definitely make life easier.

The rising of E-Commerce are succeeded in making sure that the procurement processes in business organization work better. The accessibility offered by computerized management system make daily business activities involving procurement a lot easier.

Current system used in procurement department in most of business organization focus on maximizing the usage of Microsoft Excel. The features offered by Microsoft Excel are definitely good. But, how about trying something new? In this cases, the tendering processes monitoring and data entry are happen manually. In fact, stand-alone Microsoft Excel file might loss due to several factors such as file corrupted, storage data broken and failure in computer system.

Tender tracking is another vital process in procurement. An enhanced tracking system should be used in bigger business organization as they might have quite a numbers of tenders and contracts to track. However, using the conventional approach, some human error might have occurred thus lead to inefficiency and delay in works which unfortunately will result in some losses faced by the business organization.

1.2 Problem Statement

1.2.1 Monitoring Using Microsoft Excel is obsolete

Majority of procurement department still using Microsoft Excel as their main platform to store database. The information such as tender number, procurement value, tender owner, and several important dates are inserted into the system using

the ordinary table in Microsoft Excel. In this case, some of the data might be wrongly inserted as well as leading to data redundancy.

1.2.2 Inefficiency of Management and Monitoring Process

In some occasion, the people involved in data entry might not have a friendly user interface to help them insert data in systematic order. They have to key in the data in such a way that would lead to problems such as missing information, misspelled words, and incorrect format.

Current approach used for tender tracking purpose is time consuming. User need to open the file and monitor the progress and do the tracking process on their own. After identifying which tenders and contracts is due, they need to inform the person in charge manually. Therefore, it is better to have a tracking system that contact the person in charge for respective tenders automatically. It would undeniably reduce time consumed for tracking purpose.

1.3 Significant of the Project

Since Tender Management and Monitoring System (TMMS) offered both offline and online system, it can be accessed anytime and anywhere unless the internet connection are available. This system will provide a better way to manage database on tenders and contract within business organization. Since the system using its own storage, it store all the specific data for numbers of tenders and contract as wishes by the business organization itself.

In addition, the system would definitely provide a friendly user interface that would increase the efficiency of data entry process. Subsequently, the data entry process will no longer be a boring task to do and therefore, the human error in the process can be dodged.

Despite of just normal monitoring system, TMMS will also provide automatic monitoring, tracking and flagging system to track the current progress for tenders and contract. The system will automatically send a reminder in form of email to the person in charge in the tender and contract preparation as well as the tender secretary for specific threshold value. This special features will let the person managing the tender's

progression aware on the dateline of key milestone in the tender progression. Consequently, this features will lead to improvement in work efficiency and reduce the time consumption.

1.4 Objective

This project is all about developing a systematic web-based database and monitoring system for procurement department which include these specific objectives:

1. To provide a systematic web-based database system for data entry and storage.
2. To have tracking and flagging system equipped with the system for better monitoring purpose and improve efficiency in tendering processes.

This project is expected to fulfill these specific objectives.

1.5 Scope of Study

Developing this project would involving in several scopes. First scope include the processes and procedures occurred in tender cycle in project procurement management department. Before proceed with system development, knowledge on this matter should be obtained first. System development process can only started as soon as enough information is obtained. It is believed that this knowledge can best be obtained using interview sessions and self-experience approach.

Next scope involve throughout the process is on the development of the system itself. References need to be done first before deciding on what platform should be used for database system development. Looking at the features offered by the system, observation and differentiation between database developer platforms should be first priority. The information learned from this process should be stored for references in the future.

Focusing on the system development, another new scope of study is involved. In developing the system, learning focus on the syntax used in programming language. Error in writing programming language and coding would provide new knowledge for the developer. Enhancement in individual skills would lead to the betterment of the system development.

1.6 Relevancy of the Project

Developing TMMS will enable user to have systematic way of managing the database and tracking the progression for each tenders and contracts.

Applicable in workplace

The system will be used widely in workplace. Therefore, connectivity between computers and internet in the workplace will enable data sharing and easy database management. The system would not require high specification computer. Only networking between those computers and internet matter.

Simplicity as main focus

This system would enable user to minimize the effort. Thence, the simple database structure and user interface would help user in having better way to complete their task in smart ways. This system would also help in management and tracking purposes. The long queue of process can easily be reduced by this system. No more long procedures need to be followed in tracking the progression of tenders and contracts. It is just straight forward.

User Interface is at its best

Data entry would be assist by user friendly interface design offered by the system. More time can be saved in data entry process. In fact, the interface design for report function would be specific and precise.

1.7 Feasibility of the Project

Technical Feasibility

The development of TMMS would use simple platform that can be widely used in business organization. In addition, no further advancement in technology is needed for this system. As long as having connection to internet and intranet, the system would perform at its best.

In fact, most of the computer software currently updated to the latest version. Hence, the installation of this system in the future would not be a problem for the business organizations.

Operational

As the time allocation for TMMS to be completed is 28 weeks, the project development process can be finished within that time frame. Key milestones that contributed to this system also have been structured.

The development process of the system will be using the open source database application which is available in the market. There are references available for the system to be developed.

Economical

Development of TMMS will be able to reduce the cost. The development tools available nowadays would be used to develop the system. In the future, it is believed that operating cost can be reduced. Since there are no updates required for the computers to run this system, no additional cost required. However, cost incurred during the process of developing the system is still considered as reasonable and affordable.

CHAPTER 2

LITERATURE REVIEW

2.1 Database Management System

Database Management System (DBMS) is computerized-data keeping system (IBM, 2013). DBMS has been widely used in organization to help organizing the data in orderly structure. In enhancement of new data structure, DBMS is used to help the process. DBMS is a software that allows a computer to perform database functions of storing, retrieving, adding, deleting and modifying data (Chapple, Mike 2013). A few examples of DBMS include Microsoft Access, MySQL, Microsoft SQL Server, Oracle and FileMaker Pro. DBMS also implement relational model of tables and relationship. This system is widely used in order to systematically manage all the information within business organization. The application of DBMS will give several advantages to the user:

- ***Minimal Data redundancy***

In DBMS all the data within the organization or specific department is integrated and stored into a single database. No data duplication occurred. However, some data might be necessary to be redundant. In this case, user have complete control on data redundancy.

- ***Data Consistency***

Since data redundancy is reduced, data consistency can be achieved.

- ***Data Integration***

In DBMS, single database contains multiple tables. Those tables can be linked and connected using relationship.

- ***Data Sharing***

DBMS can allow several user which have been given authentication to access the information. In addition, several user can access the data simultaneously. The nature of DBMS would enable sharing between platforms.

2.2 Flagging System

Monitoring the progression of every tender is another important aspect that contribute to the development of this system. Current way of monitoring the progression of the tender is not efficient and can be improved.

Based on the survey done within PPMD, the flagging system is established as one of interesting method for categorizing the progression of the task especially in procurement (S Sook Yi, 2013). Top management level within organization also emphasized on the flagging system. It is believed that the flagging system will definitely bring more effect compared to normal monitoring system.

The implementation of flagging system is widely used in daily life nowadays. One of the implementation of flagging system used is in YouTube. In this case, YouTube used flagging function to determine inappropriate videos posted by the user. Based on (Google, 2013), they have special team that working on this flagging functionality and making decision either to remove the flagged video or keep them on. The flagging system itself enable YouTube team to come out with their decision within 24 hours, or maximum in a few days.

In addition, several characteristics have been identified by YouTube as their flagging criteria. Based on (Google, 2013) the criteria include:

1. **Graphic sexual activity**

"Graphic sexual activity" describes content which contains actual visible or implied sex acts.

2. **Nudity**

"Nudity" refers to exposed or see-through coverage of areas typically covered by a bathing suit or underwear. Sometimes nudity is allowed on YouTube, depending on the context.

3. **Suggestive, but without nudity**

"Suggestive" content refers to materials with sexual themes that do not necessarily depict sexual activity or nudity. Sexually suggestive content may not be suitable for all audiences and may include fetish-related content.

4. **Shocking or disgusting content**

"Shocking or disgusting content" refers to disturbing imagery, such as graphic depictions of violence, accidents or gore, which lack an appropriate context.

5. **Promotes hatred or violence against a protected group**

Hate speech is content that promotes or encourages hatred or violence towards a group based on race or ethnic origin, religion, disability, gender, age, veteran status and sexual orientation/gender identity.

6. **Harmful dangerous acts**

"Harmful dangerous acts" may include content which depicts behavior likely to cause serious injury or death to a third party.

These are example of flagging system used in YouTube. However, flagging system also used in the other sector such as biochemical sector. In one of the research by (Hitch & Pullan, 2011), an automated flagging system was designed and written into the laboratory computer system to alert technical staff to samples potentially affected by the 'hook effect'. The flagging system developed will enable the staff to determine the laboratory samples which affected by the 'hook effect'.

These are several implementation of flagging functionality. Since flagging system is another good function, it will be inserted as one of vital function in the system itself. The implementation of this idea would give a better way in monitoring the progression of the tenders efficiently.

CHAPTER 3

METHODOLOGY

Based on the allocated time for completion of the system the development phase chosen for this project is possible. In this project, two main phases are determined including data collection phase and database development phase.

In the development of TMMS, several vital phases are needed to make sure this project works as planned. The methodology for this project would be divided into two specialized phase.



FIGURE 3.0. Methodology

Data Collection and Research Phase

In data collection and research phase, all information regarding the system is derived from the user. The medium of getting information includes expert interview, survey, and feedback analysis. The process of information capturing would be occur first before development process begin. The impact of this phase is important as it will determine the function, implementation plans and database architecture for the system. In fact, during this phase, system developer would see in overall perspective on the system that will be developed.

System Development Phase

System development phase is a combination of few other processes. These processes then would be explain in a framework design including several significance steps in developing the system. In this phase, developer should come out with several big decision about the system. The system developer should choose which database platform to be used, what is the logical rules to be used throughout the system and the

programming language to be used. These decisions are done based on the information retained during the data collection and research phase.

3.1 Data Collection and Research Phase

In this phase, cooperation with user is vital for purpose of information gathering. In addition, the important information on the project such as proposed functions, implementation plans, suggested database platform and database architecture would be discussed during the phase.

Series of interview sessions with the user will be held to obtain the important information. The reason of choosing interview session as one of the research methodology is simply because the information received is specific and specialized. In this case, the efficiency of research can be achieved.

The importance of having survey as one of the research methodology is to collect information on the importance of tracking and flagging purpose in monitoring system. In this case, the information on the suitability of tracking and flagging properties for the system will be received easily using the survey.

The planned activities for this phase is explained in Figure 3.1.

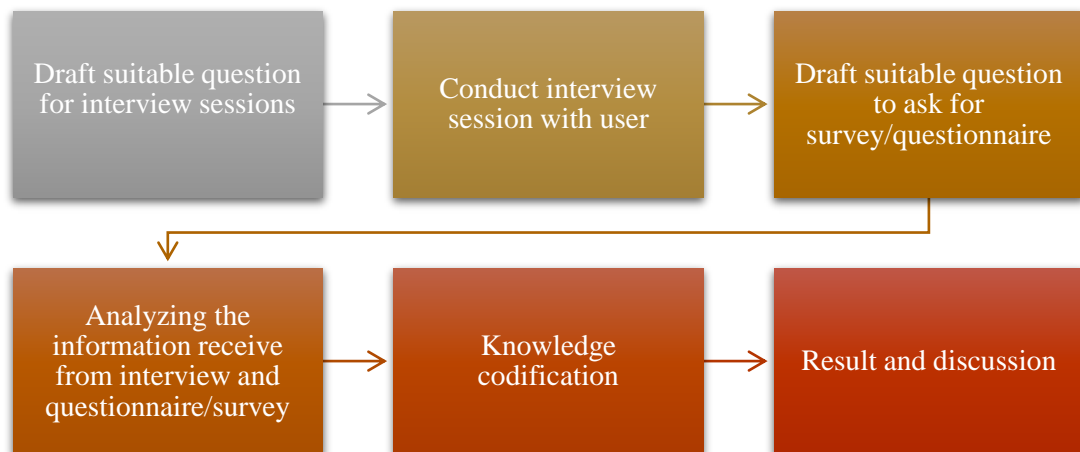


FIGURE 3.1. Data Collection and Research Phase

The final result based on this research will determine the specification of the developed system. The information received from this phase will improve efficiency during system development phase later on.

3.2 System Development Phase

Based on the chosen methodology which is **Database System Development Lifecycle**, the development phase of the system will focus on several key milestones that contribute to the project development. The flowchart of the system development will be as per explained in Figure 3.2.

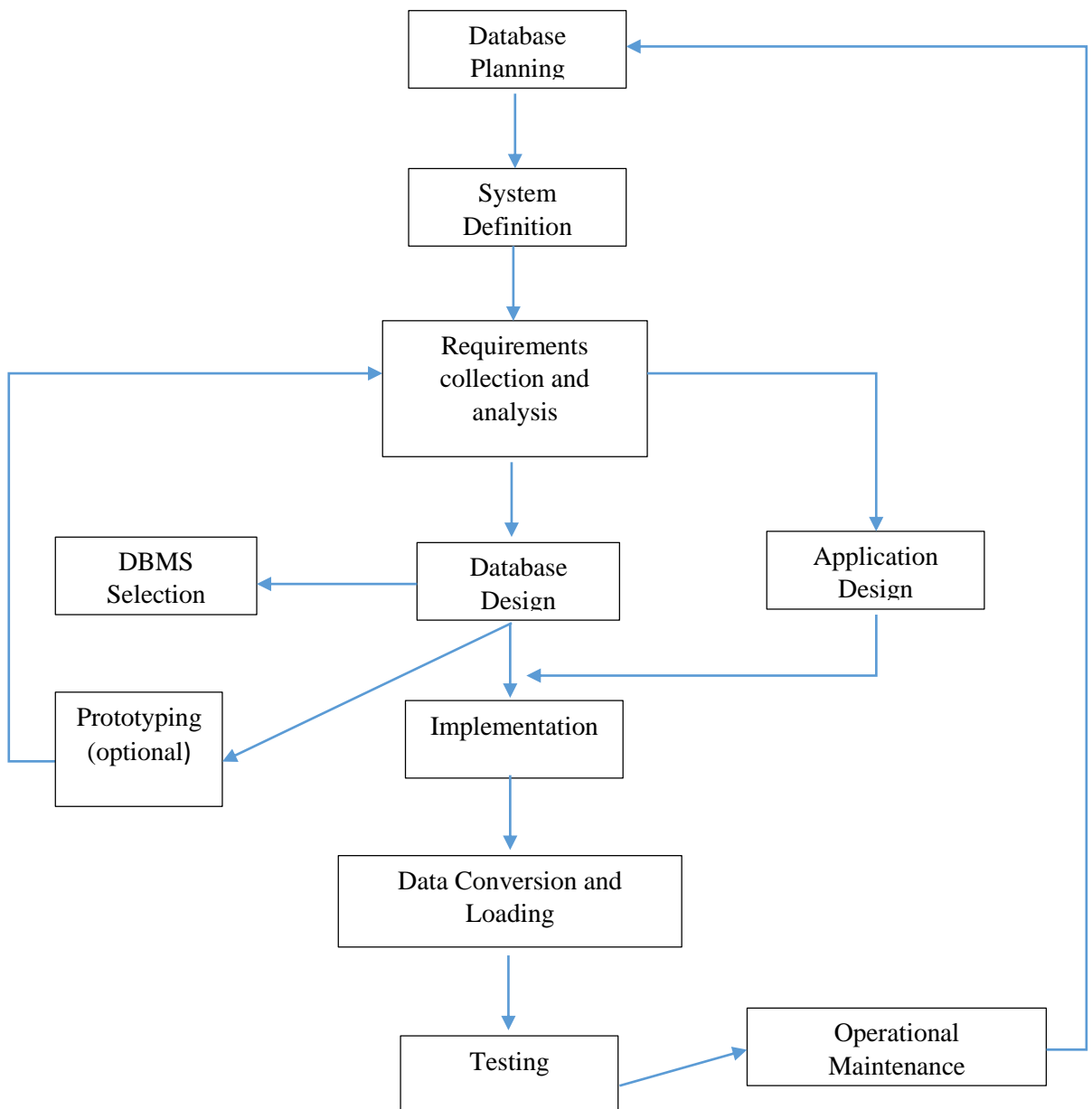


FIGURE 3.2. System Development Phase

In database planning, the database system development cycle will be realized as efficient and effective. During this phase, overall information system strategy used by the organization should be synchronized with the development strategy for the system. Here, activities involved are including defining the mission statement and the database for the system:

1. The main aim for database system
2. The function for database system
3. The supported function carry by the system
4. The resources of the database system

System Definitions

System definitions phase would allow the developer to set the scope and boundaries of the database application. The description would include:

- Links with the other information system within the organization
- What the planned system is going to do currently and in the future
- Who is the current and future user for the system

Requirements Collection and Analysis

In this phase, the developer will focus on how the resources and data received used in developing the system itself. The scope include:

- ✓ The description of the data to be used (What data?)
- ✓ The complete details on how the data will be used (How data is used?)
- ✓ Any additional information needed for the development of the system (Is the information sufficient?)

Database Design

In designing database, there are three possible steps involved:

1. Conceptual Database Design
2. Logical Database Design
3. Physical Database Design

Conceptual Database Design

In the conceptual database design phase, the model of the data to be used independent of all physical considerations is to be constructed. The model is based on the requirements specification of the system.

Logical Database Design

In the logical database design phase, the model of the data to be used is based on a specific data model, but independent of a particular database management system is constructed. This is based on the target data model for the database e.g. relational data model.

Physical Database Design

In the physical database design phase, the description of the implementation of the database on secondary storage is created. The base relations, indexes, integrity constraints, security, etc. are defined using the SQL language.

Database Management System Selection (optional)

This is an optional phase. If the current system used for database management should be changed, this is the part where developer analyze current drawback for current system and start deciding the new DBMS. The example of DBMS include Microsoft Access, Microsoft SQL Server, MySQL, and Oracle.

Application Design

In this phase, developer will focus on completing the suitable design for user interface. In addition, any additional function using the database system will defined during this phase.

Prototyping

The important aspect of prototyping is to make sure that the user to come out with features of the system by using computer.

Implementation

During this phase, the physical realization of the application design and database should considered done. This is where the developer starting to insert any programming language or logical case which are related to the system.

Data Conversion and Loading.

All the data from the old database system will be transferred to new database system during this phase.

System Testing

Before the new developed system is used and going to live, the process of testing should be done thoroughly. Some developer define this phase as error checking phase. The main objective is to find error!

Operational Maintenance

Operational maintenance phase can be best described as the monitoring and maintaining the database system. Monitoring will be focus on the performance of the system. If the system need improvement, so the developer would apply some possible improvement to the system so that it fulfill the required specifications.

3.3 Related Database Diagram

Before developing the project, several important documentation such as use case diagram, and entity relationship diagram are very important. These diagrams would later on helps in development process of the system itself.

Hence, throughout this project, this diagram would play important roles in assisting the development processes. The diagrams is portrayed in figures below.

3.3.1 Use Case Diagram

The use case diagram explain in detail what this system can provide to the user. This diagram also indicates that what privileges are granted for different log in accounts. As per figure below, there are 3 different log in available for the system which are system administrator log in, data entry level (also known as tender input log in) and tender secretary log in. Specific functions are defined for each account type as per explained in figure below.

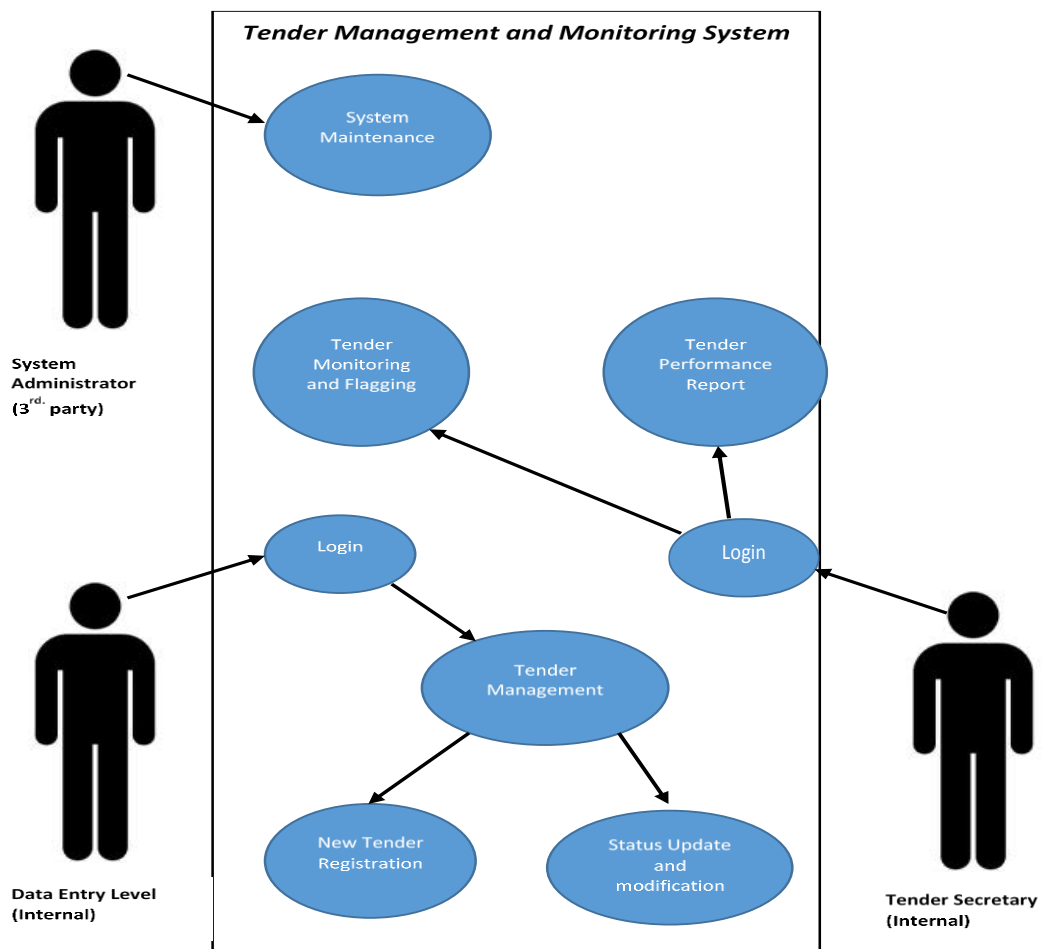


FIGURE 3.31. Use Case Diagram

3.3.2 Entity Relationship Diagram (ERD)

Entity relationship diagram (ERD), a graphical representation of multiple series of entities and their relationship between one another. To be exact this diagram commonly be used in database system to indicates the relationship between the entities.

The relationship between entities in database system can be divided into 3 different relationship category:

1. One-to-One
2. One-to-Many
3. Many-to-Many

Figure below explain the relationship between the entities in this database system. It also show how the entities are connected between one another. Different entities have different attributes. However, some attributes of an entity might become the foreign key in another entity.

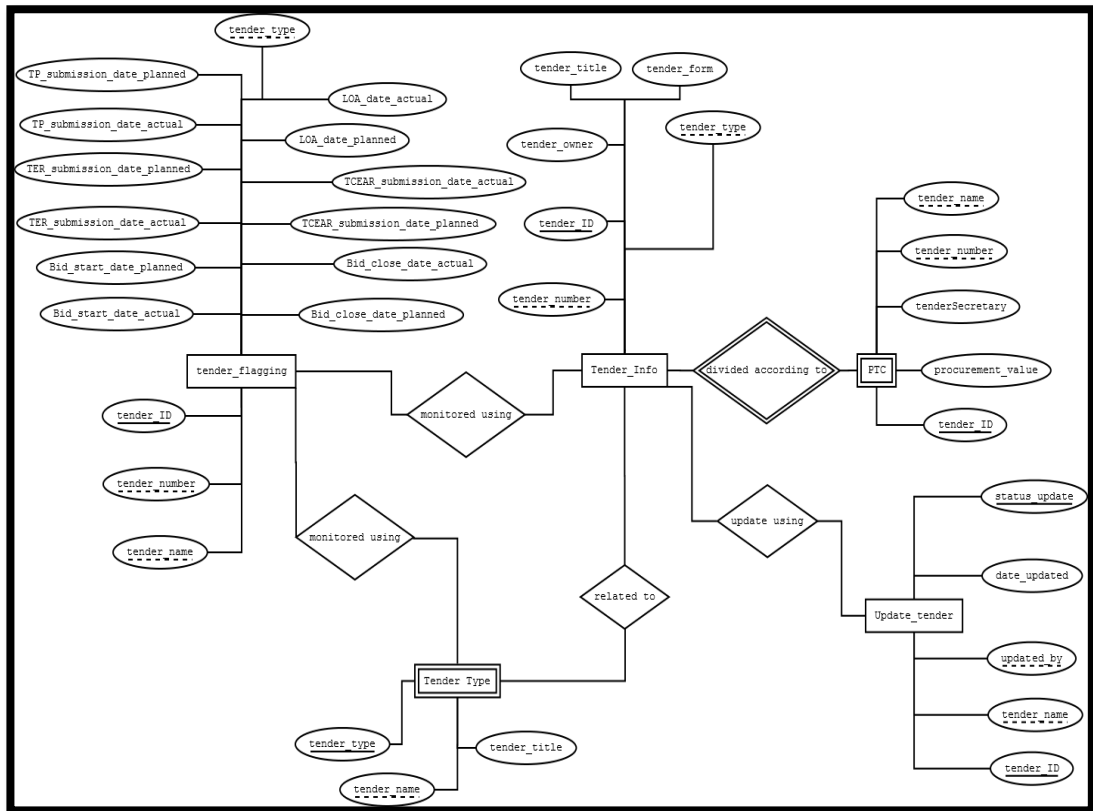


FIGURE 3.32. Entity Relationship Diagram (ERD)

3.4 Key Milestones

Based on both research phase and development phase, several key milestone is identified for the project. The suggested milestones explained in Figure 3.4

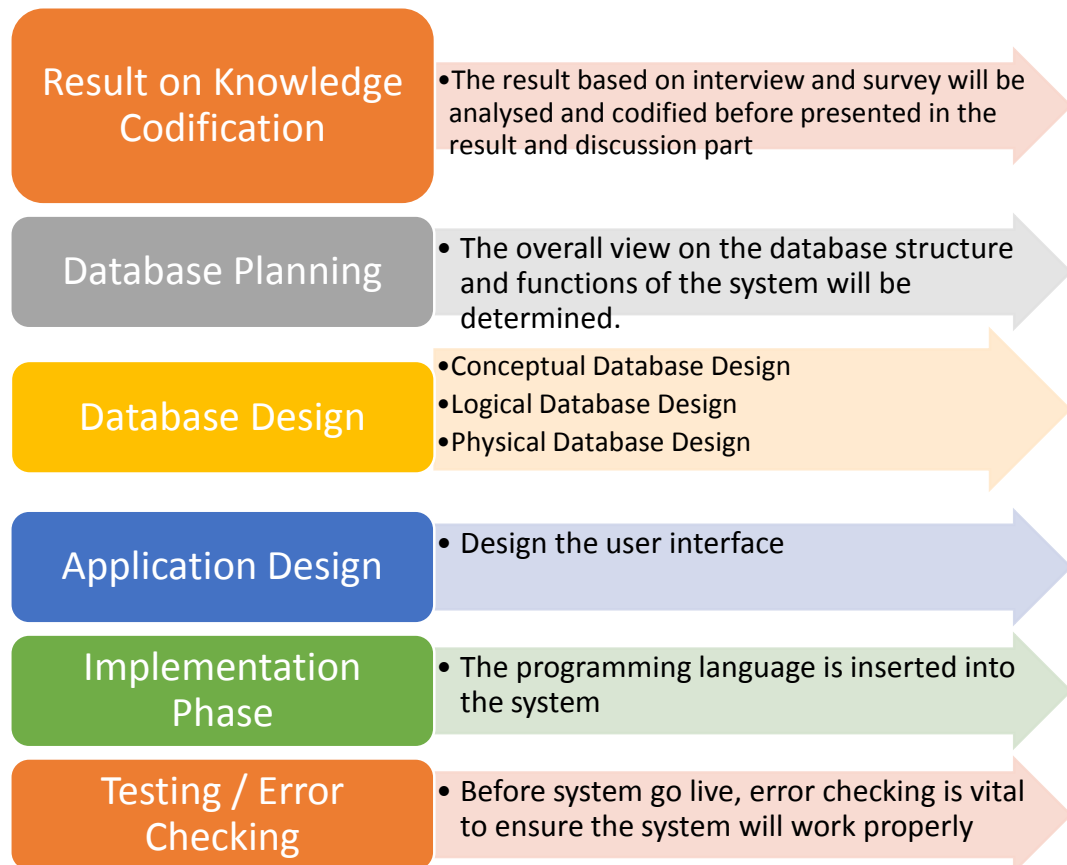
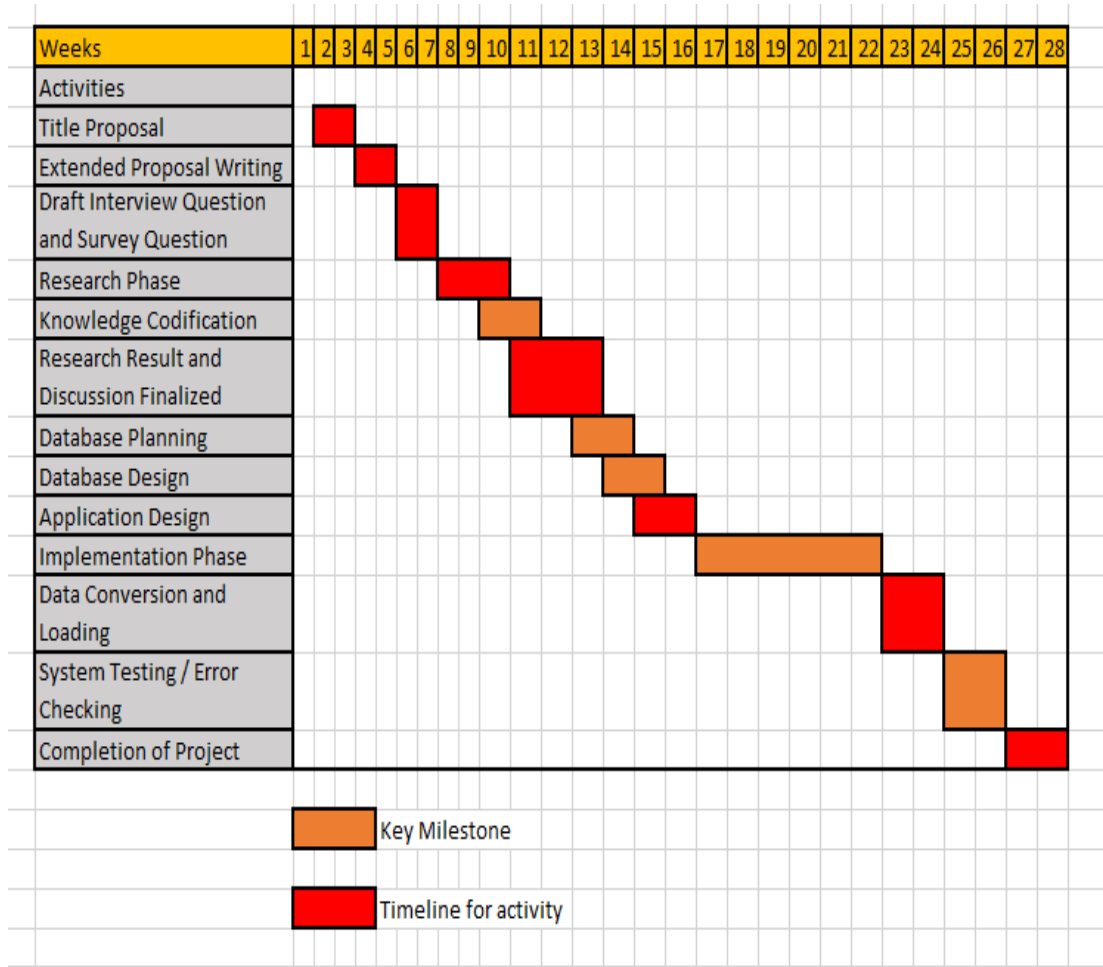


FIGURE 3.4. Key Milestones

3.5 Project Gantt's Chart

TABLE 3.5. Project Gantt's Chart



3.6 System Architecture

Figure 3.6 below show the general system architecture for the system itself. The system will directly connected to web database storage to store the data. When the system execute query based on user defined, the system would access all the data inside the database and provide output using web-page interface. This architecture would use multiple PHP scripts to run. The SQL query is codified inside the PHP script itself.

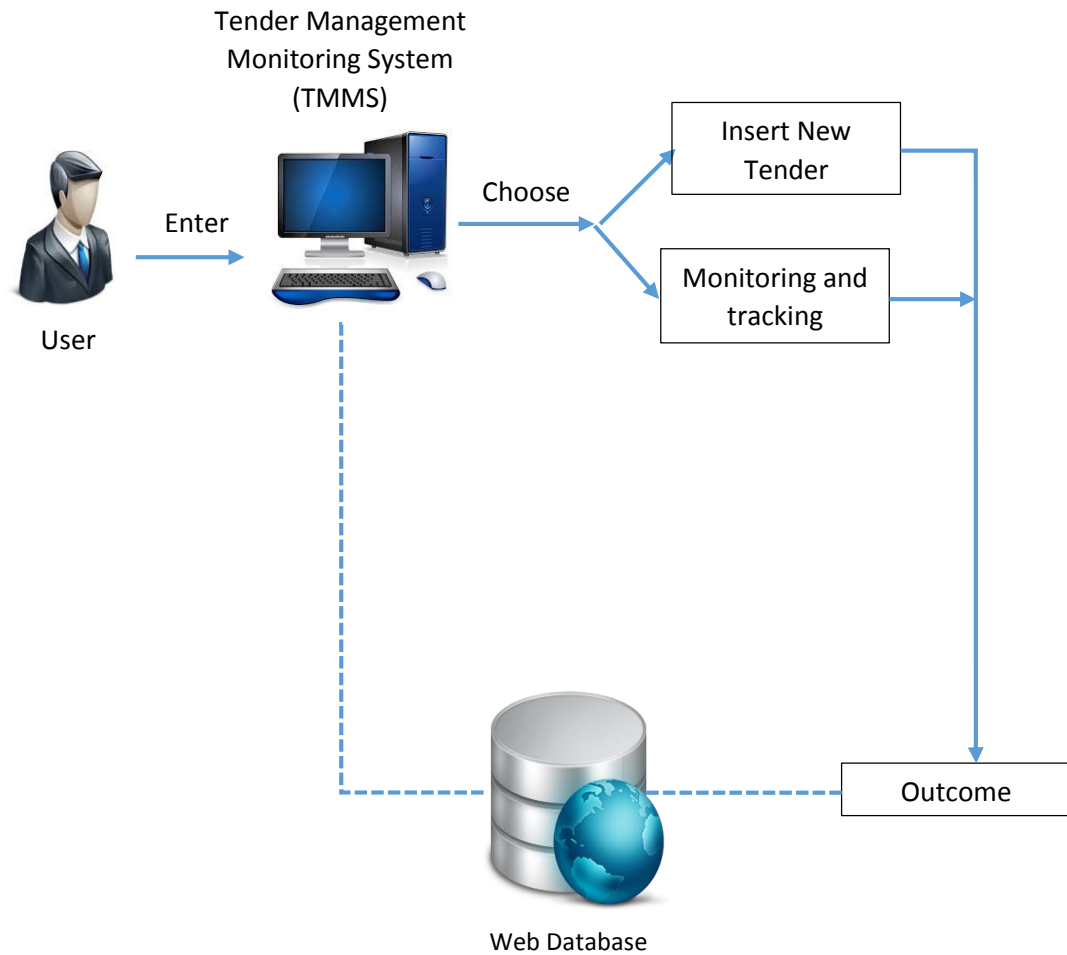


FIGURE 3.6. General System Architecture

CHAPTER 4

RESULT AND DISCUSSION

4.1 Research Findings

In order to collect more data related to the system developed, series of interviews and surveys with procurement experts has been conducted. The person involved in the interview is Ms. Shum Sook Yi, Seneral Manager for Governance Unit, PPMD, T&E Division, PETRONAS. In fact, the interview was conducted to get more information on several requirement on the system itself. The overall feedback about the interview session is explained in Table 4.1.

TABLE 4.1. Overall Feedback of the Interview

Scope of interview	Expert's answer
The importance level of the system	<ul style="list-style-type: none">• Less number of system available for tracking and monitoring tender make this system highly recommended and important.• 68% of procurement department within companies still using Microsoft Excel which is obsolete.
Current problem faced from the existing system	<ul style="list-style-type: none">• No back-up of data available. Since all the information on tender progression is stored in Excel file within the computer, if anything happen to the computer, no backup will available. Unless they have physical backup store somewhere else.• Time consuming. The process of tracking and monitoring tender progression will take more time and it is not efficient.

	<ul style="list-style-type: none"> • Input process is not efficient. Input process for data is not efficient. Since data is inserted manually into tables, user might wrongly inserted the data.
Suitable architecture for the system	<ul style="list-style-type: none"> • Web-based database. The installation process would be easier. • Both online and offline. If online version is available, the user can open the system anywhere as long as it is connected to the internet.
Security measures	<ul style="list-style-type: none"> • User need to log in to use the system. Unauthorized user will not have access to the system. • Admin log in. Only admin can grant access to the user. The user cannot used the system unless has been granted to use the system.

4.2 System Features

Data Storage

The developed system will let user to store the data on tender information in systematic way. The system will allocated spacious memory for user to store any information regarding the tender. In this system, the storage of the data will be categorized according to specification requested by the user.

Data Modification

Despite of storing new data, the system will provide function to modify the existing data. As example, any changes on the early information can easily edited using a user friendly interface. It would definitely help the process of modifying the information. In addition, in several situation where the status of the tender need to be updated, the system will provide a friendly mechanism for that purpose. In fact, the developed system will be equipped with numbers of status updates for the user to choose based on tender update requirements.

Monitoring and Flagging

This is a crucial part of the system itself. The flagging system is the specialty of the system. The target user for this function would possibly the tender secretary. User can straight forward sending reminder to the tender preparer regarding the submission of tender papers using email from the developed system. Despite of having manual reminder system, this system will notify the user on the out-scheduled tender and sent email as reminder straight to the tender paper preparer.

In addition, the progression of the tender will be categorized in three categories. Flagging function enable the user to determine which tender showing good progression and which tender are not. The color used as flagging are green, yellow and red. These color represent different status based on the current progression.

Green – Tender progression has 7 days or more from any nearest due date.

Yellow – Tender progression has less than 7 days from the nearest due date

Red – Tender progression has less than 3 days from the nearest milestone's due date.

User Friendly Interface

The developed system will come together with user friendly interface. This is to help all the process of insertion, modification, and deletion of data. In fact, the user interface used in monitoring and flagging function would help the user to understand throughout the process well. In this system, the interface would be a web-based interface to ensure that the interface would easily help user in the future.

4.3 User Feedback

A session of user testing has been done after the system completed. There are four question asked in order to check whether the development of this system achieve the objective or not. The participant of this survey are the staff of PPMD. Total participants involved in this session is 20.

The question includes:

1. Do you think that TMMS would possibly replace the current system used in tender management? (Microsoft Excel)
2. Do you think that the implementation of TMMS would possibly reduce the time taken to complete your task?
3. Do you think that the implementation of TMMS would possibly help the process of monitoring tender progression?
4. If possible, would you like the system to be implemented in the department?

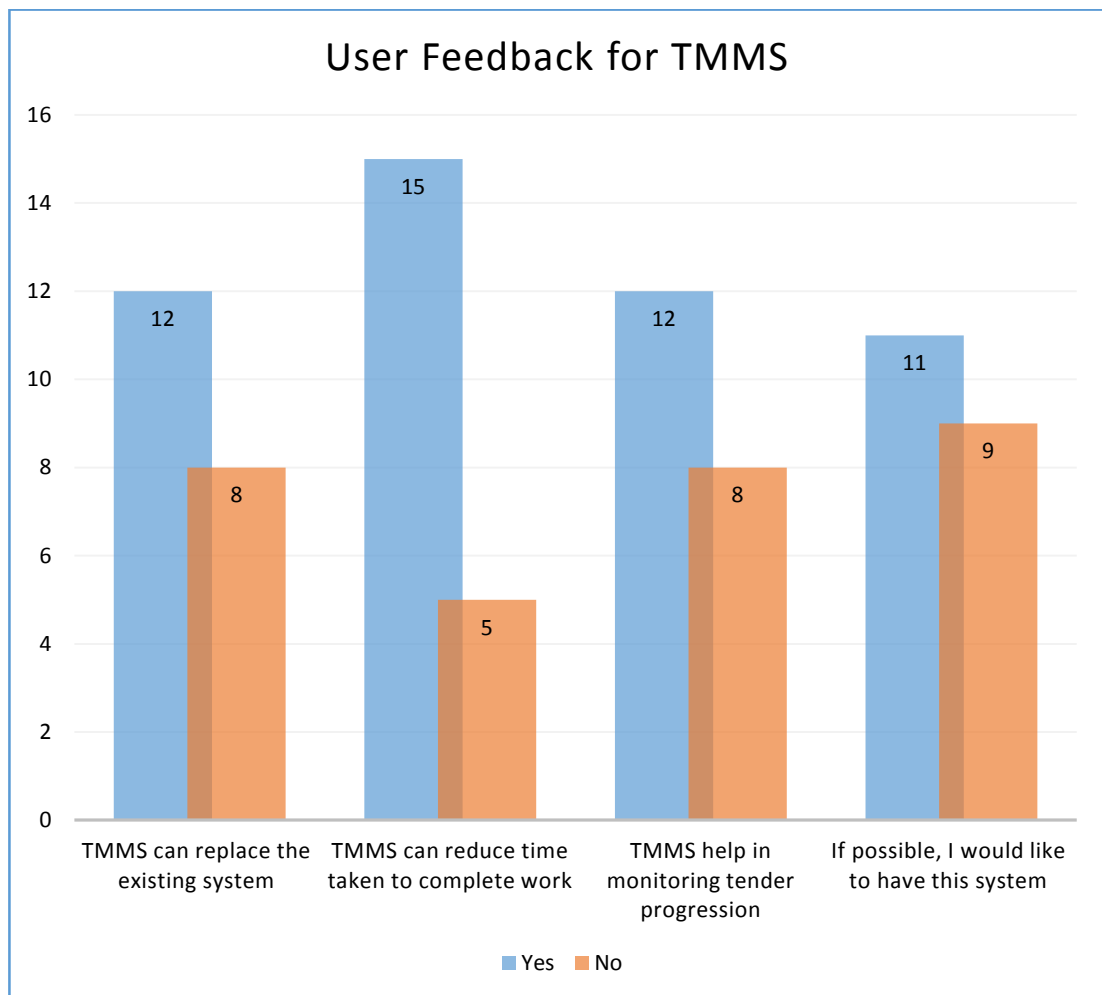


FIGURE 4.3. User Feedback for TMMS

4.4 Software and System Used

The list of software and application used for the development of the system is explained in table 4.2 below.

TABLE 4.2. Software and Programming Language Used

Software / Programming Language	Function
HTML	- Programming language used for developing the interface of the system.
PHP/SQL	- Programming language used for queries in database structure.
Notepad++/Adobe Dreamweaver	- User interface for the system.
XAMPP-MyPHPAdmin	- Software used as server for system development process.

4.5 System Design and Implementation

This section of the paper will explain about the development phase of the web application. For development process the developer used Adobe Dreamweaver and Notepad++ to write the necessary coding for the designing process of the system.

The usage of Adobe Dreamweaver and Notepad++ would help the developer designing the interface design in simplest way. The Notepad++ will help the developer especially when it comes to case related coding.

Figure 4.51 show the coding process for web designing and database integration. The developer able to improve the efficiency in coding by using Notepad++ and Adobe Dreamweaver compared to using the ordinary notepad.

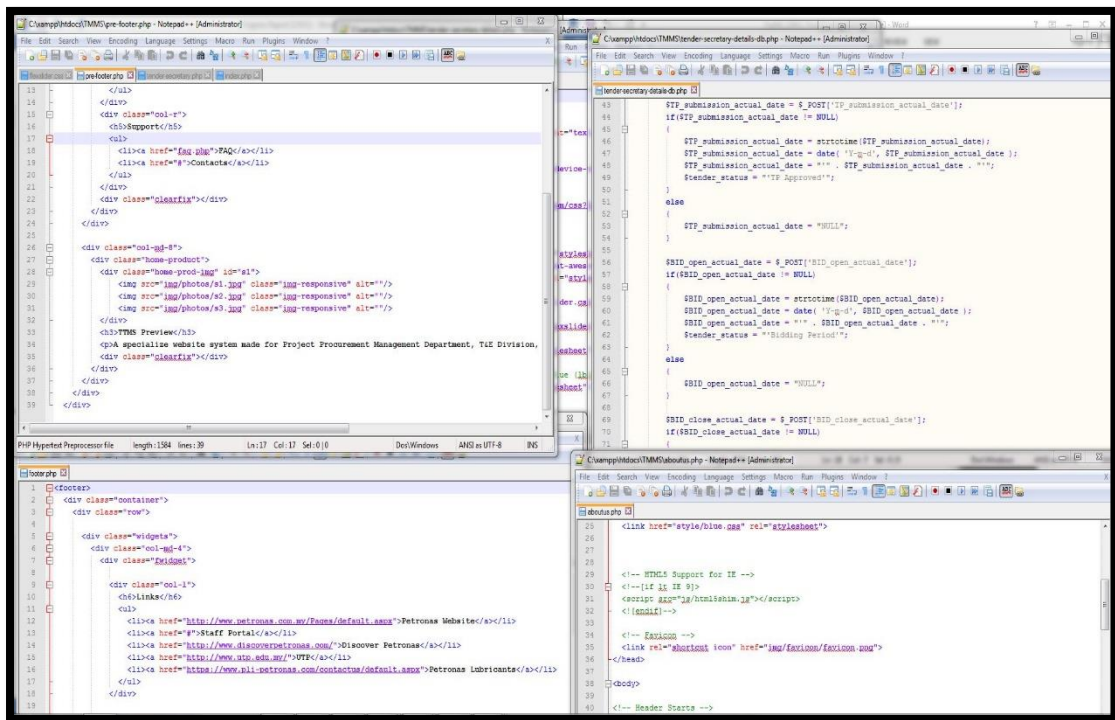


FIGURE 4.51. Code Tab for Web Designing

When user go to the URL for the system, there are several options available for the user to choose. The main page of the system is as per portrayed in figure 4.52 in the next page.

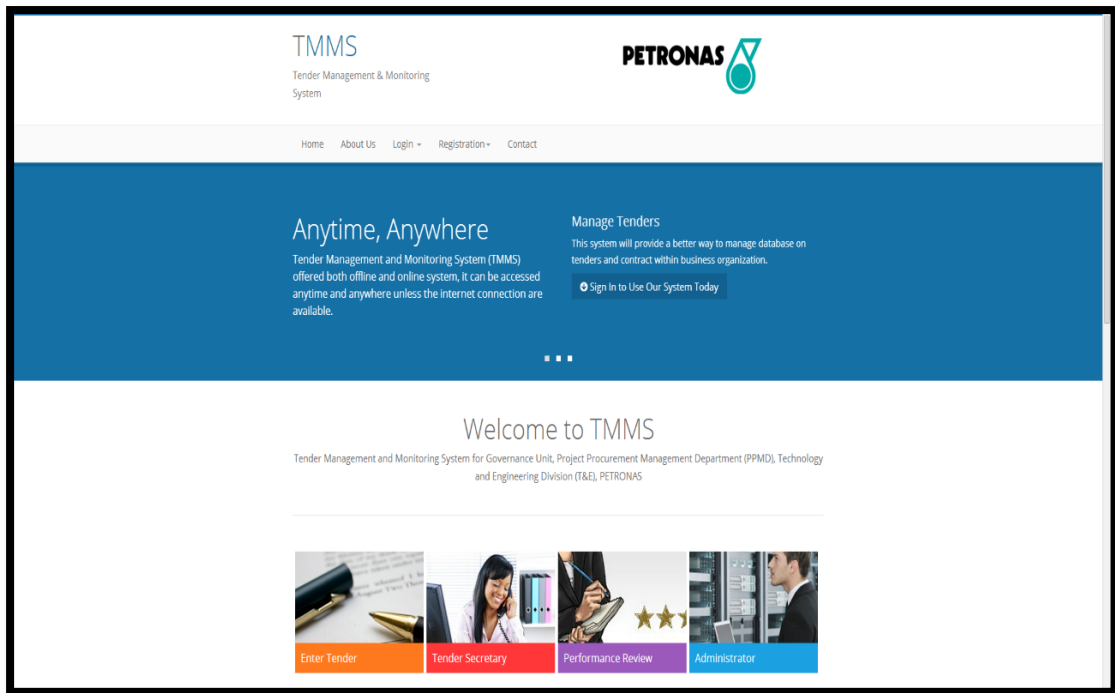


FIGURE 4.52. Homepage for TMMS

In the homepage, there are several explanation on what is the website is all about. It will also explained briefly on the key features offered by the system. There are multiple tabs available for user to choose such as Login, Registration, Contact and About US. Focusing on well-structured interface design, the interface is very interesting and equipped with colors and design. It also enable the user to go to another website related by clicking the link on the footer of this page.

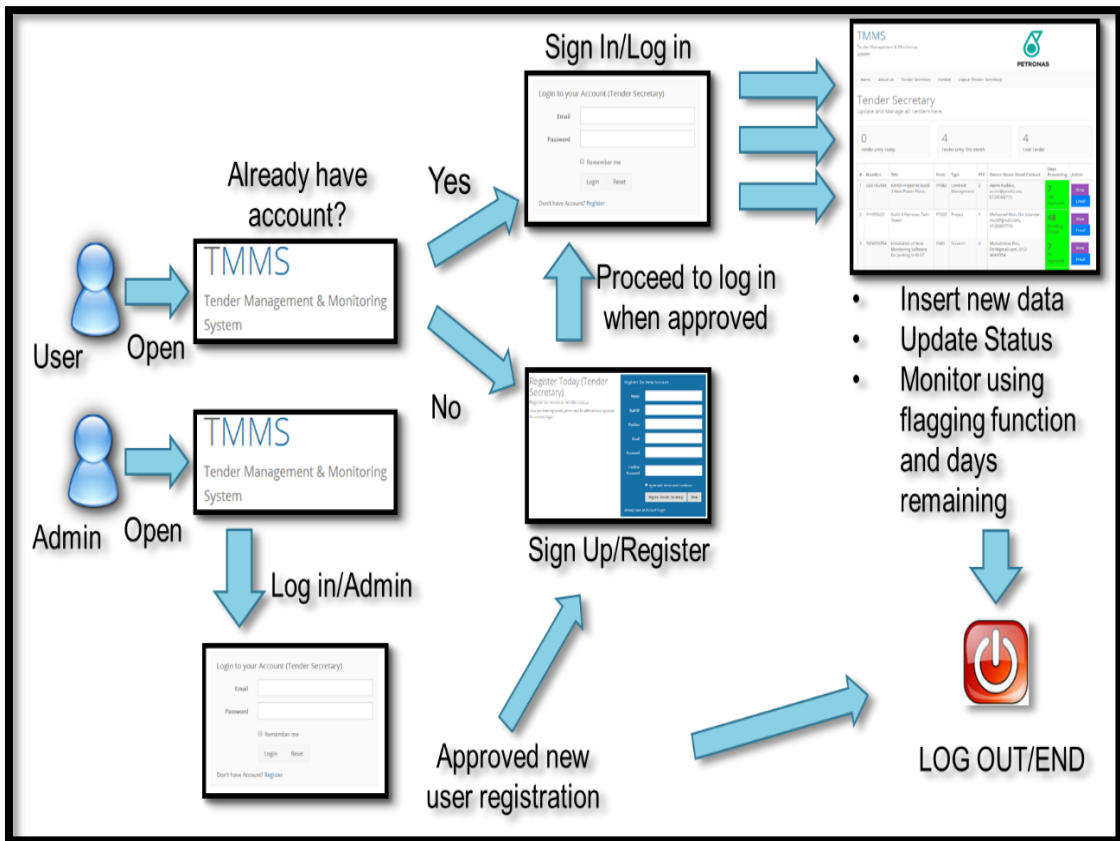


FIGURE 4.53. Overall System Flow

The overall system flow is as per explained in figure 4.53. There are two options available for the user. If the user is a new user, registration need to be done first before sign in into the system.

There are two type of log in available; user and administrator account. For user account, the type of login is divided into 2; tender input log in and tender secretary login. First of all, registration need to be done before the user have access to the system. Then, the new user registration will be viewed by the administrator for approval. Once the registration has been approved by the administrator, the user can enter the system using email and password prior to information given during the registration process.

Then, the administrator will grant access to the new registered user. Figure 4.54 located in the next page shows the screen shot of admin account.

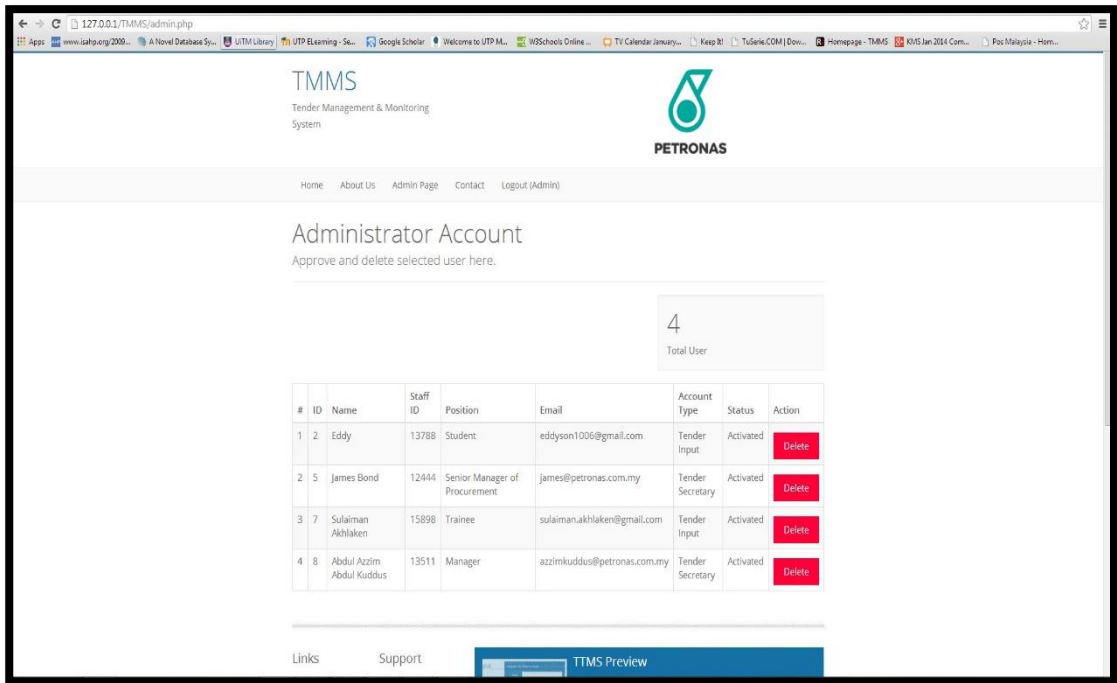


FIGURE 4.54. Administrator Account

As shown in figure 4.54, the admin can approve new user and delete the existing user. Hence, if the user is no longer using the system, admin will easily delete that account. There will be no more access from that particular user.

As per mentioned before, there are two log in page which are tender input and tender secretary log in page. The reason of having two type of log in features is because there are restriction for the user. The restriction is explained in table 4.3 in the next page.

TABLE 4.3. Role for Tender Input and Tender Secretary

User Account	Roles
Tender Input	<ul style="list-style-type: none"> • Insert new tender registration only. • Tender input will have no control over monitoring and tracking purposes as their role is only for data insertion.
Tender Secretary	<ul style="list-style-type: none"> • Tender secretary will have different roles. • Tender secretary will be given access to modify existing tender, and update the status of the tender. • For monitoring and tracking purpose, tender secretary will also able to see numbers of days remaining, current tender progression status and also flagging function for the tender. • Hence, it will help the process of monitoring and managing the tender progression.

Figure 4.55 and 4.56 in next page will show the screen shot of tender input account and tender secretary account respectively.

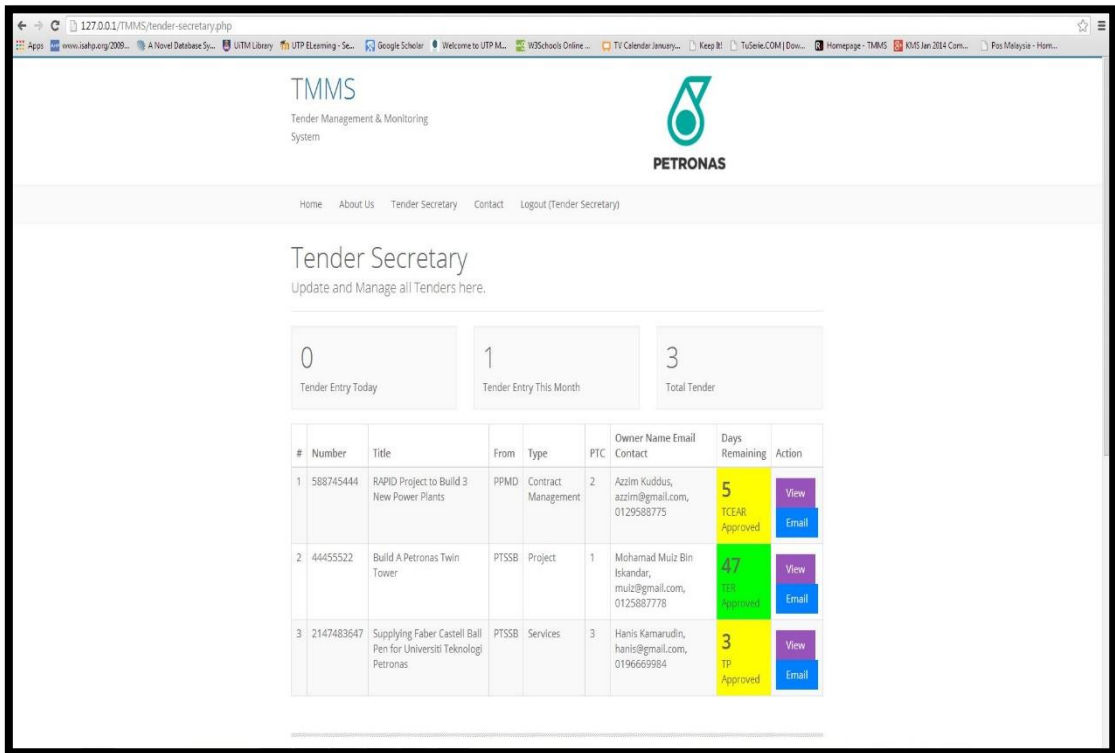


FIGURE 4.55. Tender Secretary Account

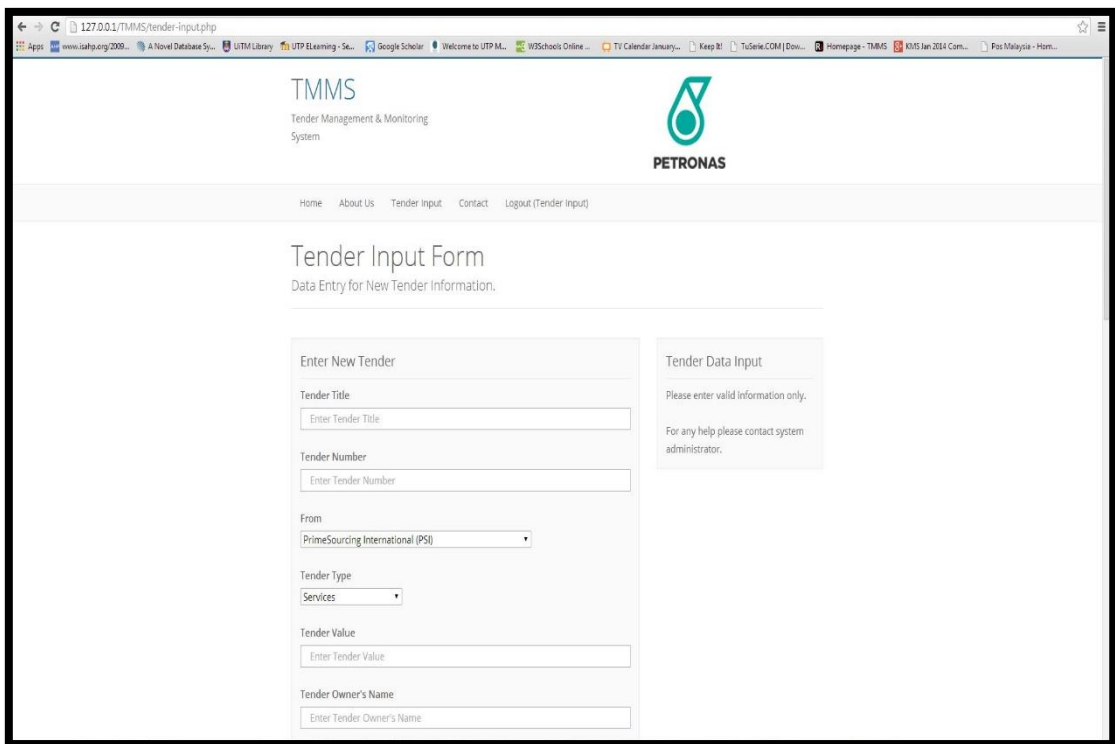


FIGURE 4.56. Tender Input Account

For tender secretary account, there will be an option for them to update the progression for the tender. The status update can be done by clicking the View button beside the days remaining and flagging function. Figure 4.57 below shows the close-up version of the tender secretary account.

Tender Secretary
Update and Manage all Tenders here.

0 Tender Entry Today 1 Tender Entry This Month 3 Total Tender

#	Number	Title	From	Type	PTC	Owner Name Email Contact	Days Remaining	Action
1	588745444	RAPID Project to Build 3 New Power Plants	PPMD	Contract Management	2	Azzim Kuddus, azzim@gmail.com, 0129588775	5 TCEAR Approved	View Email
2	44455522	Build A Petronas Twin Tower	PTSSB	Project	1	Mohamad Muiz Bin Iskandar, muiz@gmail.com, 0125887778	47 TER Approved	View Email
3	2147483647	Supplying Faber Castell Ball Pen for Universiti Teknologi Petronas	PTSSB	Services	3	Hanis Kamarudin, hanis@gmail.com, 0196669984	3 TP Approved	View Email

FIGURE 4.57. Close up page for Tender Secretary

By clicking the View button, tender secretary can update the progression by inserting the actual date for the tender progression. Once the actual date is inserted, the status update of the tender will automatically be updated. There are several status update available. The default status update will be TP Approval. Status such as TP Approved, Bidding Open, Bidding Closed, TER Approved, TCEAR Approved and LOA Awarded. In addition, this system will also inform the user on who is actually updating the tender progression for respective tender. The date and time of update, and the value of the tender will also be available for viewing. Not to forget, the system will also inform when the tender registered into the system.

For status update, the user need to choose the actual date for respective progression. Meanwhile, the planned date is available for references. As per stated before, once the user choose the actual date, click the update button and it will be updated automatically.

Further detail on this function is shown in figure 4.58 and 4.59.

The screenshot shows the TMMS (Tender Management & Monitoring System) interface. At the top left, it says "TMMS Tender Management & Monitoring System". On the top right is the PETRONAS logo. Below the logo is a navigation bar with links: Home, About Us, Tender Secretary, Contact, and Logout (Tender Secretary). The main heading is "Tender Details" with a sub-heading "View full details of tender here and update actual date here." Below this is a table of tender details:

Number	Title	From	Type	PTC	Owner Name Email Contact	Days Remaining	Action
2147483647	Supplying Faber Castell Ball Pen for Universiti Teknologi Petronas	PTSSB	Services	3	Hanis Kamarudin, hanis@gmail.com, 0196669984	3 TP Approved	Email

Below the table is another section with the following data:

Tender Value	Updated By	Updated At	Tender Creation Date
RM1000	Name: Abdul Azzim Abdul Kuddus Staff ID:13511	2014-04-08	2014-04-02

FIGURE 4.58. Tender Update

The screenshot shows the "Update Tender Info" form. It contains several sections for updating dates:

- TP Submission Planned Date:** 2014-04-03
- TP Submission Actual Date:** 08 / 04 / 2014 (with a note: Eg: 19/12/2013)
- BID Open Planned Date:** 2014-04-10
- BID Open Actual Date:** [Dropdown] / [Dropdown] / [Dropdown]
- BID Close Planned Date:** 2014-04-20
- BID Close Actual Date:** [Dropdown] / [Dropdown] / [Dropdown]
- TER Submission Planned Date:** 2014-04-25
- TER Submission Actual Date:** [Dropdown] / [Dropdown] / [Dropdown]
- TCEAR Submission Planned Date:** 2014-05-01
- TCEAR Submission Actual Date:** [Dropdown] / [Dropdown] / [Dropdown]
- LOA Planned Date:** 2014-05-10
- LOA Actual Date:** [Dropdown] / [Dropdown] / [Dropdown]

At the bottom of the form are "Update" and "Reset" buttons. To the right of the form is a "Tender Data Input" box with the text: "Please update the date according to their arrangement. This will ensure the system works properly. For any help please contact system administrator."

FIGURE 4.59. Tender Update cont'd

The database part for this project is done using PHP scripts. During the development phase, the developer use offline mode for better editing and enhancement purpose. The software used during development to act as a server is XAMPP. Figure 4.6 shows the usage of XAMPP during development phase as a server.

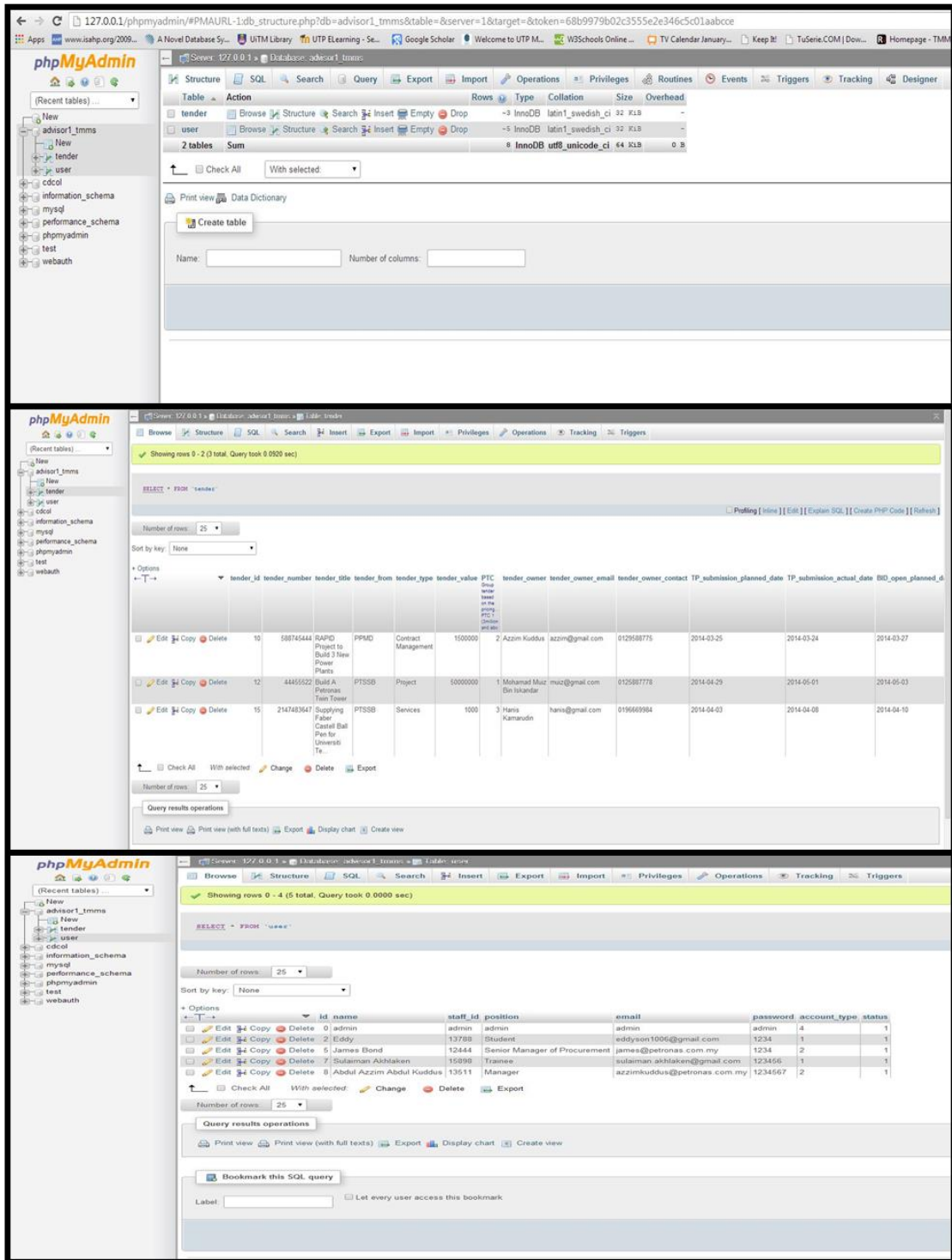


FIGURE 4.6. XAMPP as Database Server

CHAPTER 6

CONCLUSION

As per explained earlier in this document, this paper explained on the design and development of tender management and monitoring system for Governance Unit, Project Procurement Management Department, Technology and Engineering Division, PETRONAS. The development of this system would enable a systematic way on managing and monitoring tender progression within the department itself.

Referring to Chapter 1, in section 1.2 and section 1.4, this system would solve the problem happen by offering a management and monitoring system as per discussed in both earlier section respectively.

6.1 Relevancy to the Problem Statement and Objectives

6.1.1 Monitoring Using Microsoft Excel is obsolete

As per explained previously in earlier chapter, this project is basically developed to replace the current system used for tender management and monitoring purpose which is using Microsoft Excel file.

The idea of having this project will definitely help in some possible ways such as keeping the data secured, availability of recovery and data backup, and systematic way of data management.

6.1.2 Inefficiency of Management and Monitoring Process

The process if management and monitoring process would be easier with the usage of web-based database system. This project used web application as the interface of the system while the database is stored in server.

The key features of this system which is tender flagging and tracking functions enable the user to know the number of days remaining and also the flag color of the tender itself. This is the part where the intelligence capability of the system replace human roles traditionally. In fact, these functions will definitely reduce number of time taken to track the progression of the tender in the list.

The status update function in fact provide the user with features to keep track on the latest status of the tender. It would definitely improve the tendering process efficiency as per expected by the company.

6.2 Future Recommendation

As for future recommendation for the system, it would be better if few key features are implemented into the system itself.

6.2.1 Automatic Reminder System

Automatic reminder system is system which can sent the email directly to the tender owner itself. Hence, it will also reduce the time taken to follow up the tender owner on reminding about the deadlines. The system would do it for you. This recommendation is feasible since most of the system used nowadays have this feature especially banking system such as CIMB CLICKS and Maybank2u.

6.2.2 Performance Review

In the future, this system would be upgraded by installing another feature for performance review.

This feature will enable the higher management level to see overall performance of the tender. Hence, now strategies and initiatives can be done to improve the performance of the tender in the list.

In addition, this function will help by displaying the performance evaluation using graphical method such as line graph, bar graph, pie-chart and others.

In this specific function, the target user is actually the top management level. The system will provide a comprehensive monitoring platform. On the other hand, the system will also provide complete report on the progression of each tender such as number of days taken to complete the tendering processes, Average Processing Time (APT), and deadlines for required tender paper submission.

As a conclusion, this system would believe to replace the current system used in order to increase the efficiency in management and monitoring tenders for the department. In the same time, the system also expected to fully maximize the usage of IS and IT in businesses.

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